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**Coronavirus (COVID-19) and Indonesia:  
Modelling the External Financial Shock**

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## **Economics and Coronavirus**

The novel coronavirus pandemic has emerged as the greatest challenge of the 21<sup>st</sup> century for economies globally. From small beginnings in Wuhan province, China, in late 2019, the coronavirus has now infected over 16.5 million people and caused nearly 700,000 deaths worldwide as at 29 July 2020. The scale and nature of the pandemic represent a global critical juncture in a health and economic crisis that was unforeseen and is now unprecedented in its effects (Acemoglu and Robinson 2012). Health effects have varied between countries with greater international exposure leading to a higher number of cases in the United States, United Kingdom and across Europe. Unequivocally, however, it has been the emerging market economies that have fared the worst economically. Ecuador and Zambia were the first to default, with over 100 countries having now requested or expressed interest in IMF assistance so far in 2020 (IMF 2020b; Basri, Drysdale & Triggs 2020).

Indonesia has experienced a rising number of cases since March 2020. As at 29 July 2020, official figures have reported 102,051 infections and nearly 5,000 deaths from the virus, though many believe the true tally could be four or five times larger (WHO 2020a). Jakarta issued a state of emergency on 23 March for two weeks, effectively shutting down the economy. Limited activity has been allowed since 10 April and further restrictions on travel and events have been enforced. From 22 April, 23 regions were under large-scale social restrictions and bus, plane and sea travel were suspended until 31 May. Movement restrictions have since begun to ease coinciding with a rising number of infections recorded daily.

Economic impacts of the coronavirus in Indonesia can be represented by three main shocks. A demand shock is caused by quarantine measures forcing large portions of the population to remain at home (Basri 2020). Increased uncertainty and unemployment from halting economic activity have decreased household spending. Similarly, business closures and containment have disrupted supply chains. The resulting supply shock is perhaps most dangerous as it may lead to supply shortages, but it is difficult to map these potential production choke points (Gertz 2020). Finally, a country risk premium shock occurs as investors lose confidence and require higher returns to maintain holdings in the domestic economy, leading to large-scale capital outflows from emerging markets.

This paper models the third of these shocks by utilising the G-Cubed (G20) model (version 151) to analyse the effects of a temporary 2.5 per cent country risk premium shock in Indonesia. It is important to model the shock separately from supply and demand to isolate its effects and improve understanding of the policies that may be required as Indonesia looks toward economic recovery. The first section discusses the situation in Indonesia and market indicators of risk, while the second section presents key literature on pandemics and intertemporal models. This is followed by a comprehensive analysis of the impacts of the shock in Indonesia and internationally through trade and capital flows. Finally, the paper concludes with policies the Indonesian central bank and government will need to adopt with international cooperation to create a positive future growth outlook.

## **Coronavirus in Indonesia**

Indonesia, with the fourth largest population in the world of 273.5 million, is the largest economy in southeast Asia and now suffers from the third-highest coronavirus death toll in Asia after China and India (OECD 2020a). The current percentage of deaths to infections is marginally above the world average at 4.8 per cent. Whilst some claim high pneumonia cases represented a significant number of untested coronavirus cases in Indonesia in January, officials did not implement widespread social distancing until early April (OECD 2020a). This was followed by a transition period in June known as the ‘new normal’ and a large-scale relaxation of restrictions from July 16 that has led to over 1,000 new infections recorded daily. Only around 660,000 people have been tested across the country (WHO 2020b). Even with this amount of testing, over 32,000 ‘unconfirmed but suspected’ cases have been tested and excluded from overall figures and a further 2,200 people are reported to have died with symptoms of the disease without being recorded (Allard & Lamb 2020; Reuters 2020).

An initial estimate (OECD 2020b) suggests annual GDP growth will decrease by 2 per cent each month that containment measures continue due to contractions in output, household spending and corporate investment – explaining in part the Indonesian government’s haste to reopen the economy. For Indonesia, however, the effects are further complicated. To help control the spread of the virus, foreign nationals were barred from transiting or entering Indonesia from 2 April (OECD 2020a). As trade, tourism and commodity prices fall, so too do sources of foreign income usually used to finance extensive debt repayments.

Exchange rate volatility has also contributed to Indonesia's debt woes. The Indonesian Rupiah (IDR) fell nearly 20 per cent against the US Dollar (USD) to 16,625 IDR/USD in March and had already appreciated to 14,820 IDR/USD by the end of April and has remained around the same rate, exceeding many expectations for recovery (BI 2020). A depreciating exchange rate increases the cost of external debt while volatile rates spook investors and lead to large capital outflows. To stabilise the Rupiah and assist in funding government expenditure, Indonesia's central bank, Bank Indonesia (BI) lowered interest rates, raised macroprudential liquidity and bought USD billions worth in government bonds (BI 2020). The local bond market is 32 per cent owned by foreign investors, meaning the government bond market in Indonesia is largely driven by foreign investment (Karunungan & Wong 2020). As the cost of borrowing increases with ten-year government bond yields rising to 8.08 per cent, so too will capital outflows as foreign investors leave the market (Akhlas 2020c). Foreign direct investment has indeed already fallen 6.9% in the second quarter from the same period in 2019 (Pangastuti 2020). An increasing external debt, the rising cost of borrowing and a decreasing source of income does not bode well for Indonesia's future debt repayments. Further central bank and fiscal measures will be required beyond current budgetary reallocation and frontloading of spending commitments (Van der Eng 2020).

Despite this, Indonesia is in a better position than in 2008, in the aftermath of the Global Financial Crisis (GFC) and in 1997, the Asian Financial Crisis (AFC). The country's financial system is strong and well maintained, therefore better able to absorb shocks, and the government and central bank have been establishing financial commitments through an 'International Financial Safety Net' (BI 2020). One of the gravest impacts of the AFC was the combination of a sudden increase in unemployment and food prices that, even after government subsidies, led to food riots as many could not afford to buy food (Mason 2014 p.242). This continues to be a high risk today, with around half the population living around the poverty line of US\$2 per day. Compared to the AFC, however, the central bank is better capitalised with improved macro credibility and international support frameworks.

It is clear an unknown number of coronavirus cases, inadequate testing regimes, high debt levels and the worst performing currency in Asia in 2020 have raised the country risk premium. Changes in credit default swaps are a significant indicator that markets are pricing Indonesian debt as riskier. This paper will separate out the effect of the risk shock, increasing

country risk premia by 2.5 per cent, *ceteris paribus*, to highlight the impacts on the real economy.

## **Literature Review**

A new body of research has emerged since the onset of the COVID-19 pandemic as economists have produced an abundance of literature on the effect of an influenza pandemic on the global economy. The OECD, IMF, Oxford Economics, World Bank, and the Brookings Institution are among the many that have recently published reports detailing the economic effects of the coronavirus. Many have reverted to analysing the impacts of pandemics in history – from the ‘forgotten’ Spanish Influenza of 1918-19, to the SARS outbreak in 2003. This has been combined with literature on global financial crises to create an overview of the health and economic consequences of COVID-19 and to provide rationale for government responses.

Today’s governments are responding to the crisis based on Irving Fisher’s debt-deflation theory of Great Depressions, added to by Ben Bernanke’s credit crunch hypothesis, and Keynesian ideas on government spending. Fisher associated deflation with an increasing cost of debt (Yueh 2018, p.110). Bernanke added to this the ‘credit crunch’ - the idea that decreasing asset prices and rising loan impairments decreased incentives for creditors to lend, impacting aggregate demand through consumption and investment (Yueh 2018, p.113).

Fisher suggested that when inflation declines and the economy collapses, the central bank should act aggressively. BI has indeed followed this approach, cutting the interest rate four times so far in 2020, and six times since the current easing cycle began in 2019 (Akhlas 2020a). The latest cut saw BI reduce the policy rate by 25 basis points to 4.0 percent, the lowest rate since 2016 (Akhlas 2020d).

Keynesian economics encouraged deficit spending, raising government expenditure during downturns, and repaying debt during good times (Yueh 2018, p.129). Keynes advocated public investment as a tool for correcting an economy operating below its full potential. Since the GFC, Keynesian spending has been the driving factor behind excessive debt levels globally as governments continued to spend to prop up low inflation and growth rates. Fiscal stimulus packages have likewise followed the advent of the crisis in Indonesia. Fortunately,

public debt levels across southeast Asia are lower than among other emerging economies, allowing for room to manoeuvre on spending commitments (Oxford Economics 2020, p.14).

Both the IMF (2020a) and OECD (2020) have produced extensive research on the crisis, downgrading growth outlooks, evaluating tax and fiscal policies and analysing the initial impacts of containment and fiscal measures. They considered economic stabilisation measures essential to ‘cushion the blow’ of the global shutdown. International policy coordination was also identified as a key factor in making stimulus packages more effective as those less impacted by the virus, such as Australia, are able to create positive feedback loops through trade and investment (OECD 2020b, p.4). The IMF (2020a) noted that shocks to supply and demand are amplified significantly by reappraisals in financial markets. As country risk premia increase, investors liquidate assets, lenders withhold credit and borrowing costs increase. Falling commodity prices place greater pressure on exporters and emerging markets experience a reversal in the flow of investment and capital (IMF 2020a p.3). This has extended earlier studies that considered the susceptibility of specific countries to outbreaks and how fear-based consumption behavioural change increases household willingness to pay (Keogh-Brown et al. 2009; Verikios et al. 2011).

