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The COVID-19 Pandemic and ASEAN+3 Corporate Debt-at-Risk

Yin Fai Ho and Li Lian Ong

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The COVID-19 Pandemic and ASEAN+3 Corporate Debt at Risk

Prepared by Yin Fai Ho and Li Lian Ong[1] [2]

Authorized by Hoe Ee Khor (Chief Economist)

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Abstract

The COVID-19 pandemic put tremendous pressure on company balance sheets in the ASEAN+3 region and elsewhere. Policy support measures kept interest rates accommodative and facilitated borrowing by firms to stay afloat, and avoid large-scale employee layoffs and defaulting on their debt obligations. From a financial stability perspective, the rise in credit risks exposed banks to a deterioration in the asset quality of their loan portfolios. This paper analyzes the impact of the pandemic on the region's listed companies, across economies and industries, and assesses the effectiveness of policy support measures for this sector. Specifically, the paper estimates the amount of corporate debt-at-risk to determine the potential implications for the economy if under-pressure firms had been or are unable to adequately service their debt or obtain credit. The findings underscore the importance of supportive economic policies and the need to sustain the confidence of lenders to continue rolling over loans to the corporate sector.

JEL classification: F34, E44, E52, G28, G32, P52

Keywords: corporate debt, COVID-19 pandemic, debt-at-risk, debt service ratio, financial stability, interest coverage ratio, listed firms, policy support

[1] Authors' e-mails: Ho.YinFai@amro-asia.org; ong.lilian@amro-asia.org

[2] The authors would like to thank Diana del Rosario, Siang Leng Wong, and colleagues at Bank Indonesia and Bangko Sentral ng Pilipinas for useful comments. All remaining mistakes are the responsibility of the authors.

Abbreviations

AFC	Asian financial crisis
ASEAN	Association of South-East Asian Nations
ASEAN+3	ASEAN plus China (including Hong Kong), Japan, Korea
BIS	Bank for International Settlements
CN	China
COVID-19	coronavirus disease 2019
DAR	debt-at-risk
DSR	debt service ratio
EBIT	earnings before interest and tax
EBITDA	earnings before interest, tax, depreciation, and amortization
GFC	global financial crisis
HK	Hong Kong, China (“Hong Kong”)
ICR	interest coverage ratio
ID	Indonesia
IE	interest expense
IPO	initial pricing offer
IR	interest rate
JP	Japan
KR	Korea
LA	Lao PDR
MM	Myanmar
MY	Malaysia
NFC	nonfinancial corporate
PH	Philippines
ROA	return on assets
SG	Singapore
STD	short-term debt
TA	average total assets
TD	average total debt
TH	Thailand
VN	Vietnam

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"If you owe the bank $100 that's your problem. If you owe the bank $100 million, that's the bank's problem."

~ J. Paul Getty
Founder, Getty Oil

I. Introduction

The rise in nonfinancial corporate (NFC) debt in the ASEAN+3 region since the global financial crisis (GFC) had intensified risks to financial stability that were subsequently exacerbated by the COVID-19 pandemic. Although improved corporate governance and macroprudential oversight over the years since the Asian financial crisis (AFC) had incentivized stronger risk management of corporate balance sheets, private sector debt in the region has since increased to well above 100 percent of GDP, dwarfing government debt in the majority of cases (Figure 1). Among many ASEAN+3 economies, NFCs entered the pandemic with already high debt service burdens, attributable to the decline in profitability and the rise in financing costs (Kim, Li, and Yoo 2021).[3] As of the end of 2020, private sector debt was split almost equally between households and NFCs in some countries, and dominated by the latter in others. Indeed, credit to NFCs had reached historical highs by the end of 2020 (Appendix I).

The COVID-19 pandemic severely impacted the bottom line of businesses in the ASEAN+3 region and elsewhere. Firms posted significant losses as a result of recurring physical containment measures that had to be enforced to control the spread of the virus. Consequently, many businesses faced difficulties paying their expenses and fulfilling their debt obligations. A knock-on effect was the increase in employee layoffs and a corresponding loss in household incomes, resulting in the inability to service personal debt, and the vicious cycle of deteriorating domestic demand adversely affecting businesses.

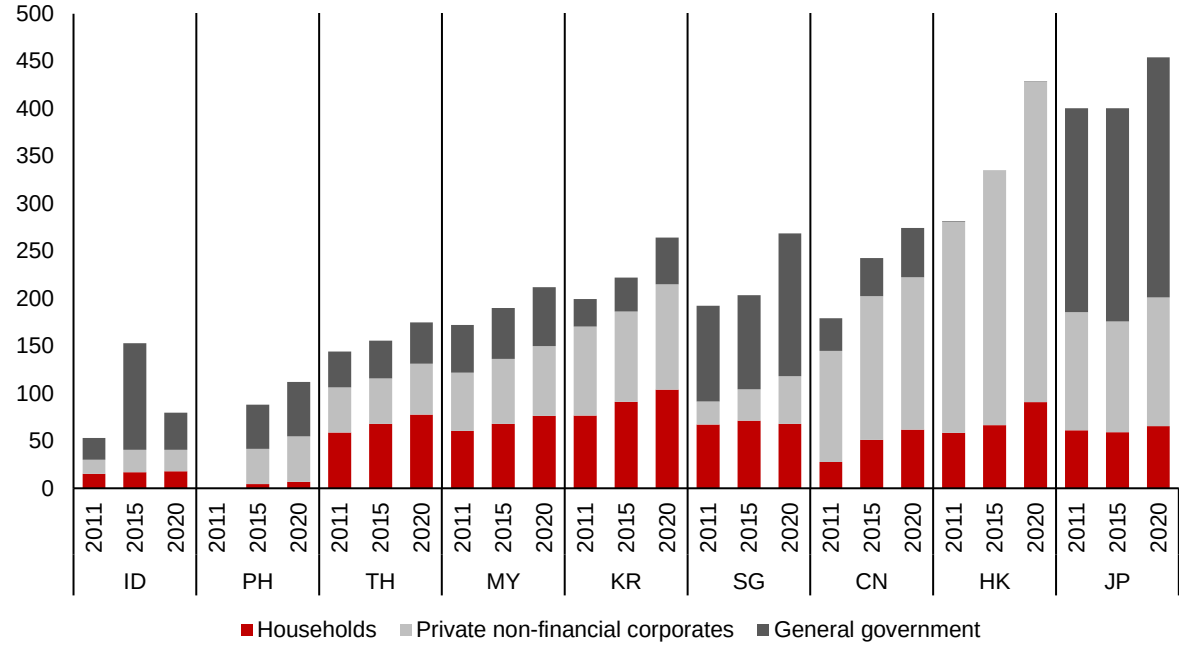
The heightened risks of business defaults and bankruptcies and consequent rise in unemployment during the pandemic represented twin threats to financial stability. Creditor banks were directly exposed to any deterioration in the asset quality of their loan portfolios. In addition to heightened credit risks, bank revenues were also negatively affected by the drop in demand for financial services and products, as economic activity slowed sharply or contracted. In an increasingly interconnected financial system, losses by banks could have potentially pushed other financial institutions into distress, magnifying the already-extensive damage to the real economy (Sun 2020).

Recognizing the critical importance of businesses in this macro-financial nexus, policymakers introduced a wide-ranging raft of measures to support firms, households and the financial sector. Fiscal policies such as cash transfers, subsidized wages, and payment deferments were enacted to help to keep businesses and households afloat, preventing large-scale layoffs and massive defaults on debt obligations (AMRO 2021). Financial regulations, such as capital and liquidity requirements, and treatment of nonperforming loans were eased to buffer banks against balance sheet impairments while encouraging them to continue supplying liquidity to the financial system. To some extent, these measures appear to have been successful in warding off bankruptcies (McCallum 2020; Vandenberg 2021)

[3] See Appendix I for short- and long-term debt and interest expense trends of ASEAN+3 listed firms over the past decade.

and bolstering banks' ability and willingness to lend to and support customers (S&P Global Ratings 2021), while buying time for the economy to recover.

Figure 1. Selected ASEAN+3: Private Sector and Government Debt
(Percent of GDP)



Sources: Bank for International Settlements and national authorities, both via Haver Analytics; and AMRO staff calculations.
Note: CN = China; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand.

However, perpetual extensions of policy lifelines are unsustainable. A key concern is that the bankruptcy gap—the decoupling between economic activity and the concurrent incidence of bankruptcies—which is being driven by the policy responses to the pandemic could be followed by a postponed wave of insolvencies (Banerjee, Noss, and Vidal Pastor 2021). Although the support measures offered temporary relief to households and businesses, the uncertain nature of the pandemic—characterized by new virus variants and recurrent waves—and narrowing fiscal and monetary space in some economies have put policymakers in a growing predicament. They may eventually be faced with the unpalatable choice of prematurely withdrawing existing measures, which could trigger a shock to economic recovery—and consequently, financial stability—or maintaining the provision of policy support, perhaps even to economic sectors that are no longer viable, and further diminish remaining buffers against other potential future shocks to the economy.

This paper analyzes the impact of the COVID-19 pandemic on corporate debt in the ASEAN+3 region. The aim of this exercise is to assess the state of the region's corporate balance sheets, provide insights into the performance of specific economic sectors, and gauge the effectiveness of pandemic support measures in promoting economic activity and safeguarding financial stability. The findings highlight the significance of keeping economic policies supportive to ensure that there is sufficient credit within the economy, but also emphasize the critical importance of ensuring sustained economic recovery, to maintain the confidence of lenders to continue rolling over loans to the corporate sector.

The rest of the paper is structured as follows: Section II presents the methodology and data, followed by an analysis of the results in Section III. Section IV provides back-of-the-envelope

estimates of how much corporate debt may potentially be at risk as of the end of 2021 and the attendant implications for financial stability and policy. Section V concludes.

II. Methodology and Data

In this paper, two commonly used solvency metrics are estimated for individual firms across the ASEAN+3 region, for which requisite financial information is available. They comprise the following:

- ***Interest coverage ratio (ICR)***, which is the ratio of earnings before interest and taxes at time *t* ($\mathrm{EBIT_t}$) relative to interest expense during the same period ($\mathrm{IE_t}$). This indicator measures the ability of a company to pay its interest expenses on outstanding debt with their available earnings during a given period. A lower ICR typically indicates a higher risk of insolvency:

$$\mathrm{ICR_t} \equiv \frac{\mathrm{EBIT_t}}{\mathrm{IE_t}}$$

- ***Debt service ratio (DSR)***, which is the ratio of earnings before interest, taxes, depreciation and amortization at time *t* ($\mathrm{EBITDA_t}$) relative to interest expense ($\mathrm{IE_t}$) and principal on short-term debt at time *t*–1, due at time *t* (STD_{t-1}). It measures the ability of a company to use its operating income to repay all its debt obligations. A lower DSR typically indicates a higher risk of insolvency:

$$\mathrm{DSR_t} \equiv \frac{\mathrm{EBITDA_t}}{\mathrm{STD_{t-1}} + \mathrm{IE_t}} .$$

The firms in the sample are placed in the various buckets based on their respective ICRs and DSRs, as follows:

[ICR $<$ 0; 0 $\leq$ ICR $<$ 1.25; 1.25 $\leq$ ICR $<$ 3.00; 3.00 $\leq$ ICR $<$ 4.25; 4.25 $\leq$ ICR $<$ 8.50;

8.50 $\leq$ ICR]; and

[DSR $<$ 0.0; 0.0 $\leq$ DSR $<$ 1.0; 1.0 $\leq$ DSR $<$ 2.0; 2.0 $<$ DSR].

The ICR buckets broadly follow Damodaran's (2016) classifications, which assign synthetic ratings based on each company's ICRs (Appendix II). Companies with ICRs lower than 1.25 are the equivalent of S&P ratings of "CCC" and below, while those with ICRs of between 1.25–3.00 are in the equivalent "B" rating categories, and those above 3.00 are mapped to "A" rating categories. Correspondingly, companies with DSRs lower than 1.0 are generally considered to be facing high solvency risks—it suggests that they are not generating sufficient earnings to meet their debt service and repayment obligations. Although views differ on what an adequate DSR should be, a score of 2.0 or higher is considered healthy as a general rule of thumb.

Debt-at-risk (DAR) is defined as the debt of financially stressed borrowers. DAR does not correspond directly to nonperforming loans; rather, it is the debt that could come under strain or could *potentially* become nonperforming. It is defined as follows:

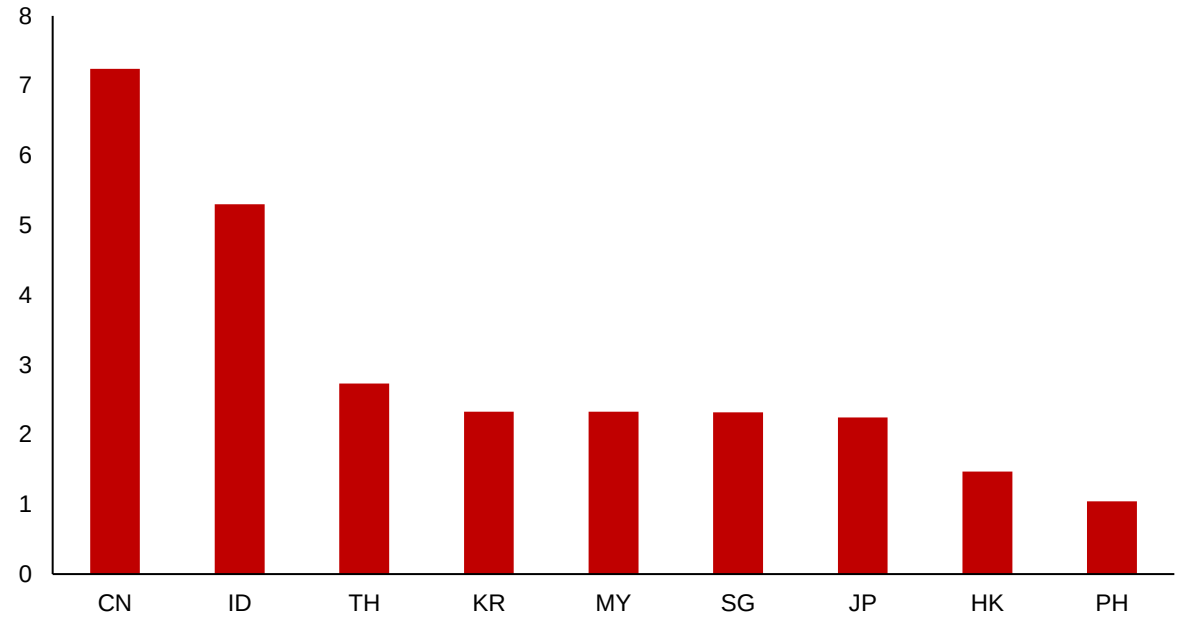
$$DAR_t \equiv \frac{\sum_i S_i D_i}{\sum_i D_i},$$

where, D_i is the total debt of company *i*; and $S_i = 1$ if ICR < 1.25 or DSR < 1.0 , and 0 otherwise.

