

Indonesia: Selected Issues



INDONESIA

SELECTED ISSUES

March 2022

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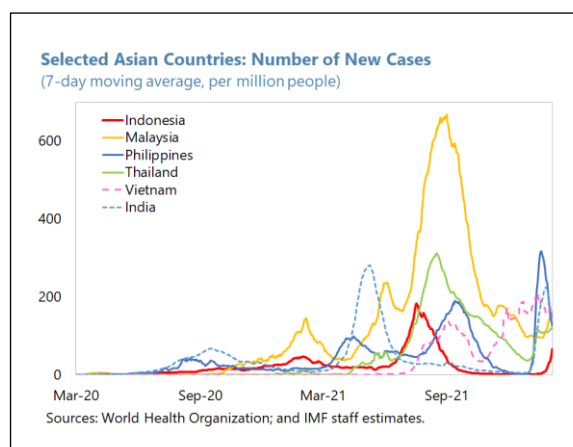
THE PANDEMIC AND ITS SCARRING EFFECTS IN INDONESIA¹

The pandemic triggered the first recession in Indonesia in more than 20 years. Its impact has been large and very heterogeneous across both economic sectors and provinces. Looking ahead, the international evidence highlights that recessions are often associated with scarring or hysteresis—in the sense that the level of output often does not recover back to the pre-recession trend. However, there is also evidence, including from past recessions in Indonesia, that pre-recession policy buffers and financial resilience are associated with reduced scarring, and that well-structured and paced structural reforms as well as targeted active policy actions can help to offset scarring.

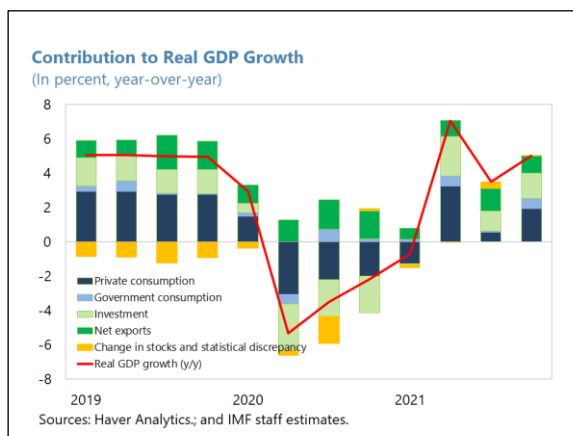
A. Introduction

1. The COVID-19 pandemic and the associated measures to contain it have severely affected the Indonesian economy.

After many years of strong growth of around 5 percent per year, output contracted by 2.1 percent in 2020 and is estimated to have expanded by about 3.2 percent in 2021. COVID-19 was first detected in Indonesia in March 2020 and quickly prompted far-reaching mobility restrictions to suppress the spread of the virus, taking a significant toll on economic activity. Indonesia has seen several waves of COVID-19 infections over the course of the pandemic, most recently in mid-2021 when the COVID-19 Delta variant spread rapidly across South Asia (chart).

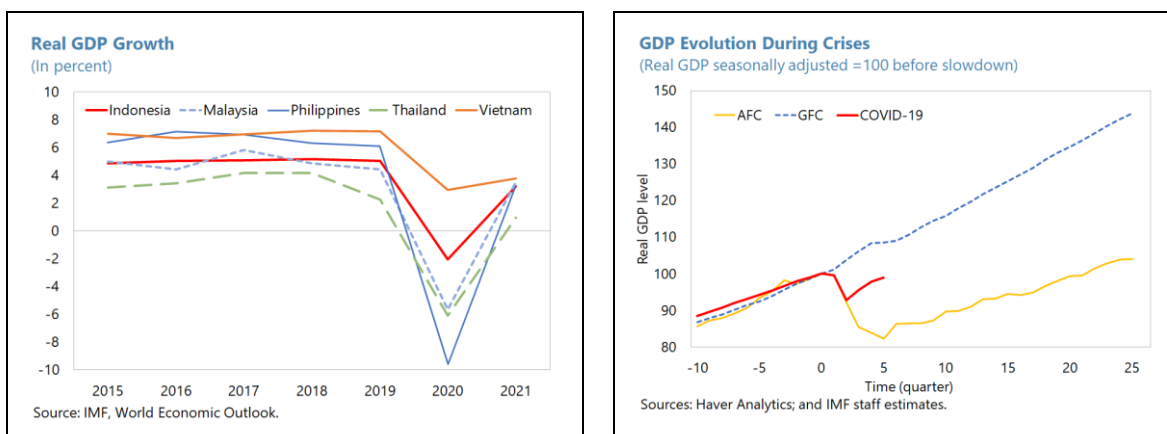


2. Like in many other countries, the most severe impact on economic activity occurred in the early phase of the pandemic, when testing was limited and measures to curb the spread of infections were relatively less targeted. Indeed, output contracted by nearly 8 percentage points during 2020Q1–Q2 (Text figure). The recovery began swiftly with a strong rebound in 2020Q3, which saw output rise by 3 percent q/q s.a. The pace of economic recovery slowed from 2020Q4 onwards, held back by additional waves in early 2021 and especially by the Delta variant wave in mid-2021.



¹ Prepared by Eugenio Cerutti, Robin Koepke, and Rani Setyodewanti (all APD).

3. Indonesia's contraction in real GDP during the COVID-19 recession was smaller than in most ASEAN peer countries (left chart below). This favorable performance was likely helped by less severe social and mobility restrictions, which allowed parts of the economy to remain open for business even as the COVID-19 situation escalated. That said, the COVID-19 recession was still the most severe disruption to the Indonesian economy in over 20 years. Output losses relative to pre-crisis trends exceeded those during the Global Financial Crisis by a wide margin, but they were still substantially smaller than those during the Asian crisis (right chart below).



4. The objective of this chapter is to analyze how the COVID-19 pandemic has affected economic activity in Indonesia in order to gauge the implications for scarring effects. To this end, the chapter first analyzes the nature of the impact of the pandemic across economic sectors and provinces in Indonesia. Then, it compares the impact of the pandemic associated recession with previous recessions in Indonesia and other countries. Following the literature, we define scarring or hysteresis as when the level of output does not recover back to the pre-recession trend.² Based on these analyses, we derive policy implications for reducing the expected scarring effects from the COVID-19 pandemic.

5. The empirical analysis suggests three main messages.

- First, it shows how multifaceted the COVID-19 shock has been for the Indonesian economy, hitting some sectors hard while leaving others unscathed, and even benefitting certain industries. While the health and communication sectors grew during the peak of the recession and gathered momentum as the economic recovery took hold, the transportation/storage sector and the hotel/restaurant sector has been lagging due to the mobility restrictions during the pandemic. The analysis also points toward large heterogeneity across provinces, which is only partially explained by differences in the sectoral composition of provincial economies. Differences in mobility dynamics as well as labor market conditions immediately before the pandemic are additional factors that explain the heterogeneity across provinces.

² The literature referred as hysteresis to what is today, during the COVID-19 pandemic, is being referred to as economic scarring. See Box 2 for more details on the definition of scarring used in this chapter.

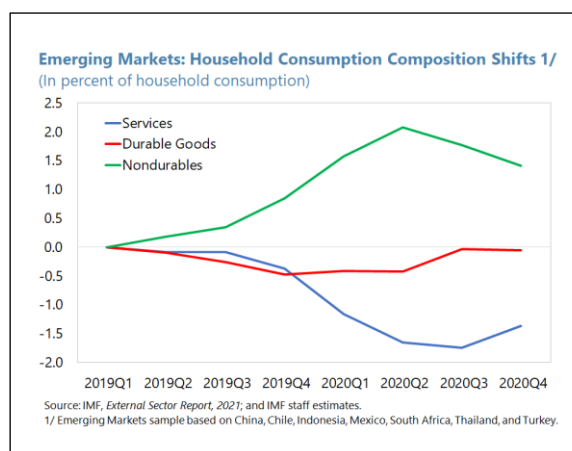
- Second, the historical study of recessions indicates that pre-recession policy buffers and financial resilience are important factors associated with reduced scarring. Indonesia's pre-pandemic fiscal buffers provided sizable fiscal policy space to mitigate the effects of the crisis on domestic demand while its financial resilience prevented a systemic banking crisis from occurring.
- Third, recessions provide opportunities to give further impetus to structural reforms. This has been especially so for emerging markets, including Indonesia in the past. Structural reforms as well as targeted policy actions (e.g., cash transfers to protect vulnerable workers; financial help to viable firms to cope with the pandemic and improve worker retention, retraining labor programs) can help Indonesia to offset scarring and even improve medium-term potential growth.

B. The Impact of the Pandemic Across Sectors and Provinces

A Disaggregated View

6. An important feature of the pandemic recession globally is its asymmetric impact across economic sectors.

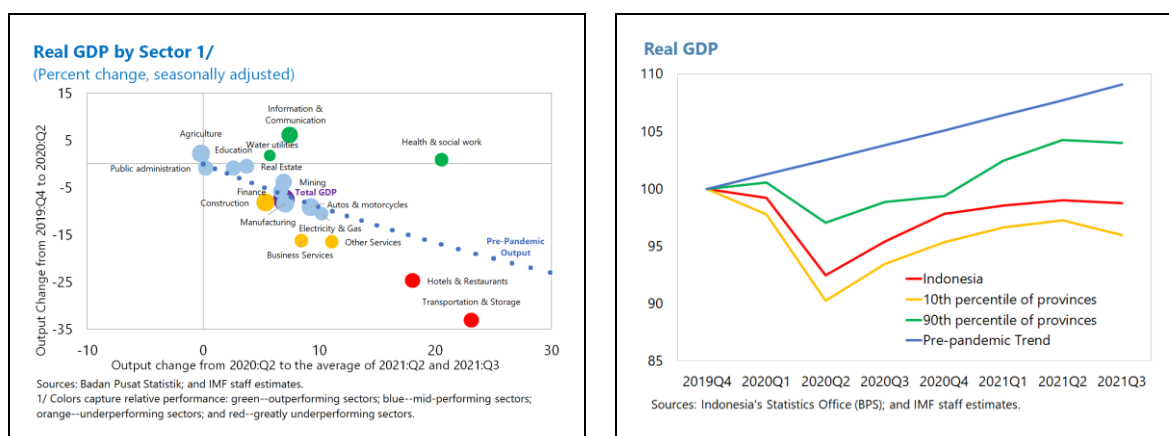
Generally speaking, sectors that depend on the presence or movement of people have been hit the hardest, while sectors in which activity is compatible with social distancing have been less affected, and in some cases even benefitted. Consistent with this general pattern, services sectors have seen greater adverse effects, while goods' sectors have been relatively more resilient (see chart). Primary sectors, such as agriculture and mining, were generally resilient to the pandemic because they require only limited physical interaction, even though they employ a sizeable portion of the labor force (Pasaribu and others, 2021).



7. These general asymmetric patterns also apply to Indonesia. As of 2021Q3, output in most goods sectors was back to or even above pre-pandemic output levels, while services sectors were lagging (left-hand side figure below). The hardest hit sectors were the transportation/storage sector and the hotel/restaurant sector, whose 2021Q3 levels of GDP were 19 percent and 14 percent below the pre-pandemic level, respectively. Other sectors with sustained output losses during the pandemic include business services and "other services" sectors. On the other end of the spectrum, sectors that appear to have gained momentum during the pandemic include the health & social work sector (which likely benefitted from additional healthcare needs) and the information & communication sector (which benefitted from the proliferation of remote work).

8. Economic performance has also varied widely at the provincial level in Indonesia. While all of Indonesia's 34 provinces except Papua saw output on a lower path than their pre-pandemic trends, some provinces have been much harder hit than others (right chart below). To some extent, the variation in provincial performance reflects the sectoral composition of provincial GDP. For

example, Bali has been the worst affected province, with 2021Q3 GDP down 16 percent from its pre-pandemic level, reflecting the important role of tourism for Bali's economy (see Appendix I). But even after accounting for variation in the sectoral composition of provincial GDP, there is significant variation in provincial output performance. For example, Papua witnessed much stronger growth during the pandemic than would be suggested by its sectoral GDP composition, reflecting faster growth for most economic sectors compared to the Indonesian average growth rates of those same sectors.



Empirical Analysis

9. In order to uncover the factors behind the heterogeneity in sectoral and provincial performance, a more formal analysis is needed. To this end, we construct a panel with quarterly GDP growth at the sector and provincial level and a range of explanatory variables—sectoral fixed effects, labor market conditions, and mobility changes across provinces (see Box 1 for regression details). The results are summarized in Table 1, which provides estimation details for each of the three time periods (pandemic, downturn, and recovery).³

- The **sectoral fixed effects** confirm the significant heterogeneity at the sectoral level across provinces, with transportation & storage and hotels & restaurants underperforming across provinces, as did the business services and “other services” sectors. In all four sectors, the underperformance is apparent in the estimations for the entire period of the pandemic (2019Q4 to 2021Q3) but is driven by the early phase of the pandemic, given that the sign of the estimated coefficient flips during the recovery. This is consistent with the pattern apparent in the above scatterplot, which showed these four sectors lagging in their level of output relative to their pre-pandemic level, even though they were among the fastest growing sectors during the recovery. These sectors can thus be thought of as “high beta” sectors with respect to the pandemic in the sense that they are particularly sensitive to changes in social restrictions and mobility. By contrast, the health & social work sector and the information & communication

³ Fixed effects are shown for each sector except for the agricultural sector, which has been among the least affected sectors by the pandemic (see Appendix I). That is, the sectoral fixed effects indicate how much each sector has been affected relative to the agricultural sector.

sector grew significantly across provinces. The regression results reveal that this outperformance is entirely attributable to the recovery period. This suggests that it took time in the early stage of the pandemic for the economy to shift resources to health and communication sectors. This delay may help explain why the first infection wave was so much more damaging to the economy than subsequent waves: By the time the second and third waves occurred, support from the health and social sector had been ramped up and information and communication technology had been expanded to allow for economic activity to function despite mobility restrictions.

- The **pre-pandemic level of sectoral employment** as a share of the provincial population can be thought of as a proxy for how concentrated economic activity is in particular sectors within each province. The estimated coefficient on this variable is negative during the downturn, but positive during the recovery. In other words, the greater concentration of activity in particular sectors is associated with a sharper downturn in economic activity. This finding may point to the challenges that large sectors have in adapting to the new realities of the pandemic, for example in terms of facilitating the reallocation of resources to activities that are compatible with health and safety protocols. The adverse effect of concentration is (partially) reversed during the recovery, when pressures to reallocate resources diminished.
- The **pre-pandemic level of labor force participation** can be thought of as an indicator of resource utilization, with low participation rates indicating there may be idle resources for the provincial economy to absorb. The findings indicate that low participation rates were associated with stronger growth during the recovery period, likely reflecting the absorption of idle labor as new opportunities opened up and pressure on financially constrained households rose. This interpretation would be consistent with the notion that the Indonesian economy exhibited a growing degree of adaptation and reallocation of resources as the pandemic progressed.
- The **pre-pandemic level of wages** has a negative association with growth over the course of the pandemic, although the effect is not statistically significant when looking at either the downturn or the recovery period individually. This relationship may in part reflect reallocation of labor from high-wage areas to low wage professions or subsistence farming due to job loss, including geographical reallocation to low-wage provinces as individuals returned to their hometowns (notably in the first year of the pandemic).
- The **mobility indicator** is a high frequency proxy for the severity of the pandemic (e.g., Putra and Arini, 2020; Gamtkitsulashvili and Plekhanov, 2021). The results show that an increase in residential mobility is associated with reduced growth, especially during the downturn phase of the pandemic (2020H1). This is consistent with the “stay-at-home-effect” described in the recent literature (e.g., Cali and Ryandiansyah, 2020; IMF, 2022 forthcoming). Provinces that suffered a greater increase in residential mobility tended to grow more slowly over the course of the pandemic, consistent with the notion that successful management of COVID-19 outbreaks helped reduce the economic toll of the pandemic.

Table 1. Indonesia: Baseline Estimation Results for the Determinants of Real GDP Growth

	(1) Pandemic	(2) Downturn	(3) Recovery
Pre-pandemic level of employment	-0.002 (0.002)	-0.007 ** (0.003)	0.004 * (0.002)
Pre-pandemic level of labor force participation	-0.004 ** (0.002)	0.001 (0.002)	-0.006 *** (0.002)
Pre-pandemic level of wages	-0.032 ** (0.013)	-0.021 (0.021)	-0.003 (0.013)
Changes in residential mobility	-0.005 *** (0.001)	-0.006 ** (0.002)	-0.001 (0.001)
Sectors			
Mining sector	-0.033 (0.041)	-0.135 (0.052)	0.096 ** (0.043)
Manufacturing sector	0.012 (0.041)	-0.099 ** (0.044)	0.106 *** (0.032)
Electricity and gas sector	0.001 (0.042)	-0.135 ** (0.055)	0.130 *** (0.041)
Water utilities sector	0.099 (0.079)	-0.100 * (0.053)	0.194 ** (0.080)
Construction sector	-0.046 (0.034)	-0.187 *** (0.047)	0.136 *** (0.036)
Autos and motorcycles sector	-0.048 ** (0.021)	-0.149 *** (0.028)	0.098 *** (0.023)
Transportation and storage sector	-0.287 *** (0.048)	-0.498 *** (0.065)	0.206 *** (0.042)
Hotel and restaurant sector	-0.210 *** (0.046)	-0.407 *** (0.058)	0.192 *** (0.040)
Information and communication sector	0.102 ** (0.040)	-0.035 (0.054)	0.130 *** (0.039)
Finance sector	0.016 (0.038)	-0.143 *** (0.051)	0.153 *** (0.038)
Real estate sector	-0.013 (0.039)	-0.139 *** (0.052)	0.117 *** (0.039)
Business services sector	-0.150 *** (0.043)	-0.299 *** (0.062)	0.143 *** (0.041)
Public administration sector	-0.083 ** (0.035)	-0.101 ** (0.044)	0.013 (0.036)
Education sector	-0.035 (0.034)	-0.118 *** (0.044)	0.078 ** (0.033)
Health and social work sector	0.118 *** (0.041)	-0.096 * (0.052)	0.208 *** (0.040)
Other services sector	-0.176 *** (0.066)	-0.363 *** (0.135)	0.181 ** (0.080)
Adjusted R ²	0.32	0.32	0.09
Number of observations	569	569	569
Standard error of regression	0.16	0.18	0.15

Source: IMF staff estimates.

Box 1. Regression Specification

The estimated equation is:

$$Y_{ij} = \alpha + \beta_1 \cdot EMP_{ij} + \beta_2 \cdot LMC_j + \beta_3 \cdot HC_j + \beta_4 \cdot SP_j + \gamma_i + \varepsilon \quad (1)$$

Where Y is real GDP growth, α is a constant term, EMP is sectoral employment as a share of the population (by province), LMC is the indicator for labor market conditions, HC is the proxy for human capital, SP is the variable capturing the severity of the pandemic, γ captures fixed effects at the sectoral level, i is the sectoral subscript, j is the subscript for Indonesia's provinces, and ε is an error term.

To avoid distortions in seasonal factors during the pandemic, all GDP data are seasonally adjusted using pre-pandemic seasonal factors by applying the X12 method to data for 2010 through 2019Q4. We analyze cross sections for three periods: the period of the pandemic (output change from 2019Q4 to 2021Q3), the downturn (2019Q4 to 2020Q2) and the recovery (2020Q2 to 2021Q3). These three periods are defined so as to uncover variation in the economic factors linked to output changes over the course of the two main phases of the pandemic, while also considering the pandemic period as a whole.

The independent variables available at the provincial were initially grouped into three categories, from each of which one variable is included in the regression (variables used in the preferred specification are shown in italics):

- Group 1: Proxy for labor market conditions pre-pandemic (variables: *labor force participation*; unemployment rate).
- Group 2: Proxy for human capital pre-pandemic (variables: *wage level*; share of workers in informal sector; years of education; poverty rate).
- Group 3: Proxy for severity of pandemic (variables: residential mobility from *Google's Community Mobility Report*; COVID-19 cases per capita; COVID-19 deaths per capita). Each of the indicators in Group 3 is calculated as the change over the reference period.