Intertemporal models including computable general equilibrium (CGE) modelling and the GTAP model are preferred when modelling pandemics and financial crises for their ability to depict trade flows and contagion effects. Previous papers using the G-Cubed model have also utilised its intertemporal nature to investigate contagion effects of the Global Financial Crisis (McKibbin & Stoeckel 2009), the effects of coordinated fiscal stimulus (Triggs 2018) and modelling the goal of G20 economies to reduce current account imbalances (McKibbin & Triggs 2018). In modelling the GFC, McKibbin and Stoeckel (2009, p.2) also distinguished the difference between temporary and permanent shocks, highlighting the significance of forward-looking expectations in the G-Cubed model. In a temporary shock, forward-looking agents anticipate the return to normal and smooth behaviour over time, leading to smaller real effects in the economy. The country risk premium shock implemented in this paper is similar in its results.

The increasing frequency and intensity of both health and economic shocks in recent years has now begun to converge in the literature. A study by McKibbin and Fernando (2020) models seven different potential scenarios, varying in the severity of the coronavirus

outbreak, using the G-Cubed Model. The report highlighted the importance of assumptions in the model, detailing how supply, demand and fiscal shocks combined lead to amplified effects. Sharp drops in consumption and investment were found to be associated with declines in aggregate demand, lower interest rates and a drop in equity markets due to the rising perception of risk. All countries, including those in Asia, however, experienced a v-shaped recovery, indicating the end of the virus would likely result in the reversal of even large fluctuations. This is similar to an Asia-centric analysis of the coronavirus and policy responses undertaken by Oxford Economics (2020). The study forecasts strong rebounds in 2021 provided a more severe pandemic scenario does not appear.

An understanding of policy responses draws on work from Snower's (2020) investigation of the relevance of fiscal stimulus packages given social distancing prevents changes to aggregate demand. Snower concluded that Keynesian government spending will not stimulate economic activity until pandemic-related closures and containment come to an end.

This paper will extend on the previous literature and fills a gap by specifically analysing a temporary shock to Indonesia's country risk premium associated with the crisis. It will provide evidence of the likely international effects of the shock and presents policy options relevant to the Indonesian economy.

## **The Model**

The G-Cubed model is an intertemporal general equilibrium model with multiple countries and sectors. Originally developed by McKibbin and Wilcoxon (1999), the model includes the best features of CGE models and those of dynamic stochastic general equilibrium models. It was extended in McKibbin and Triggs (2018) to include 24 autonomous country blocks, one for each of the G20 countries and four additional regions representing the rest of the world (Table 1). Agents in each country block include representative households, firms and governments that trade goods, services, and financial assets. Each country is characterised by their markets for goods and services, factors of production and money markets, including bonds, equity, and foreign exchange.

**Table 1: Countries and Regions in the G-Cubed Model**

<b>Code</b>	<b>Country</b>	<b>Code</b>	<b>Regions</b>
Q/ARG	Argentina	E/EUZ	<b>Rest of Euro Zone</b>
A/AUS	Australia		Spain, Netherlands, Belgium, Luxembourg,
B/BRA	Brazil		Ireland, Greece, Portugal, Finland, Cyprus, Malta, Slovakia, Slovenia, Estonia
N/CAN	Canada	O/OEC	<b>Rest of Advanced Economies</b>
C/CHI	China		New Zealand, Norway, Sweden, Switzerland,
F/FRA	France		Iceland, Denmark, Iceland, Liechtenstein
G/DEU	Germany	P/OPC	<b>Oil Exporting and Middle East</b>
D/IND	India		Algeria, Angola, Bahrain, Congo, Ecuador, Iran,
W/INO	Indonesia		Iraq, Israel, Jordan, Kuwait, Lebanon, Libya,
I/ITA	Italy		Nigeria, Oman, Palestinian Territory, Qatar, Syrian
J/JPN	Japan		Arab Republic, United Arab Emirates, Venezuela, Yemen
X/KOR	Korea	V/OAS	<b>Other Asia</b>
M/MEX	Mexico		Hong Kong, Indonesia, Malaysia, Philippines,
R/RUS	Russia		Singapore, Taiwan, Thailand, Vietnam
S/SAU	Saudi Arabia	L/ROW	<b>Rest of the World</b>
H/ZAF	South Africa		All countries not included in other groups
T/TUR	Turkey		
K/GBR	United Kingdom		
U/USA	United States		

The six sectors represented are Energy (a1), Mining (a2), Agriculture (a3), Durable Manufacturing (a4), Non-Durable Manufacturing (a5) and Services (a6). Given that each of these is an imperfect substitute for any sector in another country, there are effectively 144 sectors represented in the model. This high level of disaggregation through countries, sectors and markets is unique to the G-Cubed model and allows for sectoral differentiation that shapes outcomes within and between countries.

Households maximise an intertemporal utility function subject to lifetime budget constraints. Each household consumes goods, services, labour and capital and supplies labour and financial capital, via savings. Firms maximise the present value of the future stream of their share of market value subject to production technology and the cost of adjustment of capital. Future valuation and backward-looking base investment decisions are based on Tobin's Q. Firms and households take prices as given.

Labour is perfectly mobile between sectors within a country, though immobile across borders. This ensures nominal wages are sticky, adjusting slowly over time in response to country-specific conditions including current or expected inflation, excess demand, or the supply of labour. Unemployment occurs as a result of a deviation or shock to the system away from long run equilibrium and slowly converges over time. Physical capital is likewise immobile once installed and can only increase due to savings or reduce due to depreciation.

Financial markets are completely fluid within and between countries as financial capital will flow to where rates of return are highest. This implies shocks will have large short run effects on asset prices and depend on exchange rates. Real effective exchange rates are determined by purchasing power parity conditions in the long term and interest differentials in the immediate future. Risk premia on country-denominated assets prevents perfect arbitrage and allows mobile financial capital flows to act as a stabiliser. Explicit arbitrage links the real and financial rates of return and measures of risk in the model. Central banks follow the Henderson-McKibbin-Taylor rule allowing actual policy interest rates to adjust gradually to the desired interest rate. Policy interest rates are set to target macroeconomic outcomes including inflation and unemployment in the long run, smoothing adjustments over time.

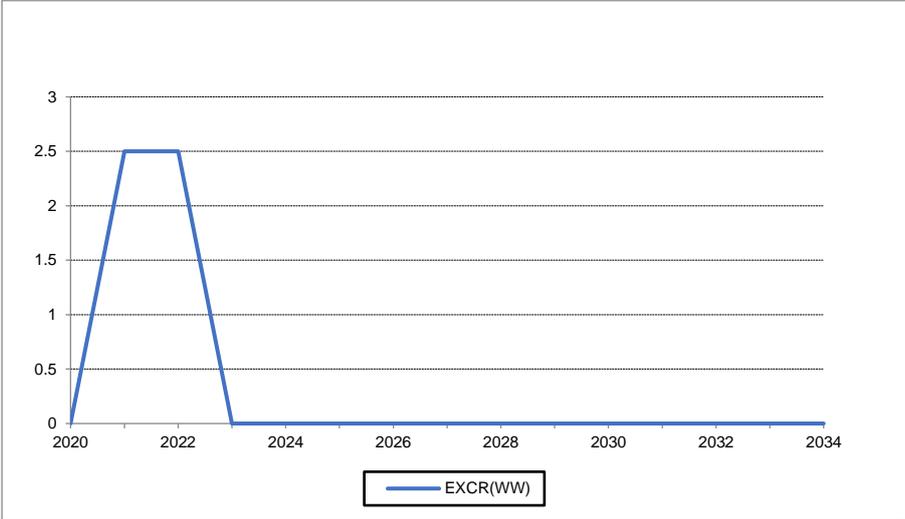
Intertemporal budget constraints are placed on countries and governments as well as firms and households. Government deficits are financed by borrowing, however a closure rule means this debt must be serviced indefinitely. This Non-Ponzi-type requirement ensures other agents are not deterred from holding debt in the model. Budget deficits accumulate into government debt and current account deficits accumulate into foreign debt.

The country risk premium shock to Indonesia is implemented in the base year, 2020, and lasts for a period of two years. Results are analysed to 2034 and are measured as percentage deviations from the baseline. Government tax rates and fiscal policy are assumed to be unchanged and growth in populations and productivity are determined exogenously. The broad range of assumptions utilised in the model allow for projections that encapsulate a greater number of interactions and lasting impacts of shocks through capital accumulation and mobility. Nominal rigidities allow for adjustments to the neoclassical steady state equilibrium. A more comprehensive discussion on the assumptions of the model, including equations for optimising behaviour of agents, can be found in McKibbin and Triggs (2018).

### The Shock

A temporary 2.5 per cent shock to the country risk premia relative to the U.S. in percentage deviation has been used to analyse the economic consequences of the coronavirus in Indonesia (Figure 1). The shock lasts for two years and is representative of real market changes in the Indonesian economy since January 2020, following predictions from the IMF (2020a), Bank Indonesia (BI) and scenarios presented by McKibbin and Fernando (2020) in their simulations of shocks from the coronavirus. The scale of the effects would be very different if the pandemic lasts for a longer timeframe or if it is expected to be a permanent seasonal recurrence in future.

**Figure 1: Country risk premium (EXCR) shock of 2.5% in Indonesia (WW)**



McKibbin and Fernando (2020) simulated seven COVID-19 scenarios to the global economy represented as temporary shocks. Three of these simulate the pandemic occurring in all countries to some degree. Each showed the equity risk premium shock in Indonesia between 2.06 per cent for the best case and 2.93 per cent for the worst-case scenario. This is consistent with data from Indonesia’s central bank, BI.

