INTERNATIONAL MONETARY FUND

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# INDONESIA

## SELECTED ISSUES

March 2021

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INTERNATIONAL MONETARY FUND

# INDONESIA

## SELECTED ISSUES

January 29, 2021


Approved By
**Asia and Pacific Department**

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# INDONESIA'S GOVERNMENT BOND YIELDS AND NONRESIDENT PARTICIPATION IN GOVERNMENT BOND MARKETS[1]

*This note presents the evolution of government bond yields in Indonesia and compares it with those in other large Emerging Markets (EMs). The note documents that during periods of global financial stress, nonresident participation in domestic government bond markets in EMs can be fickle while exchange rate volatility can be substantial. The empirical analysis suggests that a larger share of nonresident participation in domestic bond markets seems to be associated with both lower levels of local currency government bond yields and higher sensitivity to changes in global risk aversion. It also finds that both local currency and foreign currency bond yields are positively correlated with exchange rate volatility.*

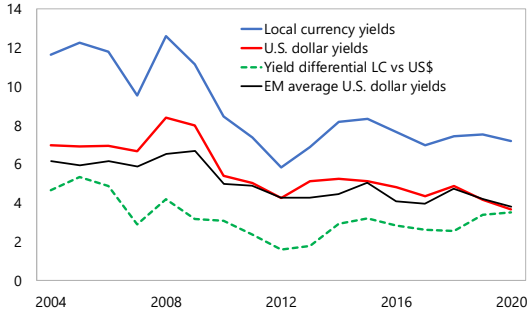
**1. This note explores the questions of whether government bond yields in EMs vary with the share of nonresident participation in government bond markets and exchange rate volatility**. The first section discusses the evolution in bond yields in Indonesia in recent years and compares it with that of other EMs and global factors. The second section documents the exchange rate volatility in Indonesia and other EMs, especially in episodes of global financial stress. The third section documents the evolution of nonresident participation in domestic bond markets in Indonesia and other EMs, highlighting substantial differences across countries. In the last section, the note presents an econometric analysis of the correlations between government bond yields and bond market characteristics such as the participation by nonresidents in government bond markets, the role of exchange rate volatility, and other domestic and global factors. The objective is to analyze whether the share of nonresident investors in the government bond market is systematically correlated with bond yields, while controlling for domestic factors and time and country specific factors. The latter is an aspect that differentiates this analysis from previous work and contributes to the literature. The note concludes with policy considerations.

**2. Indonesian government bond yields have declined in the past decade compared to the early 2000s**. However, since the beginning of the 2010s, and in line with the EMs average, Indonesian U.S. dollar bond yields have declined more than the yields on local currency government bonds (Figure 1, left chart). More recently, with the spike in global risk aversion (as measured by the VIX) immediately after the COVID-19 shock hit the global economy, the yields of both Indonesian local currency government and U.S. dollar government bonds increased sharply before declining when external pressures started to ease as well as liquidity was restored in bond markets. However, the yields of Indonesian U.S. dollar government bonds have declined more than yields in local currency government bonds, leading to an increase in the yield differential between these bonds (Figure 1, right chart). These different dynamics in the yields of government bonds depending on

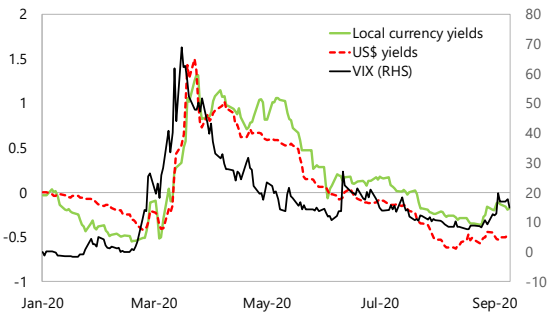
[1] Prepared by Francisco Arizala (SPR).

currency denomination reflect differences in liquidity in these markets and differences in the perception of currency and credit risk, as well as differences in local currency bond market characteristics, such as the share of nonresident participation in government bond markets.

**Figure 1. Government Bond Local Currency and FX Bond Yields**



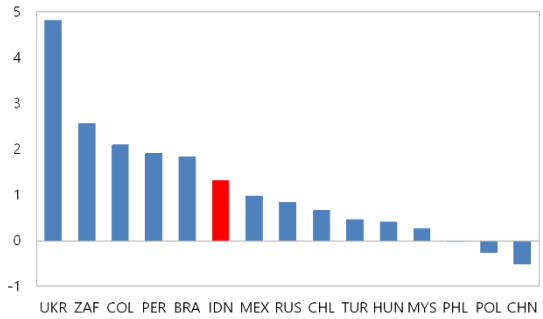

Sources: Bloomberg L.P.; and IMF staff estimates.



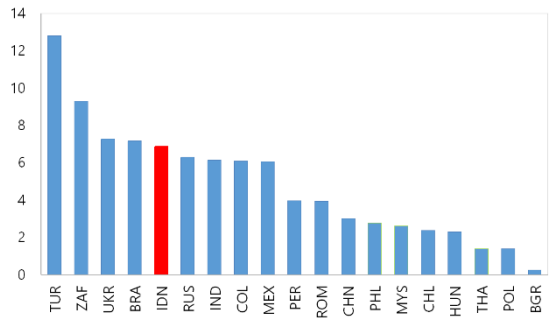

Sources: Bloomberg L.P.; and IMF staff estimates.

**3. Global financial conditions tightened after the COVID-19 shock**. Government bond yields increased in Indonesia and across all EMs, with market pressures being the sharpest in March 2020 (Figure 2, left chart). As of September 2020, local currency bond yields in Indonesia were at levels comparable to those in other large EMs, such as Brazil, Russia, India, and Mexico, but relatively higher when compared to those in other ASEAN EMs countries, Thailand, Malaysia, and the Philippines (Figure 2, right chart).

**Figure 2. Local Currency Bond Yields During the COVID-19 Crisis**




Sources: Bloomberg LP.; and IMF staff estimates.

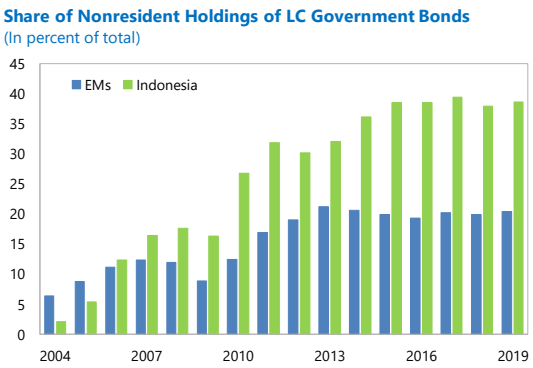



Source: Bloomberg L.P.

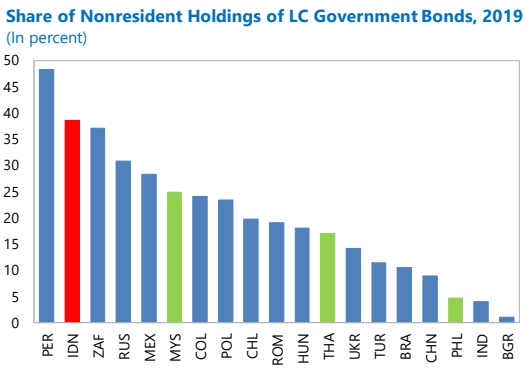
## A. Nonresident Participation in Government Bond Markets

**4. The share of nonresident participation in local currency bond markets in Indonesia has increased more than in other EMs since the 2010s** (Figure 3, left chart). In 2019, Indonesia was among the EMs with the highest participation of nonresidents in local currency bond markets (Figure 3, right chart). This high, pre-pandemic share also implies that Indonesia represented the second-largest share (just below Mexico) of the total amount invested in EMs local currency bond markets by nonresidents.

**Figure 3. Nonresident Participation in Local Currency Government Bond Markets**




Sources: Arslanalp and Tsuda (2014); and IMF staff estimates.




Source: Arslanalp and Tsuda (2014).

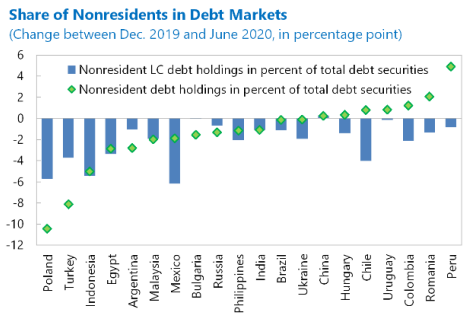
**5. A higher participation of nonresidents in government bond markets has benefits but it also entails risks**. The increased holdings of EMs government bonds by nonresident investors has contributed to improving government bond markets liquidity in these economies and has also increased financial resources available domestically. In principle, increased participation by nonresidents can lead to lower funding costs as it increases the availability of financial resources in the economy (Peiris, 2010 and Ebeke and Kyobe, 2015). However, a higher share of nonresident holdings of government bonds can also increase the exposure to risks associated with sudden capital outflows (IMF/WB, 2020). Such outflows by nonresidents in periods of financial stress would imply that local currency bond yields would likely be more sensitive to changes in global risk aversion, and potentially translate into disorderly market conditions.

**6. Since the beginning of the COVID-19 crisis, the share of nonresident holdings of government bonds has declined across EMs, with relatively large declines in Indonesia**. In the first semester of 2020, the share of nonresident holdings in total outstanding debt securities in Indonesia declined from 50 percent to 45 percent, compared to a reduction, on average, from 36 percent to 34 percent in EMs (Figure 4, left chart). The composition by currency denomination in the decline in nonresident participation varied across countries. In Indonesia, Egypt, and Malaysia most of the decline of nonresident participation was accounted for by outflows from local currency bond markets. In Poland and Turkey, on the other hand, the distribution in outflows was even between FX and local currency denominated securities. In Mexico, the decline in the participation of

nonresidents in the local currency bond market was the sharpest one among EMs, but it was largely compensated by large issuances of FX debt (Figure 4, right chart). In Indonesia, domestic banks substantially increased their holdings of local currency government bonds, more than compensating for the reduced holdings by nonresident investors.

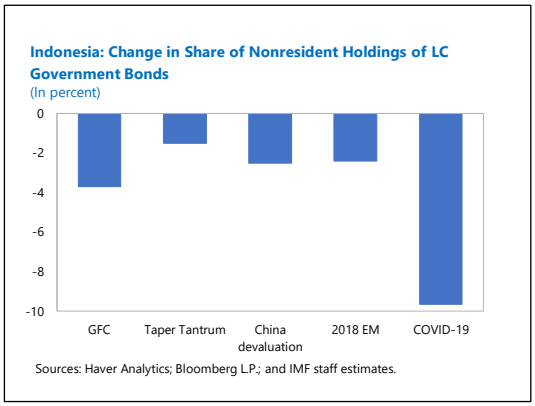
**Figure 4. Nonresident Participation in Total Debt Government Bond Markets During COVID-19 Crisis**


Sources: Arslanalp and Tsuda (2014); and IMF staff estimates.



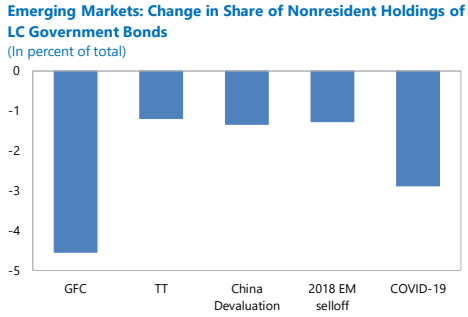

Sources: Arslanalp and Tsuda (2014); and IMF staff estimates.

**7. Nonresident participation in EMs local currency bond markets can be particularly fickle during global financial market turmoil**. During such periods, the participation of nonresident investors in EMs bond markets has typically declined, leading to disorderly market conditions in local currency bond markets and increases in bond yields. A comparison across different episodes shows that EMs selloffs in the GFC and 2018 were particularly acute for the EMs government bonds asset class (Figure 5, left chart). ASEAN countries also

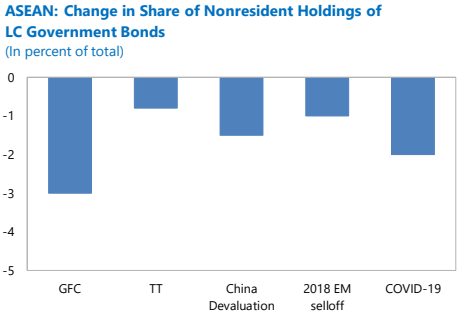



Sources: Haver Analytics; Bloomberg L.P.; and IMF staff estimates.

**Figure 5. Nonresident Participation in Local Currency Government Bond Markets During Episodes of Global Financial Stress**




Sources: Arslanalp and Tsuda (2014); and IMF staff estimates.




Sources: Arslanalp and Tsuda (2014); and IMF staff estimates.

experienced declines in nonresident participation in these episodes, as well as in the 2015 devaluation episode in China (Figure 5, right chart). In the case of Indonesia, the decline in nonresident participation in local currency bond markets in the COVIID-19 crisis exceeded that of other episodes (see text chart on the right).

**8. In the COVID-19 crisis, large nonresident outflows from EMs local currency bond markets have been compensated for by sustained issuance of hard-currency bonds by EMs**. This asset class has benefited from the ample global liquidity after the monetary easing by the U.S. Fed and other major central banks. Hard-currency bond issuance has been unprecedented in Indonesia, compared to other periods of global financial stress, and they have also outperformed the issuances by other EMs. (Figure 6). In net terms, in 2020 the substitution between nonresident holdings of local currency and foreign currency debt has been substantial. Nonresident outflows from local currency bonds reached about US$9 billion, while bond issuances of Indonesian government bonds denominated in U.S. dollar amounted to about US$10.9 billion (see text chart on the right).

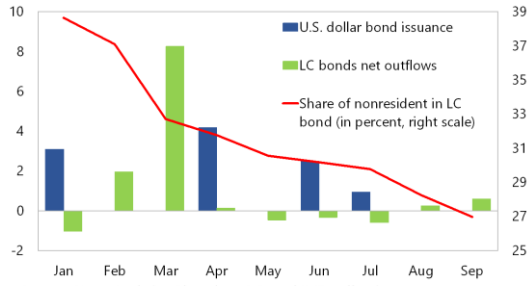
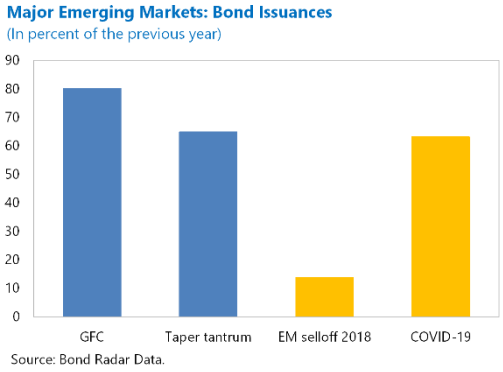
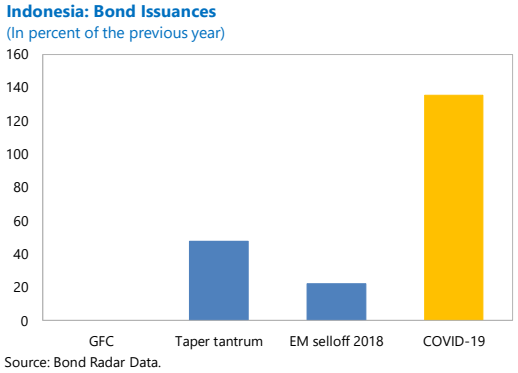



**Figure 6. Issuance of Hard Currency Bonds During Episodes of Global Financial Stress**

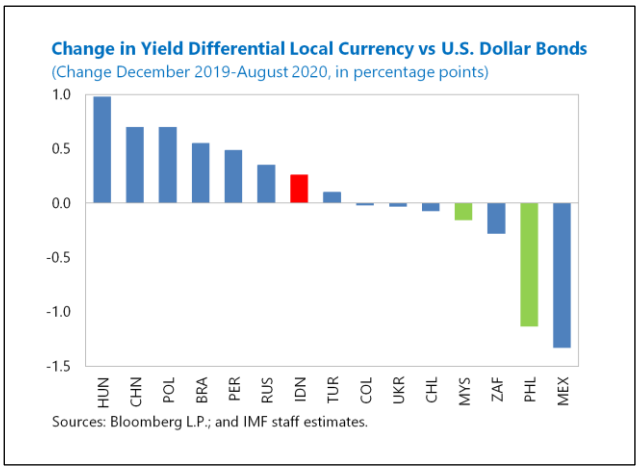



## B. Exchange Rate Volatility

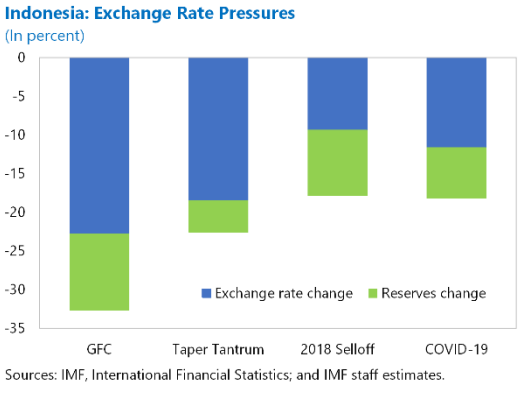
**9. Sharp exchange rate depreciations tend to lower the take-home returns for nonresident investors, thereby affecting their demand for local currency EMs bonds**. Nonresident investors, even when entering the local currency bond markets, are optimizing

returns measured in foreign currency (Hofmann, Shim, and Shin, 2020). Changes in the exchange rate, therefore, affect their investment decision, and the tendency toward exchange rate-related, synchronized exit/entry of some nonresident investors can reinforce increases/declines in yields on government bonds denominated in local currency. Also, in periods of global market turbulence, exchange rate volatility, combined with a preference for assets in FX by nonresident investors, can lead to an increase in the yield differential between local currency and FX government bonds. Since the beginning of the COVID-19 crisis, this differential increased in Indonesia, Brazil and Russia but it declined in the Philippines and South Africa, for example (see text chart).




**10. In previous episodes of global financial stress, EMs exchange rates depreciated sharply, and exchange rate volatility increased substantially**. In relative terms, exchange rate depreciations were the largest in the GFC, but they were also considerable in the COVID-19 crisis (Figure 7). In Indonesia, episodes of increased exchange rate volatility have been mainly associated with global financial stress. Indeed, the volatility of the Rupiah was the largest in the GFC (2008–2009), the Taper Tantrum (2013), the devaluation episode in China (2015), and the COVID-19 crisis (2020) (Figure 8, left chart). Considering the period 2004-2020, exchange rate volatility in Indonesia has been close to the median across EMs, but it has been relatively higher than in other ASEAN peers (Figure 8, right chart).

## Figure 7. Exchange Rate Market Pressures



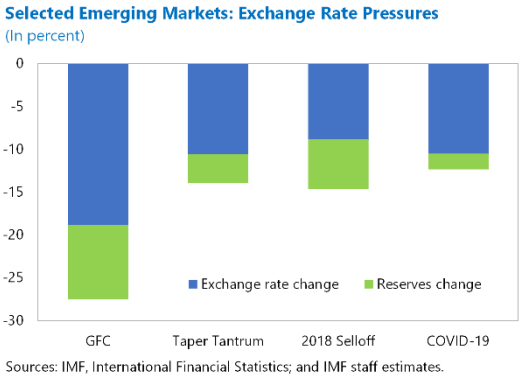
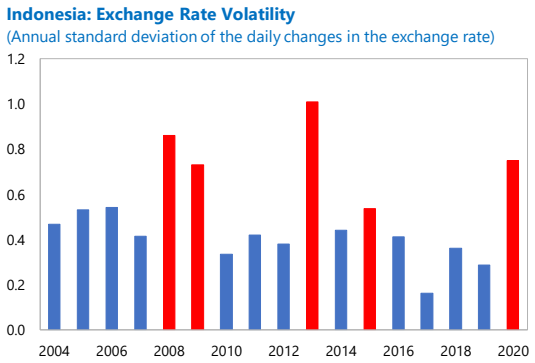
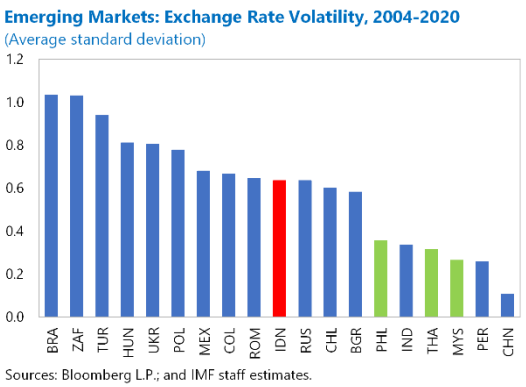



**Figure 8. Exchange Rate Volatility**



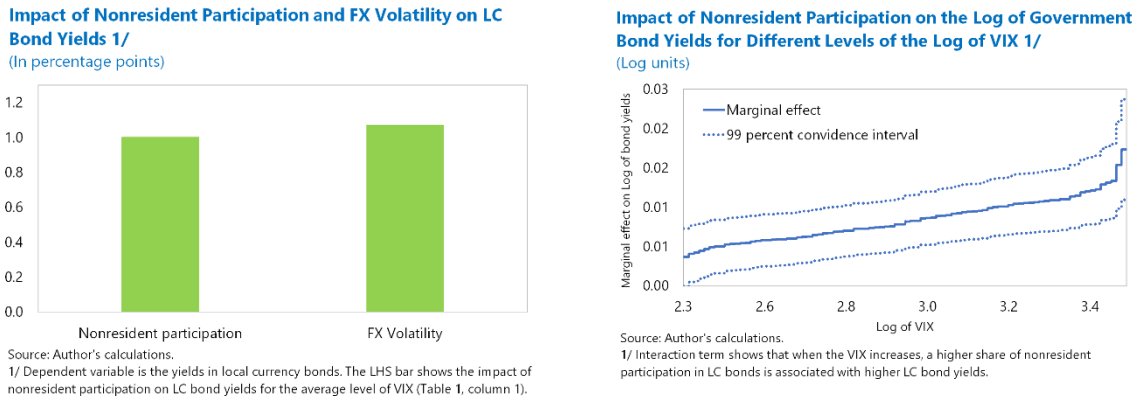

## C. Determinants of Government Bond Yields

**11. As noted earlier, government bond yields tend to be associated with country characteristics, such as the participation of nonresidents in government bond markets or the volatility of the exchange rate**. In addition, other domestic and global factors also matter. The regression analysis in this note uses government bond yields in local currency and government bond yields in U.S. dollars as dependent variables (Equation 1). This note contributes to the literature by simultaneously estimating the impact of nonresident participation and FX volatility on EMs bond yields while controlling for other domestic and global factors. The econometric model includes the share of nonresident holdings of total government bond securities and the volatility of the lagged daily changes in the exchange rate, and other country-specific variables, such as the monetary policy rate, real GDP growth, inflation, and the returns in the local equity market. The model also includes global factors, such as the VIX and the yields in the 10-year U.S. treasury bonds, as in Miyajima and others (2012), and the returns on U.S. equities. Government bond yields are also likely to be affected by the fiscal stance and debt sustainability concerns. These are not explicitly included in the model due to lack of data availability on a monthly basis. To capture the sensitivity to global factors, given some specific characteristics, the analysis also considers interaction terms (e.g., the share of nonresident holdings of total government debt securities interacted with the VIX). All other country-specific factors that are assumed to be constant over time are captured by country fixed-effects. All other factors varying over time and potentially affecting all countries are captured by the inclusion of time fixed effects. The bond yields, the monetary policy rate, and the global factors enter the equation in logs. The regressions use quarterly data over the period 2004:Q1-2020:Q2. The countries included in the analysis correspond to a sample of 18 large EMs, selected based on data availability, most notably on high-frequency information on nonresident participation in government bond markets from Arslanalp and Tsuda (2014) (see Appendix 1).

$$\text{Bond yields}_{it} = \text{Nonresident}_{it-1} + \text{Volatility (Daily FX Changes}_{it-1}) + \text{Other Domestic Factors}_{it-1} + \text{VIX}_{it-1} + \text{US 10yr yield}_{it-1} + \text{Interactions terms} + \text{time FE} + \text{country FE} \quad (1)$$

**12. The regression analysis corroborates that local currency government bond yields are affected by domestic and global factors**. The econometric analysis shows that, on average, local currency bond yields are negatively associated with a higher presence of nonresidents in bond markets (Table 1). This result is consistent with the view that the increased availability of resources lowers funding costs. However, positive coefficient on the interaction term between the share of nonresident holdings of total government bond securities and the VIX also shows that this benefit comes at the cost of a higher exposure to global risk perceptions. If the latter, as captured by the VIX, increase, a higher share of nonresident participation in government bonds is associated with higher local currency yields in EMs (Figure 9, chart). This finding highlights the tradeoffs associated with a higher share of nonresident participation. More specifically, the regression analysis shows that, at the average sample level of the VIX, a one-standard deviation increase in the share of nonresident participation in government bonds is associated with an increase of 1.0 percent in the average level of local currency bond yield. The regression results also suggest that an increase in exchange rate volatility is associated with higher local currency bond yields in EMs. An increase of one-standard deviation in the exchange rate volatility of the exchange rate is associated with an increase of 1.03 percentage points in local currency bond yields. This positive correlation is consistent with the hypothesis that nonresident investors require higher returns to compensate for higher exchange rate volatility. The econometric results also show that local currency government bond yields are positively associated with monetary policy rates. The coefficients are robust to different specifications, including sequentially excluding one of the main variables of interest.

**Figure 9. Impact of Nonresident Participation and FX Volatility on Local Currency Government Bond Yields**




**13. The regressions also suggest that yields of government bonds denominated is U.S. dollar are associated with different factors than the bond yields in local currency bonds**. Bond yields in foreign currency are positively correlated with global factors such as the VIX and the returns of U.S. treasury bonds, and do not respond to the monetary policy rate or the nonresident participation in government bond markets (as it is the case of local currency bond yields) (Table 2). This positive correlation is in line with the intuition that as global risk aversion increases as measured

by the VIX investors, demand higher yields for their (risky) investments. Also, when the yields of U.S. treasury bonds increase, then yields for risky assets denominated in U.S. dollars also increase as they are perceived as alternative investments with lower credit quality. On the other hand, bond yields in U.S. dollar denominated bonds decline in the presence of strong economic activity, consistent with the view that investor appetite for bonds is positively correlated with strong economic performance. In addition, government bond yields in U.S. dollar are positively associated with the volatility of the exchange rate, as is the case of local currency government bond yields.

**14. The spread between local currency bond yields and FX bond yields depends crucially on the domestic monetary policy rate, the inflation rate, and the volatility of the exchange rate**. We proxy the currency risk premium by the yield differential between the government bond yield in local currency and its correspondent yield in U.S. dollar. We find that this "currency spread" is positively correlated with the monetary policy rate and the inflation rate (Table 3, columns 1−2). The positive correlation with the monetary policy rate can be explained by the fact that the monetary policy rates often operates as the floor for interest rates in the economy. The result on inflation is consistent with the notion that investors are more concerned about real (net on inflation) than nominal returns on their investment. In addition, the econometric results show that the "currency spread" is positively correlated with the volatility of the exchange rate. As mentioned above, this result is in line with the idea that nonresident investors demand higher yields in the presence of uncertain returns measured in their home currency.

**15. The econometric analysis suggests that the proxy for country risk premium is more closely correlated with global factors than the proxy for currency risk premium**. We proxy the country risk premium by the EMBI spread, which is equal to the difference between the yield of country i government bond in U.S. dollars relative to yield of the U.S. government bond. The regressions show that, as opposed to the currency risk premium, this premium is positively correlated with global factors, such as risk aversion (VIX), and with alternative investments is U.S. dollars such as U.S. government bonds and the U.S. equity index (Table 3, columns 3−4). This result is in line with the intuition that that the "country risk premium" is compensating for differences in the riskiness of assets denominated in the same currency, the U.S. dollars in our case.

**16. A high participation of nonresidents in domestic bond markets has benefits, such as increased access to financing, but it also entails risks as the recent COVID-19 crisis has shown**. A higher participation by nonresidents in EMs government bond markets provide for capital flows that can have substantial benefits for countries, including by enhancing efficiency, promoting financial sector competitiveness, and facilitating greater productive investment and consumption smoothing (IMF, 2012). However, the flipside is that higher nonresident participation also increases the exposure to the downside risks of capital outflows in times of stress. In such episodes, capital outflows can amplify rather than counter domestic disorderly market conditions. These vulnerabilities associated with domestic government bond markets could be reduced by strengthening domestic markets infrastructure, including hedging markets and liquidity, broadening inclusion in global bond indices, and maintaining a stable macroeconomic environment (IMF/WB, 2020). The results presented in this note also suggest that keeping inflation low can

contribute to a lower currency risk premium, consistent with the important role of sound policies in managing macroeconomic and financial stability risks (IMF, 2012). In addition, in the case of Indonesia, increasing revenue mobilization, deepening domestic bank and nonbank financial markets, e.g., by increasing saving rates and further developing pension funds' investments in government bonds, and attracting more FDI would contribute to offering alternative sources of financing for the government and reducing the reliance on volatile nonresident portfolio flows into government bonds.

**Table 1. Emerging Markets: Determinants of Local Currency Government Bond Yields 1/**

| VARIABLES | Local Currency Bond Yields (1) | (2) |
|---|---|---|
| Nonresident in percent of total bonds (t-1) | -0.009 *** | -0.009 *** |
| | (0.003) | (0.003) |
| Nonresident in percent of total bonds (t-1) x Vix (t-1) | 0.004 *** | 0.004 *** |
| | (0.001) | (0.001) |
| FX daily volatility (t-1) | 0.063 ** | 0.063 ** |
| | (0.030) | (0.030) |
| Monetary policy rate (t-1) | 0.334 *** | 0.334 *** |
| | (0.040) | (0.040) |
| Real GDP growth (t-1) | -0.610 | -0.610 |
| | (0.427) | (0.427) |
| Inflation (t-1) | 0.067 | 0.067 |
| | (0.652) | (0.652) |
| Equity index, percent change (t-1) | -0.034 | -0.034 |
| | (0.049) | (0.049) |
| VIX (t-1) | -0.203 | -0.187 * |
| | (0.117) | (0.103) |
| US treasury 10-year bond yield (t-1) | -0.088 | -0.047 |
| | (0.159) | (0.118) |
| US equity index, percent change (t-1) | | -0.195 |
| | | (0.291) |
| Constant | 1.594 *** | 1.557 *** |
| | (0.371) | (0.339) |
| Observations | 1,023 | 1,023 |
| Time fixed-effects | Yes | Yes |
| Country fixed-effects | Yes | Yes |
| R-squared | 0.692 | 0.692 |
| Number of c_code | 18 | 18 |

1/ Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

**Table 2. Emerging Markets: Determinants of U.S. Dollar Government Bond Yields 1/**

| VARIABLES | U.S. Dollar Bond Yields (1) | (2) |
|---|---|---|
| Nonresident in percent of total bonds (t-1) | -0.004 | -0.004 |
| | (0.005) | (0.005) |
| Nonresident in percent of total bonds (t-1) x Vix (t-1) | 0.003 | 0.003 |
| | (0.002) | (0.002) |
| FX daily volatility (t-1) | 0.141 *** | 0.141 *** |
| | (0.026) | (0.026) |
| Monetary policy rate (t-1) | 0.076 | 0.076 |
| | (0.055) | (0.055) |
| Real GDP growth (t-1) | -1.279 *** | -1.279 *** |
| | (0.421) | (0.421) |
| Inflation (t-1) | 0.359 | 0.359 |
| | (0.249) | (0.249) |
| Equity index, percent change (t-1) | 0.002 | 0.002 |
| | (0.061) | (0.061) |
| VIX (t-1) | 0.321 ** | 0.339 ** |
| | (0.143) | (0.128) |
| US treasury 10-year bond yield (t-1) | 0.656 *** | 0.702 *** |
| | (0.158) | (0.159) |
| US equity index, percent change (t-1) | | -0.219 |
| | | (0.304) |
| Constant | -0.235 | -0.277 |
| | (0.436) | (0.409) |
| Observations | 1,036 | 1,036 |
| Time fixed-effects | Yes | Yes |
| Country fixed-effects | Yes | Yes |
| R-squared | 0.641 | 0.641 |
| Number of c_code | 18 | 18 |

1/ Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

## Table 3. Emerging Markets: Determinants of Country Credit Risk and Currency Risk 1/

| | Yield Differential Between LC and FX | | EMBI Spread | |
|---|---|---|---|---|
| VARIABLES | (1) | (2) | (3) | (4) |
| Nonresident in percent of total bonds (t-1) | -0.019 | -0.019 | -0.019 | -0.019 |
| | (0.030) | (0.030) | (0.013) | (0.013) |
| Nonresident in percent of total bonds (t-1) x Vix (t-1) | 0.007 | 0.007 | 0.01 ** | 0.01 ** |
| | (0.011) | (0.011) | (0.005) | (0.005) |
| FX daily volatility (t-1) | 0.259 ** | 0.259 ** | 0.282 *** | 0.282 *** |
| | (0.120) | (0.120) | (0.093) | (0.093) |
| Monetary policy rate (t-1) | 0.518 *** | 0.518 *** | 0.175 * | 0.175 * |
| | (0.157) | (0.157) | (0.091) | (0.091) |
| Real GDP growth (t-1) | 2.978 | 2.978 | -3.733 ** | -3.733 ** |
| | (3.608) | (3.608) | (1.389) | (1.389) |
| Inflation (t-1) | 6.498 *** | 6.498 *** | 1.290 | 1.290 |
| | (1.923) | (1.923) | (1.496) | (1.496) |
| Equity index, percent change (t-1) | -0.162 | -0.162 | 0.082 | 0.082 |
| | (0.248) | (0.248) | (0.159) | (0.159) |
| VIX (t-1) | -0.412 | -0.333 | 1.008 *** | 0.845 *** |
| | (0.920) | (0.918) | (0.216) | (0.195) |
| US treasury 10-year bond yield (t-1) | -0.529 | -0.324 | 1.376 *** | 0.952 ** |
| | (1.185) | (1.163) | (0.393) | (0.376) |
| US equity index, percent change (t-1) | | -0.970 | | 2.004 ** |
| | | (1.051) | | (0.706) |
| Constant | 0.509 | 0.326 | 1.058 | 1.435 * |
| | (2.900) | (2.894) | (0.783) | (0.718) |
| Observations | 759 | 759 | 759 | 759 |
| Time fixed-effects | Yes | Yes | Yes | Yes |
| Country fixed-effects | Yes | Yes | Yes | Yes |
| R-squared | 0.279 | 0.279 | 0.492 | 0.492 |
| Number of c_code | 18 | 18 | 18 | 18 |

1/ Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

# Appendix I. Data Sources

## Table 1. Emerging Markets: Variables and Data Sources

| Variable | Description | Source |
|---|---|---|
| Government 10-year local currency bond yields | In percent | Bloomberg L.P. |
| Government 10-year EMBI bond yields | In percent | Bloomberg L.P. |
| Nonresident participation in government bond markets | Nonresident holdings of government bonds in percent of total outstanding | Bloomberg L.P. and author's calculations |
| FX volatility | Sandard deviation of the lagged daily changes over each quarter | IMF, International Financial Statistics (author's calculations) |
| Monetary Policy rates | In percent | Haver Analytics |
| Real GDP growth | In percent | IMF, International Financial Statistics |
| Inflation | In percent | Haver Analytics |
| Equity index, percentage change | In percent | Bloomberg L.P. |
| VIX | Chicago Board Options Exchange's CBOE Volatility Index | Bloomberg L.P. |
| U.S. 10-year treasury bonds yields | In percent | Bloomberg L.P. |
| S&P 500 equity index, percentage change | In percent | Bloomberg L.P. |

## Table 2. Emerging Markets: Sample of Countries in the Regression Analysis

| List of Countries | | | |
|---|---|---|---|
| Brazil | Chile | China | Colombia |
| Hungary | India | Indonesia | Malaysia |
| Mexico | Peru | Philippines | Poland |
| Romania | Russia | South Africa | Thailand |
| Turkey | Ukraine | | |

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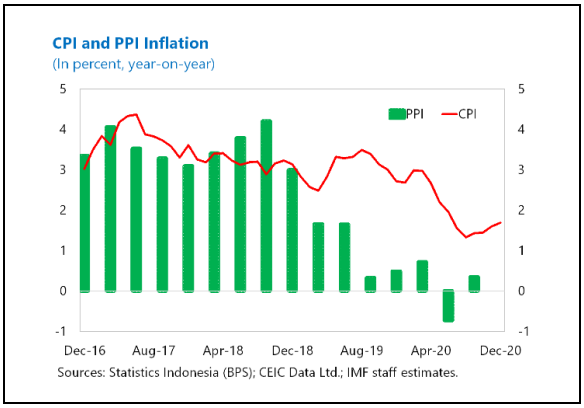
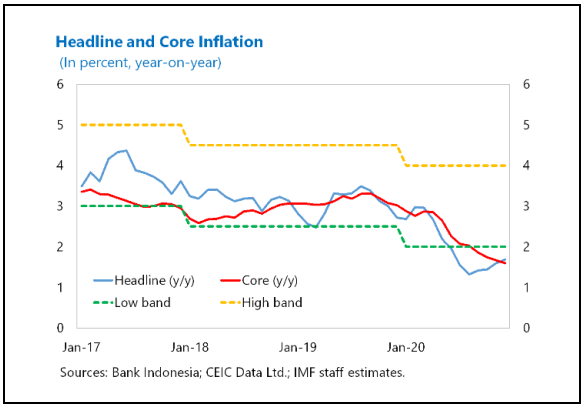
# INDONESIA'S INFLATION DYNAMIC DURING THE COVID-19 PANDEMIC[1]

*This note takes stock of Indonesia's recent inflation dynamics, analyzing the main drivers behind the recent disinflation and their implications for the outlook. The analysis suggests that the pandemic has strongly reinforced a disinflationary trend that was already underway. The disinflationary effects of the pandemic appear to stem mainly from aggregate and sectoral demand shocks, which have added to disinflationary pressures from positive supply shocks and idiosyncratic sectoral shocks. Staff projects inflation to stabilize in the coming months before picking up later in 2021.*

## A. Introduction

**1. Indonesia has experienced significant disinflation over the past year, reflected in both consumer and producer price indices** (left chart below). Headline CPI inflation fell to 1.7 percent y/y in December 2020 from 3 percent in March, below Bank Indonesia's target band of 2 to 4 percent (right chart below). Core inflation declined to 1.6 percent from 2.9 percent over the same period. Much of the downward shift in inflation rates occurred against the backdrop of the COVID-19 pandemic, which buffeted the Indonesian economy through a multitude of channels.

