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Assessment of Firms' Financial Resilience against Pandemic and Disaster Shocks in Albania

June 2021



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Abbreviations

CBR	cash burn rate
CFO	cash from operations
DaR	debt at risk
EaR	employment at risk
EBIT	earnings before interest and tax
EBITD	earnings before interest, tax, and depreciation
EBRD	European Bank for Reconstruction and Development
EBT	earnings before tax
EU	European Union
FCI GP	Finance, Competitiveness and Innovation Global Practice
GDP	gross domestic product
GoA	Government of Albania
ICR	interest coverage ratio
INSTAT	Albanian Institute of Statistics
MSMEs	micro, small, and medium enterprises
SECO	Swiss State Secretariat for Economic Affairs

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Executive Summary



OVERVIEW AND OBJECTIVE

Over the period 2019–21, Albania had to confront dual shocks: the 2019 earthquake and the COVID-19 pandemic. Both had sizable impacts on the country's economy. The COVID-19 pandemic took a heavy toll on an economy already affected by the earthquake in 2019. Key sectors were put in lockdown in the second quarter of 2020, and the economy suffered a severe contraction of -10.6 percent in gross domestic product (GDP). The pandemic hit the travel, tourism, and other services sectors first; then mobility restrictions and post-COVID-19 behavior changes affected firms' supply and demand. Given the structure of the economy, the associated loss in sales and profits had a disproportionate effect on small and medium enterprises (World Bank 2021b).

Vulnerable to disaster risks, Albanian firms have significant physical asset values at risk. The main perils responsible for losses include flash floods (30 percent of losses), floods (28 percent), earthquakes (19 percent), and landslides (11 percent) (World Bank 2020c). An estimated lek 1.8 trillion (US\$17.6 billion) of commercial, industrial, and agriculture assets are at risk of floods and earthquake, according to the AIR Worldwide catastrophe risk model for Albania.¹ A 1-in-100-year earthquake could cause total damage of lek 48 billion (US\$469 million, or close to 3 percent of GDP) to these assets, while a flood event of the same magnitude could cause lek 28.2 billion in damage (US\$275 million, or 1.8 percent of GDP). These events could also result in long periods of interruption to business activities, signaling potential indirect losses of firms' revenues. The most recent (2019) earthquake caused US\$168 million in losses and damage to the commercial sector; 3,534 businesses were impacted, including 300 businesses in manufacturing and 414 in trade (World Bank 2020c).

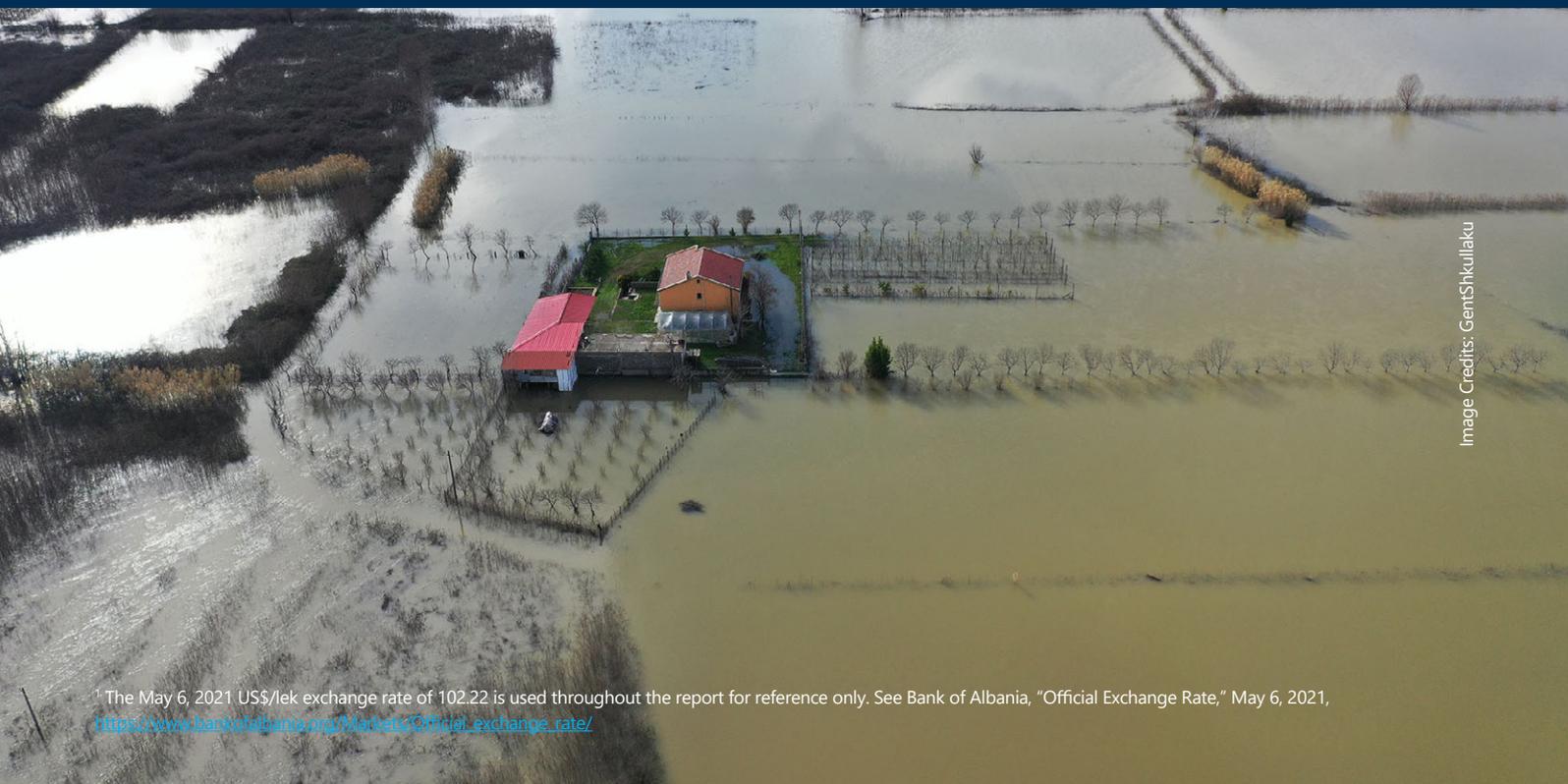


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¹ The May 6, 2021 US\$/lek exchange rate of 102.22 is used throughout the report for reference only. See Bank of Albania, "Official Exchange Rate," May 6, 2021, https://www.bankofalbania.org/Mercato/Official_exchange_rate/

A significant share of the costs for response and recovery related to the dual shocks was shouldered by the Government of Albania (GoA). These include significant support to affected businesses which suffered reduced revenues and damaged assets. Increased spending, including on earthquake reconstruction, alleviated the impact of the pandemic on poverty. Albanian authorities introduced wage subsidies, increased social spending, and launched two credit guarantee windows through commercial banks to ease salary payments and release financing for working capital and investment needs. Public spending rose to 33.2 percent of GDP. To help small and medium enterprises, tax deferrals and further value added tax exemptions were introduced.

Public support is justified due to a combination of market failures, but the fiscal cost is significant. The scale of the pandemic shock has been unprecedented. Given the low penetration of catastrophe insurance in Albania, there is a potential gap in private funding that can cause mass firm closures and layoffs in similar events. Without interventions to help avoid unnecessary layoffs and firm bankruptcies, there could be significant negative externalities costs due to the loss of long-term relationships between firms and workers that would be difficult to rebuild and loss of income that will prolong the recession. At the same time however, the scale of support put a significant strain on government budget. Total public revenues slumped to 26.5 percent of GDP, despite grants financing reconstruction (World Bank 2021b), which may prove to be unsustainable in future shocks.

The GoA is making efforts to be better financially prepared for future shocks while strengthening the resilience of the private sector; this analysis will support these efforts. The recovery from the earthquake and COVID-19 pandemic offers an opportunity to strengthen government's and businesses' financial resilience to disasters, including climate-related events, by taking a green, resilient, and inclusive development path. Initial steps have been taken to develop a comprehensive disaster risk financing program, one that defines post-disaster priorities and combines different sources of funds to address disasters of different frequency and severity. Increasing the resilience of the economy to disasters could help mitigate the GoA's contingent liabilities due to disasters, or explicitly set the amount of such liabilities up front.

With the aim of further strengthening firms' financial resilience, this report presents the findings from stress tests carried out to determine firms' financial vulnerability to pandemic and disasters shocks; it also quantifies the liquidity needed to support firms in overcoming such shocks. The objectives of the assessment are twofold. First, it aims to model the impact of exogenous shocks to revenue and physical assets on firms' profitability, liquidity, capital structure, and debt vulnerability; based on these findings, it seeks to understand vulnerabilities to employment and government revenues. Second, it quantifies the demand for funding to support viable firms from falling into bankruptcy due to liquidity shortfalls. The exercise can inform governments' financial planning by (i) quantifying the funding demand to address liquidity shortfall; and (ii) estimating the (up-front) cost of different fiscal/financial support packages. The stress test exercise is based on financial filings at the National Business Center by a large sample (about 10,000) formal firms in 2019. Using the country's disaster profile and the COVID-19 shock experience as an illustration of potential future shocks, it quantifies overall changes in firms' financial health due to drops in revenue and asset damages. The exercise also identifies the characteristics of the most severely affected firms, including size, age, manager's gender, sector, and geographical location.



KEY FINDINGS

Under the impact from pandemic and disaster shocks, and in the absence of any government interventions, firms are projected to become less liquid, more leveraged, and less profitable. Compound shocks substantially impact firms' coverage ratios; the number of firms that do not have the ability to cover short-term debt is likely to increase three times: from 2,500 firms under baseline to more than 7,000 firms.² In addition, firms' profitability is projected to fall significantly.

² Firms unable to cover short-term debt are those with a ratio of earnings before interest, tax, and depreciation (EBITD) to short-term borrowings of less than 0.5.

The share of profitable firms may decline from 57 percent at baseline to 23 percent under a pandemic and national-scale disaster. Shocks from a pandemic and national disaster could force 44 percent of firms into overleverage (defined as the ratio of liability to assets greater than 0.75), up from a baseline of 36 percent. In financially vulnerable firms—those that are highly leveraged, with a low current ratio, and inadequate interest coverage³—up to 30,000 jobs could be at risk in this scenario. The loss in tax revenue is also severe: reduced firm profit can cut the government's corporate income tax revenues by more than 60 percent.

Compound shocks could send a large share of firms into a liquidity crunch and cause the cash flows from operations to contract quickly due to collapse in revenues. Without external cash funding, firms would have to burn their cash reserves on balance sheets to cover these losses. Despite relatively high baseline cash reserves among firms, the number of firms with a cash burn rate (CBR) in the -1 to 0 range—that is, those that generate negative cash flows and would burn their cash reserves in less than a year—increases substantially under shocks. Estimates suggest that total funding needs for one year of liquidity for all firms could rise to lek 767 billion (US\$750 million) in the pandemic shock scenario and to lek 868 billion (US\$849 million) in the compound pandemic and disaster shock scenarios. As a share of GDP, the liquidity funding gap for all firms would rise from under 1 percent under no shock scenario to about between 13 percent and 52 percent of total GDP. Many of the firms with low liquidity were already financially vulnerable prior to the shocks, however. Restricting to financially viable firms,⁴ the funding gaps amount to between 1.6 and 3.4 percent of GDP in different shock scenarios (table ES.1).

The estimated impact on firms' financial vulnerability differs significantly depending on firm size, firm age, and manager's gender. Under compound shocks, large firms are more impacted by reduced profits, high debt burden, and high share of employment at risk, likely driven by asset damages and the relatively more importance role of fixed assets. Both male- and female- managed firms may become much less financially resilient following compound shocks, but the share of employment at risk is higher for female-managed firms. Young firms may become disproportionately more financially vulnerable under pandemic and disaster shocks. Among firms with negative profit, the share of younger firms (less than five years old) is slightly lower than the share of older firms; but the share of younger firms with less than one year of liquidity and current ratio under 1 is consistently higher than that of older firms. The share of employment at risk among young firms is also higher, at 16 percent compared to 13 percent for older firms.

By region, firms in Lezha are projected to be the most vulnerable; by sector, the most vulnerable are in transport and food and accommodation services. By almost all financial indicators, Lezha has the highest share of firms that become vulnerable under compound pandemic and disaster shocks: 79 percent of firms will have negative profits; 81 percent will have earnings unable to cover annual interest expense; 39 percent will have liquid assets unable to cover short-term liabilities; 49 percent will have insufficient liquidity to cover one year of operational costs; and 18 percent of total employment will be at risk. This is partly driven by the region's weaker financial performance at baseline.

Table ES.1. Total funding needs for one year of liquidity (as a % of GDP), by scenario

Scenario:	Base	Pandemic	Disaster - National Level	Disaster - Regional Level	Pandemic & Disaster - National Level	Pandemic & Disaster - Regional Level
Liquidity funding gap - all firms	0.49	45.76	13.78	13.74	51.75	51.70
Liquidity funding gap - viable firms (% GDP)	0.36	2.05	1.60	1.57	3.41	3.37

Note: GDP is 2019 nominal GDP

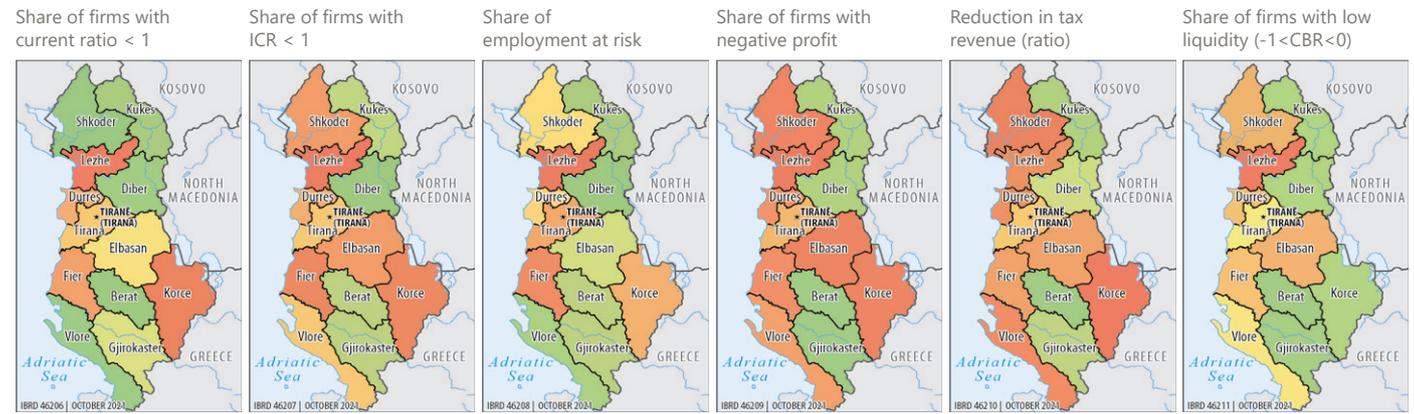
³ Financially vulnerable firms are those with a liabilities-to-assets ratio greater than 0.75, a current ratio less than 1, and an interest coverage ratio less than 1.

⁴ Financially viable firms are defined as firms with at least five employees, with ratio of net debt to earnings before tax of less than 4 or operating profit margin greater than 1 percent.

Albania's main economic centers—Tirana, Durrës, and Vlorë—have medium vulnerability in terms of share of vulnerable firms. Food and accommodation services are exposed to the highest liquidity risk and have the highest share of loss-making firms following the shocks: 91 percent of such firms are projected to have negative profit, 91 percent to have

insufficient earnings to cover interest payments, and 61 percent to have insufficient cash flow to cover one year of operating costs. Both the transport sector and food and accommodation are projected to have the highest reduction in tax revenue and share of employment at risk (see figure ES.1 for further information).

Figure ES.1. Financial vulnerability by region and sector under compound shock (pandemic and regional disaster)



Source: World Bank staff estimates.

Note: ICR = interest coverage ratio; CBR = cash burn ratio. ICR indicator in heat maps is defined as ratio of earnings before interest, tax, and depreciation (EBITD) to short-term borrowing. Red, yellow, and green represent high, medium, and low vulnerability respectively: red corresponds to higher (worse) values of the financial indicators; yellow corresponds to medium values, and green corresponds to the lowest values (color intensity is proportional to the range of values of the indicators).

Compound shocks could further exacerbate the debt vulnerability of firms and potentially translate into financial sector vulnerabilities. For the sample of firms analyzed, the combined pandemic and disaster shock could increase debt at risk (including both bank and nonbank debt) by almost lek 15 billion (US\$391 million) among firms that meet the three vulnerability criteria.⁵ This translates to 2.25 percent of GDP or 6.55 percent of total domestic credit to the private sector. Given the level of credit provided to firms, some of these debts could potentially translate into nonperforming loans as the crisis prolongs. Overall, total debt at risk as a percent of total credit to the private sector would increase by 2.5 percentage point in the compound shock scenario (table ES2).

Firms' worsened earnings have an impact on government's revenues. Negative shocks cause contractions in firms' earnings before tax, which in turn lead to reduction in the amount of corporate income tax payable to the government. Government's tax revenues from firms are likely to decline accordingly. A compound shock from a pandemic and national-scale disaster is likely to plunge 74 percent of firms into the red, doubling the number of firms with negative profits in the base case and cutting the government's corporate income tax revenues by more than 60 percent.

Table ES.2. Total Debt at Risk by scenario

Scenario:	Base	Pandemic	Disaster - National Level	Disaster - Regional Level	Pandemic & Disaster - National Level	Pandemic & Disaster - Regional Level
Total Debt at Risk (lek billion)	23.31	27.33	35.92	35.94	37.82	37.83
Total Debt at Risk (% of GDP)	1.39	1.63	2.14	2.14	2.25	2.25
Total Debt at Risk (% of domestic credit to private sector)	4.04	4.73	6.22	6.23	6.55	6.55

Note: GDP and domestic credit to the private sector are in 2019 nominal values.



OPTIONS TO STRENGTHEN FIRMS' FINANCIAL RESILIENCE IN ALBANIA

The GoA could consider a number of policy options, as they undertake measures to support firms' recovery from the COVID-19 pandemic, to strengthen their financial resilience against future shocks. The GoA could consider a strategic approach to support firms' financial resilience following pandemic and disaster shocks as part of its effort to develop a national disaster risk finance program. Such a strategic approach would require establishing a set of fundamental building blocks, including (i) a clear vision and priorities for financial protection of firms, (ii) development of data

infrastructure and analytics to inform policy decision-making, (iii) a mix of financial instruments that can be accessible to firms in times of shocks, (iv) an enabling policy and regulatory framework, and (v) mechanisms for implementation, delivery, and monitoring and evaluation. The GoA could also consider a more holistic approach to financial resilience that takes into account other interconnected risks that could potentially compound the impacts on firms.

The assessment provides estimates of government's up-front costs for three support instruments: tax deferrals, lines of credit, and credit guarantees. Total cash funding required to ensure that 5,204 financially viable firms survive one year could go up to lek 34 billion (US\$332 million) under a pandemic scenario.⁶ This amount could increase by 66 percent—to lek 56.5 billion (US\$552 million)—under a compound pandemic and national disaster scenario.

⁵ These are liabilities-to-assets ratio greater than 0.75, current ratio less than 1, and interest coverage ratio less than 1.

⁶ Viable firms are defined as firms with at least five employees, with ratio of net debt to earnings before tax of less than 4 or operating profit margin greater than 1.

A one-year tax deferral could amount to lek 0.9 billion (US\$8.8 million) under a COVID-19 scenario and lek 1.5 billion (US\$14.6 million) under a compound COVID-19 and natural disaster shock. This estimate takes into account the various tax rates applied to firms with varying levels of revenue. For different shock scenarios estimated using differing methods, the costs of government support through credit guarantees range from lek 2 billion (US\$19.5 million) to lek 36 billion (US\$352 million). Potential contingent liabilities of the government for providing full credit guarantees to access lek 34 billion (US\$332 million) of banks' credit could amount to lek 21 billion (US\$205 million) for all viable firms under pandemic scenarios.⁷ In terms of GDP

and assuming full deferrals of corporate income taxes, the cost of support for viable firms through credit guarantees ranges between 0.002 percent and 2.16 percent of GDP in different scenarios and based on different valuation methods (see Table ES.3).

[Analytical underpinnings can help policy makers better target and design interventions.](#) Policy makers could consider a range of instruments for providing support, including grants, guarantees, concessional lending, trade finance, increased bank lending, factoring, and tax credits and deferrals. Easing financial conditions and exercising regulatory forbearance

Table ES.3. Cost of credit guarantee to financially viable firms (as a % of GDP) by scenario

Scenario:	Base	Pandemic	Disaster - National Level	Disaster - Regional Level	Pandemic & Disaster - National Level	Pandemic & Disaster - Regional Level
Cost of Guarantee after tax deferrals - Present Value Method	0.03	0.15	0.12	0.12	0.26	0.26
Cost of Guarantee after tax deferrals - Black Scholes Method	0.002	1.11	0.77	0.77	1.92	1.91
Cost of Guarantee after tax deferrals - Jump Diffusion Method	0.07	1.26	0.90	0.90	2.15	2.14

Note: GDP is 2019 nominal GDP

might be necessary as long as conditions remain difficult. Measures should be transparent and time-bound. Targeting support to the firms most affected and deserving can help preserve scarce fiscal resources and ensure that firms receive an adequate level of support in line with their immediate needs. Different criteria can be used for prioritization. For example, financially viable firms in Albania also pay higher wages at baseline, which may be correlated with higher labor productivity. Examples of less complex criteria include young firms, firms integrated in trade or global/local value chains, or firms in innovation-intensive sectors. Young firms in particular have been shown to contribute more than older firms to net job creation in Albania, yet they are also projected to be more vulnerable under compound shocks. The assessment can also help in targeting and operationalizing credit guarantee schemes launched during the COVID-19 pandemic as well

as in designing insurance solutions for businesses.

[As firms face increasing risk of climate change and disasters, and governments face increasing fiscal constraints, the GoA could consider crowding in private capital through "greening" and de-risking of instruments that will be used to support firms' recovery.](#) Specifically, green, resilient, and inclusive elements could be mainstreamed in the instruments that will support firms; and financial protection elements could be embedded in these instruments to strengthen firms' resilience in the face of future shocks that allow the participation of private capital. An example would be to open new windows under credit guarantee schemes to allow guarantees of new loans that meet environmental, governance, and social standards, and embed a risk-sharing mechanism to lessen the exposure of these schemes to climate and disaster risks.

⁷ Calculations use the Black Scholes and jump diffusion methods.

1. An Overview of Albanian Firms before the COVID-19 Shock



FIRMS' DISTRIBUTION

Formal firms in Albania are dominated by micro, small, and medium enterprises (MSMEs), in both the number of firm numbers and employment.⁸ Large firms defined by asset size account for 3.1 percent of total firms and 15 percent of total formal jobs; defined by employment size, large firms account for less than 1 percent of total firms and 11 percent of total formal jobs. MSMEs make up the majority of firms and contribute to over 85 percent of total formal employment in Albania's private sector.

Image Credits: GentShkullaku

⁸ The analysis in this study is based on a sample of 10,486 formal firms that provided formal statements for 2019 to the National Business Center. More details on the data used for this study can be found in the section 5. Micro firms have fewer than 10 employees or lek 5 million to 15 million in assets; small firms have 10 to 50 employees or lek 15 million to 150 million in assets; medium firms have 50 to 250 employees or lek 150 million to 750 million in assets.

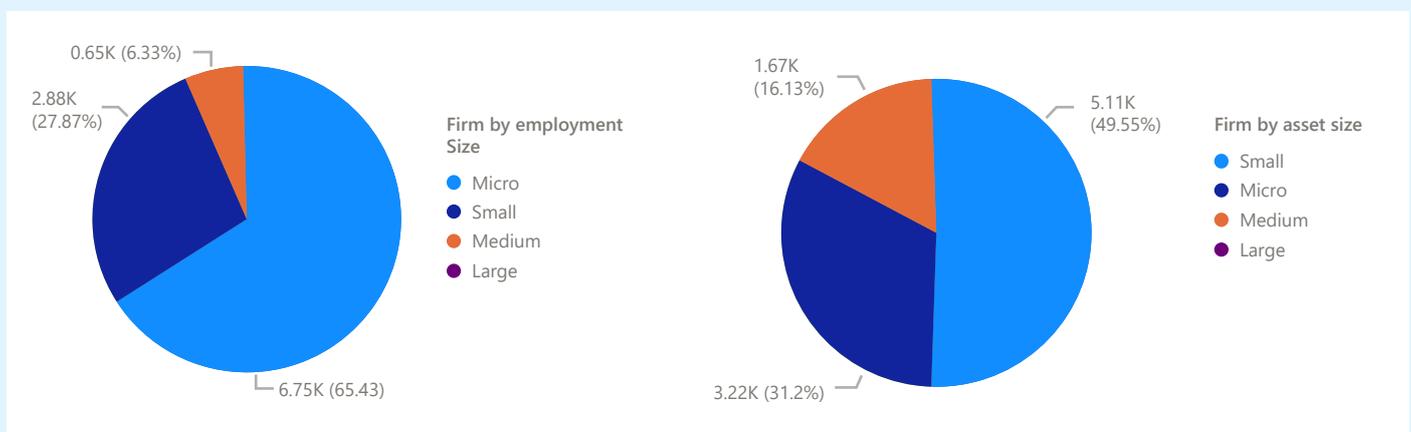
Most of Albanian firms are in the nontradable services sector. Around 70 percent of firms, most of them MSMEs, operate in the wholesale and retail, construction, and other service sectors. Large firms tend to concentrate more in the manufacturing sector. The main driver of job and output growth, however, has been in export-oriented manufacturing and services such as tourism and business process outsourcing. Between 2013 and 2017, more than half of export growth came from information and communications technologies and travel and tourism, and another 13 percent from textiles and footwear (O'Brien and Lu 2020). However, these sectors are being hard hit by the COVID-19 pandemic, which has shut down international travel and caused the European Union (EU) market—Albania's largest trading partner—to contract (see further details below).

Women are underrepresented in firm management. Female-managed firms represent only 18.6 percent of total firms. MSMEs account for at least 97.5 percent of female-managed firms, and more than half of female-managed firms are in wholesale and retail and other services. These firms contribute 19 percent of total jobs created in Albania, 90 percent of which can be attributed to MSMEs. By region, Tirana has the highest share of female-managed MSMEs at 59.9 percent, followed by Durres (9.5 percent) and Vlora (6.4 percent).