BI’s (2020) latest reports show sovereign credit default swaps are around 3.1% and implied market risk premia at 2.2 per cent since January 2020. The financial market volatility index, an indicator of risk premiums, peaked in March 2020 at 83.2 from a pre-COVID figure of 18.8. In April, the risk had subsided somewhat to 43.8, 2.4 times the pre-COVID figure.

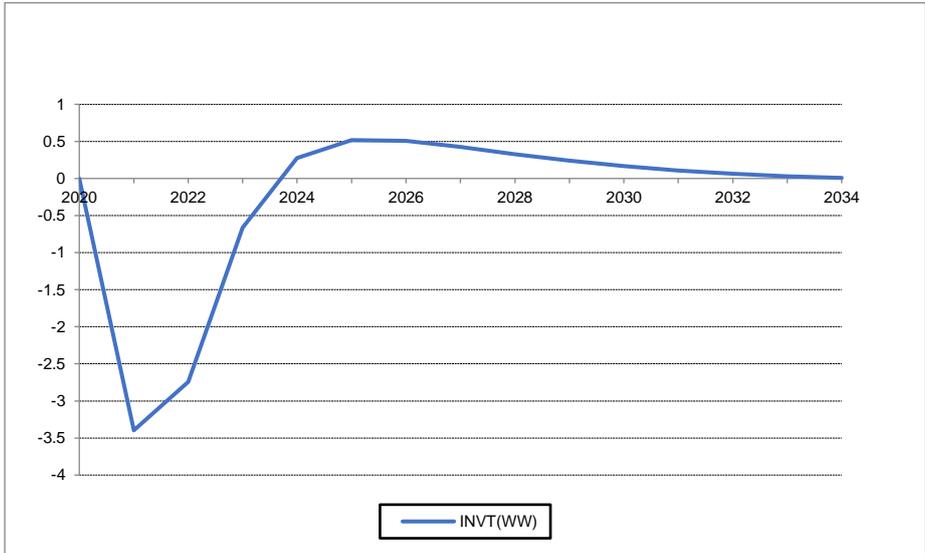
Credit default swaps likewise rose from an average of less than 100 pre-COVID (average of 2019 to January 2020) to over 200 in March 2020. External government debt increased by 3.1 percent at the end of May 2020 to 36.6% of GDP (BI 2020). This debt, of which over half is denominated in USD, is likely to increase further in the longer term as Indonesia increases public health expenditure and seeks to fund various economic recovery measures.

Overall, the current economic environment in Indonesia shows the increase in the country risk premium is around 2.5 per cent. A temporary shock of the same amount will therefore be implemented in the G-Cubed model through the interest parity equation and represents the higher returns required by investors to hold assets in Indonesia relative to the US. Changes are expected to flow through the domestic economy via labour markets and globally through trade and capital flows. The shock will last for two years, the predicted length of the coronavirus crisis. Volatility in the real economy is likely to be less than under a permanent shock given businesses and households know that risk premia will reduce in the future.

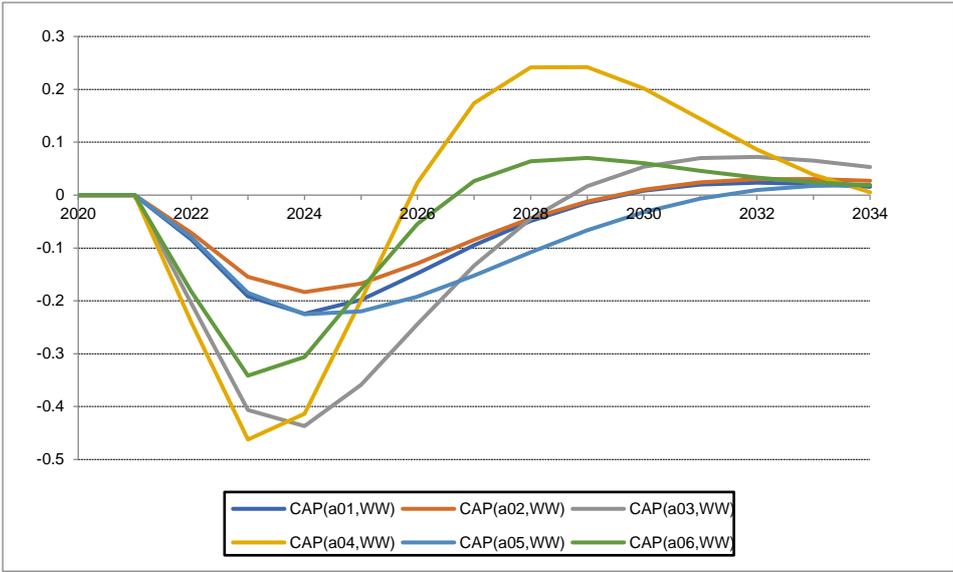
### Results and Analysis - Indonesia

The 2.5 per cent shock to country risk premium represents the higher risk associated with investing in Indonesia compared with other markets. Given the higher risk, investors lose confidence with falling growth expectations leading to large capital outflows from Indonesia. This causes an immediate drop in overall investment (Figure 2) and the capital stock in all sectors (Figure 3).

Figure 2: Investment (INVT)

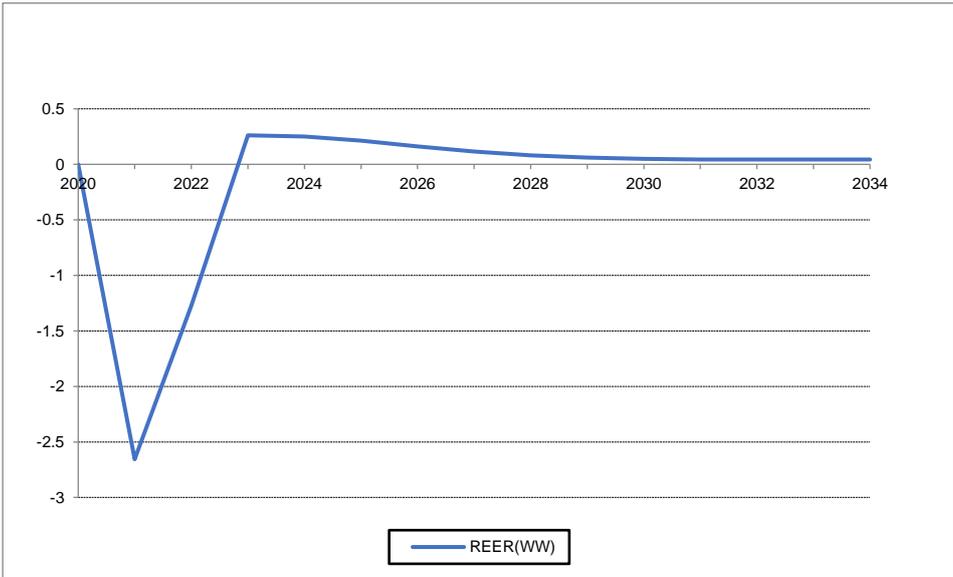


**Figure 3: Capital stock (CAP) in all sectors (a1, a2, a3, a4, a5, a6)**

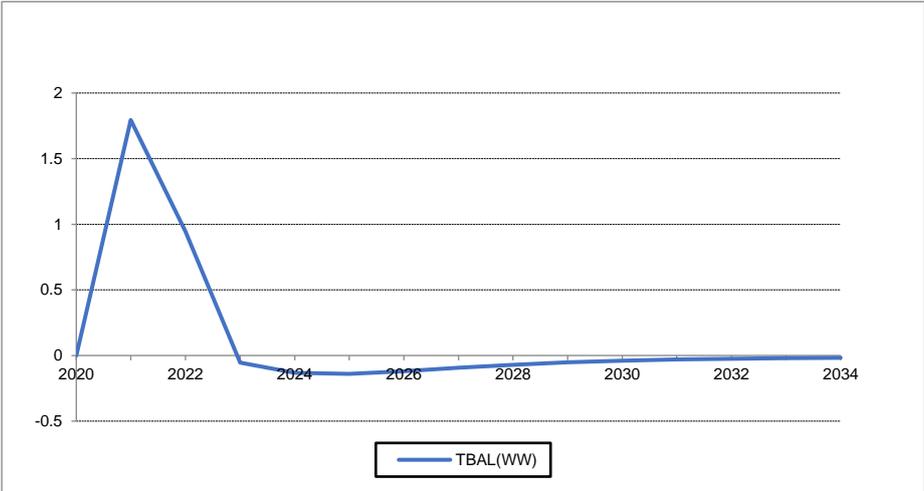


Currency moves reflect the risk sentiment and so Indonesia’s Rupiah, with flexible exchange rates, will depreciate sharply by the amount of the risk premium, as shown in Figure 4. This is largely caused by capital outflows and downward pressure on prices faced by commodity exporters. Exports are made more desirable by the lower prices and a trade surplus results as demand increases for Indonesian exports from the rest of the world. Trade can thus act as a stabiliser and allow output growth to recover after the initial shock to the long run equilibrium.