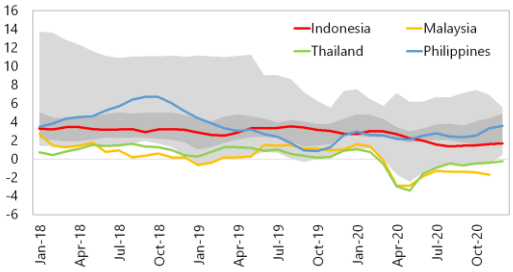



**2. The pandemic has affected most other emerging market (EM) economies around the same time and via similar channels as Indonesia** (Ebrahimy and others 2020). Therefore, one could expect that inflation across a broad range of EMs may display similar patterns. Among a

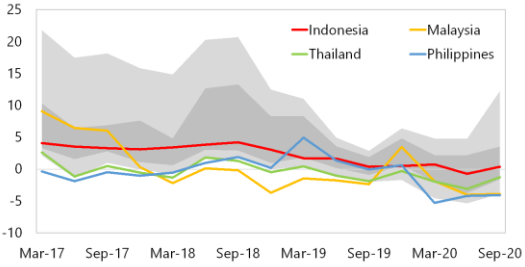
[1] Prepared by Robin Koepke and Rani Setyodewanti (APD).

sample of 22 EMs, most countries experienced some disinflation in the initial lockdown phase, but generally saw a reacceleration once the economy began to recover (see chart).[2] This pattern is particularly pronounced among other ASEAN countries like Malaysia and Thailand (though not the Philippines), which saw 12-month inflation rates turn negative amid the lockdown.




**CPI Indonesia and Emerging Markets 1/**
(In percent, year-on-year)

Sources: Statistics Indonesia (BPS); Haver Analytics; IMF staff estimates.
1/ Darker shade indicates 25th to 75th percentiles, lighter shade indicates 10th to 25th and 75th to 90th percentiles.




**PPI Indonesia and Emerging Markets 1/**
(In percent, year-on-year)

Source: Statistics Indonesia (BPS), Haver Analytics, IMF Staff Calculation
1/ Darker shade indicates 25th to 75th percentiles, lighter shade indicates 10th to 25th and 75th to 90th percentiles.

**3. The U-shaped pattern generally also holds for producer prices of ASEAN countries, which also saw a notable drop during the early phase of the pandemic** (see chart). Of note, Indonesia's producer price inflation had been on a firm downward path since well before the pandemic, falling from an average of 3 percent in 2016–18 to 0.5 percent at end-2019 and 0.3 percent in September 2020.

## B. Inflation During the Pandemic: Phases and Drivers

**4. The COVID-19 pandemic has severely disrupted economic activity in Indonesia and the rest of the world**. Lockdowns and other social restrictions have affected supply and demand through several channels that interact in complex manners. For the Indonesian economy as a whole, the onset of the pandemic sharply reduced aggregate demand, as agents were unable or unwilling to consume and/or invest. At the same time, the pandemic affected different sectors in very different ways, depending on how contact-intensive particular sectors are and whether workers are able to work from home (Del Rio-Chanona and others 2020). For example, the hotel and accommodation industry has been among the most affected, while agriculture has been among the least affected. The asymmetric impact on different sectors is mirrored in asymmetric impacts across geographic regions, as some sectors are important for certain regions but not for others. For example, Jakarta has a high share of business services in its GDP while Kalimantan is mining-oriented and Bali is heavily reliant on tourism.

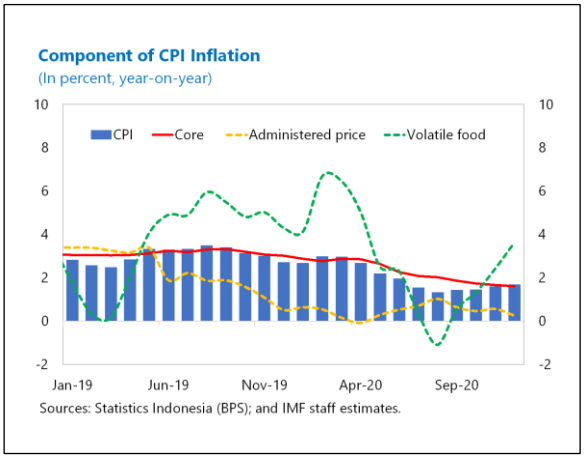
**5. In order to assess the likely impact on inflation, it is useful to distinguish several phases of the epidemic in Indonesia and consider how different drivers are likely to have**

[2] The economies included in this analysis are Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Lebanon, Malaysia, Mexico, Nigeria, Philippines, Poland, Russia, Saudi Arabia, South Africa, South Korea, Thailand, Turkey, and the United Arab Emirates.

**affected inflation in each of these phases**. Table 1 presents a stylized illustration of the phases and drivers considered to be most relevant.

**Table 1. Schematic: Drivers of Inflation during the COVID-19 Pandemic**

| Stage of Pandemic | Pre-COVID-19 | Lockdown | Early recovery | Transition to new normal |
|---|---|---|---|---|
| **Aggregate demand** | below trend | sharply lower | gradually recovering | approaching new equilibrium |
| **Sectoral demand shocks** | -- | sharp drop and shifts | partial reversal/recovery | approaching new equilibrium |
| **Output/employment gap** | small negative gap | gap widening sharply | large negative gap | gap gradually closing |
| **Food supply** | fluctuating | strong harvest | food supply normalizing | uncertain |
| **Administered prices** | small increasees | small price increases | small price decreases | price increases likely small but growing |
| | **Feb. 2020** | **Mar.-Jun. 2020** | **Jul.-Dec. 2020** | **2021–22** |




- **Pre-COVID-19 phase**: In the period leading up to the pandemic, inflation in Indonesia was on a downward trend, likely reflecting a slowdown in aggregate demand and some degree of slack in the economy. In addition, Bank Indonesia's preannounced lowering of the inflation target by ½ percentage point at end-2017 and end-2019 with increased policy credibility likely also contributed to the lower inflation readings. Looking at specific CPI components, prices of volatile food (16 percent of CPI basket) were fluctuating but had little net effect on headline inflation until early 2020 (see chart). Administered price increases (18 percent of CPI basket) were relatively subdued.

- **Lockdown phase**: When the spread of COVID-19 in Indonesia began to escalate, the Indonesian authorities imposed tight social restrictions to mitigate the epidemic. Aggregate demand plummeted, exerting downward pressure on prices, while supply bottlenecks appear to have been limited. Some sectors were more severely affected than others, and a few sectors even saw increased demand, such as personal care and hygiene products. Administered prices were little

changed during the lockdown phase and into the early recovery phase, contributing to disinflationary pressure.[3]

- **Early recovery**: The economy began to recover around June/July 2020, with Q3 real GDP growing at 12.4 percent (q/q s.a.a.r). Month-on-month changes in consumer prices continued to fall, however, dipping into negative territory. These declines would be consistent with the view that the rebound in demand has not yet significantly reduced substantial economic slack. Nevertheless, sectoral shocks began to reverse during this period, and downward pressure on prices at the sectoral level likely started to subside.

- **Transition to new normal**: As the pandemic eases, demand is expected to recover and the output gap should narrow over time. Inflation is expected to pick up gradually as a result, with the speed depending on the pace of the economic recovery and several idiosyncratic drivers, including food supply dynamics and the path of administered prices.

**6. Beyond the disruptions to economic activity, it is worth noting that the COVID-19 pandemic also introduces complications regarding the measurement of inflation**. An emerging literature finds that consumption baskets changed substantially during the pandemic, and the lockdown phase in particular (e.g., Cavallo, 2020; Reinsdorf, 2020; and Seiler, 2020). This is in contrast to the standard fixed basket weights typically used to measure inflation. As a result, standard measures of inflation may understate "true" price increases during the pandemic because the items that are in high demand during the pandemic will generally see higher price increases and vice versa (Reinsdorf, 2020). A separate study by Jaravel and O'Connel (2020) finds evidence that there was indeed an initial spike in consumer prices during the lockdown, based on high-frequency data for advanced economies. International evidence suggests that the mismeasurement from fixed inflation baskets can be significant but mostly temporary, arguing against nonstandard changes to inflation baskets (Reinsdorf, 2020).

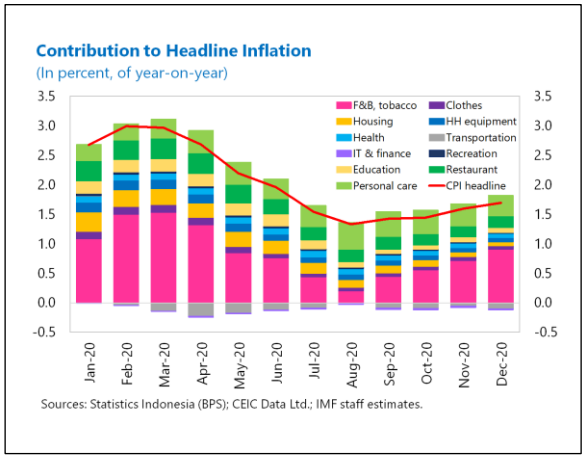
## C. A Disaggregate Analysis of Consumer and Producer Prices

**7. In order to investigate why Indonesia's inflation rates have continued to decelerate in recent months, we analyze component and subcomponent data of CPI and PPI indices**.[4] Most components of the CPI contributed to the disinflationary trend, though food prices accounted for

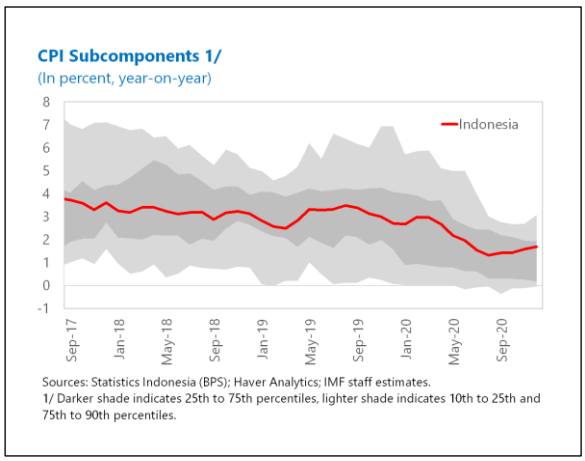
[3] There was a temporary increase in administered prices during the lockdown phase due to social distancing measures related to passenger travel.

[4] The CPI basket includes 11 components (such as "food, beverages and tobacco") and 43 subcomponents (such as "non-alcoholic beverages"), while the PPI basket includes 9 components (such as "agriculture" and 35 subcomponents (such as "food crops"). The Indonesian statistics office does not publish more disaggregated price data.

the largest share (see chart). Two notable exceptions are personal care products (e.g., soap and other hygiene products) and health-related items, which are likely to have seen increased demand due to concerns about the pandemic.

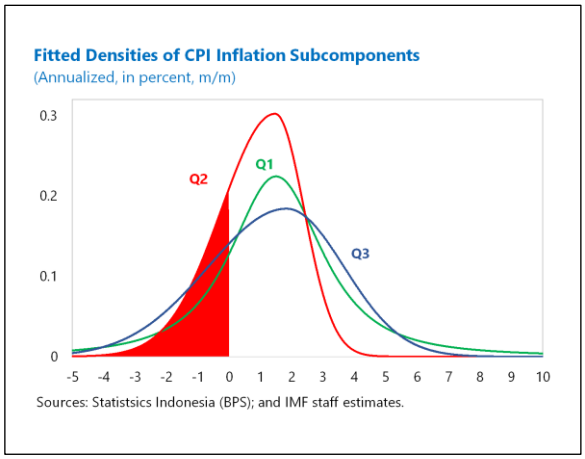



**8. A look at subcomponent data confirms that there has been a downward shift in inflation rates for most goods and services** (see chart). The downward shift is particularly pronounced on the upper end of the distribution, i.e., for CPI subcomponents that had previously seen relatively elevated inflation rates. Some examples include education, restaurants, and other services, which saw declines in year-on-year inflation rates of 2 to 5 percentage points. Notably, each of these components relate to contact-intensive sectors, consistent with the notion that these sectors have been disproportionately affected by the pandemic.




**9. Subcomponent data shed further light on inflation dynamics during the lockdown and subsequent recovery**. We conduct an analysis similar in spirit to the work by Banerjee and others (2020), which looks at "inflation at risk" from COVID-19, using a quantile regression approach to estimate the probability distribution of inflation outcomes during the pandemic (see also Lopez-Salindo and Loria 2020). We use monthly data on the 90 subcomponents of CPI data and fit a skewed-t probability distribution—proposed by Azzalini and Capitanio (2003)—which is characterized by 4 moments: mean, variance, skewness, and kurtosis. The skewed-t distribution is a flexible function that nests both normal and standard t-distribution. Thus, it allows us to stay broadly agnostic about the shape of the distribution of inflation densities.

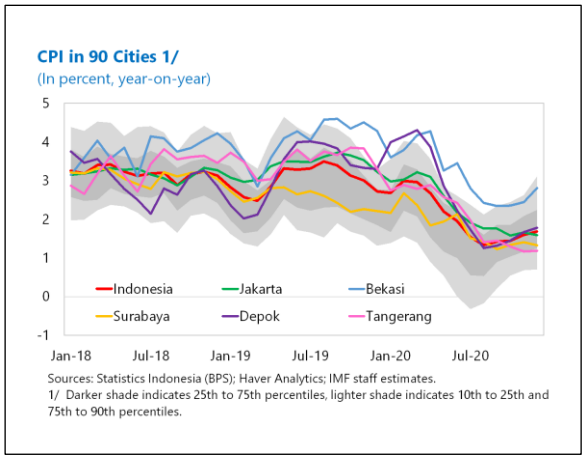
**10. The analysis suggests that inflation densities shifted to the left in 2020:Q2, the quarter when the lockdown took place**. The inflation density in Q2 (see chart) narrowed somewhat compared to the previous quarter, suggesting that the initial shock was relatively uniform across inflation components



(and thus economic sectors). Subsequently, the density of inflation readings widened in 2020:Q3, suggesting that the early recovery phase was marked by greater dispersion in how different economic sectors were affected. Looking ahead, it will be important to monitor whether this greater dispersion of inflation outcomes at the sectoral level continues.

## D. Regional CPI Data Point to Broad-Based Disinflation with Some Geographic Differentiation

**11. Regional inflation data suggest that the COVID-19 shock has had broad-based effects across Indonesia while also pointing to the importance of asymmetric shocks** (see chart). CPI data for 90 cities show that disinflation has been observed in most regions of Indonesia. At the same time, larger cities have generally seen more elevated inflation rates than smaller cities, notably the five cities with biggest CPI weights: Jakarta, Bekasi, Surabaya, Depok, and Tangerang.

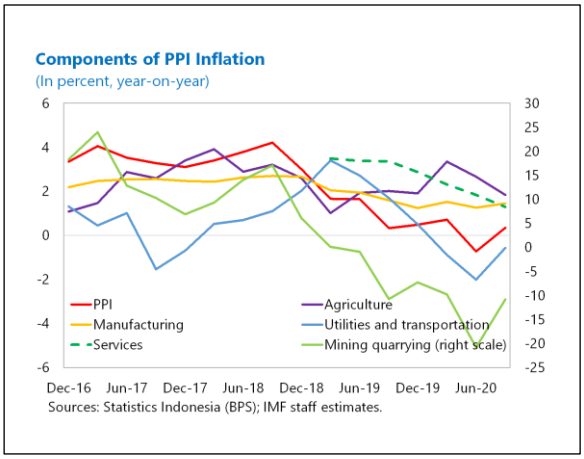



**12. Several other characteristics appear to have shaped regional inflation dynamics**. For example, the cities below the 10th percentile in the probability distribution were mostly located outside of Java, particularly in Sumatra island. The common cause of the low inflation (or deflation) in those cities appears to have been a significant decline in the prices of air transport and the food, beverages and tobacco component, likely due to restricted economic activities and mobility amid the pandemic. Meanwhile, the cities above the 90th percentile in the probability distribution include the East Nusa Tenggara province and the Papua province. The more elevated inflation rates appear to have been driven by food commodities, given that supplies to these regions largely come from other parts of Indonesia. Furthermore, in tourism-dependent Bali, the city of Denpasar saw inflation fall from 2.2 percent in June to 0.8 percent in September, reflecting the sharp decline in economic activity, with regional GDP contracting by 12 percent y/y in 2020:Q3.

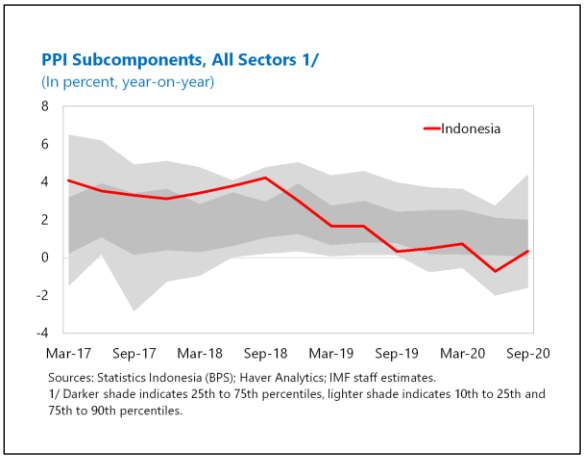
## E. Producer Prices: Mining and Utilities in Deflation

**13. Data on producer price inflation shed additional light on inflation dynamics as they allow for a more targeted analysis of different economic sectors**. Indonesia's producer price index shows inflation falling from 4.2 percent y/y in 2018:Q3 to 0.7 percent in 2020:Q1 (at the onset of the pandemic) and −0.7 percent 2020:Q2, suggesting that the pandemic has reinforced a

disinflationary trend that was already underway. In 2020:Q3, PPI inflation recovered to 0.3 percent. Sector-level data show that mining and utilities played a key role in driving down the overall PPI index, with the two sectors registering deflation of 10.8 percent and 0.6 percent y/y, respectively, as of September 2020 (see chart). Downward pressure in the mining sector was mainly driven by falling coal prices (coal exports account for 20.9 percent of total exports), which dropped 51 percent from their peak in September 2018.

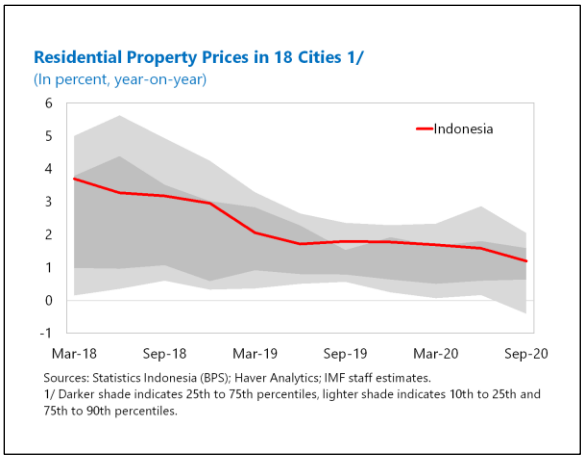



**14. The disproportionate role of the mining and utilities sectors is evident when looking at the dispersion of inflation readings** (see chart). Most PPI sectors have seen only limited disinflation in recent quarters and the overall PPI index is well below the median of the distribution, reflecting the heavy weights of sectors in that are experiencing deflation.




## F. Property Prices

**15. Property price data show limited disinflation in recent quarters**. Property price increases averaged around 2 percent for much of 2019, before dipping to 1.2 percent in 2020:Q3 (see chart). The largest contractions in 3Q were seen in Batam at the border of Singapore, as well as Balikpapan (East Kalimantan), and Banjarmasin (South Kalimantan). Larger contractions were mostly occurred in large and medium properties.




- **Batam** was severely affected by declining tourism and trade due to the pandemic, reflecting its close proximity to Singapore. Residential property price inflation fell 3.8 percent in March and 1.6 percent in September.

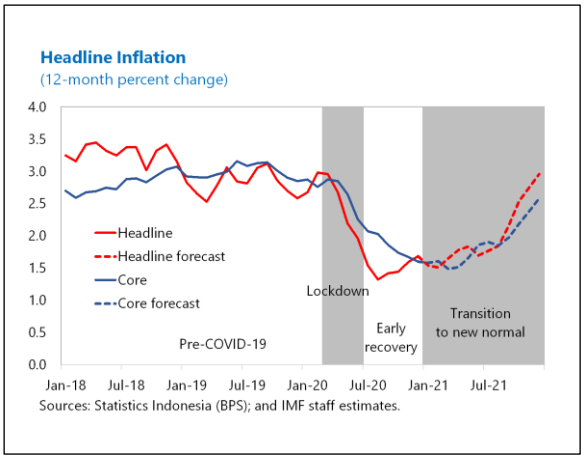
- **Balikpapan**, the largest city of East Kalimantan, is the home of the largest coal and oil producer in Indonesia. Economic activity of this region was affected by weaker coal demand and global coal prices, which dragged down the mining sector (33 percent of regional GDP) to contract by

6.2 percent y/y in Q2. Residential property prices deflation in Balikpapan stood at 0.4 percent y/y in September, down from 0.1 percent deflation in March.

- **Banjarmasin**, the capital city of South Kalimantan, is one of the largest crude palm oil and coal producers in Indonesia. Its economy contracted 2.6 percent y/y in Q2, dragged down by weaker demand in the mining sector amid the pandemic. Residential property price inflation fell from 0.5 percent in March to −0.4 percent in September.

## G. Takeaways and Outlook

**16. Overall, the analysis suggests that disinflationary pressures in Indonesia have resulted from the complex interplay of a multitude of shocks, many of which relate to the pandemic while others do not**. Most of these shocks are expected to dissipate gradually over time, which is likely to result in inflation returning back towards its pre-COVID-19 level (see also the discussion in Goodhart and Pradhan, 2020). This is reflected in staff projections for a gradual return of inflation over the course of 2021 (see chart), with headline inflation is projected to climb from 1.7 percent in December 2020 to 3 percent next year, while core inflation is forecasted to climb from 1.6 percent in December 2020 to 2.6 percent at end-2021. These projections are broadly consistent with Bank Indonesia's forecast, which also envisions inflation to gradually return to the 3.0%±1% target range in 2021 (Bank Indonesia 2020).




**17. Factors affecting the outlook for staff inflation projections include**:

- Aggregate demand has started to recover, reflected in the expansion of economic activity in 2020:Q3 relative to the prior quarter. While high frequency data suggest that growth has slowed in 2020:Q4, the recovery is expected to regain some traction in coming quarters.

- Sectoral demand shocks have begun to unwind, with sectors that saw the sharpest contractions in Q2 being among those with the strongest increases in economic activity in Q3, such as the transportation and the travel and accommodation sectors. Similarly, these sectors are likely to see inflation recover as the COVID-19 shock eases.

- The mining sector stands out as having been subject to the largest idiosyncratic shocks, stemming from the sharp drop in the prices of coal and other commodities since late 2018, reinforced by the pandemic early in 2020. These commodity prices have generally recovered from their trough in spring, reflected in a pickup in producer prices in Q3 that should continue in the period ahead.

**18. There are significant upside and downside risks to this forecast**. These risks include the possibility that the pandemic will weigh on economic activity for longer than anticipated and that disinflationary forces become more entrenched, which could result in sustained undershooting of Bank Indonesia's inflation target. On the other hand, a more vigorous economic rebound could result in price pressures building earlier than expected, lifting inflation more quickly.

**19. Finally, it bears emphasis that the COVID-19 pandemic is an exceptional event whose effects on output and inflation dynamics are highly complex and difficult to forecast**. Given the protracted nature of the pandemic, its deleterious effects are likely to be with us for some time to come and much additional research will be needed to investigate the interplay of shocks that drive inflation dynamics during and after this period.

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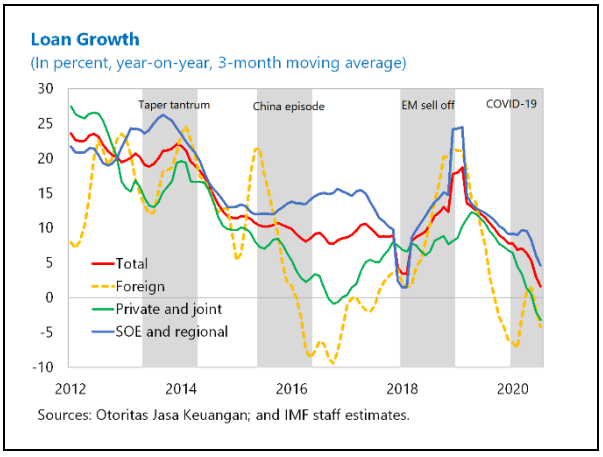
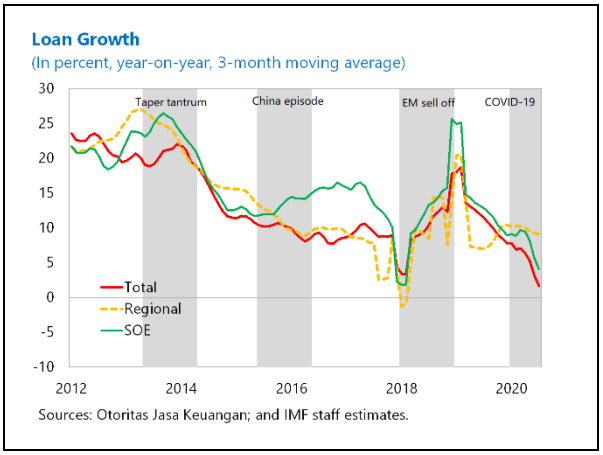
# COVID-19 AND THE DECLINE IN BANK LENDING IN INDONESIA: WHAT CAN WE LEARN FROM PREVIOUS STRESS EPISODES?[1]

*A historical look at loan growth dynamics in Indonesia highlights that higher lending from public banks during stress episodes has often provided some cushion against relatively lower lending from nonpublic banks. A similar pattern is taking place during the COVID-19 pandemic, but not to the same degree, possibly reflecting unique features of the pandemic, including its unprecedented balance sheet effects on the nonfinancial sector. An empirical analysis of bank-level lending behavior in Indonesia suggests that deposit growth and liquidity conditions remain important determinants of loan growth also in stress episodes. These results suggest that increased central bank liquidity provision, as initiated during the pandemic, helps support lending activity and the ensuing economic recovery, especially in the case of solvent banks with initial moderate levels of liquidity.*

## A. Bank Lending Dynamics

**1. Bank lending has decelerated rapidly in recent months, as the economic fallout of the COVID-19 pandemic has unfolded in Indonesia**. From 8 percent (y/y) at end-2019, loan growth quickly declined in 2020 and fell below 2 percent (y/y) in July 2020, a record low in recent history. The slowdown in bank lending appears more pronounced for private and foreign banks, whose lending contracted in June and July 2020, while public banks, including SOEs, and regional banks, have maintained positive, albeit declining, loan growth. While the pandemic is unique in many ways, including through its unprecedented balance sheet effects on the nonfinancial sector, a historical look at loan growth in Indonesia highlights some comparable dynamics during recent stress episodes. The gap in loan growth between public and nonpublic banks widened during the taper tantrum, the 2015–16 stock market turbulence in China, and the 2018 emerging market (EM) sell-off, with higher lending from public banks providing some cushion against relatively lower lending from nonpublic banks (see also Bosshart and

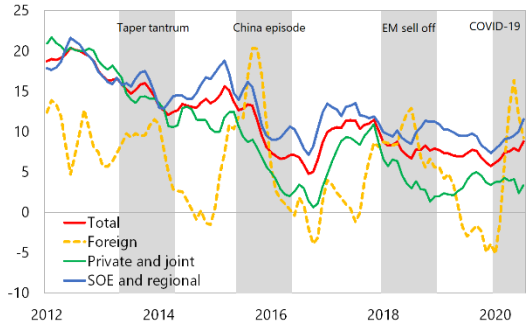


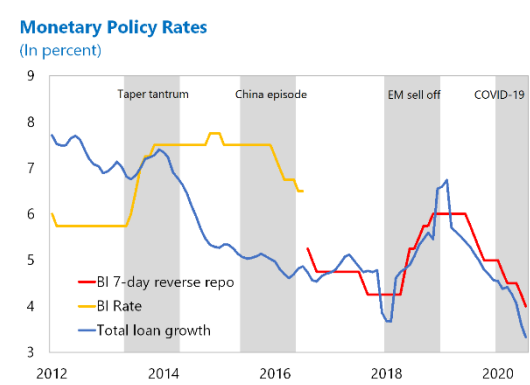

[1] Prepared by Tidiane Kinda and Agnes Isnawangsih (APD).

Cerutti 2020 for similar evidence for other emerging market countries during the Global Financial Crisis).

**2. A stronger deposit base for public banks may support their lending activity**. From around 6 percent (y/y) at end-2019, deposit growth rose to about 9 percent by July 2020, driven by deposit growth in SOE banks (13 percent y/y), which, in addition to potential safe haven perception by depositors, benefited from fiscal resources to support credit activity as part of the pandemic recovery program. Public banks' deposit growth has always exceeded that of nonpublic banks at the end of recent stress episodes. For instance, in end-2018, public banks recorded a deposit growth of 24 percent (y/y), compared to 8 percent for private and joint banks.




**3. Bank lending dynamics have not closely followed the changes in monetary policy rates in recent years**. Indonesia has experienced sizeable shifts in monetary policy rates during stress episodes in recent years. As monetary policy appeared to have responded to changes in both domestic and external conditions, bank lending dynamics and changes in the policy rate have been asynchronous at times, especially since 2018. For instance, it took several months for credit growth to reverse following the increases in the monetary policy interest rate in 2018. More recently, pre-COVID-19 cuts in the BI policy interest rate in 2019 had yet to transmit to loan growth, which was on a sustained declining trend. Other factors, including the retrenchment in credit demand during the COVID-19 crisis, have also been affecting bank credit growth.




## B. The Role of Banks' Characteristics in Bank Lending Dynamics

**4. This section explores how bank characteristics influence their lending behavior in Indonesia**. In addition to monetary policy shocks, the empirical literature has identified banks' size, liquidity, and capitalization as three potential drivers of loan growth in emerging market economies.

- *Size*. Small banks may be constrained in their lending activities because of relatively more limited access to internal and external funding relative to large banks (Kashyap and Stein, 2000). Yet, larger banks may have lower loan growth compared to smaller banks as the former are in a more mature and less growth-oriented life cycle (Yang and Shao, 2016; Khan, Ahmad, and Gee, 2016; and Fungacova, Nuutilainen, and Weill, 2016).

- *Liquidity*. Higher liquidity levels allow banks to draw down on liquid assets to meet short-term obligations, thereby preserving banks' capacity to maintain and expand their lending activities (Koeva Brooks, 2007; Fungacova, Nuutilainen, and Weill, 2016; Yang and Shao, 2016).

- *Capitalization*. While a high capital ratio could support bank lending, well-capitalized banks may also constrain their lending to meet regulatory requirements and contain potential financial vulnerabilities (Van den Heuvel, 2002).

**5. The analysis draws on monthly bank balance sheet data**. The dataset from the CEIC portal (collected by OJK) covers aspects of assets and liabilities of 86 commercial banks, representing more than 80 percent of loans provided by commercial and rural banks in Indonesia. The sample for this study includes foreign, foreign joint venture, private, and public banks and covers the period from January 2012 to July 2020 given limited data availability in the period before.

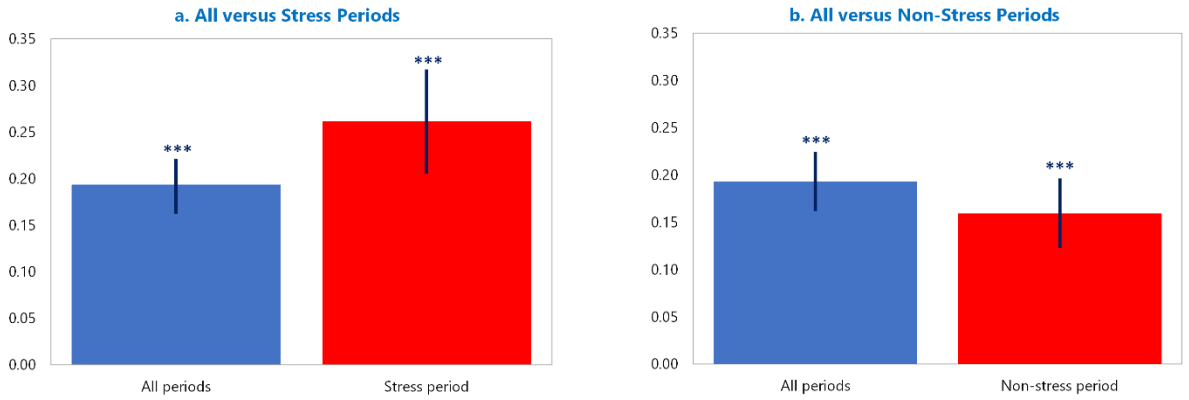
**6. The empirical strategy investigates the determinants of loan growth, through the following equation**:

$$\Delta loan_{it} = \alpha + \gamma X_{it-1} + \delta Stress_{it} + \varphi b_i + \theta t_t + \epsilon_{it}$$

Where $\Delta loan_{it}$ captures the monthly loan growth rate of bank $i$ at time $t$. $X_{it-1}$ captures bank level characteristics, such as size and liquidity, with a one period lag to mitigate potential endogeneity from reverse causality. *Size* is captured by the share of each bank's asset in total bank assets. *Liquidity* is measured by the ratio of liquid assets (e.g., cash, securities, and short-term placements) to total assets of a bank. *Stress* is a dummy taking one during episodes of stress, defined as 12 months following the onset of the shock. In addition to the COVID-19 shock, the stress dummy captures the taper tantrum, the 2015−16 Chinese stock market turbulence, and the 2018 EM sell off. $b_i$ and $t_t$ represent respectively bank fixed effects and time (monthly) fixed effects. Beyond unobservable fixed factors, controlling for bank fixed effects allows us to account for time-invariant characteristics such as bank ownership (public vs. nonpublic). By controlling for common shocks across all banks during a given month, such as monetary policy shocks, time fixed effects allow us to focus on time varying bank specific characteristics that are deemed important for loan growth. $\epsilon_{it}$ is the error term.

**7. The results highlight the importance of bank-level liquidity for loan provision** (Table 4 and Figure 1). The baseline results show that more liquid banks have higher loan growth. While episodes of stress are associated with lower loan growth on average, banks with higher liquidity appear to provide some cushion by providing relatively more loans. Deposit growth is positively associated with loan growth, confirming the pass-through effect of deposits on loan growth.

**Figure 1. Estimated Impacts of Liquidity on Loan Growth 1/**

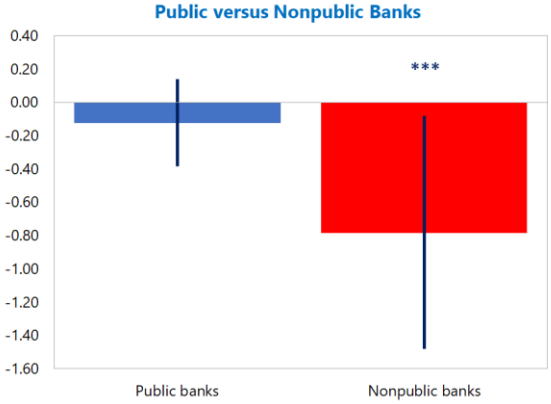



Source: Author's estimates.

1/ These figures illustrate coefficients and confidence intervals from three bank-level estimations of the impact of liquidity ratio on loan controlling for deposit growth, banks' size, and bank fixed effects and time fixed effects. (a) illustrate both the impact for all periods and for stress episodes such as the taper tantrum, the 2015–16 stock market turbulence in China, the 2018 EM sell off, and the 2020 COVID-19 pandemic. (b) illustrate both the impact for all periods and periods without significant economic/financial stress. The error bars refer to the 95 percent confidence intervals around the estimated coefficients. ** p<0.05; *** p<0.01.

**8. The results also confirm that lending from public banks is more stable during episodes of stress**. Episodes of stress are associated with lower loan growth from nonpublic banks, but these episodes do not seem to be associated with materially lower lending from public banks (Table 5 and Figure 2). This result supports the observation that higher lending from public banks has provided some cushion against relatively lower lending from nonpublic banks in difficult times.

**Figure 2. Estimated Impacts of Stress Episodes on Loan Growth 1/**




Source: Author's estimates.

1/ These figures illustrate coefficients and confidence intervals from two bank-level estimations of the impact of a stress episode dummy (as defined in figure 5) on loan controlling for deposit growth, banks' size, liquidity ratio, bank fixed-effects, and time fixed-effects. The bars illustrate the impact for public banks and nonpublic banks. The error bars refer to the 95 percent confidence intervals around the estimated coefficients. ** p<0.05; *** p<0.01.

**9. The main results are robust to a variety of tests**. These include additional control variables such as the capital adequacy ratio and gross nonperforming loans ( Table 6).[2] We do not find evidence that larger banks are associated with relatively larger loan growth on average. Liquidity seems to matter equally for loan growth during 2012–2017, a period of steady decline in

[2] Our monthly dataset does not include banks' total equity, which is usually used to define bank capitalization, measured by the ratio of equity to total assets. Using quarterly and more limited data on capital adequacy ratio to test the robustness of our main results leads to a sizeable drop in the sample size. Similar drop in the sample size occurs when controlling for gross nonperforming loans, which is also available on a quarterly basis and with significant data gaps.

loan growth, and afterwards ( Table 7). Deposit growth appears to play a lesser role in supporting loan growth after 2017, suggesting that the effectiveness of increasing deposits through fiscal support to encourage bank lending might be smaller than in the past.

**10. The impact of liquidity on loan growth may be non-linear**. As the Indonesian banking system is highly liquid overall, the marginal impact of higher liquidity on bank loan growth may differ according to bank specific initial conditions. For instance, higher liquidity may have a proportionally larger impact on the lending activity of banks with moderate liquidity. Spline fixed-effect regressions allow identifying thresholds of liquidity ratio coinciding with a significant change in the relationship with loan growth.[3] The spline estimations indicate that the marginal positive effect of liquidity ratio on loan would be significantly higher when the bank's liquidity ratio is below 34 percent of total assets (Table 8).

**11. A look at liquidity distribution across banks further highlights a decline in liquidity for some banks with already low liquidity**. For instance, the liquidity ratio of the 10th percentile, the banks with the lowest liquidity ratios, further declined in 2020 to 15 percent (Table 1).