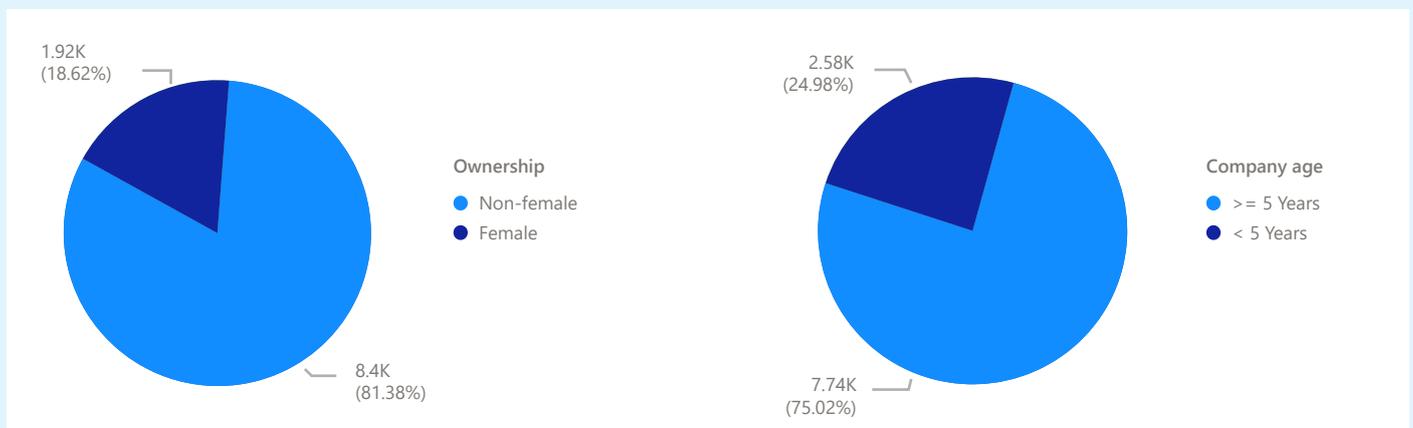
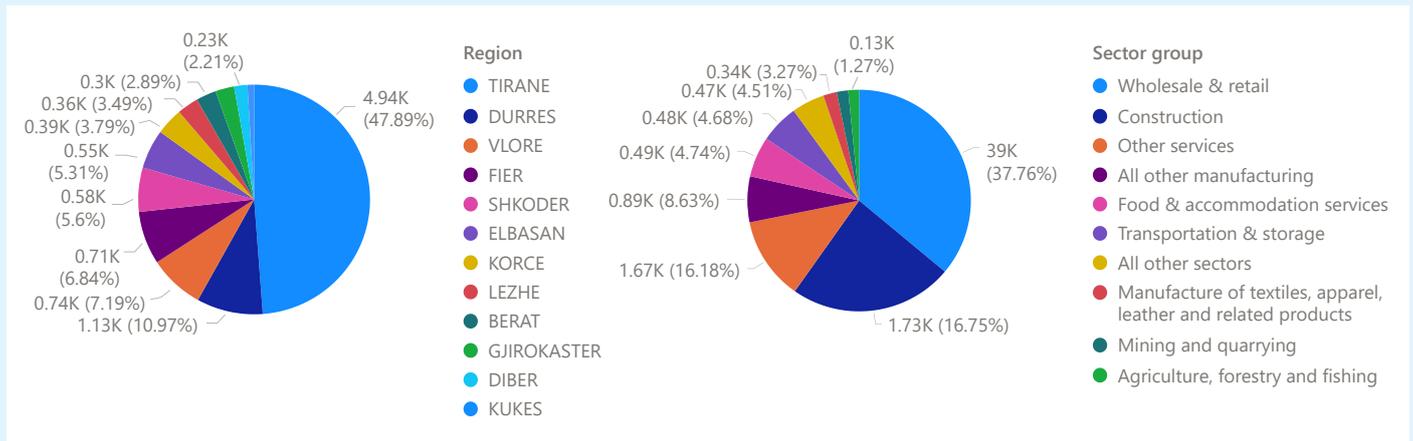
Only a quarter of firms in Albania are less than five years old. Most of these young firms are MSMEs and follow the distribution of MSMEs—i.e., they are concentrated in the Tirana region and in the wholesale/retail, construction, and services sectors. As of end-2019, young firms contributed around 1.4 percent to the country's employment and were responsible for 50 percent of jobs in the food and accommodation sector. The low share of young firms is a cause of concern as it implies relatively low entry.⁹ Further, young firms in Albania were found to have created most of the new jobs in 2016 in the service and manufacturing sectors (World Bank 2019).

There remains a disparity in geographical distribution of firms in Albania due to the disparity in level of economic activities across regions. The Tirana region is home to more than half of firms, to major industries, and to over 50 percent of jobs in the private formal sector. Other regions, such as Berat, Lezha, and Korce, have many fewer firms and therefore much lower levels of employment.

Figure 1.1. Firm distribution in 2019



⁹ For comparison: in 2018, the share of firms three years old or under was 30 percent in Italy and 40 percent in the United Kingdom. Eurostat, "Structural Business Statistics: Overview," <https://ec.europa.eu/eurostat/web/structural-business-statistics>.



Source: World Bank staff calculations based on National Business Center data.

Note: In figure 1.1a, micro = 0–10 employees; small = 11–50 employees; medium = 51–250 employees; large = 250+ employees. In figure 1.1b, micro = assets under lek 15,000; small = assets of lek 15,000–150,000; medium = assets of lek 150,000–750,000; large = assets of lek 750,000+.



FIRMS' FINANCIAL HEALTH

Analysis of firms' financial statements shows an increase in balance sheet size over the 2018 and 2019 financial years.

Aggregate firms' assets, liabilities, and equities increased respectively by 7 percent, 11 percent, and 2 percent from 2018 to 2019. The assets were not distributed evenly; 17 percent of assets were concentrated in large firms that account for less than 3 percent of total firms.

In aggregate, large firms deploy more long-term assets (53 percent of total assets) with higher shares of fixed assets which shows that large firms operate more in capital-intensive sectors while MSMEs use more liquid assets for their operations. However, fixed assets may have been underreported because some firms engaged in fiscal evasion or because assets under lease or rent contracts were not reported in firms' financial statements. See table 1.1 for firms' finances and table 1.2 for firms' asset size and composition.

Table 1.1. Overview of firms' finances (million lek)

Indicator	All firms			Large firms			MSMEs		
	2019	2018	YoY	2019	2018	YoY	2019	2018	YoY
Total assets	2,186,013	2,042,713	7%	395,619	377,750	5%	1,790,394	1,664,963	8%
Total liabilities	1,282,668	1,160,579	11%	214,438	200,625	7%	1,068,230	959,954	11%
Total equities	903,345	882,134	2%	181,181	177,125	2%	722,164	705,009	2%
Total loans & borrowings	397,698	374,326	6%	96,215	99,645	-3%	301,482	274,681	10%
Working capital	425,585	413,213	3%	61,695	43,893	41%	363,890	369,320	-1%
Interest expense	14,515	10,301	41%	3,571	3,394	5%	10,943	6,907	58%
Revenue	1,409,022	1,355,413	4%	347,234	361,639	-4%	1,061,788	993,774	7%
Operating earning	72,564	72,833	0%	8,144	10,251	-21%	64,419	62,582	3%
Earning before tax	98,683	100,039	-1%	12,436	15,896	-22%	86,246	84,143	2%
Net earning	82,271	83,115	-1%	9,961	13,329	-25%	72,309	69,786	4%

Source: National Business Center.

Note: YoY = year on year growth rate. Data in the table represent aggregates by firm type and are calculated from the firm sample.

Table 1.2. Firms' asset size and composition (million lek)

	All firms	Large firms	MSMEs
Total assets	2,186,013	395,619	1,790,394
Short-term assets	1,249,765	186,282	1,063,483
% short-term assets in total assets	57%	47%	59%
Long-term assets	936,248	209,337	726,911
% long-term assets in total assets	43%	53%	41%
Fixed assets (% of long-term assets)	88%	91%	87%

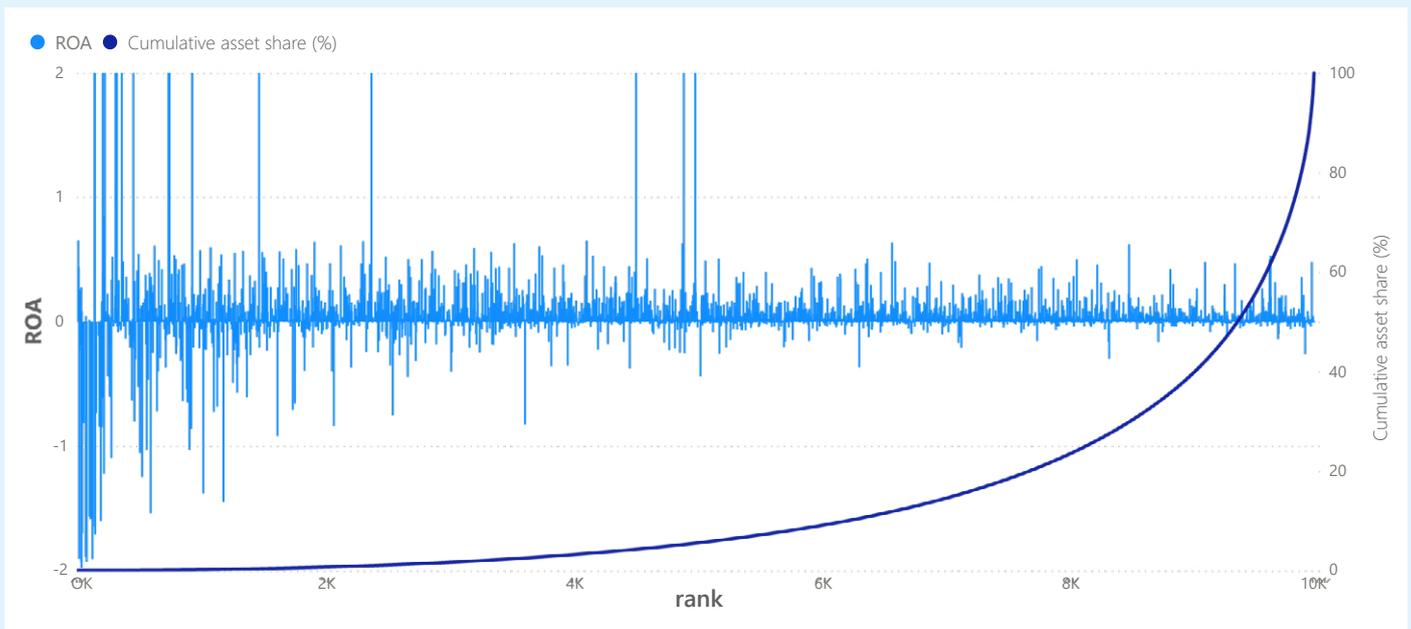
Source: National Business Center.

Note: Data in the table represent aggregates by firm type and are calculated from the firm sample.

MSMEs exhibited higher operational and financial efficiency than large firms during the observed period. Despite increases in assets and equities during the 2018 and 2019 financial years, large firms saw contractions in both revenues and earnings. In contrast, MSMEs reported increases in their sales and earnings over the same period. Large firms also showed less financial efficiency than MSMEs, with lower

return on assets despite their larger asset size (figure 1.2). Assessment of firms' formal financial statements also show that more than 70 percent of firms in Albania were profitable before COVID-19, and that only about 27 percent of firms under study were not making a profit before COVID-19; most of the latter were operating in the wholesale/retail, construction, and other services sector.

Figure 1.2. Firms' cumulative asset share (%) and return on assets



Source: World Bank staff calculations.

Note: The graph shows a distribution of firms' ranking (on the horizontal axis) by cumulative asset share out of all firms' aggregate assets (on the left vertical axis) and by return on assets (on the right vertical axis). The graph shows that except for outliers and against some volatilities, as firms rank higher in terms of asset size, their return on assets did not fare much better than that of smaller firms.

The assessment also reveals potential structural issues in firms' financing; MSMEs appear to have an overreliance on short-term liabilities, especially short-term payables. Data show that firms rely on short-term liabilities in addition to equity to finance their operations. Equity is the largest source of firms' financing (making up 41 percent of total liabilities and equities), and short-term liabilities are the second largest (38 percent). MSMEs are particularly reliant on short-term liabilities, which make up 39 percent of their total financing, and less so on long-term liabilities, which

make up 21 percent. Within the structure of current liabilities, short-term borrowing accounts for only 5 percent of all MSME financing, and the rest is other short-term payables to suppliers or taxes (see table 1.3). This high rate of short-term payables could be driven by the inter-dependence relationship within the supply chain. However, the reliance on short-term payables makes firms vulnerable to revenue shocks, which may in turn transmit to upstream parts of the supply chain.

Table 1.3. Firms' financing structure

	All firms		Large firms		MSMEs		Female		Young firms	
	Value (million LEK)	Share in total liabilities and equities	Value (million LEK)	Share in total liabilities and equities	Value (million LEK)	Share in total liabilities and equities	Value (million LEK)	Share in total liabilities and equities	Value (million LEK)	Share in total liabilities and equities
Total liabilities	1,282,668	59%	214,438	54%	1,068,230	60%	187,362	52%	159,229	80%
Short-term liabilities	824,179	38%	124,587	31%	699,592	39%	117,155	33%	97,806	49%
Short-term debt	116,371	5%	32,151	8%	84,219	5%	15,785	4%	12,363	6%
Other short-term liabilities	707,808	32%	92,435	23%	615,373	34%	101,369	28%	85,443	43%
Long-term liabilities	458,488	21%	89,851	23%	368,637	21%	70,207	20%	61,422	31%
Long-term debt	281,327	13%	64,063	16%	217,263	12%	33,586	9%	32,874	16%
Other long-term liabilities	177,161	8%	25,787	7%	151,374	8%	36,620	10%	28,547	14%
Equities	903,345	41%	181,181	46%	722,164	40%	170,617	48%	40,617	20%
Total liabilities and equities	2,186,013	100%	395,619	100%	1,790,394	100%	357,980	100%	199,846	100%

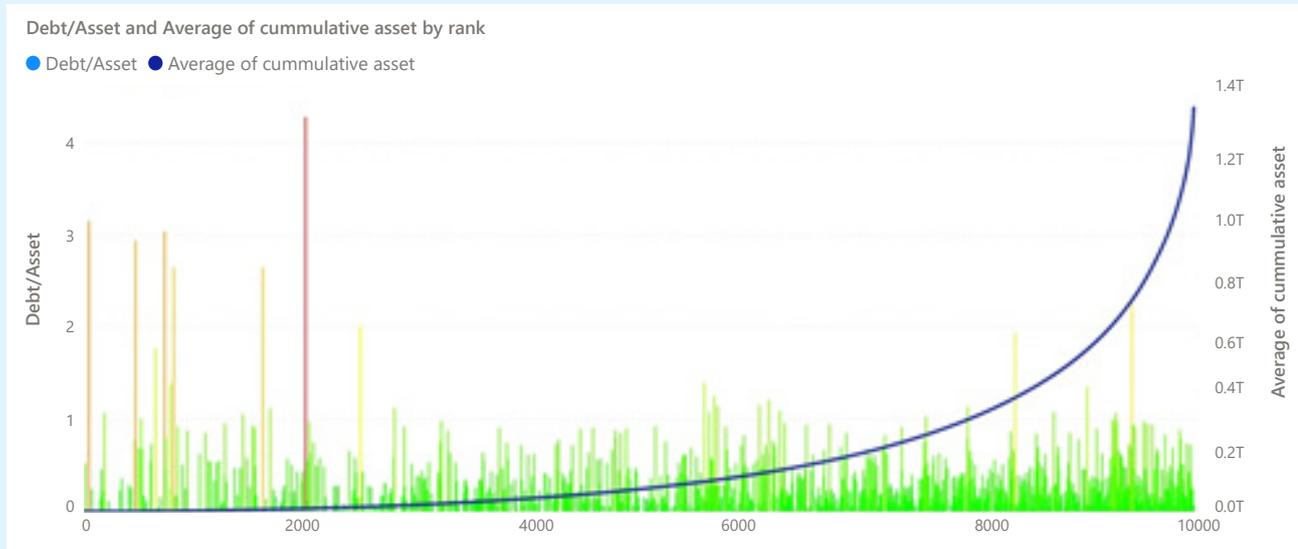
Source: World Bank staff calculations.

A quarter of firms were at solvency risk, that is, having total liabilities-to-total assets ratio greater than 1. A significant portion of medium and large firms have higher debt-to-assets ratios, putting them at higher risk of distress under shocks (figure 1.3). In addition, firms' aggregate short-term liabilities almost double their long-term liabilities (table 1.3), and 15 percent of firms have short-term debt greater than long-term debt, meaning that they could have less

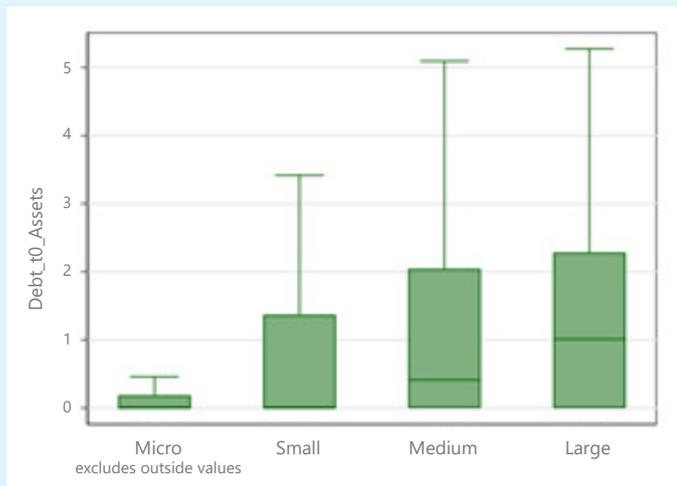
room to roll over their debts should they run into a cashflow shock. Among these firms, only 4 percent are large; the rest are MSMEs and are concentrated in the wholesale/retail, construction, and other services sectors (figure 1.4). It is noteworthy that more than 6,000 firms either did not report long-term borrowing or indicated zero long-term borrowing.

Figure 1.3. Firms' debt-to-asset

a. Firms' cumulative asset share (% of all firms' aggregate assets) and debt-to-asset ratio

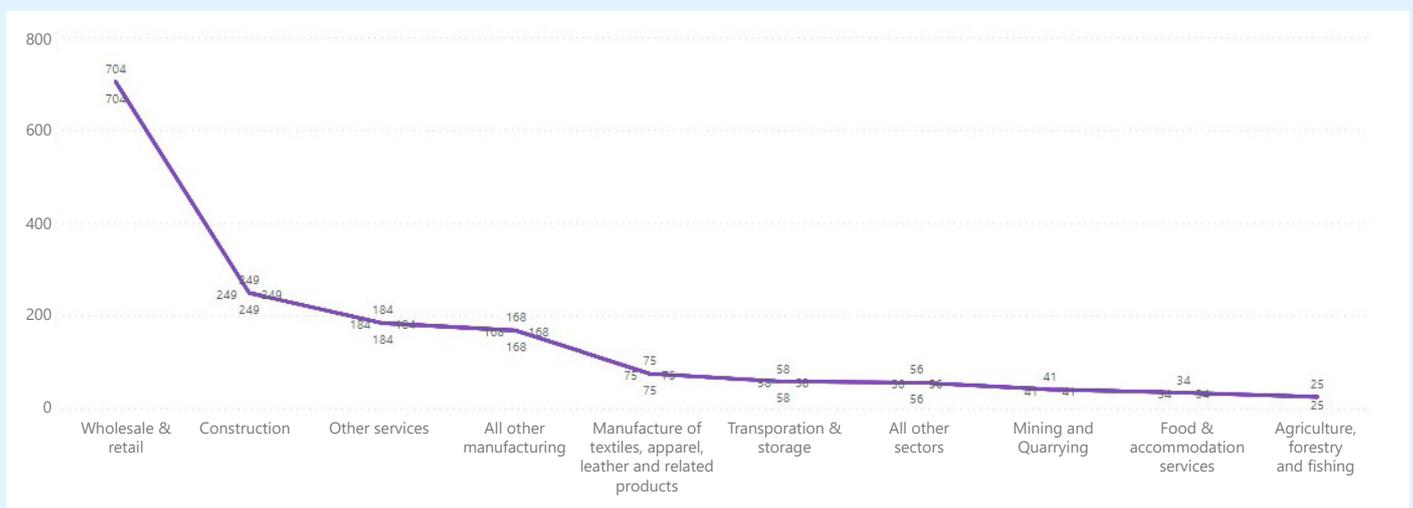


b. Debt to assets



Source: World Bank staff calculations.

Figure 1.4. Number of firms with short- to long-term debt ratio under 1, by firm sector



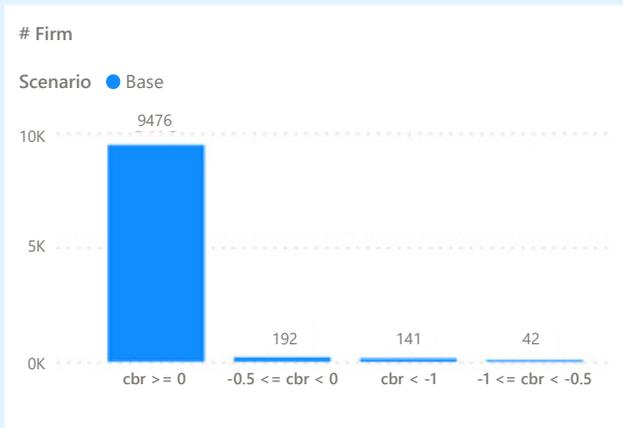
Source: World Bank staff calculations.

Most firms had a sufficient cash buffer to sustain one year of operations. The vast majority of firms had positive cash flow. Only about 2 percent of firms did not have sufficient cash buffers to survive one year, with cash burn rates (CBRs) between -1 and 0 (figure 1.5a). However, there is significant heterogeneity in potential financial vulnerability across firm types and sectors. While only 1.3 percent of micro

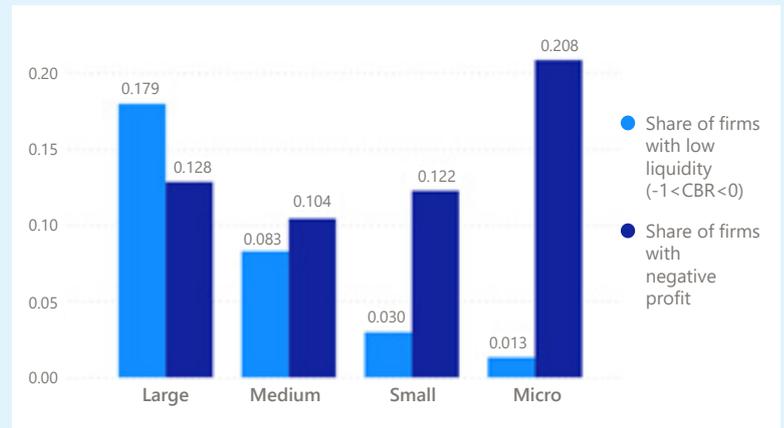
firms had insufficient cash buffers to survive one year, 20 percent of these firms had negative profits, putting them at risk of liquidity distress if revenue falls further (figure 1.5b). The construction and service sectors saw the highest numbers of firms with inadequate cash reserves to sustain operations for one year.

Figure 1.5. Firms' financial health at baseline

a. Number of firms by cash burn rate ranges



b. Share of firms with low liquidity, by firm size



Source: World Bank staff estimates using data from the National Business Center 2019 financial records.
 Note: Analysis excludes firms without data needed to calculate CBR.

Female-managed firms have a more balanced financing structure and a slightly lower share of profitable firms than male-managed firms. The share of equity in financing operations is higher for female-managed firms, at 48 percent of total capital (table 1.3), than for male-managed firms, where the share is 40 percent. Female-managed firms are still reliant on short-term liabilities, though to a lesser degree than other firms. Female-managed firms also include a slightly lower share of profitable firms than male-managed firms (55 percent of total female-managed firms compared 57 percent for male-managed firms). In addition, more than 90 percent of female-managed firms had sufficient cash reserves to survive one or more years of operations.

Young firms seem to be exposed to a high level of leverage. These firms' liabilities account for a high share—80 percent—of the capital structure, while equities account for only 20 percent. They also rely heavily on short-term liabilities, particularly short-term payables, to finance their operations. Young firms also accounted for 30 percent of

all loss-making firms before COVID-19. Most of the firms have sufficient cash buffers to survive one year of operation.



FIRMS' ACCESS TO FINANCE

Lending represents a small share of the funding that firms use to finance their operations. Assessment of 2019 financial statements indicates that close to 40 percent of firms have a ratio of liabilities to assets greater than 0.75, and that short- and long-term borrowings make up only 30 percent of firms' aggregate liabilities (see table 1.3).

This situation indicates that firms have limited access to credit and use other means of finance for their operations. The use of loans by large firms is greater, at 24 percent of total equity and liabilities, and by MSMEs is less, at 17 percent. While total borrowing makes up only 18 percent of firms' total financing (table 1.3), long-term borrowing accounts for about 70 percent and short-term borrowing about 30 percent of total borrowing reported on firms' 2019 balance sheets. Firms' skewness toward long-term borrowing as shown on their financial statements, coupled with a current maturity mismatch in banks' loan and deposit portfolios, could worsen this structural issue in the banking sector.

Albania's MSMEs are reported to face significant constraints in access to finance. Small firms are particularly disadvantaged in access to finance and tend to face more barriers, including high demand for collateral, stricter lending standards, and banks' perception of MSMEs as risky, given their low business capacity and informality (World Bank 2018).

According to the World Bank 2019 Enterprise Survey, around 30 percent of these firms have had a bank loan or line of credit (compared to over 50 percent of medium and large enterprises). Many micro firms did not apply for loans because they feared being rejected or because they perceived the loan application process as too complicated. The cost of loans did not seem to be a significant barrier to access to finance. The demand for partial credit guarantees or other types of credit enhancement is strong, while liquidity is high in the Albanian banking sector (World Bank 2018).

MSMEs rely on retained earnings or informal sources of funding to finance their operations. MSMEs have lower shares of bank lending and lower shares of equities in their financing structure. With limited use of formal financing, many firms rely on informal finance, such as loans from family or friends, to finance their activities. The share of Albanian MSMEs using such informal third-party finance is about 15 percent, much higher than their peers in the region; for example, the share is 5 percent in Bulgaria, 7 percent in Montenegro, and 5 percent in Serbia. About 24 percent of Albanian MSMEs finance their operations

from retained earnings, which is higher than in Bulgaria (14 percent), Montenegro (6 percent), Serbia (14 percent), and Croatia (18 percent) (World Bank 2018).

Firms have limited access to finance for risk management purposes. Insurance for firms, particularly for MSMEs, is still nascent in Albania due to a number of reasons including low level of insurance culture and affordability. Albania has one of the smallest insurance markets in Europe, with gross written premiums in 2019 of ALL 17.6 billion (US\$162 million) from both life and non-life insurance sectors¹⁰.

There have been a few public credit guarantee schemes, namely the Albanian Guarantee Fund, the Rural Credit Guarantee Fund, and the credit guarantee facility supported by the European Bank for Reconstruction and Development¹¹. The use of these instruments by MSMEs as shock buffers is limited. None of these guarantee or credit programs have introduced insurance as an instrument to mitigate disaster risks in lending or guarantee. Credit guarantee has only recently been used by the Government of Albania (GoA) to provide liquidity support to firms affected by COVID-19.

Female-administered firms reported the least use of bank credits for their businesses. They rely heavily on equities to finance their operations; equities account for 48 percent of their total capital. Only 13 percent of total capital is financed through bank credits, and the rest through short-term payables and other forms of long-term financing (likely borrowings from family and friends).

Young firms have limited access to formal finance. These firms rely heavily on short-term liabilities, which make up 46 percent of total capital; short-term credit accounts for only 6 percent. This structure also indicates the use of informal finances by these firms to sustain their operations.

¹⁰ https://amf.gov.al/pdf/publikime/A_Informacion_per_Shoqerite_e_Sigurimit_T4_2019.xlsx

¹¹ World Bank 2020, Albania Credit Guarantee Scheme Assessment

2. Disasters and COVID-19 Shocks in Albania



DISASTER RISK IN ALBANIA

Albania is among the countries most exposed to disaster risks in Europe. The World Bank's (2020c) Albania Disaster Risk Finance Diagnostic indicates that over the 20 years from 1995 to 2015, total recorded losses were estimated at about lek 12.5 billion (US\$124 million). The main perils responsible for the losses include flash floods (accounting for 30 percent of losses), floods (28 percent), earthquakes (19 percent), and landslides (11 percent). Flooding and earthquakes caused physical damage to firms' properties and damage to water supply, arable land, and transport infrastructures, which in turn disrupted firms' operation.