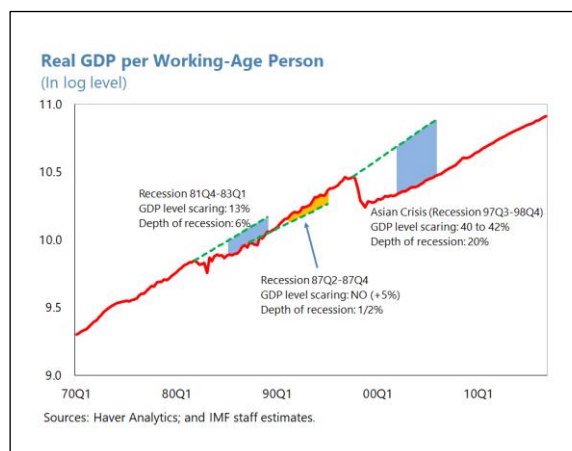
C. A Historical Perspective on Scarring

Previous Indonesian Recessions

10. Three Indonesian regressions are identified. While Indonesia had not experienced a recession in the two decades before the pandemic, it has experienced three recessions since the 1970s as shown in figure below (see Box 2 for the criteria used to identify recessions).

- **The 1981 recession:** It started in the last quarter of 1981 and lasted two quarters. It was linked to that year's abrupt decline in oil prices. The fall in the level of output vis-à-vis the pre-recession trend was about 13 percent.
- **The 1987 recession:** It lasted three quarters, covering 1987Q2 and 1987Q4, but it was relatively shallow, registering only about ½ percent fall in real GDP. This recession can be linked with the sharp decline in stock markets across the world, which started in the U.S. with Black Monday and was transmitted through the global financial system leading to the fall of the European and Asian stock markets. There was no scarring impact from this recession. GDP was above the pre-recession trend two years after the recession.

- **The 1997 recession:** This was the result of the Asian financial crisis, covering seven quarters (from 1997Q3 to 1998Q4) and a fall in nominal GDP of up to 20 percent along with a systemic banking crisis. The fall in the level of output vis-à-vis the pre-recession trend was about 40 percent, the deepest recession since the 1970s.⁴



11. While the recessions of 1981 and 1997 display hysteresis/scarring, the 1987 recession does not.

The fact that the recession of 1987 does not display scarring is not only linked to its shallowness and short characteristics, but also, as can be appreciated in the figure above, that there was an increase in the GDP trend growth just after. This phenomenon could be linked with a series of structural economic reforms that accelerated in 1987. There was a broad deregulation of the economy process (Halim, 1988) as well as the starting of a trade liberalization process (Fane and Condon, 1996), which facilitated a rapid export led-growth process.

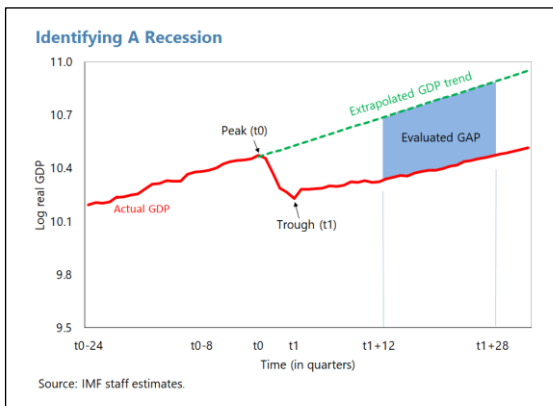
12. The documented uneven pace of recovery from the pandemic is symptomatic of persistent output losses that typically emerge after deep economic downturns, in Indonesia and elsewhere. The Article IV IMF staff projections for real GDP growth does not forecast a loss in medium-term growth rates, but a loss in the output level of about 6 percent in the medium term relative to the level envisaged in the January 2020 WEO.⁵ Other recent studies for Indonesia also highlight potential scarring effects. World Bank (2021) argues that the crisis could damage Indonesia's growth potential through lower investment, weak productivity growth, and loss in human capital. Learning from past experiences, Pritadrajati (2021) found long-term scarring effects due to unemployment and informal self-employment. The scarring effects were significant among senior workers who were unemployed, and among young workers who were self-employed.

⁴ The 1997 Asian crisis not only triggered significant economic scars but also drove policymakers to embark on major regulatory reforms to strengthen the resiliency of the country's financial system against future shocks. One of the reasons why Indonesia did not experience a recession during the 2007/2008 Global Financial Crisis was the strength of the financial sector.

⁵ The projected scarring is lower than the historical average among emerging markets that is discussed in the next section when analyzing the historical evidence.

Box 2. Methodology Used for Identifying Recessions and Quantifying Scarring Effects

Identifying a recession: A recessionary period or “recession” is traditionally viewed as a period during which the level of GDP—sometimes, but not always—monotonically contracts. To identify such periods, the non-parametric methodology of Harding and Pagan (2002, henceforth referred to as the “BBQ”) is applied to the log level of quarterly real GDP as compiled in Aslan and others (2019). Broadly speaking, the BBQ algorithm mathematically defines turning point events—peaks and troughs—as local maxima and minima in the level of a series given certain censoring rules. The settings for the traditional BBQ algorithm were set as follows: the symmetric window parameter was set to two quarters; the minimum length of the phase for both expansions and contractions was set to two quarters; the minimum complete length for a cycle (expansion plus contraction) was set to five quarters.



Quantifying the scarring effects: Following Blanchard, Cerutti, and Summers (2015), a two-step procedure was adopted using real GDP per working-age person (calculated as GDP over population of 16 to 64 years old). First, the pre-recession trend associated with each recessionary episode was determined. In calculating pre-recession trends, a number of factors are taken into consideration. The first, as noted in Martin, Munyan, and Wilson (2015), is that detrending tools cannot accommodate long-lasting deviations from trend, and so simple exponential trends are instead estimated recession-by-recession using nearby historical data. A second issue is how to account for the fact that the economy may have been in a boom—and thus above trend—before the recession started. Therefore, the two years before the peak from the computation of the trend are excluded.

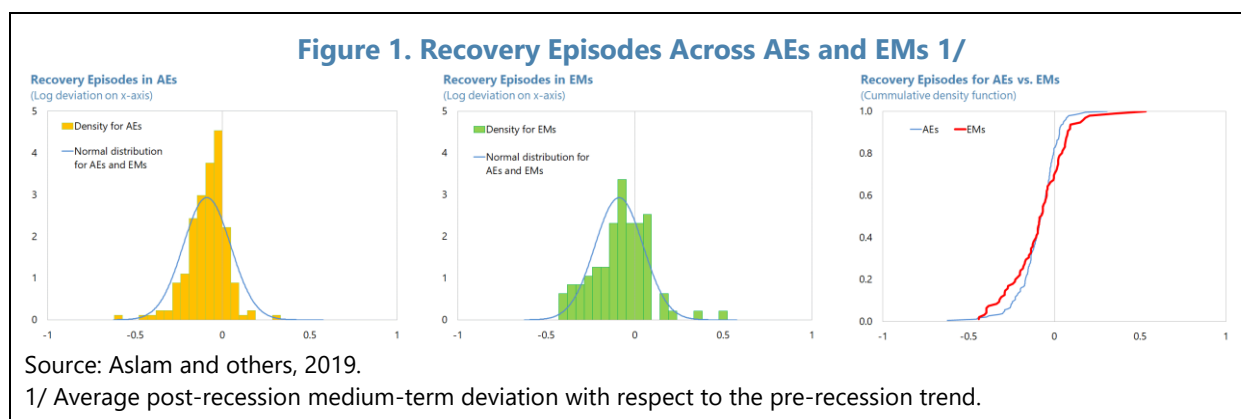
The second step, once the pre-recession trends have been calculated, is to determine to what extent the recession has damaged the economy by comparing the real GDP level following the subsequent recovery with the pre-recession trend. The window over which this post-recession output loss is measured is an average of 3 to 7 years after the trough of the recession.

International Evidence

13. There have been studies about how recessions can affect economic output. In general terms, scarring or hysteresis captures several channels by which a recession can impact future economic activity, in the sense that the level of output often does not recover back to the pre-recession trend. First, a particularly destructive/long-lasting recession can force a reallocation of resources. For workers, the more time spent out of work, the more their skills may decline—job losses may also occur disproportionately in higher skill (productivity) sectors. In addition, a portion of the capital stock may become obsolete. Second, subdued or uncertain growth prospects cause firms to reduce investment, including in intangible assets, which can both reduce the capital stock and depress productivity growth. On this front, Aghion and others (2010) show that tight credit constraints, which often arise following financial crises, imply procyclical investment in intangible assets. Using firm-level data in France, Aghion and others (2012) show that while research and

development spending plummets in recessions, its increase during subsequent upturns is not proportional. Both findings can help explain why recessions can have hysteresis effects.

14. An analysis of past recessions offers useful lessons for the current experience. In the rest of this section, we rely on the calculations of Aslan and others (2019) for a sample of 23 advanced economies (AE) and 27 Emerging Markets (EM) during the period 1960Q4-2016Q4. Their analysis shows that even accounting for shallower recessions, which are often less related to large supply shocks (e.g., banking crisis and/or oil price shocks), the presence of scarring or hysteresis in both AEs and EMs is clear. As shown in the left and center charts of Figure 1 below, the average experience of EMs following recessions is remarkably similar to the ones experienced by AEs. Across the 255 recession-and-recovery episodes in their sample, 82 percent of recessions in AEs exhibit scarring/hysteresis, compared to 69 percent in EMs. Relative to the pre-recession trend, the average output loss is 8.8 percent in AEs, compared to 6.8 percent in EMs. Nonetheless, the distribution of outcomes is more varied in EMs. Although some recovery episodes are above the pre-recession trend, there are more outcomes in the left tail of the distribution denoting very weak recoveries. This is also visible in the right chart of the Figure 1 below, when comparing the cumulative density functions.



15. Post-recession recoveries are influenced by structural factors, especially in EMs. Recession characteristics and economic circumstances have similar effects in both country groups, suggesting that recoveries and recessions in EMs are not so different from those in AEs, on average. However, post-recession experiences are somewhat more varied in EMs—the tails of the distribution of recovery outcomes are fatter. Aslan and others (2019) find that stronger recoveries are linked to improvements in the quality of institutions, especially in EMs, in their panel study of the post-recession periods. The fact that EMs are the ones that could benefit more from structural reforms could explain the larger right-tail mass in EMs compared with AEs shown in the Figure 1. This is suggestive of a greater impact of structural reforms in EM countries than in AEs, given there is often more room for improvements and space for cross-country convergency dynamics in EMs.

16. Recessions which coincide with banking crises tend to be deeper and longer lasting. The estimates show that even once the length of recession is controlled for, recoveries still tend to be much weaker following recessions that feature banking crises, and the results are very similar for both AE and EMs. If a recession is associated with a banking crisis, the average post-recession

output loss increases by about 4.8 percentage points, with no discernable EM-specific difference in impact. This result finds ample support in the literature—for example, Cecchetti, Kohler, and Upper (2009) show that there are several elements of financial crises which have lasting effects on the real economy and tend to give rise to hysteresis. First, funding costs are driven up (higher spreads for corporate/household borrowing, relative to benchmark rates; lower equity prices) and credit availability is likely to be reduced, as banks and other financial institutions look to shore up balance sheets. Next, firms' and households' net worth will generally decline, owing to lower equity and property prices, increasing adverse-selection problems for lenders and weakening creditworthiness for households. Finally, confidence effects reduce firm and household spending, given heightened uncertainty about future revenue/income prospects. Each of these conspires to reduce investment and consumption activity. Aghion and others (2010, 2012) provide evidence on the negative effect of credit constraints on investment in intangible assets, which also speaks to the prevalence of hysteresis following financial crises. More generally, a number of other studies also find that output losses and recession durations are larger/longer following banking crises (e.g., Caldara and others, 2016; Jorda and others, 2011 and 2013; and Reinhart and Rogoff, 2009) and that recoveries are notably weaker thereafter (e.g., Cecchetti and others, 2009; and Teulings and Zubanov, 2014).

D. Policy Recommendations

17. The analysis in this chapter highlights the magnitude and the heterogeneity of the impact of the pandemic in Indonesia. It triggered the first recession in 20 years, and while it has impacted some sectors (e.g., transportation & storage and hotels & restaurants) more severely than others initially, there are still significant differences across provinces, which go beyond different sectoral compositions and related with labor market differences as well as the impact of the pandemic on mobility.

18. Expected characteristics of the current recovery in Indonesia are in line with previous recessions, which also helps to highlight policy priorities. Following the international and domestic precedents, the expected level of scarring for the pandemic in 2025 is about 6 percent in the baseline scenario of the 2022 Article IV with respect to the pre-pandemic January 2020 WEO projections.⁶ This is in line with the reviewed empirical evidence in the literature that find that most recessions in both AEs and EMs exhibit scarring/hysteresis—in the sense that economic activity generally fails to return to its pre-recession trend. Nonetheless, the heterogeneity found across episodes in Indonesia and other EMs also indicates that there is room for policy action and that some pre-pandemic strengths in the Indonesian economy are important factors. The following three key policy priorities could be highlighted:

- *Financial sector resilience* is key to avoiding large scarring effects. Banking crises, both in AE and EM, have similar and very important impact on scarring. The fact that the Indonesian banking sector was in good financial shape pre-pandemic and the authorities' continuous efforts to strengthen supervision and regulation to preserve financial sector stability have mitigated the

⁶ In other words, Indonesia would need to grow at about 7 percent per year for at least 5 years to reach back to a pre-pandemic level trend that had imbedded about 5 percent growth per year.

impact of the pandemic associated recession. Going forward, preserving financial stability is key to avoiding deeper costs in the future.

- *The availability of fiscal space* before recessions is also important to diminish their impact. Not only could this be key to providing support to shore up financial resilience, but also for active policies during the recession. As shown in our sectoral and provincial analysis for Indonesia, some targeted policy support in hard-hit sectors and/or provinces could help the adjustments in those sectors by providing time and/or facilitating resource reallocation as much as possible. Active policies should be executed with a clear balance between costs and benefits and policy responses should be calibrated in light of evolving conditions.⁷
- *A successful and well-paced implementation of structural reforms* is essential for overcoming scarring in the medium to long term. As shown for Indonesia and other countries, recessions also provide opportunities for structural reforms. Indonesia has taken advantage of the pandemic in this sense, especially with the omnibus bill on job creation enacted last year. However, the implementation and complementarity of the reforms would be key. Market and labor reforms embedded in the omnibus bill could be further complemented with measures to enhance governance and address weak access to finance through financial deepening.⁸ The first steps enacted reforms aimed at increasing fiscal revenues as well as further reforms in this area (e.g., a broad medium-term revenue strategy that includes streamlining the business income tax structure, reducing special regimes and discretionary exemptions in the VAT system (see IMF Country Report No. 21/46 for details) would provide not only the needed medium-term finance for high-social-return spending priorities such as education, health and infrastructure, but also would help to improve the allocation of capital and labor for increased productivity.

⁷ Chapter 3 of the April 2021 WEO shows how job retention policies are extremely powerful at reducing scarring and mitigating the unequal impacts of a pandemic shock across workers, while reallocation policies supporting job creation can help ease the adjustment to the more permanent effects of the COVID-19 shock on the labor market.

⁸ Chapter 3 of the October 2019 WEO shows how reform in areas such as governance, domestic and external finance, trade, and labor and product markets could deliver sizable output gains in the medium term. The pace of implementation of labor reforms should also take into account the state of recovery since some measures could be counterproductive during the middle of recessions (see April 2016 WEO).

Appendix I. GDP by Sectors and Provinces

Figure 1. Indonesia: GDP by Sectors and Provinces

(Index 2009Q4 = 100; percentile based on 34 provinces)

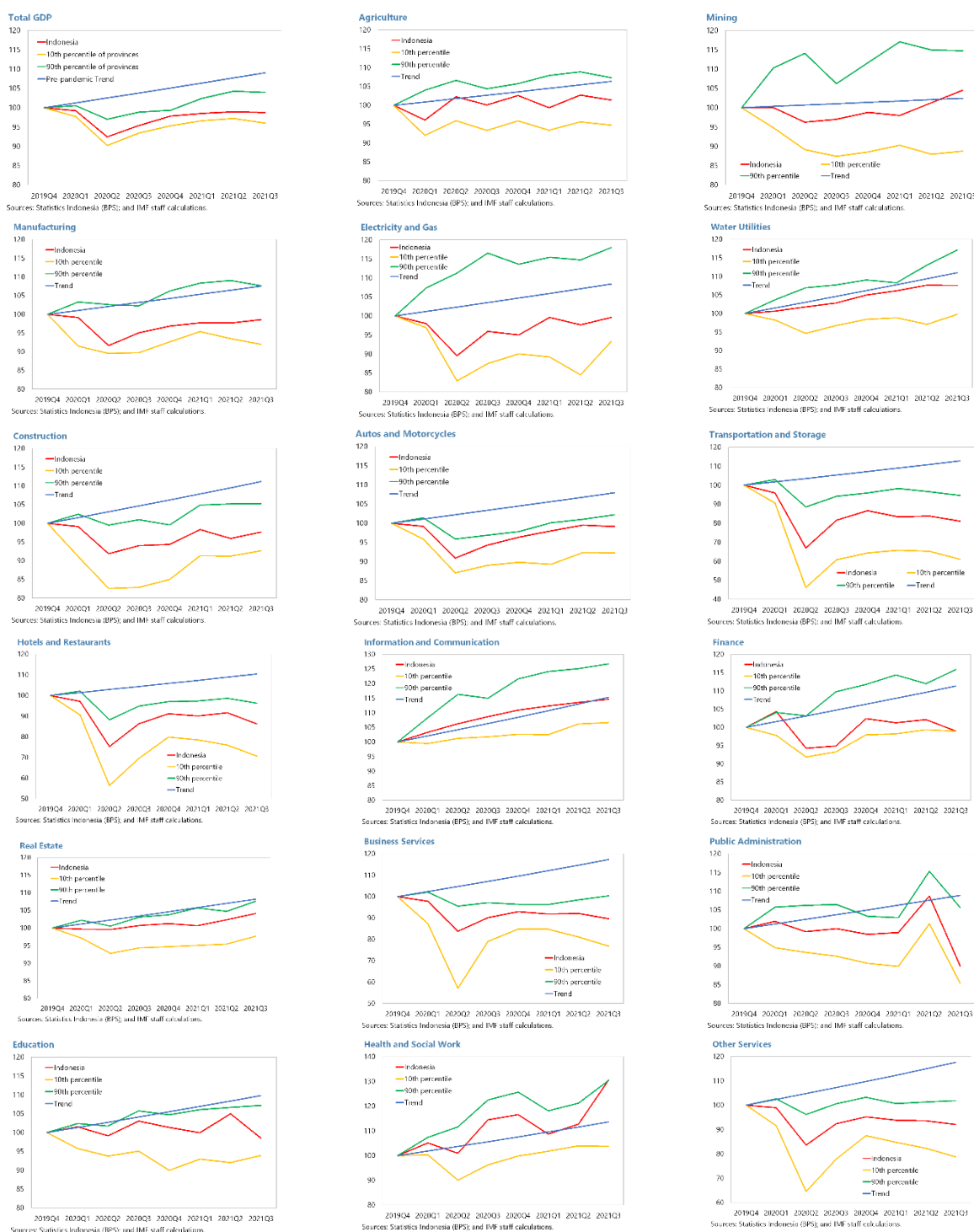
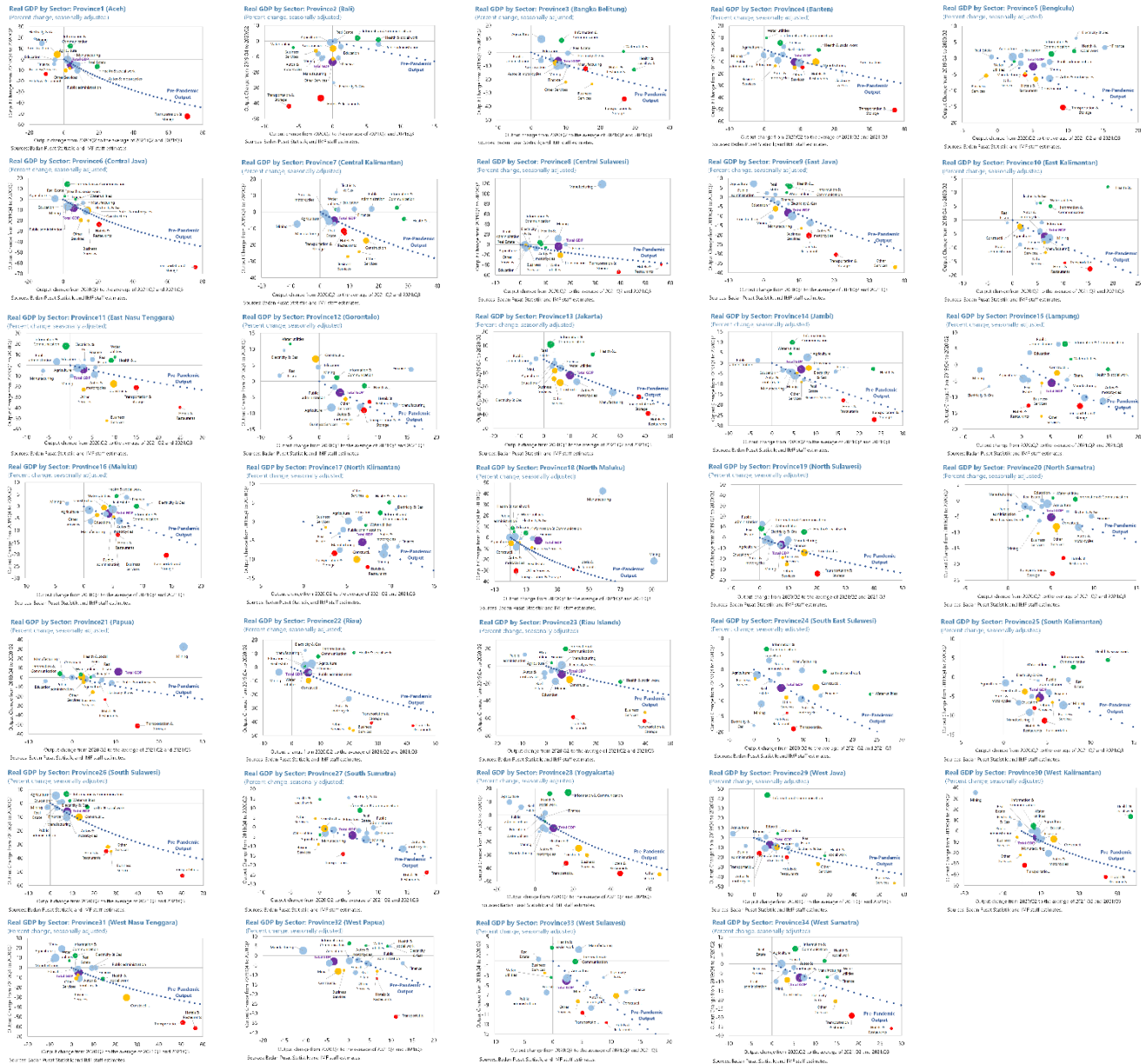