**Table 1. Indonesia: Distribution of Liquidity Ratios Across Banks and Time**

| Year | Mean | 10th Percentile | 25th Percentile | Median | 75th Percentile | 90th Percentile |
|---|---|---|---|---|---|---|
| 2012 | 32.3 | 19.1 | 23.5 | 29.6 | 37.5 | 49.6 |
| 2014 | 28.3 | 19.2 | 22.1 | 26.7 | 33.0 | 39.0 |
| 2018 | 28.3 | 18.7 | 21.6 | 26.3 | 33.8 | 41.0 |
| 2020 | 26.7 | **15.0** | 19.3 | 25.8 | 31.9 | 39.5 |

**12. The results suggest that strengthening liquidity of solvent banks could support lending activity and the ensuing economic recovery**. By combining supply and demand shocks with large balance sheet effects on the nonfinancial sector, the pandemic differs from previous relatively milder stress episodes in this analysis. Supporting liquidity, in particular for solvent banks with strong fundamentals and relatively low liquidity that have experienced a further drop in liquidity since the onset of the pandemic, could support lending activity and the ensuing economic recovery. Monitoring and providing funding to banks would facilitate reductions in banks' interest rates as concerns about loss of funding or deposit base could be contained. The additional measures that the government has taken in the form of SME loan guarantees (e.g., insurance covered loan with premium paid by the government), SME temporary interest payment subsidies, as

[3] Spline regressions estimate linear slopes for different ranges of liquidity ratios with the endpoint of each range identified as a "knot." By default, knots are placed at equally spaced centiles of the distribution of the liquidity ratio. The model starts from the spline specification with the highest possible number of knots and converges towards the best fitting model by eliminating statistically insignificant knots (at the 5 percent level).

well as state fund deposits with low interest (under the condition of further lending to MSME) would complement the liquidity availability.

**13. If credit growth does not recover in early 2021—when weak demand from borrowers as well as lending risk aversion from lenders subsides—other complementarity forms of support could be considered**.[4] For instance, many countries have implemented funding for lending programs in episodes of crisis (Tables 2 and 3). Under these programs, the central bank provides relatively cheap funding to eligible banks with explicit requirements to lend, for example to SMEs. Important design elements of funding for lending schemes have included: (i) incentives such as favorable interest rate or higher funding caps to use the funds for new lending; and (ii) borrowing caps to limit bank borrowing and facilitate the exit strategy. While Malaysia and Thailand implemented broad funding to lending programs by the Central Bank to support SMEs, Philippines and Indonesia took a slightly different route by providing direct assistance to the government, through monetary budget financing, which launched SME packages using some of the central banks' funds (Cerutti and Helbling, 2020). Considering BI's legal limitation to provide direct lending to banks, expanding the provision of fiscal resources to all eligible banks (beyond SOE banks) with appropriate safeguards and incentives to lend could further support credit creation.

[4] Improved global perspectives in controlling the pandemic, for instance through vaccination programs, could lower uncertainty and lending risk aversion from lenders, and support credit demand from borrowers.

## Table 2. Funding for Lending Programs Schemes Implemented by Selected Advanced Economy Central Banks

| | United Kingdom | Australia | Sweden | Euro Area | Japan |
|---|---|---|---|---|---|
| With negative policy rate? | No | No | No | Yes | Yes |
| Size | Linked to bank loan book size, with additional funding for business loans | AUD 84 billion (US$61 billion), recently extended to AUD 200 billion (US$146 billion) based on bank caps | SEK 500 billion (US$57 billion or 10.7 percent of GDP) | Linked to bank loan book size, taking into account excistin LTROs | JPY 90 trillion plus another JPY 20 trillion for corporate bonds and commercial paper (US$0.85 trillion or 16.9 percent of GDP) |
| Rate | At or very close to policy rate (currently 0.1 percent) | Fixed at 0.25 percent | Floating based on policy rate (currently 0 percent) | Fixed at –0.75 percent Policy rate currently –0.5 percent | Fixed at 0 percent with effective rate of –0.1 percent if banks expand business lending. Policy rate currently –0.1 percent |
| Maturity of loans | 4 years | 3 years | 2 years | 3 years | 1 year |
| Take up | GBP 34 billion (US$44 billion or 1.5 percent GDP) | AUD 52 billion (US$38 billion or 2.7 percent of GDP) | SEK 165 billion (US$19 billion or 3.5 percent of GDP) | EUR 1.3 trillion, very strong take up (US$1.5 trillion or 11.5 percent of GDP) | JPY 35 trillion (US$0.3 trillion or 6.6 percent of GDP) |
| Incentives to lend | Caps linked to expansion of business lending, particularly to SMEs, plus a penalty of up to +0.25 ppt if lending contracts | Caps linked to expansion of business lending particularly to SMEs | +0.2 ppt penalty if net corporate lending does not increase by 20 percent of amount borrowed | Bank lending to households and business must not contract, or interest rate increase to –0.5 percent | +0.1 percent bonus payment to banks who increase SME lending |

Sources: Bank of England; Bank of Japan; European Central Bank; Reserve Bank of Australia; Sveriges Riksbank; World Bank; and ANZ Research.

## Table 3. Funding for Lending Programs Schemes Implemented by Selected Emerging Market Central Banks

| | Chile | China | Hungary | Poland | Thailand | Malaysia |
|---|---|---|---|---|---|---|
| With negative policy rate? | No | No | No | No | No | No |
| Size | An initial line to 3 percent of the base portfolio (sum of commercial and consumer loans end of February). An additional line based on the observed increase in loans and fraction of the line's resources destined for smaller companies | | HUF 1 million to HUF 20 billion per SME | Up to EUR 25,000 in primary agricultural sector, EUR 30,000 in fishery and aquaculture, EUR 200,000 in all other sector per company over three fiscal years. | Max of 20 percent loan outstanding as of end December 2019 | RM 50 thousand to RM 5 million per SME |
| Rate | MPR rate, adjusted to the lower value in case MPR change during the six months of the program. | LPR rate | Maximum 2.5 percent | Ranging from 1-year IBOR plus margin of 25 bps (SMEs 1-year loan) to 200 bps (large enterprises 4–6 year loan) | 2 percent | Ranging from 3.5 to 7 percent |
| Maturity of loans | Up to 4 years | 1 year | Up to 20 years | Up to 6 years | Up to 2 years | Up to 10 years |
| Take up | CLP 28 trillion (US$35 billion or 14.1 percent of GDP) | RMB 1 trillion (US$140.2 billion or 1 percent of GDP) | HUF 1.5 trillion (US$5 billion or 3.3 percent of GDP) | PLN 11.5 billion (US$2.9 billion or 0.5 percent of GDP) | THB 500 billion (US$16.3 billion or 3.2 percent of GDP) | RM 18.1 billion (US$4.3 billion or 1.3 percent of GDP) |
| Incentives to lend | Caps linked to expansion in loans to small enterprises. | Expansion in loan to small businesses | The central bank provides refinancing loans to credit institutions at zero percent. | Caps linked to expansion in loans to SMEs and large enterprises. | The BOT provides loans at 0.01 percent interest rate to financial institutions, risk sharing | Expansion to loan in SMEs |

Sources: European Comission website; The National Bank of Hungary; Central Bank of Chile; Bank of Thailand; Bank Negara Malaysia; and Reuters.

## Table 4. Indonesia: Baseline Estimations 1/

| | Dependent Variable: Loan Growth | | | | |
|---|---|---|---|---|---|
| | All periods | | | Stress period | Non-stress period |
| | (1) | (2) | (3) | (4) | (5) |
| Deposit growth | 0.435 *** | 0.435 *** | 0.435 *** | 0.476 *** | 0.408 *** |
| | (0.00711) | (0.00711) | (0.00711) | (0.0128) | (0.00828) |
| Asset share, t-1 | 0.0269 | 0.0270 | 0.0236 | -0.425 | 0.0343 |
| | (0.0861) | (0.0861) | (0.0860) | (0.476) | (0.0810) |
| Liquidity ratio, t-1 | 0.193 *** | 0.193 *** | 0.184 *** | 0.261 *** | 0.16 *** |
| | (0.0156) | (0.0157) | (0.0160) | (0.0286) | (0.0187) |
| Liquidity ratio X Stress, t-1 | | | 0.0298 *** | | |
| | | | (0.00914) | | |
| Stress dummy | | 0.0361 | -0.674 ** | | |
| | | (0.176) | (0.280) | | |
| Constant | -7.639 *** | -7.663 *** | -7.355 *** | -8.947 *** | -6.575 *** |
| | (0.565) | (0.578) | (0.585) | (1.221) | (0.684) |
| Bank FE | Yes | Yes | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 6,344 | 6,344 | 6,344 | 2,654 | 3,690 |
| R-squared | 0.384 | 0.384 | 0.385 | 0.363 | 0.414 |
| Number of banks | 63 | 63 | 63 | 63 | 63 |

1/ Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

**Table 5. Indonesia: Public Versus Non-Public Banks 1/**

| | Dependent Variable: Loan Growth | | |
|---|---|---|---|
| | All | Public banks | Non-public banks |
| | (1) | (2) | (3) |
| Deposit growth | 0.435 *** | 0.0732 *** | 0.470 *** |
| | (0.00711) | (0.00659) | (0.00835) |
| Asset share, t-1 | 0.0236 | 0.0102 | -0.639 |
| | (0.0860) | (0.0204) | (0.414) |
| Liquidity ratio, t-1 | 0.184 *** | 0.077 *** | 0.189 *** |
| | (0.0160) | (0.00794) | (0.0204) |
| Liquidity ratio X Stress, t-1 | 0.0298 *** | -0.00313 | 0.0358 *** |
| | (0.00914) | (0.00430) | (0.0117) |
| Stress dummy | -0.674 ** | -0.122 | -0.781 ** |
| | (0.280) | (0.134) | (0.358) |
| Constant | -7.355 *** | -4.126 *** | -6.316 *** |
| | (0.585) | (0.292) | (0.820) |
| Bank FE | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes |
| Observations | 6,344 | 1,596 | 4,748 |
| R-squared | 0.385 | 0.314 | 0.414 |
| Number of bank_name2 | 63 | 16 | 47 |

1/ Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

## Table 6. Indonesia: Robustness Check: Additional Control Variables 1/

| | Dependent Variable: Loan Growth | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Deposit growth | 0.435 *** | 0.435 *** | 0.410 *** | 0.604 *** | 0.708 *** | 0.708 *** |
| | (0.00711) | (0.00711) | (0.00896) | (0.0182) | (0.0145) | (0.0145) |
| Asset share, t-1 | 0.0236 | 0.0278 | 0.0217 | 0.425 | 0.519 | 0.509 |
| | (0.0860) | (0.0862) | (0.0859) | (0.438) | (0.322) | (0.322) |
| Liquidity ratio, t-1 | 0.184 *** | 0.183 *** | 0.185 *** | 0.273 *** | 0.211 *** | 0.211 *** |
| | (0.0160) | (0.0160) | (0.0159) | (0.0444) | (0.0380) | (0.0380) |
| Liquidity ratio X Sress, t-1 | 0.0298 *** | 0.031 *** | 0.030 *** | 0.0114 | 0.0389 ** | 0.0378 * |
| | (0.00914) | (0.00929) | (0.00913) | (0.0230) | (0.0192) | (0.0193) |
| Asset share X Stress, t-1 | | -0.0355 | | | | |
| | | (0.0480) | | | | |
| Deposit growth X Stress | | | 0.0654 *** | | | |
| | | | (0.0145) | | | |
| Stress dummy | -0.674 ** | -0.656 ** | | -0.488 | -0.939 | -0.901 |
| | (0.280) | (0.281) | | (0.749) | (0.585) | (0.587) |
| Capital adequacy ratio, t-1 | | | | 0.0744 * | | -0.0429 |
| | | | | (0.0446) | | (0.0521) |
| NPL, t-1 | | | | | -0.156 | -0.147 |
| | | | | | (0.103) | (0.103) |
| Constant | -7.355 *** | -7.351 *** | -7.347 *** | -14.35 *** | -10.03 *** | -9.215 *** |
| | (0.585) | (0.585) | (0.584) | (2.339) | (1.746) | (2.005) |
| Bank FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 6,344 | 6,344 | 6,344 | 836 | 770 | 770 |
| R-squared | 0.385 | 0.385 | 0.387 | 0.592 | 0.770 | 0.770 |
| Number of banks | 63 | 63 | 63 | 24 | 23 | 23 |

1/ Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

## Table 7. Indonesia: Possible Structural Change in Loan Growth 1/

| | Dependent Variable: Loan Growth | | |
|---|---|---|---|
| | All Years | 2012-2017 | 2018-2020 |
| | (1) | (2) | (3) |
| Deposit growth | 0.435 *** | 0.499 *** | 0.100 *** |
| | (0.00711) | (0.00831) | (0.0124) |
| Asset share, t-1 | 0.0236 | -0.494 | 0.0334 |
| | (0.0860) | (0.453) | (0.0629) |
| Liquidity ratio, t-1 | 0.184 *** | 0.228 *** | 0.182 *** |
| | (0.0160) | (0.0211) | (0.0283) |
| Liquidity ratio X Stress, t-1 | 0.0298 *** | 0.0412 *** | 0.00772 |
| | (0.00914) | (0.0116) | (0.0122) |
| Stress dummy | -0.674 ** | -1.051 *** | 0.0529 |
| | (0.280) | (0.364) | (0.356) |
| Constant | -7.355 *** | -8.083 *** | -7.05 *** |
| | (0.585) | (1.052) | (0.906) |
| Bank FE | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes |
| Observations | 6,344 | 4,448 | 1,896 |
| R-squared | 0.385 | 0.464 | 0.096 |
| Number of banks | 63 | 63 | 62 |

1/ Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

## Table 8. Indonesia: Possible Non-Linearity: Spline Estimations

| | Dependent Variable: Loan Growth | | | | |
|---|---|---|---|---|---|
| | Baseline fixed effect | Spline Estimations | | | |
| | | All periods | | Stress period | Non-stress period |
| | (1) | (2) | (3) | (4) | (5) |
| Deposit growth | 0.435 *** | | 0.435 *** | 0.475 *** | 0.409 *** |
| | (0.00711) | | (0.00710) | (0.0128) | (0.00827) |
| Asset share, t-1 | 0.0236 | | -0.00483 | -0.461 | 0.00564 |
| | (0.0860) | | (0.0863) | (0.475) | (0.0815) |
| Liquidity ratio, t-1 | 0.184 *** | | | | |
| | (0.0160) | | | | |
| Liquidity ratio 1, t-1 1/ | | 1.039 *** | 1.877 *** | 2.605 *** | 1.678 *** |
| | | (0.198) | (0.160) | (0.274) | (0.195) |
| Liquidity ratio 2, t-1 2/ | | -0.402 *** | -0.436 *** | -0.627 *** | -0.419 *** |
| | | (0.145) | (0.116) | (0.204) | (0.142) |
| Liquidity ratio X Stress, t-1 | 0.0298 *** | | 0.0327 *** | | |
| | (0.00914) | | (0.00916) | | |
| Stress dummy | -0.674 ** | | -0.722 *** | | |
| | (0.280) | | (0.280) | | |
| Knot position | | 34.4 | 34.4 | 33.7 | 34.9 |
| Bank FE | Yes | Yes | Yes | Yes | Yes |
| Month FE | Yes | Yes | Yes | Yes | Yes |
| Observations | 6,344 | 6,344 | 6,344 | 2,654 | 3,690 |
| R-squared | 0.385 | 0.018 | 0.386 | 0.365 | 0.415 |
| Number of banks | 63 | 63 | 63 | 63 | 63 |

1/ Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

2/ Liquidity ratio 1" and "ILiquidity ratio 2" differentiate the coefficients of liquidity ratio depending on whether the latter is either below (Liquidity ratio 1) or strictly above (Liquidity ratio 2) a threshold (the knot position).

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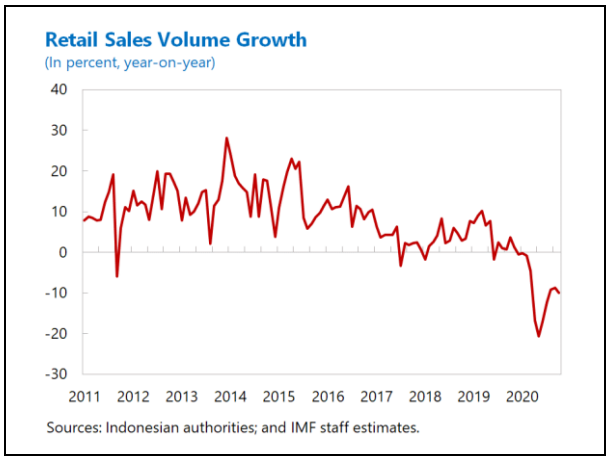
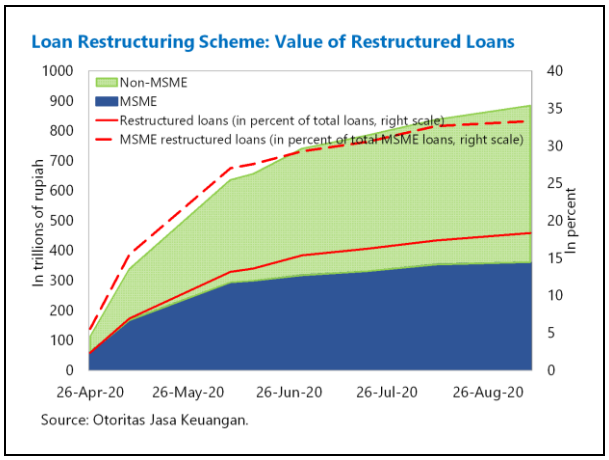
# IMPACT OF COVID-19 ON NONFINANCIAL CORPORATE VULNERABILTIES IN INDONESIA[1]

*Nonfinancial corporate (NFC) firms in Indonesia entered the COVID-19 pandemic with a relatively weak debt service capacity and modest liquidity buffers compared with peers in the region. For a sample of 459 Indonesian NFC firms at end-2019, about half of the firms used more than half of their operating income to cover their interest payments and held cash holdings covering less than 20 percent of their outstanding current liabilities. Without adequate policy support, about half of these firms might have become unable to cover their interest payments and may have faced cash shortages by end-2020. Their liabilities are expected to account for about one-third of total outstanding NFC debt, more than double the end-2019 share, which could put significant strains on the banking system.*

## A. Introduction

**1. As elsewhere around the world, nonfinancial firms in Indonesia are coping with unprecedented challenges from the COVID-19 crisis**. The unexpected collapse in sales due to stringent containment measures put the survival of many firms at risk, even for otherwise viable firms before the pandemic. Extraordinary emergency support measures, including a large-scale loan restructuring program, have assisted them sustain the impact so far. As the pandemic goes on, however, policymakers will likely face an increasingly difficult tradeoff between preserving policy space for the future and continuing with the support to save more firms and jobs now. An understanding of the scale and nature of the NFC problems, especially relative to other major economies in the region, could help inform this important policy decision.

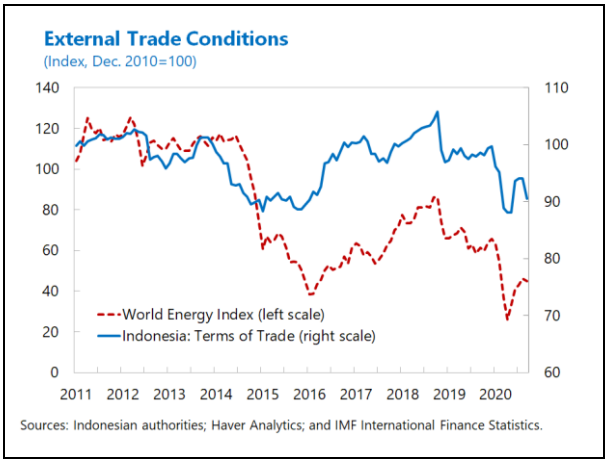


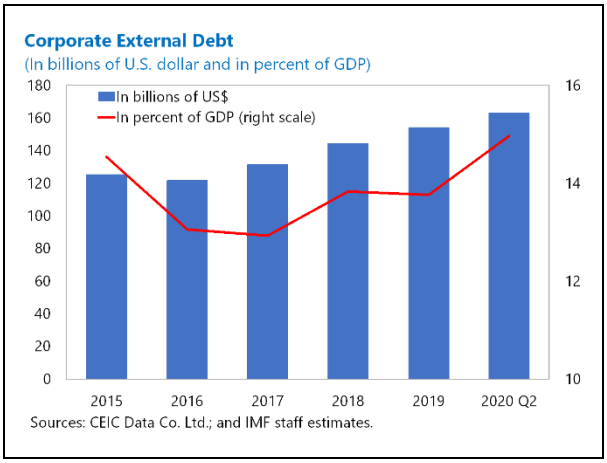




**2. The challenge for Indonesian firms has been compounded by their financial vulnerabilities pre-dating the pandemic**. A sustained decline in commodity prices since the Global

[1] Prepared by Minsuk Kim (APD), based on a forthcoming IMF working paper, "Impact of COVID-19 on Financial Health of Nonfinancial Firms in ASEAN," co authored with Jiae Yoo and Xin Li (all APD).

Financial Crisis (GFC) in 2008, together with the heightened global trade tensions over recent years, weighed down on Indonesian firms' corporate performance. On the financing side, the reliance on external debt had increased in recent years, which contributed to the persistently high currency risk premium and potentially left Indonesian firms' balance sheets more susceptible to sudden large fluctuations in the exchange rate. Some of the associated risks were nonetheless mitigated by a set of prudential requirements introduced in 2014 on hedging,[2] liquidity, and minimum credit rating.




**3. This chapter assesses the impact of COVID-19 using a novel firm-level dataset**. In the current environment, assessments through the usual banking system soundness indicators could miss an accurate picture of the fast-evolving financial health of NFC firms. The dataset used in this analysis is constructed from S&P's Capital IQ database and comprises 459 nonfinancial firms in Indonesia as of end-2019. The sample accounts for about 62 percent of total NFC debt in the economy and 22 percent of GDP in terms of revenue. Both publicly listed (439) and non-listed private firms (20) are included in the dataset, and 23 of the 459 sample firms are state-owned enterprises (SOEs). The dataset contains information on the currency composition of individual firms' outstanding debt, a major advantage over other commercial firm-level databases considering Indonesian firms' reliance on FX debt. Appendix I provides further details on the firm-level dataset.

## B. Financial Health Before COVID-19 Pandemic

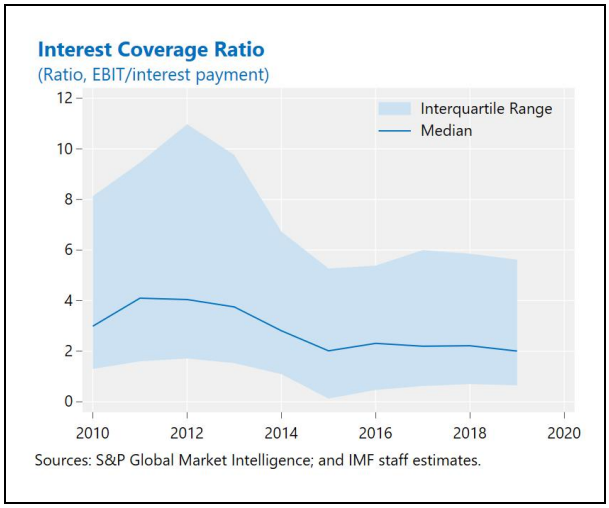
**4. We first evaluate the solvency of Indonesian NFCs using the interest coverage ratio (ICR) as the organizing framework**. The ICR, defined as the earnings before tax and interest expenses (EBIT) to interest payment (INTP) ratio, measures a firm's capacity to service its debt payments out of its EBIT. To understand the underlying drivers of the ICR dynamics before the pandemic, we decompose the ICR in year *t* as follows:

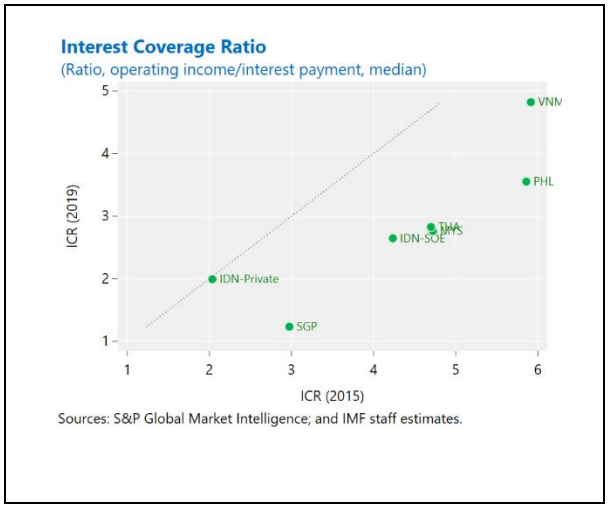
$$\mathrm{ICR}_t = \mathrm{EBIT}_t/\mathrm{INTP}_t = \mathrm{ROA}_t/[(\mathrm{INTP}_t/\mathrm{DEBT}_{t-1}) \times (\mathrm{DEBT}_{t-1}/\mathrm{ASSET}_{t-1})] = \mathrm{ROA}_t/(\mathrm{EIR}_t \times \mathrm{LEV}_{t-1}),$$

[2] According to the regulation (No. 16/21/PBI/2014), non-bank corporations with external debt are required to meet a minimum hedging ratio of 25 percent of the negative difference between maturing foreign currency assets and foreign currency liabilities in the next three months and in the next three to six months.

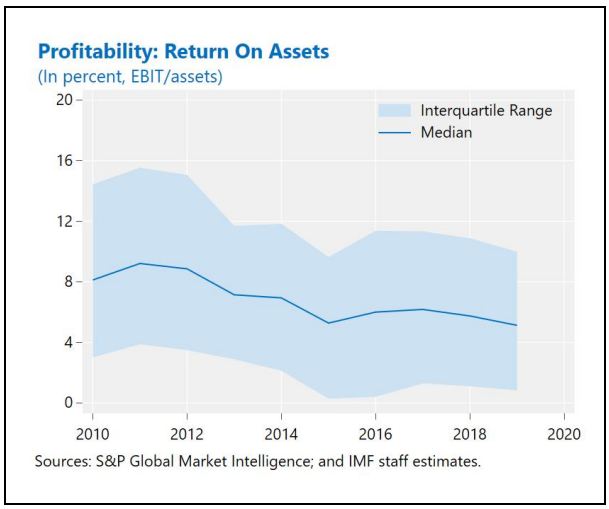
where ROA, EIR, and LEV denote the return on assets, effective interest rate, and leverage, respectively. We analyze the evolution of the ICR by examining each of these components in turn.

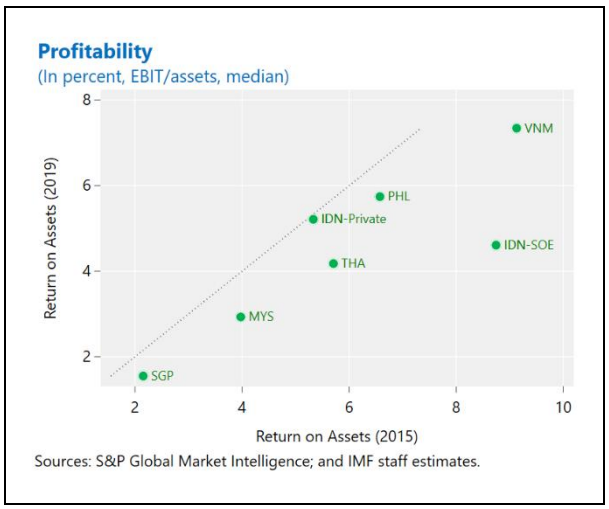
**5. Indonesian firms' debt service capacity had been broadly stable in the run up to the pandemic, although at low levels**. Since 2015, the median ICR of sample Indonesian firms had remained relatively stable within a narrow range of 2 and 2.5, which stands in contrast with their peers in the ASEAN region that experienced significant declines in the ICR. The median ICR of 2 as of end-2019 was nevertheless among the lowest in the region. Furthermore, the stable ICR ratio over 2015–2019 masks a noticeable fall in the ICR for sample SOEs ("IDN-SOE"), a potential concern from a systemic perspective, given their relatively large firm size.



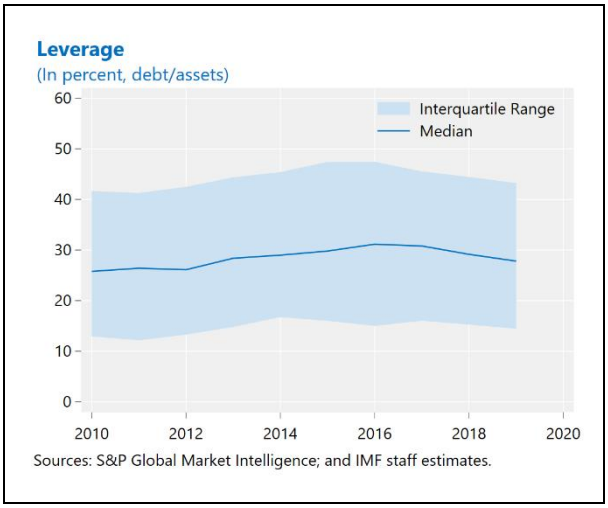

**6. Profitability was maintained at adequate levels, despite some deterioration during 2011–2015 and 2018–2019, closely following the trend in the terms of trade**. The median ROA of sample Indonesian firms stood at about 5.1 percent as of end-2019, comfortably higher than 3.4 percent for other firms in ASEAN. Notwithstanding some slight decline

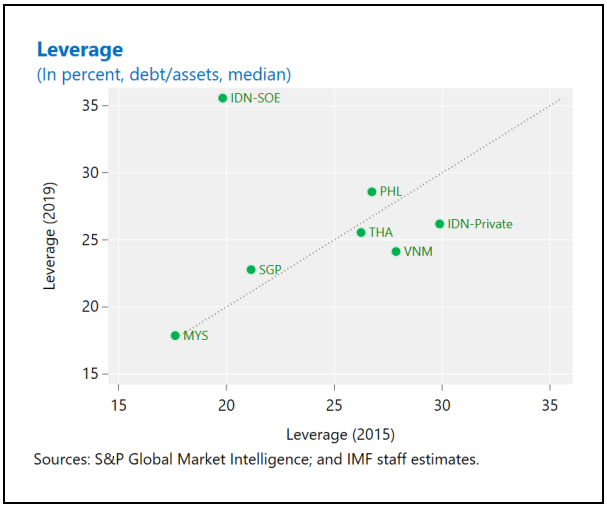


over 2018–2019, the median profitability of private sector Indonesian firms ("IDN-Private") in 2019 was comparable to the level in 2015, which contrasts with other sample firms in the region that generally saw their profits decline over the same period. On the other hand, the profitability of Indonesian SOEs dropped sharply, although from a relatively high level in 2015, partly contributing to the deterioration in their debt service capacity.

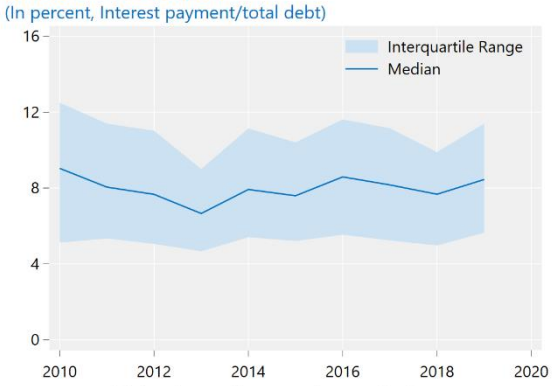
**7. Corporate leverage was relatively high in 2019, despite some deleveraging in recent years**. As of end-2019, the median debt-to-assets ratio of sample Indonesian firms stood at 27 percent, compared with 22 percent for other NFCs in the region, partly explaining Indonesian firms' relatively low ICR despite the relatively strong profitability. The surge in the leverage of Indonesian SOEs from about 20 percent in 2015 to 36 percent in 2019 is especially remarkable considering the large decline in their profitability over this period.[3] Meanwhile, private sector Indonesian firms had reduced their leverage over the same period, likely reflecting higher financing costs (discussed below).



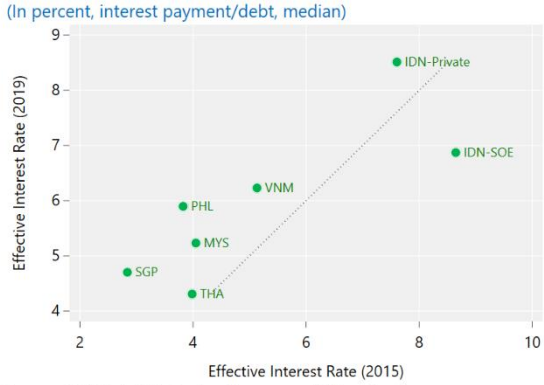




**8. The cost of financing, proxied by the effective interest rate, had increased since 2015, in line with the trend in ASEAN countries**. This increase reflected the rise in the policy rates across the region in the recent years, which led to higher short-term market interest rates. In the case of private sector Indonesian firms, however, the effective interest rates had been markedly higher than the rates elsewhere, which was another factor explaining their relatively low ICRs in addition to high corporate leverage. Meanwhile, the effective interest rate of Indonesian SOEs had actually declined over 2015–2019, indicating a significant degree of subsidization in their financing.

[3] The increase in leverage partly reflects SOEs' active involvement in government priority projects in infrastructure and energy.

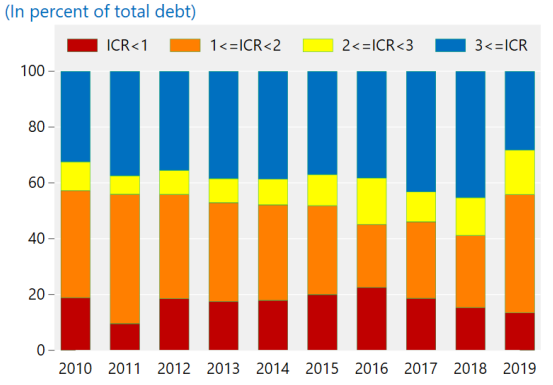


Sources: S&P Global Market Intelligence; and IMF staff estimates.

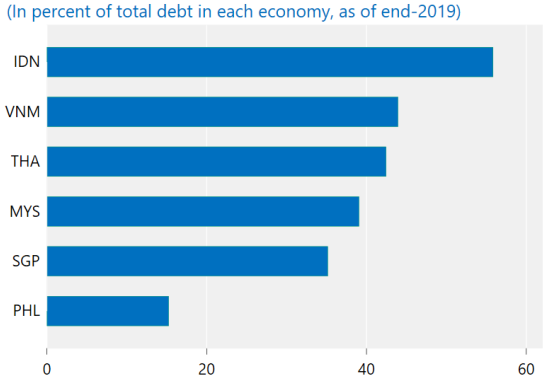


Sources: S&P Global Market Intelligence; and IMF staff estimates.

**9. The share of outstanding NFC debt held by low-ICR firms remained comparable to historical levels in 2019, although higher than in other ASEAN economies**. As of end-2019, the debt-at-risk share of Indonesia firms with ICR below 2 stood at about 56 percent, significantly higher than even in Singapore (35 percent) where the median ICR was lower in 2019. This difference indicates that the firms with high debt service burden were relatively larger in size in Indonesia than in Singapore. The data also show that, while the debt-at-risk share was not at an alarming level in light of Indonesia's own history, the risks posed by the NFC sector to the broader financial system was nonetheless the greatest among major ASEAN economies.



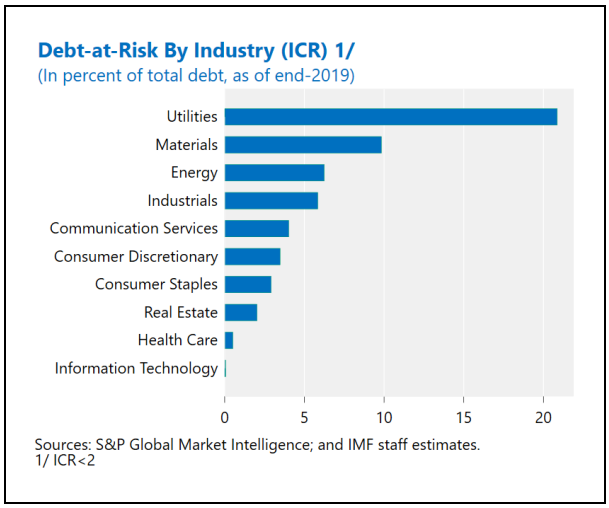
Sources: S&P Global Market Intelligence; and IMF staff estimates.

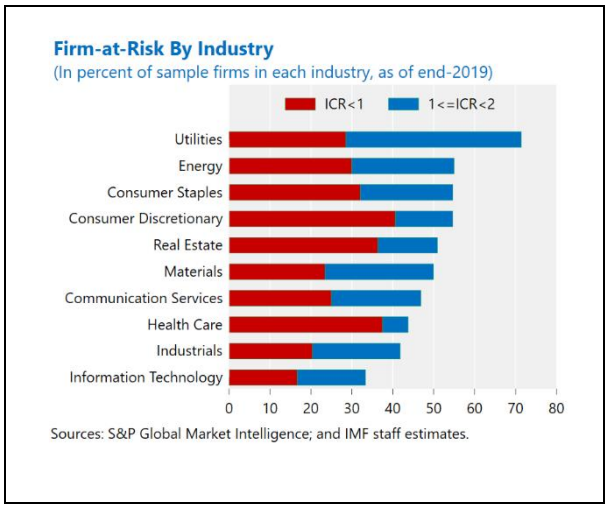


Sources: S&P Global Market Intelligence; and IMF staff estimates.

**10. Across industries, firms in the utilities, materials, energy, and consumer staples and discretionary sectors had the weakest debt service capacity**. In 2019, the debt of low-ICR firms in utilities accounted for over 20 percent of total outstanding NFC debt in Indonesia, followed by firms in materials (about 10 percent), together consisting of more than half of the NFC debt-at-risk in Indonesia. While these industries warrant attention from a financial stability perspective, the high

share of risky firms in consumer staples and discretionary industries raise concerns from an employment-at-risk perspective, given their relatively high labor intensity.[4]




**11. The reliance on FX debt is another importance source of NFC vulnerability in Indonesia**. Specifically, the firm-level data reveal the following regarding Indonesian firms' use of FX debt prior to the pandemic:

- As of end-2019, sample Indonesian firms held about 39 percent of their outstanding debt in foreign currencies, more than double the average share for other sample firms in major ASEAN economies (about 16 percent).

- The share of FX debt had increased over 2016–2019, especially among small-sized firms, as indicated by the relatively larger increase in the median FX debt share compared with the asset-weighted share. Furthermore, the FX debt share had increased relatively more for the 75th percentile firms, although still comparable to the post-GFC levels.

- Private sector firms and those in utilities had relatively higher FX debt shares in 2016, and their shares increased relatively more in 2016–2019—these were also the firm groups that had relatively weak debt service capacity, as shown above.