**Figure 4: Real effective exchange rate (REER)**

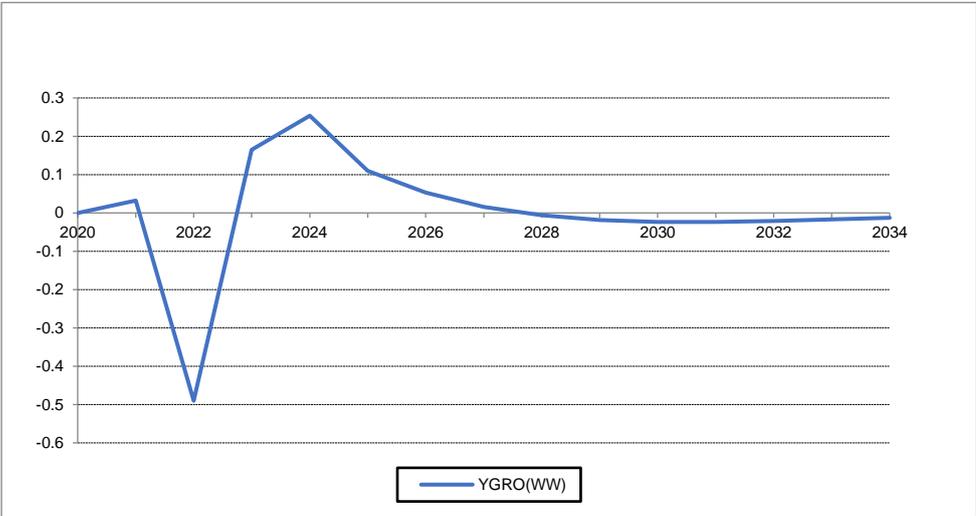


**Figure 5: Trade balance (TBAL)**



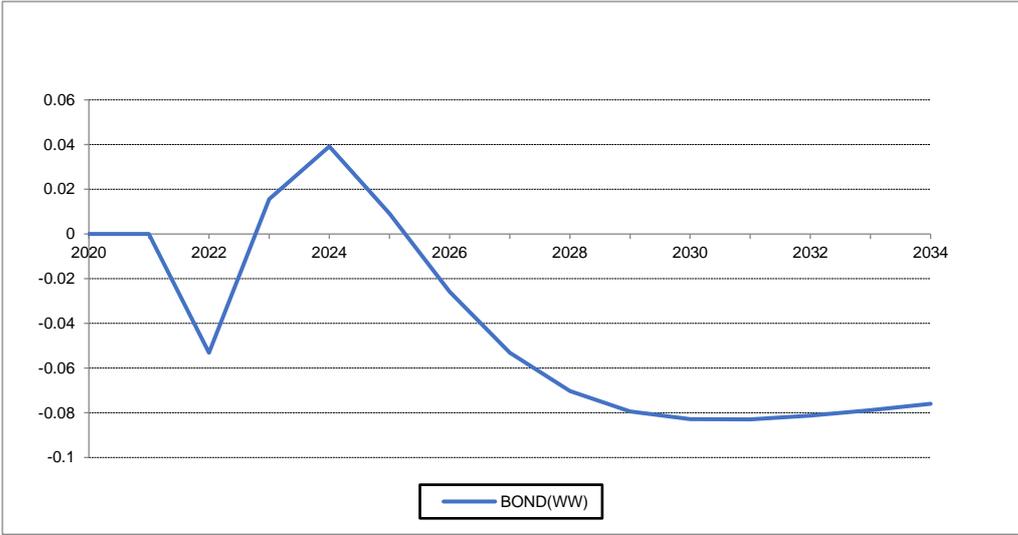
As shown by Figure 6, output growth declines initially due to the downward pressure on productivity from capital outflows before resurging to above long run growth levels and returning to the baseline in the long run.

**Figure 6: Output growth (YGRO)**

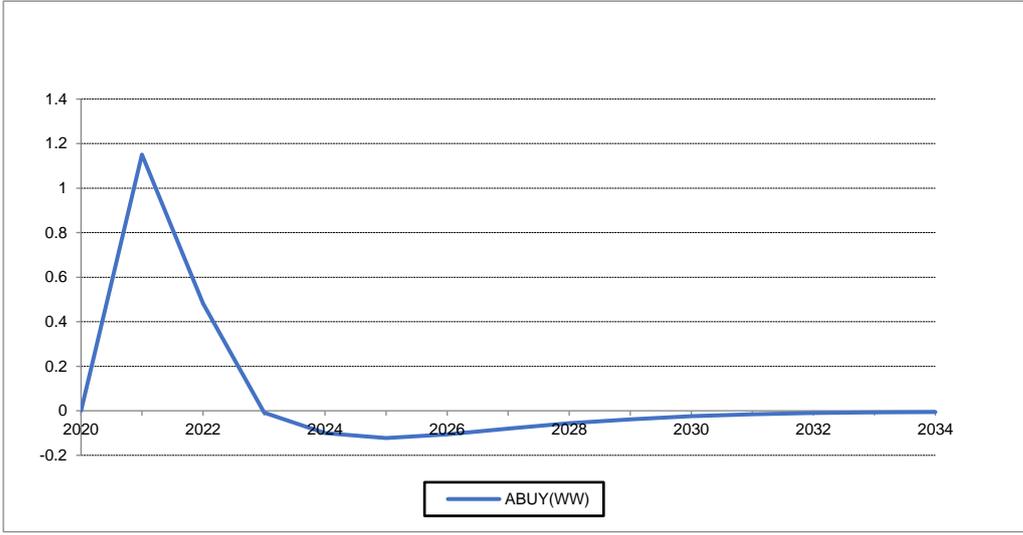


As investors lose confidence, lenders become concerned debt repayments may default and investors seek to withdraw money from the economy. As financial agents liquidate assets, borrowing costs experience upward pressure and safer investments are sought in foreign countries. This causes the bonds in Indonesia to fall as in Figure 7, and the purchase of foreign assets to sharply increase, in Figure 8.

**Figure 7: Changes in bonds as percentage GDP deviation (BOND)**

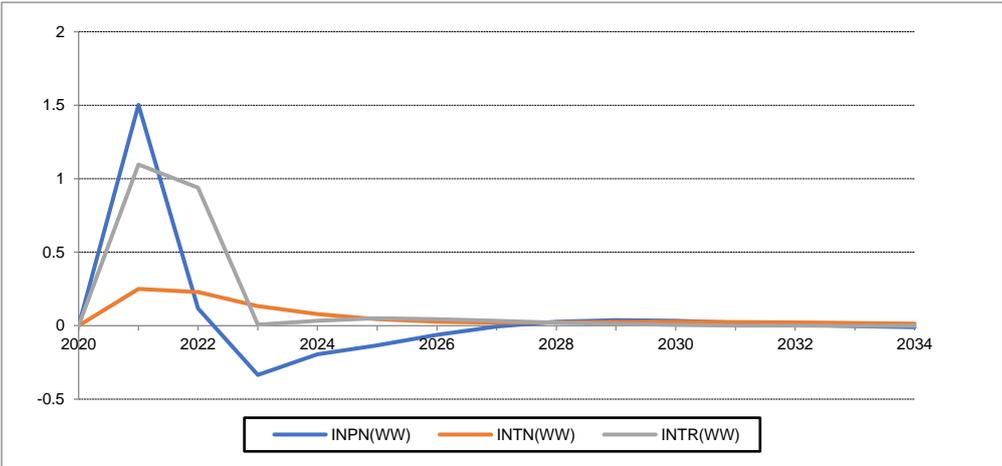


**Figure 8: New purchases of foreign assets as percentage GDP deviation (ABUY)**



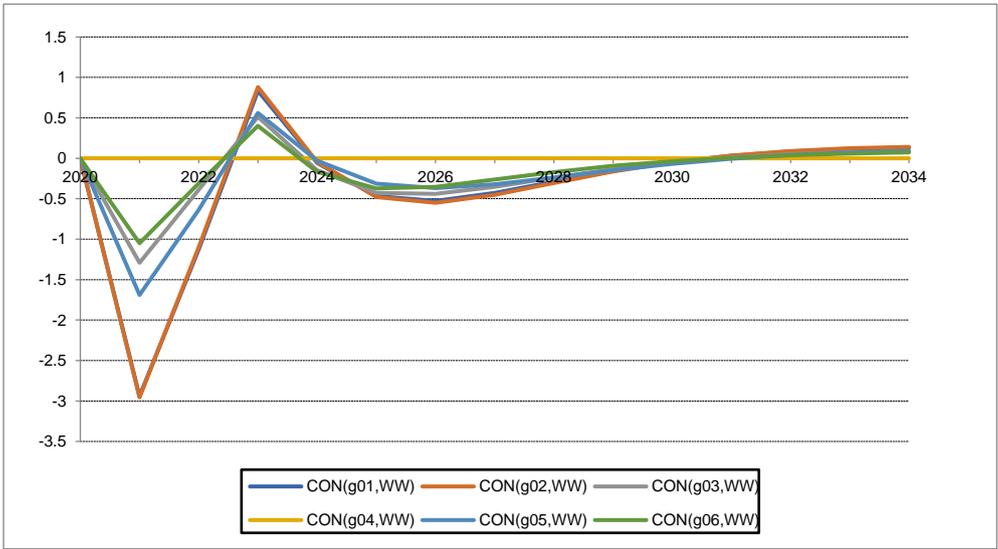
The inverse of the price of bonds is the real interest rate, which rises steeply for the two-period length of the shock before returning to the baseline. This immediately decreases the present discounted value of interest payments, increasing bond yields swiftly from their initial fall from the baseline as agents demand a premium for the debt. The nominal interest rate is tied by these real conditions and the inflation rate. Results suggest if the country risk premium shock was the only impact on the economy, the central bank would increase the policy interest rate at a much smaller proportion of the change in the nominal interest rate, slowing the fall in the real interest rate in future years. This action likewise limits overall increases in the real interest rate to below the peak of the nominal variable.