The dataset used in this paper comprises active, listed nonfinancial firms, classified according to their countries of domicile and industries. The financial data of individual firms for the 2019Q1–2020Q4 period are sourced from Bloomberg Finance L.P., where financial information is available for 9 economies in the ASEAN+3 region, namely, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. Owing to non-reporting by some companies and changes to company listings over time, the sample is subject to reporting and survivorship biases. The potential outcome would be a positive bias in the findings, given that newly-listed firms and those that remain listed generally have stronger balance sheets than those that may be forced to delist. New initial pricing offers (IPOs) in 2020 across the region represent up to 7.4 percent of the total number of companies on stock exchanges (Figure 2).

The sample of firms included for each economy does not necessarily contain the complete set of publicly listed companies. Depending on listing and disclosure requirements, firms may report the requisite financials on a quarterly, semi-annual, or annual basis. The highest number of firms report on an annual basis, followed by those that disclose on semi-annual or quarterly frequencies (Appendix III). The ICR and/or DSR metrics are not computable for some firms, for the following reasons: (1) some firms report zero interest expense, so the ICR is redundant; and/or (2) some firms do not report EBITDA, so the DSR cannot be estimated. Balance sheet items such as firms' total debt and total assets, plus nominal GDP by economy are applied to standardize the selected variables for comparison purposes.

Figure 2. Selected ASEAN+3: IPOs in 2020
(Percent of total number of listed firms)



Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand.

III. Analysis of Corporate Balance Sheets

Unsurprisingly, the share of DAR firms in the ASEAN+3 region rose in many countries in 2020. The increase in the share of DAR firms (ICR < 1.25 and DSR < 1.0) across the region was driven mainly by the rise in the share of firms in the negative ICR and DSR buckets (Figure 3), suggesting that a growing proportion of firms had posted losses. Companies with very strong buffers were able to sustain their performance, while those that fell in between the two groups appear to be have been financially squeezed. The mobility restrictions and social distancing measures—that remain in place in some form to reduce the spread of virus infections—had significantly affected economic activity throughout 2020 and increased corporate vulnerabilities:

- The smaller listed firms generally faced higher solvency risks (Appendix IV). Across the region, both average ICRs and DSRs were broadly lower for smaller firms compared to the larger ones in terms of assets, with the exception of China, Thailand and Vietnam where the opposite was the norm. Smaller firms tended to post weaker earnings, with many reporting losses even before the pandemic.

- The distribution of firms by industry was quite diverse across regional economies (Figure 4), and the impact was commensurately varied (Appendix V):

    - The cyclical consumer sector was the most widely affected, with a rise in the share of businesses in tourism, close contact services, and discretionary products reporting losses as a result of travel restrictions and falling discretionary spending, notably, in Indonesia, Japan, Malaysia, the Philippines, Singapore, and Thailand.

    - The non-cyclical consumer sector was affected to a lesser extent, as dining restrictions placed on downstream food and beverage businesses weighed on their suppliers despite robust sales among upstream food manufacturers.

    - Slow recovery in the wake of global demand and supply chain disruptions weighed on the industrial sector, especially in the Philippines and Singapore, where construction activity plunged as a result of physical containment measures.

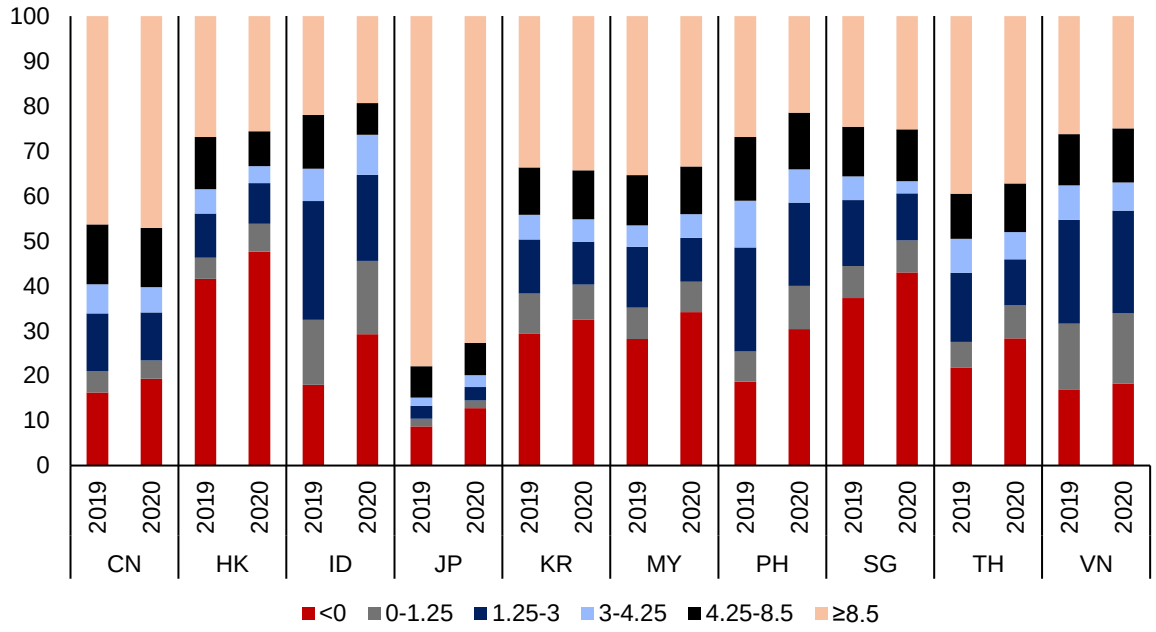
    - Weak demand for oil, as a result of the sharp contraction in economic activity, led to a precipitous decline in oil prices, slashing the earnings of upstream energy manufacturers and downstream oil refineries.

    - Fees waivers and payment deferrals for telecommunications and utility services for households and businesses, introduced in Malaysia, Thailand and Vietnam, diminished the earnings of firms in these sectors.

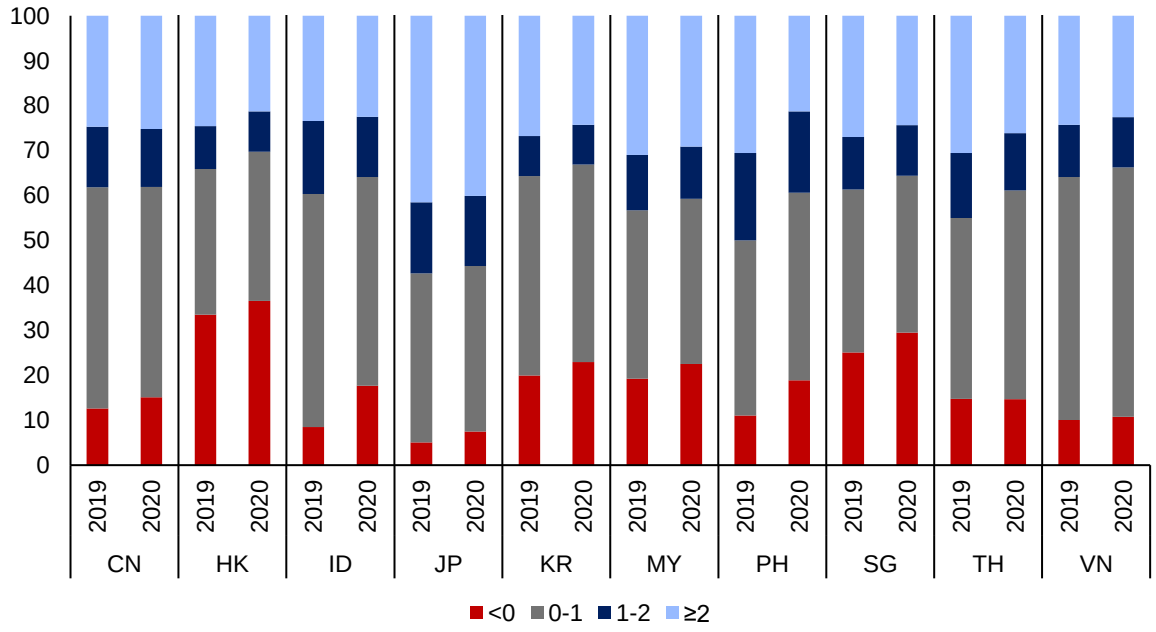
    - Conglomerates in the diversified sector were inevitably affected by the general decline in economic activity, raising their risks of insolvency.

Figure 3. Selected ASEAN+3: Share of Number of Listed Firms by Debt-at-Risk Bucket, 2019–20
(Percent of total)

By ICR Bucket

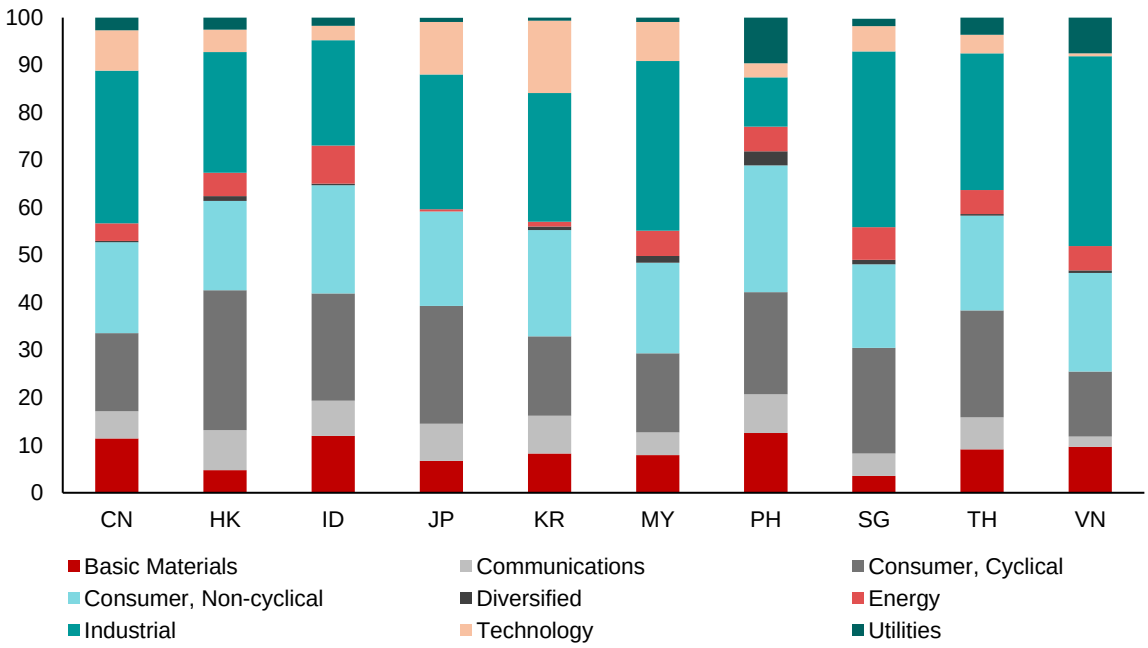


By DSR Bucket



Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 4. Selected ASEAN+3: Share of Number of Listed Firms by Industry, 2020
(Percent)



Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

The debt-to-asset and corresponding debt-to-GDP ratios of firms are subsequently calculated to assess the potential threat they pose to financial stability and the wider economy, as a result of the pandemic. The debt-to-asset ratio is commonly used to gauge the degree of leverage taken on by firms, while the debt-to-GDP ratio provides a sense of the size of any possible impact to lenders and the broader economy if the borrowers were to default. Analyses of these ratios show particular trends across firms and sectors:

- Unsurprisingly, firms with higher ICRs and DSRs generally reported lower debt-to-asset ratios, consistent with lower debt service from income generated from assets (Table 1). Conversely, firms with low ICRs had higher debt-to-asset ratios, on average; similarly, firms with low DSRs (< 1) were more highly leveraged than those in other buckets. Firms with negative ICRs (that is, with negative EBIT) tended to show lower leverage ratios, possibly because they were unable to qualify for additional loans.[4]

- The utilities and energy sectors tended to be more highly leveraged (Table 2). This characteristic is typically attributable to the large amounts of investment required to maintain and upgrade their massive infrastructure, as well as for development and production.

- Debt-to-asset ratios climbed in the consumer (cyclical and non-cyclical), communications and energy sectors. They were driven by broad-based increases in

[4] The same exercise is conducted only on firms that were listed in both 2019 and 2020, and which consistently reported their ICRs and DSRs in both years, that is, the sample does not include firms that were newly listed or delisted in 2020. The results are broadly consistent with the analysis using the full samples available for both 2019 and 2020.

leverage among companies across ICR and DSR buckets, signaling a general trend of growing financial risks among these firms.

Previous studies have reported similar cross-industry differences. For example, Aggarwal (1990) finds significant cross-country and cross-industry variations in the capital structure of large firms from 20 Asian countries, including most covered in this paper.[5] They persist even among contiguous countries and when similarities in business environments are taken into account. Firms in Hong Kong had the least industry variation; those in Korea, the Philippines, and Singapore also did not exhibit significant capital structure variations across industries. These findings contain useful information for assessments of credit and investment risks by lenders and investors, respectively.

The general increase in leverage across listed firms in the ASEAN+3 region during the COVID-19 pandemic could be explained by examining the composition of borrowings. Total debt among listed firms grew relative to GDP in 2020 (Figure 5), driven by sharp contractions in GDP from lockdowns in the first half of the year, and/or increases in short-term borrowings in the majority of economies (Figure 6). In particular, the increase in short-term borrowings were mainly by firms in the lower ICR/DSR buckets, which accounted for the largest portion of corporate debt in several economies (Figure 7).[6] More generally, corporate borrowings expanded in 2020, on the back of monetary measures enacted to ensure sufficient liquidity in the financial system and support bank lending to the broader economy.

Short-term borrowings as a percentage of GDP rose in sectors that were hard-hit by the pandemic. The consumer industries (cyclical and non-cyclical) together accounted for the largest portion of borrowing pre-pandemic. They posted an increase in short-term debt-to-GDP in 2020, attributable in part to the deployment of government lending schemes through financial institutions, to boost credit to businesses affected by the collapse in domestic demand (Figure 8). Policy rate cuts, easing loan requirements and greater access to business financing appear to have successfully created a supportive environment (Figure 9), facilitating borrowing by firms—notably in sectors such as consumer cyclicals, communications, energy, and utilities (Appendix VI)—and alleviating the strain on firms whose earnings were under pressure .

[5] Aggarwal (1990) also provides an extensive review of studies on the capital structure determinants of firms.

[6] In some jurisdictions, such as Indonesia, corporate leverage contracted during the height of the pandemic, driven by decreases in both supply and demand for financing; firms with greater DAR had difficulty accessing loans from banks, except through government guarantee programs.