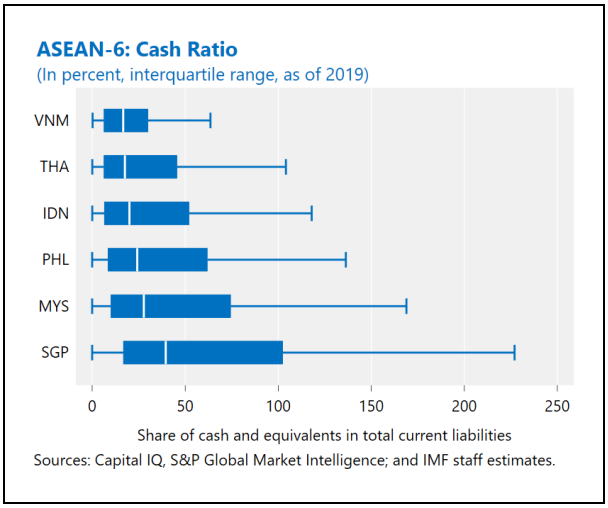
- While the firm-level data used in this study do not provide information on financial hedging,[5] we attempt to gauge the net FX exposure at the industry level by comparing the average share of foreign sales (as a proxy for natural hedges) in each industry with the average FX debt share in the same industry. The analysis shows that Indonesian firms, compared with their peers in ASEAN, generally had much higher shares of FX debt in their total debt compared to the share of foreign sales in their total sales. Notably, the average high FX debt share in utilities appears to

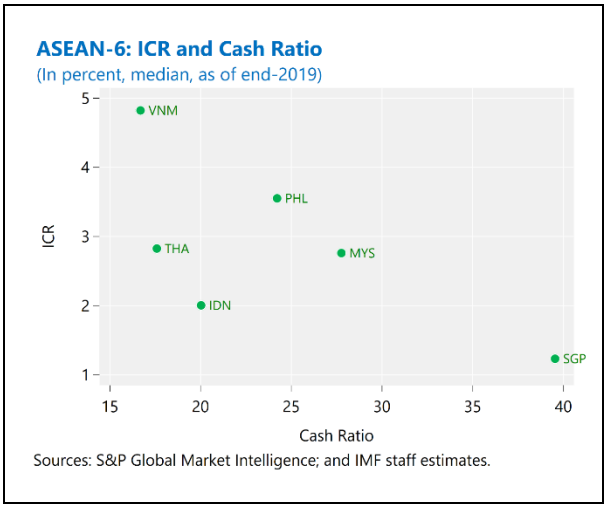
[4] It should also be noted that the majority of informal sector firms—although not included in the sample—likely belong to these industries, which comprise wholesale and retail trade, and accommodation and food services.

[5] According to Bank Indonesia's March 2020 *Financial Stability Review*, about 93 percent of 3,807 nonbank corporations with external debt met the regulatory minimum hedging ratio requirements at end-2019:Q4.

warrant caution, given the increase in recent years and the lack of natural hedges in the form of foreign sales.

**12. Indonesian firms encountered the pandemic with relatively modest cash buffers**. As of end-2019, the cash ratio (defined as the ratio of cash and cash equivalents relative to total current liabilities) of Indonesian firms stood at about 20 percent, which was relatively low in the region.[6] This situation contrasts with other economies in ASEAN, in which firms either held a combination of low cash buffers with high ICRs (e.g., Vietnam) or low ICRs with large cash buffers (e.g., Singapore). Amongst sample Indonesian firms, the median cash ratio was significantly lower for private sector firms (19 percent) than SOEs (34 percent), and for firms in materials (13 percent) and consumer staples (12 percent).




## C. Expected Impact of COVID-19 on Indonesian Firms' Financial Health

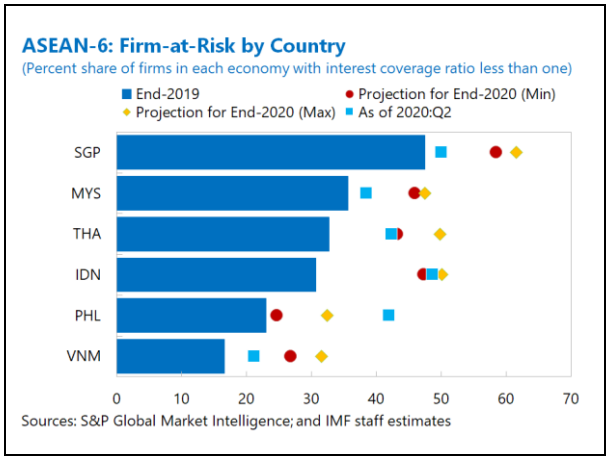
**13. Next, we evaluate the potential impact of COVID-19 by estimating ICRs at end-2020 using two complementary approaches** (see Appendix II for more details). In one approach, we directly apply relevant shocks to each firm's operating income and interest payments at end-2019 to derive the expected ICR value at end-2020. The operating income shock is set based on the information from Consensus earnings forecasts of market analysts, whereas the shocks applied to interest payments—namely, the exchange rate and the interest payment shock—are set in line with the October 2020 IMF WEO forecasts. In an alternative approach, we use a regression-based approach to predict the ICRs at end-2020, where the explanatory variables consist of a set of macroeconomic and global variables.

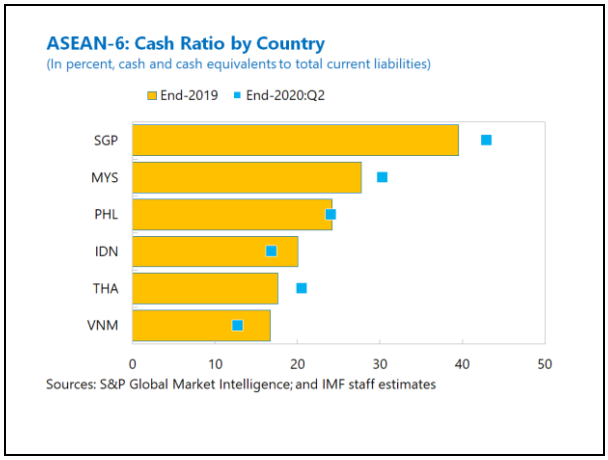
**14. The cash position at end-2020 is estimated by adding the expected net cash flow during 2020 to the cash balance at end-2019**. Specifically, the cash flow from operations is assumed to decline in line with the operating income shock assumed for the ICR analysis. Capital

[6] The assessment still holds with the asset-weighted average cash ratio, which was about 47 percent for Indonesian firms and only higher than Vietnamese firms (about 20 percent) among ASEAN-6.

expenditure and debt refinancing are set at levels broadly consistent with the magnitude of the macroeconomic shocks in past crisis episodes.

**15. Without ample policy support measures, the fallout from the COVID-19 crisis on the NFC sector could be substantial**. The analysis shows that, under the October 2020 IMF WEO, the share of sample firms with ICRs below one could reach between 47–50 percent by end-2020. Liquidity pressures would also intensify and become broad-based, potentially leaving about 45 percent of sample firms with cash shortages at end-2020 without liquidity support measures. The actual data from 2020:Q2 for a subset of sample firms[7] are broadly in line with these estimates, with the share of firms at risk (i.e., ICRs below one) at about 49 percent and a median ICR of 0.8. The decline in the ICR primarily reflected lower corporate sales and profitability, while the policy rate reduction by Bank Indonesia provided some relief on interest payments. Meanwhile, the cash ratio has also fallen to 19 percent from 20 percent at end-2019, suggesting significant underlying liquidity pressures.

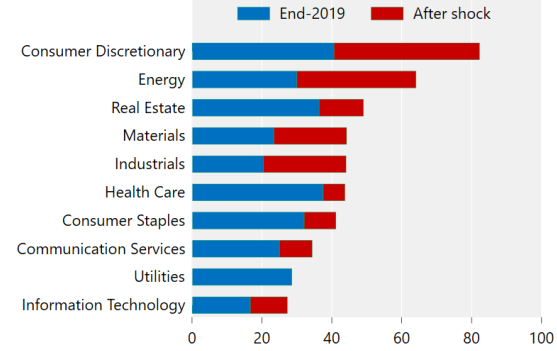


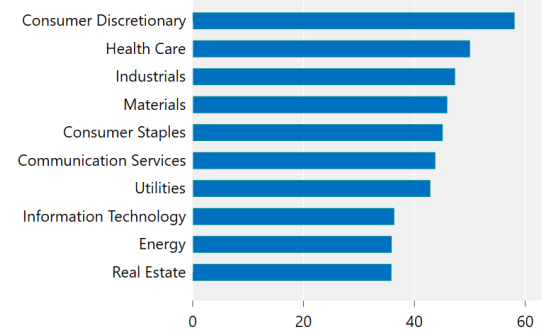




**16. The results also show large variations in the COVID-19 impact across industries, partly reflecting their pre-pandemic conditions**. Consumer discretionary, which comprises sub-industries such as retailing, consumer durables and apparel, and consumer services, is expected to be hit the hardest in terms of the share of firms facing interest payment difficulties and cash shortages, partly reflecting their weak initial position before the pandemic. This is in contrast with the energy industry, for example, in which a relatively small share of firms is expected to be cash-strapped due to the strong cash position in 2019 (median cash ratio of 43 percent). Other vulnerable industries include materials and industrials,[8] which are the industries that account for a significant share of Indonesia NFC debt-at-risk in 2019 (28 percent).

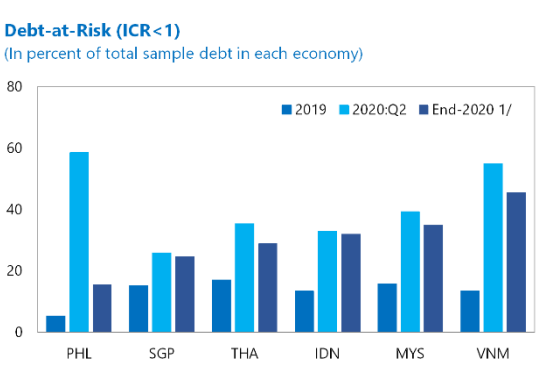
[7] The Q2 estimates are based on a sub-sample of 397 NFC firms, compared with the full sample of 459 firms at end-2019.

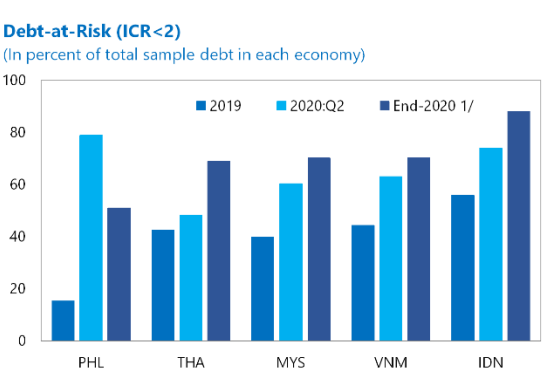
[8] Industrials comprises transportation, construction, and heavy machinery and equipment.




**17. The debt-at-risk share at end-2020 is expected to rise markedly from its level at end- 2019, which could put substantial strains on the health of the banking system**. The analysis shows that the share of NFC debt held by Indonesian firms with ICR below one and two could rise to 32 percent and 88 percent by end-2020, respectively, which would be 2½ and 1½ times higher than the levels in 2019. Data from 2020:Q2 for a subset of sample firms with available accounting information confirm that these estimates are broadly consistent with the performance up to Q2 in major ASEAN economies (except the Philippines). While some further increase is expected during the remainder of 2020 in the debt-at-risk share based on the ICR threshold of two, the increment would be relatively small due to the overall improvement in mobility and economic activity, which is expected to have led to some recovery in corporate performance.




## D. Policy Implications

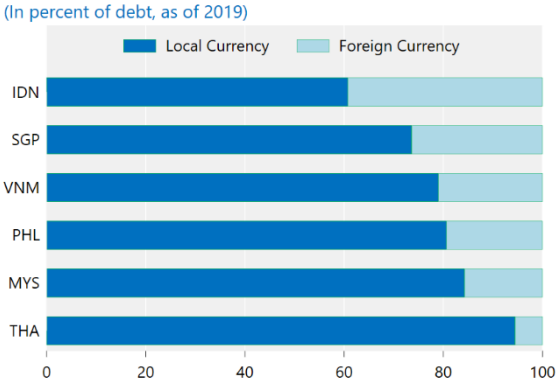
**18. The findings highlight the need to prepare for possible impending NFC problems in Indonesia**. Authorities have appropriately responded to the pandemic with bold emergency support measures, including interest rate subsidies, bank loan moratoria for MSMEs, credit guarantees, corporate income tax reduction, and liquidity support and regulatory easing aimed to facilitate loan

restructuring by banks. Considering the magnitude and persistence of the COVID-19 crisis, some of these targeted assistance measures should be sustained or even scaled up as needed until recovery firmly takes hold (see *Staff Report* for more specific recommendations). In this regard, the authorities' plan to prioritize support high value-added sectors in 2021, including through an ambitious vaccination program, would help accelerate the recovery in corporate performance. At the same time, strengthening the current insolvency framework and social safety nets, together with implementation of active labor market policies aimed at increasing employment opportunities would help minimize the long-term scars on the economy.

## Figure 1. Foreign Currency Nonfinancial Corporate Debt in Indonesia

*Indonesian firms hold a relatively high share of FX debt...*

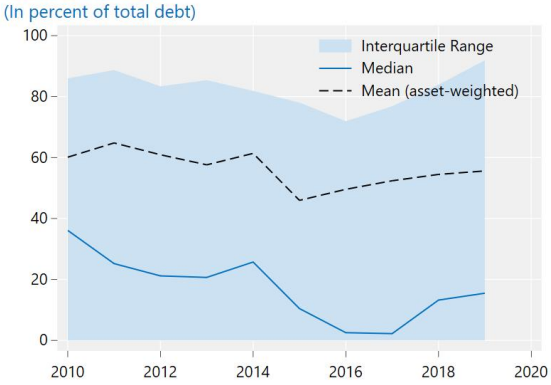
**Share of NFC Debt By Currency**
(In percent of debt, as of 2019)




Sources: Capital IQ, S&P Global Market Intelligence; and IMF staff estimates.

*...which had increased over the recent years...*

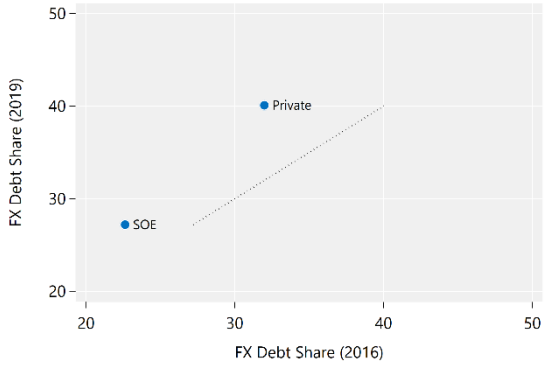
**Share of FX Debt**
(In percent of total debt)




Sources: S&P Global Market Intelligence; and IMF staff estimates.

*...especially among private sector firms...*

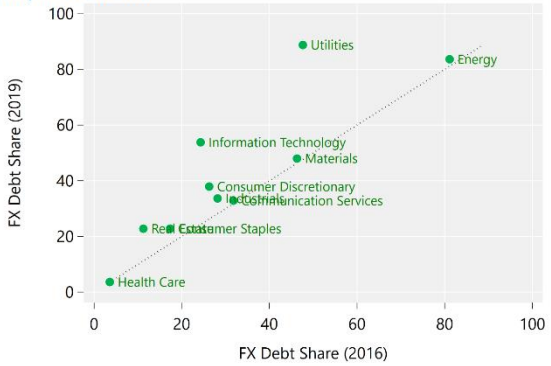
**Share of FX Debt By Ownership**
(In percent, mean)




Sources: S&P Global Market Intelligence; and IMF staff estimates.

*...and firms in utilities, information technology, consumer discretionary, and real estate.*

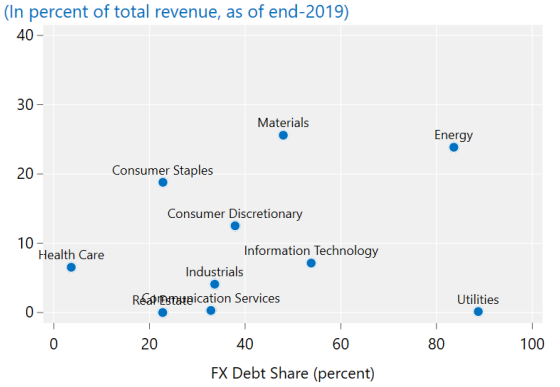
**Share of FX Debt By Industry**
(In percent, mean)




Sources: S&P Global Market Intelligence; and IMF staff estimates.

*FX debt as share of total debt is relatively high with respect to the foreign sales-to-total sales ratio in Indonesia,*

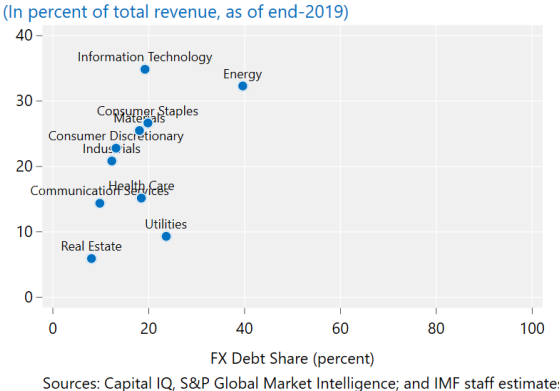
**Indonesia: Foreign Sales and FX Debt Share**
(In percent of total revenue, as of end-2019)




Sources: Capital IQ, S&P Global Market Intelligence; and IMF staff estimates

*...compared to their peers in the region.*

**ASEAN-5: Foreign Sales and FX Debt Share1/**
(In percent of total revenue, as of end-2019)




Sources: Capital IQ, S&P Global Market Intelligence; and IMF staff estimates
1/ Excluding Indonesia.

# Appendix I. Data Source

**1.** This study uses a firm-level dataset constructed from the corporate balance sheet database provided by Capital IQ, S&P Global Market Intelligence.

**2.** One advantage of the Capital IQ database over other commercial databases such as Worldscope and Orbis, is the availability of detailed information on firms' outstanding debt held in their balance sheets. Its Debt Capital Structure database, in particular, provides information on the individual debt instruments held by each firm at a point in time, including the principal amount due, the currency of denomination, and the type of instrument (for example, whether bank loans or bonds). Information on debt instruments is collected from company financial reports filed to national regulatory agencies, typically available in the supplementary note accompanying the main financial statements.

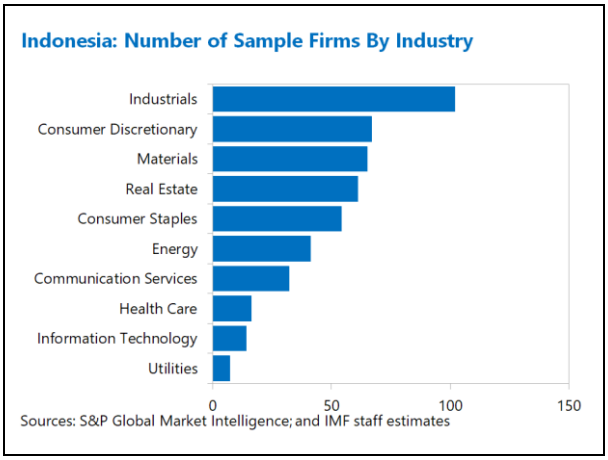
**3.** The sample consists of a total of 459 NFC firms for Indonesia and 2,594 firms for ASEAN-6 economies (see text table) as of end-2019. The sample is nationally representative in terms of the key variables of interest, such as NFC debt and GDP. In the case of Indonesia, the debt held by sample firms and their total revenue in 2019 account for about 62 percent of total outstanding NFC debt in the economy and 22 percent of GDP, respectively.

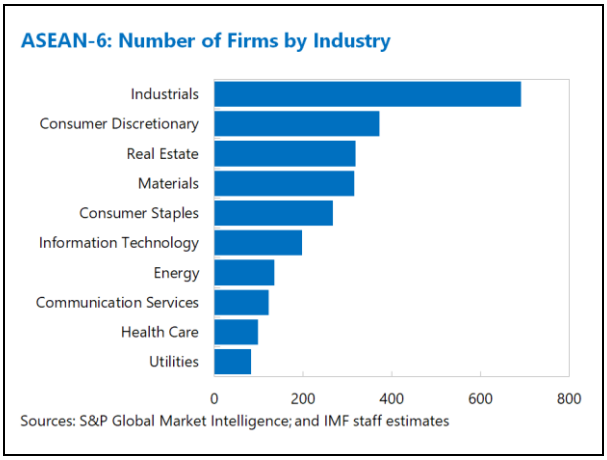
**Sample Representativeness 1/**

| | NFC Debt Share | Revenue/ GDP | Number of Sample Firms |
|---|---|---|---|
| IDN | 62.0 | 21.9 | 459 |
| MYS | 62.3 | 66.0 | 766 |
| PHL | 44.4 | 42.1 | 153 |
| SGP | 40.7 | 60.1 | 448 |
| THA | 83.5 | 73.9 | 569 |
| VNM | N.A. | 22.0 | 199 |

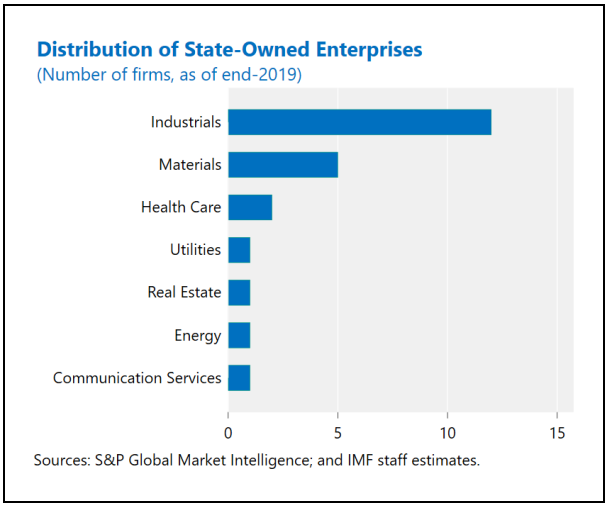
1/ Based on data as of end-2019.

**4.** The industry classification in this study follows that of Capital IQ's proprietary system. In terms of the firm distribution, industrials have the highest concentration of sample Indonesian firms (102) and utilities has the smallest (7). The industry distribution for the broader ASEAN-6 economies is also similar, thus providing some assurance that the results for Indonesia in this study are not primarily driven by the economy's sample industry composition (text chart).



Finally, the sample includes 23 SOEs, mostly concentrated in industrials (12) and materials (5) industries (text table). Although small in numbers, these SOEs represent the largest firms in the sample, with a median asset size of US$3,287 million, compared with US$135 million for private sector firms.



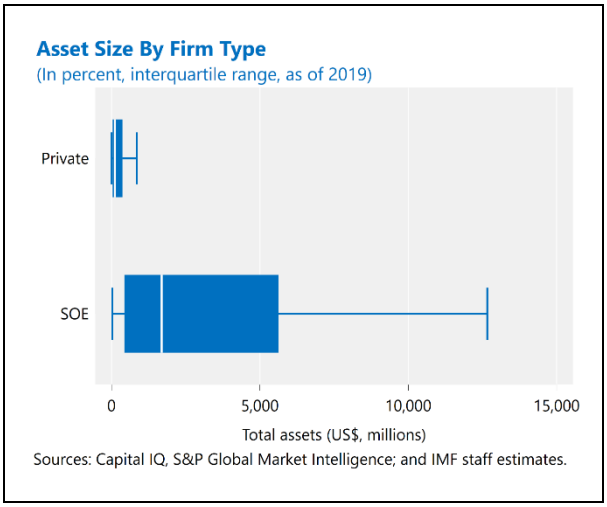




**Table 1. Indonesia: List of Sample State-Owned Enterprises**

(As of end-2019)

| Company Name | Industry | Total Assets (millions, USD) |
|---|---|---|
| Perusahaan Perseroan (Persero) PT Perusahaan Listrik Negara | Utilities | 114,544 |
| PT Pertamina (Persero) | Energy | 67,086 |
| PT Telekomunikasi Indonesia (Persero) Tbk | Communication Services | 15,986 |
| PT Indonesia Asahan Aluminium (Persero) | Materials | 11,912 |
| PT Pupuk Indonesia (Persero) | Materials | 9,796 |
| PT Waskita Karya (Persero) Tbk | Industrials | 8,859 |
| PT Hutama Karya (Persero) | Industrials | 6,623 |
| PT Semen Indonesia (Persero) Tbk | Materials | 5,767 |
| PT Wijaya Karya (Persero) Tbk. | Industrials | 4,488 |
| PT. Garuda Indonesia (Persero) Tbk | Industrials | 4,456 |
| PT Pembangunan Perumahan (Persero) Tbk | Industrials | 4,276 |
| PT Krakatau Steel (Persero) Tbk | Materials | 3,287 |
| PT Kereta Api Indonesia (Persero) | Industrials | 3,245 |
| PT Angkasa Pura II (Persero) | Industrials | 3,180 |
| PT Angkasa Pura I (Persero) | Industrials | 3,092 |
| PT Adhi Karya (Persero) Tbk | Industrials | 2,639 |
| PT Pelabuhan Indonesia III (Persero) | Industrials | 2,223 |
| PT Pembangunan Perumahan Properti Tbk | Real Estate | 1,415 |
| PT Kimia Farma (Persero) Tbk | Health Care | 1,326 |
| PT Pelabuhan Indonesia I (Persero) | Industrials | 1,194 |
| PT Pelabuhan Indonesia IV (Persero) | Industrials | 760 |
| PT Semen Baturaja (Persero) Tbk | Materials | 403 |
| PT Indofarma (Persero) Tbk | Health Care | 100 |

# Appendix II. Methodology

*This appendix provides additional details on the analytical approaches used to obtain the results in the chapter. The goal is to estimate firms' debt service capacity, proxied by the ICR, and their cash positions at end-2020 under the October 2020 IMF World Economic Outlook.*

**1.** Unlike other crisis episodes in the past, the COVID-19 crisis is characterized by large supply disruptions caused by lockdowns aimed at containing the virus transmission. As a result, the cross-industry impact on nonfinancial corporates is expected to differ markedly from the patterns observed in other crisis episodes in which demand contraction was the major driver. For example, the impacts on industries such as transportation, tourism, and other labor-intensive industries, are expected to be disproportionately larger in the COVID-19 crisis. Typical regression-based stress testing approach would not adequately capture this unique aspect of the COVID-19 crisis, however, as they entirely rely the historical data.

**2.** In light of the large uncertainty surrounding the near-term economic prospects and the impact of COVID-19 shocks, we take the following two complementary approaches to obtain a range of ICR estimates at end-2020:

### Approach I. Regression-Based Method

**3.** In this approach, we use a regression-based approach to obtain alternative forecasts of ICRs for end-2020 ($ICR^2_{2020,j}$). The sample used for the regression approach consists of 29,161 firm-year observations over the period of 2002−2019 from the sample ASEAN-6 economies.

**4.** This approach involves running separate regressions with each firm's return on assets (ROA), effective interest rate (EIR), and leverage (LEV, defined as the debt-to-assets ratio) as the dependent variable and then constructing firm-specific projections for the ICR using the relationship below:

$$ICR = ROA/(EIR \times LEV)$$

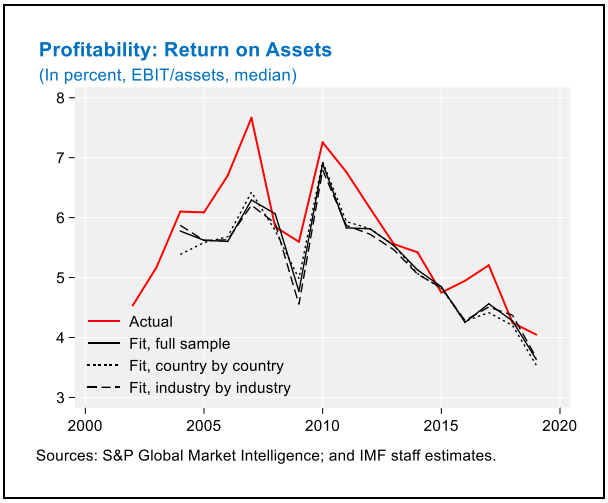
**5.** For each subcomponent, we estimate the empirical relationship between their behavior and macroeconomic variables based on the regression equation below:

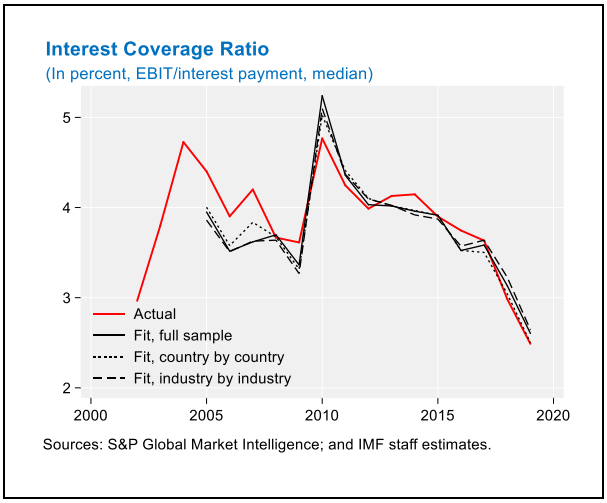
$$y_{i,j,k,t} = \sum_{s=1}^{2} \gamma^s y_{i,j,k,t-s} + \beta_1 X_{k,t} + \beta_2 E_{k,t} + \beta_3 W_t + \delta_j + \mu_k + \varepsilon_{i,j,k,t},$$

where $y_{i,j,k,t}$ denotes a subcomponent of ICR (ROA, EIR, LEV) for firm $i$, industry $j$, and country $k$, in year $t$. It considers different types of macroeconomic variables: country-level domestic variables $X_{k,t}$ including real GDP growth as a proxy for aggregate demand and lending rates; external sector variables $E_{k,t}$ including the trade partners' GDP growth weighted by the country $k$'s exports and the exchange rates (bilateral exchange rate to USD); global variables $W_t$ including commodity prices and LIBOR. It includes the lagged dependent variable, and a dummy variable indicating the

year 2010 onward to improve the model fit. We also control for industry and country fixed effects $\delta_j$ and $\mu_k$. We use the IMF WEO (including the global assumptions) for most macroeconomic data for the period of 2002 to 2019, and the IMF's *International Financial Statistics* for the lending rates. Based on the estimated relationship, we forecast the firm-level financial indicators for 2020–21, using the IMF staff projections for the macroeconomic variables as available in the WEO from the October vintage.[1]

**6.** The model predictions are robust to different regression specifications and provide good fits for the ICR (text charts). Several different specifications were considered, including different measures for each variable, as well as running similar regressions at the country- and industry-level separately instead of using the full sample. Given that the main objective is to make out-of-sample forecasts, we prioritize a specification that provides the best fit to the actual data until 2019.




## Approach II. Direct Method Using Consensus Forecast Earnings

**7.** In this approach, we directly apply relevant shocks to the subcomponents of the ICR ratio—namely, the operating income (numerator) and the interest payment (denominator).

**8.** To set the shock to the operating income, we first take the consensus earnings forecasts of individual firms for FY 2020 from both the January 2 vintage and the June 30 vintage.[2] Next, for each firm, we calculate the percentage change of the earnings forecasts between these two vintages. Finally, as these forecasts are only available for a relatively small subset of sample firms, we apply

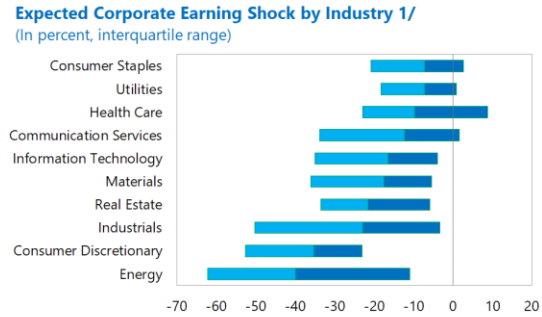
[1] For the country-specific lending rates we refer to the data available in the IMF's *International Financial Statistics*. For projection for 2020, we use the average of the available months (up to September) as a proxy; for projection for 2021, we use the latest available (September 2020) as a proxy assuming that the current low interest rates persist in 2021.

[2] The June 30 vintage is used as the reference vintage as it provides the earnings forecast that is the closest to the magnitude of economic downturn implied by the October 2020 IMF WEO projection. The quantitative results, however, are robust to using alternative reference vintages.

the industry-median earning shock to individual firms' earnings in 2019 (i.e., common operating income shock for firms *j* in the same industry *i*) to obtain the estimated earnings for 2020:

$$EBIT_{2020,j} = (1+ \theta \times EBIT\ shock_i/100) \times EBIT_{2019,j}$$

where $\theta$ is a scaling factor whose value is set such that the median ICR value for the ASEAN-6 sample in 2020 from Approach I and the value from Approach II are equal to each other (at about 1.2).[3]




**Expected Corporate Earning Shock by Industry 1/**
(In percent, interquartile range)

Sources: S&P Capital IQ; and IMF staff estimates.
1/ Interquartile range of changes in analysts' 12-month-ahead company earning forecasts for each industry between January 2 and June 30.

**9.** Meanwhile, we apply two separate shocks to the interest payment—the interest payment shock and the exchange rate shock. The exchange rate shock is set as the percent change of the bilateral exchange rate vis-à-vis the U.S. dollar between the end-2019 level and the projected end-2020 level in the October 2020 IMF WEO. The exchange rate shock is applied to the actual—not imputed—foreign currency-denominated portion of each firm's outstanding debt as of end-2019. The interest payment shock is set at 0, which is somewhat more conservative than the macroeconomic scenarios considered where interest rates are projected to decline slightly, and hence the only effective shock to the interest payment is the exchange rate shock (e.g., currency depreciation leading to higher FX debt interest payment in local currency terms). Specifically, the expected interest payment for firm *j* in 2020 would be given as follows:

$$INTP_{2020,j} = [FX\ debt\ share_{2019,j} \times (1+FX\ shock_{2020}/100) + local\ currency\ debt\ share_{2019,j}] \times (1+INTP\ shock_{2020}/100) \times INTP_{2019,j}$$

## Cash Flow Analysis

**10.** To estimate a firm's cash position at end-2020, we take the end-2019 stock of cash and cash equivalents and adjust for the expected changes in the cash flow in 2020. Specifically, we assume the end-2020 cash position of a firm to be determined as follows:

$$cash_{2020} = cash_{2019} + EBIT\ shock \times (cash\ flow\ from\ operations_{2019}) - capital\ expenditure_{2020} - debt\ amortization_{2020} + net\ interest\ payment_{2019} - dividend\ payment_{2020},$$

where

- $Capital\ expenditure_{2020} = 0.75 * capital\ expenditure_{2019}$
- $Debt\ amortization_{2020}$ = 10 percent of maturing debt (i.e. debt rollover ratio = 90 percent)
- $Dividend\ payment_{2020} = 0$

[3] Without this scaling factor, the ASEAN-6 median ICR value from Approach II would be much higher than the median ICR obtained from Approach I.

**11.** The operating income shock comes from the consensus earnings forecasts in Approach II. While the shock parameter values are somewhat arbitrary, they are set at plausible levels based on the sample data. In the case of capital expenditure (CAPEX), for example, the sample median value during the GFC in 2009 was about 80 percent of the level in 2008. In the case of the debt rollover ratio, we set it at 90 percent of the maturing debt, which is slightly lower than the median level observed in 2009 (about 100 percent) in the ASEAN-6 sample.[4]

[4] In normal times, the sample median rollover ratio is estimated at about 110 percent, implying a nominal debt growth of about 10 percent.

# FOREIGN EXCHANGE MARKETS AND INSTRUMENTS IN INDONESIA[1]

*This paper provides an overview of the foreign exchange markets in Indonesia and the foreign exchange policy instruments used by Bank Indonesia. It then examines the effect of forward interventions on liquidity conditions in the foreign exchange market and the value and volatility of the forward exchange rate. The paper also discusses considerations around the policy options for foreign exchange liquidity provision and the choice of instrument used.*

## A. Foreign Exchange Market in Indonesia: Recent Trends

**1. The size of the trading market for the Indonesian rupiah (IDR) has grown rapidly over the last decade, characterized by an increasing diversity of both instrument and counterparties**. Figure 1 shows that the average daily turnover of the Indonesian rupiah (IDR) has increased from US$4 billion to US$27 billion during the past decade (BIS, 2019). This development was accompanied by a concomitant increase in gross capital flows which grew by over 200 percent between 2007–2019.[2] While global FX turnover volumes have increased globally (BIS, 2019), Indonesia stands out in comparison with its peers, recording an increase of over 1,200 percent, similar to the increases for the Brazilian real and Indian rupee. In terms of the trading of IDR within Indonesia, it can be seen from Figure 1 that the two main FX instruments used for transacting in IDR, are FX swaps[3] and outright spot deals. The use of FX swaps has increased relatively over time and its trading volume exceeds that in outright forwards by a substantial amount. In terms of the counterparties for resident IDR trading, both financials and nonfinancial have gained more share market share and increased the volume of their trading.

**2. The market for IDR trading has most recently been dominated by activity in offshore markets**. Splitting the trading of IDR between onshore and offshore destinations reveals the strong growth of offshore trading venues. While trading was relatively evenly split between onshore and offshore destinations, a little over ten years ago, the gap in trading activity has since widened. Offshore trading now accounts for the bulk of IDR turnover volumes,

**Onshore and Offshore Markets for Indonesian Rupiah 1/**

| | 2007 | 2019 |
|---|---|---|
| Onshore (US$ billions) | 3.0 | 6.7 |
| Offshore (US$ billions) | 1.0 | 20.3 |
| Share of offshore | 0.2 | 0.8 |
| Nonresident participation | 12.8 | 38.6 |
| S.D. of ER | 170.30 | 123.90 |

1/ Onshore refers to IDR turnover in Indonesia; offshore is the difference between total IDR turnover and onshore turnover. Nonresident participation is measures as foreign owenrhsip of rupiah-denominated bonds as percent of the total.

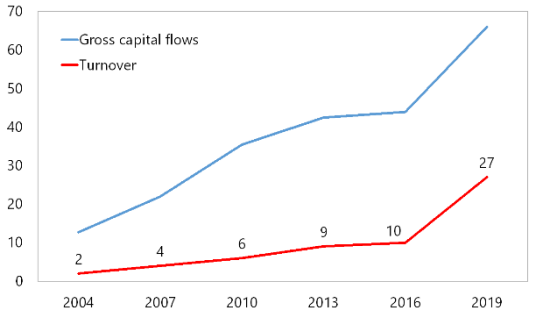
[1] Prepared by Manasa Patnam (EUR).

[2] In contrast, gross trade flows only increased by 34 percent in the same time period.

[3] An FX swap is an OTC derivative that comprises of a simultaneous spot transaction with an opposite forward contract. They are widely used by market participants to manage exposure to FX risk and undertake cross-border borrowing (BIS, 2016).