The most recent earthquake, in 2019, caused US\$168 million in losses and damage to the productive sector; out of a total 3,534 businesses, 300 businesses in manufacturing and 414 in trade were damaged. Over 500 workers from more than 150 businesses in manufacturing and trade temporarily lost their jobs as a result of the event (World Bank 2020c). The post-disaster needs assessment (GoA et al. 2020) estimated that it would take an average of 3.4 months to access a job in manufacturing, and 4.4 months to access a job in trade, depending on the level of damage and disruption of business service. Losses due to unemployment in manufacturing and trade were estimated at lek 180.88 million (US\$1.65 million) and lek 57.8 million (US\$0.53 million), respectively. The estimated income loss was lek 237.5 million (US\$2.16 million), of which lek 156.3 million (US\$1.42 million) corresponds to manufacturing businesses and lek 91.2 million (US\$0.83 million) to businesses in trade (GoA et al. 2020). Droughts also have had large-scale negative impacts on the energy and agricultural sectors in

Albania. For instance, droughts caused the “energy crisis” of November 2003 and led to electricity interruptions in 2007 (FAO 2018; cited in World Bank 2020c).

Albanian firms have significant physical asset values at risk.

An estimated lek 1.8 trillion of commercial, industrial, and agriculture assets is at risk of floods and earthquake based on AIR Worldwide’s catastrophe risk model for Albania. A 1-in-100-year earthquake could cause total damage to these assets of lek 48 billion (table 2.1a), while a flood event of the same magnitude could cause lek 28.2 billion in damage (table 2.1b). These events, coupled with an increasing trend of climate change, could further aggravate the impact on firms through longer periods of interruption to business activities and significant indirect losses of revenues.

Table 2.1. Potential financial impact of disasters in Albania

a. Earthquake loss (billion lek)

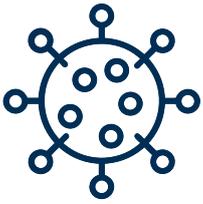
Exceedance probability		10.0%	4.0%	2.0%	1.0%	0.4%	0.2%	0.1%
Return period (years)	AAL	10	25	50	100	250	500	1,000
Commercial	1.0	1.3	4.4	10.1	21.0	41.6	64.1	75.0
Industrial	0.8	1.0	3.3	7.6	15.8	31.2	48.2	56.3
Agriculture	0.5	0.7	2.4	5.4	11.3	22.4	34.5	40.4
Total	2.3	2.9	10.1	23.1	48	95.3	146.9	171.6

b. Flood loss (billion lek)

Exceedance probability		10.0%	4.0%	2.0%	1.0%	0.4%	0.2%	0.1%
Return period (years)	AAL	10	25	50	100	250	500	1000
Residential	2.8	6.0	9.7	14.1	19.6	30.9	37.7	42.8
Commercial	0.5	1.1	1.8	2.7	3.8	5.9	7.2	8.2
Industrial	0.4	0.9	1.4	2.0	2.8	4.4	5.4	6.2
Agriculture	0.3	0.6	1.0	1.5	2.0	3.2	3.9	4.4
Total	4.0	8.6	13.9	20.3	28.2	44.5	54.2	61.6

Source: AIR Worldwide 2020.

Note: AAL = average annual loss.



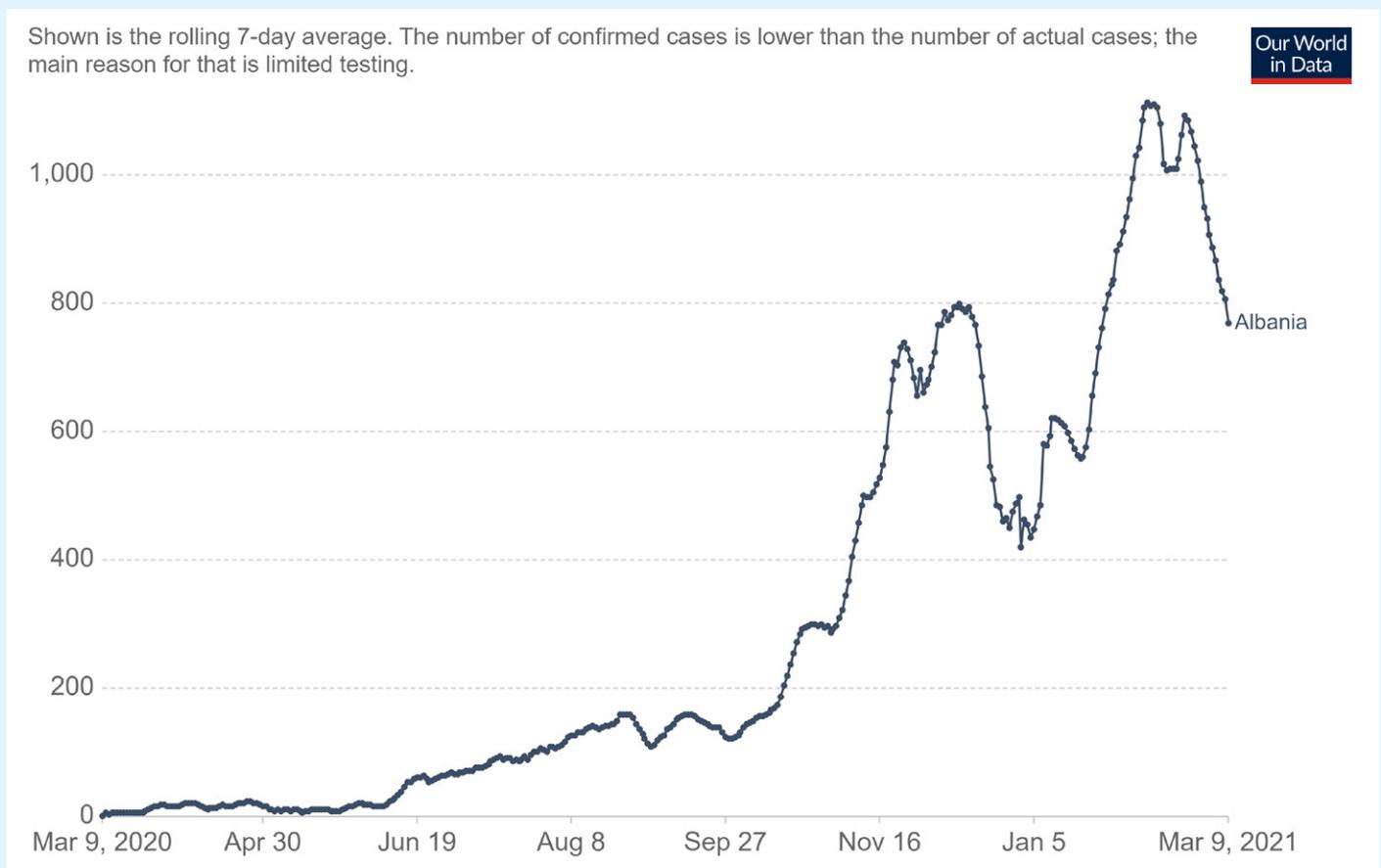
THE COVID-19 PANDEMIC

In spring 2020, just as reconstruction was getting underway after the November 2019 earthquake, the global COVID-19 pandemic forced Albania's major economic sectors into lockdown.¹² The initial number of cases was low (see figure 2.1a). However, due to its proximity and close links to Italy, which suffered a severe early outbreak, Albania adopted

some of the toughest lockdown measures, including curfews and suspension of schools, nonessential businesses, and private traffic, as soon as it detected the first confirmed COVID-19 case in March 2020. Starting in June 2020, the GoA gradually reopened the economy, reducing movement restrictions and lifting quarantine requirements for incoming visitors and tourists. With the increase in cases since November, some restrictions have been reintroduced, albeit milder. Figure 2.1b plots the evolution of containment measures in Albania and selected neighboring countries, using an index of policy stringency. It shows a level of containment measures in keeping with the rest of the region; while less restrictive than in the spring, these measures remain a significant burden to economic activities.

Figure 2.1. Trajectory of COVID-19 cases in Albania and containment policy restrictiveness in Albania and neighboring countries

a. Daily new confirmed COVID-19 cases

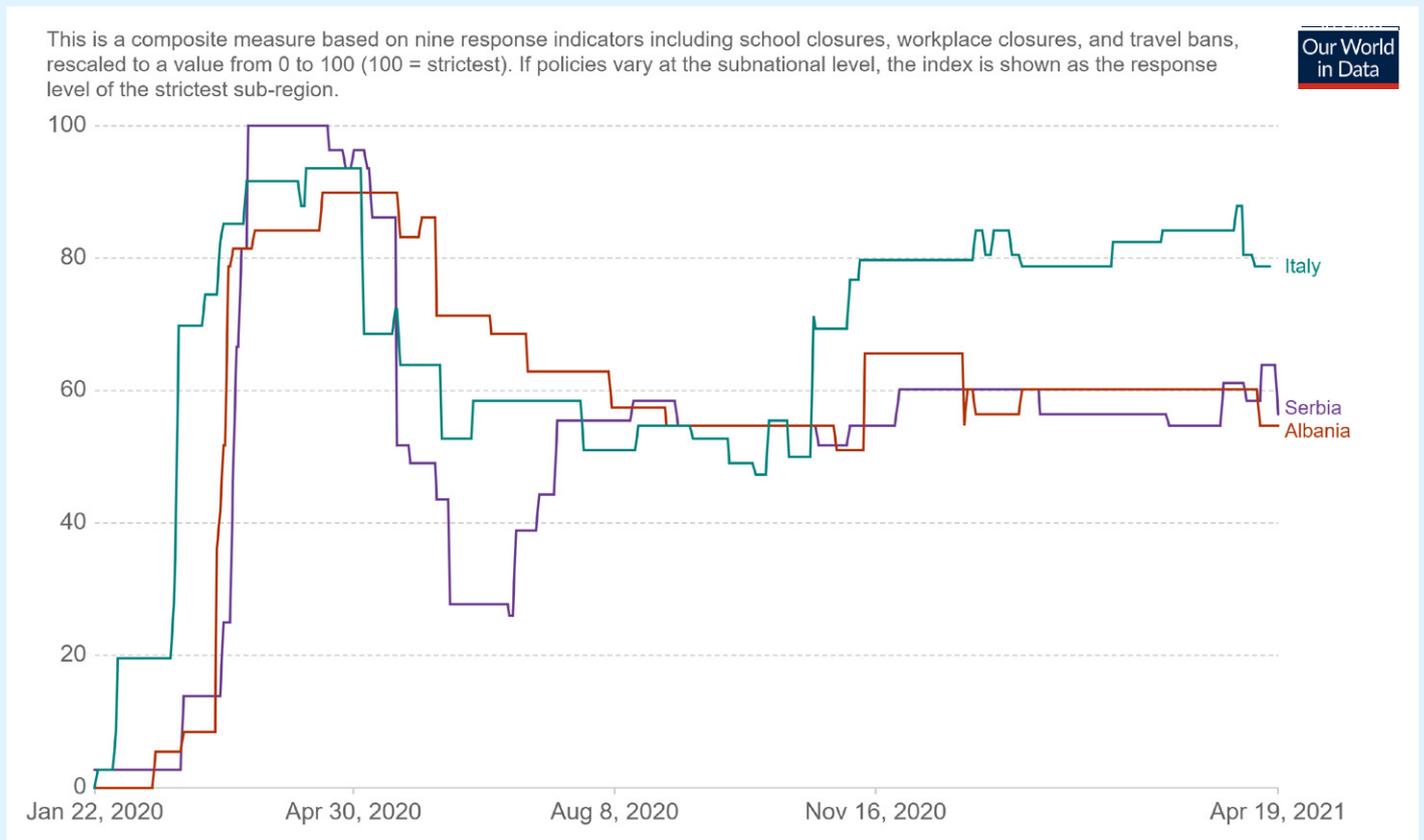


Source: Our World in Data, "Coronavirus (COVID-19) Cases," <https://ourworldindata.org/covid-cases>, using data from Johns Hopkins University Center for Systems Science and Engineering.

Note: The graph shows the rolling seven-day average from March 2020 to March 2021; the number of confirmed cases is lower than number of actual cases because of limited testing.

¹² See World Bank (2020); see also International Monetary Fund, "Policy Responses to COVID-19: Policy Tracker," <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>.

b. Policy stringency



Source: Our World in Data, "COVID-19 Stringency Index," <https://ourworldindata.org/covid-government-stringency-index>, using Oxford COVID-19 Government Response Tracker.

Note: Index is a composite measure of nine response indicators (closures, travel restrictions, etc.). In countries where locales have different measures in place, the index reflects the strictest measures.

Following the spring lockdown, the majority of businesses in Albania reported negative impacts from COVID-19, with firms affected through multiple channels. According to a survey in May 2020, 97 percent of firms expected their activity to be very negatively or negatively impacted; of these, 62 percent of export firms expected to be very negatively impacted (Albania Investment Council 2020). The initial lockdown caused mass disruptions in operations: 47 percent of companies stopped work fully (Albania Investment Council 2020). Around 45 percent of firms reduced working hours, with capacity utilization rates averaging under 60 percent (World Bank 2020d). Firms experienced severe demand shocks: 87 percent

reported a decrease in revenue, with average monthly sales more than 50 percent lower than the previous year. Firms that depend on imported inputs faced further supply disruptions: 52 percent of companies reported problems with imports, and of these only 2 percent were able to fully shift to domestic resources to ensure business continuity (Albania Investment Council 2020). As revenue fell, most firms experienced a decrease in liquidity and available cash flow. As of April 2020, more than 70 percent of firms had reported delaying payments to suppliers, landlords, or tax authorities. Almost two-thirds of firms had downsized their temporary workforce, and 27 percent had decreased the total number of permanent workers (see table 2.2).

Table 2.2. Reported impact of COVID-19 on firms, April 2020

	All	Small	Medium	Large	Mfg.	Services
Operations						
Firms permanently closed since COVID-19 outbreak (%)	1.3	1.8	0.0	0.0	0.0	1.7
Capacity utilization (%)	59.7	57.7	63.0	60.3	59.7	N/A
Sales						
Firms experiencing decreased monthly sales compared to 1 year ago (%)	87.4	88.3	88.1	75.4	89.3	86.7
Average change in monthly sales compared to 1 year ago (%)	-51.6	-53.2	-49.5	-43.1	-47.5	-53.2
Workforce						
Firms that decreased total hours worked per week (%)	45.1	40.9	52.0	61.3	54.7	41.5
Firms that decreased total number of permanent workers (%)	27.7	23.1	40.9	25.8	37.4	24.2
Firms that decreased total number of temporary workers (%)	63.9	67.8	55.9	49.8	67.5	63.0
Finance						
Firms experiencing decreased liquidity or cash flow availability (%)	71.4	74.2	65.6	62.6	78.3	69.0
Firms delaying payments to suppliers, landlords, or tax authorities (%)	71.4	77.5	58.3	59.7	75.9	69.8
Adjustment						
Firms that started or increased online business activity (%)	18.1	15.9	24.8	14.5	9.4	21.3

Source: World Bank 2020d.

Note: Mfg. = manufacturing; N/A = Not available.

As the global crisis continues, these negative impacts may be prolonged by the weakening of tourism and by spillovers from contraction of EU markets. The tourism industry, which contributes to more than a fifth of the country's gross domestic product (GDP), was severely affected. According to the Albanian Tourism Union, around 5 million overnight stays during the summer season were cancelled in 2020. Tourist visits plunged by 60 percent in 2020. Despite the partial recovery of domestic tourism as lockdown measures were relaxed, tourism growth still has uncertain prospects, particularly with slow global vaccine rollout. The contraction of economic activities in the EU, especially Italy, also had a significant spillover impact on Albania. According to the Albanian Institute of Statistics (INSTAT), in the first quarter of 2020 the export of textiles and footwear fell by over 50 percent. Goods exports to Italy, Albania's main trading partner, fell by more than 40 percent year-on-year during the most severe lockdown (March to May 2020), and by 15

per cent year-on-year in June-July. Overall, total exports of goods dropped by 6.7 percent, due mainly to contraction of garment processing orders (Musabelliu 2020; EBRD 2020; World Bank 2020b, 2021b)

The pandemic has put a major strain on an economy that had already slowed down due to the earthquake in 2019. With various economic activities disrupted, consumption and investment decisions have been delayed by uncertainty about the duration of the crisis. In the first quarter (Q1) of 2020, GDP contracted by 2.5 percent and investment shrank by 16.7 percent; at 1.1 percent, growth in consumption was minimal. Resumption of post-earthquake reconstruction supported recovery in 2020. However, GDP still contracted by an estimated 3.3 percent in 2020. (World Bank 2020b, 2021b).

3. Stress Testing Firms' Financial Resilience against Compound Impact from Pandemic, Climate, and Disaster Shocks

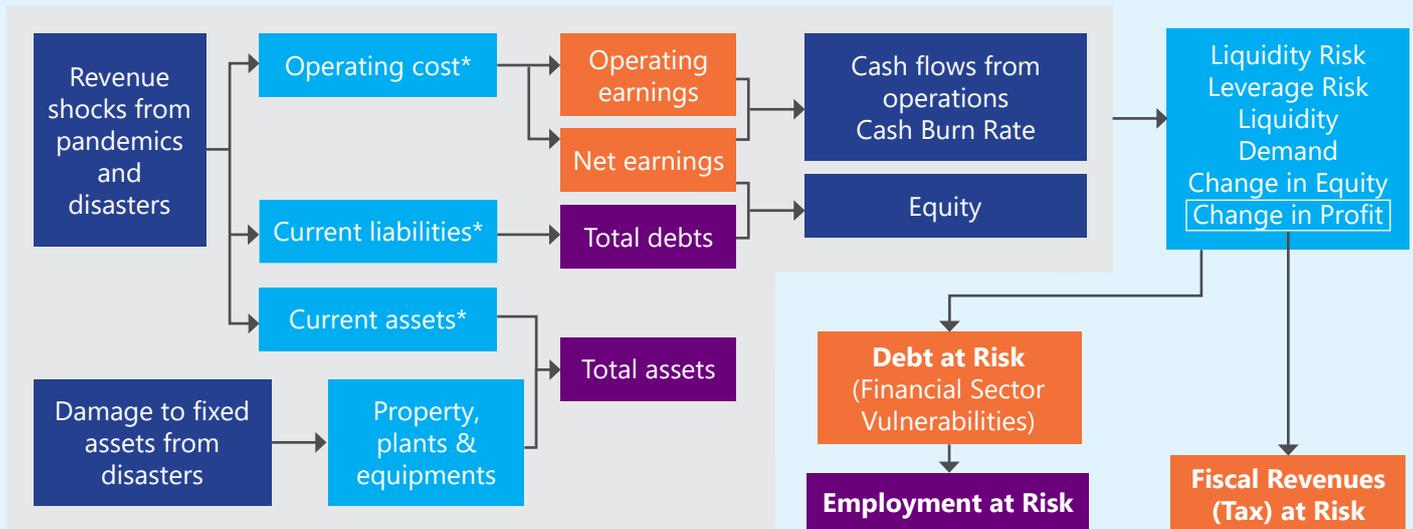


STRESS TESTING FRAMEWORK

The COVID-19 pandemic and 2019 earthquake have highlighted the private sector's vulnerability under compound shocks. This report employs a microeconomic and corporate finance approach to understand firms' financial vulnerability; specifically, it analyzes the impact from exogenous shocks to revenue on firms' key financial indicators, including liquidity, capital structure, profitability, and the (un)availability of cash buffers to withstand external shocks. This approach allows the quantification of firms' debt at risk, from which a relationship can be established to understand employment at risk and government tax revenue at risk. The simulation exercise then quantifies funding needs for alleviating liquidity shortages and estimates the cost of different financial support packages to support firms' survival through these crises. Figure 3.1 presents a summary of the approach. Annex 1 provides a full description of the methodology.



Figure 3.1. An accounting framework to model the impact of pandemic and disaster shocks on firms



Source: Authors.

Note: *assumed to changed linearly with revenue based on an estimated elasticity.

The modelling framework includes several important limitations. First, it includes only deterministic shock scenarios and focuses on two types of direct shocks – loss to revenue and fixed asset - due to lack data and existing modeling of pandemic and catastrophe risks. Second, the forecasting approach relies on a simple assumption that firms will adjust total operating costs and working capital linearly with revenue shocks. The degree of adjustment is estimated as an elasticity based on historical data, which may be a poor approximation as firms may adjust very differently under compound pandemic and disaster shocks. Further, it is a static exercise that sidesteps many general equilibrium effects: changes in the credit supply, a feedback loop due to losses of labor income and uncertainty that causes household and firms to contract spending, etc. Annex 1 discusses a more detailed description of the model limitations. Nevertheless, the results from the modelling exercise can be best thought of as an approximation of the short-term impact on firms' financials. The outputs can be used to inform short-term funding needs as well as early warning indicators for the financial system.



DATA

The analysis is based on data from the 2019 formal financial statements of firms submitted to the National Business Center until September 2020. Notably, the firm-level data set was prepared by merging 18,712 individual financial filings under three different reporting formats (IFRS, SKK2, SKK15).¹³ Close to 14 percent of firms could not be included in the data set because inconsistent formatting of the financial statements made it impossible for the software to correctly process the reported information. The resulting data set was cleaned to remove duplicates and filter observations with missing values. Further, the analysis excluded firms in the financial, public administration, and defense sectors, and observations that are cleaned for implausible or outlier values.

¹³ As of 2019, 104,090 business entities were registered with the National Business Center. These include companies and sole proprietorships. Only entities above a certain size threshold have the obligation to prepare financial statements (see footnote 15).

IFRS refers to the International Accounting Standards used by large companies and public interest entities according to the Accounting Law requirements. MSMEs use the National Accounting Standards; SKK 2 is the national standard for presentation of financial statements of small and medium enterprises (annual turnover above lek 30 million), and SKK15 is the standard for financial reporting of micro entities (annual turnover of lek 5–30 million). All businesses that have the obligation to prepare financial statements under IFRS and National Accounting Standards have the obligation to submit financial statements to the National Business Center.

The final sample contains 10,486 firms, or 56 percent of all formal firms that submitted 2019 financial statements until September 2020.¹⁴ In this sample, the median firm has six employees and lek 22.42 million in assets. The average firm age is 10.6 years. For the full distribution of the sample of firms used for the analysis, see figure 1.1. Given that most data are unavailable for excluded firms, it is not possible to

assess the true extent of sample selection. Nevertheless, the sample of excluded firms is disproportionately represented by firms reporting under IFRS and SKK2 formats, which are likely to be larger firms on average. Hence the actual demand for funding support is likely to be higher than the estimated funding from the stress testing exercise, and may be more than proportionally.

Table 3.1. Sample selection

	Firms used for the analysis	Firms excluded from the analysis
Total sample size	10,486	8,226
Firms reporting under IFRS format (%)	0.12%	2.86%
Firms reporting under SKK2 format (%)	18.21%	28.94%
Firms reporting under SKK15 format (%)	81.66%	68.20%
Median number of employees	6	
Median assets (million lek)	22.42	
Average age (years)	10.6	

Source: World Bank.

Due to data requirements, informal firms are excluded from the analysis. Informality plays an important role for employment in Albania.¹⁵ Nevertheless, by definition, most informal firms are also excluded from the formal financial system and therefore, risks to creditors' balance sheets from firm closure is limited. Further, support to firms should be prioritized for formal firms for several reasons. First, there is lower cost of entry and exit for such firms as intangible capital is largely imbedded in the entrepreneur rather than in employer-employee relationships. Second, informal firms are hard to reach by definition, as they operate outside of the tax and banking systems. While important for inclusivity, support to informal workers may be best provided through social protection channels (Freund and Pesme 2021).



SCENARIOS AND ASSUMPTIONS

Four scenarios were calibrated under the assessment. These include baseline, pandemic, pandemic and disaster at regional level, and pandemic and disaster at national level. The baseline scenario reflects business results as of 2019. The pandemic, disaster, and compound pandemic disaster scenarios reflect losses to revenue and damages to fixed assets under these shocks.

¹⁵ According to the 2019 Labor Force Survey, more than 56 percent of total employment is informal (Source: https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---sro-budapest/documents/genericdocument/wcms_751313.pdf)

There was no direct modeling of pandemic and catastrophe risk to generate scenarios for impact on firms. Instead, the analysis used the outputs from probabilistic catastrophe risk models for making assumptions, specifically the input similar in scale to the 2019 earthquake for disaster scenarios and COVID-19 for pandemic scenarios.

Assumptions for revenue loss due to the pandemic shock are differentiated by 18 broad sectors. Revenue loss is assumed to be proportional to projected nominal GDP growth in 2020 based on estimates by INSTAT, the Bank of Albania, and the Ministry of Finance and Economy. Further, assumptions on size differences in revenue impact were constructed based on survey results on the impact of COVID-19 on firm revenue by firm size (from World Bank [2020d] see table 2.2). The full list of assumptions is presented in annex 1.

Climate and disaster shocks are likely to cause additional direct and indirect losses to firms already suffering from the pandemic. Firms could experience physical damage to their properties and interruption to production and operations that result in revenue and income loss. The assumptions used to model the impact of disasters on firms' property are based on a probabilistic catastrophe risk model by AIR

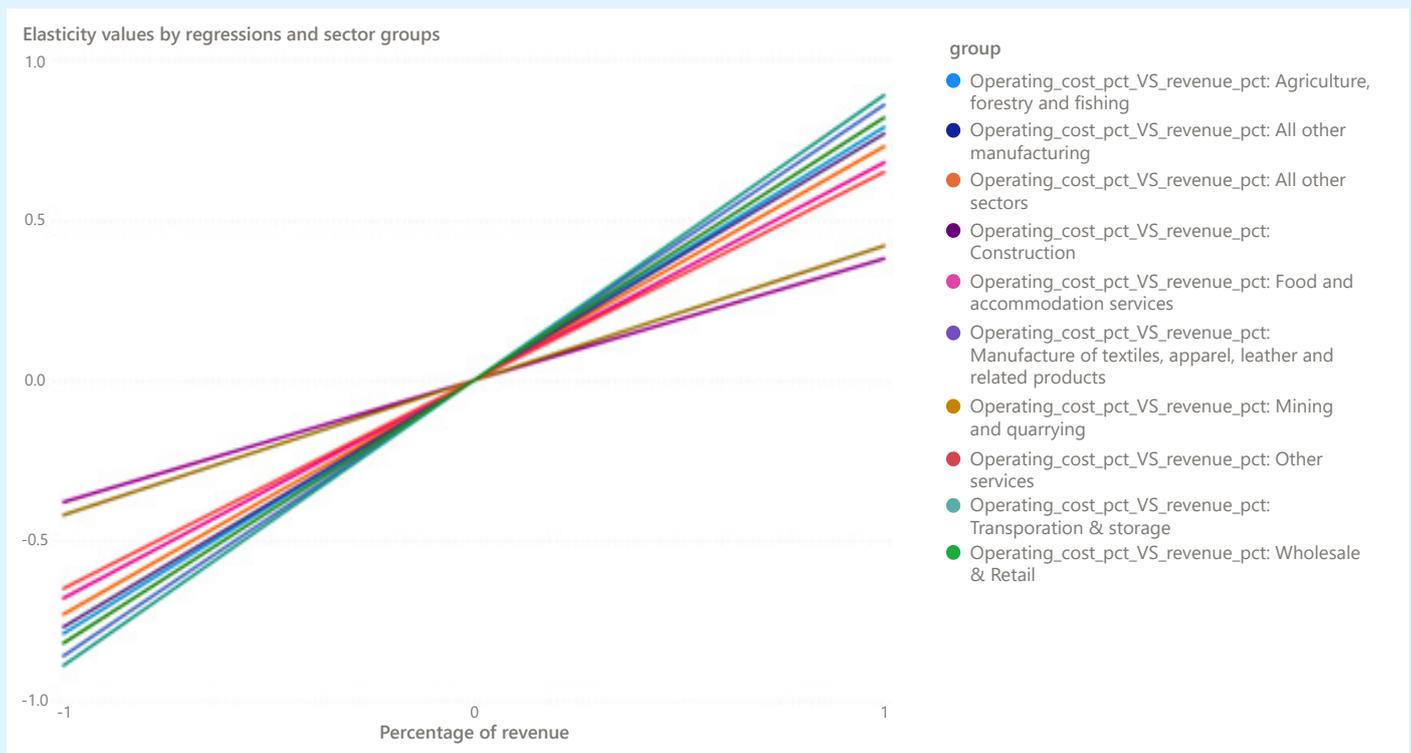
Worldwide; the assumptions used to model the impact on firms' revenues are based on historical data (see annex 1 for details).