Table 1. Selected ASEAN+3: Debt-to-Asset Ratios of Listed Firms by Debt-at-Risk Bucket, 2019–20

(Percent)

By ICR Bucket

ICR	< 0.00		0.00–1.25		1.25–3.00		3.00–4.25		4.25–8.50		≥ 8.50	
Economy	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
China	28.3	26.4	33.9	36.3	35.4	34.4	30.1	30.7	24.5	25.1	10.2	9.9
Hong Kong	40.8	45.1	38.3	35.5	31.9	32.0	27.7	30.4	24.0	22.2	9.5	9.6
Indonesia	34.6	28.8	33.2	35.5	34.2	30.8	25.7	24.9	19.9	18.0	7.7	8.1
Japan	26.6	30.4	40.1	42.5	46.0	45.6	39.7	41.3	38.7	39.8	15.0	14.8
Korea	28.5	26.8	36.7	33.8	33.2	32.8	28.7	29.1	24.4	24.3	8.2	8.5
Malaysia	20.4	17.4	33.6	37.7	32.1	30.7	29.7	25.5	22.6	22.4	9.0	9.1
Philippines	13.2	27.8	45.1	36.5	36.1	31.8	31.4	31.7	31.8	22.4	11.9	9.4
Singapore	24.5	28.6	39.1	41.5	32.5	37.2	30.1	32.9	28.2	24.7	9.3	10.5
Thailand	26.0	29.6	35.8	39.8	41.6	42.2	40.9	35.8	30.4	28.3	10.2	11.7
Vietnam	32.0	22.9	41.3	38.7	34.8	32.3	31.0	28.7	20.2	20.7	8.6	7.8

By DSR Bucket

DSR	< 0.0		0.0–1.0		1.0–2.0		≥ 2.0	
Country	2019	2020	2019	2020	2019	2020	2019	2020
China	30.7	25.8	26.9	26.5	13.8	13.3	6.1	5.4
Hong Kong	31.0	32.4	28.7	29.1	20.0	18.6	8.9	8.5
Indonesia	39.7	31.6	33.1	32.5	26.1	27.8	11.2	9.6
Japan	23.3	29.7	30.9	32.6	18.8	19.8	6.4	6.7
Korea	27.9	26.7	30.3	28.6	17.8	14.9	5.8	5.7
Malaysia	17.6	15.4	27.1	28.1	16.7	16.9	8.3	7.7
Philippines	6.2	24.9	33.3	32.6	26.3	25.5	17.9	11.6
Singapore	25.6	29.5	31.4	32.3	21.8	23.2	11.3	13.8
Thailand	28.3	25.8	36.9	37.9	22.9	29.4	5.9	6.8
Vietnam	25.4	23.3	33.7	31.2	21.2	21.7	8.7	7.3

Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: The debt-to-asset ratio for each bucket is a simple average of corresponding firms' debt-to-asset ratios. Debt-to-asset ratios outside 2 standard deviations of the sample are excluded to avoid severe distortions to the means. The greener the heatmap color (greenest = 0), the lower the average debt-to-asset ratio of firms in the sample; the redder the color (reddest = 50), the higher the average debt-to-asset ratio of firms in the bucket.

Table 2. Selected ASEAN+3: Debt-to-Asset Ratios of Listed Firms by Industry, 2019–20

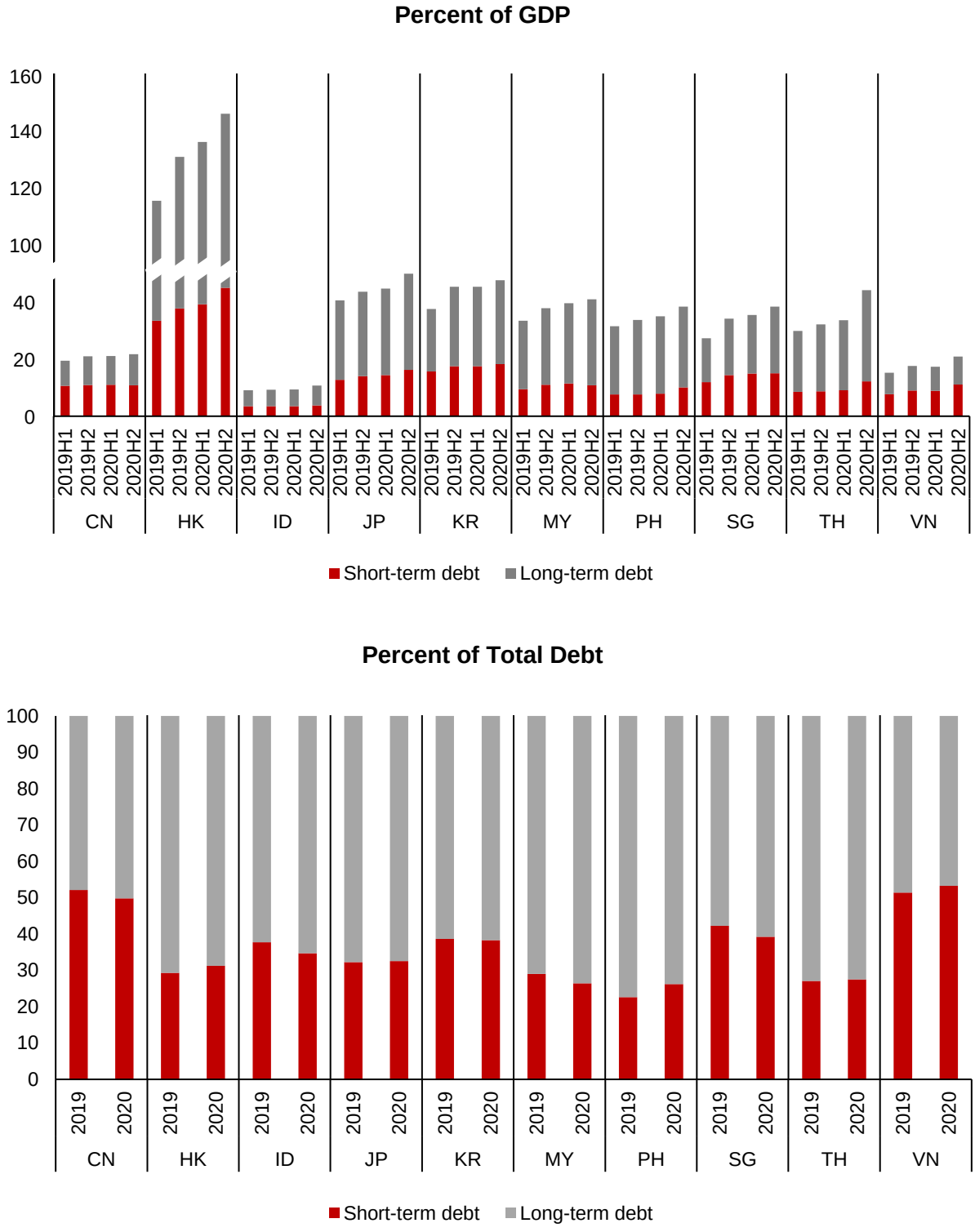
(Percent)

Sector	Basic Materials		Communications		Consumer, Cyclical		Consumer, Non-Cyclical		Diversified	
Economy	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**
China	25.3	24.7	14.3	14.3	21.3	21.7	17.6	17.3	25.1	25.0
Hong Kong	31.3	31.1	30.1	29.2	28.1	29.8	22.8	23.9	23.7	23.0
Indonesia	27.1	24.0	25.9	27.6	26.1	26.6	25.2	23.4	38.1	41.2
Japan	18.1	19.3	13.5	14.5	19.7	21.3	16.2	18.0		
Korea	22.5	22.3	16.0	15.1	24.1	23.6	21.1	20.8	11.0	12.3
Malaysia	18.4	16.8	19.9	13.2	18.8	19.4	20.7	20.0	21.8	18.7
Philippines	8.3	6.4	16.7	19.6	27.9	33.2	21.3	24.8	35.5	35.7
Singapore	21.5	20.3	16.2	21.2	25.4	28.7	20.8	24.3	28.3	26.2
Thailand	21.3	22.7	20.4	22.4	21.9	27.7	20.4	22.5	33.8	30.6
Vietnam	20.8	19.3	11.4	13.0	26.5	25.5	18.4	17.9	24.1	16.1
Sector	**Energy**		**Industrial**		**Technology**		**Utilities**			
Economy	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**		
China	29.6	28.1	20.1	20.3	13.8	13.1	35.1	35.4		
Hong Kong	30.9	32.4	24.7	24.9	15.7	15.4	38.5	38.6		
Indonesia	24.6	22.6	25.9	28.0	16.5	18.6	28.6	29.2		
Japan	29.3	29.0	16.0	17.1	10.4	10.9	31.3	34.0		
Korea	28.5	29.0	22.6	23.1	15.5	14.9	26.0	26.3		
Malaysia	24.9	18.9	19.7	17.1	7.6	9.6	35.1	34.8		
Philippines	20.4	21.5	23.0	27.8	20.2	9.1	33.2	33.0		
Singapore	25.8	31.4	21.2	21.2	11.6	9.9	39.2	40.0		
Thailand	32.4	35.9	20.9	20.5	14.9	15.1	36.4	39.0		
Vietnam	24.3	27.3	23.7	22.4	13.3	12.2	26.5	22.1		

Sources: Bloomberg Finance L.P.; and authors' estimates.

Note: The debt-to-asset ratio for each bucket is a simple average of corresponding firms' debt-to-asset ratios. Debt-to-asset ratios outside 2 standard deviations of the sample are excluded to avoid severe distortions in the means. The greener the heatmap color (greenest = 0), the lower the average debt-to-asset ratio of firms in the sample; the redder the color (reddest = 50), the higher the average debt-to-asset ratio of firms in the bucket.

Figure 5. Selected ASEAN+3: Composition of Debt of Listed Firms, 2019–20



Sources: Bloomberg Finance L.P.; and authors' estimates.
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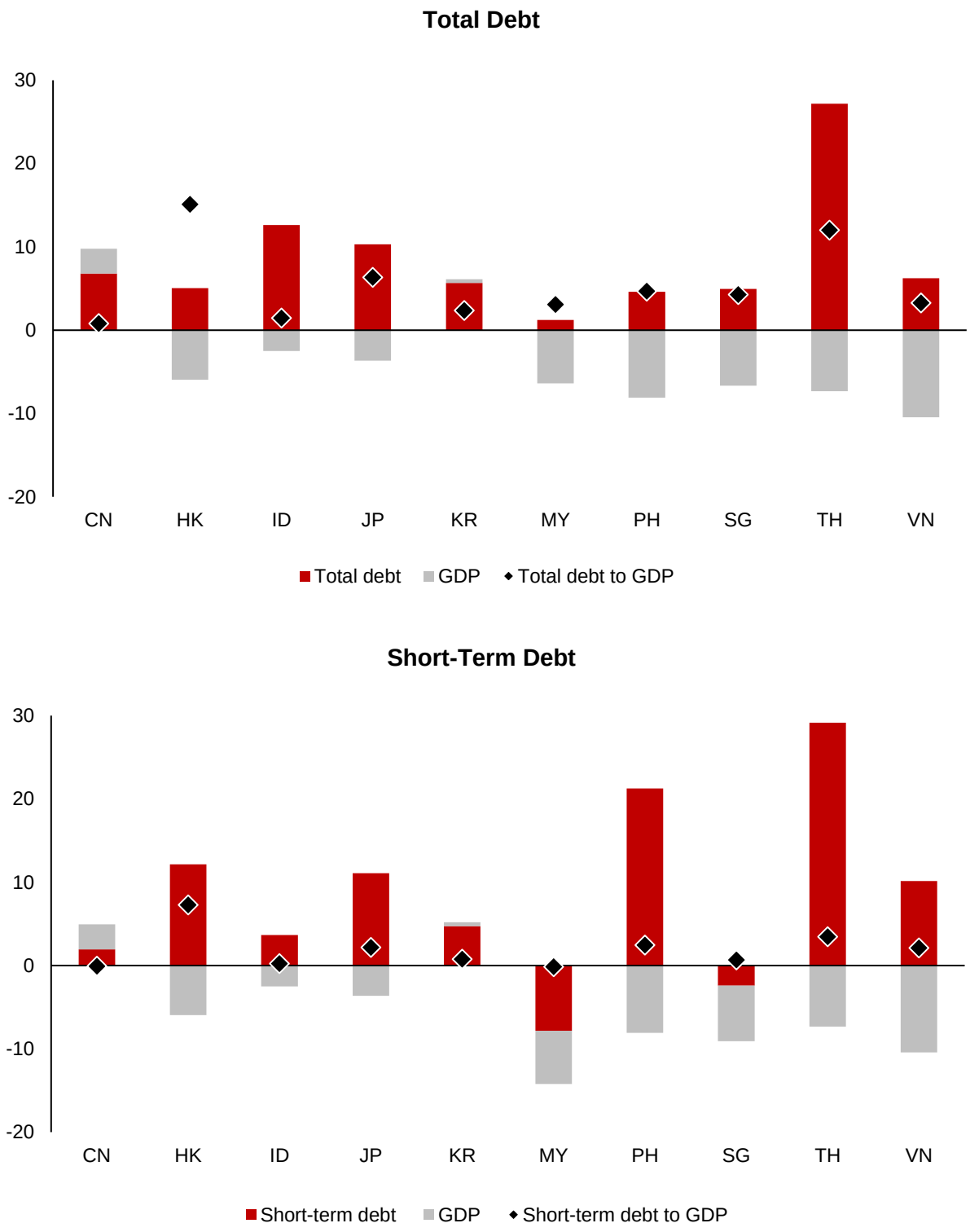
Figure 6. Selected ASEAN+3: Change in Debt of Listed Firms, GDP and Debt-to-GDP Ratios, 2020

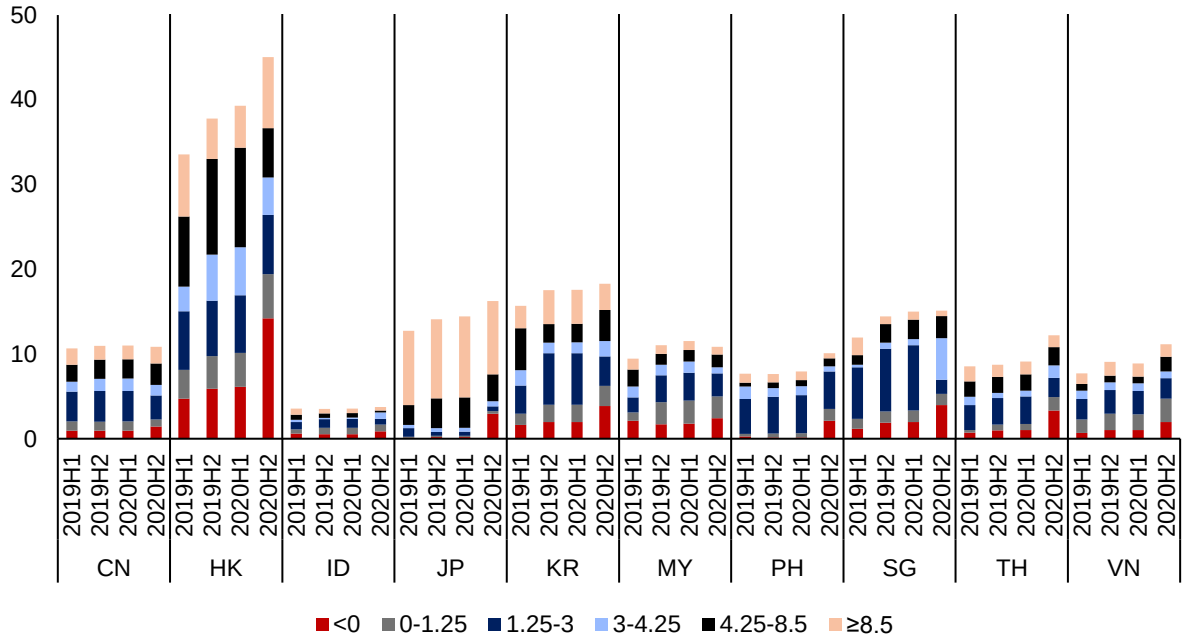
(Percent year-over-year; Percentage points)



