AMRO
ASEAN +3 MACROECONOMIC RESEARCH OFFICE

Analytical Note

Public Infrastructure Investment and Macroeconomic Impact in ASEAN+3 Economies [1]

January 18, 2023

I. Introduction

1. **ASEAN+3 member economies have rolled out fiscal stimulus measures to protect both lives and livelihoods against the COVID-19 pandemic**. Some economies have included infrastructure projects in the stimulus package to boost the recovery, while others have delayed less urgent infrastructure projects to reallocate the resources toward more urgent support programs.

2. **With an economic slack, public infrastructure investments can play a crucial role in the post-pandemic economic recovery.** In the near-term, public infrastructure investments can boost aggregate demand and crowd in private investments. Economic development theory suggests that the accumulated infrastructure stock is an important factor for production and contributes to higher productivity growth. In particular, for emerging economies and low-income developing countries with a large infrastructure gap, infrastructure investment is even more critical to upgrading their growth potential for sustainable development and poverty reduction.

3. **However, narrowed fiscal policy space during the pandemic may hinder the authorities from resuming and increasing infrastructure spending**. Due to the revenue shortfalls and massive healthcare/stimulus spending during the pandemic, the public debt-to-GDP ratios in all member economies have increased substantially, raising concerns about debt sustainability. As a result, the authorities are leaning toward restoring their fiscal buffers in the medium-term, notwithstanding the need for continuing economic recovery support.

4. **In this regard, it is vital to understand the impact of infrastructure investments on the economy and debt dynamics for better policy considerations in both aspects**. This note assesses the infrastructure stocks and investments, reviews the role of infrastructure in economic growth and development, analyzes the effects of infrastructure investments on growth and debt, and discusses the policy options.

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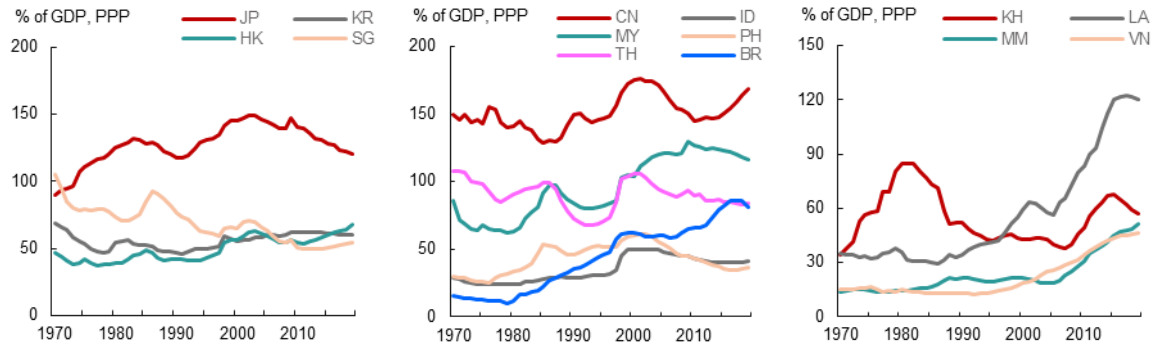
II. Overview of Infrastructure Stock and Investment in ASEAN+3 Economies

A. Infrastructure Stock Before the Pandemic[2]

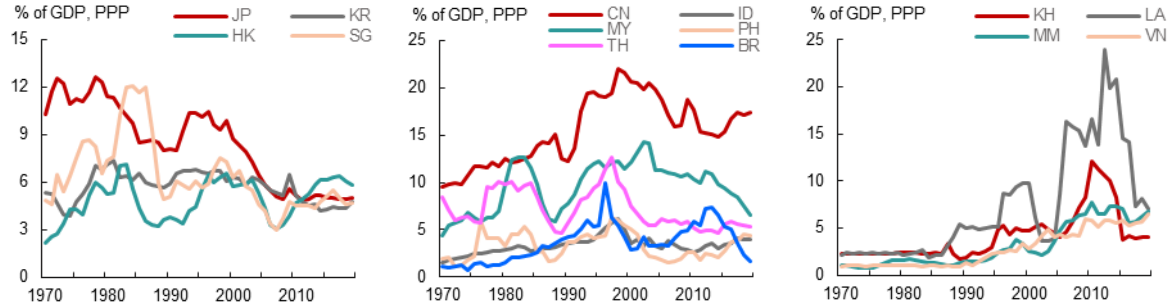
5. **The public and public-private partnership (PPP) capital stock has increased in the low-income developing countries (LIDCs) in the past ten years, while it remained stable or declined in most advanced economies (AEs) and emerging market economies (EMs)** (Figure 1).[3] The public and PPP capital investments have trended down in most AEs and EMs, although the level and slope differ across economies.[4] The public capital investment in Vietnam and Myanmar has maintained an upward trend, while Cambodia and Lao PDR have experienced a drop in recent years after substantial increases in the previous decades (Figure 2).