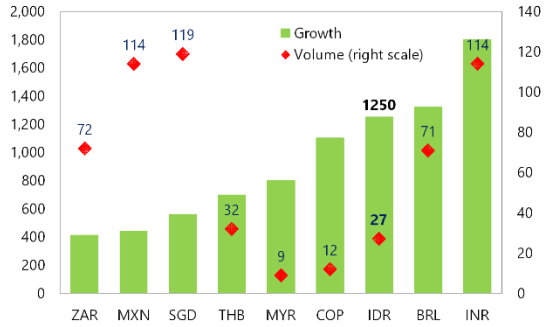
## Figure 1. Foreign Exchange Market Developments

**Indonesian Rupiah Average Daily Turnover and Capital Flows**
(In billions of U.S. dollar)



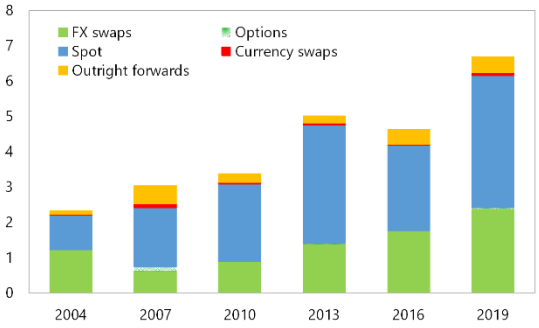

Sources: Bank for International Settlements; and Bank Indonesia.

**FX Turnover Volume and Growth**
(In percent growth 2004-2019 and 2019 daily volume in billions of U.S. dollar)



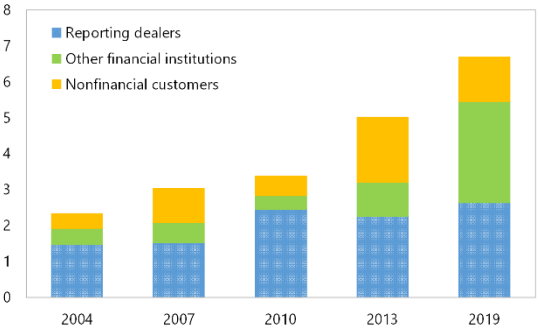

Source: Bank for International Settlements.

**OTC FX Turnover by Instrument in Indonesia**
(In billions of U.S. dollar)




Source: Bank for International Settlements.

**OTC FX Turnover by Counterparty in Indonesia**
(In billions of U.S. dollar)



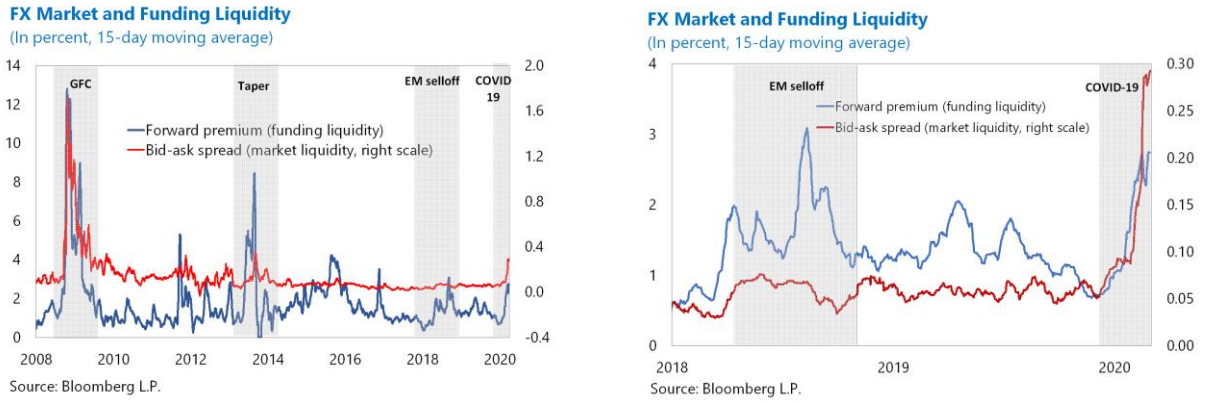

Source: Bank for International Settlements.

which has grown over six times. This development has been characterized by a three-fold increase in nonresident participation in the local bond markets which raises the need for hedging local currency holdings. At the same time the move to offshore trading venues did not contribute specifically to an increase in ER volatility which mostly declined over the period. This may reflect the development of infrastructure in the domestic money market and foreign exchange market, discussed later in the paper, which contributed to easing hedging pressures in the offshore market.

**3. FX funding and market liquidity pressures appear during periods of stress but have moderated substantially since the global financial crisis**. Figure 2 plots the price-based measures of FX market and funding liquidity, measured using the USD/IDR bid ask spreads (normalized by the mid-price) and the USD/IDR forward spread (using the three month non deliverable forward rate), respectively. The figure shows a spike in both measures, suggesting that funding and market liquidity decline sharply during episodes of stress, in particularly during the global financial crisis and taper tantrum episodes. However, pressures on funding liquidity have since then moderated. This mirrors the trend seen for other EM currencies in Asia-Pacific where the average bid-ask spreads has shown a trend decline over the past 15 years (McLaughlin, 2017). This could be

explained by several factors, including[4] (i) the changing role of traditional liquidity providers, with other financial institutions increasing their share as a supplier of FX liquidity (BIS, 2017); (ii) the rapid growth of the offshore trading market that has been attributed to lower transaction costs and thereby increasing liquidity (Patel and Xia, 2019);[5] (iii) participation of foreign intermediaries, leading to greater competition in their market (IOSCO, 2007); and (iv) improvements in technology (e.g., shift to online trading platforms) that have facilitated access to market participants. Despite these improvements, it can be seen from Figure 2 that the recent globalized market selloff following the outbreak of the COVID-19 pandemic resulted in a tripling of both market and funding liquidity measures.

**Figure 2. Foreign Exchange Funding and Market Liquidity**




## B. Foreign Exchange Instruments Used by Bank Indonesia

**4. Indonesia operates a flexible exchange rate regime**. Bank Indonesia's (BI) exchange rate policy is designed to mitigate excessive rate volatility, with a focus on moderating the rupiah's volatility and sustaining adequate market liquidity (Warjiyo, 2017). BI employs a variety of foreign exchange instruments to ensure the smooth functioning of both rupiah (IDR) and FX markets. In essence, there are three main FX instruments that BI deploys: (i) direct interventions in the spot interventions operationalized by buying and selling FX; (ii) simultaneous interventions in the spot and forward market through FX swaps operationalized mainly by selling rupiah in the spot market and selling FX in the forward market; and (iii) interventions in the forward market through selling non-deliverable FX forward settled in rupiahs. Table 1 provides an overview of the three instruments and the possible effects it may have on FX liquidity, ER value and volatility, BI reserves and demand for hedging. In terms of the size of the market, at end 2019, the outstanding stock of FX Swaps (DNDF) was US$1.5 (3.8) billion at end 2020:Q3, with total issuance of US$123 (58) billion. The

[4] An expansion of global liquidity could also help explain this trend. See Karnaukh and others (2015) on an overview of different global and domestic factors affect the demand and supply of FX liquidity.

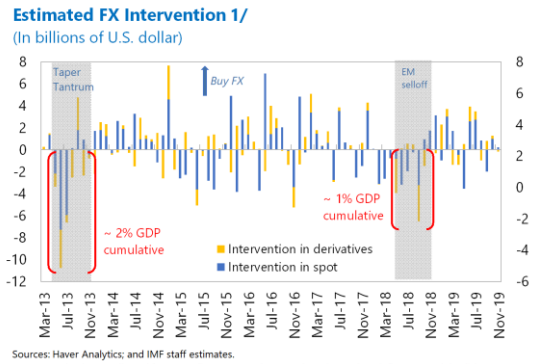
[5] The growth of offshore trading, while beneficial for liquidity, may still pose a challenge by influencing price discovery in the onshore market especially during times of stress.

average daily issuance for FX swaps and DNDF is US$290 million and US$98 million, respectively. This together represents about 17 percent of the onshore FX swap and outright forward market turnover respectively.[6]

**Table 1. Indonesia: Overview of Bank Indonesia FX Instruments**

| Instrument | Mechanism | Effects | | | | Other Countries |
|---|---|---|---|---|---|---|
| | | *Liquidity* | *ER Value/Volatility* | *Reserves* | *Hedge* | |
| FX Spot | Sell (buy) FX spot | FX & domestic liquidity | Reduce volatility and stabilize path of ER value | Loss (gain) | | Several |
| FX Swap | Buy (sell) FX spot and sell (buy) FX forward | Primarily domestic liquidity (also as a sterilization tool), possibly FX liquidity. | Could affect forward risk premia | No effect; only temporary purchase of FX | Yes | Australia, New Zealand, Switzerland (until 2011), Malaysia, India (since 2019) |
| DNDF: Currency Forward (settled in Rupiah and non-deliverable) | BI pays rupiah related to change in FX value | FX liquidity (if FX demand falls) | Can reduce volatility and stabilize path of ER value by affecting demand; reduce volatility from offshore NDFs | No effect as settled in rupiah | Yes, offsets valuation losses | Brazil, Peru, Turkey |

**5. The estimated size of spot interventions is sizeable during stress episodes, as proxied by the change in reserve holdings**. BI does not publish any data on direct interventions in the spot market. However, the change in reserve holdings net of valuation effects, suggests sizeable interventions in the range of 1–2 percent of GDP during stress episodes (Taper Tantrum and EM selloff). The total cost of holding reserves, i.e., the cost of rolling over the FX position is estimated at around 0.57 percent of GDP (monthly average, 2016–2020). On the other hand, the marginal cost of holding reserves i.e., the economic opportunity cost of increasing the central bank's



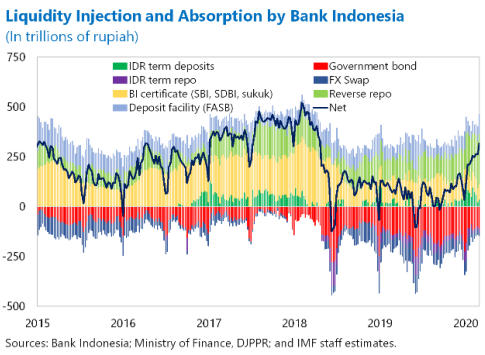
Sources: Haver Analytics; and IMF staff estimates.
1/ Intervention is not adjusted for FX outflows (e.g., FX loans & deposits) and FX inflows (e.g., debt disbursement, production sharing contracts of oil contractors, and tax in FX). Outflow data are more available than the latter.

[6] The BIS triennial survey available publicly does not provide a breakdown of offshore IDR volumes by instrument and counterparty.

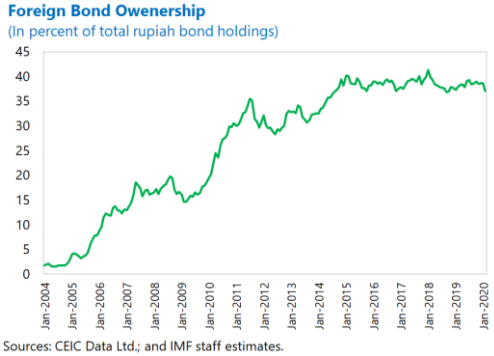
FX position is estimated to be 5 percent per unit (monthly average, 2016–2020) (see also Adler and Mano, 2018).

**6. FX swaps in Indonesia are used primarily as a domestic monetary operations instrument for open market operations for both liquidity absorption and injection**. On average, they represent approximately 25–35 percent of the total liquidity injection[7] together with bonds and term repos. The motivations for the use of FX swaps as a domestic monetary instrument vary. First, the market for repos in Indonesia is still relatively underdeveloped with high counterparty risks (IMF, 2017),[8] this encourages the use of FX as a collateral (instead of repos) for interbank borrowing. The availability of FX collateral is also boosted by the increasing presence of nonresident in the local bond market, who are willing to provide FX (mainly U.S. dollar) as collateral in exchange for rupiah to hedge their bond exposures. Second, fiscal discipline could have prevented the central bank from an excessive reliance on using government bonds to affect liquidity conditions.

**Figure 3. Foreign Exchange Swap—Hedging Needs and Rupiah Liquidity**

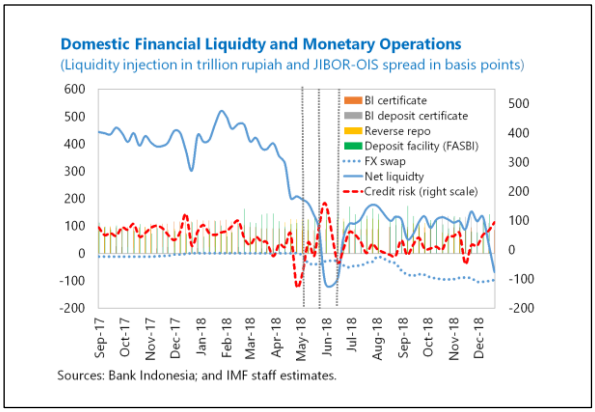



Sources: Bank Indonesia; Ministry of Finance, DJPPR; and IMF staff estimates.




Sources: CEIC Data Ltd.; and IMF staff estimates.

**7. FX swaps have been actively used to ease domestic monetary conditions**. For instance, during 2018:Q2 when interbank conditions deteriorated, the BI injected rupiah liquidity though (but not limited to) the use of FX swaps. In addition to meeting hedging demands




Sources: Bank Indonesia; and IMF staff estimates.

[7] The first Bank Indonesia FX swap auction was held on July 18, 2013, when BI offered an oversubscribed target of US$500 million on 1-, 3- and 6-month tenors. The BI reported that the FX swap auction contributed to strengthening the monetary operations in the management of foreign exchange and rupiah liquidity on the market and intended as a hedging instrument for investors and corporates (see BI communication 15/ 15 /DKom).

[8] For instance, no counterparty clearing provider currently exists. While the regulation for CCPs in place it may likely only be operational in 2023. The IMF FSAP (2017) had also recommended an improvement in the certainty and speed of execution of collateral and of bankruptcy proceedings that can enable greater use of the repo markets.

from nonresidents and providing adequate rupiah liquidity domestically, the use of FX swaps can also encourage portfolio flows, as the forward leg of the intervention (selling FX forwards) can lower forward premia. This aspect will be taken up in Section C of the paper.

**8. To provide alternative hedging instrument for banks and corporations, Bank Indonesia has recently started conducting non-deliverable forwards (DNDF) transactions**. The DNDF instruments, launched since November 2018, consist of an outright forward transaction with the net settlement paid out in local currency (the rupiah). The FX hedging needs supplied by the onshore DNDF markets has mostly been aimed at onshore banks and is neutral to the central bank's balance sheet as settlement is carried out in rupiahs. DNDFs have largely been issued at the 1-month tenor (3-month tenor has also been offered since February 2019). The DNDF market is dominated by onshore banks and liquidity is limited.

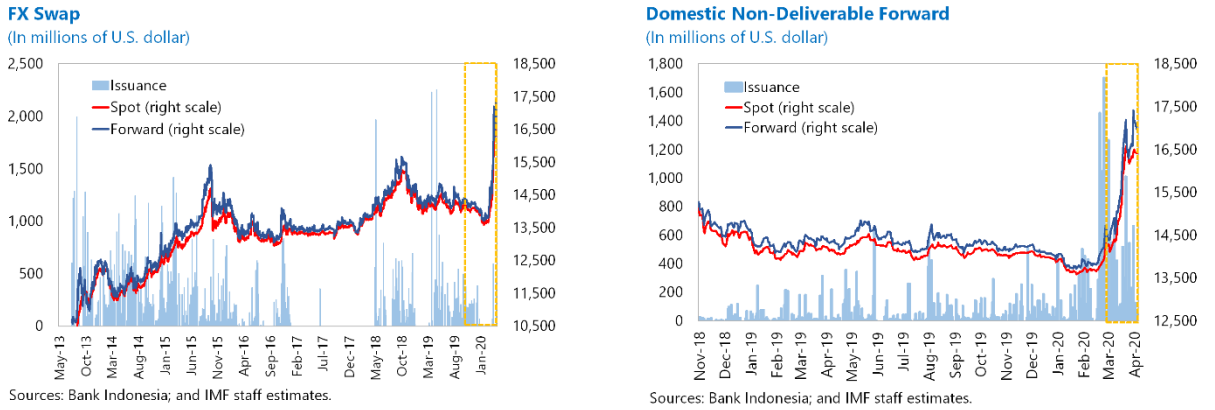
**9. The onshore pricing structure of the DNDFs differs from that of the offshore forwards limiting a full integration between the two markets**. The offshore NDF rate is mainly determined by a weighted average of 1-month NDF trades done by Singapore based brokers with no actual reference to the onshore spot at all. The DNDF market on the other hand, is fixed daily by BI (using the Jakarta Interbank Spot Dollar Rate), and the forward rate has typically been below that in the NDF market. The DNDF policy could be aimed at anchoring the rupiah stability by reshoring the non-deliverable forward transactions. However, the DNDF remains a tiny fraction of the NDF market, partly because participating in the DNDF market is more restrictive (documentation and exposure requirements). However, some of these restrictions have been eased following the outbreak of the COVID-19 pandemic and the ensuing global liquidity stress.

**10. There is some evidence of information spillovers and price-discovery between the onshore and offshore markets**. Among South East Asian currencies, the IDR is the most traded NDF (see Schmittmann and Han Teng, 2020). In this context, given that the offshore NDF market for IDR is active, there is some evidence of a one-directional spillover from NDF to both onshore spot and forward rupiah markets. Cadarajat and Lubis (2012) find an interdependence between volatility in the offshore NDF and onshore spot rate changes, and information transmission effects from NDF to forward rate changes.

**11. The issuance of FX swaps and DNDF in the forward market typically coincides with market stress episodes**. Figure 4 shows, the issuance amounts for both types of instruments, and as can be seen below, there are noticeable spikes in the volume of transactions conducted with these instruments during certain time periods. As an indicator the figure also plots the evolution of the forward and spot exchange rates. The recent market stress episode has seen the BI use more DNDFs compared to swaps, partly because of the nature of the stress which increased pressure on the exchange rate without necessarily affecting domestic liquidity conditions. Relative to the EM selloff episode when monetary policy was tightened (175 bps increase in interest rates), this episode has been accompanied by an easing of monetary policy. The pandemic outbreak also resulted in a severe outflow of nonresident capital, which also decreased the need for hedging and availability of FX collateral that may have limited the full use of FX swaps during this time.

**Figure 4. Foreign Exchange Swap and NDF**

(Since the time of initial issuance)




## C. Effects of FX Intervention Instruments on FX Liquidity and Forward Exchange Rate

**12. Empirical evidence from other emerging markets confirms the material effects of central bank interventions on both spot and forward exchange rates as well as liquidity**. Empirically, Kohlscheen and Andrade (2014) find that currency swaps have a material effect on the exchange rate and that auctions of contracts in which the Brazilian Central Bank offered to go short in foreign currency had larger effects than those in which it went long. For the same type of auctions, Chamon and others (2015) show that a program of pre-announced derivatives-based interventions was effective although it appeared not to affect exchange rate volatility. Nedeljkovic and Saborowski (2017) the impact of US$1 billion in the non-deliverable futures market moves the real/dollar exchange rate by about 0.7 percent and reduces volatility by 2.5 percent. While there are still limited studies on the impact of these interventions on FX liquidity, Domanski and others (2016) shows that an FX spot intervention has a significant impact on increasing FX market liquidity for Brazil, Peru, Russia, and Turkey.

**13. This paper examines whether forward interventions by Bank Indonesia, both using FX swaps and DNDFs, affect FX liquidity conditions and the movement of the forward exchange rate**. We use daily data on forward and spot exchange rates, bid-ask spreads, and daily issuance of FX Swap and DNDF. To measure FX liquidity, we construct two price-based indicators*: FX funding liquidity* based on the forward spread and *FX market liquidity* based on the spot bid-ask spread (see Banti and Phylaktis, 2015).[9] As FX swaps are essentially term loans of one currency collateralized with another currency, the interest rate implicit in FX swaps (i.e., forward spread) captures funding liquidity conditions (Krohn and Shushko, 2019). Market liquidity on the other hand measures the

[9] Funding liquidity is measured as the spread between the forward and spot exchange rates (IDR against the USD) normalized by the spot rates. Market liquidity is measured as the spread between the ask and bid spot rates (IDR against the USD) normalized by the mid-price.

cost of executing a FX trade and the market's ability to absorb large amount of trades without causing excessive price movements (see Karnaukh and others, 2015). A higher value on both measures indicates more illiquid market conditions. To assess how the FX interventions, affect FX liquidity, we use simple OLS regressions to understand the association between the use of FX swaps and DNDF, and specifically how they interact over stress episodes (proxied by the VIX volatility index).

**14. Both types of forward intervention instruments have been actively used**. Since the activation of the instruments (2013 and 2018 for FX swaps and DNDF respectively), there have been a total of 719 intervention days, with approximately US$150 billion of amounts issued. The average amount of daily issuance for FX swap and DNDF instruments is US$290 million and US$98 million, which together represents 17 percent of the daily onshore non-spot trading volume. Between the two instruments, DNDFs have gained more popularity with intervention carried out every other day.

**Forward Interventions Statistics 1/**

| | FX Swap | DNDF |
|---|---|---|
| Active since | Jul-13 | Nov-18 |
| Number of intervention days | 402.0 | 316.0 |
| Average (US$ millions) | 290.0 | 98.0 |
| Total amount (US$ millions) | 116.6 | 31.0 |
| Conditional probability, of intervention 1/ | 0.17 | 0.61 |

1/ Average intervention magnitudes exclude days on which no intervention occurred. Conditional probabilities are calculated as the number of reported interventions divided by the total days in the availablity period.

**15. FX liquidity pressures spike during period of global stress but have materially moderated since the global financial crisis**. In Table 2, left panel, we first document some stylized facts and correlate the liquidity metrics with stress episodes as well as the introduction and availability of the intervention instruments. Liquidity pressures have moderated through the various stress episodes, with the highest stress experienced during the global financial crisis followed by the taper tantrum episode. Comparing more recent episodes, both funding and market illiquidity appears to have risen during the COVID-19 crisis, which is a globalized shock, relative to the EM selloff period. The introduction and availability of the FX swap instrument is associated with higher FX liquidity (both market and funding) while the opposite appears to hold for the DNDF introduction and availability. This result should be interpreted with great caution as the crude dummies measuring the availability of the instruments, mask the actual amount and timing of the intervention and/or localized stress episodes, other than the major events.

**16. An examination of the timing and amount of interventions suggests that both DNDFs and FX swaps interventions are associated with lowering FX liquidity pressures during period of global stress**. In Table 2, right panel, we now use the VIX volatility index which is a continuous measure of global shocks and introduce variables measuring the amount of DNDF and FX swap interventions (measured in billions of U.S. dollar). The results show that FX liquidity tightens when the VIX rises i.e., when global stress emerges. The use of DNDF's and FX swaps, however, mitigate these negative effects on FX funding liquidity; an intervention to the size of US$250 million is associated with reducing VIX induced liquidity stress by approximately 18 percent and 27 percent for FX swaps and DNDF, respectively. The effects of these interventions on market liquidity is,

however, not significant. These results are robust to comparing interventions to similar period when the instruments were completely unavailable (i.e., dropping all zero issuance days when the instruments are available). DNDF interventions are also associated with reducing FX market illiquidity during times of stress.

**Table 2. Indonesia: FX Intervention Instruments: Effects on FX Liquidity**

**FX Liquidity during Stress/Intervention Episodes 1/**

| | Funding Liquidity | | Market Liquidity | |
|---|---|---|---|---|
| GFC | 3.131 *** | 3.399 *** | 0.53 *** | 0.519 *** |
| | (0.488) | (0.490) | (0.143) | (0.143) |
| Taper | 2.684 *** | 2.650 *** | 0.219 *** | 0.214 *** |
| | (0.485) | (0.472) | (0.053) | (0.053) |
| EM selloff | 0.132 | -0.211 | -0.050 *** | -0.048 *** |
| | (0.123) | (0.134) | (0.004) | (0.006) |
| COVID-19 | 1.072 *** | 1.111 *** | 0.116 *** | 0.155 *** |
| | (0.280) | (0.280) | (0.043) | (0.043) |
| DNDF available | | -0.383 *** | | -0.037 *** |
| | | (0.075) | | (0.005) |
| FX swap available | | 0.612 *** | | -0.013 * |
| | | (0.083) | | (0.008) |
| Constant | 1.326 *** | 1.058 *** | 0.099 *** | 0.11 *** |
| | (0.035) | (0.047) | (0.003) | (0.005) |
| Observations | 4844 | 4844 | 4844 | 4844 |
| r2 | 0.303 | 0.327 | 0.037 | 0.037 |

1/ Standard errors robust to autocorrelation (upto seven lags) and arbitrary heteroscedasticty in parantheses. The dependent variables are: Funding Liq. Is the forward spread while Market Liq. Is the spot market bid-ask spread.

**Effects of FX Intervention on FX Liquidity 1/**

| | Funding Liquidity | | Market Liquidity | |
|---|---|---|---|---|
| VIX (mean) | 0.139 *** | 0.142 *** | 0.017 *** | 0.017 *** |
| | (0.016) | (0.016) | (0.004) | (0.004) |
| VIX (spread) | -0.038 | -0.026 | -0.023 *** | -0.022 *** |
| | (0.062) | (0.063) | (0.008) | (0.008) |
| DNDF (US$ billions) | -0.053 | 4.328 *** | -0.062 | 0.216 ** |
| | (0.477) | (0.878) | (0.042) | (0.102) |
| FX swap (US$ billions) | 0.325 ** | 1.897 *** | -0.026 | 0.137 |
| | (0.145) | (0.697) | (0.034) | (0.101) |
| DNDF X VIX | | -0.151 *** | | -0.010 ** |
| | | (0.039) | | (0.004) |
| FX swap X VIX | | -0.105 ** | | -0.011 |
| | | (0.045) | | (0.007) |
| Constant | -1.898 *** | -1.998 *** | -0.126 | -0.133 |
| | (0.330) | (0.335) | (0.080) | (0.081) |
| Observations | 4843 | 4843 | 4843 | 4843 |
| r2 | 0.503 | 0.511 | 0.045 | 0.045 |

1/ Standard errors robust to autocorrelation (upto seven lags) and arbitrary heteroscedasticty in parantheses. The dependent variables are: Funding Liq. Is the forward spread while Market Liq. Is the spot market bid-ask spread. All specifications control for day of the week, month and quarter of the year and year fixed effects.

**17. We next analyze how the size and timing of the interventions can affect the value and volatility of the forward exchange rate, which is the target of both intervention instruments**. Again, we use daily data and a multivariate GARCH (1,1) model for estimation which can account for inter-day volatility clustering:

$$\Delta f_t = \alpha + \beta \Delta s_t + \gamma D_t + \theta SW_t + \rho VIX_t + \mu D_t * VIX_t + \omega SW_t * VIX_t + \epsilon_t$$

and,

$$\sigma_t^2 = \mu + \tau \sigma_{t-1}^2 + \varphi \epsilon_{t-1}^2 + \beta \Delta s_t + \gamma D_t + \theta SW_t + \rho VIX_t + \mu D_t * VIX_t + \omega SW_t * VIX_t$$

Where $f_t/s_t$ is (log of) the daily forward/spot exchange rate; $D_t$ and $SW_t$ are variables for the quantity or existence of a DNDF or FX swap intervention; $VIX_t$ is the volatility index. Note that we allow all the explanatory to affect both moments (mean and variance) of the forward return. The specification is analogous to that of event studies where we use the spot returns to proxy for the market portfolio i.e., the inclusion of this variable should capture any IDR specific pressures isolating only the effect of interventions that affect the forward rates directly and not spot.[10]

[10] This assumption is conservative and closes the price-discovery channel; in the presence of such effects the joint effects of intervention may be larger.

**18. Forward interventions have significant effects on reducing the volatility of the forward exchange rate but limited and insignificant effects on its value**. Table 3 presents results from the GARCH model estimation. It shows that, the un-interacted based effects of forward interventions are positive on both the value and volatility of the forward exchange rate. However, these results simply indicate that intervention and exchange rate volatility are often correlated, and it may be that volatility causes intervention, rather than the other way around (Dominguez, 1998). Our main coefficients of interest are, therefore, rather the effect of interventions during times of high volatility (as proxied by the VIX). Looking at the coefficients on the interactions of FX swaps and DNDFs with the VIX suggest that while both interventions are negatively associated with the value of the forward exchange rate (conditional on its correlation with factors that also move the spot rate), these effects are imprecise. However, in the conditional volatility equation for forward returns, the coefficient on the interactions of the DNDFs and FX swaps with VIX is negative and significant, which indicates that an increase in the size of the DNDF and FX swap intervention dampens the increase in the forward exchange rate volatility during times of stress. An intervention to the size of US$50 million is associated with reducing VIX induced volatility stress by approximately 65 percent and 21 percent for FX swaps and DNDF respectively. These volatility and illiquidity dampening effects must be placed in the context of the small size of Indonesia's onshore market (20 percent of the trading market) where interventions are carried out. Despite the small size of this market, the results suggest economically sizeable effects on offshore forward rates.

**Table 3. Indonesia: FX Intervention Instruments: Effects on Forward Exchange Rate 1/**

| | Mean | | Volatility | |
|---|---|---|---|---|
| Spot (Log returns) | 1.113 *** | 1.117 *** | 1.464 *** | 1.481 *** |
| | (0.023) | (0.023) | (0.275) | (0.254) |
| VIX (mean) | -0.000 | -0.000 | 0.056 *** | 0.063 *** |
| | (0.001) | (0.001) | (0.021) | (0.019) |
| VIX (spread) | 0.007 * | 0.007 * | 0.026 | 0.025 |
| | (0.004) | (0.004) | (0.045) | (0.039) |
| DNDF (US$ billions) | 0.096 | -0.097 | -2.777 | 2.150 |
| | (0.088) | (0.484) | (5.362) | (1.613) |
| FX swap (US$ billions) | -0.099 ** | 0.253 | 1.188 *** | 6.778 *** |
| | (0.049) | (0.314) | (0.400) | (2.236) |
| DNDF * VIX | | 0.009 | | -0.127 ** |
| | | (0.025) | | (0.062) |
| FX swap * VIX | | -0.022 | | -0.392 ** |
| | | (0.019) | | (0.158) |
| Constant | 0.085 | 0.077 | 1.052 | 0.222 |
| | (0.197) | (0.199) | (3.772) | (3.640) |
| Observations | 4843 | 4843 | 4843 | 4843 |

1/ Standard errors robust to arbitrary heteroscedasticty in parantheses. The dependant variable is the log return of the forward exchange rate (expressed as percent). All specifications control for day of the week, month and quarter of the year and year fixed effects.

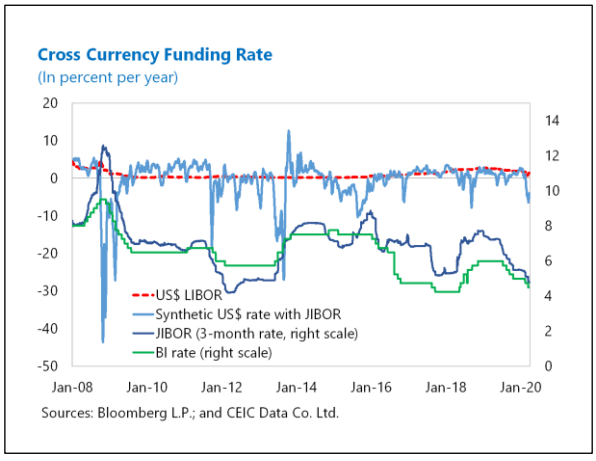
## D. Further Considerations on FX Forward Intervention Strategies

**19. Intervention involving FX forward markets can affect FX arbitrage opportunities**. Theoretically, Eaton and Turnovsky (1984) show that spot and forward market interventions have equivalent effects on the spot exchange rate in the absence of convertibility risk. However, if such risks are present, intervention in the forward market may no longer equally impacts the spot exchange rate. Walker (2019) shows that a forward intervention has asymmetric effects on the spot and forward rates, i.e., a change in the central bank's forward position has a greater effect on the

forward rate than on the spot rate. This implies that a central bank forward sale of U.S. dollar reduces the basis spread for given interest rates, reducing (increasing) the divergence from the covered interest rate parity if it is positive (negative). This can, in principle, encourage arbitrage trading during times of stress. Frankel and Froot (1990) and Taylor and Allen (1992) also show that the supply of currency swaps to the market provides an alternative for traders that are demanding currency for speculative or hedging reasons. This is especially the case if forecasters tend to extrapolate the exchange rate trends at short-term horizons; subsequently altering the supply of these contracts will ultimately affect the relative demand for foreign currency and therefore, also its price (see also Menkhoff and Taylor (2007) for a survey on the techniques used in the foreign exchange market).

**20. Central bank forward or swap-based intervention policies that affect the liquidity of FX markets may need to also take into consideration the impact on arbitrage opportunities**. Absent counterparty risk, the Covered Interest Parity (CIP) is a pure no-arbitrage relationship that equates the premium of a currency's forward over its spot exchange rate (both rates expressed as the price of foreign currency) to its nominal interest-rate advantage over foreign currency. Under CIP, the direct dollar rate should be equal to synthetic dollar interest rate from the swap market obtained by swapping the foreign currency into U.S. dollar (Du and others, 2018). In principle, if CIP does not hold, arbitrage opportunities are opened for investors to make profits. For instance, when synthetic dollar rates are cheaper than direct dollar rates, and the CIP deviation is positive, an arbitrage strategy of funding in the synthetic dollar risk-free rate and investing in the direct dollar risk-free rate would yield an annualized risk-free profit. Under these circumstances, any intervention that reduces the forward premium could, in principle, narrow the (positive) CIP divergence and reduce arbitrage opportunities. On the other hand, the same intervention could also widen a negative CIP divergence, when synthetic rates are higher than direct rates, increasing arbitrage opportunities.

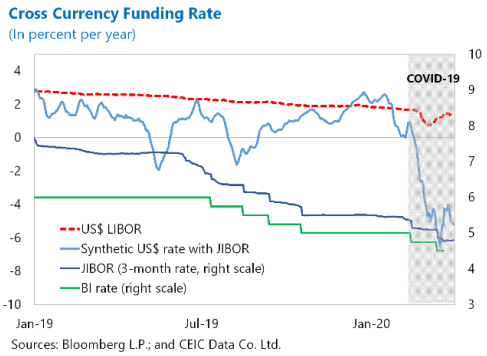
**21. CIP deviations typically appear during periods of stress but can persist in the aftermath**. Broad covered interest parity deviations emerged among advanced countries—which have deep FX forward markets—during the GFC due to the counterparty concerns that emerged during that period. Unlike in previous crises, covered interest parity deviations—at times larger, at times smaller—continued well after the GFC, and even for potentially virtually riskless transactions (Du and others, 2018; Cerutti, Obstfeld, and Zhou, 2020). Large changes in risk appetite and counterparty risks are factors that might explain (partially or fully) persistent deviation



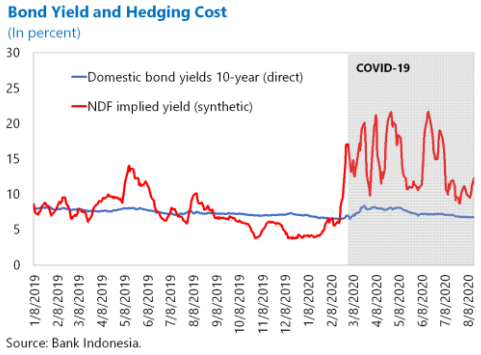
CIP in markets.[11] In Indonesia, during the onset of the GFC, the domestic liquidity conditions were such that the synthetic dollar rates turned negative and it was possible for banks to earn substantial risk-free arbitrage gains by borrowing in IDR and investing in dollar (see also ¶21 and text figure which shows increased capital outflows around the same period).[12] This held despite the fact that the JIBOR interbank borrowing rates were almost six times the LIBOR rates, suggesting that the main source of profit was the expected Rupiah depreciation (annualized 25−35 percent in the 2008:Q4). Since the GFC, the CIP deviations in Indonesia have narrowed but continue to re-appear during other acute stress episodes without fully closing after opening up, possibly from various limits on arbitrage.

**22. CIP deviations also widened during the COVID-19 crisis reflecting an increase in funding liquidity pressures**. CIP deviations are influenced both by a change in the FX funding pressures (as measured by the forward premium) and the relative interest rate differential. An increase in the forward premium, implicitly an increase in the cost of hedging, could widen the CIP deviation in the absence of similar movements in the relative interest rate differentials. These deviations can in turn reduce investors' hedge-adjusted returns as they imply, for instance, an increase in the volatility of domestic bond investments without a concomitant increase in returns (see Sushko and others, 2016 who show that the CIP deviation can be proportional to such strategic hedging demands). As an illustration, Figure 5 plots, both, the synthetic dollar (left panel) and local

**Figure 5. COVID-19 Crisis: Cross-Currency Funding Rates and Hedging Cost**




Sources: Bloomberg L.P.; and CEIC Data Co. Ltd.




Source: Bank Indonesia.

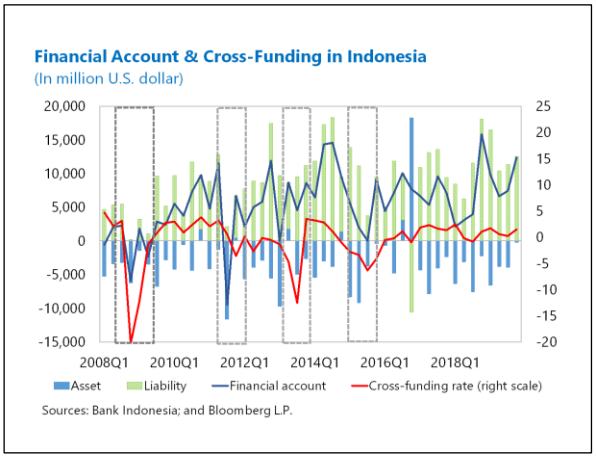
currency (right panel) rates in relation to their direct rates. It can be seen that during the COVID-19 crisis, the CIP deviations, obtained by comparing the direct and synthetic dollar rates, turned negative such that it was more profitable to fund in the synthetic dollar risk-free rate and invest in the direct dollar risk-free rate. Conversely, a hedging-based investment strategy into domestic

[11] Cerutti, Obstfeld, and Zhou (2020) highlight that the sudden appearance of deviations in CIP for small advanced countries –which have developed FX future markets–after the GFC could be signs that domestic actors may be able to borrow or lend synthetically in domestic currency at a rate that is different from the domestic central bank rate, but dependent on Fed policy.

[12] This held for bank that had access to both JIBOR and LIBOR rates. In practice the exact magnitude of arbitrage gains depends on regulatory limitations and access to borrowing facilities.

bonds offered lower risk-adjusted returns during the same period, when the synthetic domestic yields became higher than the direct domestic yields, signaling an increase in the volatility of holding such investments (see Borio and others, 2016).[13] These deviations persisted for several months after the COVID-19 pressures on financial markets eventually dissipated.