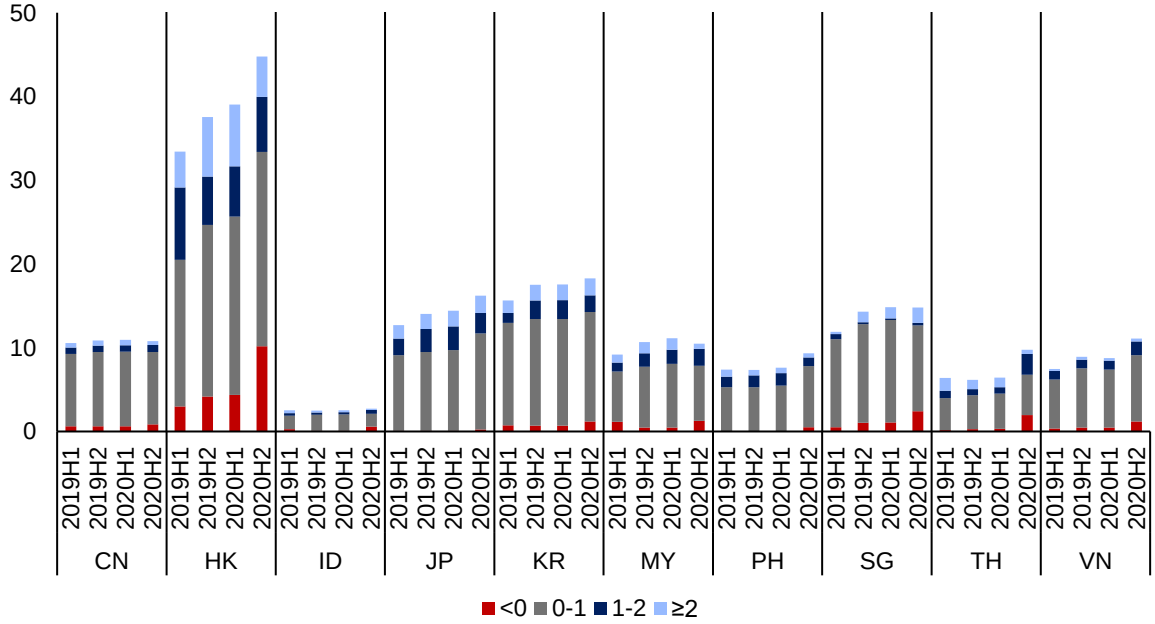
Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 7. Selected ASEAN+3: Short-Term Borrowings of Listed Firms by Debt-at-Risk Bucket, 2019–20
(Percent of GDP)

By ICR

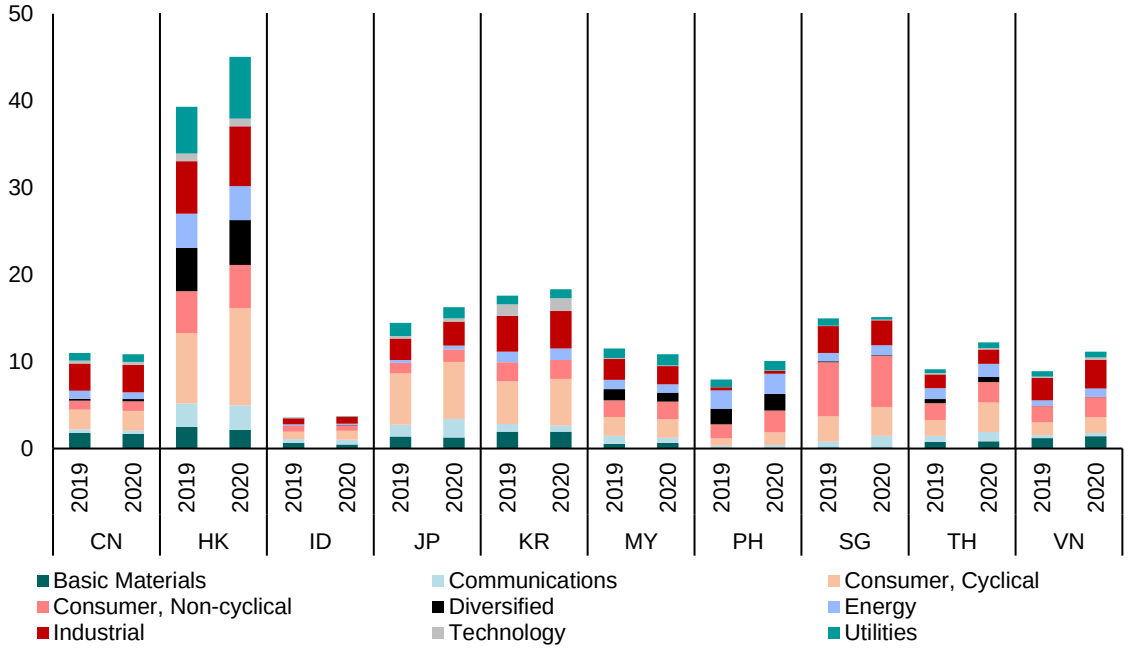


By DSR



Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 8. Selected ASEAN+3: Short-Term Borrowings of Listed Firms by Industry, 2019–20
(Percent of GDP)



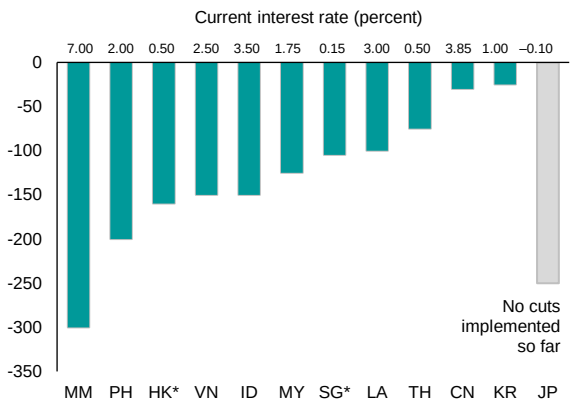
Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

IV. Implications for Financial Stability

The debt-to-GDP ratios of DAR firms ballooned in 2020 across all economies in the region. The corresponding rise in DAR may be collectively attributed to the broad-based deterioration in firms' balance sheets from the surge in short term borrowings, dip in earnings as a result of the pandemic (Figure 10), and the sharp decline in nominal GDP levels. ICR DAR as a percentage of GDP rose in all sample economies, most notably in Hong Kong, Japan, Malaysia, the Philippines, Singapore, Thailand, and Vietnam (Figure 11), while DSR DAR jumped markedly in Hong Kong, Japan, and the Philippines. Measured as a percentage of total debt, ICR DAR likewise rose in the majority of economies, but DSR DAR only increased in a handful of economies, and remained relatively stable or even declined marginally in others (Figure 12), confirming the significant effects of the contraction in GDP in 2020.

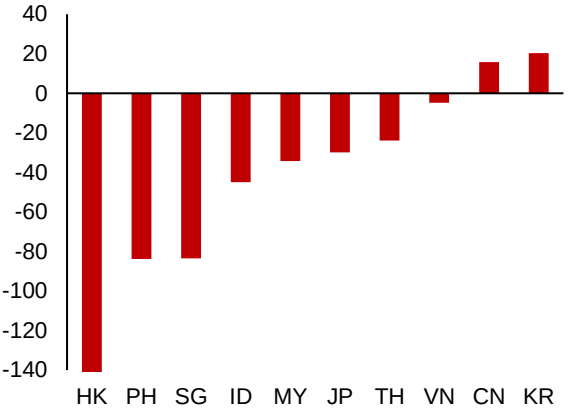
Creditor confidence in the economy is critical in ensuring that credit continues to flow to the corporate sector. Across the region, DSR DAR levels were much higher compared to ICR DAR, when measured as a percentage of both GDP and total debt. This disparity suggests that more firms would have had difficulty repaying their short-term loans out of earnings compared to servicing their interest expenses. In other words, EBITDA appears to have been insufficient to cover both components, and firms would have had to draw down their assets to repay their debt if they are unable to roll the latter over. Importantly, the corporate DAR derived for each economy is likely to have been underestimated. The data sample only covers **listed firms** that report ICR- and DSR-related information, and does not include non-reporting firms or the non-listed, small- and medium-sized firms, many of which were severely hit by the pandemic (Choo and Oeking 2020).

Figure 9. ASEAN+3: Policy Interest Rate Cuts, End-2019 to End-2021
(Basis points)



Sources: National authorities via Haver Analytics; and AMRO staff calculations.
Note: Those with an asterisk uses the monthly average of market-based rates, instead of end-of-period rates. The definition of key interest rate varies across economies, and could refer to the policy rate, the refinancing rate, the discount rate, the overnight repo rate, among others. Brunei and Cambodia are excluded from the sample given the current design of their respective monetary policies. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; LA = Lao PDR; MY = Malaysia; MM = Myanmar; PH = Philippines; SG = Singapore; TH = Thailand; and VN = Vietnam.

Figure 10. Selected ASEAN+3: Change in Earnings per Share of Listed Firms, 2020
(Percent)



Sources: Bloomberg Finance L.P.; and author's estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Simple back-of-the envelope estimates of corporate DAR for 2021 underscore the credit risks from the increase in loans taken out by firms during the pandemic and the importance of accommodative monetary policies. Projections of listed firms' interest expense (Figure 13), debt outstanding, earnings and assets for all of 2021, based on actual outturn from 2018–2021H1 (Appendix VII), point to:

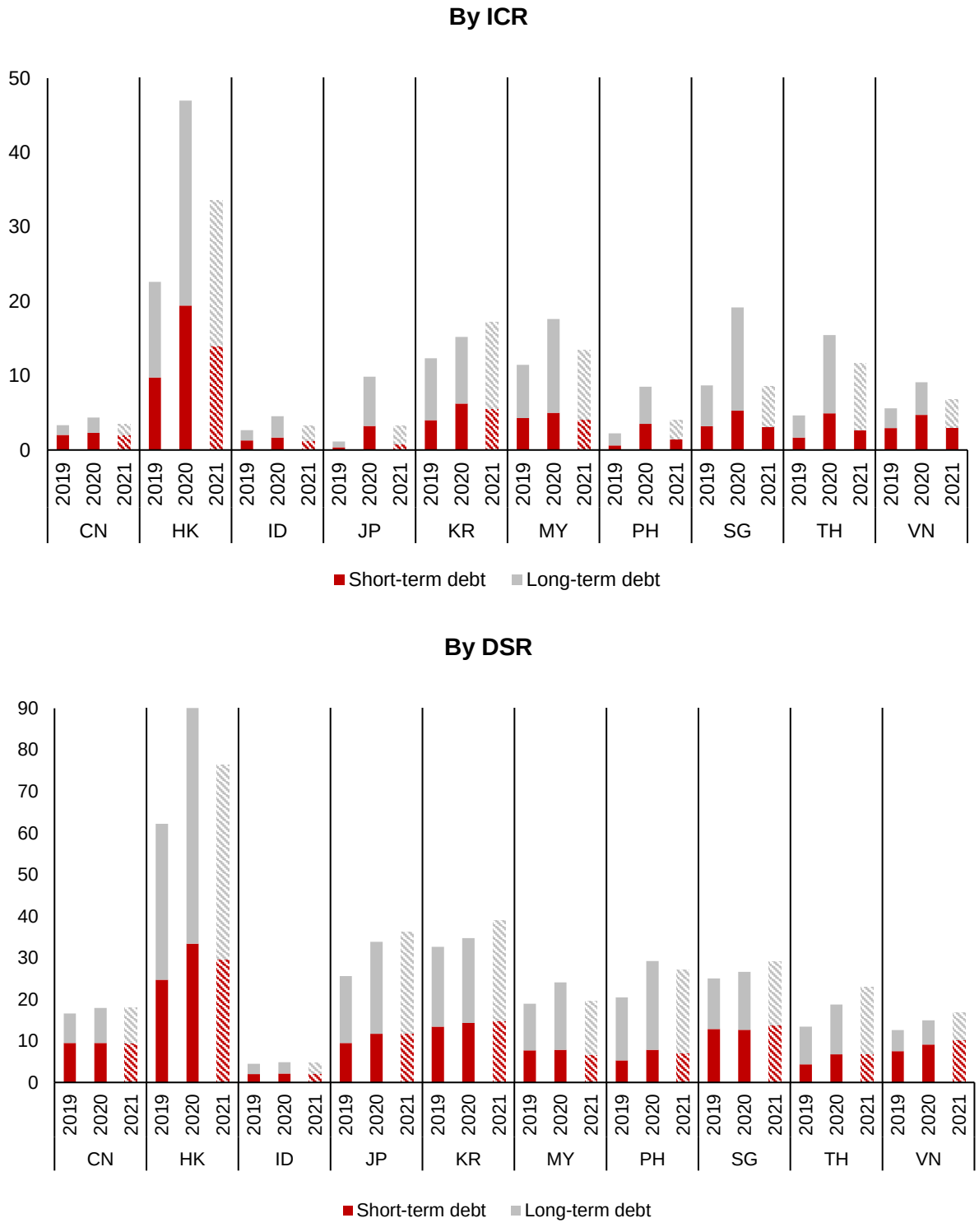
- ICR DAR falling or stabilizing as a percentage of GDP in several economies (Figure 11), in line with interest expense. It suggests that policy rate cuts and other monetary policy measures may have helped reduce or contain interest expense, despite the rise in borrowings in 2020.[7]

- DSR DAR rising slightly as a percentage of total debt in some economies (Figure 12). Despite the projected fall in interest expense, the increase in short-term debt taken on by firms in 2020 that needed to be repaid were likely to have weighed on their debt service.

- Firms' quick assets (cash or cash equivalents) at around half or less of current assets in most economies (Figure 14). When taken into account, ICR DAR fell quite sharply overall, suggesting that most firms had sufficient liquid assets to cover their interest payments (Figure 15). However, many more DAR firms may not have had enough quick assets to repay their total short-term obligations (interest and maturing principal), in the event that creditors had refused to roll over their debt (Figure 16).