Figure 2. Indonesia: GDP by Provinces and Sectors



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INDONESIA'S EXIT STRATEGY FROM COVID-19: POLICY CONSIDERATIONS AND SCENARIO ANALYSES¹

The Indonesian economy, together with the rest of the globe, is emerging from one of the worst economic crises in modern history. How should Indonesia adjust and coordinate its macroeconomic policies to ensure a strong and durable recovery? What are the important policy challenges in this process? This paper discusses these issues and examines the policy implications of different exit scenarios linked to major changes in global economic conditions, notably the expected tightening of U.S. monetary policy. The model simulations show that much will depend on the specifics of the shocks in the scenarios and underscore the importance of policy flexibility and coordination.

A. Introduction

1. With the economic recovery gathering pace in Indonesia, there is a growing need to recalibrate current macroeconomic policy settings. Since the onset of COVID-19 in early 2020, policymakers have taken a series of bold policy actions to counter the adverse economic impacts of the pandemic. The policy response was successful in restoring economic and financial stability, but nevertheless required suspending two central pillars of Indonesia's macroeconomic policy framework: namely, the annual budget deficit ceiling of 3 percent of GDP and the restriction on monetary budget financing by Bank Indonesia (BI). Under current laws, these pillars will be reinstated by 2023, in keeping with Indonesia's longstanding prudent macroeconomic management approach. As a result, the fiscal policy stance is expected to turn moderately contractionary over 2022–2023 as the fiscal deficit is lowered to comply with the 3 percent deficit target, and BI financing will end by end-2022. Monetary policy is expected to stay accommodative in the short term, but as the recovery gathers steam, a gradual exit from the accommodative stance will be needed to maintain macroeconomic stability and rebuild policy buffers against future economic shocks.

2. But the exit could be compounded by several challenges, amid still large uncertainties surrounding global growth prospects and COVID-19. Notably, spillovers from a faster than expected U.S. monetary policy normalization could lead to a tightening of domestic financial conditions when the economy still has considerable slack, interrupting Indonesia's recovery if this is not accompanied by stronger external demand. Furthermore, a new surge of COVID-19 could increase the trade-offs between preserving policy credibility and supporting the economy, given the commitment to return to the budget deficit ceiling in 2023.

3. This chapter discusses the policy considerations for Indonesia's exit strategy and the policy implications of different exit scenarios associated with U.S. monetary policy tightening. Depending on the nature and size of external spillovers from the expected tightening of

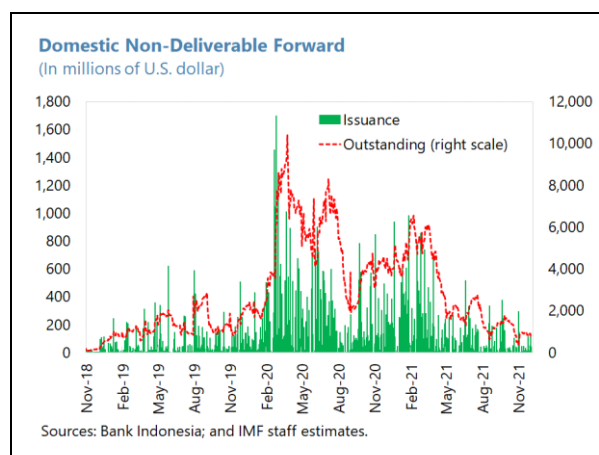
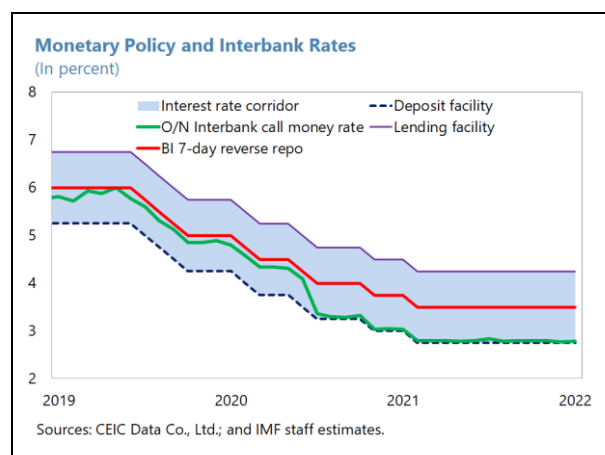
¹ Prepared by Minsuk Kim (APD) and Hou Wang (MCM), with helpful inputs from Agnes Isnawangsih (APD), Rani Setyodewanti, and Wahyu Ari Wibowo (all RRO in Jakarta).

U.S. monetary policy, the exit strategy will need to be adjusted in terms of the timing, policy mix, and sequencing. This chapter discusses the broad policy considerations for Indonesia's exit policy mix under both the baseline scenario and alternative risk scenarios using model simulations.

B. Policy Response to COVID-19

4. BI faced the pandemic with a sound monetary policy framework. After formally adopting an inflation targeting framework in 2005, BI has made several refinements to its monetary policy framework, notably to reflect the experience from the Global Financial Crisis in 2008–9. BI's current "Flexible Inflation Targeting" framework can be characterized as an inflation targeting regime with strong emphasis on exchange rate and financial stability, as well as coherent use of multiple policy tools—including macroprudential and capital flow measures—to achieve these objectives. The framework is supported by ample foreign reserves and a network of bilateral swap lines with other central banks, and the introduction of the domestic non-deliverable forward (DNDF) market in 2018 provided an additional channel to counter excessive volatility in the FX market. This framework has served Indonesia well, contributing to stable inflation and credit growth in the run up to the pandemic while allowing the exchange rate to be market-determined.

5. At the beginning of the pandemic, BI's policy response largely relied on conventional policy tools to provide liquidity. The COVID-19 crisis began to intensify in Indonesia and other EMs around February 2020, triggering large capital outflows, a spike in risk premia, and large exchange rate depreciation pressures. In response to these initial external shocks, BI made active interventions in the FX spot and DNDF markets while simultaneously purchasing IDR-denominated government bonds in the secondary market. This "triple intervention" during the first quarter

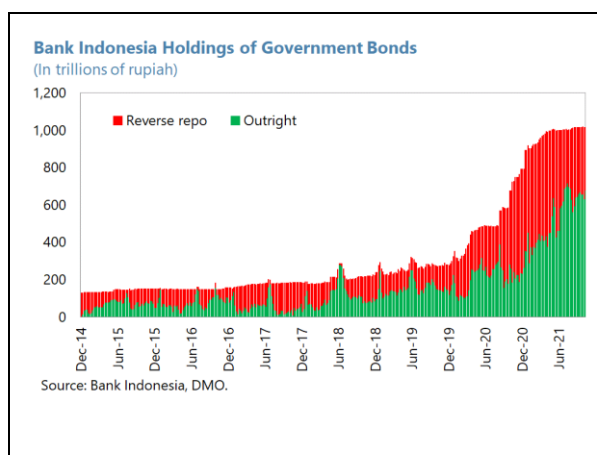
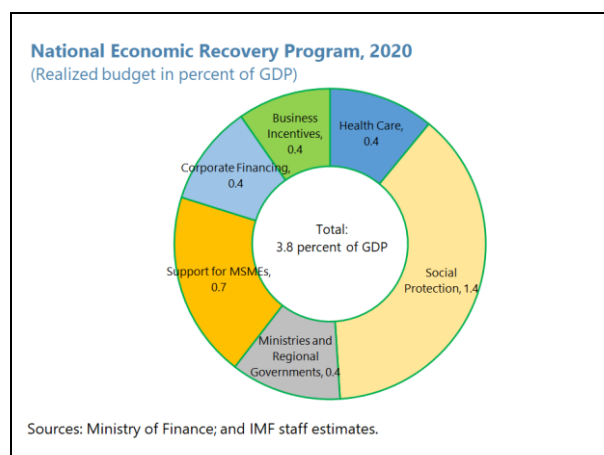


of 2020 was also accompanied by consecutive policy rate reductions in February and March (25 bps each), as a "pre-emptive measure" to maintain domestic economic growth momentum.² Then, since April 2020, BI's policy priority shifted more decisively toward monetary policy easing aimed at supporting domestic activity amid stricter social restrictions and reduced mobility. In addition to

² https://www.bi.go.id/en/publikasi/ruang-media/news-release/Pages/SP_222220.aspx.

further reducing the policy rate, BI proceeded to inject more liquidity into the banking system, including through a 200-bps reduction in the rupiah reserve requirement ratios for banks (May) and increases in BI repo and FX swap issuance. These liquidity injection measures were also complemented by an easing of macroprudential measures.³

6. But the exceptional nature and scale of COVID-19 shocks eventually led BI to resort to unconventional policy measures as part of an all-government policy response package. As the COVID-19 crisis deepened, the government increased its COVID-related spending on health and social protection through four successive fiscal packages. The additional government spending required a substantial widening of the budget deficit to 5.9 percent of GDP from 1.8 percent in the initial budget, well beyond the statutory budget ceiling of 3 percent of GDP. This extraordinary fiscal response was made possible through the issuance of Perppu No. 1 of 2020 (March),⁴ which also allowed BI to purchase long-term government bonds in the primary market to finance the higher budget deficit. With this legal foundation, BI proceeded to purchase a total of IDR 473 trillion (3.1 percent of GDP) worth of government bonds from the primary market over April-December 2020, in addition to the IDR 166 trillion (1.1 percent of GDP) worth of secondary market purchases from the triple interventions conducted in Q1 2020.⁵



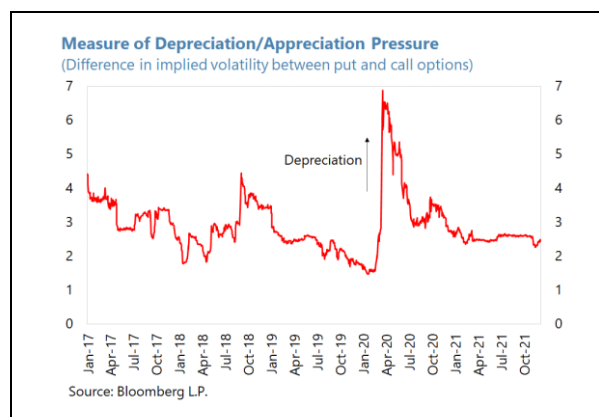
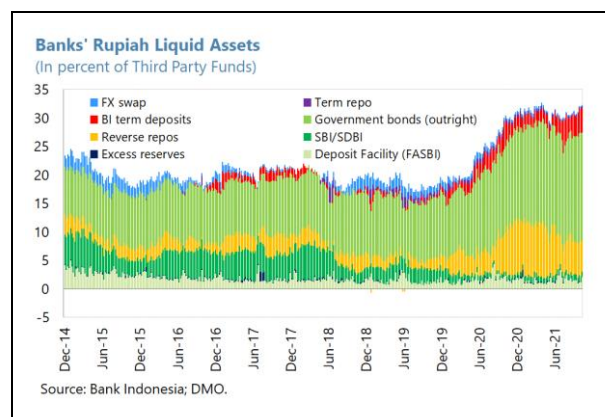
7. BI's combined policy response in 2020 helped stabilize domestic bond markets and enabled large-scale injection of liquidity into the banking system. Despite the increased issuance of government bonds and the rather weak recovery in nonresidents' local currency government bond holdings since April 2020, BI's policy rate reductions and large-scale government bond purchase program led to a sustained decline in long-term IDR-denominated bond yields throughout the remainder of 2020, and without causing notable exchange rate depreciation

³ These notably included the suspension of the macroprudential intermediation ratio and the reduction of the minimum down-payment limit for qualified motor vehicles.

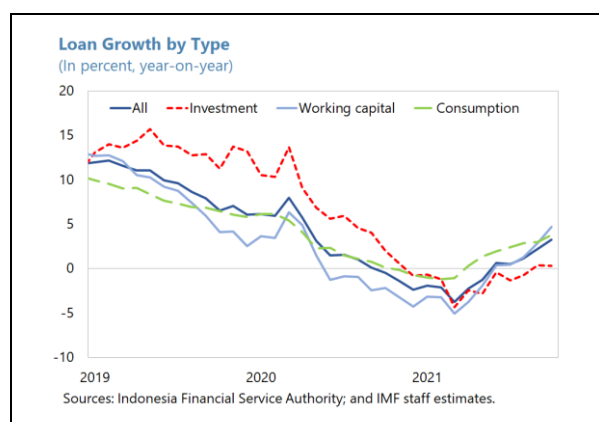
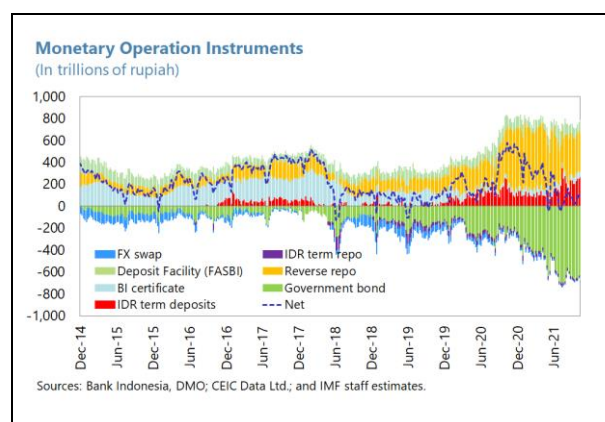
⁴ Later stipulated as Law 2 of 2020 (May).

⁵ See also Cerutti and Helbling (2021) for more background on BI's government bond purchase program and a comparison with other bond purchase programs in Malaysia, the Philippines, and Thailand.

pressures, in line with the experience in other EMs that launched similar government bond purchase programs (IMF, 2021b). Higher demand for safe assets by domestic banks also contributed, which enjoyed strong deposit growth reflecting higher precautionary savings by households and firms. As a result, the share of banks' liquid assets rose rapidly from about 20 percent at end-April 2020 to a record of about 33 percent at end-November 2021.



8. BI further eased its monetary policy stance in 2021, mainly through additional liquidity injections. The economic recovery starting from the second half of 2020 encountered brief setbacks due to a series of COVID-19 waves in early and mid-2021. As a result, headline inflation continued to stay well below the lower bound of the BI's target corridor of 3 ± 1 percent, while growth in bank lending to the private sector had remained negative during much of the first half of 2021, reflecting weak domestic demand and banks' increased risk aversion. Against this backdrop, BI continued to inject more liquidity into the banking system through additional primary market government bond purchases (IDR 358 trillion, or 2.1 percent of 2021 GDP) and reduced liquidity absorption using reverse repo operations, while also lowering the policy rate by 25 bps in February 2021. This further loosening of the monetary policy stance, together with the relaxation of some macroprudential measures,⁶ helped support the recovery in credit growth during the second half of 2021 and the rebound in economic activity in 2021Q4.

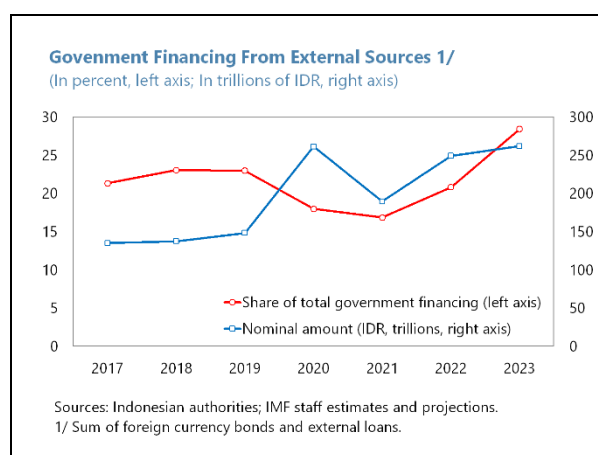
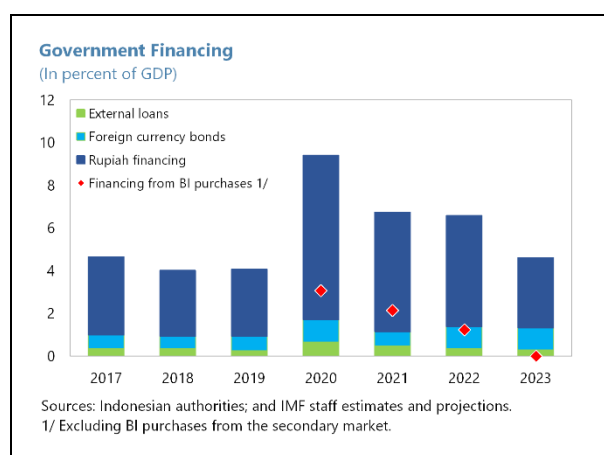


⁶ This includes an easing of the loan-to-value ratio on property and car loans to up to 100 percent until end-2022.