**Figure 9: Risk adjusted real interest rate (INTR), nominal interest rate (INPN) and the policy interest rate (INTN)**



Higher interest rates encourage saving by households and firms, causing consumption in all sectors to decrease, as in Figure 10. The effect is most exacerbated in capital intensive industries, such as energy, mining and durable manufacturing given the capital outflows resulting from heightened risk. Changing consumption behaviour in the face of the COVID-19 pandemic may alter this simple simulation with some consumables likely to experience increased demand, such as services, and other sectors facing far greater losses.

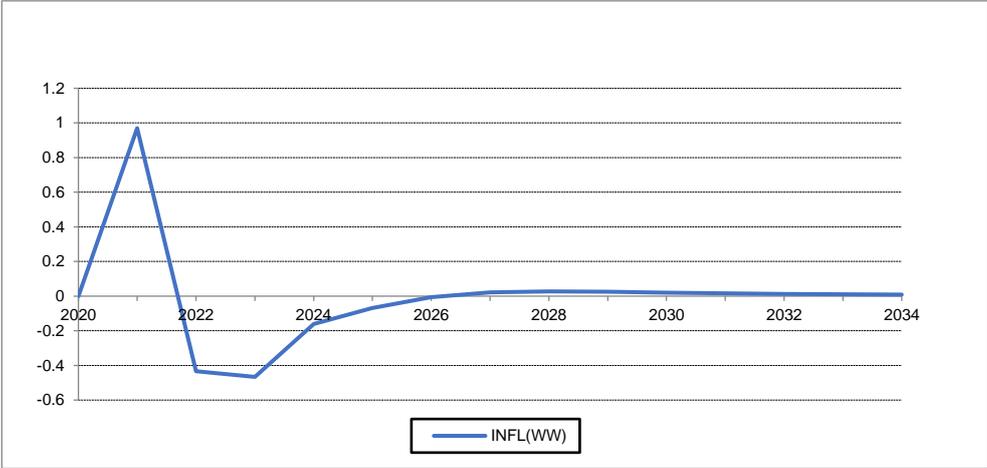
**Figure 10: Consumption (CON) across all sectors (a1, a2, a3, a4, a5, a6)**



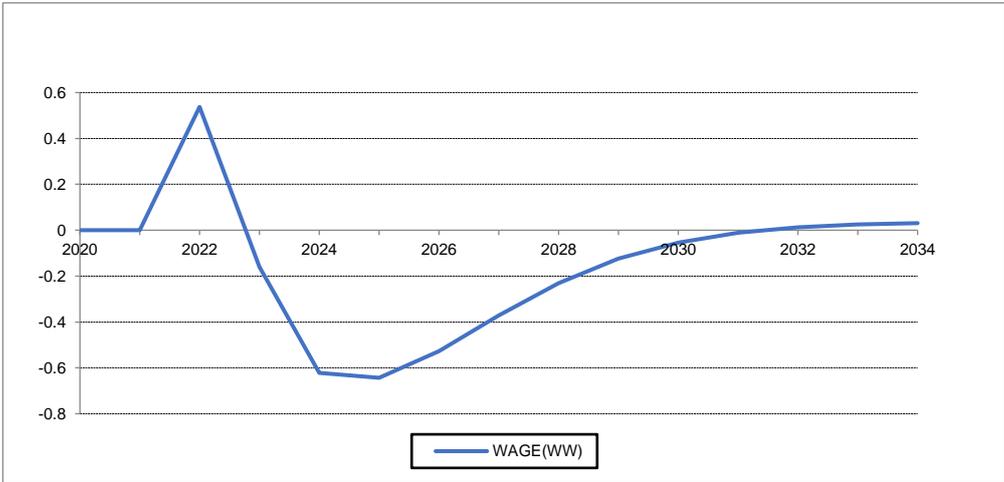
Inflation faces upward pressure from the capital outflows and changes in investment and GDP. Higher inflation expectations cause workers to incorrectly place upward pressure on wage rates (Figures 11, 12). Total labour demanded temporarily increases due to the increase

in export demand. A steep negative drop follows. This is the combined result of upwards wage movement and outflows of capital leading to temporarily negative output growth.

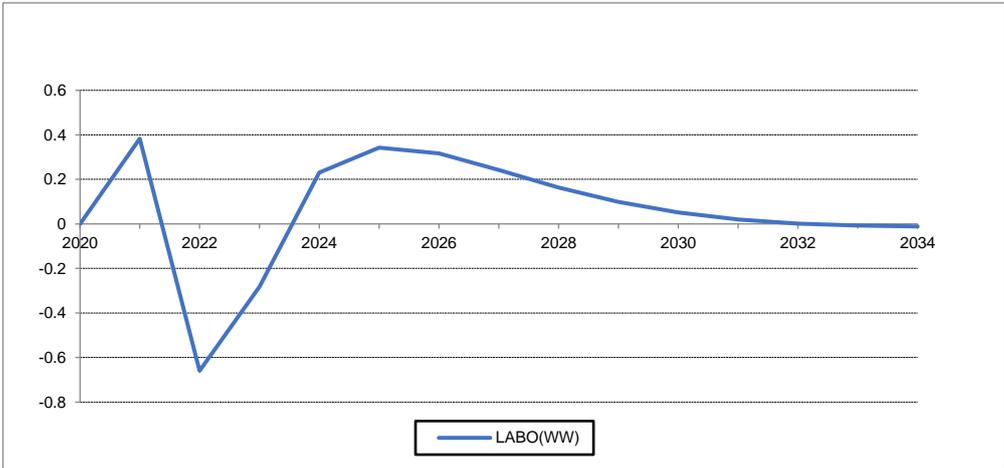
**Figure 11: Inflation rate (INFL)**



**Figure 12: Wage deviations (WAGE)**



**Figure 13: Total labour demanded (LABO)**

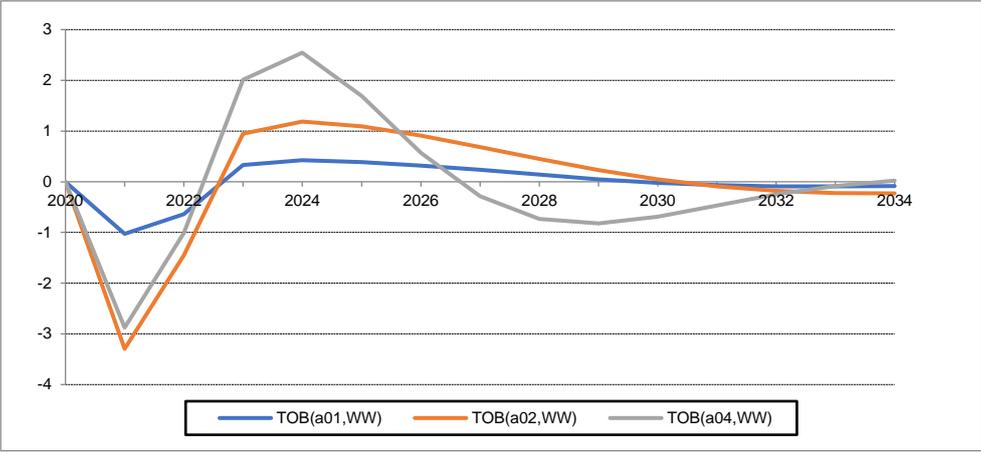


The real cost of borrowing is the nominal interest rate minus the inflation rate. As Indonesia's nominal interest rate peaks 1.5% above the baseline and inflation rises just 1% above the baseline, the real cost of borrowing increases. Investors attempting to liquidate assets to reduce debts will incidentally increase the real value of the debts. This is particularly relevant for those debts in USD that become more expensive due to the depreciating Rupiah. Indonesia must find a balance between high debt levels in USD and allowing the exchange rate to depreciate to receive gains from trade to counterbalance the fall in investment.

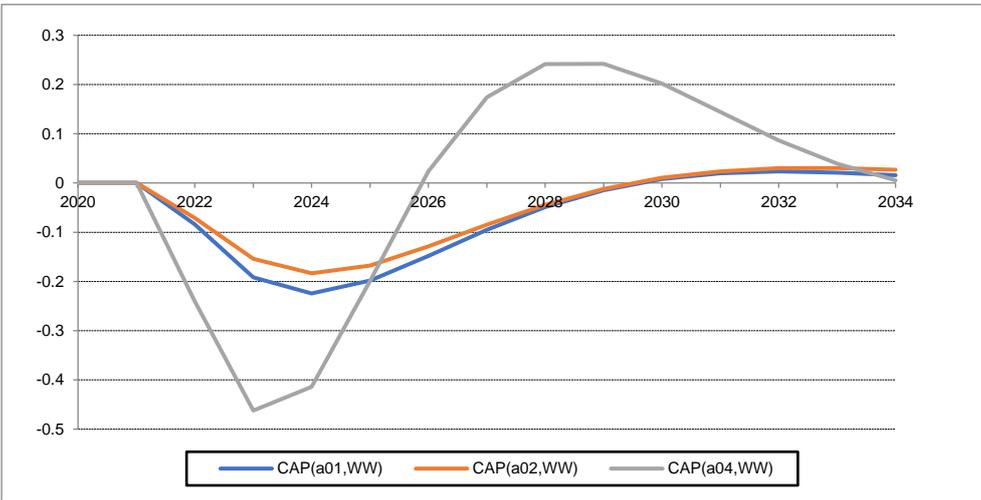
At the same time, as savings increase and consumption falls, total output falls as income, from which savings are made, also falls. In a very Keynesian outlook, this problem may benefit from government intervention to redistribute wealth away from the richest section of the population as this group tends to save a higher proportion of their income than the poor. As an emerging market economy, many of Indonesia's poor will be hardest hit by the crisis, and the most difficult to reach by means of government tax cuts and transfers.