**23. Such pricing issues around obtaining FX during times of stress could put further pressure on capital flows**. For instance, in 2008:Q2 at the onset of the Global Financial Crisis (GFC), the synthetic dollar rates turned negative and there was an increase in the acquisition of external financial assets and some reduction in capital inflows. This was also experienced in other episodes where the synthetic dollar rates fell sharply (gray dashed box in text figure). As mentioned earlier, such a pattern can be consistent with (i) arbitrage trading where banks can take advantage of the cheap rupiah liquidity to invest abroad for short-term profits, and, (ii) lower returns from a hedging-based investment strategy into Indonesia relative to direct dollar investment opportunities that could contribute to reducing the inflow of capital. Several papers document the same types of developments in other emerging economies. For instance, this was also the case for Russia (IMF, 2013) which risked a currency crisis from highly accommodative monetary conditions.[14] Jacome, Sedik, and Townsend (2011) also note that monetary loosening and unconventional monetary policy in Latin American counties during financial distress fueled capital outflows, increasing the probability of a currency crisis.




## E. FX Intervention During Crises

**24. Other than benefitting from FX swap lines with the Fed, which few countries could access, several emerging market economies set up various types of foreign exchange easing measures in response to crises**. The most common FX easing measures employed is the direct supply of FX through FX swaps and lowering the macroprudential limits relating to foreign currencies; a few unconventional measures also include expanding the scope of counterparties to include nonbanks for the provision of FX.

- *GFC:* Ishi, Stone, and Yehoue (2009) document that during the GFC many central banks eased the terms of existing foreign exchange facilities (extending maturities, broadening collateral,

[13] See also Schmittmann and Han Teng (2020) for an analysis on NDF pricing and how the increased cost of hedging from local currency bond investments could prompt non-resident investors to sell bonds. During stress episodes, the authors document that, for Indonesia the implied yields in the onshore and offshore markets differed by around +/- 50 percent, registering the largest dispersion among peer Asian economies.

[14] See also Ishi, Stone, and Yehoue (2009) who reference news reports suggesting that some Russian banks used the cheap Ruble liquidity to invest abroad and profit from depreciation.

etc.) and introduced new foreign exchange liquidity facilities (dollar repo and swap facilities). In some countries, counterparties were widened, to include nonbank financial institutions and key nonfinancial institutions (e.g., exporters or energy importers). Foreign exchange liquidity limits were relaxed, including by removing the ceilings on bank purchases of offshore foreign exchange and easing capital inflow limits. A few countries also transferred foreign currency deposits held overseas to domestic banks, guaranteed foreign exchange liabilities of banks and exporters, and lowered taxes on foreign exchange transactions. Furthermore, some central banks lowered the required reserve ratio for bank foreign currency liabilities and shifted the currency structure of required reserves away from foreign exchange.

- *COVID-19:* Given the buildup of dollar funding pressures, many central banks have already introduced FX provision measures. So far, these include lifting levies on non-deposit liabilities of FIs in FX (Korea), lowering the FX liquidity coverage ratio (Korea), foreign currency sales from proceeds of the wealth funds (Russia), expanding the list of foreign currencies acceptable as FX reserves (Chile, Russia), sale of FX through FX swaps or dollar repos (Chile, India, Russia, Mexico, England, Australia), lowering FX reserve requirement ratios (Turkey, Indonesia).

## F. Summary and Policy Implications

**25. The main points from the analysis in this paper are the following**:

- The FX market in Indonesia is large and active having grown considerably since the GFC. This market is dominated by offshore trading activity. In terms of onshore activity, the market has become more diversified and the use of FX swaps has gained prominence.

- BI uses a variety of different instruments to intervene in FX markets. Other than direct intervention in the spot market, they use FX swaps (considered a domestic OMO tool) and non-deliverable forwards (DNDFs). The daily size and frequency of interventions is nonnegligible; for instance, DNDF are carried out almost every other day and the total daily volume of interventions together represent 17 percent of the onshore non-spot trading volume.

- There is suggestive evidence that interventions in the forward market are easing pressures FX liquidity and forward exchange rate volatility. In terms of the choice of instruments, DNDFs can alleviate pressures on both funding and market liquidity although FX swaps have similar effects on funding liquidity. Both interventions have some effects on reducing forward exchange rate volatility (over and above the spot) during stressed times, with this effect relatively larger for FX swaps. However, the use of FX swaps must be balanced considering its simultaneous effects on domestic liquidity expansion as well as the supply of dollar collateral in episodes of stress.

- A highly accommodative monetary stance can open arbitrage opportunities that can potentially put further pressure on capital flows. As seen during the GFC, the synthetic dollar funding rate turned negative (and much lower than the direct dollar rate), which may have induced further outflows based on short-term, arbitrage-based profit seeking. On the other hand, the increased uncertainty and counterparty risks that are prevalent on those episodes.

- Identifying the nature of a shock is important when evaluating the courses of action. For instance, the GFC was a financial crisis stemming from endemic vulnerabilities in the financial sector of advanced countries; the EM selloff and taper tantrum episodes were localized at the EM level and derived mainly as a consequence of the U.S. monetary tightening. Instead, the COVID-19 shock has materialized more as a global shock, with markets undertaking a generalized sell-off at the peak of level of uncertainty during March and early April, but a more heterogenous recovery afterwards.

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# DIGITALIZATION: A SAFE PATH TO A MORE INCLUSIVE RECOVERY IN INDONESIA?[1]

*There are two key longstanding structural constraints to inclusive growth in Indonesia—low financial inclusion and limited access to finance—resulting in a large financing gap. Indonesia's digitalization—growing rapidly in the e-commerce and financial services sector, the latter facilitated by fintech—is helping close this gap. The COVID-19 pandemic will likely serve to further accelerate this digital transformation: adoption of e-commerce and digital payments has increased amidst lockdowns and social distancing. Digitalization can also help counter the impact of the COVID-19 crisis, including through the delivery of government support measures, and support longer-term growth. However, attempting to scale up digitalization quickly as a response to a crisis, is not merely challenging but also potentially risky (e.g., risks to financial stability or cyber risks). Hence, important challenges need to be addressed first (e.g., infrastructure, skills, regulations) to ensure an inclusive and stable recovery.*

## A. Introduction

**1. This chapter explores the opportunities and risks associated with an expansion of digitalization in Indonesia during and post the COVID-19 crisis**. It addresses the following key questions: how is digitalization evolving in Indonesia and how does this compare to other economies? What is the economic impact of digitalization, and its associated risks? And finally, what are the key challenges to its expansion, and how can digitalization be safely harnessed to mitigate the economic impact of COVID-19 and in supporting an inclusive and stable recovery in Indonesia?

**2. The sections are organized as following:** Section B provides an overview of the gaps in financial inclusion and access to credit in Indonesia, and the potential opportunity it presents for digital market penetration; Section C lays out the recent development and trends in digitalization in the economic and financial sectors of Indonesia both before and during the COVID-19 crisis; Section D analyzes the impact of digitalization in closing Indonesia's financing gap; Section E estimates its impact on economic growth; key challenges and risks to the expansion of digitalization in Indonesia are identified in Section F; and finally, Section G concludes with related policies that should be prioritized.

## B. Opportunity for Digitalization: Gap in Financial Inclusion and Bank Financing

**3. Notwithstanding progress made in recent years, financial inclusion and access to credit in Indonesia remain low** (Figure 1). Almost half of the population in Indonesia is still without a bank account, and close to 6 percent of the global unbanked adults reside in Indonesia. The ratio of bank credit to GDP remains low at 35 percent, compared with 60 percent of GDP in mid-1997. In 2017, a mere 17 percent of Indonesians borrowed from a formal bank or microfinance institutions,

[1] Prepared by Purva Khera (APD).

while 36 percent borrowed from informal sources (family, informal money lenders or other sources).[2] The World Bank (2017) finds that the small size of the banking system, weaknesses in the legal and institutional environment, high market power and limited competition, and operational inefficiencies contribute to weak bank intermediation efficiency, thus holding back financial inclusion.[3]

**4. A large financing gap in the micro-, small- and medium-sized enterprise (MSME) sector has contributed to Indonesia's low productivity and competitiveness**. There are about 63 million MSMEs in Indonesia (which account for 99 percent of all firms in all economic sectors),[4] accounting for 97 percent of employment and contributing close to 60 percent of the country's GDP; the highest economic contribution amongst ASEAN countries. On the other hand, the size of MSME loans remains amongst the lowest, after Philippines: only close to one-fifth of bank loans are to MSMEs.[5] Notwithstanding several government initiatives,[6] a large share of MSMEs, more than 70 percent, lack access to credit, where bank loans only make up 6 percent of MSME funding sources (World Bank Enterprise Survey). Banks mainly provide collateralized loans to large NFCs creating a financing divide between large and small firms: the MSME financing gap is estimated to be US$165 billion, which equates to approximately 19 percent of Indonesia's GDP in 2017 (International Finance Corporation, 2017). This has contributed to their low competitiveness and productivity, and their low share in of non-oil and gas exports (about 15 percent).

**5. Low financial inclusion and access to credit will likely exacerbate the adverse impact of the COVID-19 shock on lower income population and MSMEs** (Figure 2). While the pandemic is affecting both larger and smaller firms, the impact on MSMEs is especially severe, because of higher levels of vulnerability and lower resilience related to their size.[7] According to a recent ADB survey, around 75 percent of Indonesia's MSMEs reported a lack of working capital as the main concern to retain their business during COVID-19. Despite several new government schemes targeting MSME working capital needs, getting credit from banks to cope with the COVID-19 shock was limited: only 1 percent of MSMEs surveyed state that they borrowed from banks. On the other hand, a larger proportion utilized nonbank financial institutions and digital finance platforms for working capital loans.

**6. Digitalization holds great promise in overcoming some of Indonesia's abovementioned structural constraints**. The digitalization of the economy and finance opens up

[2] 2017 World Bank Global Findex database.

[3] Net interest margins, a commonly used measure of bank intermediation efficiency, are structurally higher in Indonesia than many other emerging market economies.

[4] More than 98 percent MSMEs are micro enterprises.

[5] 70 percent of the loans constitute working capital loans and the remining is for investment purposes.

[6] The government established the People's Business Loan (KUR) program in 2007 to enhance access of MSMEs to bank loans through the provision of subsidized, partial credit guarantees covering 70 percent of the loss. Under the program, the government provides interest subsidies to participating banks, allowing them to lend to MSMEs at capped interest rates.

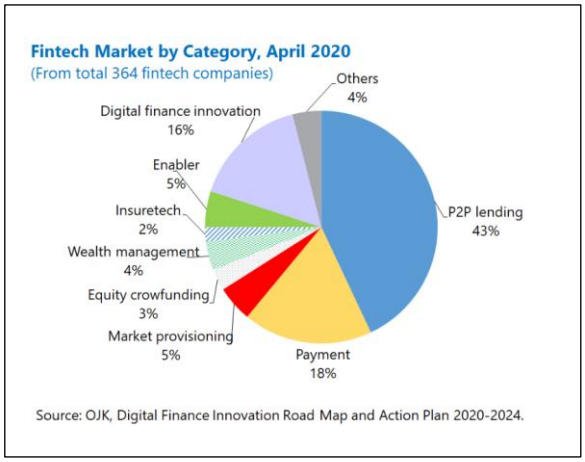
[7] SMEs may have less resilience and flexibility in dealing with the costs the COVID-19 shocks entail. Costs for prevention as well as requested changes in work processes, such as the shift to teleworking, may be relatively higher for SMEs given their smaller size, but also, in many instances, the low level of digitalization and difficulties in accessing and adopting technologies.

opportunities for economic and financial inclusion: for instance, it offers a promising channel to overcome Indonesia's geographical barriers, the most often cited reason for not having a financial account, and promote access to financial services in remote areas where the physical presence of traditional financial institutions is absent. Digital technology also helps overcome other challenges that traditional financial institutions face in extending financial services—such as by lowering the cost of financial services by lowering operational costs and using the digital track record in payments combined with big data analytics to assess borrower creditworthiness to provide quick short-term uncollateralized loans.[8] It also helps increase competition in the financial system, thus contributing to higher efficiency of credit intermediation. Moreover, digital innovation though online commerce encourages business competition, and increases the diversity of services and products that can increase society's economic participation.

**7. Moreover, digitalization has taken on added value during the COVID-19 crisis across the globe**. With lockdowns and social distancing, digitalization is already helping Indonesia mitigate the economic fallout—through telework, online consumption, continued access to financial services, while also allowing the government to disburse funds to those most in need.

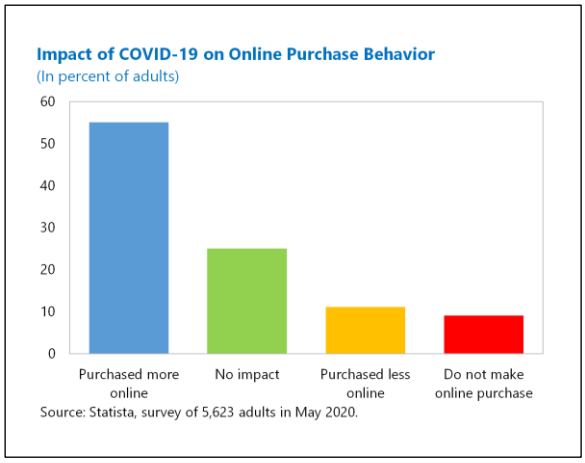
## C. Recent Developments in Indonesia's Digital Economy

**8. Indonesia's digital landscape—mainly concentrated in e-commerce and in digital financial services (DFSs)—has expanded rapidly in recent years**. Technology is transforming Indonesia's financial sector landscape. First, traditional incumbent financial institutions are adopting new technologies, thus affecting the financial services they offer. Second, technology companies entering the financial services space, i.e., fintech firms, are sometimes competing with, but also increasingly collaborating with traditional incumbent financial institutions. The major clusters of digital financial innovation in Indonesia are digital payments, digital banking and peer-to-peer (P2P) lending. Adoption of digital payments is in turn supporting the rapid growth in e-commerce. As of end-2019, there were more than 200 e-commerce players and more than 350 fintech players.



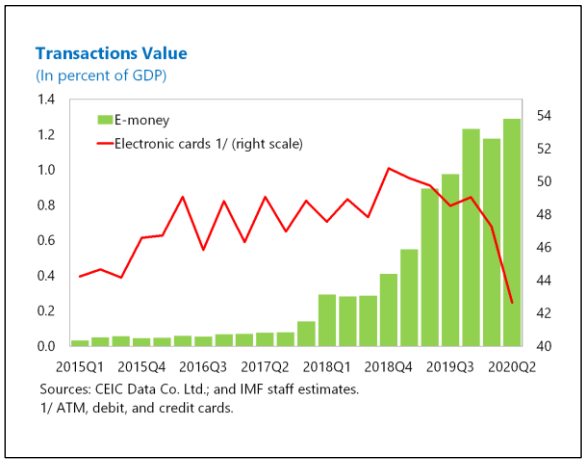

[8] MSMEs are still considered by commercial banks as risky and costly to serve, and often lack access to collateral, and credit history. From the demand side: long processing time for loan application, banks reluctance to provide short-term loans, and lack of financial literacy are the key drivers.

**9. The COVID-19 outbreak has seen Indonesia's e-commerce sector surge**. Indonesia has witnessed strong growth of online commerce in recent years (Figure 3). From 2017 to August 2019, e-commerce transactions grew by 137 percent (CAGR), and the penetration of e-commerce users, i.e., the share of population that make online purchases, increased to 44 percent in 2019 from 35 percent in 2018 (Statista, Redseer). While total retail sales have declined during the pandemic (with the sharpest decline in May at −20 percent y/y), there has been a shift towards online purchases. For instance, according to a recent study by Bank Indonesia (BI), transactions at the four largest e-commerce sites in the country is estimated to double to US$29 billion in 2020 from US$14 billion in 2019.




**10. Rapid growth in e-commerce is supported by digital payments services, which is an active market for fintech e-money issuers with a few dominant players** (Figure 3). While ATMs and debit cards continue to grow and dominate noncash transaction values and volumes, e-money transaction values are growing rapidly: it increased by 114 percent between 2015 and 2019, while transaction volumes increased by 91.4 percent. Close to one-third of e-commerce purchases are made through the use of mobile and online payment platforms by fintech firms. There is presence of a few key dominant domestic nonbank players in Indonesia's digital payments market—Gopay, OVO, DANA and LinkAja—which are the most widely used e-money services.

**11. The adoption of digital financial payments has accelerated further during the pandemic.** Despite the slowdown in economic activity, e-money transactions and digital banking transaction values maintained strong growth at 14.3 percent (y/y) and 30.3 percent (y/y), respectively in May 2020 (although they have declined more recently to 14.8 percent and 2 percent, respectively in October 2020). On the other hand, electronic card transaction (debit, credit and ATM cards) values have declined.




**12. E-commerce and digital payments services are evolving into digital lending**. Indonesia's largest fintech sector is the digital nonbank P2P marketplace lending:[9] at the end of October 2020, there were 155 registered P2P lending firms (144 firms are conventional and 11 are sharia lenders)

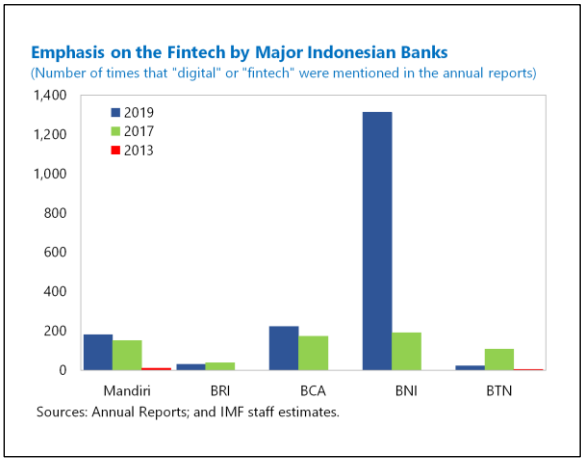
[9] Marketplace lenders directly connect lenders to borrowers, do not hold assets on their balance sheet, and add value simply by being the matchmaker and by facilitating risk assessment. P2P lenders in Indonesia are not allowed to provide on-balance sheet loans, to prevent fintech companies from directly competing with existing banks and financing companies.

with total assets of IDR 3.4 trillion, out of which 36 have been licensed by OJK. In addition, there are 3 licensed equity crowdfunding platforms,[10] and 86 digital financial innovation organizers (IKD).[11] The expansion of "alternative data" generated by the e-commerce and digital payments platforms is being used by these digital lenders to identify creditworthy clients and helping increase access to loans, particularly for those who are not included in the credit registry.

**13. Fintech lending remains small but was growing at a rapid pace prior to the COVID-19 crisis** (Figure 4). The accumulation of P2P loans in Indonesia grew at more than 230 percent (y/y) to IDR 88.4 trillion in January 2020, and total outstanding P2P loans stood at IDR 13.5 trillion in January 2020, with an increase of 137 percent (y/y). The volume of P2P lending remains small, however, at less than 0.1 percent of GDP, hence not having any systemic relevance so far.

**14. The COVID-19 shock has led to a scaling down of new P2P lending by fintech firms in response to weak demand and a focus on preserving liquidity and managing credit risks**. Outstanding P2P credit has declined by 8 percent since December 2019, in line with a decline in overall bank credit growth. This is because much fintech lending has targeted small borrowers, who are likely to be disproportionately affected in the ongoing crisis, and hence may see a sharp rise in credit costs (see Section D).

**15. Digitalization is also advancing in the traditional financial sector, and will likely accelerate further with COVID-19**.[12] Indonesian banks continue to dominate in deposits and lending. Facing competition from the strengthening of fintech's role in providing payment services, Indonesian banks are increasing their digitalization efforts to raise efficiency, improve service, attract new customers and build loyalty in their existing customers (McKinsey and Company, 2019). Some larger banks have launched digital transformation plans to cater to the shifting of customer preferences towards electronic platforms such as mobile and away from traditional branches, and their increased focus on technology is apparent in their annual reports (see text figure). This trend could be further strengthened as they adopt to lockdowns and social distancing measures to contain the COVID-19 pandemic.




**16. Banks are responding to this competitive pressure by increasingly collaborating with and investing more in fintech**. Indonesian banks and multi-finance companies are increasingly

[10] The promotion of equity crowdfunding in Indonesia has been slow due to low levels of digital financial literacy, and lack of awareness among SMEs, who have not understood what equity crowdfunding entails.

[11] IKD operators provide "innovative" financial products and services which represents a new business process or model, activity, enhancement or efficiency which provides value to the digital financial services ecosystem.

[12] Current regulations allow traditional brick-and-mortar banks to offer digital products and services, but they do not allow for a completely "virtual/digital bank."

investing funds in P2P lending platforms, as they look for new distribution channels to connect to MSMEs and reduce costs of credit assessment by outsourcing such activities to fintech platforms.[13] On the other hand, fintech lending platforms are looking to collaborate and partner with traditional financial institutions to gain access to a larger capital base to cater to the demand of borrowers. This is because P2P lending platforms in Indonesia are not allowed to provide on-balance sheet loans, to prevent fintech companies from directly competing with existing banks and financing companies, and hence banks and multi-finance companies have become one of their funding sources.

**17. However, the digital transformation in the banking sector is relatively slow and lags fintech development**. A BI survey (2018) of banks in Indonesia showed that the majority of banks are still at low levels of digitalization (IT development level), and not a single bank had succeeded in adopting biometric verification, blockchain, big data analysis, or artificial intelligence. Legacy systems and lack of technically skilled staff are the main obstacles for banks to transform. For small banks, high investment costs are also an obstacle, leading to a digital divide amongst the large and small banks, where the former (BUKU 4 and 3) are more digitally enabled.

## D. Is Digitalization Helping Fill the Gap in Financial Inclusion and Access to Financing?

**18. To assess the impact of digitalization in payments on financial inclusion, we use a new measure of digital financial inclusion introduced in** Sahay and others (2020). The "digital" financial inclusion index aggregates financial inclusion facilitated by digital payment services provided through mobile phone and the internet, combining indicators of both access and usage. On the other hand, they also compute a "traditional" financial inclusion index which captures financial inclusion driven by access to and usage of traditional financial services provided by banks (including debit cards). Their sample covers 52 EMDEs and spans the period 2014–17.

**19. Digital financial payment services have led to an increase in Indonesia's level of financial inclusion in recent years, mainly driven by widespread access to DFSs agents** (Figure 5). Indonesia's improvement in financial inclusion between 2014–17 is driven by both digital and traditional financial services. The access and usage sub-components of the digital financial inclusion index indicate that increase in digital financial access has played a key role: rapid growth in access to DFSs agents, with over 500,000 agents across the country as of June 2020, high mobile subscription and improvements in internet penetration are the main drivers leading to an increase in digital financial inclusion.

**20. However, the usage of digital financial payments remains considerably lower than in peers, leaving opportunity and room for improvement**. Usage of mobile and internet banking transactions remains low, both in volume and value. Low usage stems from low levels of financial and digital familiarity (two-thirds of the population was financially illiterate as of 2019) and small base of current internet users (see Section E).

[13] For individual investors, participating or lending through a P2P platform can allow them returns of up to 10 percent, substantially higher than the prevailing bank deposit interest rate hovering around 7 percent.

**21. At the same time, digital lending, facilitated by fintech, is helping fill the gap in MSME financing** (Figure 6). The majority of fintech borrowers are MSME-focused, i.e., extending credit to MSME clients largely for operational use, such as working capital loans, and only a small portion is consumer-focused. Business loans constitute more than 85 percent of total fintech loans.[14] Demand for P2P borrowing has increased fourfold between 2018 and 2020: the number of accumulated/active fintech borrowers in September 2020 are at close to 29.2/9.3 million.

**22. Fintech lending is complementing the services provided by traditional financial institutions**. Regions with higher access to bank loans tend to have higher P2P lending. However, traditional financial institutions focus on big clients and larger collateralized loans of longer duration, whereas the loans provided by fintech companies are mostly small, uncollateralized, of short duration, and to small clients.[15, 16] Fintech lenders instead compete directly with informal money lenders, microfinance institutions, and small banks.

**23. There is a regional divide in fintech and bank lending activity, which is geographically concentrated in Java**. Although the fintech lending sector is growing rapidly, the number of borrowers from outside Java, where the majority of Indonesians live, is considerably smaller than those from Java, with the latter accounting for close to 85 percent of the fintech lending. The uneven growth rates have been attributed to Java's larger economy, higher financial literacy levels, and inadequate information and communications technology (ICT) infrastructure outside Java (Batunanggar, 2019).

## E. Economic Impact of Digitalization—Can Digitalization Support Indonesia's Post-COVID-19 Recovery?

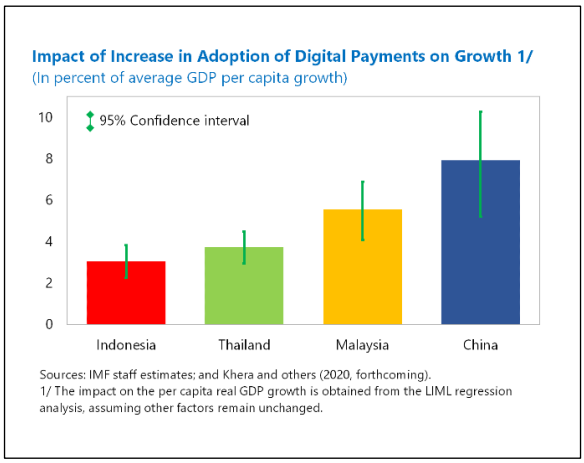
**24. Digitalization has the potential to influence economic outcomes through higher productivity and employment**. According to McKinsey and Company (2016), digitalization could expand Indonesia's economy by 10 percent by 2025 and add 3.7 million jobs, where the economic gain would materialize mostly through a combination of higher productivity and labor inputs. Kinda (2019) finds that firms engaged in e-commerce in Indonesia, are at least 30 percent more productive and export at least 50 percent more on average. A recent study by ADB estimates that improvement in productivity through adoption of digitalization, robotization and artificial intelligence technologies could add an additional accumulated growth of 11 percent of GDP during the period 2020−40 (Asian Development Bank, 2020).

[14] Consumer loans have been more prevalent in developed countries with a mature consumer credit market.

[15] The average duration of loans from P2P lending platforms span from 10 days to one year.

[16] See https://www.ojk.go.id/id/data-dan-statistik/research/working-paper/Documents/WP-18-03r.pdf.

**25. Moreover, it is also associated with higher economic growth through digital financial inclusion** (Sahay and others 2020 and Khera and others (2020, forthcoming)) Analysis conducted using data prior to the COVID-19 crisis indicates that an increase in Indonesia's adoption of digital financial payments to the level in China could raise Indonesia's real GDP growth rate by 5 percentage points. This is based on an instrumental variable regression approach, which relates the usage of DFSs to average growth over the period 2011–18 using data for 52 emerging and developing economies. To establish causality, access to mobile money agents and access to the internet are used as instrument variables to control for the simultaneity bias and to extract the exogenous components of digital financial usage.[17]




**26. Thus, digitalization can play a vital role in mitigating the economic impact of the COVID-19 pandemic, and support Indonesia's recovery**. It has provided more resilience by: (i) enabling firms and workers to maintain some operations during the COVID-19 lockdowns; (ii) supporting consumption through online purchases amidst social distancing; (iii) ensuring continued access to financial services, particularly digital payments; (iv) facilitating delivery of government social assistance disbursements; and (v) with decline in credit availability from traditional financial institutions, fintech is providing alternative sources of financing for small businesses and borrowers in some regions.

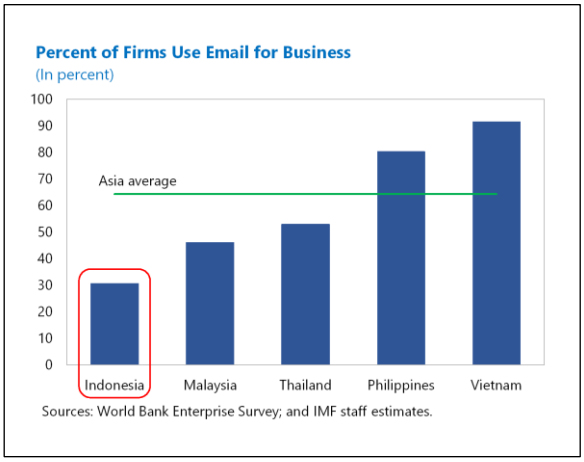
**27. It is also allowing the Indonesian authorities to better track consumer spending patterns in real-time during the current crisis**. It is helping inform which sectors are suffering the largest consumption declines and track sectoral shifts. This is helping the authorities to better assess the impact of the pandemic on different sectors and in tracking signs of recovery, while it could also help evaluate where best to target support measures.

## F. Key Challenges and Risks—Can Indonesia Safely Seize the Opportunities Brought by Digitalization?

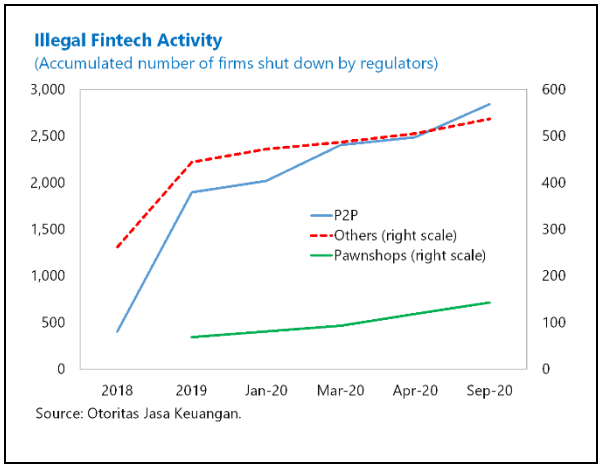
**28. There is immense room to improve the enabling factors to fully reap the benefits of digitalization in Indonesia** (Figure 7). Indonesia is still not sufficiently digitally enabled to seize the opportunities it presents: it ranks low in the World Economic Forum's Network Readiness Index, an aggregate measure that aims to capture how well an economy is using ICT technologies. For

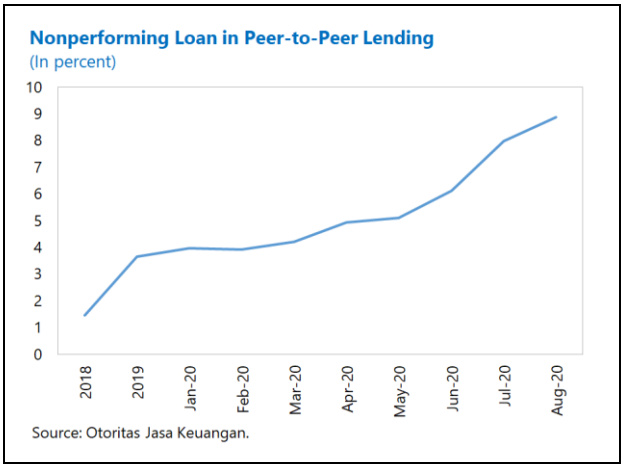
[17] Control variables include level of economic development, government consumption, foreign direct investment, private credit to GDP ratio, population growth rate and regional dummies.

instance, with less than half of the overall population using the internet, Indonesia has one of the lowest internet penetration rates in the ASEAN region. More than half of the population does not own a smartphone, and two-thirds of the population remains financially and digitally illiterate. Indonesian firms' digital connectivity—proxied by use of email by firms—also remains low driven by financial constraints, lack of skilled workers, technical uncertainties, resistance to change and the digital infrastructure gaps. Existing rural-urban digital divides and gaps in key infrastructure are still preventing Indonesia from fully reaping the potential benefits.




**29. As digitalization accelerates during and post COVID-19, risks emerging prior to the pandemic are becoming even more relevant**. Increased use of digital technology leads to increased vulnerability to data and privacy risks, loss of digital connectivity due to natural disasters, cyber-attacks, money laundering and terrorist financing, which may worsen if use of digital means is scaled up in times of crisis. The development of digital lending in Indonesia is already raising concerns about illegal and predatory lending practices, the prevalence of which has risen since the onset of the pandemic. Illegal fintech lenders charge high interest rates, apply high late payment or default fees, and employ aggressive debt collection practices. OJK has closed down close to a thousand illegal P2P lending companies between January-September 2020, operating without a license, adding to a total of 2,840 illegal entities closed since 2018. At the same time, fintech could lead to "excessive" financial inclusion if access to credit grows with insufficient regulation and supervision. These issues are even more relevant during a downturn, as individuals may seek fast access to credit, including digital credit, to meet immediate living expenses.




**30. Risks to financial stability and of greater concentration in fintech and in the traditional financial sector could set back progress made in financial inclusion**:

- Much fintech lending has targeted small MSME borrowers, who are likely to be disproportionately affected in the ongoing crisis, and hence are seeing a sharp deterioration in loan quality. The NPL ratio in the fintech sector has increased sharply from 3.7 percent at end-2019 to 8 percent in July 2020.[18] If restructured loans are included, then this ratio is 10 percent.[19] In response, fintech firms have retrenched their lending activity more sharply than banks, thereby curtailing access to finance for SMEs and low-income households (Section C). Moreover, the regulatory support measures, implemented as a response to the COVID-19 shock, are designed to be channeled mainly through Indonesia's banking sector, which could further exacerbate the procyclicality in fintech lending. Major disruptions to services provided by fintech companies could set back the progress that has been made with digital financial inclusion and innovation, and there could also be macroeconomic and financial spillovers.

- In the traditional financial sector, the digital divide amongst the small and large banks is leading to a shift in deposits from the former to the latter due to increased demand for DFSs since the onset of the pandemic. Moreover, smaller banks have less resources and expertise to respond to the competitive pressures they face from fintech companies. If they were to scale back their operations before fintech companies have sufficiently scaled up, the risk of financial exclusion could increase.

**31. Moreover, new forms of exclusion and risks to inequality could emerge**. Lack of access to digital infrastructure (i.e., mobile phones, computers, or the internet) could lead to new forms of exclusion amongst the poor and rural population and widen digital divides. For instance, while the mobile phone ownership is at 81 percent among Indonesia's higher-income population, it is at 63.5 percent among low-income individuals, and the rural-urban mobile phone ownership divide is close to 12 percent.

## G. Policy Priorities—What Policies Should Indonesia Adopt to Foster Digitalization and Manage Associated Risks?

**32. Recognizing the potential of digitalization, Indonesian authorities have facilitated its expansion through various regulatory approaches implemented in recent years prior to the pandemic** (Box 1). This includes the implementation of the National Financial Inclusion Strategy (2016), the Indonesia Payments System Blueprint (IPSB) 2025, the digitalization of disbursements of government social assistance programs and transactions of regional governments, and the strengthening of regulation and supervision. Accelerating the digital transformation of the financial

[18] P2P lending platforms have also established their own terms to facilitate borrowers affected by the pandemic. For example, by eliminating late payment fine for borrowers for those businesses impacted by the pandemic.

[19] The loan restructuring mechanism works differently in the P2P lending sector in comparison to traditional financial institutions: fintech P2P lending platforms can only facilitate loan restructuring requests from borrowers to lenders and are not authorized to restructure loans, where the authority to grant eased loan payment lies with the lender. Therefore, the lenders, not the platforms, bear the risks for loans in fintech lending. Out of the 1.96 million loan restructuring requests received by 88 P2P lending platforms, only 34 percent of them were granted, with the rest denied by lenders, according to a survey by the Indonesia Fintech Lenders Association. The total amount of reported outstanding loans that were requested to be restructured in May stood at IDR 1.08 trillion (8 percent of total loans), with just IDR 236.9 billion (2 percent of loans) approved by the lenders.

services sector is also one of the targets of the recent 2020–24 OJK financial sector strategic master plan. The government also launched the E-commerce Roadmap (2016) as part of its Economic Policy Package XIV, and has shown strong commitment to adopting the Bali Fintech Agenda (International Monetary Fund, 2018).

**33. Further supportive measures have been implemented during the pandemic to encourage the adoption of digital payments, digital credit as well as digital supervision**. This includes lowering costs/fees on credit cards and funds transfer service fees of BI's national clearing system (SKNBI) for customers and banks. Incentivizing Indonesia's MSMEs to adopt the cashless digital payments system, by setting the merchant discount rate (MDR) at 0 percent for transactions using the Indonesian Standard QR Code (QRIS) and has developed non Face-to-Face QRIS. Moreover, OJK has also taken measures to facilitate the move towards digital technology-based regulation and supervision in the banking system.

**34. However, a number of factors still need to fall into place in order to maximize the economic benefits of digitalization, and to avoid the financial exclusion and stability risks in the post-COVID-19 era**. Going forward, policies around digitalization should focus on three broad pillars: (i) ensuring equal opportunity and access for all to avoid a digital divide and rise in inequality (i.e., supply-side constraints); (ii) addressing constraints to its adoption (i.e., demand-side constraints); and (iii) high quality supervision and regulation that strikes the right balance between enabling innovation and competition while addressing risks related to financial stability, integrity, cyber-risk and consumer protection.

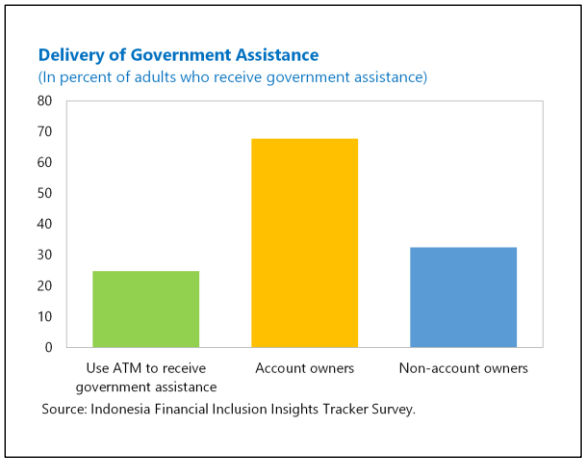
a. **Investing in and expanding access to digital-friendly infrastructure should be prioritized**. This includes both traditional digital friendly infrastructure (including access to reliable electricity and logistics infrastructure for e-commerce related pickups and delivery) and digital ready IT infrastructure (expanding access to quality internet coverage, high speed mobile internet), particularly in rural areas to close the digital divide. There is also a need to expand the reach of DFSs agents through appropriate incentives, as they tend to be concentrated in the areas where access to traditional means (bank branches) is higher.[20]

b. **At the same time, addressing barriers to digital technological adoption across firms in different industries and in the financial services sector should go hand-in-hand**. In addition to digital infrastructure gaps, technology adoption in Indonesia remains low mainly due to a lack of skilled workforce, low financial digital literacy, lack of trust in the digital ecosystem, as well as high cost of implementing digital technologies. Hence, policies should focus on:

   - *Expanding and strengthening the implementation of programs that invest in technology awareness, financial digital literacy and upgrading workers' skills*. Moreover, encouraging the entry of foreign skilled labor would help fill this gap in the short-run and stimulate innovation.