C. Baseline Scenario

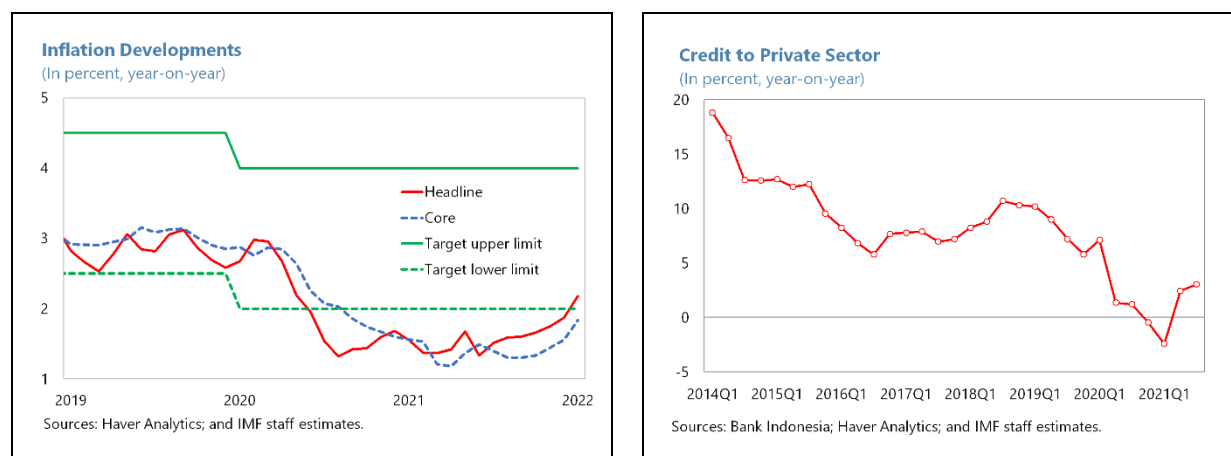
9. Under staff's baseline scenario, the recovery is expected to strengthen in Indonesia and globally over 2022–23, despite some headwinds from U.S. monetary policy tightening. In this scenario, the expected turnaround in the U.S. monetary policy stance in 2022 is expected to lead to a gradual and orderly rise in global long-term rates and depreciation of EM currencies, including the rupiah. While financial conditions in Indonesia and other EMs would tighten somewhat as a result, the potential adverse impact on domestic demand is expected to be largely offset by stronger exports, consistent with the projected global recovery under the baseline. The planned return to the 3-percent budget deficit ceiling in 2023 will impose a modest drag on growth over this period, which is expected to be more than offset by the projected rebound in domestic and external demand amid continued progress in vaccination and the easing of the pandemic by end-2022.

10. The IDR-denominated government bond market is expected to stay broadly stable. Under the baseline, domestic banks are expected to unwind some of their holdings of government bonds in favor of more credit to the private sector as economic activity continues to strengthen. Together with the planned discontinuation of BI's primary market government bond purchases by end-2022, this portfolio rebalancing by banks would put some upward pressures on long-term yields. However, the weaker domestic demand for IDR-denominated government bonds would largely coincide with reduced government financing needs over 2022–23, as well as a modest recovery in nonresidents' demand on the back of a strengthening recovery. As a result of this confluence of demand- and supply-side factors, Indonesia's long-term rates under the baseline are expected to rise gradually over 2022–23 along with other EM yields under stable market conditions.



11. Monetary policy is expected to remain broadly accommodative in the short term. Given the considerable output gap (projected at about 3½ percent in 2022), well-anchored inflation expectations, uncertain global growth prospects due to the spread of Omicron, and the expected fiscal consolidation over 2022–23, BI's monetary policy stance is expected to stay easy and supportive of the ongoing economic recovery in the short term, consistent with BI's intention to

proceed with monetary policy normalization in a “measured and prudent way to avoid disrupting the national economic recovery process.”⁷



D. Considerations for Exit Under Baseline Scenario

12. As the recovery proceeds, BI intends to undertake a gradual exit from the current policy settings. The exit process will involve a series of adjustments in both the policy mix and policy stance aimed at achieving BI’s core stability objectives (i.e., price, currency, and financial), in line with the ongoing normalization in economic and financial conditions. At the initial stages of exit, BI is expected to focus on absorbing the current abundant excess liquidity in the banking system “in a measurable and very prudent manner” (Warjiyo, 2021b), before raising the policy rate in response to “early signals of rising inflation.”⁸ The discontinuation of BI’s monetary budget financing by end-2022, as stipulated under Law 2 of 2020, would support BI’s liquidity absorption efforts post 2022 and signal a decisive exit from BI’s crisis-time unconventional policy toolkit.

13. The mix and sequencing of liquidity absorption tools could consider the ease of adjustment and the potential impact on bank lending. Given the large uncertainty surrounding the baseline outlook, there could be merit in starting the liquidity withdrawal using policy tools that are relatively nimble and easy-to-reverse if needed. Under this approach, open market operations (OMOs) such as reverse repos could take the lead at least initially. The reserve requirement ratios (RRRs) for banks could also be raised to absorb excess liquidity. Compared with OMOs, the RRRs have the advantage of not incurring additional sterilization costs for BI under the current policy setup⁹ and better suited to absorb structural liquidity than reverse repos, which are generally

⁷ https://www.bi.go.id/en/publikasi/ruang-media/news-release/Pages/sp_2331221.aspx.

⁸ Excess banking system liquidity could weaken the strength of monetary policy transmissions (Agenor and others, 2004; IMF, 2013), including in Indonesia (Bathaluddin and Wahyu, 2012), which renders support to this sequencing approach (i.e., liquidity absorption first, policy rate hike later). But this baseline approach may not be appropriate if broad-based inflation pressures emerge earlier than expected, in which case faster policy rate adjustments could be warranted (for example, see next section, Scenario 1).

⁹ In Indonesia, only bank reserves of up to 3 percent of deposit are remunerated. At the current RRR of 3.5 percent, the remaining 0.5 percent above the 3 percent threshold is unremunerated.

confined to short-term maturities. At the same time, however, this non-market instrument carries risks of discouraging banking sector intermediation by acting as a tax on lending (Gray, 2013) and tends to be relatively more difficult to change frequently, making it likely to be more desirable for a later stage of the liquidity withdrawal process once credit conditions have further improved.

14. Eventual increases in the policy rate in response to rising inflation could affect banks' financial health through several channels, but the overall impact on financial stability should be limited. An interest rate hike would reduce the market value of banks' fixed-income assets, notably government bonds, and could also lead to debt service problems in their loan portfolio. On the other hand, an increase in interest rates generally leads to higher net interest margin and thus improves banks' profitability. Several empirical findings, albeit based on advanced economies, show that the net effect on banks' net interest income tends to be positive (IMF, 2013b). Also considering the well-capitalized Indonesian banking system,¹⁰ policy rate hikes do not appear likely to severely impact the overall banking system balance sheet, provided the adjustments are made in a measured and gradual manner.

15. Policy rate hikes would also adversely affect BI's balance sheet given its large government bond holdings, but the cost seems manageable. In addition to reducing the market value of BI's government bond holdings,¹¹ an increase in the policy rate would also raise the cost for liquidity absorption through OMOs in the exit phase. Furthermore, BI will transfer part of its interest income to the Ministry of Finance (MOF) under the burden sharing agreements with the MOF, imposing additional financial burden on BI. Appendix I examines these issues under different illustrative interest rate paths and shows that these costs would be mostly manageable in magnitude and thus unlikely to constrain BI's interest rate hike decisions.

16. Exchange rate and macroprudential policies could add more flexibility to the timing of BI's policy rate hike. In the absence of imminent inflation pressures as assumed in the baseline, allowing ample exchange rate flexibility would facilitate keeping the policy rate at levels conducive to economic recovery while preserving price stability.¹² In a similar vein, macroprudential measures could be tightened—and complemented by targeted microprudential measures—if excess banking system liquidity translates to excessive credit growth before signs of inflation pressures emerge, alleviating the need for premature policy rate hikes. Conversely, if inflation pressures intensify faster than expected in the baseline, the policy rate may need to be raised sooner to preserve price stability (see next section, Scenario 1).

¹⁰ The regulatory capital to risk-weighted assets ratio as of end-September 2021 stands at about 25.2 percent.

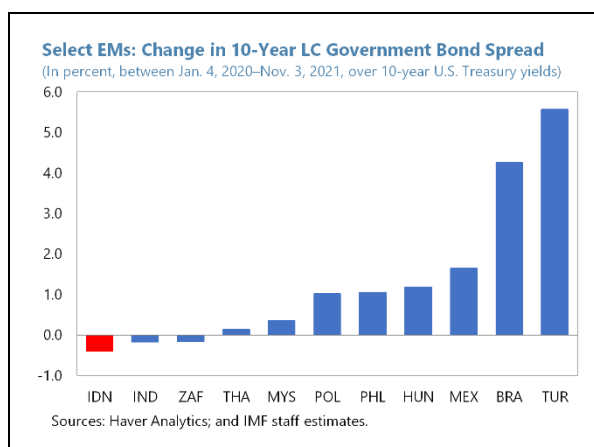
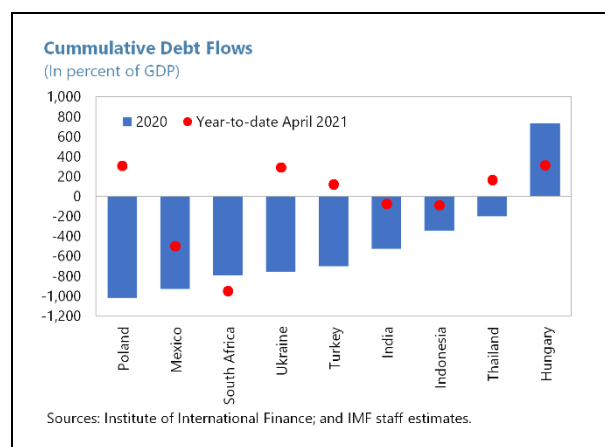
¹¹ These losses could be explicit or implicit, depending on BI's accounting treatment of these valuation changes (i.e., market value vs. book value). Regardless of the valuation method applied, however, market participants could see through the veil and adjust their responses to BI's monetary policy accordingly.

¹² The next section also considers alternative scenarios under which the exchange rate acts as a shock-amplifier. In this case, FX interventions—typically implemented in Indonesia through the triple intervention strategy—are shown to help protect price and financial stability.

17. Unwinding of BI's government bond holdings could be undertaken with a long-term horizon and in an organic manner by not rolling over maturing bonds. International experience shows that central banks tend to predominantly prefer unwinding their assets accumulated from unconventional monetary policy in this way, rather than actively offloading them. This approach is often based on the assessment that outright asset sales is unlikely to be a reliable substitute for policy rate adjustments when it comes to ensuring price stability¹³ and the possible large price impact given the shallow depth of the secondary market. If the pace of unwinding needs to be adjusted, BI could also consider partly rolling over the maturing bonds through secondary market purchases.

E. Policy Response Under Alternative Scenarios: Model Simulations

18. Compared with other major EMs, Indonesia seems well positioned to weather externals shocks. During recent episodes of heightened U.S. Treasury yield volatility (notably, over Feb.-Mar. 2021), Indonesia experienced relatively moderate outflows in the bond market and exchange rate depreciation, reflecting its strong economic fundamentals. Looking forward, Indonesia appears to be in a strong position to absorb external shocks: it has ample FX reserves; the need for foreign financing is limited with a current account estimated at close to balance in 2021; the public debt ratio is relatively low; and it has improved capacity to deal with COVID-19 infections. The long-term local-currency government bond yield also maintains a comfortable margin over the global benchmark, which should also help reduce capital outflow pressures under risk scenarios.



19. Nonetheless, if risks to the baseline paths for U.S. monetary policy and COVID-19 materialize, Indonesia's exit policies will need to be readjusted accordingly. A faster-than-expected tightening of U.S. monetary policy than in the baseline, for example, will have different impacts on the rest of the world depending on the underlying drivers. If driven by stronger growth in the U.S., the positive spillovers to the rest of the world from higher trade could more than offset the adverse spillovers from tighter global financial conditions. If the accelerated tightening of U.S. monetary policy reflects inflation surprises in the U.S. caused by global supply-side disruptions,

¹³ See, for example, Box A, *Monthly Policy Report*, from Bank of England (August 2021).

the net economic impact on emerging markets could be negative. On the other hand, the tightening of U.S. monetary policy could also be slower-than-expected in the context of another global infection wave from a new COVID-19 variant. In that case, more considerable deviations from the baseline exit path could be required (as discussed below).

20. Four illustrative scenarios are constructed to emphasize the uncertainty of shocks around the baseline scenario and to highlight the data-dependent nature of future policy actions (Figure 1). The scenarios are based on different assumptions of U.S. monetary policy

spillovers and the pandemic (Appendix II, Table 2), and all numbers should be interpreted as deviations from the baseline. It is worth noting that the policy instruments in the simulations are much narrower and more simplified than in the real world.¹⁴ Nevertheless, this model exercise is meant to shed light on the different underlying policy tradeoffs to different external shocks.

- **Under Scenario 1, more favorable-than-expected external conditions could speed up the return to normal.** Specifically, the U.S. interest rates increase as a reflection of a stronger-than-expected U.S. economy. The positive spillovers to the Indonesian economy through higher exports offset the contractionary effects coming from higher interest rates. Supply-driven inflationary tensions ease, causing U.S. inflation to fall. Output gap in Indonesia narrows, as both domestic demand and net exports strengthen. Inflation rises but only slightly, reflecting a rather flat Phillips curve. The combination of higher output and inflation calls for a faster increase in the monetary policy rate than in the baseline. The impact on the exchange rate and long-term interest rates are nonetheless small.
- **Under Scenario 2, less favorable external conditions delay the exit.** It is assumed that supply-side disruptions and higher commodity prices continue to weigh on the global economy, which brings out a difficult trade-off between output and inflation for some countries. Inflation in major economies including the U.S. surprises on the upside, and the Fed tightens monetary policy faster than expected. Higher U.S. interest rates and tighter financial conditions trigger capital outflows, a weakening of EM currencies, and higher long-term interest rates. The tighter financial conditions without the positive spillovers from abroad would imply somewhat weaker-than-expected output, and the policy rate would fall below the baseline.
- **Scenario 3 illustrates the challenge that EMs might face if another COVID-19 surge occurs due to a new variant, alongside the tightening of EM financial conditions.** The scenario assumes that another round of mobility restrictions and reduced confidence cause output to fall below the baseline both in Indonesia and the rest of the world, accompanied by a looser than expected monetary policy in the U.S. Financial conditions in EMs tighten by more than in the previous scenario, with larger exchange rate depreciation and higher long-term interest rates

¹⁴ BI implements a flexible inflation-targeting framework which integrates monetary and financial system stability through a policy mix of monetary, macroprudential, exchange rate and capital flow instruments, while strengthening the institutional arrangements in order to optimize the role of policy coordination and communication (BI website: monetary policy objectives).

due to higher risk premia. BI responds by intervening in the FX market,¹⁵ limiting the extent of depreciation and thereby the impact on inflation,¹⁶ at the cost of some decline in BI's foreign exchange reserves. At the same time, in response to the widening of output gap and tightening of financial conditions, the policy rate is lowered below the baseline in order to keep inflation within BI's target band at 2–3 year horizons.

21. Finally, Scenario 4 illustrates the benefits of an integrated policy package including fiscal policy to combat the challenges should they arise. In the Indonesian context, this could mean a delayed return to the budget deficit ceiling of 3 percent in order to provide additional support to the economy. The scenario assumes that a fiscal package amounting to about 1 percent of GDP is deployed to support the economy, financed by an increase in the fiscal deficit and issuance of new government bonds at market price. This package significantly mitigates the impact on output from the pandemic. If market participants consider that the risk of fiscal dominance is low, the fiscal package may only imply small increases in the long-term interest rate.¹⁷ The use of the fiscal space would also help preserve the monetary policy space when external stability concerns are heightened.

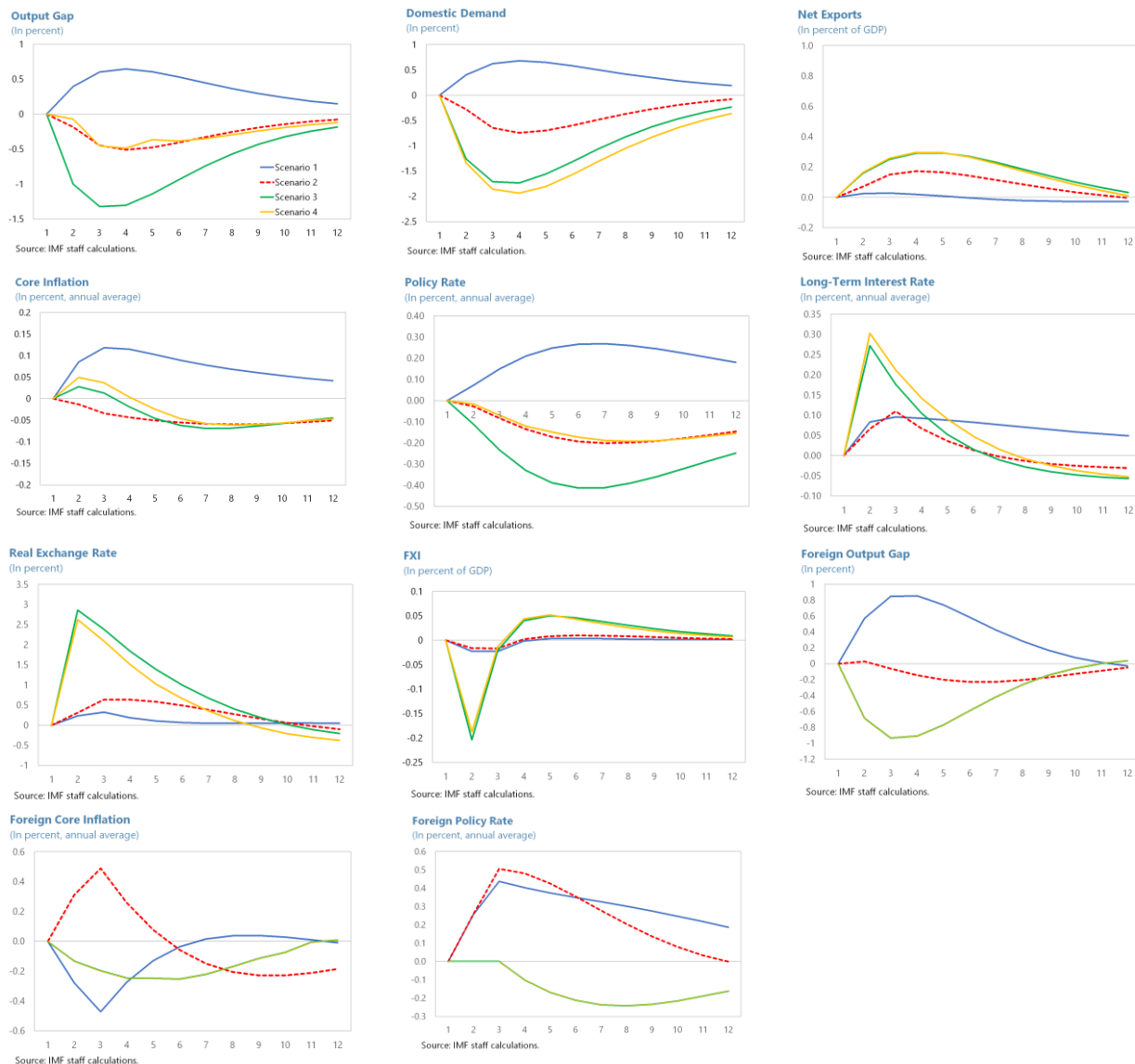
22. The model simulation results above generally underscore the need for policy flexibility and coordination under the current uncertain external environment. Allowing the exchange rate to play the role of a shock absorber will be an important policy approach under most circumstances, except when external financial conditions become disruptive and warrant FX interventions. The policy rate will need to be adjusted to preserve price stability. This could mean a faster hike path than the baseline path as in Scenario 1, or a slower and more gradual path as in Scenarios 2–4 in which output gap widens, with 2- to 3-year-ahead inflation possibly falling below the baseline (e.g., Scenarios 2 and 4). In this case, the policy rate will need to be raised more gradually than in the baseline or even lowered. But if inflation surprises on the upside despite the wider output gap, possibly due to a higher exchange rate passthrough, BI will need to respond with a higher policy rate path to anchor inflation and inflation expectations. Finally, as shown by Scenarios 3 and 4, there could be exceptional circumstances in which monetary policy alone may not be enough to sustain the ongoing recovery (e.g., an outbreak of a new COVID-19 variant), and fiscal stimulus may be useful to provide additional demand support.