ELASTICITY ESTIMATION

As revenues go down, firms will likely adjust operating costs. However, costs will not all go down at the same pace because some sticky operating costs cannot be cut in the short term. Regression analysis using 2018–19 data suggests an average cost-revenue elasticity that ranges between 0.35 and 0.89 across different sectors;¹⁶ the mining and quarrying sector and the textiles sector appear to be the most inelastic (see figure 3.2 and full regression results in Annex 3).

Figure 3.2. Estimated elasticity of total operating cost in relation to revenue



Source: World Bank staff estimates.

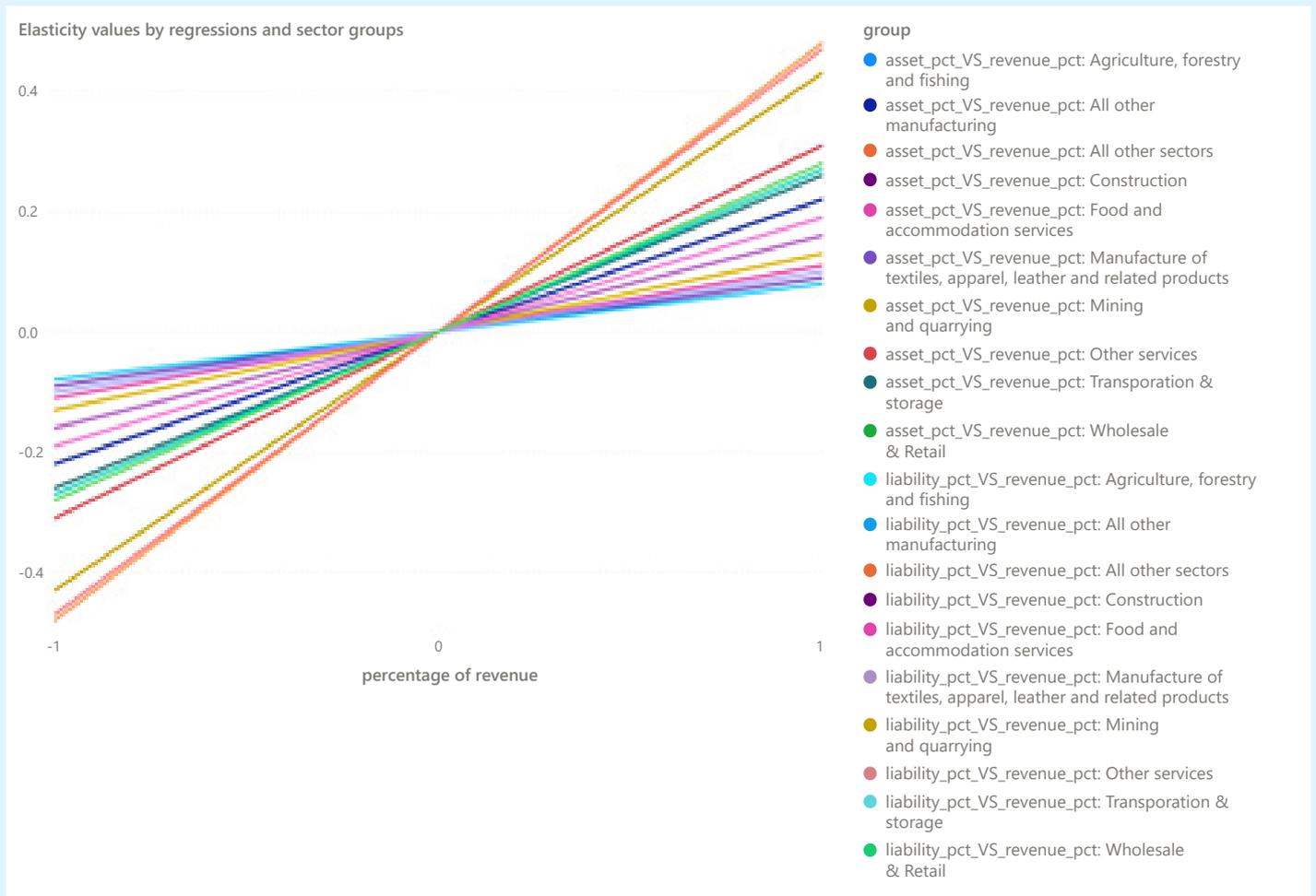
Note: $Operating_cost_pct_VS_revenue_pct = \text{Percentage change in operating cost in relation to percentage change in revenue}$

¹⁶ In other word, for every 10 percent reduction in revenue, operating costs fall on average by 3.5 percent to 8.9 percent.

Firms are further assumed to be able to partially adjust their working capital. That is, they are able to adjust short-term assets and liabilities with revenue changes. Our estimates suggest that firms are unlikely to adjust current assets and liabilities as quickly as operating costs: estimated elasticities

ranged between 0.09 and 0.31 for current assets, and between 0.08 and 0.48 for current liabilities (figure 3.3).

Figure 3.3. Estimated elasticity of current assets and current liabilities in relation to revenue



Source: World Bank staff estimates.

Note: $asset_pct_VS_revenue_pct$ = percentage change in current assets in relation to percentage change in revenue

$liability_pct_VS_revenue_pct$ = percentage change in current liability in relation to percentage change in revenue

4. Main Findings



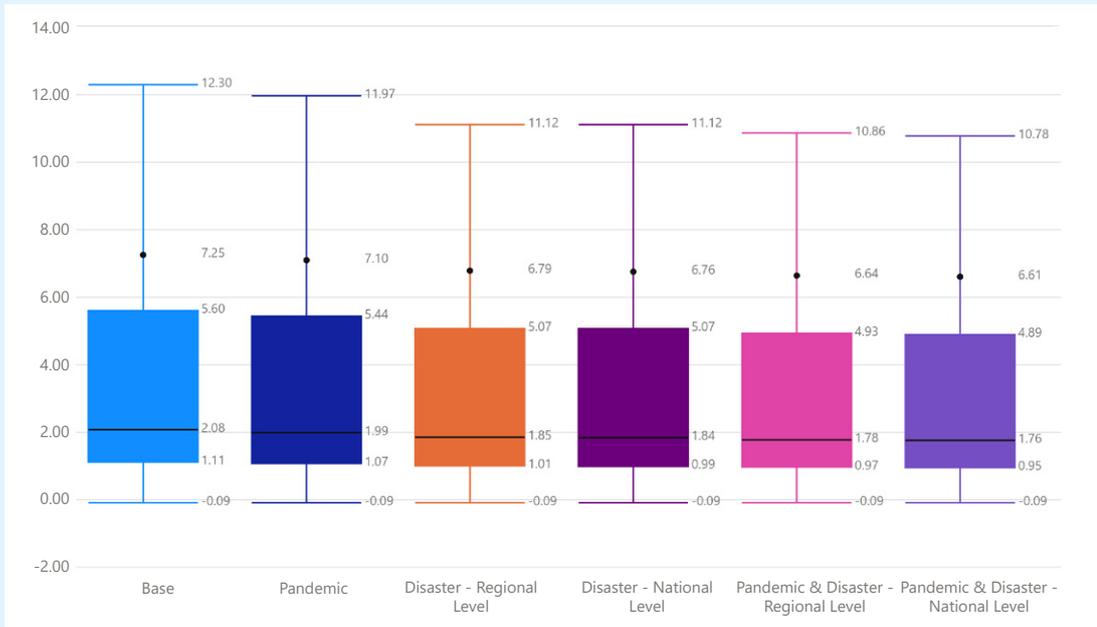
IMPACT ON FIRMS' FINANCE

Liquidity

Firms are projected to become more illiquid under compound shocks. As measured by the current ratio, average liquidity reduces from 7.25 at baseline to 6.61 in the compound pandemic and national disaster shock scenario (figure 4.1). Compound shocks also impact firms' coverage ratios substantially. The number of firms unable to cover short-term debt—those with a ratio of EBITD to short-term borrowings of less than 0.5—is likely to increase from 2,500 under baseline to more than 7,000 firms under pandemic & disaster scenario.



Figure 4.1. Projected liquidity ratios under assessment scenarios



Source: World Bank staff estimates.

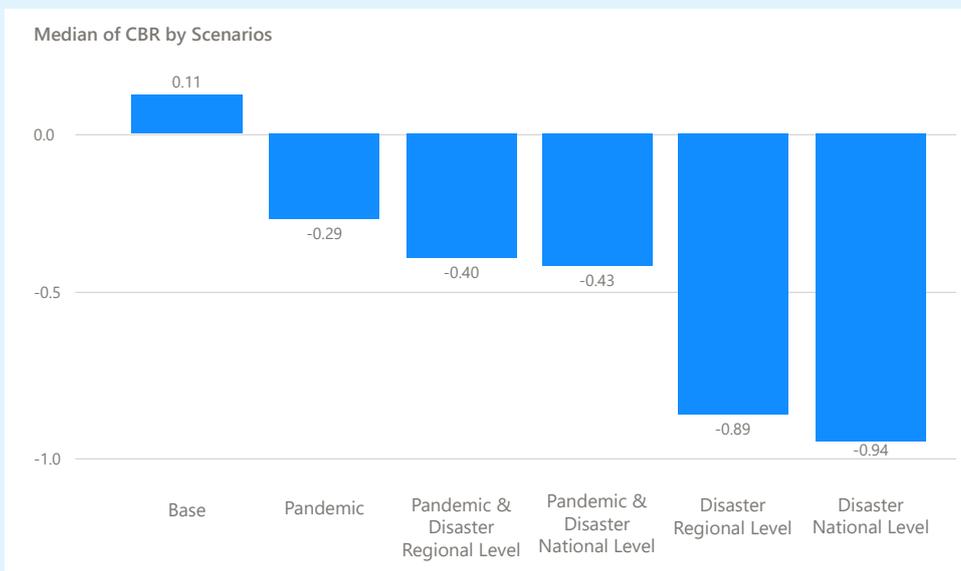
Note: Liquidity ratio is the ratio of current assets to current liabilities.

Compound shocks could send a large share of firms into a liquidity crunch. As discussed above and shown in figure 1.5a, at baseline a high share of Albanian firms had positive cash burn rates. Under pandemic and compound shock scenarios, collapses in revenue will cause the cash flows from operations to contract quickly. Without external cash funding, firms will have to burn their cash reserves on balance sheets to cover these losses. Despite relatively high baseline cash reserves among firms, the number of firms with CBR in the -1 to 0 range—that is, those generating negative cash flows that in

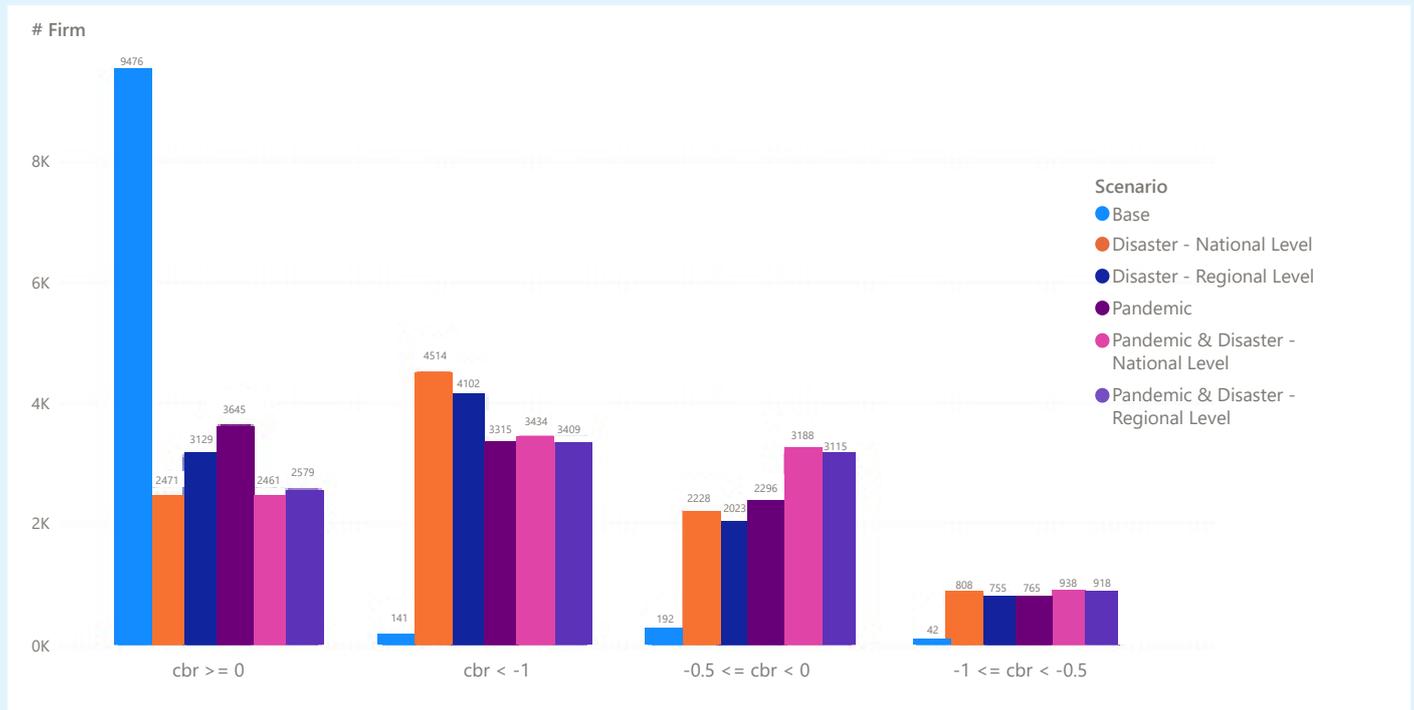
turn burn their cash reserves in less than a year—increases substantially under shocks. Estimates suggest that total funding needs for one year of liquidity for all firms could go up to lek 767 billion in the pandemic shock scenario and up to lek 868 billion in the compound pandemic and disaster shock scenarios (figure 4.2).

Figure 4.2. Firms' projected cash burn rates and funding required for one year of liquidity under assessment scenarios

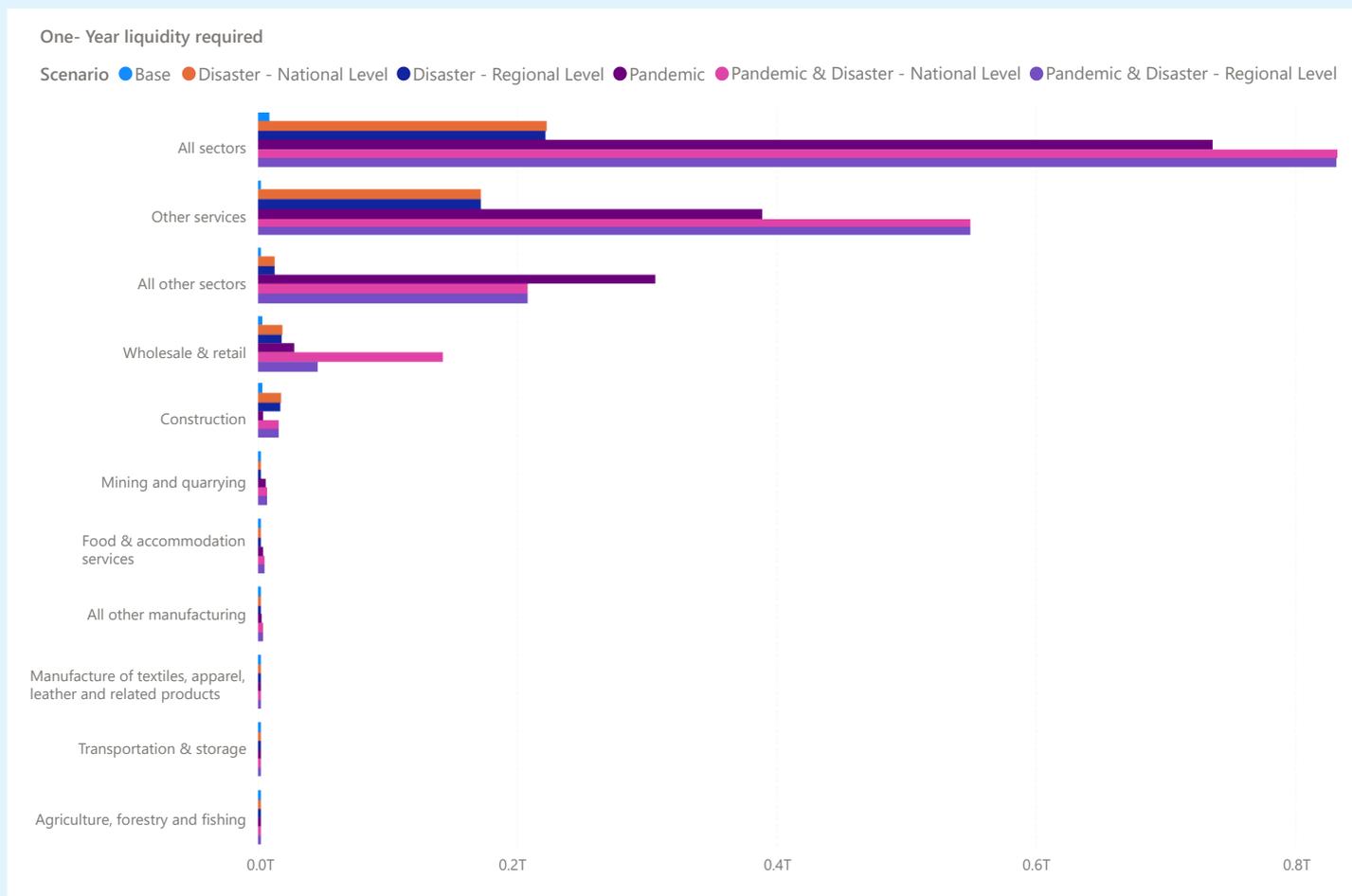
a. Median CBR



b. Number of firms by CBR range



c. Funding required for one year of liquidity



Source: World Bank staff estimates.

Note: "Other services" includes arts, entertainment and recreation, sports-related activities, repair services, personal services, and others.



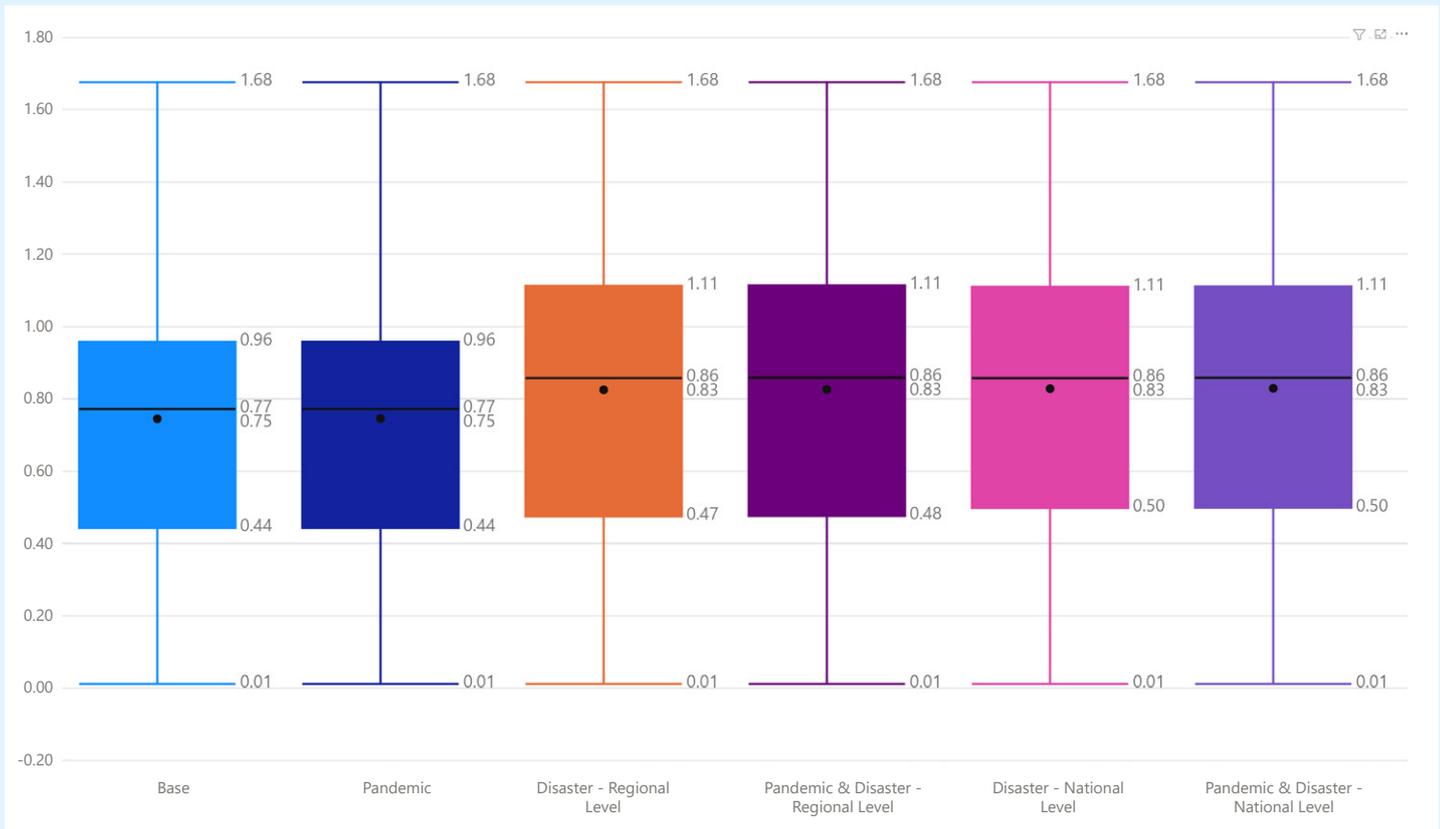
LEVERAGE

Compound shocks would cause firms to become more leveraged. Shocks from a pandemic and national-level disaster could push 44 percent of firms into overleverage (defined as a total-liability-to-total-asset ratio greater than 0.75), from a baseline of 36 percent. As exhibited in figure 4.3a, the leverage ratio increases from 0.75 on average at

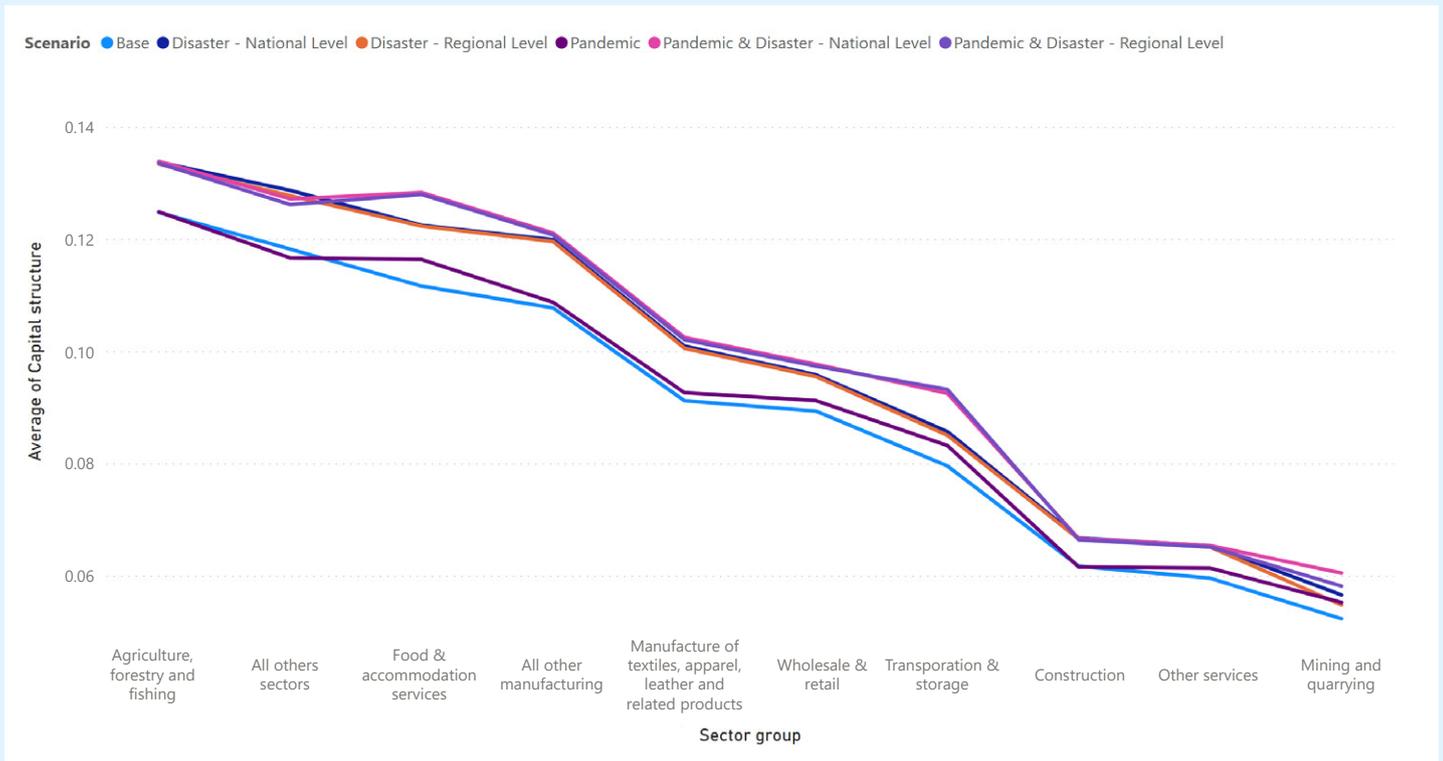
baseline to 0.83 in the compound pandemic and national disaster shock scenario. Figure 4.3b shows the shift in leverage (as defined by debts to assets) across different scenarios by sector. Under all scenarios, average food and accommodation firms and transportation and storage firms could experience a greater change in debts to assets than other firms. Disaster shocks in particular would shift the leverage structure such that firms had less room for raising liquidity from the markets and less ability to roll over their debts; in addition, fewer firms would have current assets sufficient to meet their current liabilities.

Figure 4.3. Firms' projected leverage under assessment scenarios

a. Total liabilities to total assets



b. Debts to assets



Source: World Bank staff estimates.