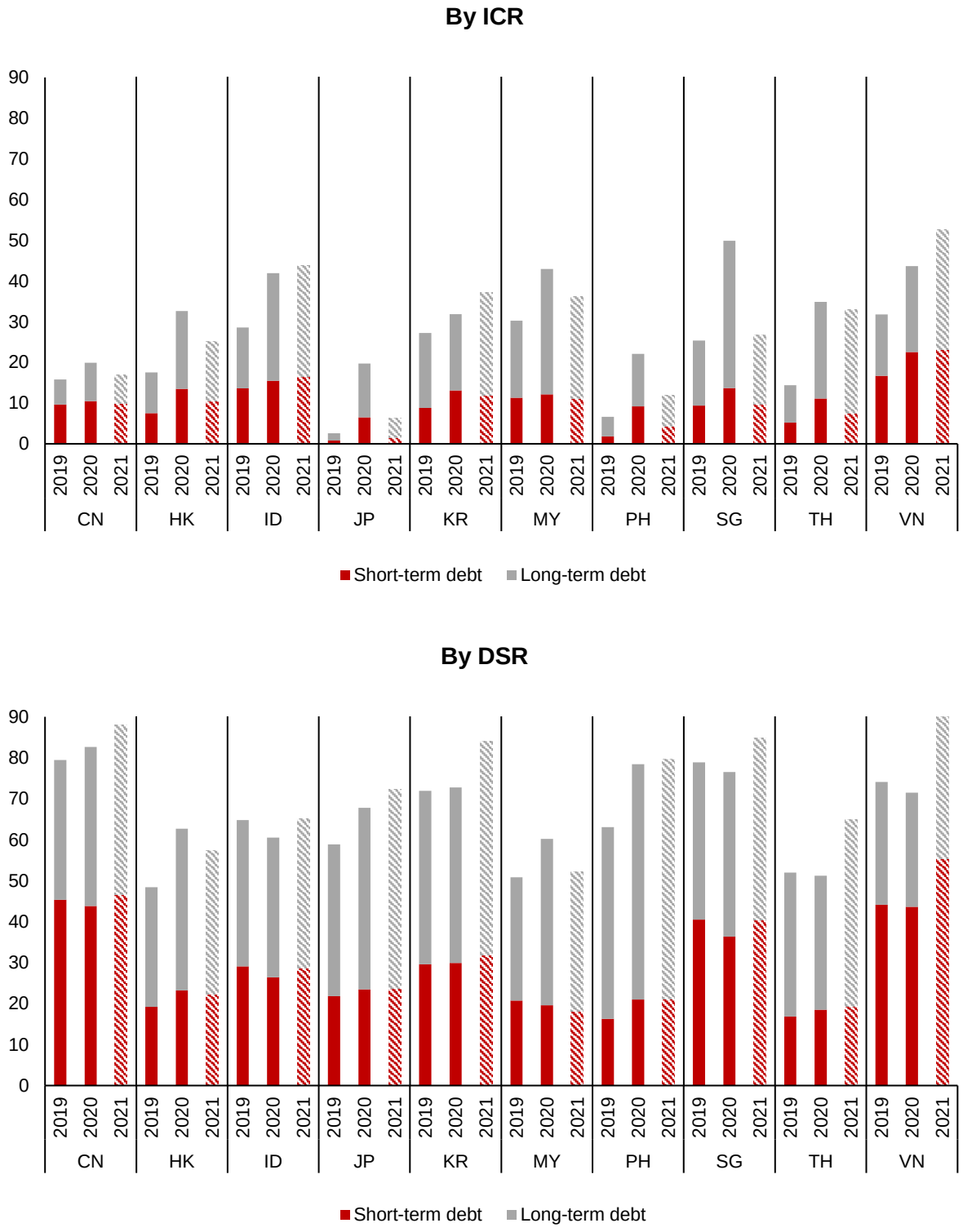
[7] In Indonesia, the metric declined in 2020H2 as a result of physical containment measures, which were subsequently alleviated by policy measures and the eventual turnaround in corporate performance.

Figure 11. Selected ASEAN+3: Actual and Projected Debt-at-Risk of Listed Firms, as a Percentage of GDP, 2019–21



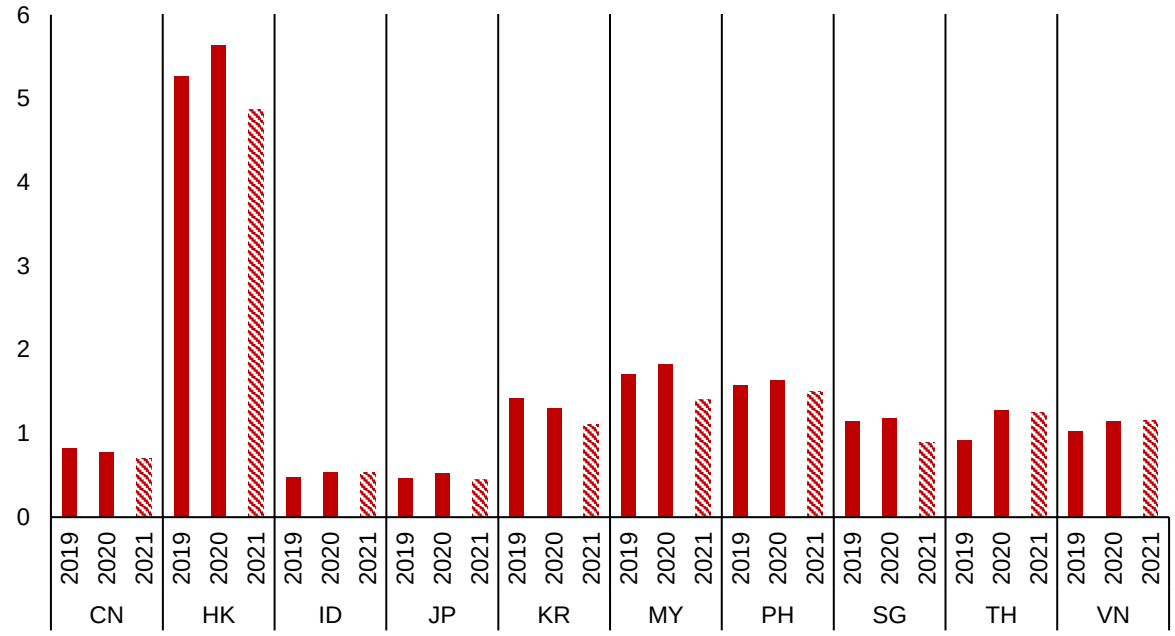
Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: DAR for 2021 is projected using the method described in Appendix VI. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 12. Selected ASEAN+3: Actual and Projected Debt-at-Risk of Listed Firms, as a Percentage of Total Debt, 2019–21



Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: DAR for 2021 is projected using the method described in Appendix VI. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 13. Selected ASEAN+3: Actual and Projected Interest Expense of Listed Firms, 2019–21
(Percent of GDP)

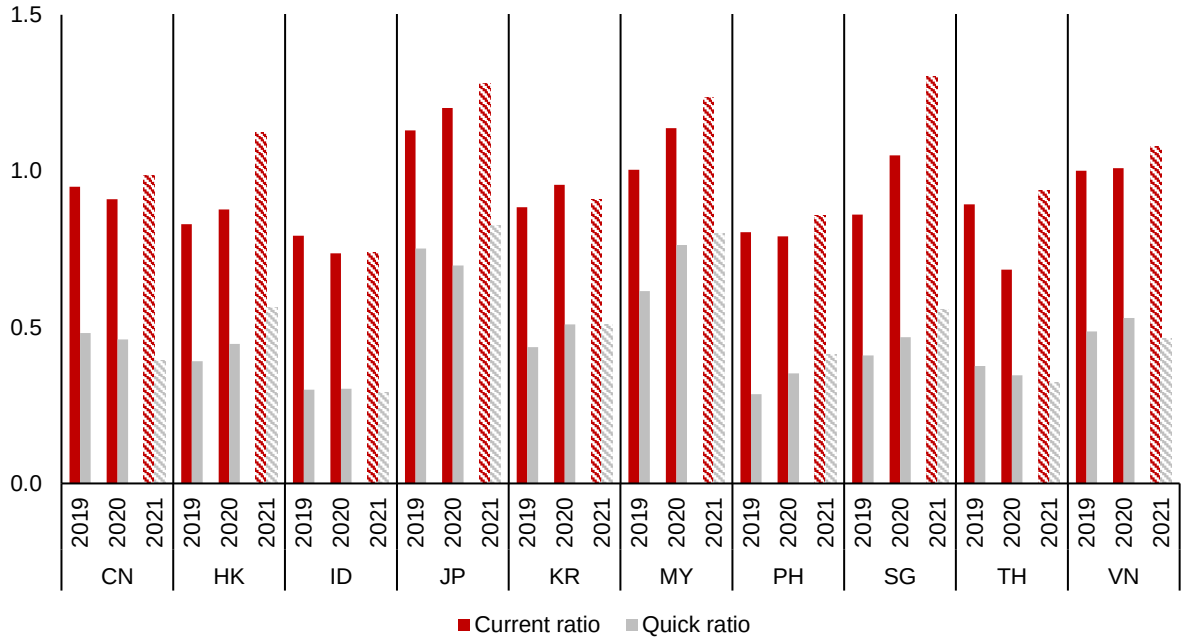


Sources: Bloomberg Finance L.P.; and author's estimates.
Note: Interest expense for 2021 is projected using the method described in Appendix VI. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

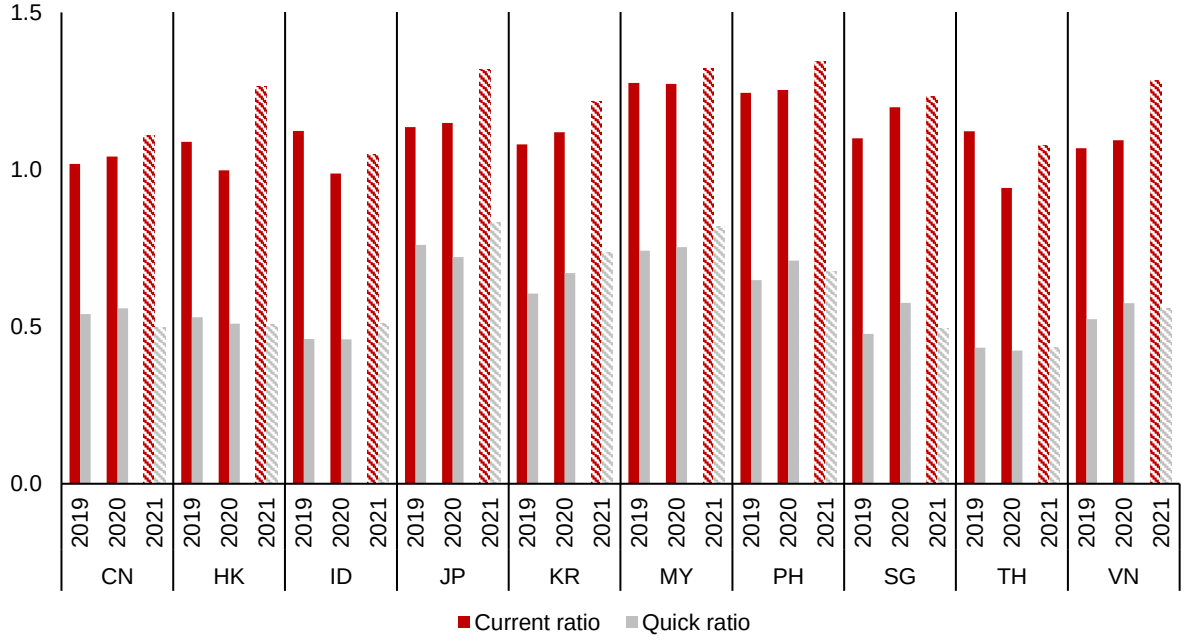
The results suggest that monetary policy and regulatory forbearance measures have been successful in supporting firms, but may have postponed some credit risks to the future. Lower interest rates have clearly helped firms cope with their interest payments, while credit support policies appear to have encouraged substantial short- and longer-term borrowing by firms in some economies in 2020 (Figure 17), which could undermine their ability to cover both, their short-term debt repayment obligations in the immediate future, and other debt down the road. Encouragingly, debt is projected to have fallen in several countries in 2021, notably for ICR DAR firms.

Figure 14. Selected ASEAN+3: Weighted Average of Current and Quick Ratios of Debt-at-Risk Listed Firms, 2019–21
(Ratio)