¹⁵ The model includes an endogenous FXI rule that reacts to nominal exchange rate movements. Since FXI data is not available, the change in central bank FX reserves is used as a proxy to mimic central bank interventions in the spot market. If central banks use FX swap or other instruments to influence the exchange without affecting the level of reserves as they increasingly do nowadays, those interventions will not be captured by this proxy.

¹⁶ The pass-through effect from exchange rate depreciation is estimated to be modest, reflecting BI's monetary policy credibility, and is in line with some recent studies such as Carriere-Swallow and others (2021).

¹⁷ This may not hold in EMs with weak policy credibility, in which case the policy rates may need to be raised to anchor inflation expectations, resulting in higher long-term rates.

Figure 1. Indonesia: Illustrative Alternative Scenarios



Appendix I. Impact of Monetary Budget Financing on BI's Balance Sheet

1. BI's primary market government bond purchase program is considerable in size, but some of its features will help protect BI against potential valuation losses. BI's primary market purchases of IDR-denominated government bonds, which amounts to about a cumulative IDR 616 trillion (4 percent of 2020 GDP) as of end-November 2021, have been carried out through 3 joint decrees (*Keputusan Bersama*, or KB) between BI and the MOF, launched in April (KB I, or "Market Mechanism") and July 2020 (KB II, or "Burden Sharing Agreement") and August 2021 (KB III, or "Coordination Agreement"), respectively (Table 1).¹ The cumulative total purchase amount under these arrangements is expected to reach about IDR 1,055 trillion (6.8 percent of 2020 GDP) by end-2022. Of this amount, about 79 percent (IDR 837 trillion) will feature a coupon rate equal to the variable 3-month reverse repo rate, providing some protection for BI against valuation losses associated with future interest rate changes. While BI would remain exposed to such losses for the remaining amount (IDR 218 trillion), which consists of government bonds purchased under the Market Mechanism, these bonds are marketable and tradable, which allows BI to sell them in the secondary market as needed going forward.²

Table 1. Indonesia: MOF-BI IDR Government Bond Purchase Agreements

	Amount (IDR trillions)	Coupon Rate	Coupon Type	Interest Income for BI 3/
KB I: Market Mechanism 1/	218.4	Market rate	Fixed	Market rate
KB II: Tranche A (for public goods)	397.6	3-month reverse repo rate	Floating	0
KB II: Tranche B (for non-public goods) 2/	177.0	Market rate	Fixed	0
KB III: Tranche A	341.0	3-month reverse repo rate	Floating	3-month reverse repo rate
KB III: Tranche B	98.0	3-month reverse repo rate	Floating	0

Sources: Data provided by the authorities; and IMF staff estimates.

1/ As of September 17, 2021.

2/ No government bond purchases by BI. Interest expense sharing only at the rate of [market rate - (policy rate - 1)].

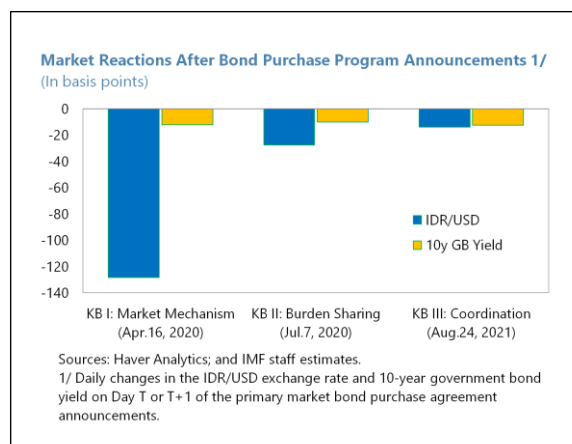
3/ Under the burden sharing agreements.

2. Initial market reactions following the announcements of these arrangements were muted. In the case of KB II and III, the IDR/USD exchange rate depreciated by a modest

¹ See Warjiyo (2021a) and Appendix VII in the accompanying staff report for more details of these arrangements.

² It should also be noted that while BI's government bond holdings from its secondary market purchases (as part of the triple intervention strategy) are also be exposed to potential valuation losses due to changes in market interest rates, the losses could be much more limited as these bonds are likely to have been bought at low prices during times of market turmoil.

28 and 14 basis points (bps) on a daily basis, respectively, immediately following their public announcements.³ The impact was larger for KB I (128 bps), however, likely reflecting the relatively higher FX market volatility around the month of the announcement (April 2020). Meanwhile, the reactions in the bond market were also rather muted, with the 10-year government bond yield declining by about 10–13 bps following the announcements.⁴ Several factors likely have contributed to the generally subdued market price reactions, including the authorities' commitment to phase out these arrangements by end-2022 and inflation staying below the target range since June 2020.



3. An illustrative exercise is conducted to calculate the plausible range of the costs for BI's burden sharing and liquidity sterilization under a set of hypothetical policy paths.

Specifically, we consider three different paths for the policy rate ("Flat," "Gradual," and "Steep") over the period of 2023–25, together with three different levels of liquidity sterilization,⁵ which collectively leads to a total of 9 distinct policy paths (Table 2). For each of these scenarios, we examine the possible range of the costs for BI due to revenue transfers to the MOF under the burden sharing and coordination agreements, as well as the interest expense that would be required to sterilize the liquidity injected from primary market purchases under these two agreements. These estimates are then compared with BI's financial positions at end-2020 to obtain a sense of their quantitative significance for BI's financial health. The cost impacts of the market mechanism are not considered in this exercise, as the interest income for BI should be net positive even after considering the sterilization costs. In this respect, the cost estimates from this exercise could be seen as the upper bound of actual costs.

4. The results shows that BI's government bond holdings under KB II and III would likely not materially hinder BI's ability to adjust its monetary policy stance as needed. Under the most hawkish scenario considered, in which BI raises its policy rate from the current 3.5 percent to 6 percent by end-2025 ("Steep" in Table 2) while sterilizing 70 percent of the liquidity injection from its primary market government bond purchases (up from about 40 percent as of end-November 2021), the total cumulative cost to BI would amount to about IDR 164 trillion

³ These are comparable to the estimates obtained from a sample of 13 EMs (IMF, 2020b), which range between 24–30 bps on or the day after the announcement of asset purchase programs.

⁴ These daily changes in the exchange rate and government bond yield are comparable to the estimates from a recent empirical analysis based on 13 emerging markets (IMF, 2020b), which shows initial announcement effects of 24–30 bps on sample EM exchange rates and 18–28 bps on local currency government bond yields.

⁵ The level of liquidity sterilization is defined as the ratio of BI's reverse repos over its total government bond holdings (the sum of government bonds held outright and sold to banks as reverse repos and minus repos purchased from banks).

over 2023–25, of which IDR 79 trillion would be due to revenue transfers to the MOF. This cost would be partly offset by BI's interest income from these government bonds estimated at about IDR 122 trillion, leaving a net cumulative cost for BI of IDR 42 trillion, which would be equivalent to about 19 percent of BI's end-2020 capital and reserves (IDR 219.8 trillion). With this cost estimate, BI's capital ratio of 8.6 percent at end-2020 would be reduced to about 7 percent.

Table 2. Indonesia: Cumulative Costs of Monetary Budget Financing (KB II and III) for Bank Indonesia Under Illustrative Scenarios

	2023	2024	2025	2023	2024	2025	2023	2024	2025
Degree of sterilization 1/	50 percent			60 percent			70 percent		
Percent of 2020 BI capital (IDR 219.8 trillion)									
Flat	3.5	7.0	10.5	4.7	9.4	14.1	5.9	11.7	17.6
Gradual	3.2	6.1	8.8	4.6	9.2	13.8	6.1	12.4	18.8
Steep	3.1	5.8	8.2	4.6	9.2	13.7	6.2	12.6	19.2
Percent of 2020 BI revenue (IDR 87 trillion)									
Flat	8.9	17.7	26.6	11.8	23.7	35.5	14.8	29.7	44.5
Gradual	8.0	15.4	22.3	11.7	23.3	34.9	15.4	31.2	47.4
Steep	7.7	14.6	20.6	11.7	23.2	34.6	15.6	31.8	48.6
Percent of 2020 BI surplus (IDR 26.3 trillion)									
Flat	29.3	58.7	88.0	39.2	78.4	117.6	49.1	98.1	147.2
Gradual	26.5	51.1	73.8	38.7	77.2	115.3	51.0	103.3	156.9
Steep	25.5	48.2	68.1	38.6	76.7	114.4	51.6	105.2	160.7
Policy rate									
Flat	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Gradual	4.25	4.75	5.25	4.25	4.75	5.25	4.25	4.75	5.25
Steep	4.50	5.25	6.00	4.50	5.25	6.00	4.50	5.25	6.00
Interest rate assumptions 2/									
Policy rate									
Flat	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Gradual	4.25	4.75	5.25	4.25	4.75	5.25	4.25	4.75	5.25
Steep	4.50	5.25	6.00	4.50	5.25	6.00	4.50	5.25	6.00
3-month reverse repo rate									
Flat	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10	3.10
Gradual	3.85	4.35	4.85	3.85	4.35	4.85	3.85	4.35	4.85
Steep	4.10	4.85	5.60	4.10	4.85	5.60	4.10	4.85	5.60
Market rate (average of 5–8 year maturities)									
Flat	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
Gradual	6.75	7.25	7.75	6.75	7.25	7.75	6.75	7.25	7.75
Steep	7.00	7.75	8.50	7.00	7.75	8.50	7.00	7.75	8.50

Sources: Data provided by the authorities; and IMF staff estimates.

1/ Defined as the share of BI's government bonds held by banks for reverse repos out of BI's total government bonds purchased (= government bonds held outright by BI + held by banks as reverse repos - held by BI as repos for liquidity injection to banks) under KB II and III by end-2022, which is expected at about IDR 837 trillion.

2/ The three scenarios for interest rates ("Flat," "Gradual," and "Steep") are for illustration purposes only and should not be viewed as IMF staff's forecasts.

Appendix II. Model Description, Estimation Procedure, and Scenario Assumptions

1. The scenarios are constructed using an estimated log-linearized formulation of Adrian and others (2021). Adrian and others (2021) presents a micro-founded New Keynesian model to analyze monetary policy and financial stability issues in open economies with financial fragilities and weakly anchored inflation expectations. The risk-bearing capacity of agents trading in the FX market is limited as in Gabaix and Maggiori (2015), which gives rise to inefficient fluctuations in the uncovered interest rate parity (UIP) risk premium. The micro-founded private- and UIP-borrowing spreads allows to quantify the effects of FX intervention on the UIP risk-premium and the exchange rate.

2. To provide the quantitative aspect of the policy tradeoffs, we assume that both the interest rate policy and FX intervention are implemented in a rule-based manner and analyze their implications.

- The interest rate is simplified to follow a Taylor-rule-type reaction function where the policy rate (i_t) reacts to the expected one-year-ahead inflation ($\bar{\pi}_{c,t+4|t}$) and the contemporaneous output gap (y_t). It has some degree of interest-rate smoothing (ρ), and i.i.d. shocks (ε_t^i) to capture deviations from the simple reaction function.

$$i_t = \rho i_{t-1} + (1 - \rho)[(1 + \gamma_\pi)\bar{\pi}_{c,t+4|t} + \gamma_y y_t] + \varepsilon_t^i$$

- The exchange rate intervention policy is modeled as a rule followed by the central bank. The central bank intervenes in the FX market in response to portfolio capital flows, affecting the amount of funds intermediated by financiers, and hence at least partly offsetting the corresponding movements in the UIP premium. The change in central bank foreign exchange reserves (ΔR_t) is used as a proxy for the size of the intervention. It responds to exchange rate movements (ΔS_t) with the coefficient ($\gamma_{\Delta S}/(1 - \gamma_{\Delta S})$) capturing the intensity of such response. Like the interest rate, it also has some degree of smoothing ($\rho_{\Delta R}$) and i.i.d. shocks (ε_t^{FXI}) to capture deviations from the simple reaction function.

$$\Delta R_t = \rho_{\Delta R} \Delta R_{t-1} - (1 - \rho_{\Delta R}) \Delta S_t \gamma_{\Delta S} / (1 - \gamma_{\Delta S}) + \varepsilon_t^{FXI}$$

3. The model is estimated using the Bayesian likelihood methods with standard priors in the literature, based on Indonesia data during 2003Q4-2020Q3. The estimation is conditional on a pre-estimated foreign economy model which comprises a smaller set of variables including GDP, price and wage inflation, policy rate, and government expenditures. The U.S. economy is used as the proxy for the foreign economy in this case. Table 1 summarizes the observables and shocks.

Table 1. Indonesia: Observables and Structural Shocks

Observables (Domestic)	Observables (Foreign)	Shocks (Domestic)	Shocks (Foreign)
Output gap Core inflation Real exports Real imports Real government consumption Nominal wage growth Real bilateral exchange rate Policy rate Long-term (10-year) interest rate Central bank foreign reserves	Output gap Core PCE inflation Nominal wage growth Real government consumption Policy rate	Domestic demand shock Price mark-up shock Export demand shock Import demand shock Government spending shock Wage mark-up shock UIP shock Policy rate shock Financial spread shock FXI shock Import price mark-up shock	Domestic demand shock Price mark-up shock Wage mark-up shock Government spending shock Policy rate shock

Table 2. Indonesia: Scenario Assumptions 1/

Scenario 1	Domestic demand shock: +0.5, +0.5	Foreign demand shock: +1, +1 Foreign inflation shock: -0.1, -0.1 Foreign interest rate shock: +0.05, +0.05
Scenario 2	Financial spread shock: +0.25, +0.25	Foreign demand shock: +0.2, +0.2 Foreign inflation shock: +0.1, +0.1 Foreign interest rate shock: +0.05, +0.05
Scenario 3	Domestic demand shock: -0.20 Exchange rate shock: +0.80 Financial spread shock: +1.0	Foreign demand shock: -1
Scenario 4	Domestic demand shock: -0.20 Exchange rate shock: +0.80 Financial spread shock: +1.0 Government expenditure shock: +1, +1, +1, +1	Foreign demand shock: -1

1/ Each number represents the size of the shock in a given quarter. All shocks are unanticipated shocks.

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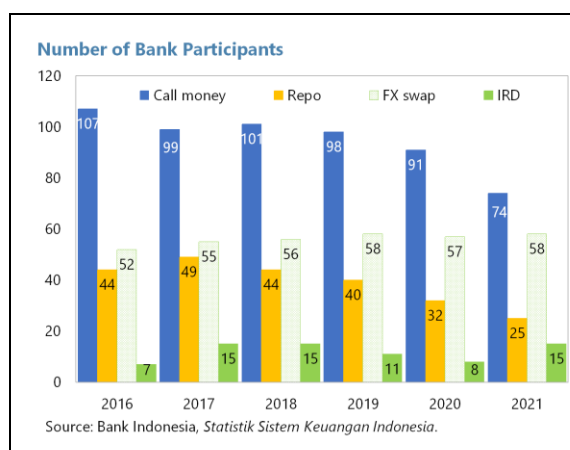
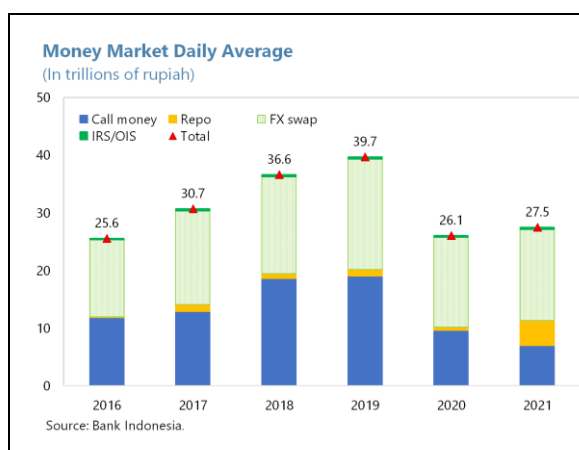
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THE RUPIAH MONEY MARKET IN INDONESIA: RECENT EVOLUTION AND IMPLICATIONS OF INTRODUCING A CENTRAL BANK DIGITAL CURRENCY¹

The rupiah money market in Indonesia has grown rapidly over the last decade. However, banks' overall incentives to trade in money market remain weak and the available instruments are limited. The authorities have thus made more efforts in modernizing the money market, as envisaged in their 2025 Money Market Development Blueprint. As a further step towards modernization, the introduction of a central bank digital currency (CBDC) could potentially increase instruments and market participants, improve liquidity management, and promote financial inclusion. This paper provides a conceptual framework on CBDC's role in promoting Indonesia's money market.

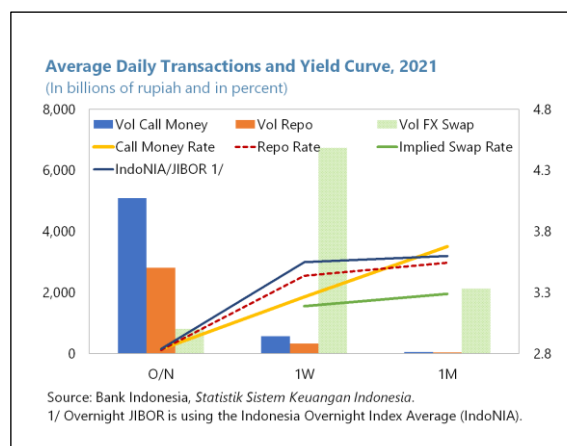
A. Money Market in Indonesia: An Overview

1. The money markets in Indonesia consist of the rupiah market, the foreign currency market, and their derivative markets. Just like all other money markets in the world, it is where short-term liquidity is traded. The size of the rupiah money market in Indonesia has grown rapidly over the last few years. The daily average volume as well as the outstanding transactions have steadily increased since 2016. During the COVID-19 pandemic, the market experienced a sharp contraction in volume, mostly driven by a decline in interbank call money market transactions, as banks' incentives to trade liquidity decreased.



¹ Prepared by Tao Sun and Hou Wang (both MCM), with helpful inputs from Darryl King (MCM), John Kiff, Rani Setyodewanti and Wahyu Ari Wibowo (both RRO in Jakarta). Kaili Chen (MCM) provided excellent research assistance.

2. Money market transactions are dominated by interbank transactions, with call money and FX swap being the mostly used instruments. Call money transactions are easy to conduct, and therefore they have the largest number of bank participants and fulfill most of the short-term liquidity needs. They are also unsecured, which causes market participants to only prefer to conduct those transactions in very short tenors, mainly overnight or up to 1 week. FX swap is the most liquid instrument in almost all tenors ranging from overnight to 12 months, as it is used not only for liquidity management but also to hedge FX risk.



3. The repo market is still developing. The number of repo users is much less than that of call money, and the users have been limited to banks and some licensed brokerage companies. Non-bank financial institutions such as insurance and pension funds are not using repo transactions due to regulation and tax reasons. Most of the repo transactions use government bonds as the underlying securities, while some other monetary instruments such as BI certificate, BI deposit certificate, sukuk BI, and sovereign bonds in foreign currencies are also acceptable. As repo transactions require transfers of title collaterals, they typically have lower credit risk compared to unsecured interbank call money. However, in Indonesia, the repo instruments are priced at a similar, if not higher, rate than unsecured interbank borrowing for the same maturity, a reflection of the challenges and weak incentives for using repos (Aditya, 2021).²

4. Despite the divergent liquidity risk profile across banks, overall incentives to trade in the interbank money market are weak. Large state-owned banks are the main liquidity providers in the rupiah money market, as they usually have abundant liquidity due to better access to deposit funding and network infrastructure. Foreign banks have a stable supply of foreign exchange (mainly U.S. dollars) but lack rupiah liquidity. As a result, they frequently access the money market to maintain their rupiah liquidity. The small banks usually face more volatile liquidity conditions and borrow from large banks, as well as trade among themselves, to fill their liquidity needs on the interbank call money. Likely due to the counterparty risk concerns, large and medium-sized banks tend to trade among themselves rather than lending to small banks, and the small banks have the most limited access to other counterparties.