Significant changes occur in capital and risk sentiment. Tobin's Q is the ratio of the valuation shareholders put on a firm to the market value of its assets, with the idea that a lower Q suggests a firm should run down or sell capital. Evidenced in Figures 14 and 15, investors lose confidence with higher depreciation and lower marginal product of capital contributing to lower Tobin's Q. Investors liquidate holdings, reducing their capital stock in response to the changes. The effect is most pronounced in durable manufacturing as the sector is more vulnerable to fluctuations in demand. All sectors rebound relatively quickly due to the currency depreciation, increasing demand for Indonesia's exports and raising sentiment in these responsive sectors.

**Figure 14: Tobin's Q (TOB) in Energy (a1), Mining (a2) and Durable Manufacturing (a4)**

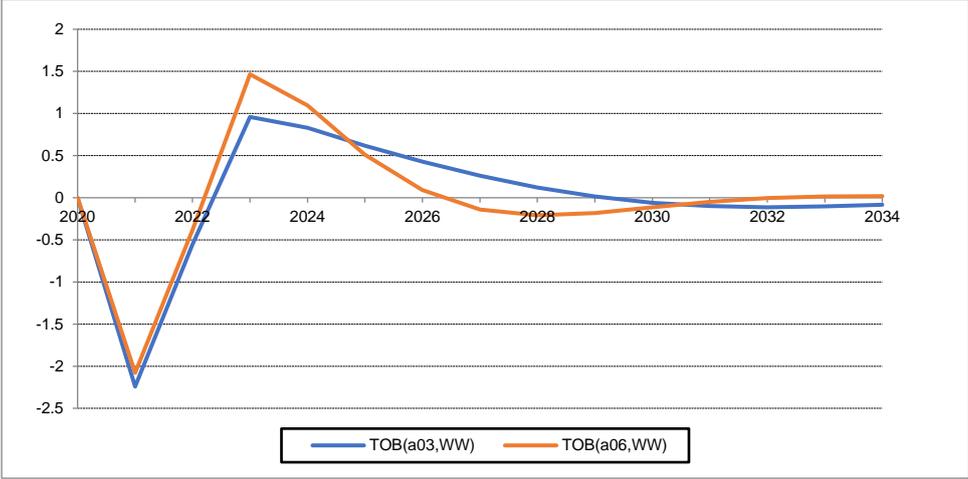


**Figure 15: Capital stock (CAP) in Energy (a1), Mining (a2) and Durable Manufacturing (a4)**



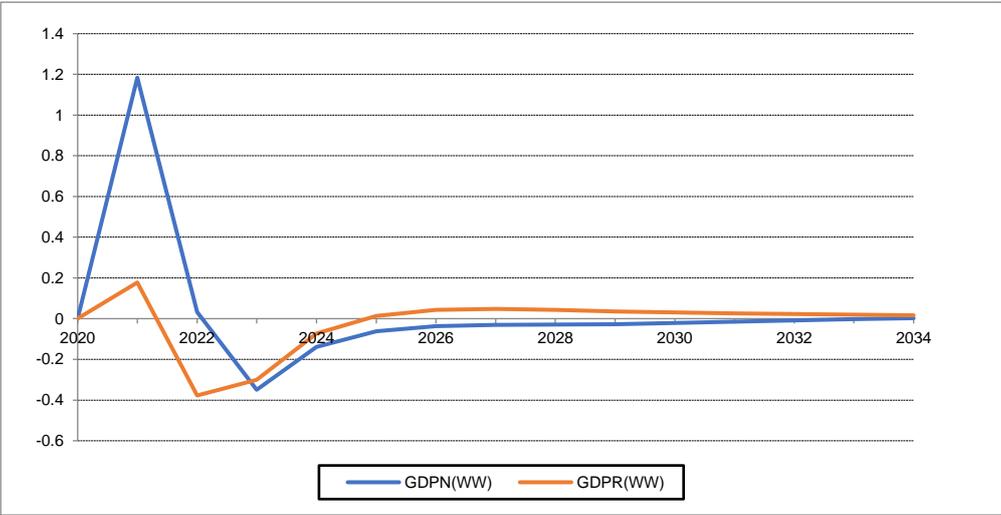
Similarly, as agriculture and services sectors are both labour intensive, they are more heavily impacted by the changes in wages and labour demand. Both are large sources of Indonesian GDP, as agriculture contributes 14 per cent to GDP while industry and services add approximately 43 per cent to output (World Bank 2020). As wages rise and labour demand declines, the valuation in agriculture and services steeply falls. These sectors recover quickly at the end of the shock period, with lower wages and a return to the baseline inflation causing prices to return to long run levels and creating a surge in demand that stimulates growth in labour-intensive sectors.

**Figure 16: Tobin's Q (TOB) in Agriculture (a3) and Services (a6)**



Overall, Indonesia’s GDP responds immediately and positively to the interim currency depreciation and trade surplus. The decline in the real effective exchange rate is enough to increase demand for Indonesian goods from overseas. Thus, the real and nominal GDP initially increase to 0.2 per cent and 1.2 per cent above the baseline, respectively (Figure 17). Conversely, the shock to the country risk premium causes a decline in investment, associated with large capital outflows and declining domestic bonds. These register in the economy later, after the initial boost from trade, leading to the decline in GDP from its peak and returning to the long run baseline five years after the shock. This should act as a warning to Indonesia. Policies should not attempt to stabilise fluctuations in the exchange rate as this may negate the positive effects of the trade balance and may lead to a decline or smaller change in real GDP in the first year after the shock.

**Figure 17: Nominal GDP (GDPN) and Real GDP (GDPR)**

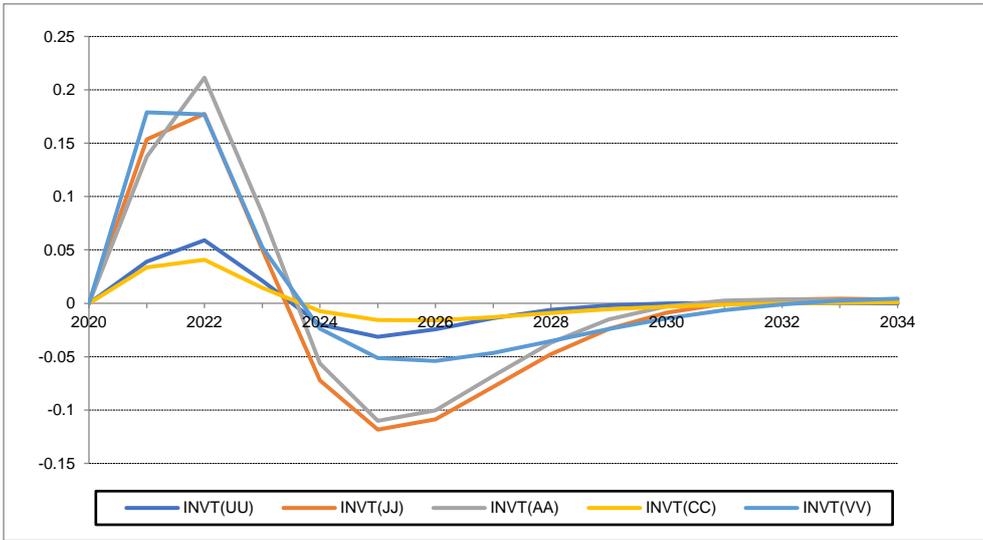


## Results and Analysis – International Trends in Australia, China, Japan, and the United States

As an emerging market economy with plentiful natural endowments, the country fares better than many of its trading partners, largely due to trade acting as a transmission mechanism linking capital flows. Indonesia’s top three export destinations are China, Japan, and the United States (US). The top three import trading partners are China, Singapore, and Japan. Capital and trade flows from a risk shock in Indonesia can be expected to, by contagion, result in changes to the real economy in China, Japan, the US and ‘Other Asia’ (representing the ASEAN-5 countries in the G-Cubed model).