[20] One of the reasons for this is that being closer to a bank branch makes it easier for DFS agents to manage liquidity (https://www.cgap.org/blog/bringing-digital-finance-agents-last-mile-indonesia).

- *Further expanding the reach of G2P will help increase growth in account ownership, including through collaboration with nonbank financial service providers*. Government assistance received digitally has helped increase account ownership in both rural and urban areas, amongst the poor and helped close the gender gap and the rural-urban divide in account ownership. However, nearly one-third of the recipients of government assistance still do not have accounts. Additional growth in account ownership can be achieved by requiring more recipients to receive government assistance via digital transfers to their own accounts. Moreover, online government services would build consumer confidence in online activities and services over time. At present noncash G2P is only disbursed through state-owned banks, and could be expanded to include fintech service providers to expand the reach of such programs.




- *Building a strong cybersecurity policy and regulations for consumer data privacy and protection* will help strengthen the trust in the digital ecosystem, improve trust in the e-commerce payment platforms and expanded alternative finance options for businesses.

c. **Continuing to strengthen regulation and interagency cooperation to address challenges from cooperative and fintech businesses that have cut across multiple traditional business lines**. There has been a rapid increase in financial products—payment, deposit, lending as well as hybrid products—being offered by unlicensed nonbanks, including cooperatives and fintech companies, that are not currently regulated by either of the regulatory fintech bodies, i.e., OJK and BI. Expanding the regulatory perimeter and closing these gaps in supervision, including through strong interagency coordination between BI and OJK that explicitly encompasses regulating, licensing and supervising fintech activities is important. At the same time, it is important to ensure that the e-commerce and fintech landscape remains sufficiently competitive after the COVID-19 crisis and continues to provide low-cost services.

## Box 1. Recent Policy Efforts to Support Integration of the Digital Economy and Finance: Before and During COVID-19

**Development of DFSs is embedded in the National Financial Inclusion Strategy (2016)**.[1] Reforms have allowed e-money issuers (banks and nonbanks) and banks to engage agents to expand service delivery outreach. Agents are now present in all provinces and in 99 percent of the districts,[2] electronification of central government social aid program disbursements and local government financial transactions.

**In end-2019, BI formulated the Indonesia Payment System Blueprint 2025 to oversee the digital transformation in both DFSs and in e-commerce, which is built upon the following initiatives**: (i) support the integration of digital economy and finance through digital banking transformation and interlink between banks and fintech using open Application Programming Interface (API) standards; (ii) strengthen the configuration of retail payment systems to make it more efficient and safer; (iii) strengthen financial market infrastructures through modernizing the infrastructure and in accordance with international best practices; (iv) establish a public data infrastructure, that will connect all payment transactions and manage the flow of payment data, including digital ID; and (v) strengthen the current regulatory, licensing and supervisory framework on the payment system to improve efficiency, market discipline, integrity, risk management, and consumer protection.

**Indonesian regulators have been focusing on striking an appropriate balance between promoting innovation and safeguarding financial stability, more proactively since 2016**. While BI is responsible for the regulation of e-money, payment processing and fund transfers in the context of the e-retail and marketplace industries, OJK regulates the P2P lending and equity crowdfunding market. Regulatory status of "marketplace lending platforms" is the same as nonbank financial institutions. Both BI and OJK have adopted the regulatory sandbox, preceded by mandatory registration of fintech business.[3]

**In response to the COVID-19 shock and related containment measures, the authorities introduced measures to encourage the use of digital payments**:

- In April 2020, BI relaxed rules on credit cards, reduced the costs of the National Clearing System (SKNBI), and supported electronic disbursements of various government social assistance programs.
- BI has also been pushing Indonesia's MSMEs to adopt the cashless digital payments system. In August 2019, it introduced the Quick Response Indonesian Standard (QRIS) as the national standard QR code payment in facilitating payment transactions in Indonesia, that allows interoperability and interconnectivity and can be used to support digital payments for MSMEs. More than 5.46 million merchants have adopted the QRIS since it came into effect, amongst which close to 43.6 percent (2.4 million) have joined during the pandemic since March 2020. In April 2020, BI also temporarily reduced the Merchant Discount Rate (MDR) on QRIS to 0 percent for micro-businesses.
- In June 2020, the government launched a digital credit program (DigiKu) for MSMEs under "Proudly Made in Indonesia" movement to facilitate the provision of low-interest loans to MSMEs through digital platforms. This is being channeled through increased collaboration between the government, state-owned banks, and tech-based companies.
- In a move towards digital technology-based regulation and supervision, OJK launched the Online Banking Provisions Information System (SIKEPO) mobile application in September 2020, which is expected to increase compliance and disseminate information on various regulations in the banking sector.

**International cooperation and collaboration in payment systems and digital financial innovation are also being strengthened, especially with central banks in ASEAN**. In August 2020, a financial technology cooperation agreement was signed between the OJK and the Securities Commission Malaysia (SC Malaysia), to facilitate information exchange between the two institutions, including information on new technology developments and trends and on regulatory aspects. In September 2020, OJK has signed an agreement with Bangko Sentral ng Pilipinas aimed at deepening financial inclusion, information sharing on digital financial innovation, and improving the supervisory framework.

_____

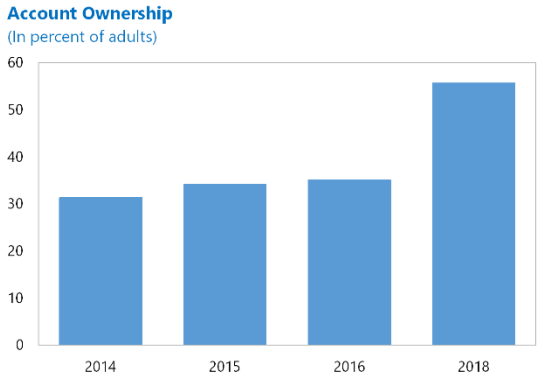
1/ National Financial Inclusion Strategy is a national framework of financial inclusion for encouraging economic growth, accelerating poverty reduction, and reducing inequality between individuals and between regions.

2/ These agents can open new bank accounts, e-money accounts and provide access to cash-in, cash-out, bill payments and transfers services through registered e-money. Some of them can also facilitate the micro loan applications and provide access to other financial services (e.g., micro insurance).

3/ The process of registration is a two-stage process. The first stage is registration with intent to operate. The second stage is licensing, where a company has to prove operational reliability with respect to platform risk mitigation, customer data safety, and fraud detection and prevention. In addition to the second regulation, the authority has set up a sandbox system where registered platforms can go through an operational reliability test to find weaknesses.

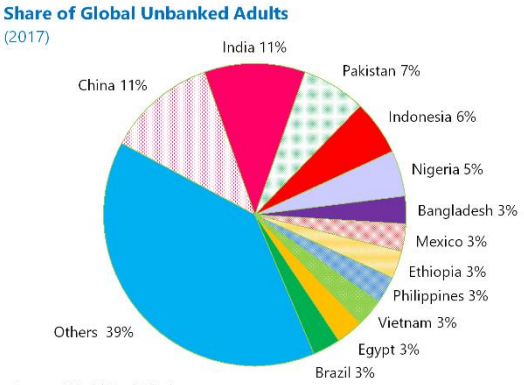
## Figure 1. Financial Inclusion and Access to Formal Credit

*Despite progress, close to half the population still remains unbanked…*



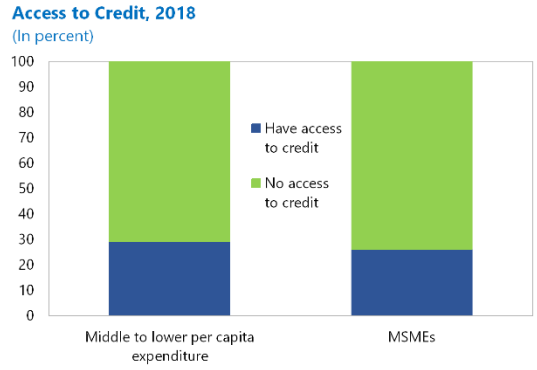

Source: Indonesia Financial Inclusion Insights Tracker Survey.

*…and 6 percent of the world's unbanked reside in Indonesia.*



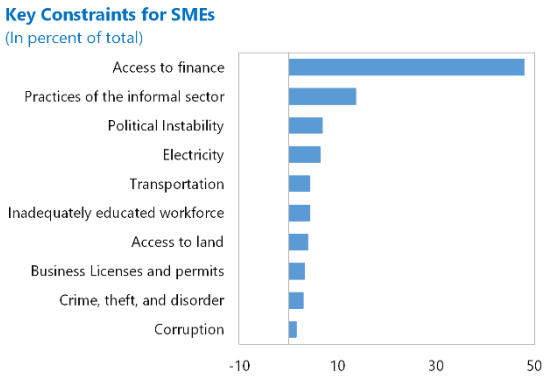

Source: World Bank Findex.

*The majority of middle to lower segment population and MSMEs lack access to finance from traditional FIs…*




Sources: Central Bureau of Statistics, Ministry of Cooperatives and MSME; Bank Indonesia.

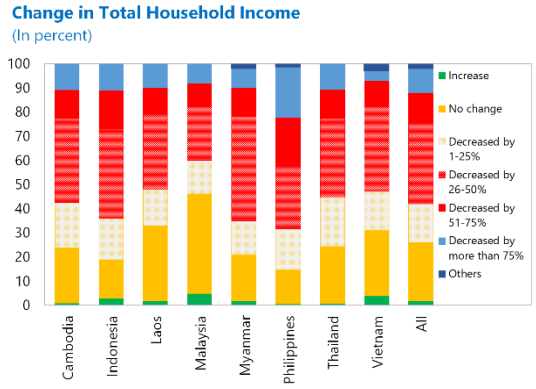
*…which is the most often cited barrier to MSME growth, leading to their low productivity and competitiveness.*



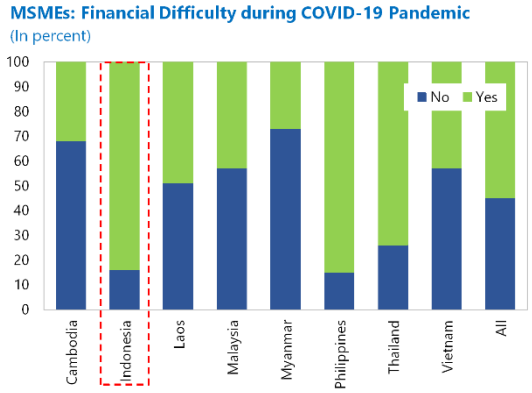

Sources: IFC, 2013, *Indonesia Market Study: Moveable Assets-based Financing to MSMEs.*

## Figure 2. Impact of COVID-19 Shock on Indonesian MSMEs and Households

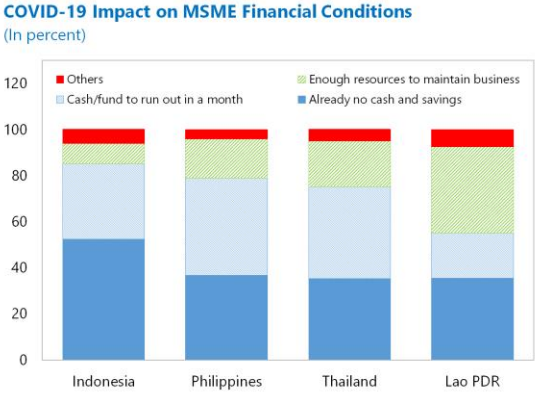
*A large share of households faced more than a 25 percent decline in income due to the COVID-19 shock…*



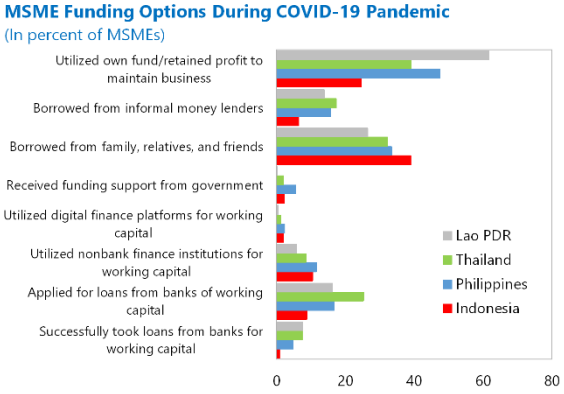

*…and the share of MSMEs that faced financial difficulty is much larger than peers.*




*More than 85 percent of MSMEs reported having no cash/ savings or funds that would run out in a month …*




*…and despite several new lending schemes, getting credit from banks was limited for most MSMEs.*

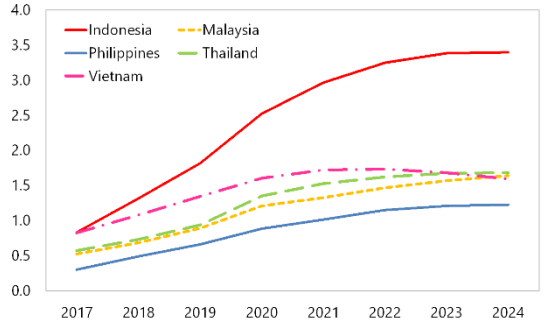



Source: ADB survey of randomly selected 1,046 households between May-July 2020 and 525 MSMEs between April-May 2020.

## Figure 3. Indonesia's E-Commerce Supported by Digital Payments

*With its large youth population, Indonesia is the largest market for e-commerce in ASEAN…*

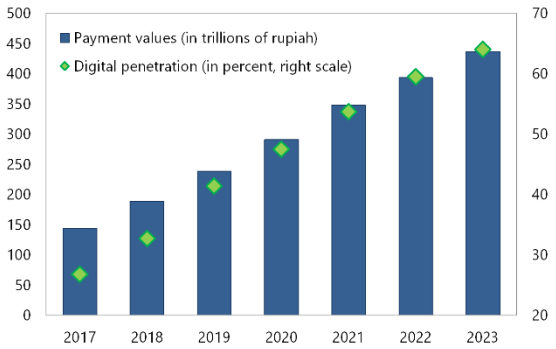
**Total E-commerce Revenues**
(In percent of GDP)




Sources: Statista Digital Market Outlook; and IMF staff estimates.

*…and is projected to grow at a rapid pace*

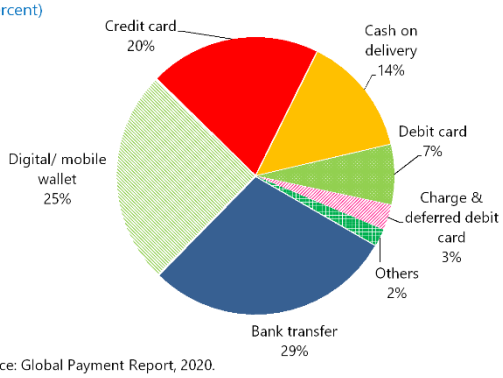
**E-commerce Payment Values and Digital Penetration**




Sources: Global Data via Statista; and Statista Digital Market Outlook.

*Large share of e-commerce purchases is being made through the use of mobile and online payment platforms…*

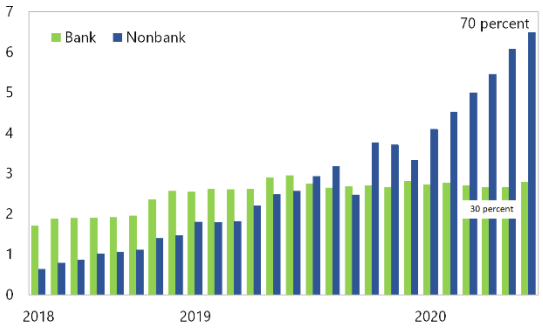
**E-commerce Payment Methods, 2019**
(In percent)




Source: Global Payment Report, 2020.

*…and preference for e-money services provided by fintech is significantly larger and continues to strengthen.*

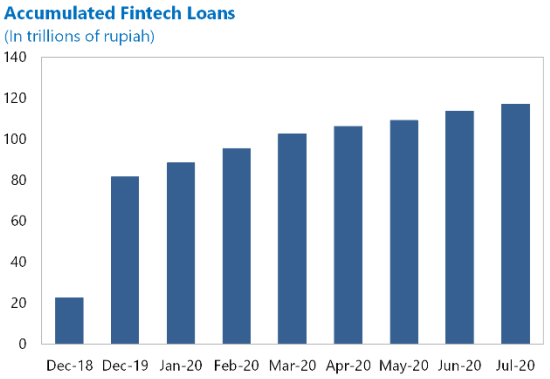
**Fintech Payment Transactions: Electric Money**
(In trillions of rupiah)




Source: Bank Indonesia.

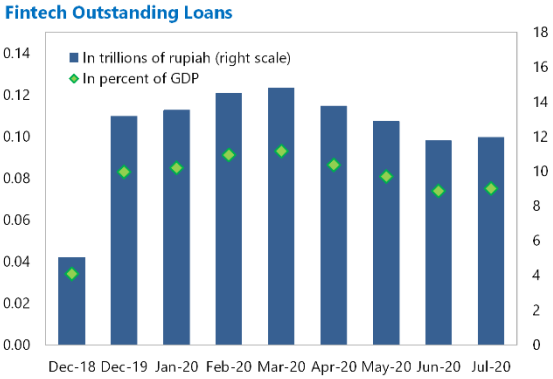
## Figure 4. Marketplace Lending: Before and During the COVID-19 Pandemic

*The growth in accumulation of outstanding P2P loans grew at more than 230 percent (y/y) to IDR 88.4 trillion in Jan-20.*



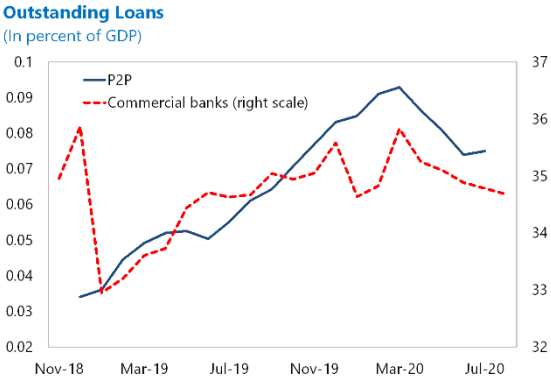

Sources: OJK; and IMF staff estimates.

*While fintech lending has been growing at a rapid pace pre-COVID, it still remains very small, at less than 0.1 percent of GDP.*



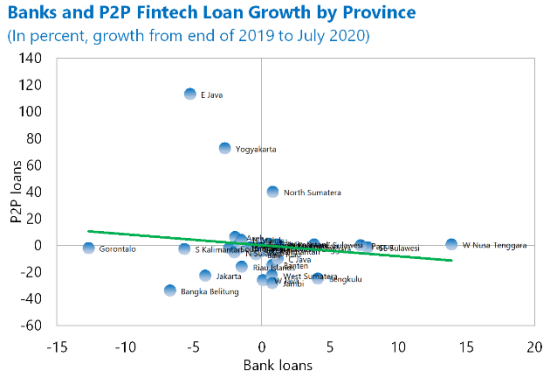

Sources: OJK; and IMF staff estimates.

*New P2P loan issuances have seen a sharp decline since the onset of the pandemic…*




Sources: OJK; CEIC Data Co. Ltd.; and IMF staff estimates.

*…and decline in P2P lending has happened across most regions.*

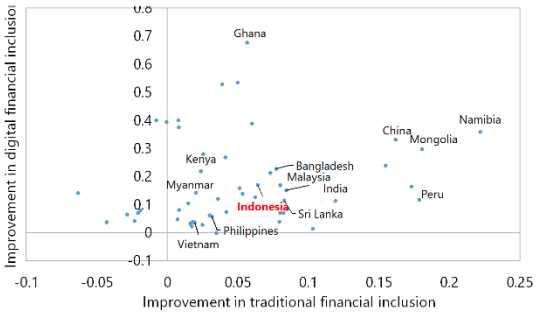



Sources: CEIC Data Co. Ltd.; and IMF staff estimates.

## Figure 5. Digital Financial Inclusion in Payments

*Digital financial inclusion has helped increase financial inclusion in recent years.*

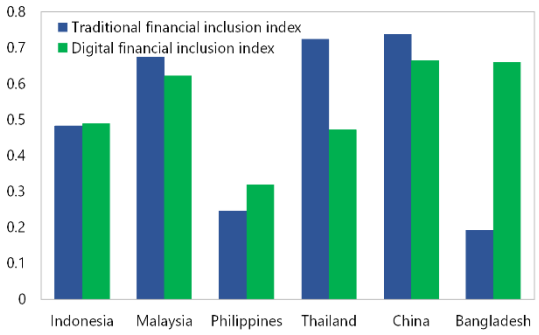
**Progress in Financial Inclusion: Traditional vs Digital, 2014-17**
(+/- indicates increase/ decrease in financial inclusion)




Source: Sahay and others, 2020.

*However, there is considerable scope for improvement…*

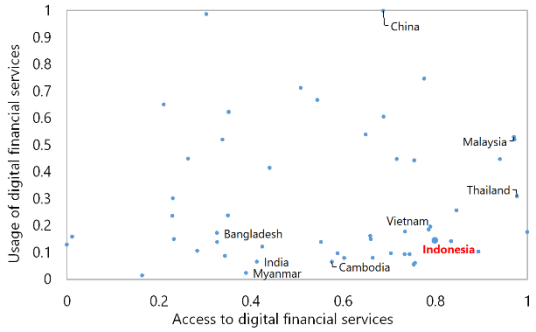
**Financial Inclusion: Traditional vs. Digital, 2017**
(0-1, higher value indicates higher financial inclusion)




Source: Sahay and others, 2020.

*…particularly in the usage of DFSs which remains considerably lower in comparison to other EMEs…*

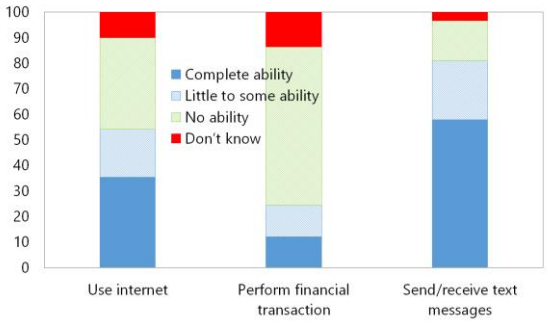
**Access vs Usage of Digital Payments, 2017**
(0-1. higher number indicates higher financial inclusion)




Source: Sahay and others, 2020.

*…owing to low levels of financial digital literacy, and small base of internet users.*

**Digital Readiness of Unbanked Population**
(In percent of adults)

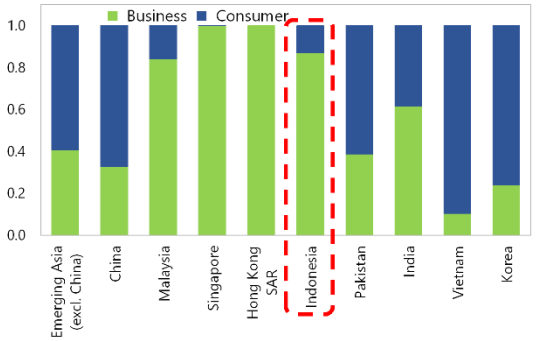



Source: Indonesia Financial Inclusion Insight Tracker, 2018-19.

## Figure 6. Access to Digital Credit

*Majority of the P2P lending is short-term uncollateralized working capital loans to MSMEs…*

**Fintech Credit Breakdown by Category, 2017**

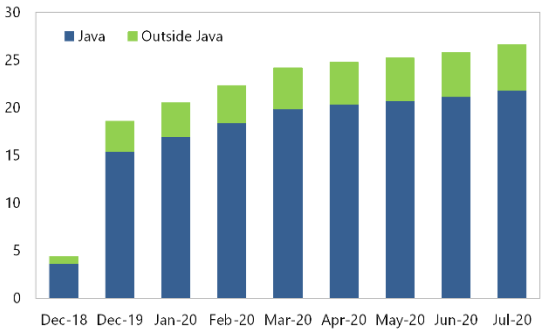



Sources: Cambridge Centre for Alternative Finance; and IMF Staff estimates.

*…and an increasing number of MSMEs are undertaking P2P loans.*

**Accumulated Fintech Borrower Accounts**

(In thousand units)

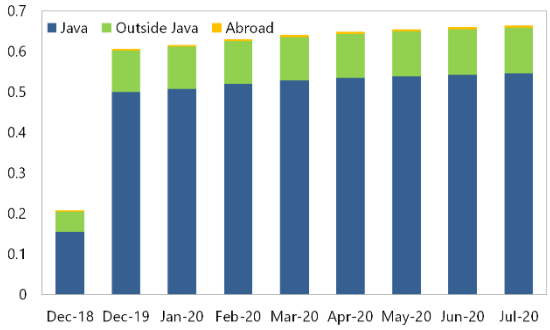



Sources: OJK; and IMF staff estimates.

*It is also providing alternative sources of investment offering returns much higher than bank deposit rates.*

**Accumulated Fintech Lender Accounts**

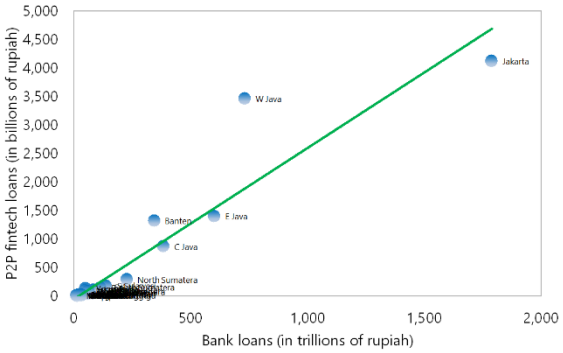
(In thousand units)




Sources: OJK; and IMF staff estimates.

*However, both fintech and bank credit are concentrated in the Java region, leading to geographical disparities.*

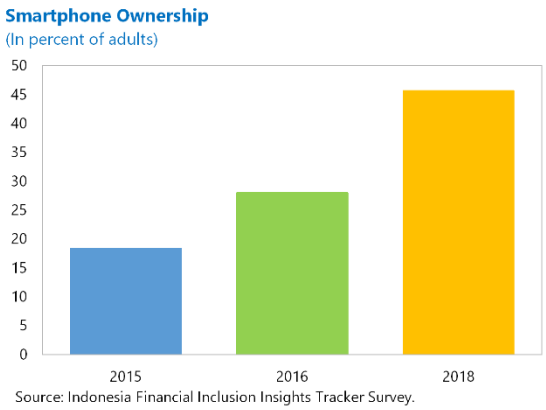
**Bank and P2P Fintech Outstanding Loans by Province, 2019**




Sources: CEIC Data Co. Ltd.; and IMF staff estimates.

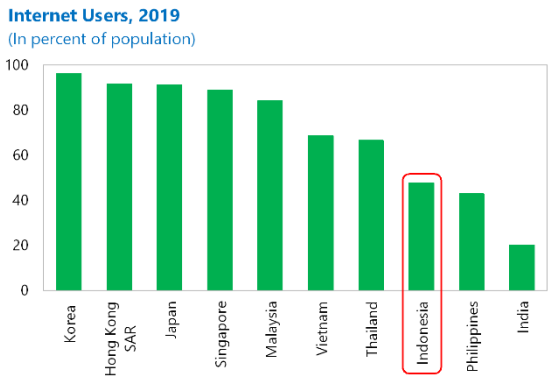
## Figure 7. Indonesia's Digital Readiness

*Although smartphone penetration has increased over the years, it remains low…*



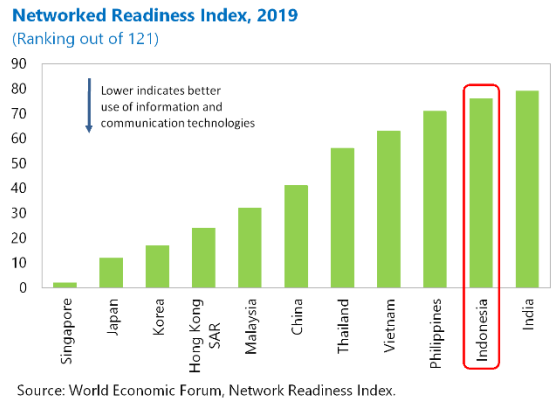

Source: Indonesia Financial Inclusion Insights Tracker Survey.

*…and internet usage remains much lower than peers.*



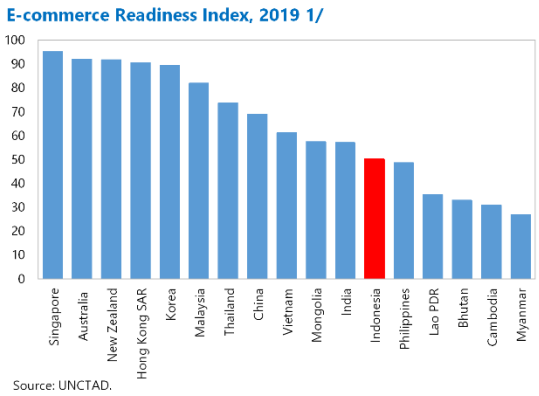

Source: International Telecommunication Union.

*Indonesia lags other countries in using digital technologies to boost competitiveness and well-being…*




Source: World Economic Forum, Network Readiness Index.

*…and ranks low on e-commerce readiness, including because of bottlenecks in postal and delivery systems.*




Source: UNCTAD.

1/ The B2C E-commerce Index is the simple average of four indicators: (1) the percentage share of individuals in the total population using the Internet; (2) the postal reliability score scaled between 0 and 100; (3) the percentage share of individuals in the total population with a financial account; and (4) an indicator of secure Internet server availability scaled between 0 and 100. The postal reliability score relies on postal statistics and surveys to measure operational efficiency based on factors such as the quality of service performance, including predictability, across all categories of postal delivery services. The share of individuals with an account captures individuals (by themselves or together with someone else) with an account at a bank or another type of financial institution or personally using a mobile money service in the past 12 months.

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# INDONESIA AND CLIMATE CHANGE: RECENT DEVELOPMENTS AND CHALLENGES[1]

*Indonesia is exposed to climate change related risks, notably more frequent and more damaging natural disasters and rising sea levels. It also likely faces transition risks from global moves away from fossil fuels, given its production, consumption and exports of carbon resources, especially coal. Indonesia has been proactively tackling climate change issues but could consider further reforms toward a greener economy. This would require additional mitigation and adaptation measures. This short note overviews recent developments and challenges ahead regarding climate change issues in Indonesia and offers recommendations for policy frameworks.*

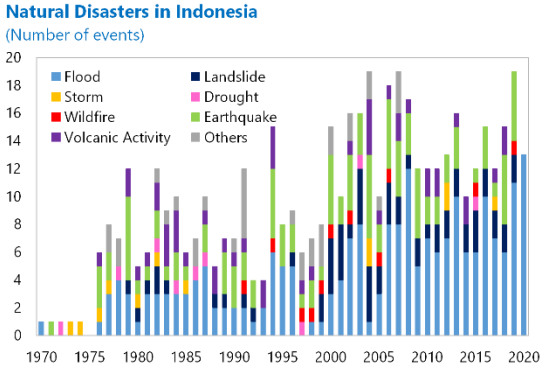
## A. Background and Recent Development

**1. Indonesia is one of the countries' most vulnerable to climate change related risks, especially with regard to extreme weather and sea level rise**. The *2021 INFORM Global Risk Index*[2] ranks Indonesia as the sixth most susceptible country to high-impact natural hazards (Table 1). The *2020 World Risk Index*[3] rates the disaster risk of Indonesia as high. In fact, after 2000, natural disasters have occurred more frequently, especially flooding (chart below). Wildfire due to

**Table 1. Natural Hazard Risk Index**

| | |
|---|---|
| 1 | Philippines |
| 2 | Bangladesh |
| 3 | Japan |
| 4 | Myanmar |
| 5 | India |
| 6 | Indonesia |
| 7 | China |
| 8 | Vietnam |
| 9 | Pakistan |
| 10 | Peru |

Source: *INFORM Global Risk Index*, 2021.



Source: CRED, Emergency Events Database (EM-DAT).

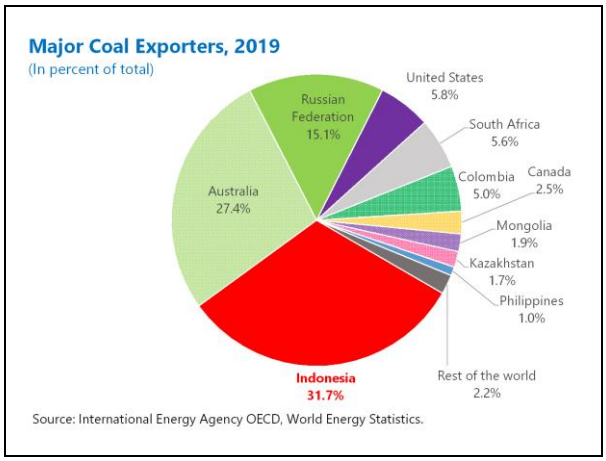
[1] Prepared by Koki Harada (APD).

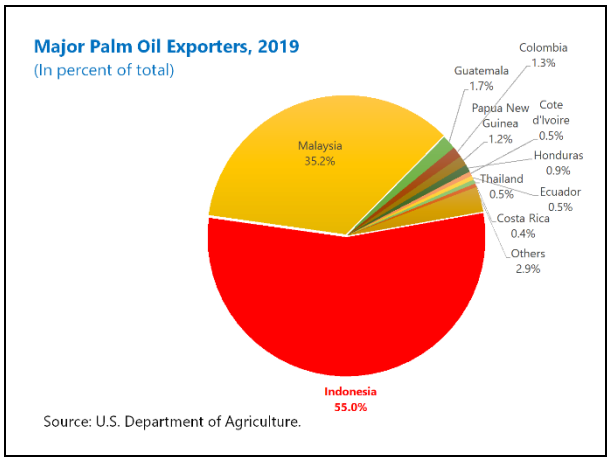
[2] INFORM is a collaboration of the Inter-Agency Standing Committee Reference Group and the European Commission; it publishes natural hazard risk based on a country's hazards and exposure, vulnerability and lack of coping capacity dimension.

[3] Bündnis Entwicklung Hilft and Ruhr University Bochum, Institute for International Law of Peace and Armed Conflict (IFHV) publishes the *World Risk Index* based on countries' exposure, vulnerability, susceptibility, lack of coping capacities and lack of adaptive capacities.

extreme drought remains a major risk factor to the country's tropical forest[4]—the third largest in the world— which plays a significant role in the mitigation of greenhouse gases (GHG) at the national and global level. Extreme weather importantly affects the agriculture, fishery and forestry sector, which accounts for 35 million workers (around 30 percent of total workers). Part of the high exposure to climate change reflects the geography of Indonesia: it is the world's largest archipelago country and has extensive coast lines. A large part of Indonesia's population[5] lives in low-lying coastal areas, including the capital Jakarta, the most populous city in South East Asia and the fastest-sinking city in the world. These areas would be significantly affected by rising sea levels.

**2. Indonesia is a large producer of fossil fuels and palm oil**. The oil, gas and coal related sector accounts for 7.2 percent of total GDP.[6] Over 1.4 million workers (1.1 percent of total) are employed in the mining and quarrying sector. Indonesia is the world largest coal exporter[7] (left chart below). Coal exports account for around 10 percent of total exports. In terms of oil and gas, Indonesia is a net importer of oil and a net exporter of gas. The government receives royalties from oil, gas and coal mining equivalent to 7.5 percent of total government revenue.[8] The share of commercial loans to the mining and quarrying sector is around 2.5 percent. The plantation sector accounts for 3.3 percent of total GDP. The share of palm oil exports in total exports is around 10 percent, which makes it the most important export good together with coal. Indonesia is the world's largest palm oil exporter with a 55 percent share in total global exports (right chart below).




**3. Indonesia could face early transition risk with the expected acceleration in global decarbonization, especially coal producers**. Both the number of signatories of the Principle for Responsible Investment (PRI) and the asset value of the Environmental, Social and Governance (ESG)

[4] The forest contains 50 percent of tropical peat swamps in the world. Peatland contains rich carbon and highly flammable. Wildfire would be difficult to extinguish, and greenhouse gas emission level would intensify.

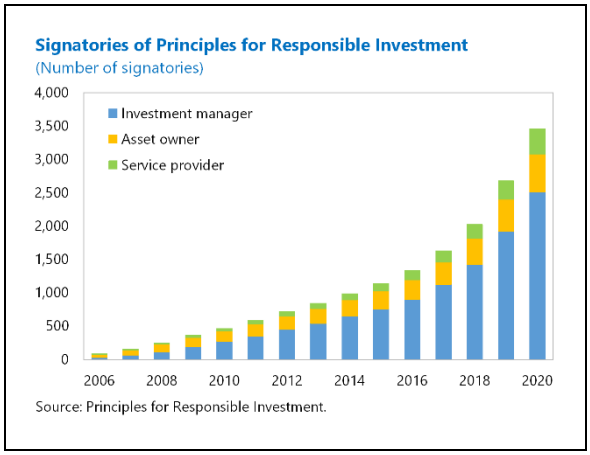
[5] According to the *First Nationally Determined Contribution of Indonesia*, 42 million people may be affected.

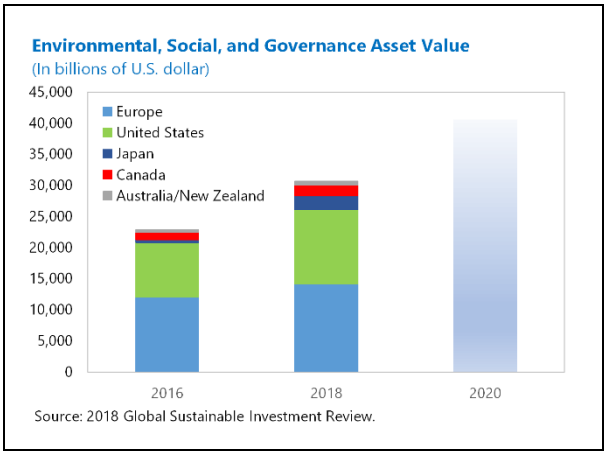
[6] The oil, gas and geothermal mining sector, the coal and lignite coal mining sector, and the coal and gas refining sector account for 2.8 percent, 2.3 percent and 2.1 percent of total GDP, respectively, in 2019.

[7] Over 60 percent of the total coal production in Indonesia was exported in 2019.

[8] Oil, gas, and coal mining royalties were 4.3 percent, 1.9 percent, and 1.3 percent of total revenue, respectively, in 2019.