² One of the challenges that discourages smaller banks from using repo is the complexity to maintain collaterals for repo transaction. Other challenges include the fact that the lack of tax rate synchronization among instruments has impeded the development of the money market: for example, unequal tax treatment between short-term (20 percent) and long-term financial instrument (10 percent) and between banks' repo transactions (nonfinal tax) and those on nonbanks (final tax).

5. Banks' excess reserves are relatively insensitive to their opportunity cost, a likely reflection of precautionary savings motive and less efficient liquidity management through the money market.

This is illustrated by a simple VAR that consists of changes in banks' excess reserves as a percent of third-party funds, as well as the spread between the overnight money market rate (IndONIA) and the deposit facility rate, for the period of January 2017 to December 2019. Both variables are of weekly frequency, and detrended with a time trend. The impulse responses show that a positive shock to excess reserves leads to a temporary reduction in the spread, while a positive shock to the spread does not have any meaningful impact on excess reserves (Figure 1).

Excess Reserves and Interbank Spreads - Vector Autoregression Estimates

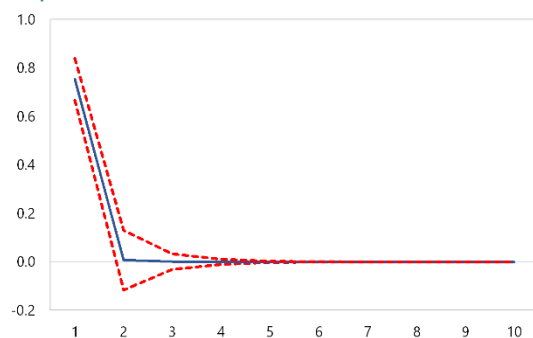
	Δ Reserve	Spread
Δ Reserve	0.0086 (-0.0854)	-0.0383 (-0.0178)
Spread	-0.0209 (-0.3801)	0.2951 (-0.0791)
constant	0.0037 (-0.061)	0.0022 (-0.0127)
R-squared	0.0001	0.1470

Standard errors in ().

Sample: 2017-2019, weekly data (153 observations).

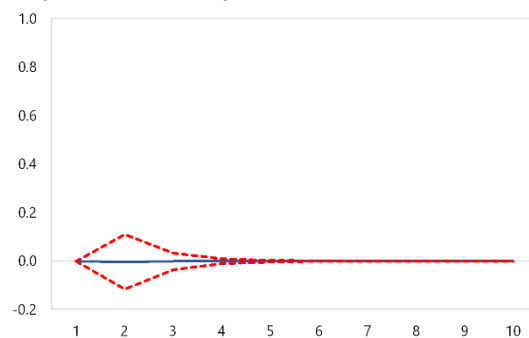
Figure 1. Excess Reserves and Interbank Spreads—Vector Autoregression Impulse Responses

Response of Reserve to Reserve Shock



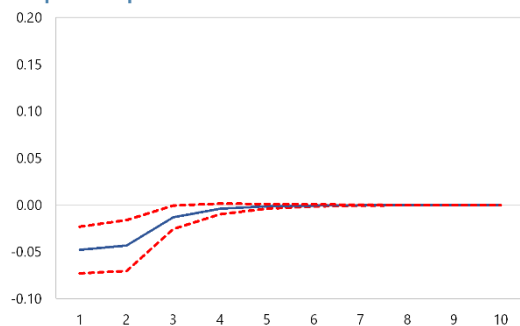
Sources: Bank Indonesia; and IMF staff estimates.

Response of Reserve to Spread Shock



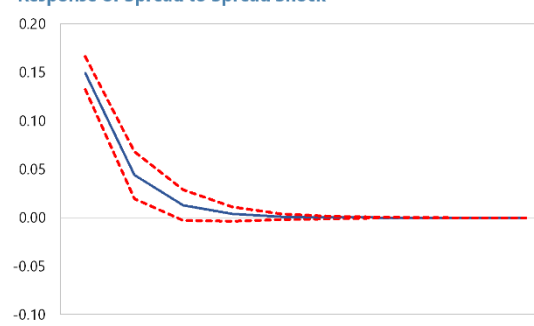
Sources: Bank Indonesia; and IMF staff estimates.

Response of Spread to Reserve Shock



Sources: Bank Indonesia; and IMF staff estimates.

Response of Spread to Spread Shock



Sources: Bank Indonesia; and IMF staff estimates.

6. The distribution of banks' excess liquidity as share of their size does not seem to be overly skewed towards larger banks.

Due to their sheer size, BUKU 4 banks hold the most excess liquidity in the system, as reflected by their placement at the BI. Once normalized by their size, BUKU 4 banks' excess liquidity relative to their total assets is about 8.5 percent, somewhat lower than the other banks on average. It is also worth noting that given the high heterogeneity within the BUKU 2 group, it is likely that those banks' excess liquidity positions are widely dispersed and many of those banks hold large amount of excess liquidity to self-insure against liquidity risk.

December 2019 Snapshot

(In billions of rupiah)

	Demand Deposit at BI (a)	Fine Tune Operation (b)	Deposit Facility (c)	Total Asset (d)	Percent of Total Asset ((a)+(b)+(c))/(d)
BUKU 2	48,783	29,675	19,374	905,190	10.8
BUKU 3	127,947	41,977	57,132	2,616,734	8.7
BUKU 4	212,815	95,453	85,291	4,628,888	8.5

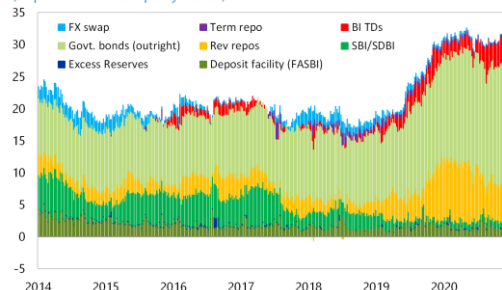
B. Recent Evolution: Impact of the COVID-19 Pandemic

7. The COVID-19 pandemic has led to a contraction in the size of the rupiah market, mainly driven by a decline in call money transactions due to banks' lower incentives to participate in the money market.

On the one hand, the economic slowdown has led to weak loan demand and declining loan disbursement, resulting in ample liquidity and reducing the need for some banks to borrow in the interbank market. On the other hand, the recession has led to a flight to safety in the banking sector, with some small banks experiencing deposit outflow and contraction in assets. This has increased the perceived credit risk, reducing banks' incentives to lend to each other. A similar but smaller contraction was seen in FX swap transactions.

Banks' Rupiah Liquid Assets

(In percent of third party funds)



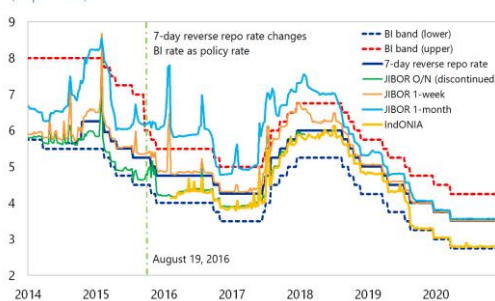
Sources: Bank Indonesia; Ministry of Finance, DJPPR; and IMF staff estimates.

8. Much of the increase in liquidity is a result of policy support during the pandemic.

BI has injected large amounts of liquidity into the banking system, through a 200 bps reduction in the statutory reserve requirement in April 2020 and monetary expansion by buying government bonds in both the primary and the secondary market. At the same time, the government placed funds in selected banks as part of the large fiscal response to the pandemic. As banks' credit growth was suppressed due to both supply and

Bank Indonesia Policy Rates and Money Market Rates

(In percent)



Source: Bank Indonesia.

demand factors, only part of those funds was eventually channeled to the real economy, resulting in a large amount of excess liquidity in the banking sector.³ A reflection of such excess is the rapid decline of the overnight JIBOR (IndONIA), much more than the decline in other JIBOR with longer tenors.

9. BI significantly increased its open market operations in the money market to absorb the excess liquidity in the banking system. Two snapshots of banks' placement at BI, one before the pandemic in end-2019 as shown previously and the other one in August 2021 below, show that the size of BI's fine tune operations have increased significantly. A closer look at banks' claims on BI—demand deposit, fine tune operations, and deposit facility—by BUKU groups (capturing bank size), shows that larger banks (BUKU 4) were more engaged in BI's open market operations than smaller banks, a reflection of both their more favorable liquidity positions and their expertise in conducting repo transactions.

August 2021 Snapshot				
	Demand Deposit at BI (a)	Fine Tune Operation (b)	Deposit Facility (c)	Percent of Total Asset ((a)+(b)+(c))/(d)
(In billions of rupiah)				
BUKU 2	40,255	48,199	33,958	939,399
BUKU 3	111,406	143,263	60,446	2,582,672
BUKU 4	167,143	242,318	73,588	5,586,649
	Demand Deposit at BI (% share)	Fine Tune Operation (% share)	Deposit Facility (% share)	Sum
(In percent of share)				
BUKU 2	33	39	28	100
BUKU 3	35	45	19	100
BUKU 4	35	50	15	100

C. Towards a Modern Money Market

10. A well-developed money market provides an alternative funding source for market participants to manage their liquidity. A deeper money market distributes short-term liquidity more efficiently, facilitates price discovery, mobilizes new savings, and provides a solid foundation for the development of other segments of the financial markets (securities, derivatives, and FX swap markets). With more instruments and participants, yields will better reflect underlying liquidity and credit risk. Nevertheless, money market themselves can also be a financial vulnerability, amplifying shocks due to the short-term nature of the instruments as well as their linkage with the broader financial system. A recent example is the U.S. money market in March 2020. The market experienced a rush out of prime funds, causing a crunch in short-term corporate debt. This has prompted regulators to again consider substantive reform to strengthen money market.⁴

11. Money market development is key to effective monetary policy. If interest rate actions are to influence output, it is essential that changes in the policy rate cause changes in the same direction as the longer-term rates at which households and firms borrow and lend (King and Mancini-Griffoli, 2018). Money market, as the first link in the chain of monetary transmission, allows

³ Though not directly relevant here in a narrow sense of assessing the impact on money rates, credit (and broad money) growth can be relevant in the longer run. High credit growth leads to more broad money and therefore more reservable deposits (through the reserve requirement), thus leading to fewer excess reserves for a given volume of total reserves.

⁴ One can argue that the U.S. money market problem arises from regulatory arbitrage which may not happen in places with different regulations. This U.S. money market problem exhibits that money market themselves can be a financial vulnerability, although the causes of the money market problem could vary in different jurisdictions.

the central bank to keep short-term interest rates at or near its operational target. By participating in the money market, banks manage their liquidity more tightly and in turn facilitate the transmission from the short rate to market interest rates (deposit and lending rates).

12. Indonesia has made considerable efforts over the past decade in modernizing its monetary operations framework, in line with IMF recommendations. BI reverted to a mid-corridor system in 2017, with the 7-day reverse repo rate as the operational target. It has been successful in aligning the overnight interbank rate with the operational target—the midpoint of the 100 basis-point corridor—except for the post-COVID-19 period for the abovementioned reasons. Since 2017, a reserve averaging mechanism has been in place, which was intended to increase banks' incentives to trade, and is in line with international best practices. Those reforms have spurred the deepening of the money market.

13. Meanwhile, parallel reforms on payment systems are expected to generate positive spillovers to the money market. More advanced digital payment methods can lower transaction costs and reduce risk. Faster processing and reduced reconciliation work can lead to more transactions occurring in real-time or near real-time in money market, freeing up liquidity that could be tied up in collateral. In theory, this could lead to less demand for excess liquidity (although the magnitude is unclear), thus possibly strengthening monetary policy transmission. In Indonesia, progress has been made on both the retail and wholesale fronts. BI launched BI-Fast as a real-time, 24/7 retail payment infrastructure in December 2021. On the wholesale front, the plan is to upgrade the current RTGS by 2025, including adding the multi-currency feature and strengthening risk management.

14. BI's plans to further develop the money market are progressing nicely. The Blueprint for Money Market Development 2025 aims to establish reliable infrastructure, offer a variety of instruments, foster high market integrity, and create a well-informed investor base. Progress has been made on the five key deliverables (market; market infrastructure; payment infrastructure; data digitalization; and regulation, licensing and surveillance). On market infrastructure in particular, 2021 has seen the implementation of Multimatching ETP for FX spot, as well as the conceptual design of BI-SSSS (Gen III) and trade repository.

15. A deeper repo market is one of the key deliverables of the reform. Since the launch of the Blueprint in December 2020, BI has conducted several initiatives to develop the repo market focusing on 3P+1I (product, participants, pricing, and infrastructure). As a result, the volume of interbank repo transactions increased significantly, with the daily average volume reaching to IDR 4.3 trillion in 2021, up from IDR 0.5 trillion in 2020. A few highlights are summarized below.

- **Market education.** BI employs an active strategy through continuous market education and moral suasion. During the pandemic, BI encouraged banks to use repo for liquidity management due to its collateralized and secured nature. Big banks were also encouraged to conduct knowledge transfer through webinars to small banks on repo accounting, settlement, and the use of infrastructure. Over time, the increase in market awareness and knowledge can lead to sustainable growth in the repo market and a reduction in the repo rate.

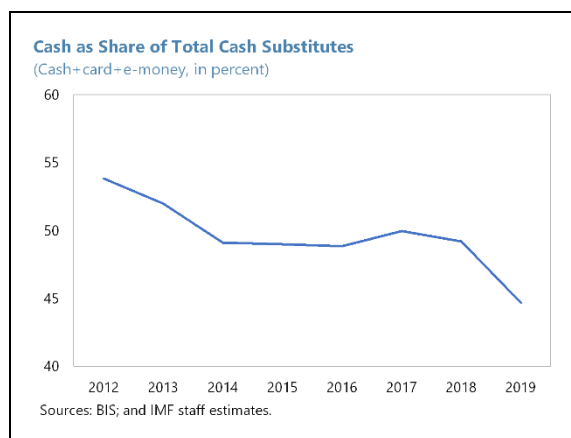
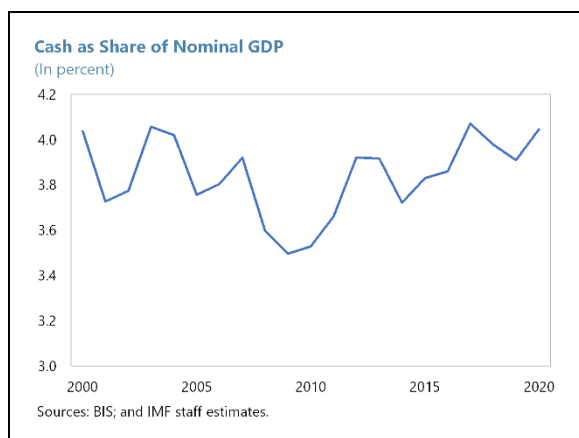
- **Regulation.** The intention is to strengthen regulatory framework (e.g., close-out netting regulation, financial sector omnibus bill, and repo taxation regulation) to support broader market participants base, particularly nonbank financial institution (NBFI) and large corporation. The authorities have added new clauses in harmonization tax law to provide umbrella regulation on equalizing tax treatments between short-term and long-term financial instruments, and between banks' repo transactions and those on nonbanks. The plan is to issue further regulations regarding the technical implementation of those taxes.
- **Infrastructure.** On the trading system, the focus is to standardize repo transactions for trading through the Electronic Trading Platform (ETP) and settled via a central counterparty (CCP). On the post-trade side, the objective is to improve transaction transparency and efficiency supported by straight-through processing. As the liquidity in the repo market has been increasing, the availability of ETP multi-matching system is becoming crucial for increased and more complex transactions. The CCP for repo is expected to be in place in 2022, considering the time for developing the business model and IT system design, alignment of priority in systems development among authorities, and tackling the legal challenges on close-out netting.

D. Implications of Introducing CBDC in Money Market

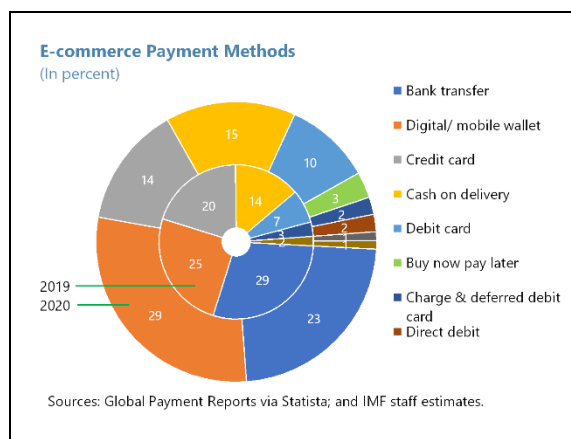
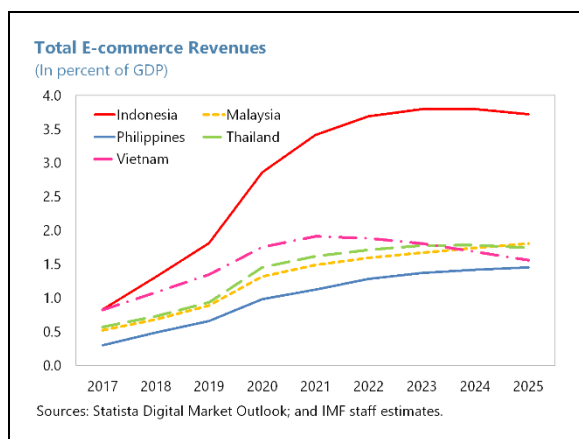
16. Interest in CBDC has risen worldwide in recent years. CBDC is a central bank's liability denominated in the local currency, which can be used as a medium of exchange and store of value. This new form of money could promote diversity in payment options, increase financial inclusion, and facilitate cross-border payments. There are various design choices for a CBDC: for example, access (widely vs restricted, or retail CBDC vs wholesale CBDC); degree of anonymity (ranging from complete to none); operational availability (ranging from current opening hours to 24 hours a day and seven days a week); and interest-bearing characteristics (yes or no) (CPMI, 2018). So far, two countries have formally introduced CBDC that are fully open to the public (Bahamas and Nigeria), while many other countries and regions such as China and the Eastern Caribbean Currency Union are running pilots open to a smaller set of the population.

17. Like many other countries, Indonesia has seen the relative importance of cash as a payment method declining over the years, although cash usage will likely remain there for its anonymity and less dependence on digital devices. Cash use (as a share of nominal GDP) in Indonesia has fallen very slowly overtime from the early 2000s until the global financial crisis, after which it started to rise again steadily. Many factors likely have contributed to the gradual increase in recent periods, including a steady increase in the household consumption share of GDP. Alternative measures of the importance of cash, such as cash relative to its alternatives, show that cash is losing its importance relative to its alternatives such as cards and e-money.⁵ While this significant shift towards digital payment methods reflects technology advances as well as change in consumer preferences, the pandemic also played an important role.

⁵ Khiaonarong and Humphrey (2019) discussed many measures including cash withdrawn from automated teller machines (ATMs) and over the counter at banks.



18. Indonesia has the potential for a secured, cash-like retail CBDC to play an important role in the retail payment landscape. Aggregate value of e-money transactions in Indonesia has risen exponentially since 2010, reaching around IDR 205 trillion as of 2020, and is expected to continue to grow (Statista, 2021). Digital/mobile wallet accounted for nearly 30 percent of the total e-commerce payments, followed by bank transfers (23 percent), cash on delivery (15 percent), credit card (14 percent), and debit card (10 percent). A few domestic nonbank players dominate Indonesia's digital payment market, including Gopay, OVO, DANA and LinkAja. When surveyed about concerns regarding digital payment methods, respondents cited security (59 percent), more comfortable with cash (49 percent), and concern over scams (36 percent) as top three answers (Statista, 2021). Launching retail CBDC (rCBDC) can explore more potential in the retail payment landscape by addressing these remaining concerns.



19. On the other hand, wholesale CBDC (wCBDC), whose access is more restricted and mainly open to financial institutions, may improve financial market settlement efficiency. Contrary to rCBDC, wCBDC may not be too new of a concept. As Mancini-Griffoli and others (2018) put it, central bank reserves can be interpreted as a wholesale form of CBDC used exclusively for interbank payments. Studies suggest that that wCBDC comparable to traditional central bank reserves in the interbank payment systems could potentially reduce cost and improve liquidity

management (CPMI, 2017). One way is to settle the outright or repo transactions using wCBDC, both on the securities leg and the cash leg, using integrated or single ledger of securities and cash on the CBDC platform. This could improve the settlement efficiency in terms of speed and complexity compared to Indonesia's current system which involves two FMIs (RTGS and securities settlement system) to complete the transaction. Nevertheless, should transaction speed further increase in existing FMIs, it remains to be seen how much additional gains the wCBDC itself can generate.