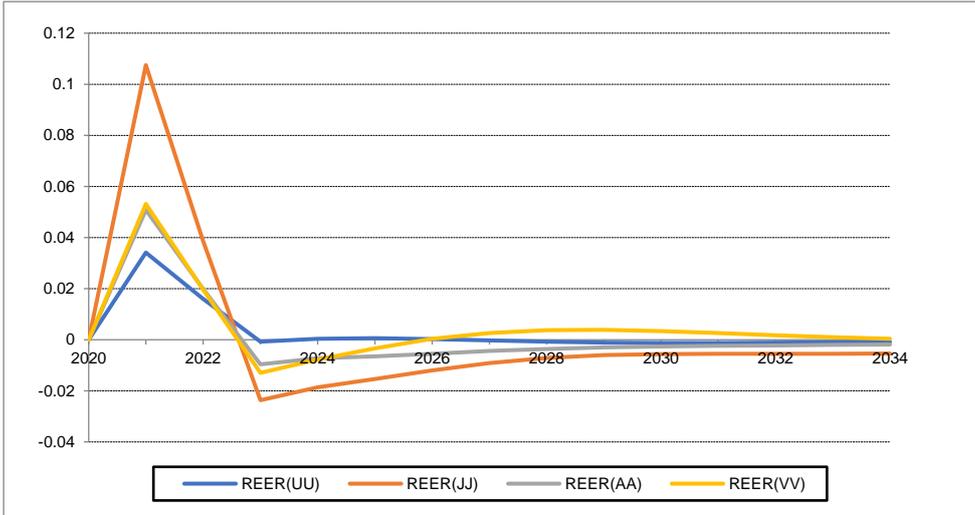
As investment and financial capital flows out of Indonesia, it flows into these other countries. Figure 18 shows the rise in investment across these top trading partners. The US and China experience only a relatively small rise in investment at 0.05 per cent above the baseline, two years after the initial shock. In comparison, Japan and the ASEAN-5 experience an increase in investment four times that in the US and China and in half the time. Despite not being one of Indonesia’s top export or import partners, close trading ties and geographical proximity mean it is Australia that experiences the largest fluctuation in investment out of all countries in the model. Investment in Australia rises over 0.2 per cent above the baseline by the second year after the shock.

**Figure 18: Investment (INVT) in Australia (AA), China (CC), Japan (JJ), Other Asia (VV), and United States (UU)**



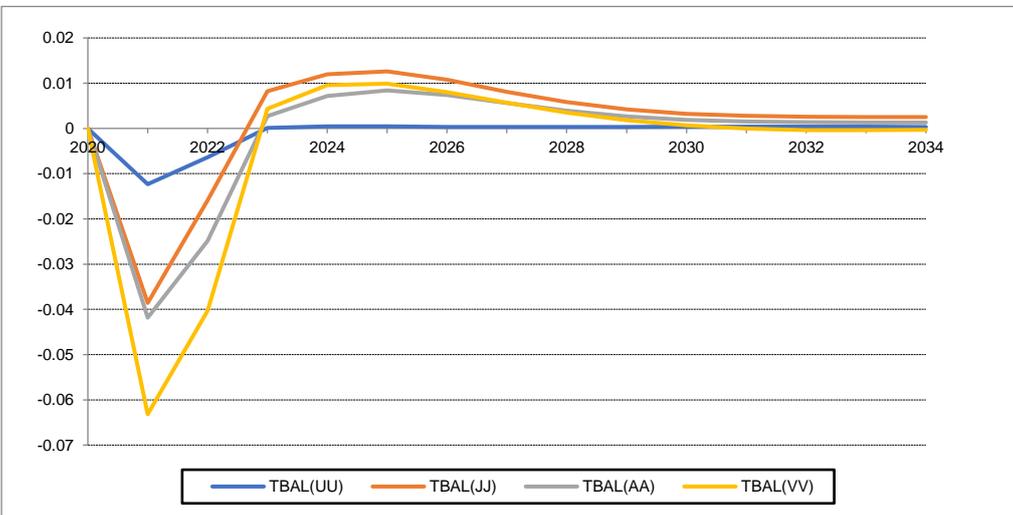
Given the fluctuations in investment, it can be expected that Japan, Australia, and the ASEAN-5 are likely to experience the largest changes across all macroeconomic variables in the real economy. Figure 19 shows the sharp appreciation in the real effective exchange rate (REER). In this case, the most pronounced change is to the Japanese Yen, appreciating over 0.1 per cent above the baseline in the first year.

**Figure 19: Real effective exchange rates (REER) in Australia (AA), Japan (JJ), Other Asia (VV) and United States (UU)**



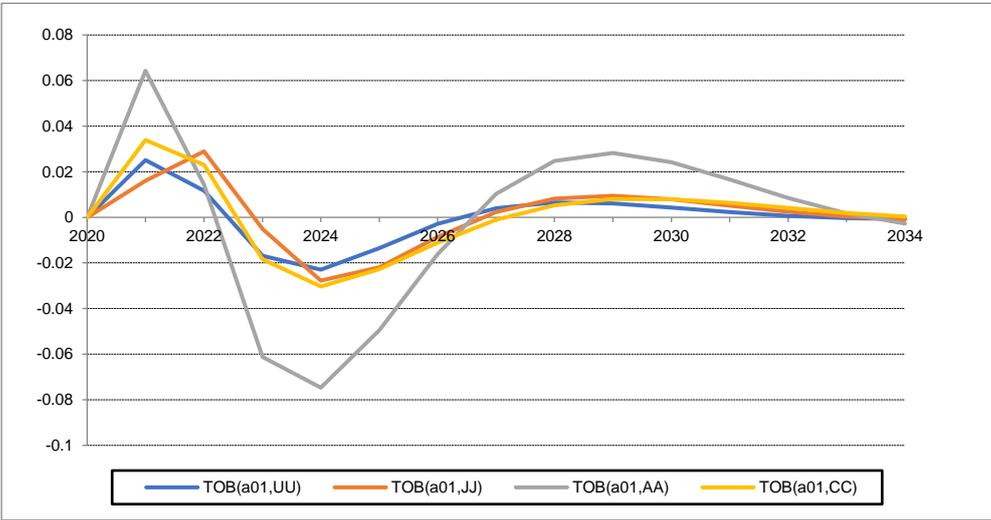
Trade balances decline accordingly, with all countries benefitting from cheaper Indonesian products as a result of exchange rate fluctuations. The ASEAN-5 economies experience the largest fall in trade, followed closely by Japan and Australia.

**Figure 20: Trade balance (TBAL) in Australia (AA), Japan (JJ), Other Asia (VV) and United States (UU)**



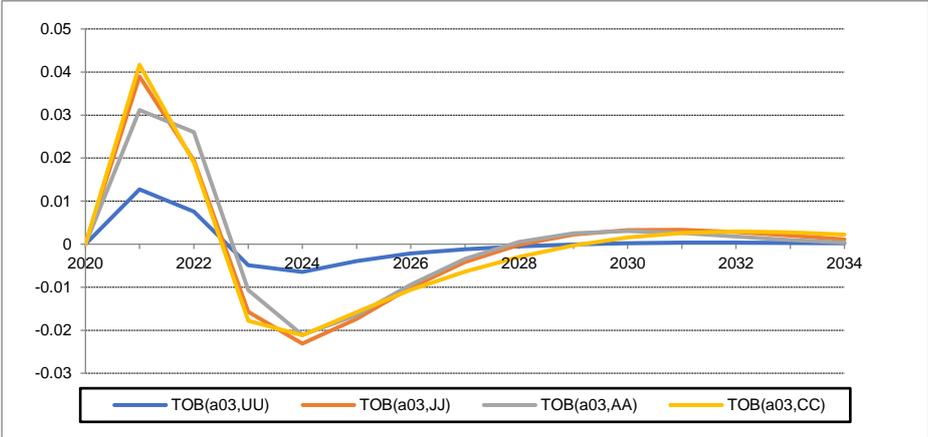
The increase in Indonesia’s real interest rate creates a higher marginal product of capital. Capital can thus be expected to flow towards the most capital-intensive sectors in the international economies, that is, energy and mining. This effect is most pronounced in Australia’s energy sector as evidenced by the change in Tobin’s Q in Figure 21. The Tobin’s Q for Australia’s energy sector rises 0.06 per cent above the baseline at the onset of the shock before a dramatic fall to 0.08 per cent below the baseline up to four years after the shock. This collapse in the energy sector occurs as capital returns to the Indonesian economy swiftly at the end of the shock.

**Figure 21: Tobin’s Q (TOB) in the Energy sector (a1) for Australia (AA), China (CC), Japan (JJ), and United States (UU)**



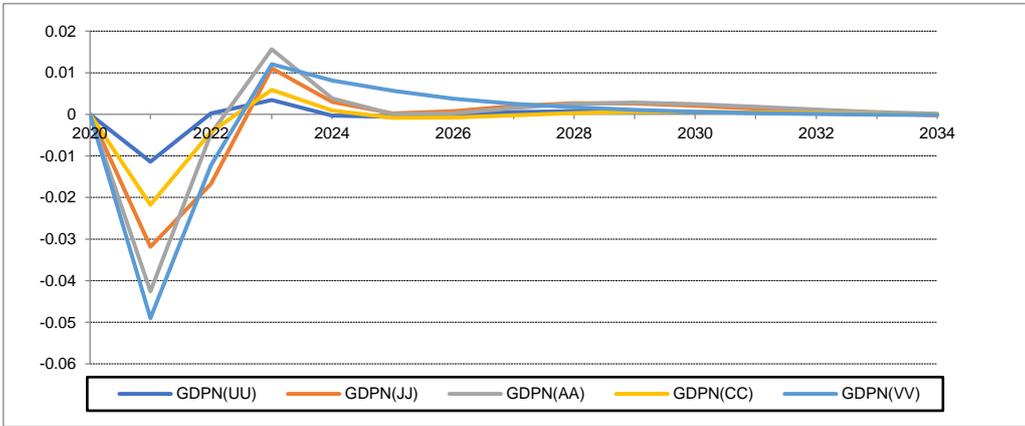
Agriculture is equally volatile. Figure 22 shows large increases in the Tobin’s Q for agriculture in Japan, China, and Australia. The initial peak at 0.04 per cent above the baseline gives way to a rapid decline as labour markets recover in Indonesia and such labour-intensive sectors suffer from a decline in labour demand in the international economies.