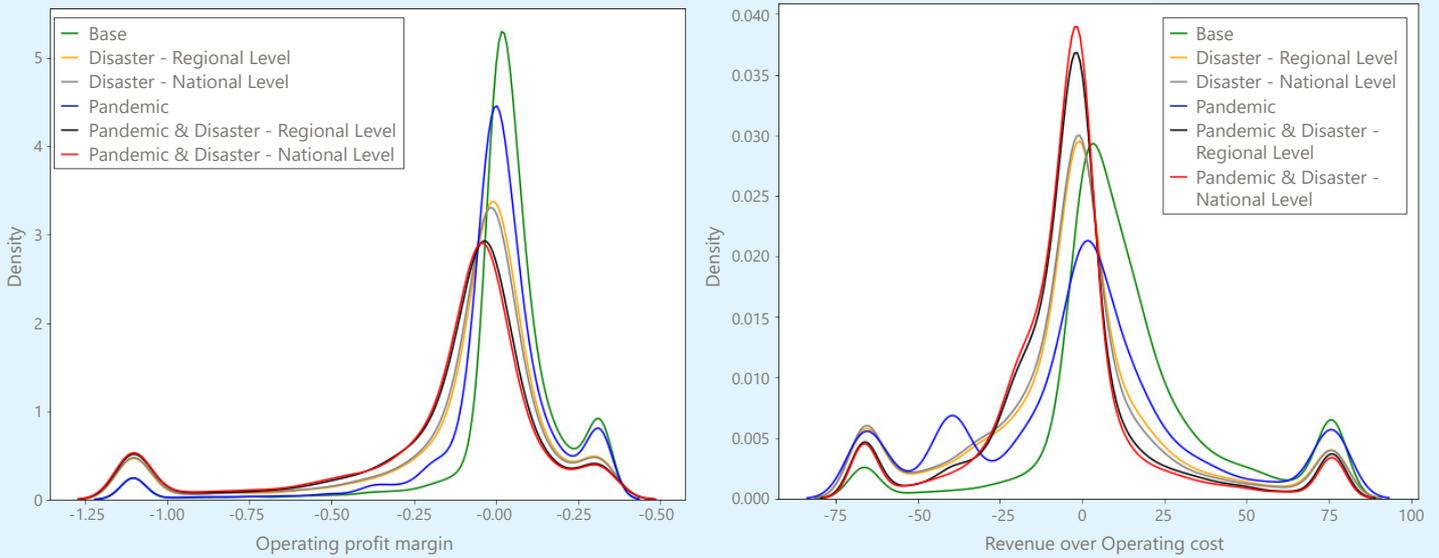


PROFITABILITY

Firms' profitability is projected to fall significantly under the pandemic scenario, disaster scenarios, and compound shock scenarios. Figure 4.4 shows the firm-level distribution of the gross profit margin and revenue-to-operating cost ratios, which shifted sharply to the left under compound shock

scenarios. On average, operating margin changed from 2 percent profit under the baseline scenario to 3 percent loss under the pandemic scenario and 28 percent loss under the pandemic and national-level disaster scenario. The average revenue-to-operating cost ratio changes from 14.2 under the baseline scenario to -4.7 under a compound pandemic and national-level disaster shock.

Figure 4.4. Firms' gross profit margin and revenue-to-operating cost distribution under assessment scenarios

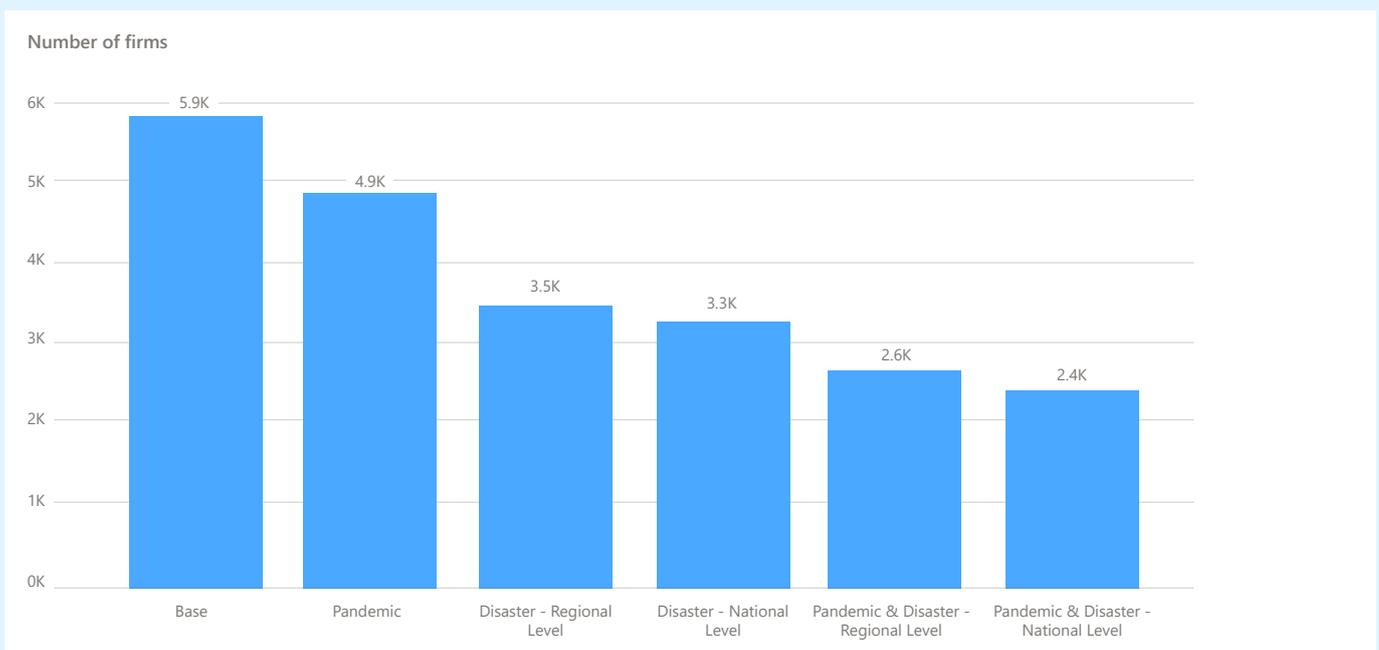


Source: World Bank staff estimates.

Net profit is expected to decline over various scenarios of shocks and lead to reduced earnings. The share of profitable firms may decline from 57 percent under baseline to 23 percent under a compound pandemic and national-scale disaster (see Figure 4.5). The decline in net profit will result in reduced retained earnings, which firms have traditionally

relied on for financing their operations and investments. This could mean that firms have less access to finance to fund their liabilities and could therefore increase their probability of default.

Figure 4.5. Firms with positive net profit under shock scenarios



Source: World Bank staff estimates.

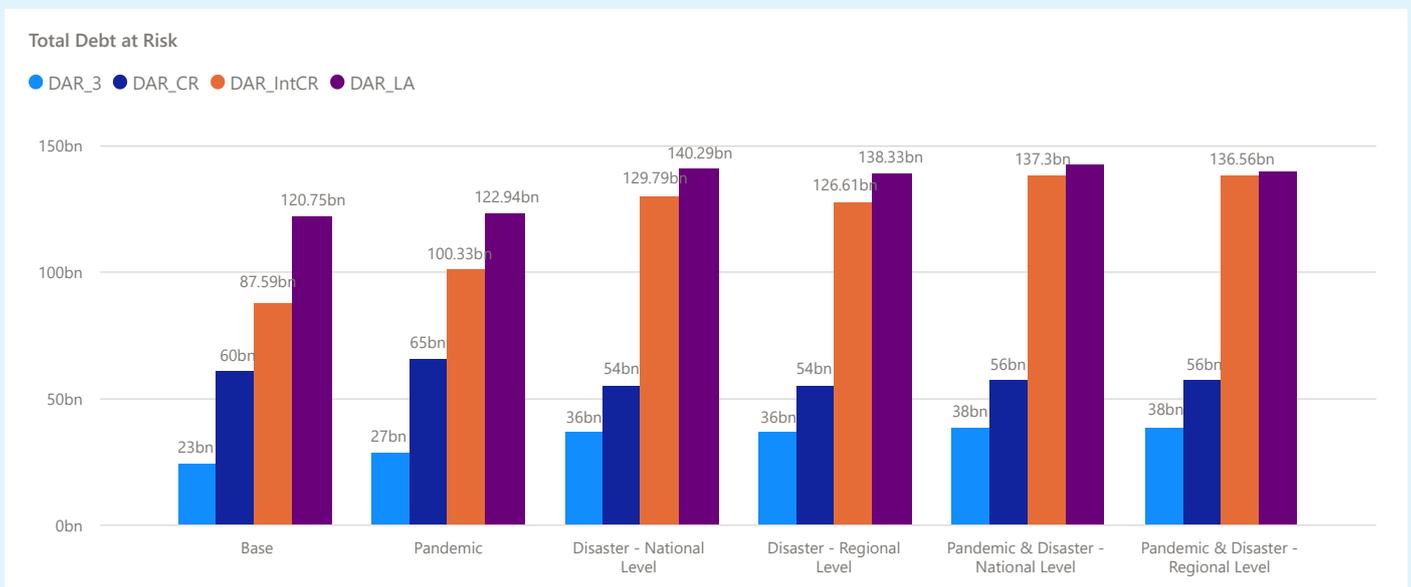


IMPACT ON THE FINANCIAL SECTOR

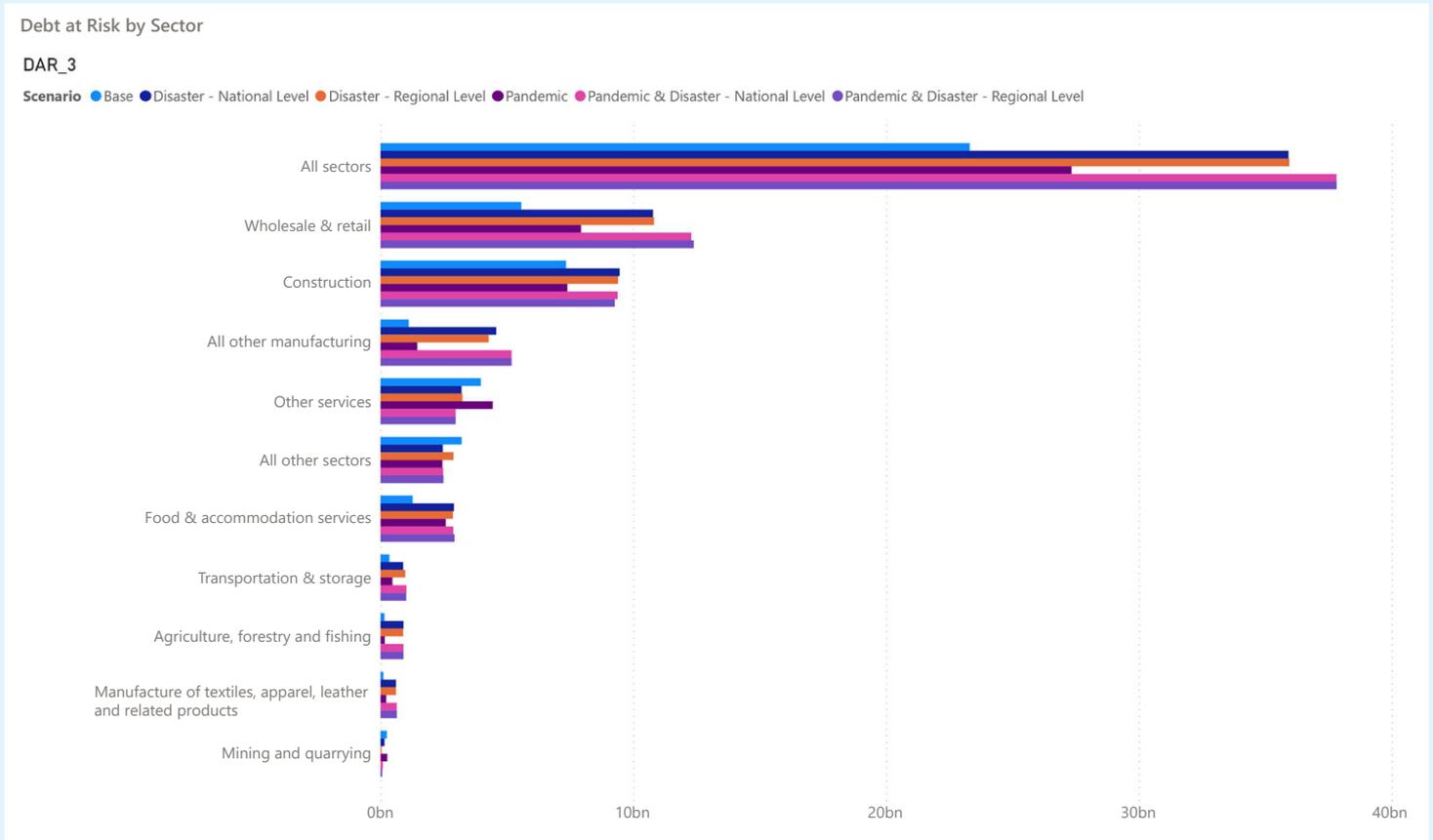
Compound shocks could further exacerbate the debt vulnerability of firms and potentially translate into financial sector vulnerabilities. Following a combined pandemic and disaster shock, the debt at risk of firms that fail all three

vulnerability thresholds could go up to lek 38 billion.¹⁷ Sectors with the highest aggregate debt at risk are also sectors with the highest shares of firms: wholesale and retail along with construction (figure 4.6a). Given the level of credit given to firms, some of these debts could potentially translate into nonperforming loans as the crisis prolongs.

Figure 4.6. Projected debt at risk under assessment scenarios



¹⁷ Debt includes both bank and nonbank debt. The three vulnerability thresholds are interest coverage ratio less than 1, current ratio less than 1, and liabilities-to-assets ratio greater than 0.75. The lek 40 billion figure for debt at risk is estimated based on the sample of 10,000 companies. The amount would be higher taking into consideration the whole population of businesses in the country.



Source: World Bank staff estimates.

Note: In figure 4.6, DAR_{IntCR} = Debt at Risk using Interest Coverage Ratio as defined by Earning Before Interest, Tax and Depreciation (EBITD) to Interest being less than 1; DAR_{CR} = Debt at Risk using Current Ratio as defined by Current Assets to Current Liabilities being less than 1; DAR_{LA} = Debt at Risk using Liabilities to Assets as defined by Total Liabilities to Total Assets being less than 0.75; DAR_3 = Debt at Risk using these three indicators and their thresholds.



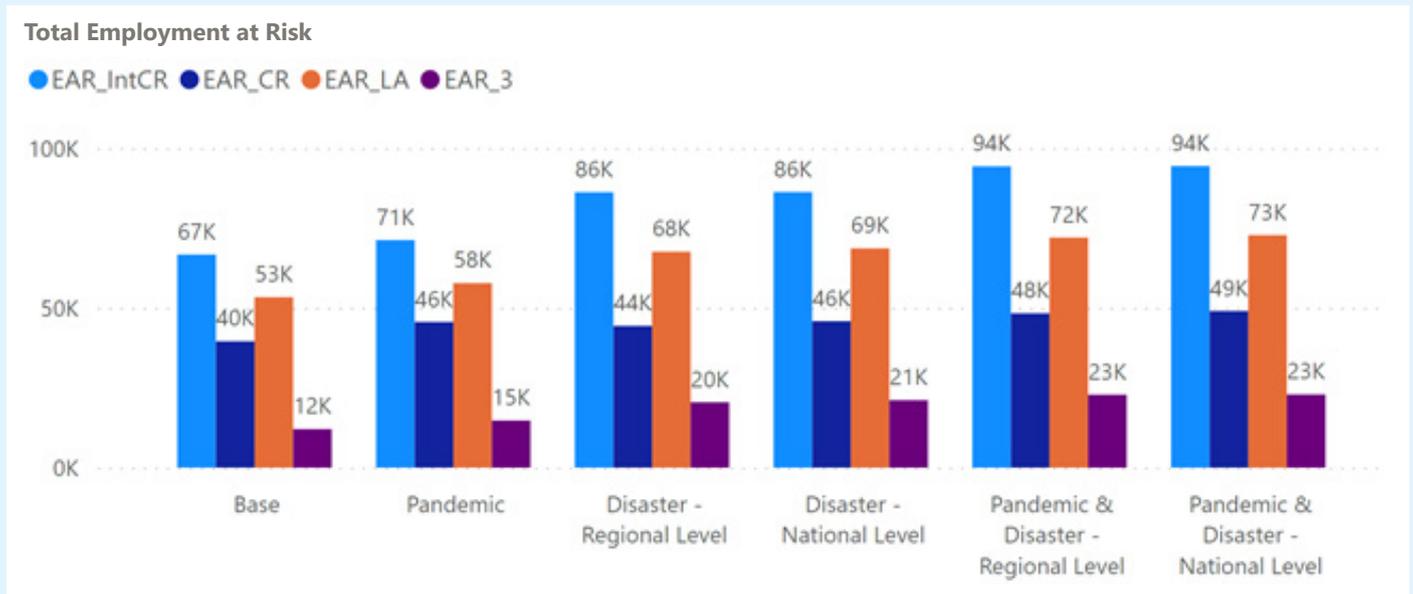
IMPACT ON FIRMS' EMPLOYMENT

Compound shocks could further exacerbate employment at risk in Albania. Employment could be put at risk at firms that have debt at risk given that firms may have to prioritize repayment to creditors. Employment in these at-risk firms¹⁸

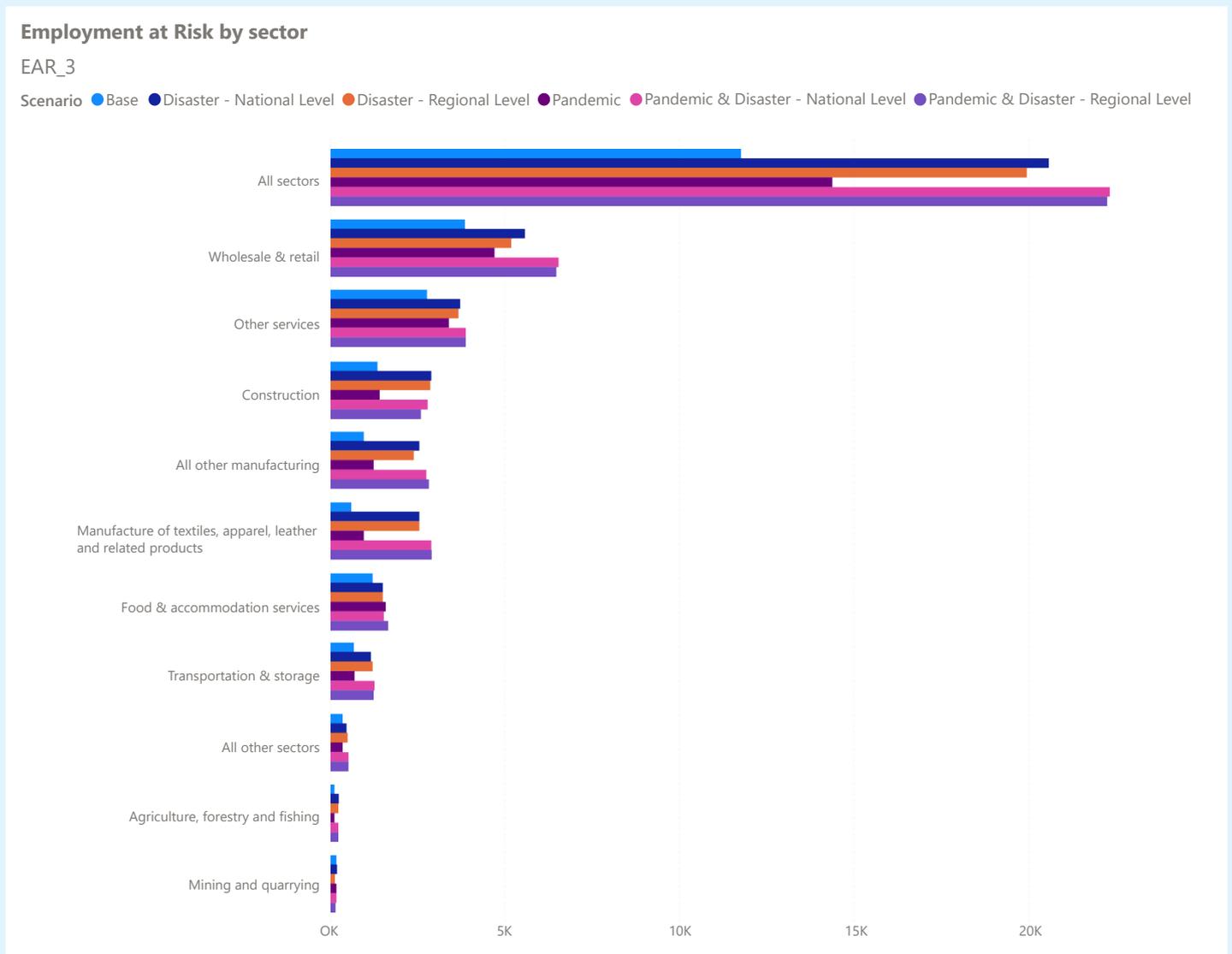
adds up to 23,000 jobs or almost 15 percent of sample firms' aggregate employment, with the highest shares in wholesale and retail and other services. Figure 4.7a and b shows the total employment at risk using different indicators and thresholds across shock scenarios.

¹⁸ Firms that fail all three Debt at Risk indicators and their thresholds.

Figure 4.7. Projected employment at risk under assessment scenarios



Source: World Bank staff estimates.



Source: World Bank staff estimates.



IMPACT ON FIRMS' CORPORATE INCOME TAX

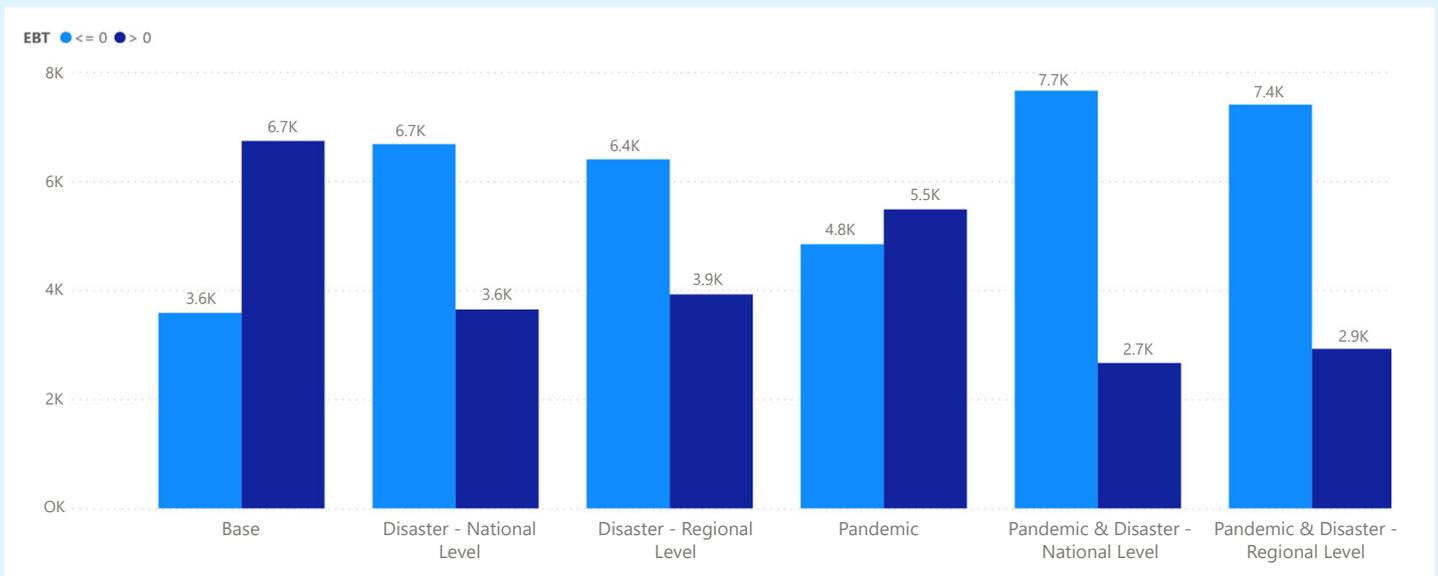
A decline in firms' earnings can affect government's revenues.

Negative shocks cause contraction in firms' earnings before tax (EBT), which in turn reduces the amount of corporate income tax payable to the government, and hence the government's tax revenues. Figure 4.8.a and b shows the

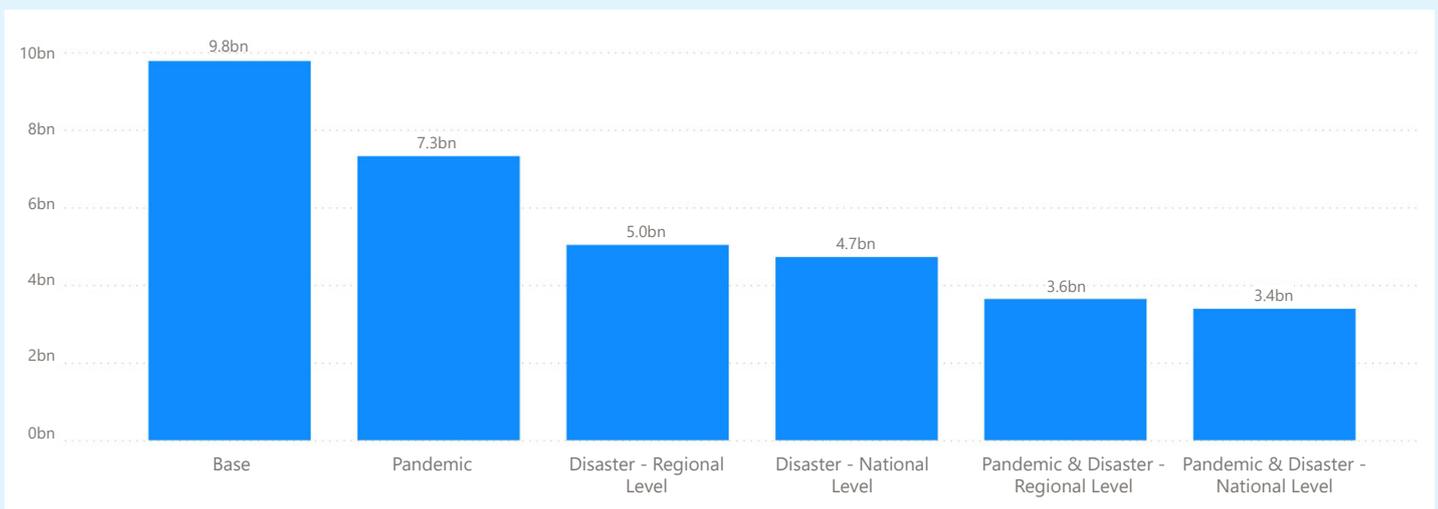
fluctuations in the number of firms that have positive EBT and the amount of corporate income tax of all firms under different scenarios. A compound pandemic and national-scale disaster shock is likely to plunge 74 percent firms into the red, doubling the number in the base case and cutting the government's corporate income tax revenues by more than 60 percent.

Figure 4.8. Firms' projected earnings before tax and taxes payable under assessment scenarios

a. Number of firms by positive and negative earnings before tax



b. Amount of corporate income tax by scenarios



Source: World Bank staff estimates.