20. While any decision to launch CBDC should be carefully made, the rest of the section aims to provide some initial thoughts regarding the role of CBDC in promoting money market development. Among the major design choices (Table 1), a key consideration is along three main dimensions in CBDC issuance—collateral, remuneration, and redeemability.

Table 1. Key Design Features of Launched/Piloted Retail CBDCs

	Central Bank of the Bahamas Sand Dollar	Eastern Caribbean Central Bank Dcash	Central Bank of Uruguay e-Peso	Central Bank of Nigeria eNaira	People's Bank of China eCNY	Bank of Jamaica
Launch dates	Pilot started Dec. 2019; launched Oct. 2020	Pilot started March 2021, still ongoing	Pilot started Nov. 2017; ended April 2018	Pilot started Oct. 2021; still ongoing	Pilots started April 2020; still ongoing	Pilot to start in Q1 2022
Transaction fees?	No, but maybe yes later	None during pilot	None during pilot	None during first 90 days	None during pilot	None
Interest bearing?	No	No	No	No	No	No
Access	Smartphones and smart cards	Smartphones only?	Smart- and feature-phones	Smart- and feature-phones	Broad array of devices	Smart-; feature-phones and smart cards.
Offline?	Limited value payments when network down. Wallets update when network is back up.	Sender must be online. If the receiver is offline the payment will process when back online.	No but can use a USSD mobile network for settlement without an "internet" connection.	Sender must be online. If the receiver is offline the payment will process when back online.	The PBOC is piloting offline universal access devices.	CBDC can be transferred in various offline media as a bearer instrument.
User holding/ transaction limits	Physical/email address, phone number and photo for low-limit access (B\$500 holding and B\$1,500/month transaction). Plus, government-issued photo ID for higher limits (B\$8,000 holding and B\$10,000/month).	Physical/email address, phone number, photo and birth date/place for low limit access (EC\$1,000 to EC\$2,700/month transaction depending on risk profile). Plus, full name and bank account for higher limits (EC\$3,000 to EC\$20,000/day).	Physical/email address, SIM card and national ID for low limit access (UYU30,000).	Physical/email address, phone number, passport photo and birth date/place for low limit access (N120,000 holding; N20,000/day). National ID Number and bank account for higher limits (N300,000 – N5,000,000 holding; N50,000 – N1,000,000/day).	SIM card for low limit access (¥10,000 holding; ¥2,000/transaction; ¥5,000/day). Plus, full name, address, phone number and bank account for higher limits (¥500,000 holding; ¥500,000/transaction and ¥100,000/day).	CBDC transactions subject to the existing risk-based AML/CFT PSP framework, including collecting know-your-customer (KYC) information on all holders.
Central bank (CB) and payment service provider (PSP) data access	CB sees pseudonymous transactions data to monitor for suspicious activity and stop accounts if necessary.	CB sees anonymous holdings and transactions data. PSPs can see the identity of payers and payees and the purpose of transactions.	CB sees anonymous holdings and transaction data, which can be decrypted under very restrictive legal conditions-e.g., with a court order.	unclear based on available information	Controllable anonymity: The CB can see all holdings and transaction data, but users can control what information they expose to counterparties.	The CB does not see holdings or transactions data. PSPs maintain the IDs of their respective users and transactions in line with KYC regulations.
Programmable?	No, but smart contracts could be used for point-of-sale tax payments, integration with physical devices or IoT applications, or automate distribution of economic relief based on specific demographic or other characteristics.					At the wallet and service provider level.
Cross-border?	Not directly	No	No	unclear based on available information	No	No
Platform vendor and type	NZIA Limited (DLT private permissioned)	Bitt Hyperledger Fabric (DLT private permissioned)	Roberto Giori Company (Centralized ledger)	Bitt Hyperledger Fabric (DLT private permissioned)	No known platform vendor (hybrid platform type)	eCurrency (DSC3 Digital Bearer Instrument)

Sources: Various central banks and technology platform vendors.

- **Collateral.** Two options are usually considered in theory: issuing CBDC against reserves or against high-quality liquid assets (HQLA) such as government bonds. Introducing CBDC against reserves could lead to more volatile market interest rates and monetary conditions, which could then be mitigated by more frequent fine-tuning OMOs. This is illustrated in the following example. Assume that the commercial banking sector converts some reserves to an equal amount of (retail or wholesale) CBDC. If the commercial banks do not call back loans, the loan to reserves ratio would increase, and the reserve requirement might be breached. To avoid that,

commercial banks would borrow from each other in the money market, pushing money market interest rates higher, driving up transactions volume in call market. In an extreme case, this could lead to bank disintermediation.⁶ Monetary policy can offset the tighter monetary conditions and volatile money market interest rates caused by CBDC creation using open market operations (OMO).⁷ Theoretically, introducing CBDC against HQLAs such as government bonds could imply less impact on reserves and thus monetary conditions, but incurs an expansion of the central bank's balance sheet, in which case the central bank will need to make decisions on portfolio composition choices consistent with its risk appetite. Additionally, an increased demand for government bonds by financial institutions could push up their prices and lower yields.

Table 2. Hypothetical Analytical Balance Sheets

Commercial Bank		Central Bank	
Assets	Liabilities	Assets	Liabilities
Before CBDC Introduction			
Loans (300)	Deposits (320)	Net Foreign Assets (20)	Cash (20)
Reserves (40)	Capital (40)	Claims on Other Depository Corporations (20)	Reserve (40)
Net Claims on Central Govt (10)		Net Claims on Central Govt (10)	
Others (10)		Others (10)	
Total (360)	Total (360)	Total (60)	Total (60)
CBDC Against Reserves			
Loans (300)	Deposits (320)	Net Foreign Assets (20)	Cash (20)
Reserves (30)	Capital (40)	Claims on Other Depository Corporations (20)	Reserve (30)
Net Claims on Central Govt (10)		Net Claims on Central Govt (10)	CBDC (10)
Others (10)		Others (10)	
CBDC (10)		Total (60)	Total (60)
Total (360)	Total (360)		
CBDC against HQLAs			
Loans (300)	Deposits (320)	Net Foreign Assets (20)	Cash (20)
Reserves (40)	Capital (40)	Claims on Other Depository Corporations (20)	Reserve (40)
Net Claims on Central Govt (0)		Net Claims on Central Govt (20)	CBDC (10)
Others (10)		Others (10)	
CBDC (10)	Total (360)	Total (70)	Total (70)
Total (360)			

Source: IMF staff calculations.

- **Remuneration.** Discussions around CBDC remuneration usually distinguish two cases: non-interest bearing and interest bearing. Although it is technically feasible to pay interest on any type of CBDC, central banks may prefer not to issue interest-bearing rCBDC concerning the pressure on commercial banks' deposits and the risk of bank disintermediation. wCBDC can in

⁶ Some literature, such as Kumhof and Noone (2018), argue that CBDC and reserves should be distinct and not convertible into each other, so as to help safeguard financial stability. The logic is that when depositors would like to obtain CBDC against their deposits, they would first transfer deposit to banks that pay out CBDC against deposits, which means that other banks would lose deposits during this process. If this demand for CBDC is in large numbers, then this creates a systemwide, near-instantaneous bank run.

⁷ Issuing CBDC against currency in circulation could be another option. However, because this option would not lead to changes in reserves and thus money market conditions, and the share of CBDC issued in this way can be very limited in a digital payment system, this study does not take currency in circulation as an example.

principle be interest-bearing, which could make it attractive as a substitute for money market instruments as a liquid and risk-free asset facilitating final settlement. Indeed, as suggested by many literatures, if institutional investors could hold wCBDC without limits, the remuneration rate could become the hard floor for money market rates. The risks of setting higher interest rates on wCBDC (higher than that of reserves, for example) could be a reduction in reserves, forcing banks to borrow in money market, and money could flow out of other short-term instruments into wCBDC, pushing those yields higher.

- **Redeemability.** In this context, redeemability refers to the ability of the holders to exchange CBDC for other assets such as physical cash, deposits, and reserves. Different forms of limits or caps on the redeemability can be used as mitigation measures for certain risks related to the introduction of CBDC. For example, by setting a cap on how much reserve can be exchanged for wCBDC in a given period, or by selecting certain banks with strong capital position as leading distributors of rCBDC, the risk of bank disintermediation could be mitigated. Such caps may be especially important as transitional arrangements that aim to ensure financial stability when new CBDC is first introduced. A similar cap can be applied on the conversion from bank deposits to rCBDC in terms of daily transaction and/or balance limits to mitigate risks of bank disintermediation. Existing CBDCs such as the Central Bank of Nigeria's eNaira and People's Bank of China's E-CNY, both have certain caps on transaction and balance limits to ease the crowding-out of bank deposits.⁸

21. If both rCBDC and wCBDC are deemed desirable, an approach where they are disintegrated (i.e., not directly convertible to one another) might be a way to start.

Distinctions are often made between rCBDC and wCBDC to facilitate conceptual discussions. In practice, countries also tend to focus on either the retail or wholesale case to best utilize the existing infrastructure and network, and to mitigate potential risks by minimizing the deviation from the current financial system structure. Having two disintegrated CBDC systems for retail and wholesale cases in parallel could allow for different design features to best meet their respective policy objectives. For example, consider the following two choices:

Examples of CBDC with Different Design		
	rCBDC	wCBDC
Collateral	Reserves	HQLA
Remuneration	Non-interest bearing	Interest bearing with variable interest rate
Redeemability	Redeemable by payment service providers, including banks and NBFIs	Redeemable by money market participants, including banks and NBFIs

- **rCBDC.** The rCBDC is designed as a digital extension of cash. Commercial banks can convert their reserves into rCBDC, to meet users' demand. The rCBDC is non-interest rate bearing.

⁸ The PBOC has put in place system frictions as prevent the rapid spread of bank runs. It uses a tiered design of e-CNY wallet with different caps on transaction and balance for different types of e-CNY wallets (PBOC, 2021).

- **wCBDC.** The wCBDC is designed as a new instrument used for money market transactions. Money market participants can obtain wCBDC from the central bank using HQLA such as government bonds as underlying collateral, through either outright purchases or repo transactions. The wCBDC is interest bearing with a variable interest rate. The interest rate on wCBDC can be set to zero when first introduced (making it closer to banks' excess reserves which are also non-remunerated) and can be allowed to be non-zero in the future.

22. If the banking system is already characterized by excess liquidity, the risk of bank disintermediation due to the introduction of rCBDC is low.

In Indonesia, the aggregate liquidity surplus of the banking system towards the central bank (defined as net foreign assets minus reserve requirement and other autonomous factors such as currency outside banks and government claims) amounts to around IDR 650 trillion in September 2021, just coming down from more than IDR 1,000 trillion last August. Since the early 2000s, the central bank is the net borrower in the interbank money market as the banking system has had excess liquidity. If commercial banks convert a small fraction of reserves into rCBDC, the chance of depleting the reserves is low, as such the probability that central bank would need to inject liquidity would be also low. Indeed, rCBDC could even become a new instrument for the central bank to absorb excess liquidity from the banking sector to incentivize interbank market transactions.

September 2021 Snapshot			
(In trillions of rupiah)			
Asset		Liability	
BI Analytical Balance Sheet			
Net foreign asset	1,976	Required reserves	284
OMO	-388	Cash in vault	93
Government claims	-293	Currency outside banks	749
Other	-168	Other	2
Total	1,127	Total	1,127
Commercial Bank Analytical Balance Sheet			
Rupiah loans	4,964	Rupiah deposits	5,625
Required reserves	284	Other deposits	890
Cash in vault	93	Capital and reserves	2,225
Other claims on BI (net)	749		
Net claims on government	1,212		
Other	1,438		
Total	8,741	Total	8,740

23. The introduction of wCBDC can impact the money market through multiple channels.

In the case of Indonesia, conditional on the abovementioned design features, the following channels could be of relevance.

- wCBDC provides money market participants who do not currently settle in central bank money with the possibility to settle directly in central bank money rather than bank deposits, which can reduce counterparty risk. By design, wCBDC do not entail any credit risk as it is a direct claim on the central bank. For NBFIs, wCBDC provides them with a new instrument that facilitates their participation in the money market.
- If banks exchange CBDC with reserves, it creates another channel on top of the existing ones where excess liquidity in the banking system could be reduced. With tighter liquidity conditions, money market transaction volume could also increase.
- To provide CBDC using HQLA as collateral, permanent expansion of central bank balance sheet by government bond purchases could lower government bond yields. If the supply of HQLA is limited, riskier assets might be tapped, thus promoting repo market development.

- If the interest rate on wCBDC is set to be higher than the return on excess reserves, commercial banks could migrate excess reserves into wCBDC to earn the interest. The interest rate set on wCBDC can become the hard floor for money market rates, which will have an impact on deposit rates. In that sense, wCBDC can become a new monetary policy tool to strengthen the transmission from the policy rate to the market interest rates.

CBDC: Ways to Promote Money Market	
Demand-side	Supply-side
More participants including NBFIs	More instruments: rCBDC and/or wCBDC
More incentives for engaging in money market transactions and increased demand for HQLAs	Absorbing excess liquidity, improving monetary policy effectiveness

24. What underpins the rationale for our analysis is the assumption of imperfect substitutability between CBDC and reserves. When rCBDC and wCBDC are disintegrated,⁹ rCBDC is essentially part of M0 like cash. The demand for rCBDC would largely depend on the degree of adoption (e.g., accepted and used by users), thus could be harder to predict. Therefore, some rCBDC will be kept by users (as a payment means) and by payment service providers (as a buffer to meet user's demand), leading to a consistent reduction in reserves and creating incentives for banks to borrow in the money market. Large banks may have more room to permanently lower their reserves due to their large networks to serve users and excess liquidity. For wCBDC, since its quantity and/or price can be controlled by the central bank, wCBDC essentially becomes a new monetary policy instrument. wCBDC and reserves are more similar in nature, both can carry an interest and be used for interbank payments, but from the monetary operations perspective, using wCBDC to absorb excess liquidity may be less costly for the central bank than using OMOs, especially if the wCBDC carries no or little interest at the very beginning.

25. Enhanced participation of non-bank financial institutions (NBFIs) in the money market can accelerate financial inclusion. CPMI (2018) suggested that if the introduction of CBDC would allow direct participation of nonbanks in the settlement process, gains could further increase. As explained in previous sections, NBFIs play a rather small role in Indonesia's money market, and the secondary bond markets lack depth and liquidity. Granting access to wCBDC using government bonds as collateral could provide opportunities for NBFIs, who often hold bond instruments to maturity, to better manage their liquidity.

26. Banks will need to adapt to overcome the challenges from the introduction of CBDC. As money shifts out of the banking system and gradually migrates into this new form of money, banks may witness deposit outflows. They will face more competition and an increased need to raise interest rates to attract deposits. The capacity to do so seems there, given the high NIMs that

⁹ Running rCBDC and wCBDC separately, at least at the early stage, could be a preferred choice. The design and implementation of a dual-purpose CBDC would be more complex. For instance, when rCBDC and wCBDC are built on DLT-based permissioned networks, the set of such payment service providers for rCBDC and wCBDC may not completely overlap. In addition, if the wCBDC is supposed to be used in a securities settlement context, the wCBDC will have to have certain smart contracting abilities built in, although this is not necessarily the case for rCBDC.

Indonesia banks enjoy. Nevertheless, as BIS (2021) also suggested, whether these challenges would indeed be disruptive would depend on the scale of the take-up of CBDC, how quickly any substitution occurs and extent of offset from third-party and non-bank financial service providers. In Indonesia, smaller banks are likely to face more challenges. Bank consolidation may help prepare banks to enhance their competitiveness and resilience.

27. The design of CBDC should take into account the country's characteristics and policy objectives. A study drawing on experts' opinions revealed that a cash-like general-purpose rCBDC would be the best suited model for Indonesia, since it could enhance financial inclusion and reduce shadow banking (Zams and others, 2020). Another study, Kang (2017), argued that an interest-bearing CBDC may enhance the competitiveness of the banking system by reducing the structurally high NIMs in Indonesia. More research is warranted to study the potential for CBDC in Indonesia, to ensure the robust design and operation of such a system.

28. The analysis also underscores the importance of the authorities' continuous money market reforms and digital infrastructure upgrades. Issuing CBDC is more than just distributing a new digital legal tender, it also requires and brings additional changes to the digital infrastructure while leveraging the existing one, and potentially makes operations more efficient. The ongoing money market development, in turn, would benefit from the improvement in digital infrastructure enhanced by the CBDC issuance. Moreover, other money market development measures, such as enhancing competition, and payment digitalization efforts, such as BI-Fast, would raise the public's digital awareness and help the banking sector to be better prepared if CBDC were to be introduced.

E. Conclusion

29. While the year 2021 saw a big decline in interbank call money transactions as banks' ample liquidity reduced incentives to trade, repo transaction volume increased, helped by BI's efforts and coordination with other authorities. Virtual joint peer learning activities between big banks and small banks have helped to increase volume in the money market.

30. Despite some temporary setbacks caused by the pandemic in other areas, Indonesia continues to develop its money market and payment systems reform agenda laid out in Blueprint for Money Market Development 2025. The improvement of the money market infrastructure through a central counterparty is expected to be in place in 2022. Further reforms of the money market can serve as a catalyst in the broad reform agenda of modernizing Indonesia's financial system.

31. The introduction of CBDC could benefit money market growth in Indonesia mainly through broadening the instruments and increasing financial inclusion of NBFIs. If considered as a feasible alternative, further research on the detailed design choices of CBDC and macro impact analysis can be done, by taking into account Indonesia's money market development, banking sector liquidity, availability of HQLAs, and associated risks.

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INDONESIA'S TRANSITION TOWARD A GREENER ECONOMY—CARBON PRICING AND GREEN FINANCING¹

The adoption of carbon pricing and corporate green financing can help Indonesia transition to a greener economy. The authorities have taken steps on both fronts, but to ensure effectiveness, further measures to enhance market mechanisms in both energy and financial markets are critical.

A. Introduction

1. Indonesia, as one of the large greenhouse gas (GHG) emitters, continues to tackle climate change. Indonesia is ranked as the eighth emitter² in the world although per capita GHG is still at low levels. The government has incorporated climate change factors into its policy planning process such as its climate budget tagging system and the issuance of green sovereign sukuks;³ Bank Indonesia and the Financial Services Authority (OJK) are closely collaborating to foster Indonesia's green financial market infrastructure, drawing on international experience in developing green taxonomies and measurements of climate risks. Despite the pandemic, COP26 motivated Indonesia to accelerate its efforts toward a greener economy, notably introducing carbon pricing and enhancing green financing. This short note provides an overview of Indonesia's updated Nationally Determined Contribution (NDC) targets and climate change policies. The note also identifies the challenges facing Indonesia in implementing carbon pricing and green financing and offers relevant policy recommendations. Assuming the presidency of the G20 this year, Indonesia is well positioned to lead the discussions on climate change and help shape the G20's policy agenda.

B. Indonesia's Updated NDC and Recent Climate Policy Measures

2. Indonesia emphasized its strong commitment to tackling climate change at COP26. Among the policies discussed, officials pledged that the forestry sector will become a net carbon sink by 2030—absorbing more carbon dioxide from the atmosphere than it releases. In the energy sector, Indonesia intends to develop an electric car ecosystem, build the largest solar power plant in Southeast Asia, promote new renewable energy, and foster clean energy-based industries. To achieve these goals, the authorities announced plans to mobilize climate finance and innovative financing such as green bonds. Indonesia stressed that carbon markets and carbon pricing must be part of the efforts to address climate change and that a carbon economy ecosystem that is transparent, has integrity, and is inclusive and fair must be created. Indonesia signed the Glasgow Climate Pact, which included the acceleration of efforts towards the phasedown of unabated coal power and the phase-out of inefficient fossil fuel subsidies. They also signed the Glasgow Leader's Declaration on Forest

¹ Prepared by Koki Harada (APD).