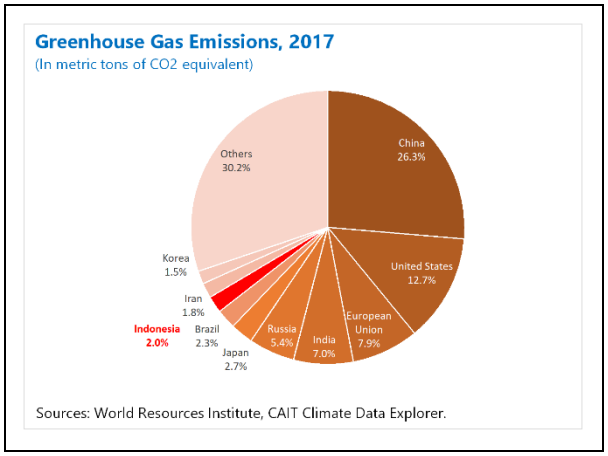
investment have been rapidly growing (charts below). Over 100 banks, including global financial institutions, have announced coal divestment, and Indonesian coal companies could increasingly face external financial constraints. Considering the global aspirations for moving toward greener economies, demand for Indonesian coal might not fully recover to pre-pandemic levels in the post-COVID-19 era, and coal prices could be subdued in the medium and long term. The possible deterioration of the financial health of coal companies could have broader economic and financial spillovers.

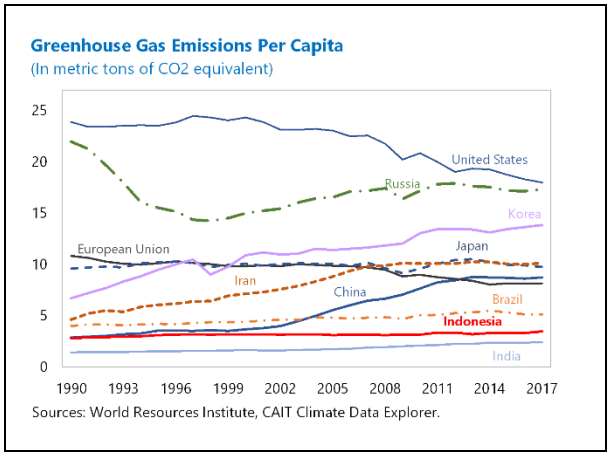



## B. Indonesia's GHG Emission Patterns and Paris Agreement Commitment

**4. Indonesia has grown into being a large emitter of Greenhouse Gases (GHG), but its emissions on a per capita basis are still lagging those of advanced economies**. In 2017, Indonesia ranked as the eighth largest GHG emitter in the world.[9] However, its emissions on a per

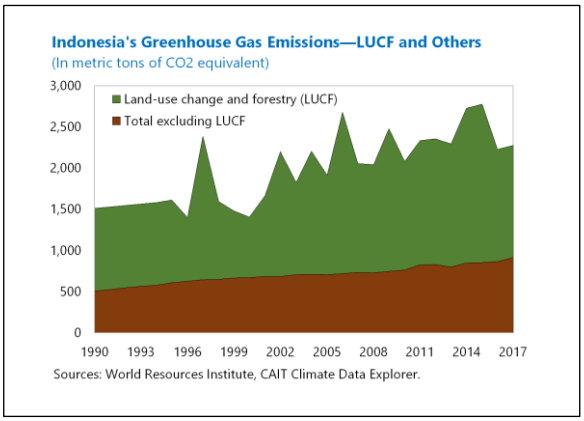


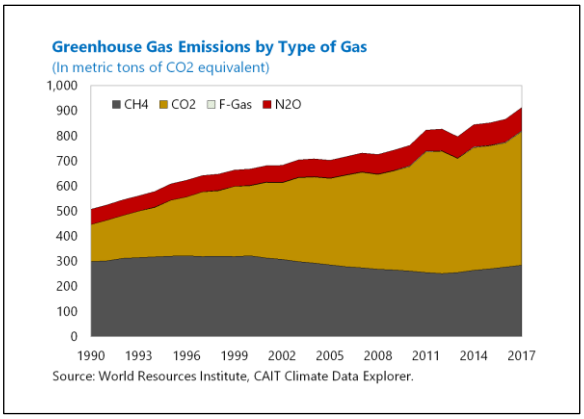

capita basis remain low (charts below). Given the stage of its economic development and vulnerability to climate change, Indonesia could be one of the leading countries actively seeking to balance policy requirements to foster development with those to reduce GHG emissions.

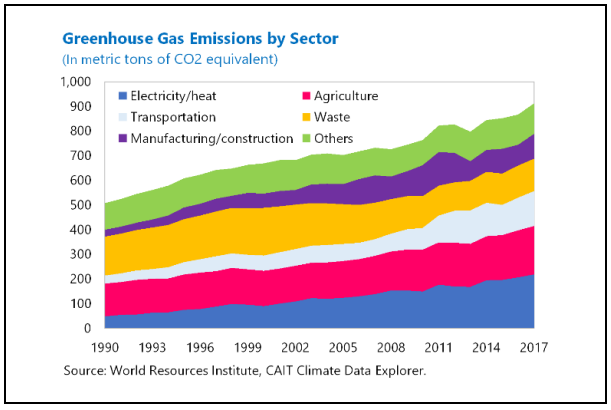
[9] Based on the total emission excluding Land Use Change and Forestry (LUCF).

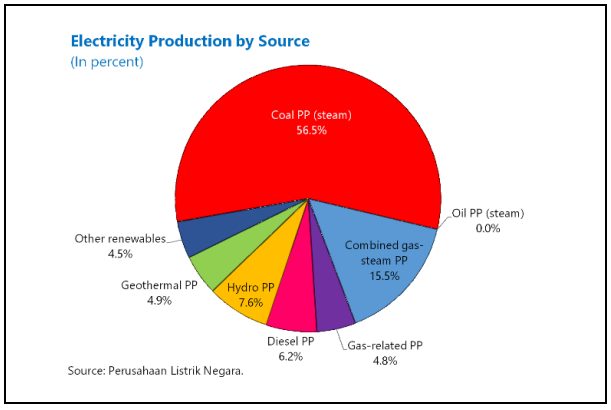
**5. Land Use Change and Forestry (LUCF) have accounted for a substantial share of the increase in GHG emissions over the past three decades**. The increase in Indonesia's GHG emissions reflects two broader sources (chart). LUCF, which accounts for more than half of the emissions, have been one main source, although the estimates of the related emissions are subject to significant uncertainty.[10] Moreover, this source of emission is less controllable, as it includes emissions from wildfires. The other main source are emissions from energy use in the economy (see below).




**6. Apart from LUCF, increase in energy use accounts for much of the rise in Indonesia's GHG emissions**. Carbon dioxide ($CO_2$) emissions have been rapidly increasing, while methane ($CH_4$) has been decreasing (chart). This pattern reflects divergences in GHG emissions by sector. While the emission levels of the waste and agriculture sectors have been reduced or maintained, emissions from energy use, reflected primarily in the emissions of the electricity and transportation sectors, have been increasing. These increases in turn mirror the country's rapid economic growth (left chart below). In terms of fuel sources for electricity, coal-based power generation has been growing rapidly and reached a share of about 57 percent in 2018 (right chart below).




**7. Indonesia set an unconditional GHG reduction target of 29 percent and a conditional reduction target up to 41 percent as Nationally Determined Contribution (NDC) in the Paris**

[10] According to the World Resources Institute, this data is useful as reference. More generally, users should note that the errors and uncertainties associated with these (and other LUCF) estimates may be significant (See World Resources Institute, 2015, *CAIT Country Greenhouse Gas Emissions: Source & Methods,* June).

**Agreement** (Table 2). In the NDC, the forestry and energy sectors are key sectors for policy measures. The main policy assumptions for the forestry sector include measures to control deforestation, support reforestation and promote sustainable forest management.[11] The main policy assumptions for the reductions of GHG emissions from energy use include the use of carbon capture technology in power plants in addition to greater use of renewable energy and of biofuel.

**Table 2. Indonesia's Nationally Determined Contribution (NDC) 1/**

(Projected BAU and emission reduction from each sector category)

| Sector | GHG Emission Level 2010 2/ Mton CO2e | GHG Emission Level 2030 (Mton CO2e) | | | GHG Emission Reduction | | | | Annual Average Growth BAU (2010–2030) | Average Growth 2000–2012 2/ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Mton Co2e | | In percent of total BaU | | | |
| | | BaU | CM1 | CM2 | CM1 | CM2 | CM1 | CM2 | | |
| Energy 2/ | 453.2 | 1,669 | 1,355 | 1,271 | 314 | 398 | 11% | 14% | 6.7% | 4.50% |
| Waste | 88 | 296 | 285 | 270 | 11 | 26 | 0.38% | 1% | 6.3% | 4.00% |
| IPPU 3/ | 36 | 69.6 | 66.85 | 66.35 | 2.75 | 3.25 | 0.10% | 0.11% | 3.4% | 0.10% |
| Agriculture | 110.5 | 119.66 | 110.39 | 115.86 | 9 | 4 | 0.32% | 0.13% | 0.4% | 1.30% |
| Forestry 4/ | 647 | 714 | 217 | 64 | 497 | 650 | 17.2% | 23% | 0.5% | 2.70% |
| Total | 1,334 | 2,869 | 2,034 | 1,787 | 834 | 1081 | 29% | 38% | 3.9% | 3.20% |

Source: First Nationally Determined Contribution, Republic of Indonesia, November 2016.

1/ CM1 = Counter Measure (unconditional mitigation scenario); CM2 = Counter Measure (conditional mitigation scenario).
2/ Including fugitive.
3/ IPPU in the table stands for the industrial processes and product use. IPPU sector covers the greenhouse gas emissions resulting from various industrial activities that produce emissions not directly the result of energy consumed during the process and the use of man-made greenhouse gases in products.
4/ Including peat fire.

**8. Indonesia is also a member of the Coalition of Finance Ministers for Climate Action and has been proactively tackling climate change issues**. Climate change is incorporated into Indonesia's planning and budgeting system. Since 2016, the government has implemented a Climate Budget Tagging (CBT) process to monitor and track expenditures on climate change actions in the budget system—focusing first on mitigation and since 2018 extending the scope also to adaptation expenses. The CBT data underpinned the issuance of green sukuks, a Shari'ah-compliant green bond, that exclusively finances or refinances sustainable and climate friendly investment projects. Three rounds of issuance have already taken place at the international level—raising US$1.25 billion in 2018, US$0.75 billion in 2019, and US$0.75 billion in June 2020.[12] These funds are used in mitigation areas such as sustainable transport, waste management, waste to energy

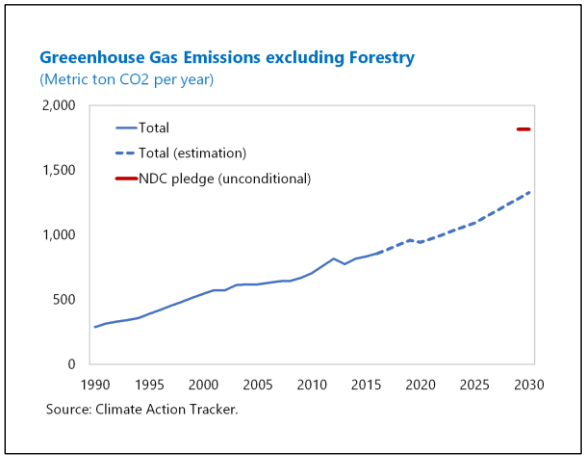
[11] It includes social forestry program, which offers farmers the opportunity to use designated forest plots legally for up to 35 years.

[12] A retail issuance also took place for local investors in November 2019, for a total of IDR 1.46 trillion, approximately US$0.10 billion.

management, and renewable energy, and adaptation areas such as resilience to climate change for highly vulnerable areas and sectors. The government has also developed a Disaster Risk Financing and Insurance strategy.[13]

**9. Bank Indonesia (BI) and Financial Services Authority of Indonesia (OJK) have also been supporting green investment through their policy tools**. BI has adopted environmentally sound policies, including the adoption of Sustainable and Responsible Investment in foreign exchange management. OJK developed a regulation, effective as of 2020, specifying that financial services institutions shall apply sustainable finance principles to their business activities and shall submit their sustainable finance action plan to OJK on annual basis.

**10. Indonesia is projected to overachieve on its commitment under the Paris Agreement, but could consider upgrading its mitigation commitments**. The expected overachievement excludes LUCF and is projected on the basis of currently implemented policies (chart).[14] However, given the inevitable risk of wildfires, which is not perfectly controllable, Indonesia would need to make further efforts to reduce GHG emissions beyond the targets in order to reduce the risk of missing the overall target. As elsewhere, the NDC is supposed to be updated ahead of the United Nations Framework Convention on Climate Change Conference of Parties (COP 26) in November 2021. Major large emitters have recently made carbon neutrality pledges for 2050 (European Union, Japan, Korea, United Kingdom) or for 2060 (China). Indonesia, as a large emitter of GHG and G-20 member, could also consider such a pledge, which could show solid commitment toward a greener economy, thereby boosting further green investments.




## C. Policy Options for Climate Change Mitigation

**11. When transitioning toward a greener economy, Indonesia would need to strike a balance between promoting development and lowering GHG emissions**. In this regard, a comprehensive transition plan toward a greener economy would facilitate policy design, especially regarding energy use. Given the policy impacts on people's livelihood, it would be appropriate to discuss the plan in a national level conference consisting of all interest groups in a transparent manner and to communicate well with the public to achieve a nation-wide consensus. The plan

[13] The strategy aims at protecting state-owned asset (national and subnational), key public infrastructure, households and communities, recovering social aspect of communities, supporting the development of domestic insurance industry. Its financing schemes such as pooling fund and insurance are tailored to fit to respective disaster risk.

[14] The source of the estimates is the Climate Action Tracker (CAT). It also states that Indonesia's climate commitments are not consistent with either limiting global temperature increase to 2°C or the Paris Agreement goal of 1.5°C. The CAT is an independent scientific analysis under a collaboration of two organizations, Climate Analytics and New Climate Institute.

could include incentives and disincentives, using expenditure, tax and regulatory measures. It would be also important to provide the necessary compensatory support for households and other parties negatively affected by the measures. At the same time, the authorities should consider transition risks from the move toward a greener economy, which would likely affect the coal sector in particular. Measures to facilitate employment in other sectors and reduce financial sectors risks through financial regulations including additional bank capital buffer requirement would help in reducing the costs from such risks.

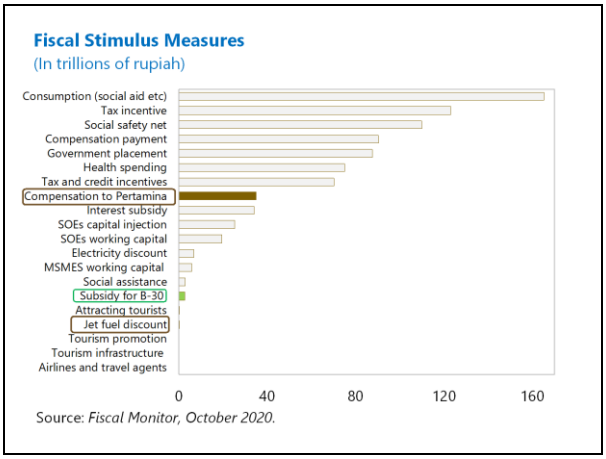
**12. Forest and land use management can contribute to climate change mitigation in Indonesia**. Indonesia has taken policy actions aimed at reducing deforestation and forest degradation as well as reinforcing wildfire monitoring. These actions include regulatory measures such as a moratorium on the development of peatland[15] and the social forestry programs.[16] Recently, Indonesia has shifted the emphasis toward restoration of its mangrove and peatland to enhance the GHG absorption capacity of its tropical forest. In order to enhance favorable cycles of deforestation and reforestation, it would be worth considering a feebate scheme consisting of levies imposed on landowners for reducing carbon storage and of subsidies to landowners who increase carbon storage. Alternatively, a tax on commodities from plantations could be another option to support reforestation. These measures could help reduce GHG emissions without adding a fiscal burden.

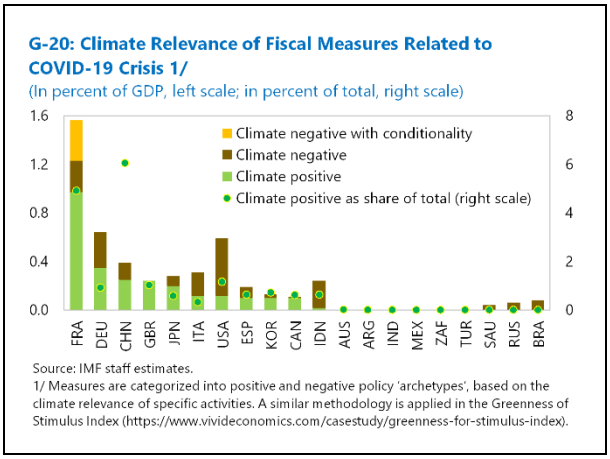
**13. Achieving Indonesia's NDC target for the energy sector could be challenging**. The National Energy Policy (KEN) was adopted in 2017, aiming to increase renewable energy in its electricity to 23 percent in 2025.[17] However, given the need to increase electric generation capacity to meet the needs of a growing economy, it seems uncertain that this target can be reached under current plans. Much of the planned increase in capacity is based on coal-based generation. The National Energy Policy might have to be complemented with policies to support renewable energy. A feebate scheme—e.g., levies imposed on power generators with above average emissions per kWh and rebates for generators with below average emissions per kWh—could be an instrument to foster change in the electricity mix. The scheme could be designed in a revenue-neutral manner. It could complement other measures for a greener recovery. The 2020 fiscal stimulus mostly consists of climate neutral expenditure. Nevertheless, it also includes some climate-negative measures, notably fossil fuel subsidies, that dominate climate-positive measures, including biofuel subsidies (charts below).

[15] Following the disastrous fire of 2015, the government issued regulations suspending the development of peatlands and rezoning conservatory lands to prevent future outbreaks of fire.

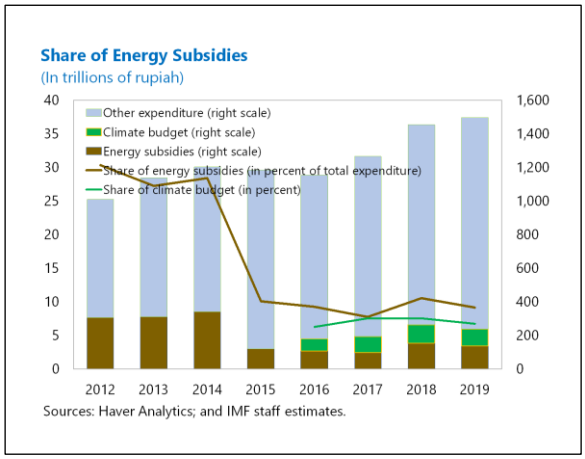
[16] In 2014, Indonesia announced a project allowing forest-dependent communities access to 12.7 million hectares of forest through social forestry permits, which give local communities control of some parts of the forest. The permitted communities use the land to establish forest enterprises like ecotourism ventures or sustainable production of goods such as bamboo or rattan. As of June 2020, Indonesia has distributed around 4.2 million hectares of land.

[17] As of 2018, power plant installed capacity of new renewable energy is 14 percent of total and power production of new renewable energy is 17.1 percent.

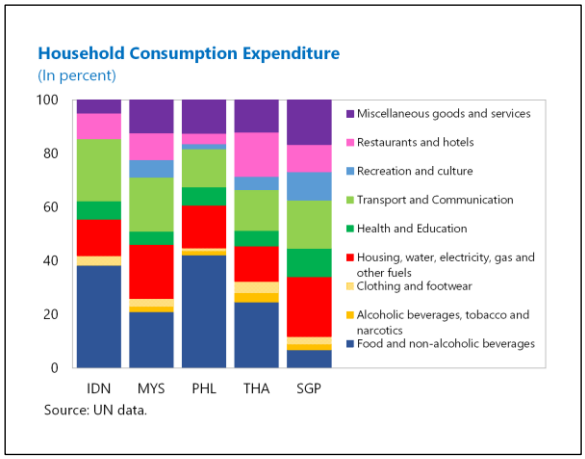



**14. The proposed energy subsidy reform in the 2021 budget would be an important step forward**. While energy subsidies significantly decreased in 2015 due to a successful reform, they still amount to over 10 percent of total government expenditure. In the 2021 budget, the authorities proposed an energy subsidy reform with the goal of transforming energy subsidies into social assistance (Box 1). While this is encouraging, unfortunately, the reform has been postponed, given the current COVID-19 crisis. As a result, expenditures on climate change remain below those on energy subsidies (chart).




**15. Energy subsidy reforms would be beneficial for several reasons**. Generalized energy subsidies tend to be regressive—richer households tend to consume more energy than poor household. They are thus not a cost-effective way to support the poorest and most vulnerable households. Targeted social assistance programs would be more effective. They would also help avoid leakages, by explicitly excluding more well-off households (e.g., through means-testing), and allow to increase the support to households in greater need. More broadly, a comparison of household spending on electricity, gas and gasoline suggests a lower share in Indonesia compared to other ASEAN countries (chart). More targeted subsidies with clear policy purposes would also enable reallocation of scarce budget for other policy purposes.



**16. A broader reform of energy price control mechanisms would also be beneficial**. With a move to targeted social assistance, the government could also consider more frequent adjustments in domestic retail prices with global market prices (Box 1). It could also consider a relaxation of price controls to promote competitiveness in fuel retail sales and power generation. While price controls can be justifiable in the case of a monopoly situation, private companies are permitted to enter the markets for retail fuels and power generation in Indonesia. Ex post regulation such as a price notification system would be superior to ex-ante regulation from the perspective of economic efficiency. The ex post regulation could ensure the regional pricing equality that the current ex ante regulation is required to achieve. More granular and targeted support to regions with high energy costs amid functioning market mechanism could be also an option.

**17. Regulatory frameworks to promote investment should aim toward a greener economy**. In 2019, Indonesia formulated a new regulation to accelerate the battery electric vehicle (EV) program for road transportation, to support the goal of becoming an EV hub for Asia and beyond with a 20 percent target share in total car production by 2025. Indonesia has natural resources such as nickel, that are important raw materials for batteries. This EV policy could be a solution to reconcile both development and green strategy and could contribute to absorbing labor from fossil related industries.[18] The policy could be complemented by a feebate scheme imposing sliding scale of fees on cars with above average emissions rates and giving a sliding scale of rebates to vehicles with below average emission rates. On the other hand, the recent omnibus bill on job creation has relaxed the regulation on environmental assessment and included royalty incentives to promote investment in the mining sector, which might include coal mining. In formulating the implementing regulation, the government should ensure that it incentivizes green investment and disincentivizes fossil fuel investment.

**18. Looking ahead, the introduction of a carbon tax could be also an effective mitigation measure**. The estimated reduction in $CO_2$ emission from a carbon tax indicates that this instrument could help Indonesia further in achieving emission targets (Table 3, IMF (2021)). Even in the case of a moderate rate of US$25 per ton $CO_2$, the carbon tax could cut emissions by 13.0 percent. The domestic environmental benefits from reduced pollution, traffic congestion, and accident casualties, would likely outweigh the domestic economic costs. On the revenue side, a carbon tax with the rate of US$25 per ton $CO_2$ could raise 0.7 percent of GDP, which could be used in part for compensation payments.

[18] Regarding its related spending, investment support should be temporary in nature. This should be clearly and transparently communicated in the budget and accompanied by cost-effectiveness assessment.

**Table 3. Indonesia: Impact of Carbon Tax, 2030 1/**

| | | | |
|---|---|---|---|
| Reduction in Fossil Fuel CO2 | | | |
| Carbon tax per ton of CO2 | $25 | $50 | $75 |
| Reduction below 2030 baseline | 13.0% | 20.3% | 25.4% |
| Domestic Environmental Benefits from a $50/tCO2 Carbon Tax | | | |
| | Economic cost | Net benefit | Gross benefit |
| In percent of GDP | -0.3 | 1.3 | 1.6 |
| Revenue | | | |
| Carbon tax per ton of CO2 | $25 | $50 | $75 |
| In percent of GDP | 0.7 | 1.4 | 2.0 |
| Energy Price Increase | | | |
| | Carbon tax per ton of CO2 | | |
| Baseline price | $25 | $50 | $75 |
| Coal (US$3.0/GJ) | 81% | 161% | 242% |
| Natural gas (US$8.7/GJ) | 13% | 26% | 39% |
| Electricity (US$0.11/kWh) | 31% | 52% | 70% |
| Gasoline (US$0.53/liter) | 13% | 26% | 38% |

Sources: IMF (2021); and IMF staff calculations.

1/ Baseline prices are retail prices estimated in Coady and others (2019) and include preexisting energy taxes. Baseline prices for coal and natural gas are based on regional reference prices. Baseline prices for electricity and gasoline are from cross-country databases. Impacts of carbon taxes on electricity prices depend on the emission intensity of power generation. Carbon tax prices are per ton. GJ = gigajoule; kWh = kilowatt-hour.

**19. The carbon tax impact on cost varies among industry sectors** (Table 4). In the case of US$25 tax per ton $CO_2$, overall jobs at risk are limited in the medium term. By sector, the mining and quarrying sector and the electric and gas sector could not absorb the carbon tax impact in the short term. This suggests that labor reallocation from the mining and quarrying sector would be inevitable. In the case of a US$50 or US$75 tax per ton $CO_2$, the cost increase and jobs-at-risk are higher. However, gradual implementation over several years could spread out the jobs-at-risk. New jobs related to green technology could smooth the movement of labor into other sectors. The introduction of a carbon tax could help raise budgetary resources to support and accelerate job reallocation and finance workers retraining programs.

**Table 4. Indonesia: Effects of Carbon Tax on Cost and Employment 1/**

| Industry | Cost Increase by Carbon Tax (In percent) | | | Medium-term Jobs at Risk (In percent of total employment) | | |
|---|---|---|---|---|---|---|
| | $25/tCO2 | $50/tCO2 | $75/tCO2 | $25/tCO2 | $50/tCO2 | $75/tCO2 |
| Agriculture, forestry and fishery | 0.40 | 0.81 | 1.21 | 0.00 | 0.00 | 0.00 |
| Mining & quarrying | 25.04 | 50.09 | 75.13 | 0.27 | 0.55 | 0.83 |
| Manufacturing | 3.27 | 6.54 | 9.81 | 0.00 | 0.41 | 0.90 |
| Electricity and gas | 29.34 | 58.69 | 88.03 | 0.07 | 0.16 | 0.24 |
| Water supply/sewerage/waste management/remediation | 1.16 | 2.32 | 3.48 | 0.00 | 0.00 | 0.00 |
| Construction | 2.70 | 5.39 | 8.09 | 0.00 | 0.00 | 0.16 |
| Wholesale and retail trade | 1.58 | 3.16 | 4.75 | 0.00 | 0.00 | 0.03 |
| Transportation and storage | 4.02 | 8.03 | 12.05 | 0.00 | 0.07 | 0.25 |
| Accommodation and food service activities | 0.59 | 1.19 | 1.78 | 0.00 | 0.00 | 0.00 |
| Information and communication | 0.71 | 1.41 | 2.12 | 0.00 | 0.00 | 0.00 |
| Financial and insurance activities | 0.49 | 0.97 | 1.46 | 0.00 | 0.00 | 0.00 |
| Real estate activities | 0.45 | 0.90 | 1.35 | 0.00 | 0.00 | 0.00 |
| Business activities | 1.27 | 2.53 | 3.80 | 0.00 | 0.00 | 0.00 |
| Pub administration/defense/compulsory social security | 1.05 | 2.10 | 3.14 | 0.00 | 0.00 | 0.00 |
| Education | 0.82 | 1.64 | 2.46 | 0.00 | 0.00 | 0.00 |
| Human health and social work activities | 1.04 | 2.07 | 3.11 | 0.00 | 0.00 | 0.00 |
| Other services activities | 0.97 | 1.94 | 2.91 | 0.00 | 0.00 | 0.00 |
| Total | 4.47 | 8.94 | 13.40 | 0.34 | 1.19 | 2.40 |

Source: IMF staff estimates.

1/ See Annex 5 of the IMF (2021) for methodology. The figures of the cost increase by carbon tax show the production cost increase from higher energy prices, both direct and indirect, as a result of a carbon tax, assuming full pass-through in upstream sectors, and no pass-through of higher costs to producer prices. The figures of the medium-term jobs-at-risk are calculated by subtracting sector growth rates as of 2019 from the jobs-at-risk number based on the methodology.

## D. Policies for Climate Change Adaptation

**20. The National Action Plan for Climate Change Adaptation (RAN-API) developed in 2014 includes comprehensive strategies for adaptation**. The plan identified areas affected by the rise in land and sea surface temperature and sea level, change in rainfall patterns, and the occurrence of extreme weather events. The objective of the plan is to build the resilience of (i) economy with emphasis of food security and energy independence aspects; (ii) living systems with emphasis of public health, housing and infrastructure; (iii) environmental ecosystems of forest and biodiversity; and (iv) urban areas, coastal areas and small islands.

**21. The adaptation plan should include fiscal costs to facilitate its implementation**. The plan should have fiscal backing for its implementation, but currently lacks such resources. In order to make the plan feasible, it would be crucial to determine the necessary medium-term expenditure, given Indonesia's limited tax base.

**22. The progress in advancing the plan should be monitored and reviewed regularly**. It would be crucial to ensure nationwide capacity development for adaptation given the broad impacts of climate change on Indonesia. The government should strengthen the monitoring and review

process for the plan to enhance the Indonesia's adaptation capacity. The capital movement plan, including its fiscal aspects, should be integrated into the adaptation plan to allow for a holistic perspective on adaptation policies.

## E. Conclusion and Recommended Policy Frameworks

**23. Indonesia's climate change related risks, including transition risk, have been increasing, given more frequent natural disasters and the economy's reliance on coal**. Preparations for managing these risks should continue.

**24. To this end, additional climate change mitigation and adaptation measures should be initiated**.[19] Particularly, Indonesian people could instantly benefit from energy subsidy reforms and from restructuring of energy pricing mechanism since some fuel retail prices are estimated to be higher than cost of supply due to market price drop. The paper suggests that the following policy steps should be considered:

- ***A comprehensive transition plan toward a greener economy***: It should be formulated as early as possible to allow for gradual transition. The plan should include steps to facilitate the reallocation of labor to other sectors, including capacity building, a road map of alternative revenue mobilization, such as carbon tax, and additional financial regulation for bank capital buffers, given risks from stranded assets.

- ***Reforestation incentive scheme***: In order to facilitate a cycle of deforestation and subsequent reforestation, it would be worthwhile considering a feebate scheme consisting of levies imposed on landowners for reducing carbon storage and subsidies for landowners who increase carbon storage. Alternatively, a tax on commodities from plantations could be an option of revenue resources for reforestation.

- ***Renewable energy generation incentive scheme***: A feebate scheme—e.g., levies imposed on power generators with above average emissions per kWh and rebates for generators with below average emissions per kWh—could be an option. Updating the National Energy Policy including policy support for renewable energy generation could reinforce its commitment toward a greener economy and attract international support as well as the ESG investment.

- ***Reforms of energy subsidies and energy pricing mechanisms***: The 2021 energy subsidy reform should be implemented as soon as possible. A functioning, market-based price adjustment for fuels and electricity, which would allow for full cost recovery in the related sectors, would be an important structural reform for greener economic development in Indonesia. At the same time, the direct support of low-income households should be strengthened.

[19] See also IMF (2021). The paper analyzes how fiscal policy can address challenges from climate change in Asia and the Pacific. It aims to answer how policymakers can best promote mitigation, adaptation, and the transition to a low-carbon economy, emphasizing the economic and social implications of reforms, potential policy trade-offs, and country circumstances.

- ***Vehicle incentive scheme***: A feebate scheme—imposes sliding scale of fees on cars with above average emissions rates and gives a sliding scale of rebates to vehicles with below average emission rates—could support a greater market share for electric vehicles.
- ***Harmonizing implementing rules for the Omnibus Bill on Job Creation with green investment***: The regulation could include incentives for green investment and disincentives for fossil investment.
- ***Introduction of a carbon tax***: It could be an effective mitigation measure for the Indonesian economy, given its reliance on coal and limited revenue base. A coal tax could be an alternative;
- ***Strengthening the monitoring and reviewing process of adaptation measures***: The government should ensure the progress of the adaptation action plan, including the capital movement plan. Its fiscal costs and financing should be integrated into the plan.

### Box 1. Indonesia's Energy Subsidies and the 2021 Reform Proposed by the Government

**The government uses energy subsidies and price controls to support low-income household and to ensure price equality across provinces**. Indonesia has two types of energy subsides, namely ex ante and ex post subsidies. An ex ante subsidy aims to lower costs for mainly supporting low-income households. An ex post subsidy, called as a compensation subsidy, fills the gap between the unit costs of supply and the retail prices for a unit of energy determined by the government. In other words, the need for compensation subsidies arises from the energy price controls imposed on energy distributors.

**The subsidized fuels are premium gasoline, diesel, kerosene, and 3 kg LPG cylinders (LPG), all fuels that are widely used by households**. Among the subsidized fuels, only diesel enjoys a fixed rate subsidy (IDR 1,000 per liter). Due to the price controls, all authorized retailers receive compensatory subsidies for kerosene and LPG. Similarly, Pertamina receives compensation subsidies for premium gasoline and diesel since the prices of these fuels sold by Pertamina are determined by the government. However, there is no effective monitoring system in place, and all users benefit from these subsidized fuels despite the policy intentions.

**The Ministry of Energy and Mineral Resources determines all fuel retail price settings of Pertamina, the state-owned oil company**. Other retailers also need to adhere to the government's pricing guidelines for fuels. Retail prices of fuels should, in principle, be adjusted in line with international market prices at least every three months. In practice, however, adjustments are infrequent. The price of LPG, for example, has been constant since 2008. Retail prices of other fuels have also been unchanged in recent years (charts 1–4).

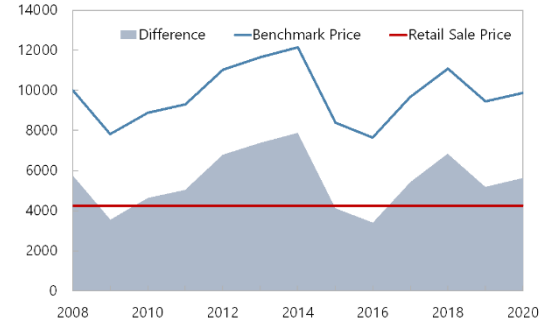
**Electricity is also partly subsidized**. PLN, the state-owned electricity company, has a monopoly for electricity distribution. The subsidy targets customers purchasing 450VA and 900VA, assuming that they are poor households. The government controls all retail prices and provides compensation to PLN for the price difference between cost of supply and retail prices. According to the Ministry of Finance, however, the subsidies and compensation are not well targeted to low-income household. Like fuels, retail prices of electricity should, in principle, be adjusted to fluctuation of cost of supply at least every three months, but real price adjustments are infrequent in practice (chart 5–6).

**The measures used in the 2021 energy subsidy reform plan will make subsidies more targeted and effective, and they should be implemented as early as possible**. The reform involves a paradigm change, shifting from commodity-based subsidies to people-based subsidies, with the latter being part of the Social Protection Program. The plan intends to take advantage of the market price mechanism given the momentum of falling oil prices. The plan includes the following measures: reduction of the fixed diesel subsidy from IDR 1,000 to IDR 500 per liter; application of market price adjustments to premium gasoline and electricity for non-subsidized customers, leading to elimination of the relevant compensation subsidy; gradual price adjustment of LPG, accompanied by integrating related subsidies into social assistance transfers.

## Box 1. Indonesia's Energy Subsidies and the 2021 Reform Proposed by the Government (Concluded)

### LPG Price

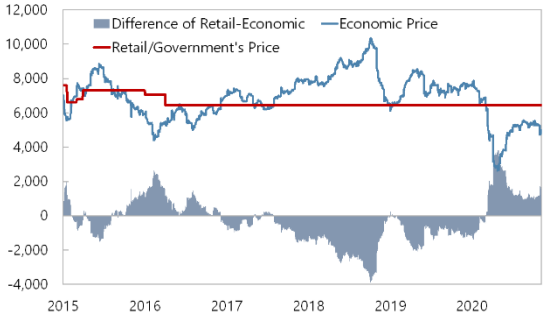
(In rupiah per kilogram)




Sources: Indonesian Ministry of Finance estimation; and IMF staff estimates.

### Gasoline 88 Price

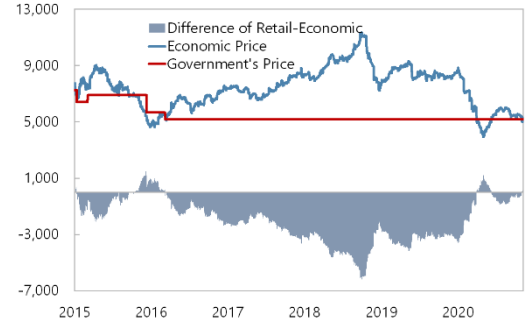
(In rupiah per liter)




Sources: Indonesian Ministry of Finance; and IMF staff estimates.

### Diesel Price

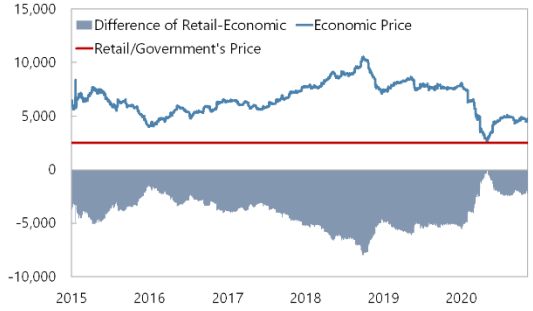
(In rupiah per liter)




Sources: Indonesian Ministry of Finance; and IMF staff estimates.

### Kerosene Price

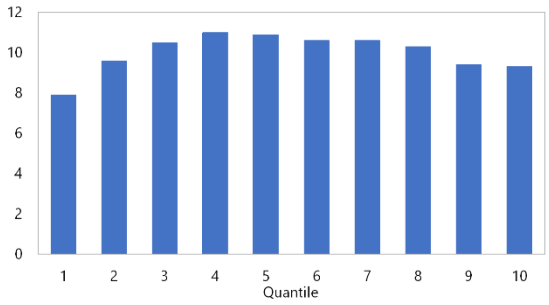
(In rupiah per liter)




Sources: Indonesian Ministry of Finance; and IMF staff estimates.

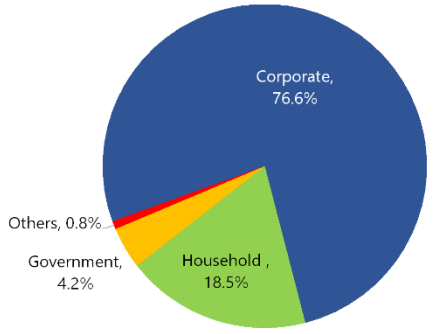
### Distribution of Subsidy and Compensation among Households, Electricity

(In percent)




Sources: Susenas 2018; and Indonesian Ministry of Finance estimates.

### Compensation Beneficiary, 2019




Sources: Perusahaan Listrik Negara; and Indonesian Ministry of Finance.

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