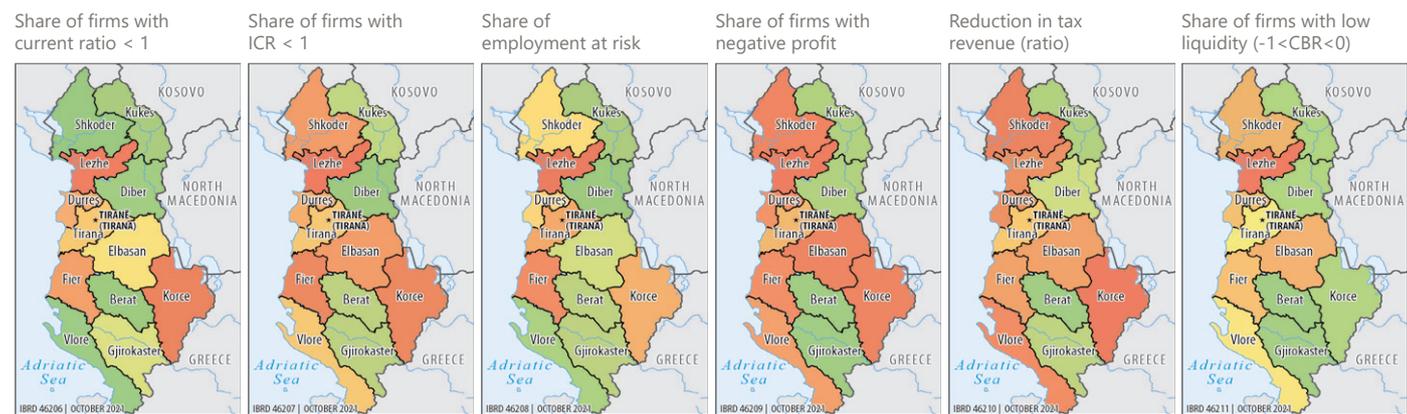
FIRMS MOST VULNERABLE UNDER SHOCKS

Due also to weaker financial performance at baseline, firms in Lezha are projected to be more vulnerable than those in other regions. By almost all financial indicators, Lezha has the highest share of firms that could become vulnerable under a compound pandemic and disaster shock: 79 percent

of firms would have negative profits; 81 percent would have earnings unable to cover annual interest expenses; 39 percent would have liquid assets unable to cover short-term liabilities; 49 percent would have insufficient liquidity to cover one year of operational costs; and 18 percent of total employment would be at risk. This is partly driven by the fact that the region also has the highest share of firms with low earnings/interest coverage ratios, low liquid assets/short terms liabilities ratios, and high share of employment at risk before shocks. Albania's main economic centers—Tirana, Durrës, and Vlora—have medium vulnerability as measured by their share of vulnerable firms. The least vulnerable regions are Kukës, Dibra, Gjirokastra, and Berati (see figure 4.9).

Figure 4.9. Financial vulnerability by region under compound shock (pandemic and regional disaster)

Region name	Share of firms with ICR < 1	Share of employment at risk	Share of firms with negative profit	Reduction in tax revenue (ratio)	Share of firms with low liquidity (-1 < CBR < 0)	Share of firms with current ratio < 1
Qarku i Lezhës	0.78	0.18	0.79	0.72	0.49	0.39
Qarku i Korçës	0.74	0.14	0.75	0.86	0.33	0.36
Qarku i Fierit	0.74	0.16	0.74	0.68	0.42	0.35
Qarku i Durrësit	0.69	0.13	0.72	0.74	0.42	0.35
Qarku i Tiranës	0.67	0.15	0.67	0.60	0.38	0.34
Qarku i Elbasanit	0.72	0.09	0.75	0.68	0.43	0.32
Qarku i Gjirokastrës	0.49	0.08	0.41	0.34	0.30	0.30
Qarku i Kukësit	0.57	0.07	0.50	0.11	0.30	0.27
Qarku i Vlorës	0.67	0.07	0.70	0.75	0.40	0.26
Qarku i Dibrës	0.48	0.04	0.49	0.38	0.32	0.25
Qarku i Beratit	0.46	0.08	0.40	0.26	0.28	0.24
Qarku i Shkodrës	0.72	0.12	0.75	0.80	0.43	0.24



Source: World Bank staff estimates.

Note: ICR = interest coverage ratio; CBR = cash burn ratio. ICR indicator in heat maps is defined as ratio of EBITD to short-term borrowing. Red, yellow, and green represent high, medium, and low vulnerability respectively: red corresponds to higher (worse) values of the financial indicators; yellow corresponds to medium values, and green corresponds to the lowest values (color intensity is proportional to the range of values of the indicators).

Transport and food and accommodation services are among the most vulnerable under compound shocks (figure 4.10). Food and accommodation services are exposed to the highest liquidity risk, and this sector has the highest share of firms that could experience a loss following the shocks: 91 percent of firms are projected to have negative profit,

88 percent to have insufficient earnings to cover interest payments, and 61 percent to have insufficient cash flow to cover one year of operating costs. Both sectors are projected to have the highest reduction in tax revenue and share of employment at risk.

Figure 4.10. Financial vulnerability by sector under compound shock (pandemic and regional disaster)

Sector group	Share of employment at risk	Share of firms with ICR < 1	Share of firms with low liquidity (-1 < CBR < 0)	Share of firms with negative profit	Reduction in tax revenue (ratio)	Share of firms with current ratio < 1
Transportation & storage	0.20	0.70	0.45	0.78	0.78	0.43
Food & accommodation services	0.19	0.88	0.61	0.91	0.97	0.68
Agriculture, forestry and fishing	0.18	0.70	0.26	0.69	0.70	0.44
All other manufacturing	0.15	0.70	0.40	0.72	0.73	0.37
Other services	0.15	0.66	0.34	0.68	0.49	0.39
Wholesale & retail	0.13	0.68	0.44	0.67	0.71	0.25
Manufacture of textiles, apparel, leather and related products	0.12	0.66	0.35	0.69	0.69	0.35
Construction	0.09	0.59	0.30	0.59	0.57	0.24
All other sectors	0.08	0.54	0.20	0.56	0.10	0.37
Mining and quarrying	0.04	0.87	0.48	0.89	0.93	0.44

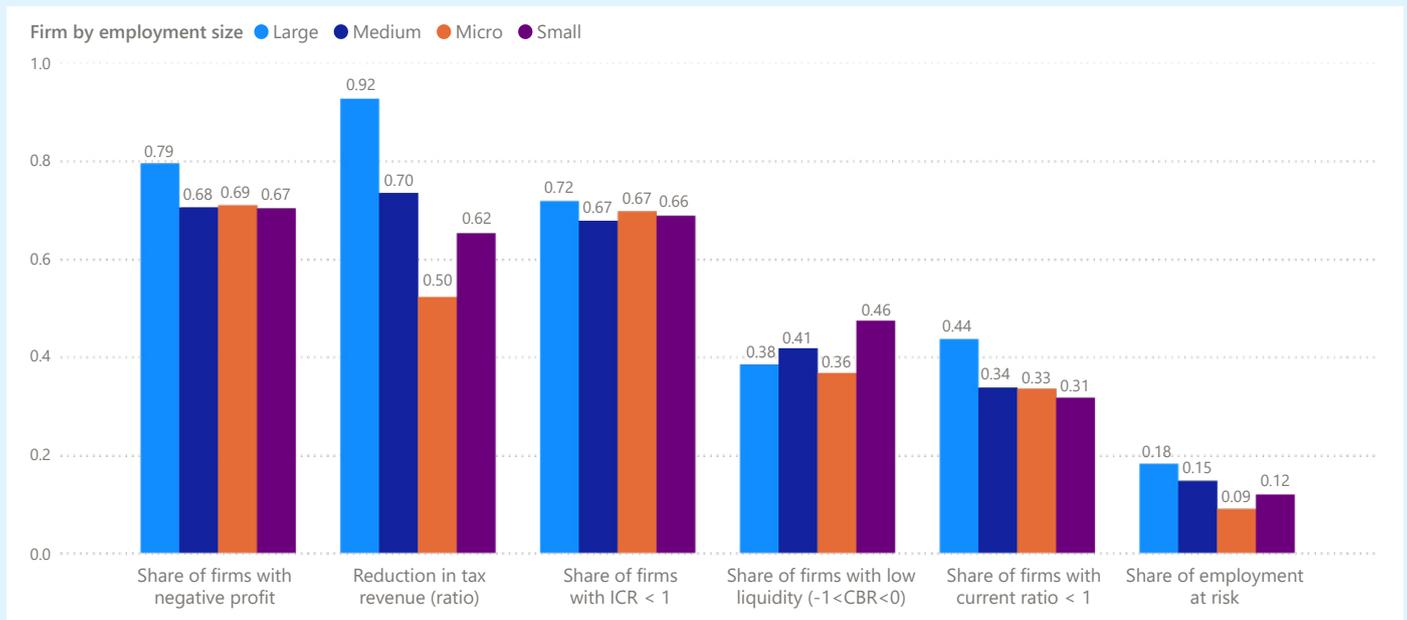
Source: World Bank staff estimates.

Note: ICR = interest coverage ratio; CBR = cash burn ratio. Red, yellow, and green represent high, medium, and low vulnerability: red corresponds to higher values of the financial indicators; yellow corresponds to medium values; and green corresponds to the lowest values.

Under compound shocks, large firms would be more impacted by reduced profits, high debt burden, and high share of employment at risk than smaller firms due to their higher reliance on fixed assets (figure 4.11). The share of large firms with negative profits under a compound shock is almost 80 percent, compared to below 70 percent for MSMEs. Among the four firm sizes, large firms have the second highest share of firms with low liquidity (cash flow unable to cover one year of operations); only micro firms have a higher share. Reduced profits and high debt burden

mean that large firms are also more likely to have a high share of employment at risk. However, these results are likely driven by the disaster shocks in addition to pandemic, which affect firms with higher assets disproportionately. Large firms also show greater reductions in the amount of applicable corporate income tax than MSMEs. Under a pandemic shock only, micro and small firms are more likely to have reduced profitability and reduced interest coverage. The share of employment at risk is also more similar across firm sizes (see annex 2).

Figure 4.11. Financial vulnerability by firm size under compound shock (pandemic and regional disaster)



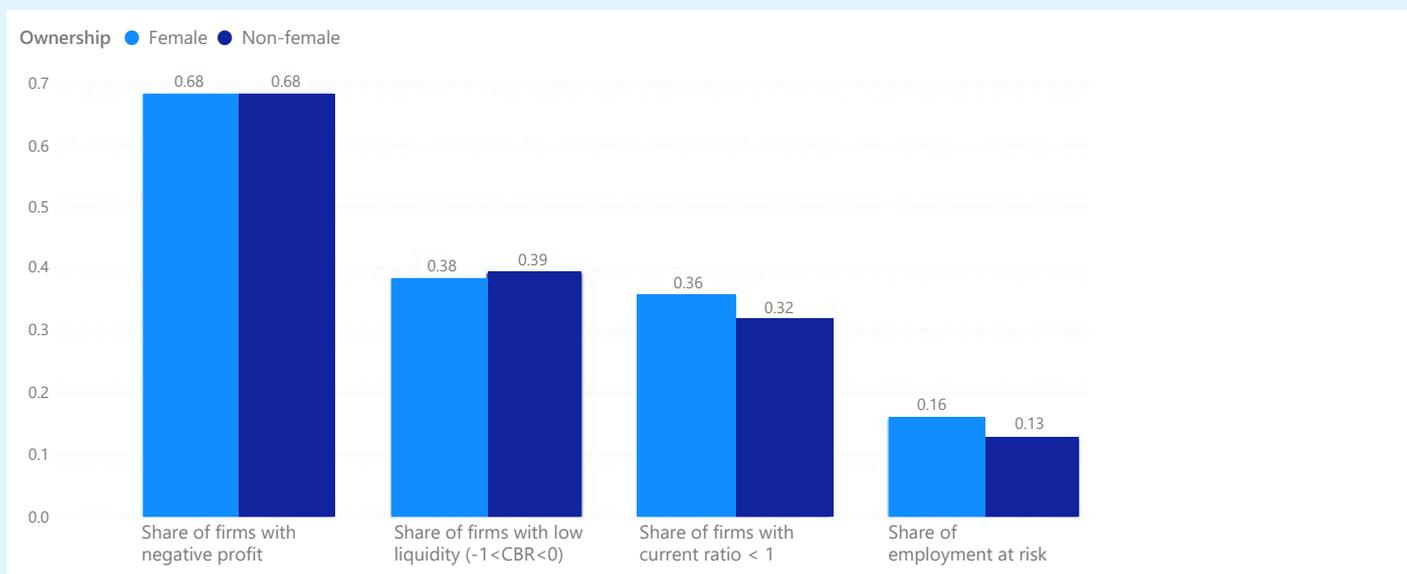
Source: World Bank staff estimates.

Note: ICR = interest coverage ratio; CBR = cash burn rate.

Both male- and female-managed firms could become much less financially resilient following a compound shock, but the share of employment at risk is higher for female-managed firms. The share of profitable firms decreases by half under a compound shock such that two-thirds of both male-managed and female-managed firms will have negative profits. The share of employment at risk in female-managed

firms rises from 8 percent under baseline to 16 percent under a compound pandemic and regional-level disaster shock; for male-managed firms, the share of employment at risk increases from 9 percent under baseline to 13 percent under the compound shock scenario (see figure 4.12 and figure A2.1b in annex 2).

Figure 4.12. Financial vulnerability of male- vs. female-managed firms under compound shock (pandemic and regional disaster)



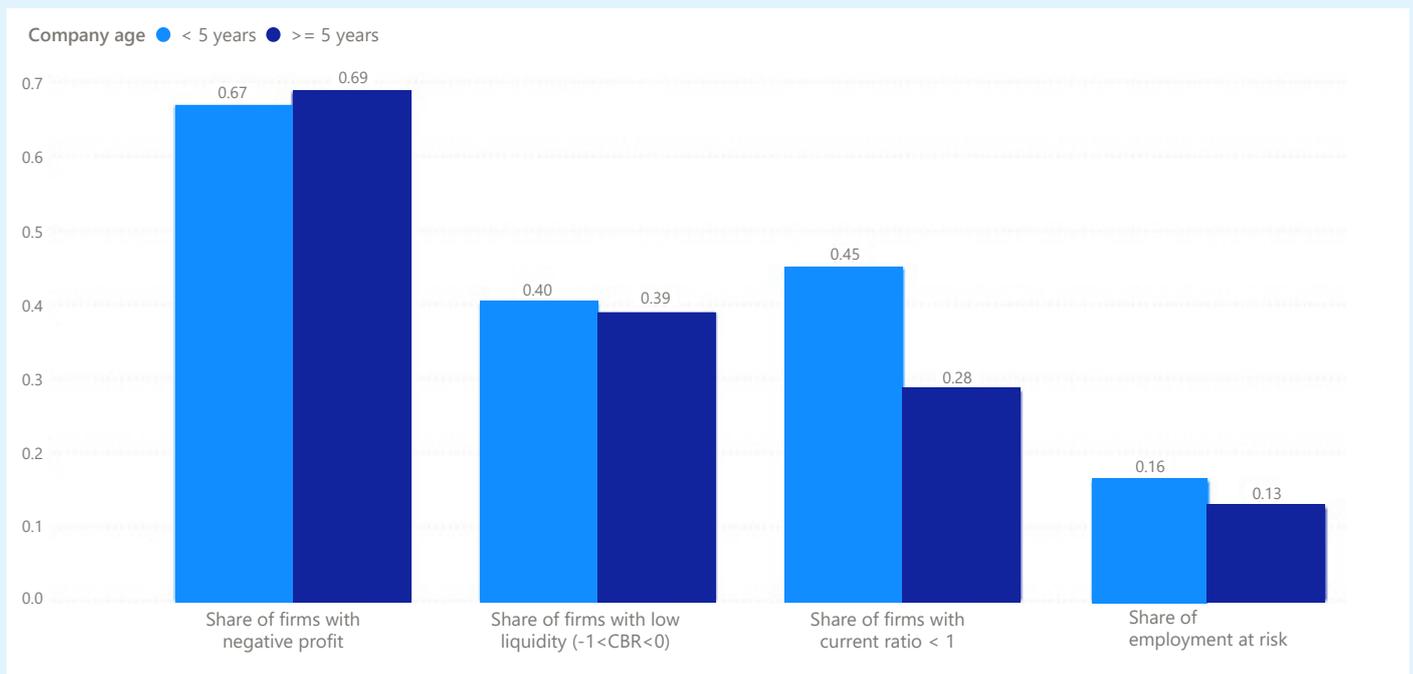
Source: World Bank staff estimates.

Note: CBR = cash burn rate.

Young firms may become disproportionately more financially vulnerable under pandemic and disaster shocks (figure 4.13). Although the share of younger firms (less than five years old) with negative profit is slightly lower than that of older firms, the share of firms with less than one year of liquidity and current ratio under 1 is consistently higher for young firms than for older firms. The share of employment at risk

is also higher for young firms, at 16 percent compared to 13 percent for older firms. This is a cause of concern, as research has shown that young firms are an engine of growth and contributed more to job creation in Albania than older firms (World Bank 2019).

Figure 4.13. Financial vulnerability by firm age under compound shock (pandemic and regional disaster)



Source: World Bank staff estimates. Note: CBR = cash burn rate.

5. Options to Support Firms Following Pandemic and Disasters



GOVERNMENT'S SUPPORT TO FIRMS FOLLOWING COVID-19 IN ALBANIA

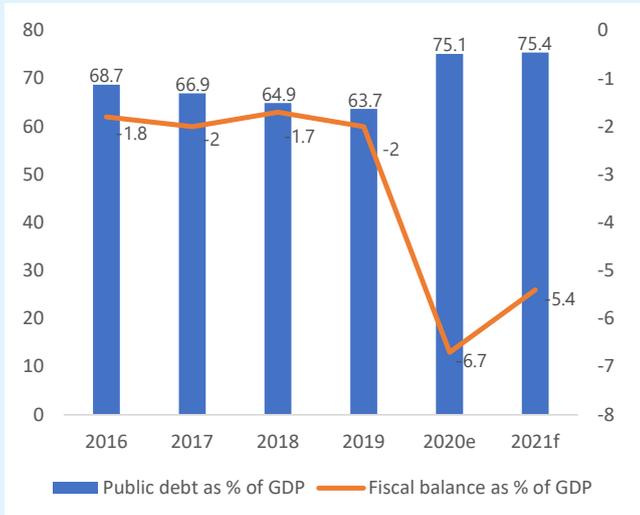
In response to the COVID-19 pandemic, the Government of Albania adopted various support packages and policy instruments in March, April, August, and November 2020.¹⁹ These packages, which sharply increased government spending (figure 5.1a), introduced wage subsidies for the businesses most affected, increased social spending, enacted a temporary moratorium on loan repayments and other forbearance measures for the banking sector, and offered credit guarantees to facilitate access to working capital, investments and wage payment. The government has also adopted different tax deferral policies for large companies, the tourism industry, active processing and call centers, and small businesses. Take-up is high for these support measures. Credit growth in 2020 is 10 percent year-on-year, despite the economic downturn, due to low funding costs and the take-up of measures to mitigate the impact of COVID-19 on borrowers (figure 5.1b). Wage subsidies measures were received by more than 87 percent of firms by April 2020, one of the highest rates in Europe (figure 5.1c). Under the first and second sovereign guarantee packages, a total loan amount of almost lek 15 billion had been disbursed by February 2021 (World Bank 2021b).



¹⁹ See World Bank 2020b; International Monetary Fund, "Policy Responses to COVID-19: Policy Tracker," <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>.

Figure 5.1. Government support measures in response to COVID-19

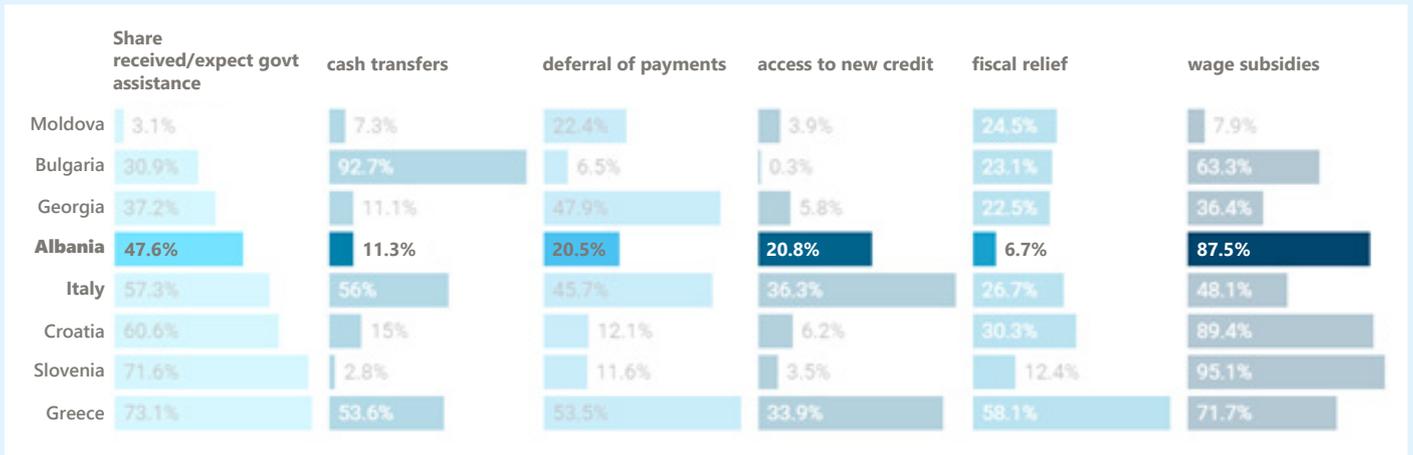
a. Increased government spending in response to the crisis



b. Increased credit growth aided by government guarantee program



c. Share of firms with access to government support in April 2020: Albania vs. regional peers



Sources: World Bank 2021b (for figure 5.1a); Bank of Albania; World Bank 2021b (for figure 5.1b); World Bank 2020d (for figure 5.1c).

Note: 2020e = 2020 estimated; 2021f = 2021 forecast



RATIONALE AND DESIGN CONSIDERATIONS FOR PUBLIC SUPPORT

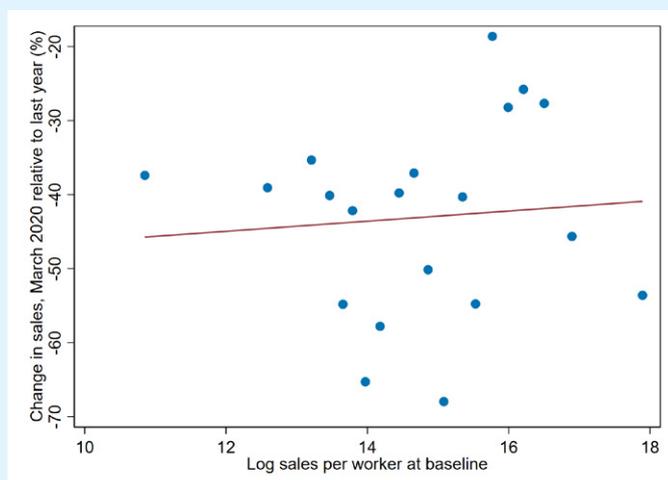
There is a strong case for policy intervention for firms following large-scale external shocks such as pandemics and disasters due to the presence of multiple market failures.

These includes a consistently large catastrophe insurance protection gap (World Bank 2020c) due to constraints on the demand and supply side of the insurance market²⁰. In addition, firms may face challenges in accessing credit following natural disasters or pandemics because banks may perceive them as high risk due to high level of uncertainty caused by large scale shocks as revealed through the COVID-19 crisis, or even if banks extend credit to firms after these shocks, they would charge high risk premium or impose additional requirements such as higher collaterals. Projection results have shown that under compound shocks,

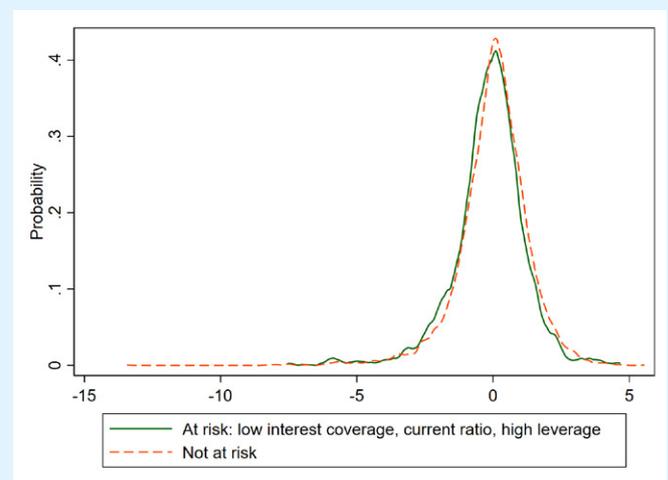
falling demand and tightening credit supply can send a large share of firms into a liquidity crunch. In the absence of any interventions, firms' liquidity crunch could result in mass layoffs and labor income losses, as firms adjust wages and employment to reduce labor costs and as insolvent firms are forced to exit. Loss of income can further cause falling demand, heighten uncertainty, and prolong the crisis. Given the widespread nature of both pandemic and disaster shocks and the potential large negative externalities costs, there is a strong case for policy intervention. The World Bank 2019 Enterprise Survey shows that the magnitude of the revenue shock in April 2020 was similar among both high- and low-productivity firms (figure 5.2a). The World Bank assessment further suggests that crises can financially impact high-performing firms just as much as low-performing firms: conditional on firm size and sector, firms projected to be financially vulnerable due to revenue shocks have similar value added per worker before the shocks (figure 5.2b). Interventions to help avoid unnecessary layoffs and firm bankruptcies could prevent the loss of potentially productive firms and preserve the long-term relationships between firms and workers that would be difficult to rebuild.

Figure 5.2. Impact of initial COVID-19 shock on "good" and "bad" firms

a. Revenue shock in April 2020 and labor productivity at baseline



b. Distribution of baseline labor productivity of projected "at risk" vs. "not at risk" firms under COVID-19 shock



Sources: World Bank Enterprise Survey 2019; World Bank 2020d.

Note: In figure 5.2a, the data are presented as a binned scatterplot that groups baseline labor productivity (sales per worker) into 20 equal-sized bins; each dot presents the average change in firm sales within each bin. Figure 5.2b shows log value added per worker, partialling out four-digit industry fixed effects and firm-level capital.

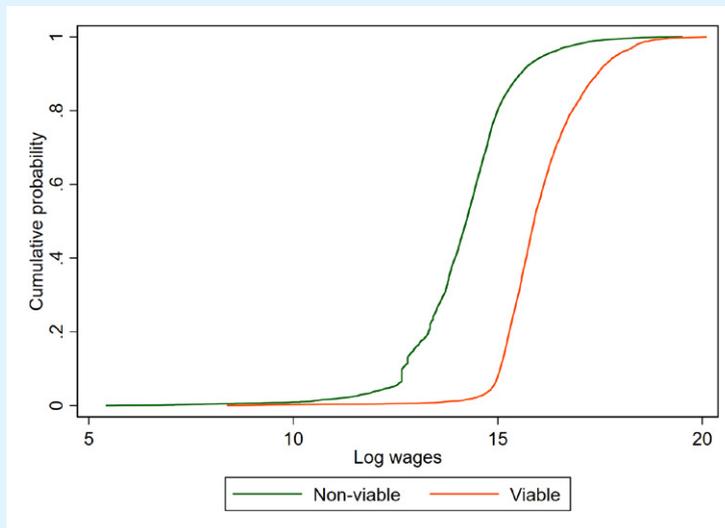
²⁰ See the discussion on "Firms' Access to Finance" in Section 1 of this report.