By ICR

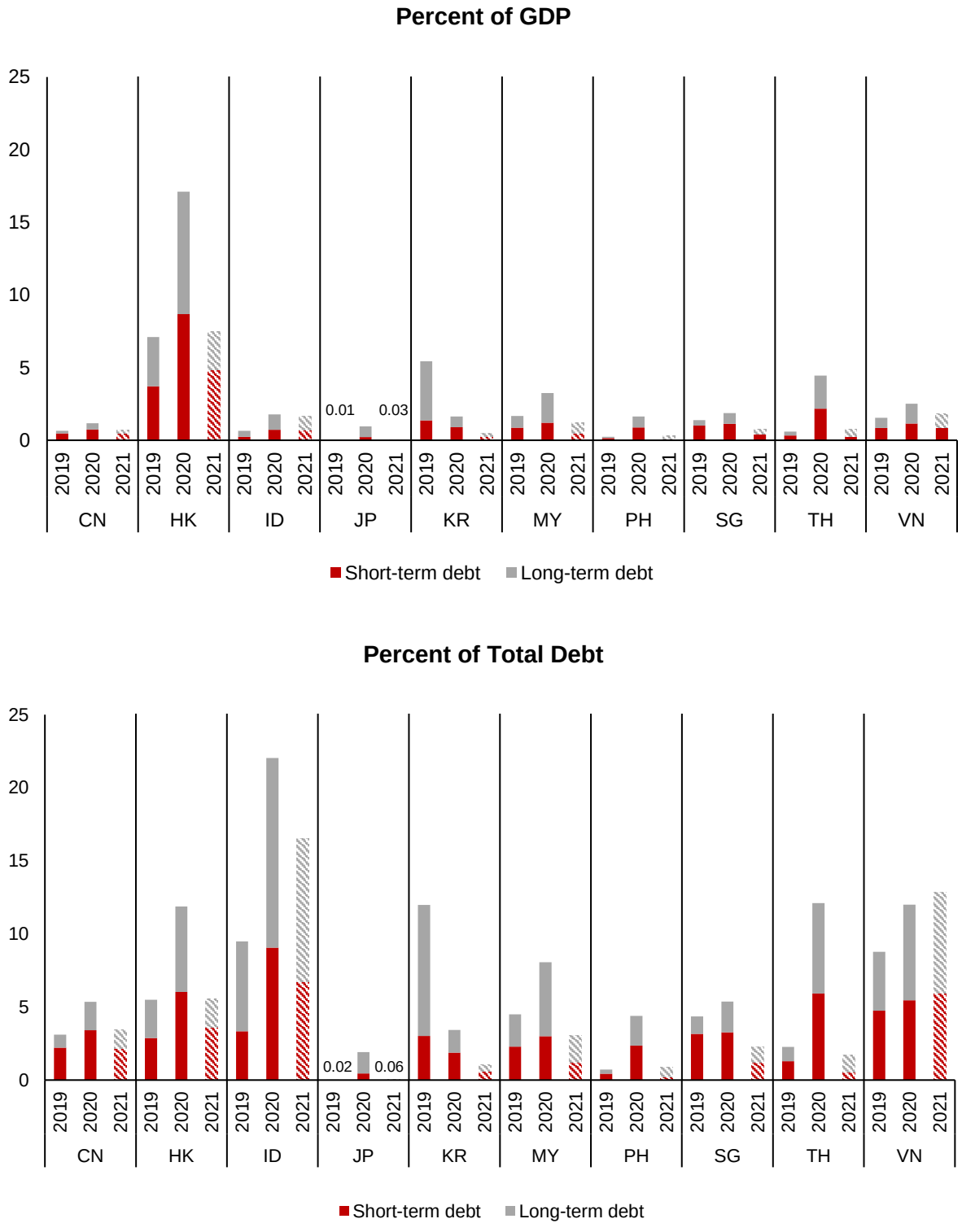


By DSR



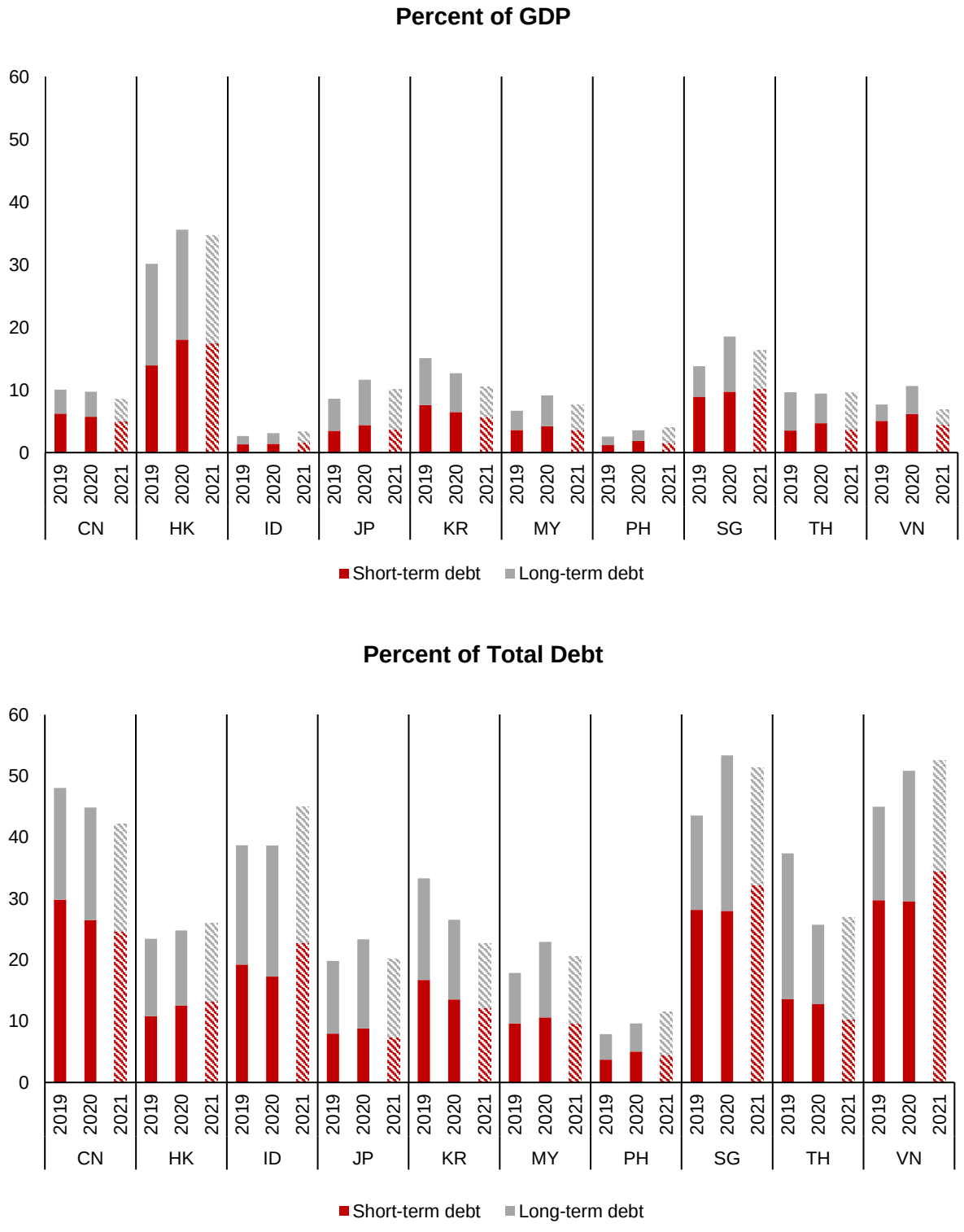
Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: Current and quick ratios for 2021 are projected using the method described in Appendix VI. Weighted averages of current and quick ratios are based on the short-term debt of firms. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 15. Selected ASEAN+3: Actual and Projected ICR Debt-at-Risk after Taking into Account the Availability of Quick Assets, 2019–21



Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: DAR for 2021 is projected using the method described in Appendix VI. Firms with ICR < 1.25 DSR <1 that do not have sufficient quick assets to cover short-term obligations are classified as DAR. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

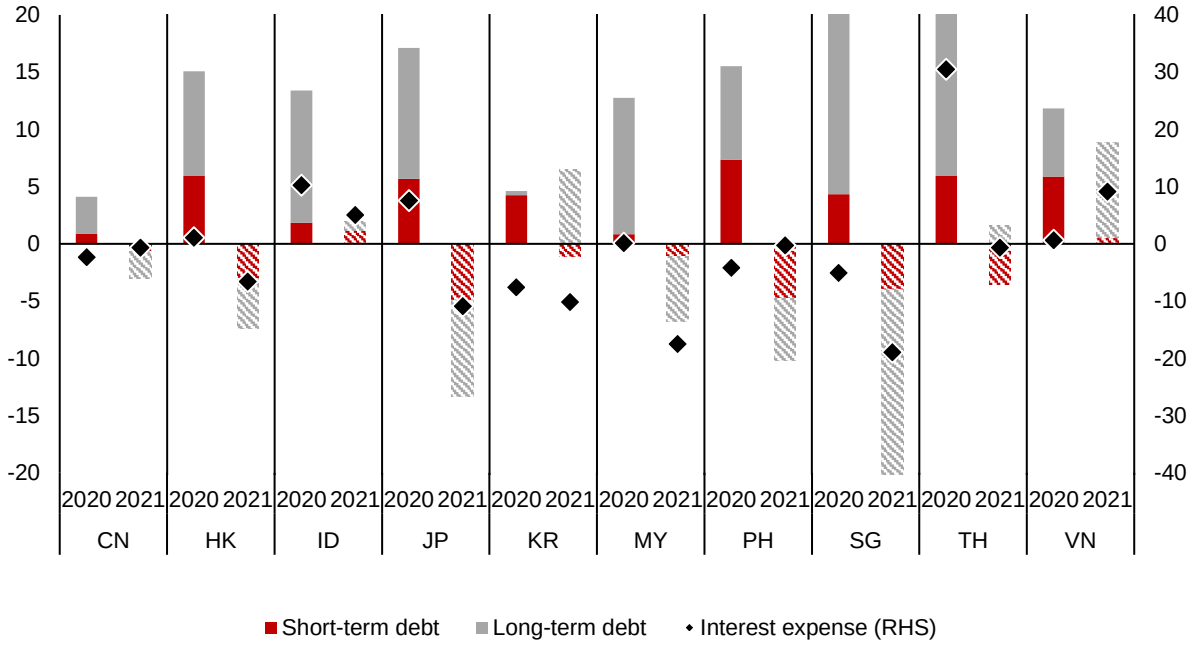
Figure 16. Selected ASEAN+3: Actual and Projected DSR Debt-at-Risk after Taking into Account the Availability of Quick Assets, 2019–21



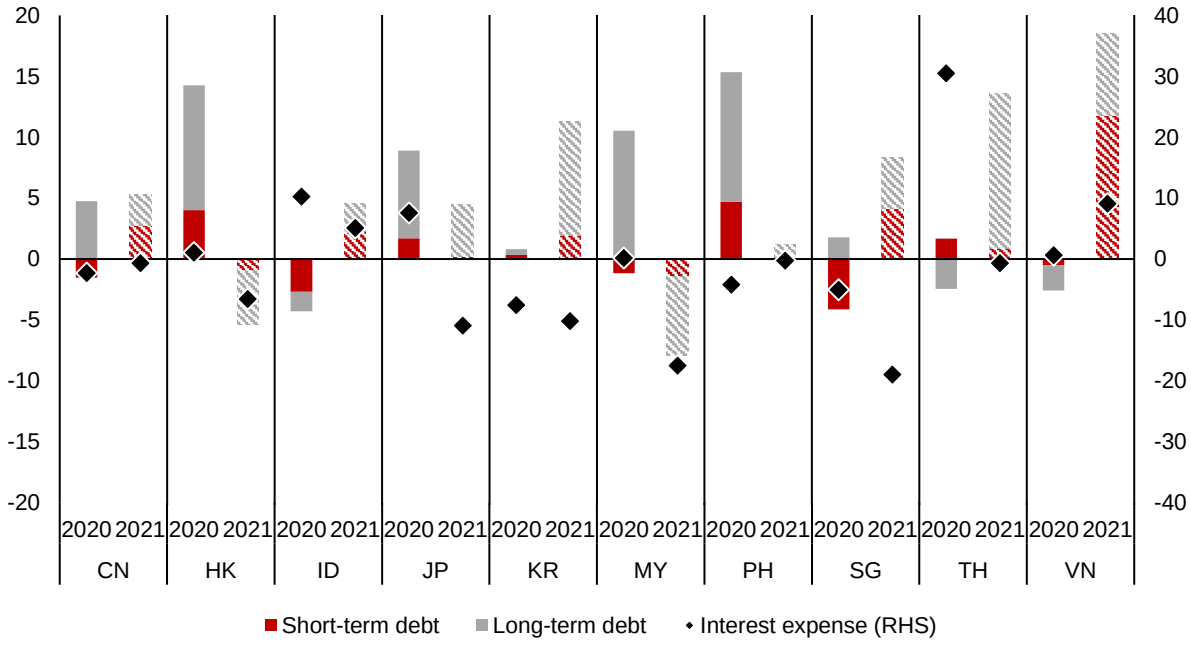
Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: DAR for 2021 is projected using the method described in Appendix VI. Firms with ICR < 1.25 DSR <1 that do not have sufficient quick assets to cover short-term obligations are classified as DAR. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Figure 17. Selected ASEAN+3: Actual and Projected Change in Debt and Interest Expense of Debt-at-Risk Listed Firms, 2020–21
(Percent of total debt; percent year-over-year)

By ICR



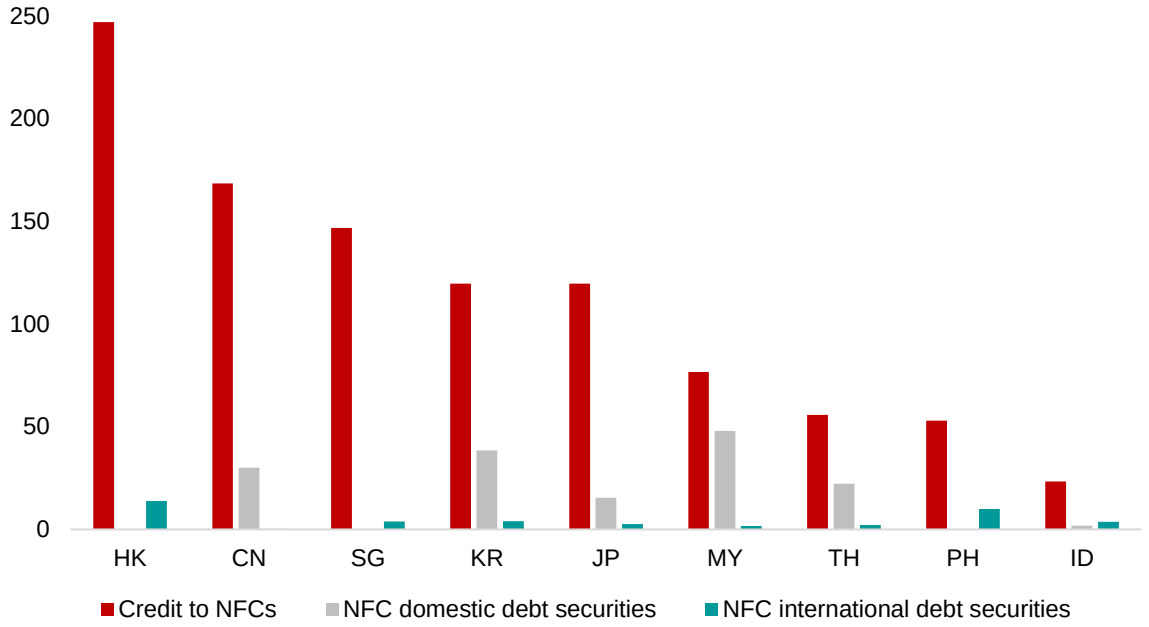
By DSR



Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: Debt and interest expense for 2021 are projected using the method described in Appendix VI. CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Bank lending remains the main source of financing in the ASEAN+3 region. Domestic institutional investors, through the purchases of corporate bonds—largely denominated in local currency—replaced banks as key liquidity providers to East Asian firms in the years following the GFC (Abraham, Cortina, and Schmulker 2021). Indeed, corporate bond issuance doubled among economies in the region, largely through relatively smaller firms issuing bonds at shorter maturities. Nonetheless, the outstanding stock of the region's NFC debt was, by far, still held by banks as of the end of 2020 (Figure 18), comprising both loans to and debt securities issued by NFCs per Dembiermont, Drehmann, and Muksakunratana 2013.

Figure 18. ASEAN+3: Sources of Nonfinancial Corporate Debt, 2020
(Percent of GDP)



Sources: Bank for International Settlements and national authorities, both via Haver Analytics; and AMRO staff calculations.
Note: Credit to NFCs for most economies largely comprises bank loans and debt securities held by banks, which are also included in the NFC domestic and international debt securities data.