**Figure 22: Tobin's Q (TOB) in the Agricultural sector (a3) for Australia (AA), China (CC), Japan (JJ), and United States (UU)**

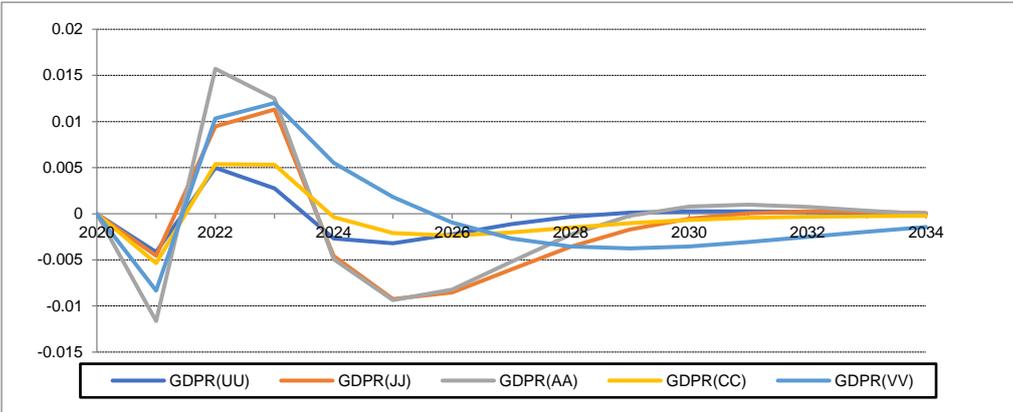


All countries experience a decline in nominal and real GDP (Figure 23, 24). Excluding the ASEAN-5 economies that are more vulnerable to shocks, the single largest impact is felt in Australia. Australian nominal GDP falls 0.04 per cent below the baseline and real GDP fluctuates from an initial decline to the largest rise, still only a small 0.015 per cent above the baseline. This corresponds with Indonesia's falling trade surplus and GDP as the capital outflow registers in the economy. If Indonesia stops buying Australia's products as they attempt to stabilise their own exchange rate, the consequences to the Australian economy are likely to be far more severe. The size of the impacts will depend on the scale of the risk shock, increasing proportionally with risk. These effects show there is a strong incentive for Australia, Japan, and the ASEAN economies to act in their own self-interest by assisting Indonesia in stabilising their domestic economy after a country risk premium shock.

**Figure 23: Nominal GDP (GDPN) in Australia (AA), Japan (JJ), and Other Asia (VV), United States (UU)**



**Figure 24: Real GDP (GDPR) in Australia (AA), Japan (JJ), Other Asia (VV), and United States (UU)**



**Policy Consequences**

As shown in the results above, a country risk premium shock will cause large scale investment and capital outflows that depreciate the Rupiah, stagnate demand and drive unemployment. Some of these effects will be stabilised as international capital flows allow the trade surplus to improve GDP temporarily. These results suggest there are several policy options available to Indonesia moving forward. The monetary, fiscal, and structural responses outlined in this section to stabilise the economy will prove particularly critical when considered in the broader context of shocks from containment measures and disruptions in supply chains.

**Monetary Policy**

Indonesia’s central bank is at a crossroads. A trade off exists between, firstly, allowing the exchange rate to depreciate so the trade balance improves and offsets the capital and investment outflows; and secondly, to not let the exchange rate depreciate so much that government debt, denominated predominantly in USD, causes the economy to default.

Since January 2020, BI has worked towards stabilising the Rupiah by intervening in domestic money markets and selling dollar-denominated bonds worth US\$4.3 billion in April (BI 2020). The latter caused foreign exchange reserves to rise to US\$127.9 billion and is expected to be able to sustain imports for around seven months, well above the international standard of three months (Akhlas 2020b). BI also joined the Federal Reserve’s list of ‘Foreign and International Monetary Authorities’ that are entering into a repurchasing agreement whereby

BI exchanges their US Treasury securities for US Dollars (Federal Reserve 2020b). BI then repurchases the securities at maturity using the overnight rate, a function that has so far been reported to have appreciated the Rupiah by two per cent against the USD (Connors 2020; Segal 2020).

If the central bank continues to pursue these measures, commodity prices will rise and international demand for Indonesian exports will fall, decreasing the trade balance. This would mean trade flows could not counterbalance investment and capital outflows and GDP would fall. It is of utmost importance that BI allows the exchange rate to enter a monitored depreciation given containment measures, supply chain disruptions and rising unemployment from the economic shutdown are all likely to place downward pressure on GDP. This would be possible given the forecast v-shaped recovery in the exchange rate on the other side of the pandemic as the economy reopens.

Instead, BI could investigate the opportunity to expand and utilise currency swap lines. Swap lines are a way to secure liquidity, crucial to preventing Indonesia's US\$407.5 billion in external debt from skyrocketing under a depreciating exchange rate (BI 2020). Securing swap lines will be crucial given repurchasing agreements only provide USD to the extent that Indonesia has US Treasuries, and that currency depreciation increases the size of foreign debt (Segal 2020). Australia, Japan, Singapore and China are among those in Asia that have swap lines with Indonesia. As shown in this analysis, Australia and Japan are most at risk from contagion effects and have the most to lose from an Indonesian default. Both should therefore assist in increasing Indonesian liquidity to prevent defaults which would simultaneously hedge against a decline in GDP growth figures in the two countries. The US Federal Reserve has likewise established currency swap lines with several, mainly advanced, countries such as Australia, Norway, and Singapore (Triggs 2020b). Mexico, and Brazil are also on the list, however, and Indonesia could join these two emerging economies in gaining access to greater USD liquidity (Basri, Drysdale & Triggs 2020; Federal Reserve 2020a). A swap line that could be used during the pandemic would signal to markets that Indonesia would be able to continue repaying and refinancing debts, preventing a default, and simultaneously hedging against forward exchange rate fluctuations (Triggs 2020b). By decreasing risk sentiment, investors would return their capital to the Indonesian economy, raising future growth projections.

## **Fiscal Policy**

Several rounds of fiscal stimulus measures have already been distributed in Indonesia. The results in this paper suggest that, under usual circumstances, higher risk would create a downturn in consumption and output growth that would benefit from such measures. The current health crisis, however, must be considered. As most households and businesses have been asked to abide by containment measures, macroeconomic policy aiming to stimulate aggregate demand is not likely to be as effective (Snower 2020 p.5). The only sectors that will benefit are those that are able to move to online activities or essential services – already in high demand (Basri 2020). A fiscal stimulus package would carry the most impact if it were implemented as infection rates decline in Indonesia and social distancing measures are alleviated. Given rising infection rates in the country, Indonesia is not yet at this stage despite the easing of some restrictions. Fortunately, to date only 4.2 per cent of GDP has been announced in fiscal support (Oxford Economics 2020, p.14). Other countries in the region, such as Australia, Malaysia, Singapore and Thailand, have extended over 10 per cent of GDP in fiscal packages in 2020 (Oxford Economics 2020, p.14). Despite potential inflationary constraints, Indonesia could increase expenditure given their lower public debt in comparison to other emerging markets (Basri 2020). Delaying further fiscal stimulus packages could sustain higher levels of GDP growth beyond the initial burst from the trade balance. This will depend on whether the package can be timed correctly and the severity of the pandemic.

## **Structural Policies**

Further policies should focus on labour markets as falling labour demand will increase unemployment, even before the effects of containment measures are taken into account. Wage flexibility and price controls would assist in this, particularly when combined with targeted social safety nets. This would support workers as capital stock declines in all sectors and would smooth consumption where demand decreases in the short term (OECD 2020c). Broader social transfers will be extremely difficult to implement given Indonesia's rampant informal sector and cash economy. This renders price controls more important to prevent the type of food price inflation seen in the AFC.

BI should continue targeting inflation and engaging in international discussions on coordinated monetary and fiscal policy actions to amplify the results of domestic actions. Further financial reform should continue Indonesia's long run trajectory of managing risk

more effectively than in the past and finding funding external to the classical backstop of the IMF. These actions would work together to improve macro-credibility, allowing for greater monetary and fiscal policy freedom and independence in the future.

In modelling a higher country risk premium in Indonesia, this paper has shown that there is a trade off between balancing excessive foreign debt and allowing a depreciating real exchange rate to draw the benefits of trade into the domestic economy. Short run fluctuations in investment, capital stocks, consumption and GDP growth will not extend beyond the course of the virus, adjusting back to the baseline within five years of the start of the two-year shock. Capital flows highlight contagion effects that are most pronounced in Australia and Japan. These effects provide an incentive for international economies to offer assistance to Indonesia in balancing the debt-exchange rate trade-off.

Several limitations are recognised throughout this report that provide opportunity for further research. This report investigates the country risk premium effect, whilst the full effect of the coronavirus pandemic would include both demand and supply shocks. These are likely to amplify many of the results and create a greater drag on growth in the short term. Further research should analyse the effect of each of these shocks in Indonesia separately and combine all three shocks to identify the most appropriate policy options. Similarly, the scale of the numbers would be very different if the pandemic lasted for a longer period or if expectations moved to a permanent, rather than temporary shock to the economy. A country risk shock implemented in all emerging markets may also produce the contagion effects most likely to be seen in the global economy today. For Indonesia and the world, macroeconomic forecasting is critical to improving economic stability, preparedness for future shocks and building financial resilience through sound monetary, fiscal, and broader structural policy.

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