Policy targeting will be needed given budget constraints and the risk of resource misallocation. As estimated by the stress testing exercise, about there is a potential funding gap of about lek 800 billion, or close to half of GDP, to bring all firms with low cash reserves to one year of liquidity under the assumption of compound disaster and pandemic shocks to revenue and fixed assets (see figure 4.2c). Yet some these firms might already be financially fragile even in the absence of external shocks, while some might already have adequate access to finance. Targeting support to the firms most affected and more deserving can help preserve scarce fiscal resources and ensure that firms receive an adequate level of support in line with their immediate needs.

The government can prioritize support for financially viable firms and firms or sectors with higher potential for productive employment preservation. Analysis using financial data prior to the pandemic shock suggests that

criteria for financially healthy firms can also help select firms that pay higher wages at baseline (figure 5.3).²¹ To the extent that wages reflect worker productivity, this result argues for selecting firms that have lower risk of defaulting on debts and that are potentially more productive in the future. An analysis by the World Bank (2019) supports prioritization of productive firms, as they tend to provide more and better-paid jobs. In addition, it is important to target firms with higher potential for spillovers. One such criterion is employment. As micro informal firms are less likely to have long-term employment relationships than larger or formal firms, it might be beneficial to target support to non-micro firms in the formal sector and protect workers in micro informal firms through the social safety net. Another type of firms with high potential for spillovers is systematically large firms whose activities can propagate significant shocks up and down the value chains.

Figure 5.3. Firms' financial viability and average wages



Source: World Bank staff estimates.

At the same time, however, targeting adds elements of complexity and discretion, which will require transparent criteria and time-bound commitments to avoid risk of capture. Targeting can be difficult to implement, particularly in settings where data on businesses are limited and hard to verify. In such cases, less complex, more transparent criteria can also be used as proxy for firms' need (e.g., difficulty in accessing finance) or potential for benefits

(e.g., high productivity, innovativeness, high degree of linkages). Examples of such firms include young firms, firms that fulfill their tax obligations in the years before a shock, exporters/ importers or very large firms that are integrated in trade or global/local value chains, and firms in innovation-intensive sectors.²²

²¹Financially healthy firms are defined here as those with at least five employees, and a ratio of net debt to earnings before interest and tax under 4, or operating profit margin of at least 1 percent. See annex 2 for further discussion of viable firms.

²²Indeed, a World Bank (2019) analysis suggests that young firms and exporting firms are both more productive and contribute more to net job creation in Albania than older firms and non-exporters. Young firms in particular have been shown to contribute more to net job creation in Albania, yet are also projected to be more vulnerable under compound shocks.

Easing financial conditions and borrower relief measures might be necessary as long as conditions remain difficult; but for any measures adopted, credible commitments to phase out support is needed to avoid political capture. Evidence suggested that government assistance, once enacted, are often difficult to retract.²³ One option to design exit strategies is to link legally the continuation of support to certain objective macroeconomic indicators of recovery, such as the unemployment rate, industrial production, exports, or other high-frequency indicators about economic activities.

Climate resilience and inclusivity are among the key policy considerations for post-COVID-19 recovery. As Albania emerges from COVID-19 and pursues investment stimulus policies for recovery, the public and private sectors will find themselves in significant need of financing; this will occur at the same that the government's fiscal resources are depleting and the domestic banking sector is challenged by a potential increase in nonperforming loans as the forbearance measures phase out. Against this backdrop, one of the key questions for policy makers is how to make firms' recovery green, resilient, and inclusive so as to ensure their resilience against future shocks.



OPTIONS TO SUPPORT FIRMS' FINANCIAL RESILIENCE AGAINST PANDEMIC AND DISASTER SHOCKS

The GoA could consider a strategic approach to support firms' financial resilience following pandemic and disaster shocks as part of its effort to develop a comprehensive framework for financial protection. Such a comprehensive approach would require establishing a set of fundamental building blocks, including (i) a clear vision and priorities for financial protection of firms²⁴, (ii) development of data infrastructure

and analytics to inform policy decision-making, (iii) an enabling policy and regulatory framework, (iv) a mix of financial instruments that can be accessible to firms in times of shocks, , and (v) mechanisms for implementation, delivery, and monitoring and evaluation. The GoA could also consider a more holistic approach to financial resilience that takes into account other interconnected risks that could potentially compound the impacts on firms.

A policy, regulatory and institutional framework conducive to pre-arranged financing mechanisms is critical in supporting firms to weather future disaster and pandemic shocks. At high level policy making, the GoA could consider the use of sovereign contingent financing mechanisms in case it needs extra funds to backstop liquidity support to firms following extreme shocks. It is important that such policies are designed to crowd in private capital to share the burden with the government in post-event funding through risk sharing mechanisms such as insurance or partial credit guarantee schemes. In order to address impeding market failures, public and private stakeholders can work together to provide quality and affordable risk finance products. An effective supporting regulatory, institutional and capacity environment is needed to optimize the uptake of these products. This includes measures to address the constraints on both demand and supply side including interventions to increase firms' awareness of these financial risk management mechanisms and stimulate the risk culture possibly through regulatory requirements to embed risk finance considerations into public procurements, and strengthen regulatory and oversight framework, as well as policy making and technical capacities of public institutions involved in regulating or overseeing market players that are part of the supply chain of such financial risk management products.

A range of fiscal/financial instruments are available for policy makers to provide ex-ante protection or address ex-post liquidity shortages brought on by pandemic and/or disaster shocks. Some selected options are discussed below. Some instruments such as payment deferrals, grants and loans have already been used in Albania following the COVID-19 pandemic. Others, including, equity, equity guarantee, and disaster risk insurance instruments are still relatively underdeveloped.

²³ For example, in Brazil, credit market interventions in response to the global financial crisis continued to expand even after the economy recovered (Bonomo, Brito and Martins 2015).

²⁴ See the above discussion on targeting firms for support.

Nevertheless, in the long-term, development of these instruments is needed to strengthen both government and private sector's financial resilience. Each of the options has its own advantages and disadvantages and can be combined in an optimal way to deliver support to firms in a timely and cost-efficient manner. These include:

i. **Deferral of tax obligations and other fees:** While taxation is an instrument entirely under control of government, the limitation of tax deferral is that it can be effective only for firms that make tax payments, such as those with positive profits. There will be many firms that make a loss following these shocks and will not be able to benefit from such tax holidays.

ii. Injection of liquidity into firms through **grants and bridge loans** or through **(contingent) lines of credit:** The provision of direct liquidity should be done only in an emergency context, given the limited fiscal space and option of providing lines of credit only if there is a shortage of liquidity in the banking sector. Contingent lines of credit could be pre-arranged by the government through dedicated structures in a way that eligible firms can access liquidity quickly when a post-event trigger is met, for example an earthquake of a certain level of severity.

iii. **Equity:** In addition to debt instruments, the government can also consider supporting introduction of equity or quasi debt/equity instruments – for example through public-private investment funds. As additional liquidity reaches firms in the forms of debt, there is a risk of debt overhang, deterring future investments, highlighting the importance of alternative instruments (Carletti et al. 2020). Further, equity instruments can help governments sidestep the issue of targeting and can be particularly suited to support young and innovative firms and mobilize private investments in key industries such as green energy and infrastructure (Freund and Pesme 2021). However, the equity investment industry in Albania is still in its nascent stage (see below on equity guarantees).

iv. **Guarantees** to alleviate barriers to private sector credit: Credit guarantees should be provided only when the banking sector has sufficient liquidity. Because the guarantor

is liable only for defaulted loans, the up-front cost of credit guarantees is typically much lower than for lump-sum distributions. In the context where targeting financially viable firms is challenging, guarantee funds could also consider equity guarantee instrument through which the guarantee agency will provide a guarantee to private investment funds such as private equity or venture capital funds that invest in firms' equity. This option may work in contexts where private equity investment is more advanced which is not the case in Albania for the time being given the nascent equity investment industry in the country.

v. **Insurance** to provide financial protection to firms post disaster: The government could support the further development of insurance products as risk management instruments for firms, for example stimulating property insurance to protect firms' physical assets from damage caused by disasters or business interruption insurance to cover firms' loss of income due to disruptions caused by catastrophic events. Given the current level of development of the insurance industry, the government could consider supporting the set up of a risk pooling mechanism for firms to share the risks.

This report attempts to quantify the total funding required for firms to sustain one year of operations, focusing on the three policy options— tax deferrals, lines of credit, and credit guarantees—that could help firms overcome liquidity shortages. Figure 6.1 shows the up-front costs of these options. The total cash funding required for 5,204 viable firms to survive one year could be as high as lek 34 billion under a pandemic scenario.²⁵ This amount could increase by 66 percent, to lek 56.5 billion, under a pandemic and national-level disaster scenario.

Under the first option, the GoA could support firms in efforts to alleviate liquidity constraints through **deferral of tax obligations**. The amount of a one-year tax deferral under a pandemic scenario would be 0.9 billion; under a compound pandemic and natural disaster shock, it would be lek 1.5 billion. These amounts are only a fraction of the total funding required by firms. The calculation takes into account the various tax rates applied to firms with varying levels of revenue.

²⁵ Viable firms are defined as firms with at least five employees, with a ratio of net debt to earning before tax less than 4 or an operating profit margin greater than 1 percent.

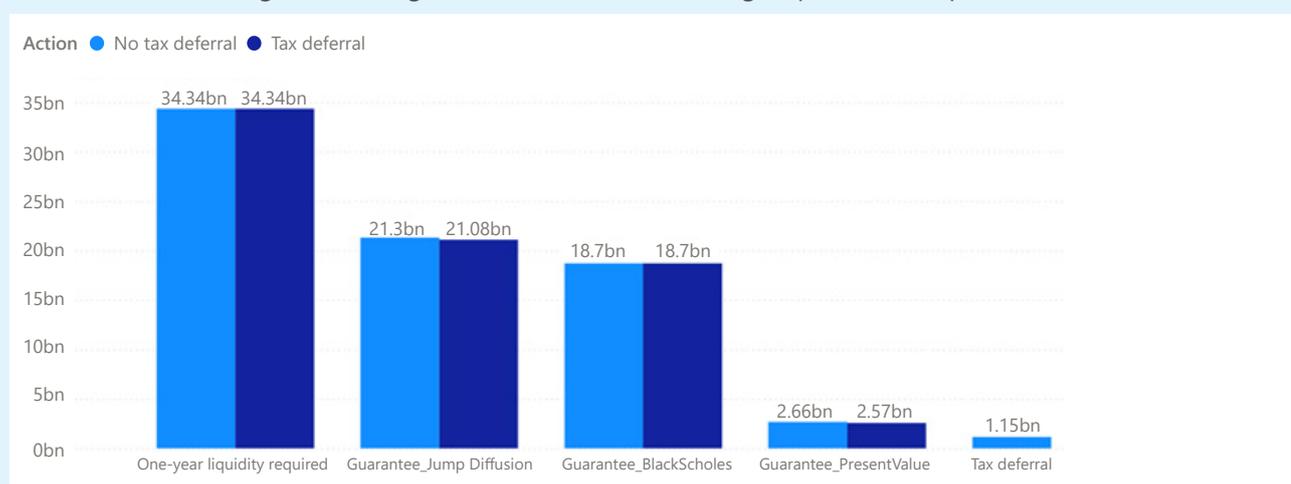
While the Albanian banking sector currently has ample liquidity following the COVID-19 crisis, the GoA could consider as a second option a [line of credit](#) to inject liquidity into firms in future scenarios when local banks lack sufficient liquidity. The size of the credit line could be decided based on the size of firms' calculated funding needs, government's fiscal space, government's contingent liabilities from such provision of support,²⁶ and the state of development of the country's financial sector.

If the GoA alleviates liquidity constraints using [credit guarantees](#), the third option, its contingent costs of support

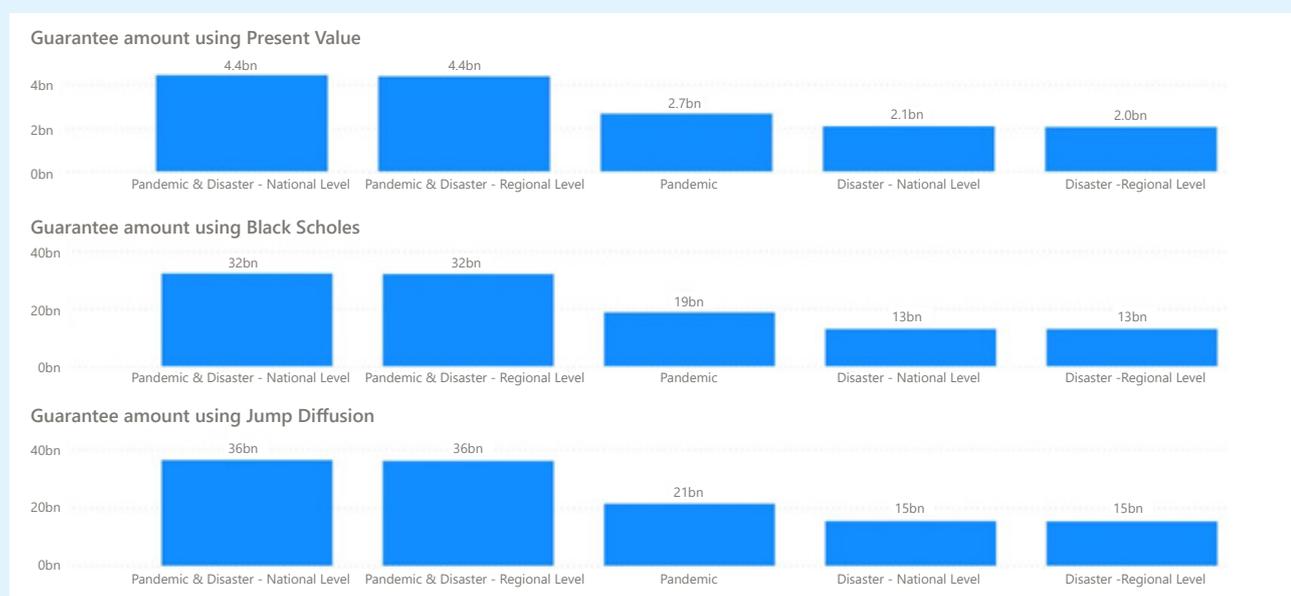
in different shock scenarios and using different valuation methods range from lek 2 billion to lek 36 billion. Under a pandemic scenario, the government's potential contingent liabilities for providing full credit guarantees to access lek 34 billion in banks' credits could amount to lek 21 billion for all viable firms.²⁷ As indicated above, the estimates for funding support are based on the sample of firms with available data for the analysis, which accounts for 56 percent of all formal firms reporting to the National Business Center. The actual funding may be higher considering the full population of firms in Albania.

Figure 6.1. Options for financial support to viable firms

a. Tax deferral, contingent cost of guarantees, and total funding required under pandemic scenario



b. Guarantee funding under different stress scenarios: Analysis using present value (top), Black Scholes (middle), and jump diffusion (bottom)



Source: World Bank staff estimates.

Note: *Guarantee_PV_VF* = Contingent cost of credit guarantee using present value method for the required funding for viable firms to sustain one year of operations; *Guarantee_BS_VF* = Contingent cost of credit guarantee using Black Scholes method for the required funding for viable firms to sustain one year of operations; *Guarantee_JD_VF* = Contingent cost of credit guarantee using Merton's jump diffusion method for the required funding for viable firms to sustain one year of operations.

²⁶ Valuing the contingent cost of loans would be similar to valuing the contingent cost of credit guarantee. See annex 1 for further details.

²⁷ Calculations use the Black Scholes and jump diffusion methods.

As firms face increasing risk of climate change and disasters and governments face increasing fiscal constraints, the GoA could consider crowding in private capital through “greening” and de-risking of instruments that will be used to support firms’ recovery. This could be done through mainstreaming the green, resilient, and inclusive requirements within the instruments that will be used to support firms and by embedding financial protection elements into these instruments to strengthen firms’ resilience in the face of future shocks. An example would be to design new windows under credit guarantee schemes in order to redirect capital towards low-carbon activities²⁸ and embed a risk-sharing mechanism to lessen the exposure of these schemes to climate and disaster risks.

To support firms’ long-term recovery and resilience, the proposed financial instruments will have to work in tandem with other structural and nonstructural measures.

Access to finance is not the only constraint faced by firms making investments to be more productive and resilient. Evidence suggests that despite its severe impact on firms globally, the COVID-19 pandemic has a silver lining: the rapid adoption of digital technologies in response to the lockdown shock (Apedo-Amah et al. 2020). In Albania, 18 percent of firms had started using or were increasing the use of digital platforms as of April 2020 (see table 22). To compete with firms globally, Albanian firms will need to continue investing in new technologies and innovations. However, this process is fraught with uncertainties and impeded by various barriers, including information frictions and shortages of skills, which may require different types of interventions.

Policy to in recovery phase will have to shift focus from supporting “hibernation” to “reactivation”. In this new phase, the government has a range potential policy options to facilitate recovery through encouraging productive investments and reallocation of resources. Examples of these measures include:

- In the short run, more immediate support on the demand side to expand firms access to markets (e.g., export promotion arrangements, simplification of export licenses, simplification and digitization of government-to-business transactions to ease participation in public procurement). To directly support firms in efforts to improve capacity for

technological upgrading, the government can provide access to technology extension programs as well as management capability programs that target general managerial practices.

- In the medium term, tax incentives can be restructured to encourage beneficial investments, such as investments in green technologies and in FDI firms to train the local labor force.
- In the longer run, continued structural reforms can help improve competition and encourage productive firms to enter and expand, and can reduce the cost of exit by nonproductive firms. These reforms would include, among others, new regulatory framework for start-ups, improved insolvency resolution, transparent policy implementation and simplification of procedures, and accelerated investments in critical infrastructure.

A full discussion of non-financial instruments is outside the scope of this paper. For a summary of the pros and cons of different policy instruments and considerations for targeting and policy design, see Freund and Pesme (2021).

Finally, sound analytical underpinnings for decision making on support to firms’ financial resilience requires quality data and robust analytics. The quality of decision making heavily relies on the quality of data and analytics. The GoA has made a great stride in building up a national database of firms’ business and financial data over the past few years. Availability of these data will allow a range of analyses to inform policy decisions, including assessing firms’ financial vulnerabilities which can be extended to analyze vulnerabilities in the country’s employment markets, government tax revenues and financial system. The next step would be to strengthen data infrastructures to enable data sharing across different government agencies. Besides strengthening data infrastructure, the government can continue expanding data collection and develop a set of analytical tools to mainstream the use of data for different policy objectives. To support the green, resilient growth agenda, it will be important to collect data on historical damage to firms’ physical assets, losses to firms’ revenues, and government spending for firms’ support in tandem with firm’s financial information.

²⁸ Calice, P., “From protection to reallocation: Public credit guarantee schemes in the post-pandemic world”, <https://blogs.worldbank.org/psd/protection-reallocation-public-credit-guarantee-schemes-post-pandemic-world>

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Annex 1. Methodology for Assessment of Firms' Financial Vulnerability

OBJECTIVES

- 01.** The main objectives of the analytical framework and methodology are these:
- Understand firms' financial vulnerability by analyzing the impact from exogenous revenue shocks on firms' profitability, liquidity, capital structure, and debt vulnerability.
 - Establish the relationship between financial fragility (debt at risk, or DaR) and employment vulnerability (employment at risk, or EaR).
 - Help viable firms avoid bankruptcies due to liquidity shortfalls.
 - Inform government's financial planning by (i) quantifying funding demand to improve short-term liquidity, and (ii) estimating the (up-front) cost of different fiscal/financial support packages.

FRAMEWORK FOR ANALYSIS

Shock Transmission Channels

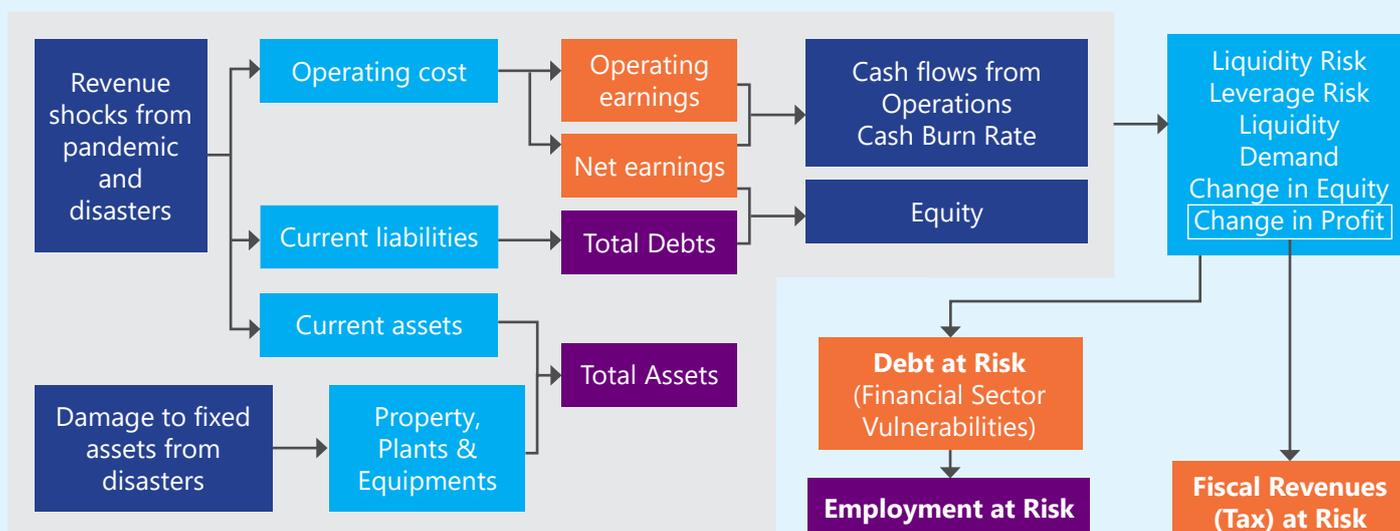
- 02.** The COVID-19 shock affects firms' demand and supply globally and simultaneously through several channels (World Bank Group 2020):
- Demand: COVID-19 shock can affect firms' (i) demand for final local consumption and exports and (ii) demand from other firms in the value chains which can impact the quantity sold and prices.
 - Supply: COVID-19 also causes supply side shocks due to lack of intermediate goods including imported goods as value chains are disrupted.
 - Financial markets: SMEs are particularly reliant on cashflows to fund working capital and will face more strains due to disruptions in cash flows. They are expected to face more restrictions in access to bank finance due to banks' perception of uncertainty and limited physical access to banking services. Potential volatilities in financial markets can also impact bank funding costs.
 - Labor market: COVID-19 caused a shock to supply of labor including (i) a decline in the availability of labor due to containment measures and workers' lives are disrupted; (b) decline in firm productivity as workers are less efficient as they adjust to new working modalities and processes.
 - A feedback loop due to losses of labor income and uncertainty: Shocks to labor income further causes loss and reduction in earnings among the workers which will in turn affect the demand for consumption of firms' goods and services in the faces of reduced disposable incomes. Uncertainty about both the direction and magnitude of demand and supply shocks can affect the sentiments of businesses and households making them more uncertain about their future income or employment and causing them to cut spending and increase their precautionary savings.

- 03.** Disaster shocks can affect firms through channels similar to the COVID-19 shock. However, the magnitude is likely to differ, as past disasters have not generated any simultaneous global shocks of such magnitude and scale before. Rather, disasters often occur more locally (in one or more locations of a country) or regionally (in a few countries, such as the tsunami in 2004). Disasters can present additional shocks to firms through the following channel:
- Asset values and services: Disasters affect firms' value, outputs, and revenues through direct damage to firms' physical assets and through indirect impact from impaired infrastructure or disrupted utility services and disruption in firms' demand and supply.

Stress Testing: Modeling the Impact of COVID-19 and Disaster Shocks on Firms' Financial Vulnerability Using Firm-Level Balance Sheet Data

- 04.** A microeconomic and corporate balance sheets approach is used to simulate firm's financial vulnerability, including liquidity and leverage risks. Although firms can be impacted by multiple channels, as discussed above, our approach focuses on negative shocks to revenue and fixed assets' services.
- 05.** In terms of forecasting financial results, firms are assumed to adjust costs proportionally based on estimated elasticities, leading to changes in earnings and other changes on the balance sheets. We assume that firms are able to adjust other inputs and employment due to changes to revenue and input cost. These shocks and subsequent decisions will result in changes to earnings and cash flow and eventually lead to liquidity risk, inability to survive, and further job losses.

Figure A1.1. Accounting framework to model the impact of pandemic and disaster shocks on firms



Note: *assumed to change linearly with revenue based on a fixed elasticity

Source: World Bank.

Financial vulnerability indicators

- 06.** Firms' cost structures, capital structures, and revenue structures are quantified, subject to data availability, in order to understand their business and financing models. Along with revenue, key cost components are analyzed, including interest expenses, overhead, and other fixed costs; variable costs, including direct labor, materials, and utilities, are also analyzed.
- 07.** Leverage vulnerability indicator is created to quantify the number of firms and the amount of capital vulnerable to an economic shock in emerging and developing economies. Specifically, financial ratios from three categories (interest coverage, liquidity, and capital structure) are examined. Businesses that fail to meet a threshold on one or more of these ratios are considered at risk.

Interest Coverage

$$\text{Times interest earned and cash burn: } \frac{\text{EBIT}}{\text{Interest expense}} = \frac{\text{EBIT}}{\text{Short-term debt}} \frac{\text{CF from operation}}{\text{Cash}}$$

Liquidity

$$\text{Current ratio: } \frac{\text{Current assets}}{\text{Current liabilities}}$$

Capital structure

$$\text{Leverage and structure: } \frac{\text{Total debt}}{\text{Book value of equity}} \quad \frac{\text{Total debt}}{\text{Total assets}}$$

$$\frac{\text{Short-term debt}}{\text{Long-term debt}}$$

$$\frac{\text{Short-term debt}}{\text{Long-term debt}}$$

We create specific thresholds for each indicator, and firms failing to meet this threshold are considered vulnerable based on the particular indicator.

Indicator	Vulnerability threshold
Interest coverage ratio	< 1 (earnings unable to cover annual interest expense)
Current ratio	< 1 (liquid assets unable to cover short-term liabilities)
Liabilities/assets	> 0.75 (high leverage reduces ability to obtain more financing)

08. The amount of debt at risk is quantified for a specific country by linking the indicator scores to the value of outstanding debts.²⁹

$$\text{DaR} = \frac{\text{Total debt of country x firms that are vulnerable based on y indicators}}{\text{Total debt of country x firms}}$$

This can be rolled up to the sector level within a country, and by focusing on the numerator only, the total monetary value of the DaR can be quantified.

Assumptions on shocks to revenue and asset services

09. **Assumptions on pandemic shocks.** Each business will be impacted both on the revenue side and the cost side in a disaster scenario. Scenarios are constructed to vary in length (in months) and severity (in revenue loss and input cost changes).

- Assumptions on revenue loss will rely on (i) macroeconomic indicators, (ii) survey results where available, and (iii) information on sectoral vulnerability (e.g., due to the intensity of face-to-face interactions and elasticity with respect to consumer income).
- In the case of Albania, the revenue loss is differentiated by one-digit sectors and is assumed to be proportional to estimated sectoral GDP growth in 2020 (see table below).