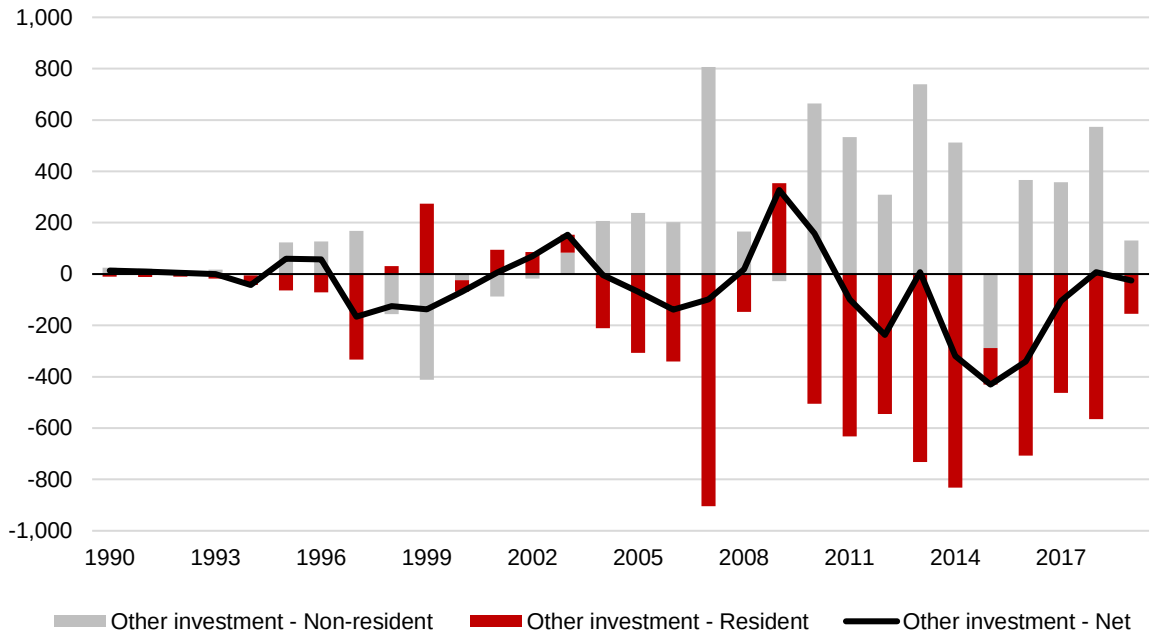
The region's corporate DAR carries important implications for growth and financial stability going forward. Some potentially important corporate insolvency triggers include rising interest rates, as a result of any faster than expected surge in inflation (Kho and others 2021); resurgence in infections from more infectious and virulent virus variants, resulting in continued start-stop economic activity; ill-timed or poorly-considered withdrawal of policy support, which could adversely affect banks:

- First, banks' balance sheets are exposed to greater credit risks from the NFC sector as a result of the pandemic. Pandemic policy support measures have been necessary and effective in keeping debt service costs low and containing losses on bank balance sheets to date. However, high indebtedness accumulated by firms when real economic activity was impaired has generated significant uncertainty and may have increased tail risks of ballooning corporate bankruptcies (Gourinchas and others 2021; Juselius and Tarashev 2021).

- Second, as events surrounding periods of turbulence in emerging markets have shown, banks may decide to pull back short term lending as occurred in the region

during episodes of emerging market turbulence (Figure 19). Any sharp rise in creditor retrenchment, if they assess the credit risks emanating from the corporate sector to be too high (King 2001), could then trigger a domino effect of widespread corporate insolvencies, feeding back into the economy and financial system (IMF 1998).

Figure 19. ASEAN+3: Bank Credit Flows during the AFC and Emerging Market Turbulence Periods
(Percent of GDP)



Sources: IMF via Haver Analytics; and AMRO staff calculations.
Note: Other investment flows among the ASEAN+3 economies are largely dominated by bank flows.

V. Conclusion

The increase in the number of DAR firms in the ASEAN+3 region during 2020 underscores the threat to financial stability posed by the COVID-19 pandemic. Any difficulty experienced by corporate borrowers in servicing their loans, as a result of start-stop physical containment measures that affect economic activity, translates to a deterioration in banks' asset quality, even as bank revenues are negatively affected by weak growth. Any build-up of such pressures that lead to massive losses for banks could trigger a systemic financial crisis if a domino effect across interconnected financial institutions were to occur. Recognizing the critical importance of the macro-financial nexus, policymakers introduced wide-ranging measures to support firms, households, and the banking sector. This paper analyzes the impact of the pandemic on listed firms in region, to assess the risks to financial stability and inform policy decisions going forward.

Unsurprisingly, the share of DAR listed firms in the ASEAN+3 region rose during the pandemic, as measured by their ICRs and DSRs. Firms with higher ICRs and DSRs typically had lower debt-to-asset ratios, and conversely for those with weaker debt service ratios. The increase in leverage across listed firms in the region was supported by highly accommodative monetary conditions, enacted to ensure sufficient liquidity in the financial system and encourage bank lending to the broader economy. Total debt among the listed firms grew relative to GDP in 2020, on the back of sharp contractions in GDP and/or

increases in short-term borrowings, mainly by firms in the lower ICR/DSR buckets. Back-of-the envelope projections point to ICR DAR falling as a percentage of recovering GDP in 2021, in line with lower interest expense, but DSR DAR rising slightly as a percentage of total debt from the rise in short-term debt.

From a policy perspective, the findings of the paper underscore the importance of certain policy measures that have been implemented over the course of the pandemic.[8] In particular:

- Monetary policy actions have been successful in keeping the corporate sector afloat and should remain accommodative as long as it is prudent to do so. They have kept interest expense low and stable despite the increase in debt levels, and will continue to play a critical role with the pandemic still far from over. Many economies in the region continue to calibrate economic reopening in the face of new waves and variants of infections.

- Pandemic policies have played a key role in turning economic activity around and every effort should be made to ensure that the recovery is sustained. Continued recovery would raise firm revenue, increase employment, and strengthen bank asset quality, and consequently, give creditors the confidence to continue lending and rolling over debt.

- Economic sectors, industries, and firms have been affected differently by the pandemic, and structural shifts are underway. Policy support should be targeted at viable-but-under-pressure industries/firms to ensure efficient allocation of valuable resources. Those that are unable to innovate, survive, and eventually thrive should be encouraged to exit in an orderly manner, while policies to reassign or upskill affected workers are implemented.[9]

Policy measures that are facilitating banks' credit support to the economy cannot last indefinitely and risks abound. Easy monetary conditions have helped firms cope with their interest payments, while credit support programs appear to have encouraged substantial short- and longer-term borrowing by firms, for operational and restructuring or expansion purposes. These measures may have postponed, in part, the realization of credit risks to the future. The growing prospect of concerted interest rate rises could potentially increase the DAR of firms in the region going forward, possibly coinciding with the eventual withdrawal of policy support.

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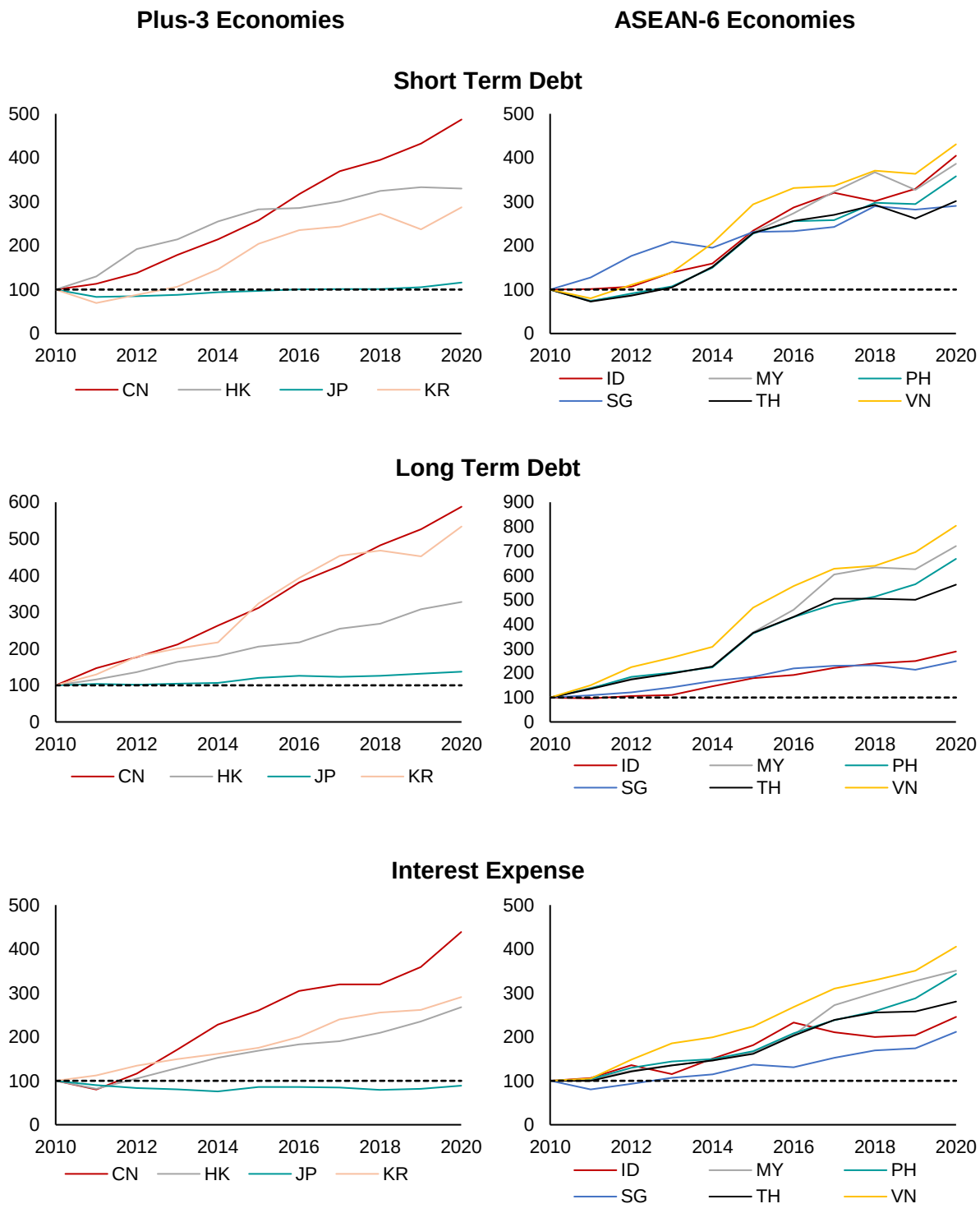
[8] See "ASEAN+3 and COVID-19: Panoply of Pandemic Policies" at https://www.amro-asia.org/covid-19-in-focus/.

[9] See Araujo and others (2022) for a discussion on principles that could guide the design of policy support and restructuring of firms adversely impacted by the pandemic.

Appendix I. Selected ASEAN+3: Nonfinancial Corporate Debt Trends

Appendix Figure 1. Selected ASEAN+3: Debt and Interest Expense Trends of Listed Firms

(Index, 2010=100)



Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Appendix II. Mapping Interest Coverage Ratio Buckets to Bond Ratings

Appendix Table 1. Damodaran: ICR Buckets vs. Synthetic Bond Ratings

Interest Coverage Ratio	Estimated Bond Rating
≥8.50	AAA
6.50–8.50	AA
5.50–6.50	A+
4.25–5.50	A
3.00–4.25	A–
2.50–3.00	BBB
2.25–2.50	BB+
2.00–2.25	BB
1.75–2.00	B+
1.50–1.75	B
1.25–1.50	B–
0.80–1.25	CCC
0.65–0.80	CC
0.20–0.65	C
< 0.20	D

Source: Damodaran (2016).

Appendix III. Availability of Financial Information on Listed Firms

Appendix Table 2. Selected ASEAN+3: Reporting Frequency of Listed Firms, 2020

(Number of firms)

By ICR Availability

Economy	Frequency			Total
	Quarter	Semi-Annual	Annual	
China	3,322	4,148	4,767	6,630
Hong Kong	241	1,071	1,136	1,496
Indonesia	476	7	527	698
Japan	2,953	2,952	3,196	3,964
Korea	1,924	5	2,291	3,962
Malaysia	659	67	756	989
Philippines	111	12	135	192
Singapore	100	392	449	561
Thailand	538	10	612	806
Vietnam	536	541	1,156	1,464

By DSR Availability

Economy	Frequency			Total
	Quarter	Semi-Annual	Annual	
China	130	3,763	4,699	6,630
Hong Kong	164	958	1,103	1,496
Indonesia	305	7	396	698
Japan	2,778	2,748	3,179	3,964
Korea	1,789	5	2,263	3,962
Malaysia	571	35	707	989
Philippines	83	8	122	192
Singapore	77	310	427	561
Thailand	274	7	408	806
Vietnam	524	535	1,153	1,464

Sources: Bloomberg Finance L.P.; and authors' calculations.
Note: The total represents the actual number of listed companies each country has on Bloomberg.

Appendix Figure 2. Selected ASEAN+3: Reporting Frequency of Listed Firms, 2020
(Percent)

Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: CN = China; HK = Hong Kong; ID = Indonesia; JP = Japan; KR = Korea; MY = Malaysia; PH = Philippines; SG = Singapore; TH = Thailand; VN = Vietnam.

Appendix IV. Debt-at-Risk of Listed Firms by Firm Size

Appendix Table 3. Selected ASEAN+3: Average Interest Coverage Ratios of Listed Firms by Total Assets, 2019–20

(Ratio)

Economy / Percentile	China		Hong Kong		Indonesia		Japan		Korea	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
0 – 20	15.71	13.67	-2.17	-5.72	3.50	-1.47	17.84	11.90	0.92	-1.70
20 – 40	12.46	12.07	-1.15	-1.72	4.64	0.85	21.74	20.54	5.69	6.16
40 – 60	9.19	10.95	2.39	1.06	7.10	1.86	26.29	22.46	8.42	8.62
60 – 80	9.06	10.56	5.21	3.65	6.38	2.95	28.79	25.91	10.14	8.89
80 – 100	8.65	8.19	9.95	5.79	4.98	6.57	27.73	22.77	9.13	8.66
Economy / Percentile	**Malaysia**		**Philippines**		**Singapore**		**Thailand**		**Vietnam**	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
0 – 20	2.70	-0.36	-3.39	-7.42	-4.39	-3.60	10.32	5.65	7.38	5.06
20 – 40	3.92	1.85	10.95	11.10	4.76	1.08	8.32	10.33	5.25	4.12
40 – 60	7.49	9.38	9.58	7.45	3.00	0.59	11.94	9.44	7.72	6.43
60 – 80	6.07	6.21	11.46	5.89	4.36	6.04	6.13	5.99	4.82	6.25
80 – 100	6.51	6.58	5.98	3.68	5.47	5.05	8.30	4.97	7.46	7.04

Sources: Bloomberg Finance L.P.; and authors' estimates.

Note: The ICR for each percentile is a simple average of corresponding firms' ICRs. Extreme outliers (outside the absolute value of 100) are excluded to avoid severe distortions in the means. The greener the heatmap color (greenest = 29), the higher the average ICR of firms in the sample; the redder the color (reddest = –8), the lower the average ICR of firms.