² As of 2018, based on World Resources Institute, CAIT Climate Data Explorer.

³ See Harada (2021) paragraph 8 for more detail.

and Land Use, which included commitment to working collectively to halt and reverse forest loss and land degradation by 2030.

3. Indonesia announced that it will explore a plan to reach net-zero emissions in 2060 or sooner but left unchanged its NDC targets. Indonesia submitted its updated NDC to the United Nations Framework Convention on Climate Change (UNFCCC) in July 2021 but kept the GHG emissions targets the same as in the 2016 submission, which imply further increases in greenhouse gas emissions from current levels: the unconditional target for GHG reduction is 29 percent compared to a Business as Usual (BAU) scenario, while its conditional reduction target is 41 percent compared to BAU. The projected BAU and emission reduction from each sector's category are also unchanged. More than half of the reduction in GHG emissions will be contributed by forestry and other land uses, which are expected to see a significant reduction in levels by 2030 compared to 2010. In contrast, emissions from energy use in 2030 will be lower relative to BAU but substantially higher compared to 2010 levels.

Table 1. Indonesia: Updated Nationally Determined Contributions (NDCs)
(Projected BAU and emission reduction from each sector category)

Sector	GHG Emission Level 2010 1/	GHG Emission Level 2030 (Mton CO ₂ e)			GHG Emission Reduction				Annual Average Growth BAU (2010-2030)	Average Growth 2000-2012 1/
		BaU	CM1 2/	CM2 2/	CM1 2/	CM2 2/	CM1 2/	CM2 2/		
Energy 1/	453	1,669	1,355	1,223	314	446	11%	15.5%	6.7%	4.50%
Waste	88	296	285	256	11	40	0.38%	1.4%	6.3%	4.00%
IPPU	36	70	67	66	3	3	0.10%	0.11%	3.4%	0.10%
Agriculture 3/	111	120	110	116	9	4	0.32%	0.13%	0.4%	1.30%
Forestry and Other Land Uses (FOLU) 4/	647	714	217	22	497	692	17.2%	24.1%	0.5%	2.70%
TOTAL	1,334	2,869	2,034	1,683	834	1,185	29%	41%	3.9%	3.20%

Source: Republic of Indonesia, 2021, *Updated Nationally Determined Contribution*.

1/ Including fugitive.

2/ CM1 = Counter Measure (unconditional mitigation scenario); CM2 = Counter Measure (conditional mitigation scenario).

3/ Only include rice cultivation and livestock.

4/ Including emission from estate crops plantation.

4. The updated NDC includes specific policies to reach the GHG emission reduction target. For example, in forestry, Indonesia set a 2030 target for peat land restoration of 2 million hectares and rehabilitation of degraded land of 12 million hectares. In the energy sector, Indonesia is developing green refineries, to produce green fuels from bio-resources and mixing them with existing fuels in order to increase biofuel content and reduce fossil fuel consumption.

5. The authorities have banned the new development of coal-fired power plants from 2022 and intend to phase out such plants by 2056 at the latest.⁴ To this end, the Indonesian authorities are devising a roadmap for shifting from coal-generated electricity to renewable energy sources, including by accelerating related infrastructure deployment. The strategy will be

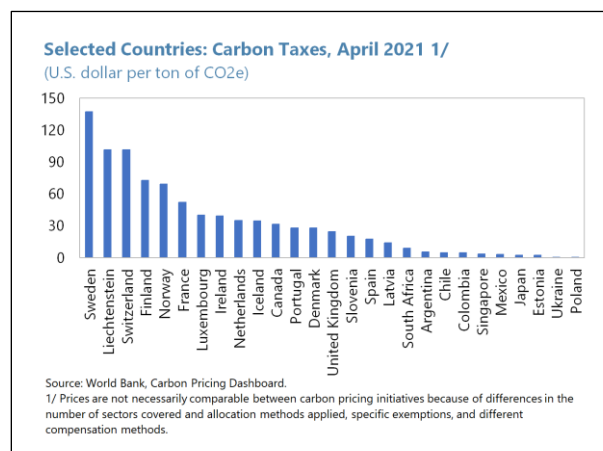
⁴ A moratorium on new plans for coal fired power plants does not apply to those already approved.

complemented by energy-efficiency measures,⁵ increased use of biofuels, and the development of an electric vehicle industry. However, existing contracts with coal-fired power plants operators could be a roadblock in the energy transition in the near to medium term. Indonesia's energy mix target by 2025 as stated in the National Energy Plan (RUEN)⁶ remains unchanged: oil (25 percent), gas (22 percent), coal (30 percent), and new and renewable energy (23 percent). The current RUEN has been mapped into a new Electricity Supply Business Plan (RUPTL) for 2021–2030⁷ by PLN, the state-owned electricity company.⁸

C. Carbon Pricing

6. The general purpose of carbon pricing is to reduce GHG emissions by making them costly. Depending on its design, a carbon tax could, for example, lead to higher fossil fuel prices, which, in turn, could discourage individuals from using fossil fuels to produce energy and incentivize for corporates to invest in greener facilities. Carbon tax and Emission Trading Systems (ETs) are the main forms of carbon pricing mechanisms. The former works directly through prices, while an ETS works through restrictions on the quantity of carbon emissions afforded to individual emitters, which, in turn, affects the cost of carbon through the price of emission rights. To maximize the effectiveness of carbon pricing, cost increases through carbon pricing systems must be passed on to end-users through market mechanisms. The path of carbon prices should be predictable and increasing, focusing on achieving GHG emissions targets by 2030. In this way, through behavioral change in end-users, GHG emissions will gradually decrease.

7. Indonesia is introducing carbon pricing mechanisms. A carbon tax will be introduced on April 2022, with a rate of IDR 30,000 per ton CO₂e, which is imposed on GHG emissions exceeding a certain threshold (a cap and tax system). At about US\$2 per ton of CO₂e, this carbon price will be one of the lowest tax rates among the countries where carbon taxes currently are in place. There are no plans for further increases. Despite these limitations,



⁵ The government regulation 70/2009 requires all companies with an annual energy consumption exceeding 6,000 tons of oil equivalent to appoint an energy manager, develop an energy conservation plan, perform an energy audit and report energy consumption to government (IEA, 2021).

⁶ The latest RUEN was established in 2017.

⁷ Approved by the Minister of Energy and Mineral Resources in October 2021.

⁸ The new RUPTL was devised based on the assumption that electricity demand growth is 4.4 percent annually, which is significantly lower compared to 6.5 percent in the previous RUPTL 2019–2028 plan, and subsequently additional power capacity is around 40 percent lower. The reduction of additional power capacity is mainly from fossil fuel power plant capacity and thus the renewable energy share has increased. 26.3 GW of the total 40.6 GW of planned additional capacity is allocated to Independent Power Producers (IPPs) and thus investment of private sector on renewable energy is expected. The total power investment needs are estimated at around US\$9.14 billion per year over 2021–30 and, of this total, PLN is expected to contribute to US\$5.14 billion per year (OECD CEFIM, 2021).

the tax is an important first step given that only a limited number of developing countries have introduced a carbon tax. The authorities will start an ETS by 2024, the design of which is still under preparation. The pilot of the ETS has been completed with the participation of 32 coal-fired power plants with 14 buyers and 18 sellers.

8. Achieving Indonesia's mitigation objectives will require structural reforms to strengthen the market element in energy pricing. To support the transition to renewable energy and greater energy efficiency, the relative effective costs of energy for end-users need to favor green energy. However, energy subsidies apply to fuels and electricity, and domestic market prices are fixed in practice, with very infrequent adjustments to changes in world market prices.⁹ This is at odds with the aims of carbon pricing, which are to internalize the costs of GHG externalities and thereby fix the market failure that led to high GHG emissions. Introducing carbon pricing without policy reforms may lead to harmful outcomes because electric companies cannot recover their costs by passing them on to customers. The electric company is a monopoly that is state-owned, and the rigid price mechanism would lead to fiscal risks. Carbon pricing mechanisms will thus only be effective with complementary broader energy pricing reforms.

9. Removing energy subsidies will be essential. The Indonesian government proposed its reform plan to parliament in 2020.¹⁰ The plan recognizes that current energy subsidies are not well-targeted and do not meet their objective of providing support to poorer people through low energy prices (for example, LPG can be purchased at a fixed price regardless of income level). To improve targeting, the energy subsidy reform will transform some of the energy subsidies into direct social assistance. The reform is expected to be implemented this year, but its implementation will be dependent on the pace of economic recovery from the pandemic. However, there are no plans to reform the energy pricing mechanism.

10. While energy price adjustment is a prerequisite for carbon pricing, a gradual adjustment would be warranted. The transition from fixed to flexible pricing should be gradual and clearly communicated to minimize distributional effects across income groups and address concerns about potential inflation stemming from energy price hikes. Enhancing accountability and transparency of the government and energy companies would be necessary to increase energy prices.¹¹ However, although the current energy pricing system is designed to regularly adjust to changes in energy prices, this has not occurred in practice. Thus, if energy prices are not adjusted despite the introduction of carbon pricing, the additional costs to energy companies would be covered by subsidies, cancelling out the effects of carbon pricing.

11. Going forward, the design of carbon pricing should be further developed. Achieving net zero emissions by 2060 would require a substantial rise in the carbon price. The cap and tax design

⁹ See Harada (2021) Box 1 for more detail.

¹⁰ See Harada (2021) paragraph 14 for more detail.

¹¹ In this regard, introducing an electricity fee system to reflect customer preferences on energy sources might be worth considering as a means to demonstrate end-user support for renewable energy sources and secure political backing for green energy.

does not provide incentives for below-the-cap companies to reduce GHG emissions further since they will not be able to profit from selling their allowance of GHG emissions. In this sense, the cap-and-tax type of a carbon tax system would be weaker than ETS in terms of GHG reduction mechanisms. Moreover, the current carbon tax applies only on a limited basis to coal-fired power plants, leaving the industry and transportation sector, which account for about 29 and 26 percent of the GHG emissions by the energy sector,¹² respectively. Thus, a redesign of the carbon tax system to include further carbon tax rate hikes and an expansion of applicable sectors, should be considered. The upcoming ETS should incorporate major emitter sectors. To reduce GHG emissions, it is desirable for the ETS to involve as many sectors as possible. The ETS also requires a market adjustment mechanism for energy prices.

12. A comprehensive mitigation strategy and its roadmap by 2030 would be needed to accelerate GHG emission reduction.¹³ Carbon pricing can achieve mitigation goals with the lowest economic cost, but given the difficulty of implementing effective carbon pricing, complementary mitigation measures such as feebates and regulations should also be considered. Carbon pricing revenues could also be used to compensate people for the loss of income from higher energy prices. In the case of Indonesia, a carbon price of US\$25 would not only reduce GHG emissions by 16 percent but also generate revenues of 0.7 percent of GDP.¹⁴ Close communication with stakeholders and the public about reform packages would facilitate consensus building, leading to the implementation of effective mitigation measures.

D. Green Financing

13. The authorities are seeking to promote green finance to meet the significant investment needed to achieve climate change and development goals. The authorities estimated that the financing needed to achieve its NDC targets amount to 2.8 percent of GDP annually. Also, its infrastructure needs are estimated as 6.0 percent of GDP annually. The extent of climate and infrastructure financing needs suggests that mobilizing private investment is essential. In this regard, OJK updated its sustainable financing roadmap to identify several key priorities: developing a green taxonomy; implementing Environmental, Social, and Governance (ESG) aspects into risk management, through reporting on ESG aspects and developing key performance indicators; sharing success stories of innovative green scheme development; developing innovative schemes of sustainable project financing; and building an understanding of the importance of the activities that consider ESG aspects.

¹² As of 2018, based on World Resources Institute, *CAIT Climate Data Explorer*. GHG emissions of the industry sector come from manufacturing/construction, other fuel combustion, and fugitive emissions. GHG emissions of the electricity/heat sector account for 41 percent of the total GHG emissions of the energy sector.

¹³ See Black and others (2021) Box 2 for more detail.

¹⁴ Black and others (2021).

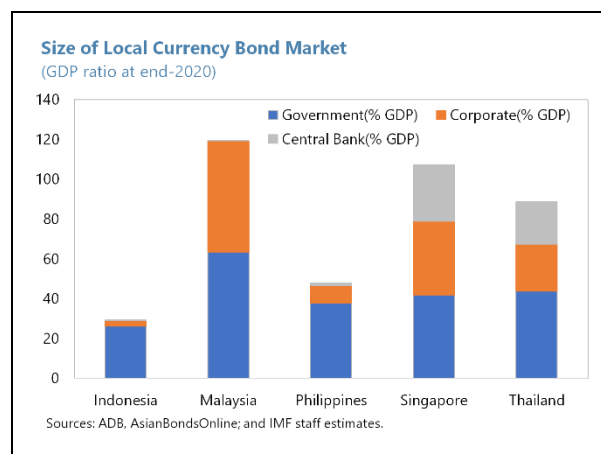
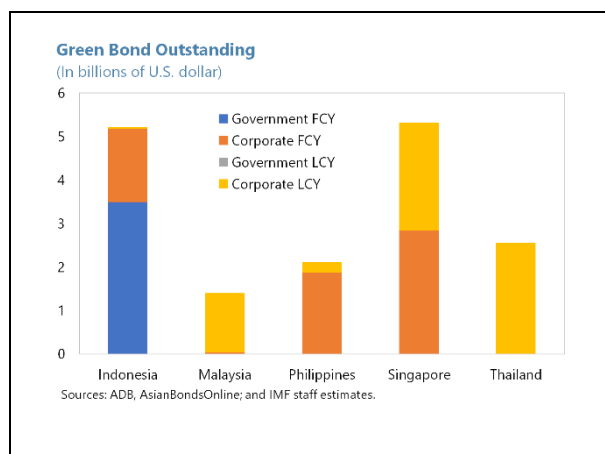
Table 2. Indonesia: Estimated Financial Needs

<i>The authorities' estimation to meet the unconditional target in 2030</i>		
Sector	Financial Needs (In trillions of rupiah)	Financial Needs (In billions of U.S. dollar)
Forest and land use	309	22
Energy & transportation	3,500	246
Agriculture	7	1
IPPU	1	0
Waste	185	13
Total	4,002	281
Annual average 1/	301	21
Annual average (GDP ratio)	2.8	--
<i>ADB's estimation of Infrastructure Needs (Climate-adjusted estimates 2016-2030)</i>		
Investment Needs (In billions of U.S. dollar)	Annual Average (In billions of U.S. dollar)	Investment Needs (In percent of GDP)
1,229	82	6.0

Source: Asian Development Bank, 2021 *Benniel Update Report*; and IMF staff calculations.

1/ The timeframe is 2011-2030 for agriculture, 2013-2030 for forestry and land use, and 2018-2030 for the others.

14. Indonesia has issued several sovereign green sukuku internationally, but domestic green financing is yet to be developed. Indonesia's green bond market is the second largest among its Southeast Asia peers behind Singapore in nominal terms (see left chart), although it is still small in relative terms to GDP (US\$5 billion, accounting for around 0.5 percent of GDP). The market is dominated by government bonds partly reflecting the government's green development initiatives, and almost all bonds are denominated in foreign currency (FCY). In some peer countries, local currency (LCY) corporate green bonds account for a substantial share of the market. However, the size of Indonesia's local currency bond market is the smallest among its peers in terms of GDP ratio, implying only a limited size in the domestic market for green bonds. The mobilization of private green investment will require the development of the domestic financial market.



15. The demand for green sukuk in the secondary market is mixed.

The government green sukuk issued in 2018 appears to carry a greenium (green bond premium) since 2020, aligned with a surge in global ESG investment demand. However, the other government green sukuk do not appear to show a similar premium, probably because they lack liquidity and have long maturity. In the chart, the green sukuk 1 has the largest amount of issuance and the shortest remaining maturity among the four green sukuk and shows higher prices than conventional bonds. While the green market is still at an early stage of development, it would be important to closely monitor developments in both the primary and secondary markets to identify areas for improvement in the green market infrastructure as well as in the issuance strategy. The government's green sukuk could be used as a benchmark for the design and pricing of the corporate green market in Indonesia.

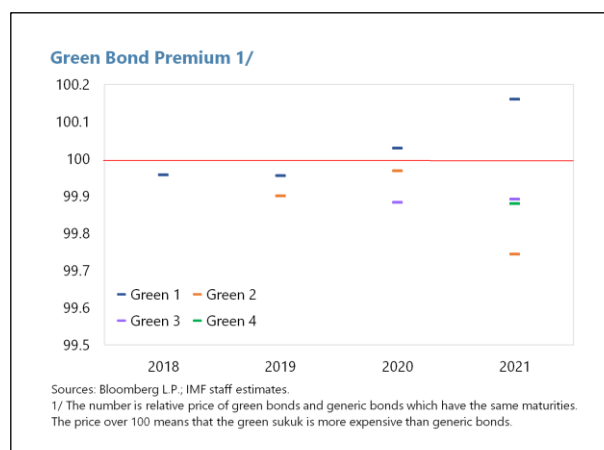


Table 3. Indonesia: Government Green Sukuk

	Government Green Sukuk 1	Government Green Sukuk 2	Government Green Sukuk 3	Government Green Sukuk 4
Amount	US\$1,250 million	US\$750 million	US\$750 million	US\$750 million
Issue Date	3/1/2018	2/20/2019	6/23/2020	6/9/2021
Maturity Date	3/1/2023	8/20/2024	6/23/2025	6/9/2051
Coupon	3.75	3.9	2.3	3.55

16. Transparency is key to enhancing the functioning of a green financing market. It is crucial to diminish the issue of information asymmetry as much as possible. The disclosure standards of listed companies should be internationally aligned to ensure comparability and consistency, and sufficient for investors to assess the risk profiles of green projects. As OJK recognizes in its sustainable financing roadmap, the Indonesia Green Taxonomy is also essential for comparing information about green financial instruments for investment decisions.

17. To promote green financing, Indonesia needs to overcome the limitation of a shallow financial market and maintain sound macroeconomic fundamentals. This is a longstanding challenge and will require efforts towards promoting financial deepening more broadly. In this regard, it would be important to implement the 2017 FSAP recommendation regarding enhancing

bond yield curve by consolidating debt issuance and improving secondary markets.¹⁵ In addition, maintaining strong macroeconomic policies will be crucial to attract foreign direct investment and foreign financing for green investment, and enabling the private sector to obtain more favorable financing terms for green investment.

E. Conclusion

18. Promoting green financing combined with effective carbon pricing is key to reconciling the reduction of GHG emissions while fulfilling Indonesia's development needs.

Green financing in tandem with carbon pricing could strengthen and accelerate the transition toward a greener and inclusive economy. To this end, further policy efforts are needed within a comprehensive mitigation strategy. The strategy would outline a roadmap by 2030, that could include the energy subsidy and pricing reforms as well as a carbon pricing revenue recycling plan. The authorities should also consider redesigning the carbon pricing mechanisms, including expanding the number of participants in the ETS and increasing carbon tax rates in a clear and predictable manner. Furthermore, it would be important to establish institutional frameworks to manage all carbon pricing mechanisms in a consistent and effective manner, while ensuring that the burden of carbon pricing does not fall disproportionately on lower income groups. Finally, enhancing transparency, including the implementation of the green taxonomy, deepening financial markets, and maintaining sound macroeconomic policies would help foster a green financing market. These measures would facilitate the development of green financing market mechanisms, which could help Indonesia meet its financing needs for climate change.

¹⁵ The 2017 FSAP raised as priorities: (i) improving the efficiency of the yield curve by consolidating the number of instruments issued and prioritizing the issuance (and reissuance) of benchmark maturities for T-bonds and increasing the issuance of T-bills; (ii) removing legal obstacles to the development of structured non-recourse products, critical for infrastructure financing; (iii) reforming the taxation of financial products (including by replacing the tax applied to the gross value of transactions with one more closely linked with firms' performance), (iv) strengthen insolvency procedures and creditor rights to improve expected recovery rates; and (v) promoting the development of derivative instruments to enable risk hedging.

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