²⁹This approach is based on Feyen et al. (2017), with modifications to accommodate the objective of the assessment

	Change in annual sales (%)		
	Small firms (< 20 employees)	Medium firms (20–99 employees)	Large firms (100+ employees)
Agriculture, forestry and fishing	-1.02	-0.96	-0.83
Mining and quarrying industry	-39.18	-36.96	-31.79
Manufacturing industry	-10.81	-10.20	-8.77
Electricity, gas, steam and air conditioning supply	24.42	23.04	19.81
Water supply; sewerage, waste management and remediation activities	7.00	6.60	5.68
Construction	0.76	0.72	0.62
Wholesale and retail trade; repair of motor vehicles and motorcycles	-12.34	-11.64	-10.01
Transportation and storage	-31.80	-30.00	-25.80
Accommodation and food service activities	-38.29	-36.12	-31.06
Information and communication	-6.74	-6.36	-5.47
Real estate activities	8.52	8.04	6.91
Professional, scientific and technical activities	-18.95	-17.88	-15.38
Administrative and support service activities	-17.04	-16.08	-13.83
Education	-4.07	-3.84	-3.30
Human health and social work activities	7.89	7.44	6.40
Arts, entertainment and recreation	-12.97	-12.24	-10.53
Other service activities	-13.48	-12.72	-10.94

- Costs are also impacted in each scenario. Variable costs can be adjusted to revenue loss, but other fixed costs and wage costs in particular are generally inflexible in the short run. Cost adjustment will depend on the extent of revenue loss, which is measured through elasticities estimated from firms' historical balance sheet data.

10. Natural disaster shocks. Disasters are assumed to happen in the country/territory of the study, and impact on firms is translated into revenues, fixed assets, and capital/equity due to loss of outputs.

- Damage to fixed assets is estimated through probabilistic catastrophe risk modeling or historical actuarial analysis. Firms' fixed assets (properties, equipment, inventories) on their balance sheets are assumed to be all geographically distributed in the same country/territory under consideration and proportionately follow the loss distribution of all modeled private assets (if available) or total modeled assets for the country/territory. Losses are estimated on a probabilistic basis at various return periods.
- Loss of output (revenue) is estimated based on proxies, given the scarcity of data.

Loss assumptions	
Damage to fixed assets	Regional level:
	<ul style="list-style-type: none"> • Damage ratio from floods: Shkoder, Fier, Korce, Elbasan, Vlore: 17% (1-in-50-year event) • Damage ratio from earthquake: Kruje, Shijak, Kavaje, Kamez: 14% (1-in-50-year event) • Damage ratio from both floods and earthquake: Tirana, Durres, Lezha: 15.3% (1-in-50-year event)
	National level:
Loss of output (revenue)	<ul style="list-style-type: none"> • Damage ratio: 15.3% across all firms
	<ul style="list-style-type: none"> • Number of days of business interruption (complete revenue loss) per year = 20 days

11. Measuring firms' cash flow movements in response to shocks. A change in demand (sales) due to external shocks will impact firms' cash from operations (CFO). Changes to CFO are measured by changes in sales, changes in operating costs, changes in corporate income taxes, changes in current assets and current liabilities, and elasticities of these changes in current assets and liabilities to changes in sales.³⁰

12. Measuring employment vulnerability. An EaR indicator is created to allow for comparisons of total employment in financially distressed firms under each stress scenario.

EaR = Total employees of firms in country x whose debt is vulnerable based on y indicators

- In addition, firms' employment responses are allowed to change as firms adjust total labor costs. Changes to survival probability are also estimated based on historical data. Aggregate employment impact can be predicted through a combination of employment adjustments in surviving firms and job losses in exiting firms.

Estimating potential funding support required for firms' survival

13. Cash burn rate ((CBR) is quantified for baseline and different scenarios using cash on balance sheets and CFO and CFO movements estimated. The CBR will show how quickly (number of months/years) firms' cash buffers will be depleted for survival.

- CBR measures how long (number of months/years) a firm's cash flow from operations builds or burns its current cash holding on its balance sheet: $CBR = (Cash)/(CFO + \delta CFO)$
- Firms with CBR between -1 and 0 are those that have less than one year of liquidity and hence a high risk of not surviving.

14. Stress tests. Firms' financial ratios are stress tested by simulating different outcomes under various future stress test scenarios based on the impact of COVID-19 and disasters. Firms' cash flows and DaR are first estimated for the baseline scenario. Firms' responses are captured under each stress scenario.

15. Funding required is calculated as the amount of funding required to ensure a firm has at least one year of cash for survival based on the CBR.

To inform potential policy targeting, this funding gap estimate can be disaggregated by (i) level of firm productivity, (ii) firm size, and (iii) sector. Disaggregating funding gaps by firm type will provide information on how much funding is needed to prioritize certain firms—e.g., high-productivity firms or small and medium enterprises.

³⁰ This approach is based on the methodology in De Vito and Gomez (2020).

Assessment of Policy Interventions to Alleviate Liquidity Constraints

- 16.** Several policy options exist for policy makers to address a liquidity crisis brought on by pandemic shocks or other disaster scenarios. To improve firms' cash flow, the government can choose to reduce firms' obligations through **deferrals of payments** such as taxes, interest payments, and other fees. The limitation of this approach is that it can be effective only for firms where such payments are applicable (such as those with positive profits, those with existing loans). Another way to inject liquidity is through increasing cash available to firms, such as through direct **lump-sum payments** (using grants and bridge loans) or direct lending through **subsidized loans**. In addition, **credit guarantees** may be an effective means of injecting liquidity while simultaneously stimulating private lending. Because the guarantor is liable only for defaulted loans, the total cost of credit guarantees is typically much lower than for lump-sum distributions.
- 17.** In this report, the assessment of policy interventions focuses on estimating the expected cost to ensure firms have at least one year of cash for survival based on the projected CBR. This entails
- Calculating the **total funding required as a lump-sum payment to firms**
 - Calculating the cost of **tax deferrals** (as an illustration of payment deferrals)
 - Calculating the cost of **credit guarantees**

The assessment bypasses the evaluation of loans, as the up-front cost of loans would be similar to the lump-sum method cost. However, in this case, the government would expect repayment at a subsidized interest rate. Thus valuing the contingent cost of loans would be similar to valuing a credit guarantee.³¹

- 18. Direct provision of cash as a lump sum.** The amount and cost of a lump-sum provision of cash can be determined by setting the CBR equal to the desired time period for liquidity. As a lump-sum cash distribution immediately increases the cash on the balance sheet, the funding would affect the numerator:

CBR = where t denotes the desired time period for liquidity.

- Solving for funding we get:

$$\text{Funding} = t * (\text{CFO} + \delta\text{CFO}) - \text{cash}$$

- 19. Tax deferrals.** A tax deferral decreases a firm's current taxes, which will help increase its cash flow from operations, in turn helping to alleviate its CBR. The cash burn rate is expressed thus:

$$\text{CBR} = \frac{\text{Cash}}{\text{CFO} + \delta\text{CFO}}$$

where the denominator is the projected annual cash flow from operations under shock scenarios. Firms that have negative CBR are using up cash in daily operations, since the denominator is negative. Only firms with a negative CBR will require funding.

- To estimate the cost and the funding required to provide enough liquidity for one year, we set the following relationship:

$$\text{CBR} = \frac{\text{Cash}}{\text{CFO} + \delta\text{CFO} - \text{funding}} = -t, \quad \text{where } t = 1 \text{ for firms with } -1 < \text{CBR} < 0.$$

- Solving for funding we get

$$\text{Funding} = \text{CFO} + \delta\text{CFO} - \frac{\text{Cash}}{t}$$

³¹The key difference is that with a credit guarantee, banks will usually need to lend at a higher rate, even though the loan is guaranteed. This is because a bank's cost of financing will likely be above government interest rates, so it will need to recoup this cost. However, the government may take on additional costs in a direct lending program, including administrative costs and operational risk.

- Note that for firms with $-1 < \text{CBR} < 0$, it is always more efficient to improve CBR by providing funds rather than by reducing cost. In other words, the cash requirement in this case is less than the cost from the tax deferral.
- However, in practice, tax deferrals can only go as high as total tax obligations. Therefore, the total funding for tax deferrals can be calculated thus:

$$\text{Funding} = \text{Earnings before taxes} * \text{tax rate, if } \text{EBT} > 0, \text{ and if } -1 < \text{CBR} < 0$$

20. Credit guarantees.

Since the government is guaranteeing payment on the loan, the lender will view this as a "risk-free" loan. The value of the guarantee can then be estimated as the difference between a risky and a risk-free loan.

$$\text{Value of risk-free loan} = \text{Value of risky loan} + \text{value of loan guarantee}$$

The expected cost of credit guarantees then can be calculated using three methods:

- Present value method:

$$\text{Credit guarantee cost} = \text{Present value of risk-free loan} - \text{present value of risky loan}$$

- Black Scholes method:

$$\begin{aligned} \text{Credit guarantee cost} &= \text{Value of a put option} \\ &= \text{difference between the value of risk-free and risky loan} \end{aligned}$$

- Merton's jump diffusion method:

$$\text{Credit guarantee cost} = \text{Value of a put option, accounting for non-normal returns and left tail events}$$

Model Limitations

21. Shock Scenario Assumptions

- The methodology has only focused on two types of shocks – loss of revenue and damage to fixed asset. Other indirect shocks such as increased prices due to supply change disruptions, indirect uncertainty shocks which may impact investment responses, loss of revenue due to disruptions to public infrastructures and production are not taken into account. Data on revenue loss from disaster or climate shocks is extremely limited.
- The current model assumes a uniform shocks to total operating costs which is proportional to the magnitude of revenue shock, while wages and fixed costs in reality may be more inflexible. This can be easily relaxed by estimating historical elasticities for different types of costs. However, lack of detailed accounting data on different types of cost is often the limiting factor. Further, in times of truly global shocks, historical elasticities may be a poor approximation as firms may be less able to adjust. As such, the model results may present a lower bound estimate on the impact on firm profitability.
- The model assumes that all fixed assets on firms' balance sheets are distributed in the same region/location of assessment while they may be geographically distributed differently. Assumptions on damage to physical assets have not taken into account the level of risk reduction or mitigation each firm has in place.

22. Debt at Risk and Employment at Risk

The proposed indicators are not exhaustive and can be flexible depending on country context and data constraints. Leverage indicator (Liabilities/Assets) can be misleading where firms with consistent and predictable cash flows often have a capital structure with high Liabilities to Assets due to cheaper cost of debt financing. These firms can be "safe" firms. In addition, Current Ratio (Current Assets/Current Liabilities) may not be the best indicator for liquidity in times of global pandemic shocks as inventories are often frozen due to disruptions to value chains and related restriction measure.

23. Cash Burn Rate

The model assumes that the current year (base case) cash flow from operations is in a "steady state" - while the current year's cash flow could have been an anomaly which can cause a biased estimate of a firm's ongoing ability to generate cash flows. Each firm will have their own elasticity, however, for modeling purposes, all firms were grouped by sector for running regressions to estimate elasticity for that sector(s). These estimates could either under-state or over-state the impact of a change in revenue on operating costs, current liabilities and current assets.

24. Funding Required and Costs

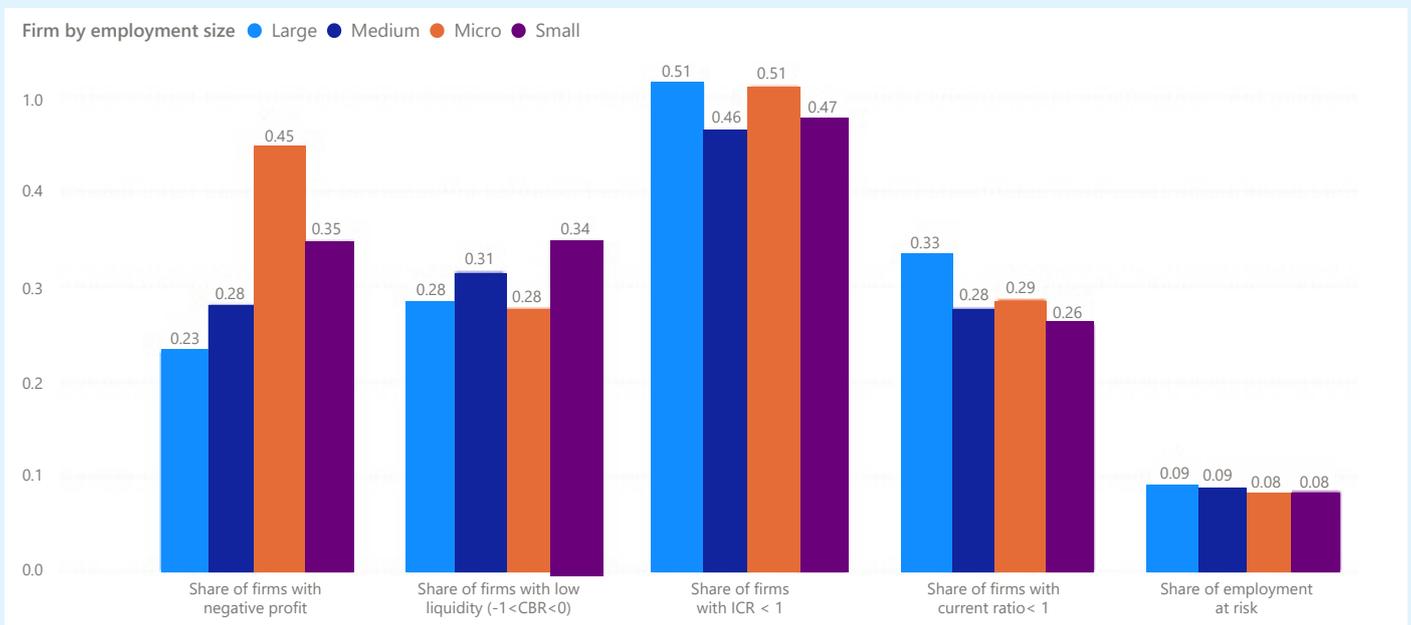
The model could understate the length firms need to remain liquid and understate their funding needs, if the length and severity is greater than anticipated. The model currently assumes 1 year for liquidity on the expectation that COVID-19 shock can resolve itself within a year and a firm can turn around after 1 year. Some firms that have negative cash from operations could be healthy firms, with a strong ability to tap into external private equity or private lending. If so, these firms might not actually require government emergency funding.

The use of costing methods could lead to a wide range of results given the difference in underlying methodology. For example, the cost of guarantees using Present Value method may give much smaller costs of guarantee compared the Black Scholes method because the Present Value method does not take into account firms' asset values. In addition, the estimated costs of guarantees using the Present Value method will change if the assumptions on guaranteed rates and risky rates change. Under the Black Scholes method, historical asset volatility could lead to a significant understatement because firm assets are carried at book values. Time horizon of the credit guarantee will impact the cost of guarantees. The Black Scholes assumption has not taken into account the cases where asset prices would not follow normal distribution, and therefore may understate the probability of default and the cost of contingent claims.

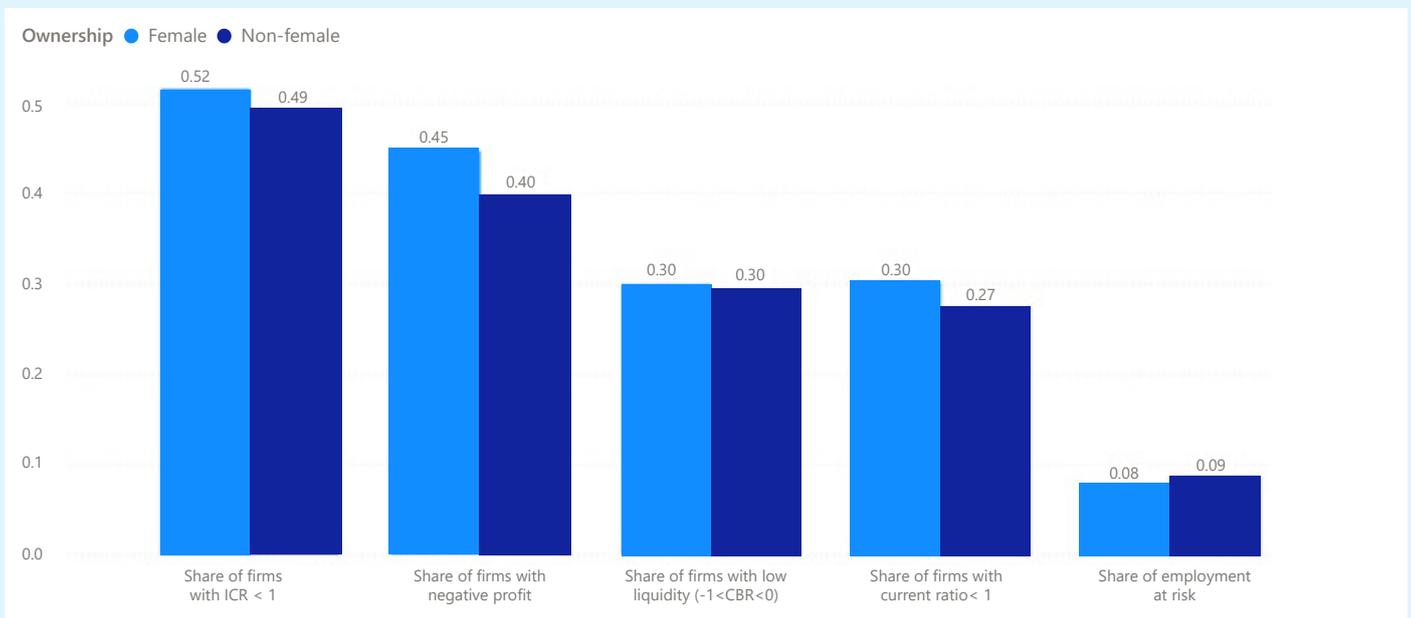
Annex 2. Additional Assessment Results on Firms' Financial Vulnerabilities to Compound Disaster and Pandemic Shocks

Figure A2.1. Financial vulnerability by firm type under pandemic shock only

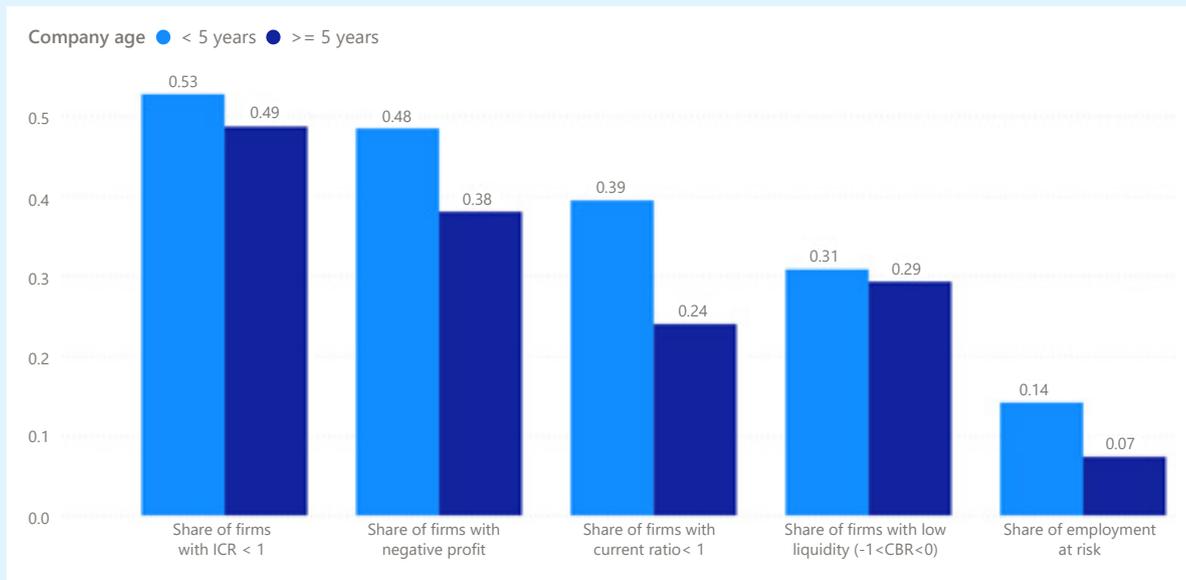
a. By firm employment size



b. By gender of the manager



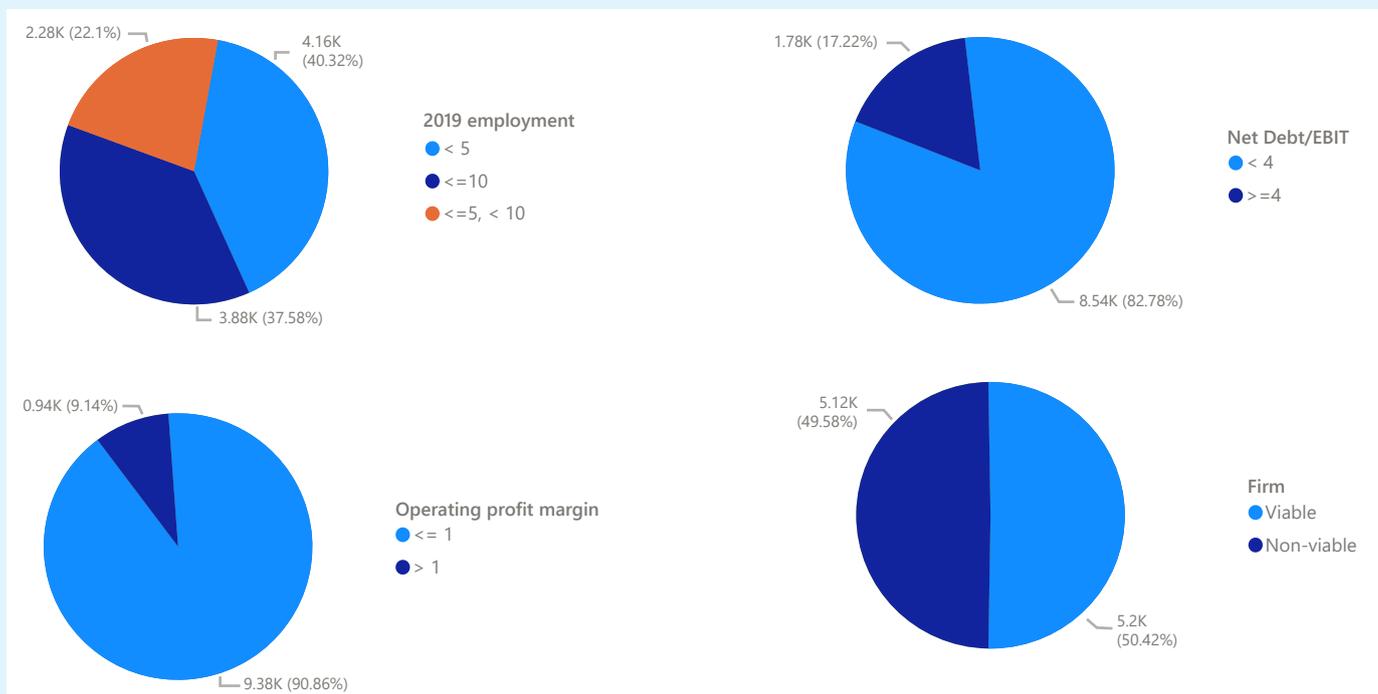
c. By firm age



Source: World Bank staff calculations.

Note: ICR = interest coverage ratio; CBR = cash burn ratio.

Figure A2.2. Number and share of viable firms



Source: World Bank staff calculations.

Note: Viable firms are defined as those with at least five employees, and a ratio of net debt to earnings before interest and tax under 4, or operating profit margin of at least 1%. Viability criteria are not exhaustive and can vary from country to country depending on government's objectives.

Annex 3. Additional Regression Results

sector_group	operating_cost_pct = alpha * revenue_pct + beta									
	alpha	x1_coef	rsquared	Rsquared adj	pvals	conf_lower_alpha	conf_higher_alpha	conf_lower_beta	conf_higher_beta	# firms
Manufacture of textiles, apparel, leather and ...	0.03606	0.768099	0.800709	0.799995	1.01E-99	-0.011979	0.722939	0.084096	0.813259	281
All other manufacturing	0.01913	0.857141	0.783998	0.783758	2.08E-302	-0.003427	0.82774	0.041685	0.886541	904
Transportation & storage	0.01905	0.894155	0.824745	0.824287	6.53E-147	-0.016697	0.852744	0.054791	0.935566	385
Food & accommodation services	0.11349	0.67616	0.796075	0.79574	4.34E-212	0.042342	0.648904	0.184642	0.703417	610
Other services	0.08867	0.649643	0.683614	0.6834	0.00E+00	0.043472	0.627085	0.133868	0.6722	1479
All other sectors	0.05987	0.737979	0.681085	0.680133	3.87E-85	-0.003765	0.683707	0.123496	0.792251	337
Agriculture, forestry and fishing	0.05524	0.792601	0.781889	0.780115	1.73E-42	-0.004175	0.717886	0.114647	0.867317	125
Mining and quarrying	-0.0327	0.423724	0.648284	0.645716	6.91E-33	-0.150749	0.370997	0.085354	0.476452	
Wholesale & retail	0.01686	0.824673	0.826927	0.826889	0.00E+00	0.008434	0.813711	0.025288	0.835634	4555
Construction	0.12702	0.383311	0.609675	0.60937	1.49E-263	0.066899	0.366486	0.187142	0.400135	1281

sector_group	current_liability_percentage = alpha * current_revenue_change_percentage + beta									
	alpha	x1_coef	rsquared	rsquared_adj	pvals	conf_lower_alpha	conf_higher_alpha	conf_lower_beta	conf_higher_beta	size
Manufacture of textiles, apparel, leather and ...	0.30459	0.104098	0.013204	0.010259	3.50E-02	0.194577	0.007382	0.414606	0.200815	337
All other manufacturing	0.5344	0.480221	0.038024	0.037159	5.13E-11	0.404389	0.338162	0.664406	0.622281	1115
Transportation & storage	0.43145	0.27739	0.020152	0.018253	1.20E-03	0.265828	0.110106	0.597063	0.444675	518
Food & accommodation services	0.58503	0.185129	0.030821	0.029604	6.03E-07	0.442211	0.112902	0.727851	0.257357	798
Other services	0.87293	0.472104	0.060999	0.060537	1.10E-29	0.720095	0.391578	1.025757	0.55263	2037
All other sectors	0.73448	0.477879	0.035972	0.033626	1.05E-04	0.456771	0.238002	1.012178	0.717755	413
Agriculture, forestry and fishing	0.32833	0.081166	0.002755	-0.003983	5.24E-01	0.148057	-0.169668	0.508596	0.332001	150
Mining and quarrying	0.58976	0.42637	0.092799	0.087585	3.94E-05	0.135249	0.226903	1.044265	0.625837	
Wholesale & retail	0.37297	0.282219	0.024051	0.023884	9.41E-33	0.333023	0.236086	0.412916	0.328353	5838
Construction	0.56537	0.158668	0.054543	0.053909	5.73E-20	0.450831	0.125132	0.679911	0.192204	1495

operating_cost_pct = alpha * revenue_pct + beta										
sector_group	alpha	x1_coeff	rsquared	rsquared_adj	pvals	conf_lower_alpha	conf_higher_alpha	conf_lower_beta	conf_higher_beta	size
Manufacture of textiles, apparel, leather and ...	0.03606	0.768099	0.800709	0.799995	1.01E-99	-0.011979	0.722939	0.084096	0.813259	281
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Agriculture, forestry and fishing	0.05524	0.792601	0.781889	0.780115	1.73E-42	-0.004175	0.717886	0.114647	0.867317	125
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Wholesale & retail	0.01686	0.824673	0.826927	0.826889	0.00E+00	0.008434	0.813711	0.025288	0.835634	4555
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