Appendix Table 4. Selected ASEAN+3: Average Debt Service Ratios of Listed Firms by Total Assets, 2019–20

(Ratio)

Economy / Percentile	China		Hong Kong		Indonesia		Japan		Korea	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
0 – 20	3.47	3.22	1.72	-1.74	1.51	1.70	3.85	3.44	1.54	1.15
20 – 40	2.94	3.18	-0.34	0.29	2.44	2.02	4.67	4.12	4.11	3.08
40 – 60	2.24	2.51	1.53	1.57	1.51	1.57	5.62	4.05	3.65	4.63
60 – 80	1.80	2.04	1.88	2.16	2.26	2.25	5.12	5.54	3.97	4.54
80 – 100	1.49	1.75	3.01	1.28	2.00	3.10	5.37	5.52	3.07	3.18
Economy / Percentile	**Malaysia**		**Philippines**		**Singapore**		**Thailand**		**Vietnam**	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
0 – 20	1.98	2.89	-1.76	-1.34	-4.36	-2.64	5.12	3.83	3.68	3.92
20 – 40	0.81	1.68	5.36	4.53	3.61	0.77	6.92	5.78	2.58	2.18
40 – 60	3.43	3.11	4.71	1.84	1.67	1.46	4.21	2.08	3.21	1.79
60 – 80	3.10	1.46	1.57	1.31	3.51	3.40	2.89	1.42	2.32	3.00
80 – 100	2.10	1.87	1.69	1.23	2.72	2.38	4.44	2.47	1.72	1.42

Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: The DSR for each percentile is a simple average of corresponding firms' DSRs. Extreme outliers (outside the absolute value of 100) are excluded to avoid severe distortions. The greener the heatmap color (greenest = 7), the higher the average DSR of firms in the sample; the redder the color (reddest = –5), the lower the average DSR of firms.

Appendix V. Debt-at-Risk of Listed Firms

Appendix Table 5. Selected ASEAN+3: Change in Share of Listed Firms by Industry and Debt-at-Risk Buckets, 2020
(Percent)

Interest Coverage Ratio

ICR < 0.00

Economy	Industry								
	Basic Materials	Communica-tions	Consumer, Cyclical	Consumer, Non-Cyclical	Diversified	Energy	Industrial	Technology	Utilities
China	-0.7	8.2	9.5	2.2	5.5	1.0	0.8	1.7	3.7
Hong Kong	0.7	-3.3	9.8	3.6	56.6	5.4	2.2	-0.8	0.0
Indonesia	6.0	15.0	17.5	5.6	0.0	15.4	13.3	5.6	0.0
Japan	2.7	0.4	7.5	6.4		5.3	2.1	1.4	3.7
Korea	4.9	7.1	6.1	-0.6	0.0	26.8	3.7	-3.7	-6.3
Malaysia	3.6	12.2	11.2	-3.2	0.0	22.5	5.7	10.4	25.0
Philippines	-12.5	-5.7	41.9	5.6	0.0	14.3	16.1	0.0	0.0
Singapore	14.1	-4.0	10.8	-0.8	25.0	7.7	8.6	-5.4	-16.7
Thailand	2.9	9.8	20.7	2.3	0.0	9.7	-1.0	-7.5	4.5
Vietnam	-1.3	9.1	10.0	0.3	0.0	6.5	0.5	9.1	1.1

ICR 0.00–1.25

Economy	Industry								
	Basic Materials	Communica-tions	Consumer, Cyclical	Consumer, Non-Cyclical	Diversified	Energy	Industrial	Technology	Utilities
China	-1.8	-1.3	-1.0	0.2	6.6	3.7	-0.3	-1.4	-5.1
Hong Kong	4.2	-0.1	2.0	1.8	-8.2	1.8	1.0	0.0	0.0
Indonesia	5.3	5.0	-0.8	1.5	50.0	0.0	5.0	0.0	0.0
Japan	0.5	0.0	-0.8	-0.6		0.0	1.2	-0.3	0.0
Korea	1.9	-1.5	-1.0	-2.1	0.0	-5.2	-0.4	0.5	-5.8
Malaysia	3.1	2.6	-3.2	0.5	16.7	-3.8	-1.0	-3.0	23.2
Philippines	3.8	14.8	0.0	5.6	0.0	7.1	1.8	0.0	-7.7
Singapore	6.2	0.0	3.9	-4.6	0.0	-6.0	-1.2	3.7	33.3
Thailand	3.2	4.3	1.2	4.0	33.3	-6.5	-1.3	4.5	13.6
Vietnam	-7.9	0.0	-2.5	2.9	-25.0	3.0	2.3	0.0	1.1

Debt Service Ratio

DSR < 0.0

Economy	Industry								
	Basic Materials	Communica-tions	Consumer, Cyclical	Consumer, Non-Cyclical	Diversified	Energy	Industrial	Technology	Utilities
China	0.0	4.8	7.7	1.7	0.0	1.4	0.1	1.8	3.1
Hong Kong	-3.3	-4.1	4.3	0.9	38.5	8.0	1.5	-5.8	-9.6
Indonesia	9.4	15.3	15.7	1.6	0.0	0.6	13.9	9.1	10.7
Japan	2.2	-0.6	4.0	3.4		0.0	0.5	2.2	0.1
Korea	5.5	7.3	7.7	-0.9	0.0	13.4	1.6	-1.3	0.0
Malaysia	-2.8	12.1	9.5	3.7	2.3	16.7	3.9	11.5	14.3
Philippines	-5.3	4.0	23.5	5.5	0.0	4.5	14.3	0.0	0.0
Singapore	29.2	-15.0	5.7	-0.3	0.0	15.6	7.0	-4.0	-33.3
Thailand	-2.0	-4.5	8.7	-0.2	0.0	-3.0	-8.1	8.3	5.9
Vietnam	-3.0	8.3	9.5	0.8	0.0	-0.1	0.4	6.7	0.0

DSR 0.0–1.0

Economy	Industry								
	Basic Materials	Communica-tions	Consumer, Cyclical	Consumer, Non-cyclical	Diversified	Energy	Industrial	Technology	Utilities
China	-3.0	-4.0	-4.2	-1.3	16.7	-2.4	-2.2	-1.9	-1.9
Hong Kong	-5.8	4.4	1.6	2.2	-15.4	-0.4	6.9	0.5	15.4
Indonesia	-7.2	-2.5	-2.9	-5.4	0.0	3.4	-4.3	9.1	-32.1
Japan	-0.7	1.0	2.6	-0.4		0.0	2.3	-1.1	-9.0
Korea	-1.5	-2.5	-8.1	-0.7	0.0	-8.0	-1.4	2.3	-9.2
Malaysia	2.1	3.4	-1.3	-5.7	-4.5	-2.8	-3.8	-2.1	-14.3
Philippines	-10.5	15.2	9.1	-1.3	0.0	-5.8	-11.0	-25.0	12.2
Singapore	-3.8	13.3	4.2	-8.0	0.0	-14.8	-11.8	-8.0	33.3
Thailand	1.4	0.0	2.8	7.0	0.0	10.9	6.1	11.1	8.8
Vietnam	0.2	-2.8	-1.6	0.1	-26.7	2.5	-1.6	1.7	0.0

Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: The change in share of firms in each industry is the difference in share of firms in each bucket from 2019Q4 to 2020Q4. The deeper the red (reddest ≥ 20), the more positive the change; the deeper the green (greenest ≤ –20), the more negative the change. A positive change denotes that the share of firms in the bucket has increased over the year, and a negative change denotes otherwise.

Appendix VI. Debt of Listed Firms

Appendix Table 6. Selected ASEAN+3: Change in Debt of Listed Firms by Industry, 2020
(Percent of GDP)

Economy	Industry								
	Basic Materials	Communica-tions	Consumer, Cyclical	Consumer, Non-cyclical	Diversified	Energy	Industrial	Technology	Utilities
China	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Hong Kong	-0.5	0.1	2.9	-0.1	0.2	-0.1	0.8	0.0	1.7
Indonesia	-0.2	0.1	0.2	0.0	0.0	0.0	0.1	0.0	0.0
Japan	-0.1	0.8	0.7	0.2	0.0	0.1	0.3	0.1	-0.2
Korea	0.0	-0.2	0.5	0.0	0.0	0.1	0.2	0.1	0.0
Malaysia	0.1	-0.4	0.0	-0.1	-0.2	-0.1	-0.3	0.0	0.2
Philippines	0.0	0.1	0.9	0.6	0.1	0.2	0.0	0.0	0.3
Singapore	0.0	0.7	0.4	-0.7	0.0	0.2	-0.2	0.0	-0.1
Thailand	0.1	0.3	1.6	0.4	0.1	0.3	0.0	0.0	0.2
Vietnam	0.2	0.0	0.4	0.4	0.0	0.3	0.7	0.1	0.0

Sources: Bloomberg Finance L.P.; and authors' estimates.
Note: The change in debt of firms in each industry is the difference in debt to GDP of firms in each bucket from 2019Q4 to 2020Q4. The deeper the red (reddest ≤ –1), the more positive the change; the deeper the green (greenest ≥ 1), the more negative the change. A positive change denotes that the debt to GDP of firms in the bucket has increased over the year, and a negative change denotes otherwise.

Appendix VII. Projecting Financial Indicators of Listed Firms

The DAR for each economy—by ICR and DSR—as of the end of 2021 is projected based on the historical data of the constituents. The following steps are taken:

- First, the average 2021 interest rate (IR) for firm *i* is estimated by averaging the interest rates for 2019 and 2020:

  (1) $\mathrm{IR}_{\mathrm{i},2021} = \mathrm{Average}\ (\mathrm{IR}_{\mathrm{i},2019\ |\ \mathrm{i},2020})$.

  where, the interest rates for firm *i* for 2019 and 2020 are computed by dividing the interest expense (IE) for each year by the average total debt (TD) of the current and previous year:

  (2) $\mathrm{IR}_{\mathrm{i,t}} = \frac{\mathrm{IE}_{\mathrm{i,t}}}{\mathrm{Average}(\mathrm{TD}_{\mathrm{i,t-1|i,t}})}$.

- Next, the return on assets (ROA)—based separately on EBIT and EBITDA—for firm *i* for 2021 is estimated by averaging the ROA for 2019 and 2020:

  (3) $\mathrm{ROA(EBIT)}_{\mathrm{i},2021} = \mathrm{Average}\left(\mathrm{ROA(EBIT)}_{\mathrm{i},2019\ |\ \mathrm{i},2020}\right)$;

  (4) $\mathrm{ROA(EBITDA)}_{\mathrm{i},2021} = \mathrm{Average}\left(\mathrm{ROA(EBITDA)}_{\mathrm{i},2019\ |\ \mathrm{i},2020}\right)$.

  where, the ROA for EBIT and EBITDA for firm *i* for 2019 and 2020 is then separately computed by dividing each item by the average total assets (TA) of the current and previous year:

  (5) $\mathrm{ROA(EBIT)}_{\mathrm{i,t}} = \frac{\mathrm{EBIT}_{\mathrm{i,t}}}{\mathrm{Average}(\mathrm{TA}_{\mathrm{i,t-1|i,t}})}$;

  (6) $\mathrm{ROA(EBITDA)}_{\mathrm{i,t}} = \frac{\mathrm{EBITDA}_{\mathrm{i,t}}}{\mathrm{Average}(\mathrm{TA}_{\mathrm{i,t-1|i,t}})}$.

- Total debt and total assets for firm *i* as of the end of 2021 are estimated by annualizing the 2021H1 numbers proportionately vis-à-vis corresponding 2020 numbers:

  (7) $\mathrm{TD}_{\mathrm{i},2021} = \frac{\mathrm{TD}_{\mathrm{i},2021\mathrm{H1}} \times \mathrm{TD}_{\mathrm{i},2020}}{\mathrm{TD}_{\mathrm{i},2020\mathrm{H1}}}$;

  (8) $\mathrm{TA}_{\mathrm{i},2021} = \frac{\mathrm{TA}_{\mathrm{i},2021\mathrm{H1}} \times \mathrm{TA}_{\mathrm{i},2020}}{\mathrm{TA}_{\mathrm{i},2020\mathrm{H1}}}$.

- The interest expense incurred by firm *i* in 2021 is projected by multiplying the interest rate estimated in equation (1) by the average of its total debt in 2020 and 2021 in equation (7):

  (9) $\mathrm{IE}_{\mathrm{i},2021} = \mathrm{IR}_{\mathrm{i},2021} \times \mathrm{TD}_{\mathrm{i},2021}$

- The EBIT and EBITDA earned by firm *i* as of the end of 2021 are estimated by multiplying the respective ROAs in equations (3) and (4) by the average of its total assets in 2020 and 2021 in equation (8):

(10) $\mathrm{EBIT}_{\mathrm{i},2021} = \mathrm{ROA(EBIT)}_{\mathrm{i},2021} \times \mathrm{TA}_{\mathrm{i},2021}$

(11) $\mathrm{EBITDA}_{\mathrm{i},2021} = \mathrm{ROA(EBITDA)}_{\mathrm{i},2021} \times \mathrm{TA}_{\mathrm{i},2021}$

- The ICR and DSR for firm *i* are subsequently estimated as follows:

(12) $\mathrm{ICR}_{\mathrm{i},2021} = \frac{\mathrm{EBIT}_{\mathrm{i},2021}}{\mathrm{IE}_{\mathrm{i},2021}}$;

(13) $\mathrm{DSR}_{\mathrm{i},2021,\mathrm{i}} = \frac{\mathrm{EBITDA}_{\mathrm{i},2021}}{\mathrm{IE}_{\mathrm{i},2021}+\mathrm{STDebt}_{\mathrm{i},2020}}$,

where $\mathrm{STDebt}_{\mathrm{i},2020}$ is the reported short-term debt of firm *i* in 2020.

Firms are then allocated into their projected 2021 ICR and DSR buckets. The estimated DAR for economy *n* as of end-2021 is then computed by aggregating the total debt of firms in the ICR and DSR buckets that are considered at risk.

The estimated DAR for 2021 is proportionately adjusted to account for the differences in the number of companies reporting in quarterly, semi-annual, and annual frequencies, and consequently, any potential under- or overestimation. Thus, the projected DAR for economy *n* is multiplied by an adjustment factor, θ, based on the average of the aggregate reported annual total debt to semi-annual total debt, over 2019 and 2020:

$\theta_{\mathrm{n}} = \mathrm{Average}(\frac{\mathrm{Debt}_{\mathrm{n},2020}}{\mathrm{Debt}_{\mathrm{n},2020\mathrm{H1}}}, \frac{\mathrm{Debt}_{\mathrm{n},2019}}{\mathrm{Debt}_{\mathrm{n},2019\mathrm{H1}}})$;

$\mathrm{Adjusted\ DAR}_{\mathrm{n},2021} = \mathrm{DAR}_{\mathrm{n},2021} \times \theta_{\mathrm{n}}$,

where $\mathrm{DAR}_{\mathrm{n},2021}$ is the projected total debt of economy i in 2021 held by firms whose debt is at risk.

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Address: 10 Shenton Way, #15-08
MAS Building, Singapore 079117
Website: www.amro-asia.org
Tel: +65 6323 9844
Email: enquiry@amro-asia.org
LinkedIn | **Twitter** | **Facebook** | **YouTube**