Figure 1. Public and PPP Capital Stock



Sources: IMF Investment and Capital Stock Database (ICSD); AMRO staff estimates

Figure 2. Public and PPP Capital Investment



Sources: IMF Investment and Capital Stock Database (ICSD); AMRO staff estimates

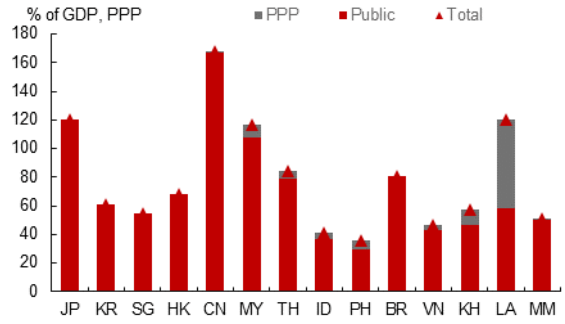
[2] Since the infrastructure investment and cumulated stock data are not readily available for most countries, the public and public-private-partnership (PPP) investment and capital stock are used as proxies. In most countries, a significant share of the public capital investment is still on infrastructure. Meanwhile, the infrastructure has also been increasingly provided by the PPP investments in many emerging economies and low-income developing countries.

[3] The public capital investments are measured by the gross fixed capital formation (GFCF) of the general government. The public-private partnership (PPP) investments in emerging economies and low-income developing countries are based on the World Bank Private Participation in Infrastructure (PPI) database. Since the WB PPI database provides the total value of PPP investment commitments at contract signature or financial closure, annual PPP investments are derived by spreading the value of PPP project commitments over five years. The public and PPP investment series are then converted to constant international dollars using purchasing power parities. The capital stocks are constructed following the perpetual inventory equation with initial capital stock, and time-varying depreciation rates. See IMF (2021) for a detailed discussion.

[4] The decline in public capital stock in advanced and emerging economies may partially reflect an increasing role of the private sector and SOEs in the provision of infrastructure (such as energy and telecommunications).

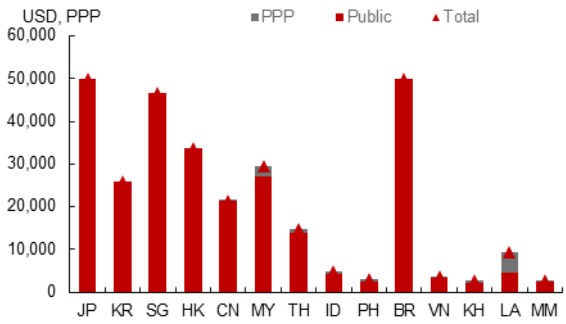
6. **A large infrastructure gap still exists among AEs, EMs, and LIDCs**. The public and PPP capital stock in percent of GDP may not be directly comparable across countries, mainly due to different growth drivers and development levels (Figure 3).[5] However, in per capita terms, the capital stocks in LIDCs and some EMs are still only a fraction of the those in the AEs (Figure 4). The variation in infrastructure investment across countries can be confirmed by the assessment of the quality of physical infrastructure. According to the Global Competitiveness Report 2019, there are considerable gaps in transportation (road, railway, airport, shipping port) and ICT infrastructure (mobile phone, internet), although the gaps in utility infrastructure (electricity and water access) are relatively small (Figure 5). It is worthwhile to note that the public and PPP capital stock per capita is closely related to the result of physical infrastructure assessment, partly justifying our use of public and PPP capital as proxies for infrastructure (Figure 6).

Figure 3. Public and PPP Capital Stock in percent of GDP (2019)



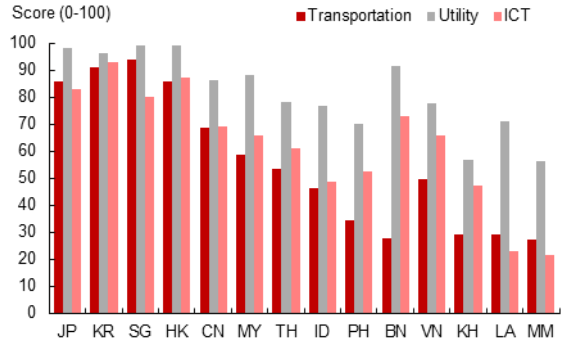
Sources: IMF Investment and Capital Stock Database (ICSD); AMRO staff estimates

Figure 4. Public and PPP Capital Stock per Capita (2019)



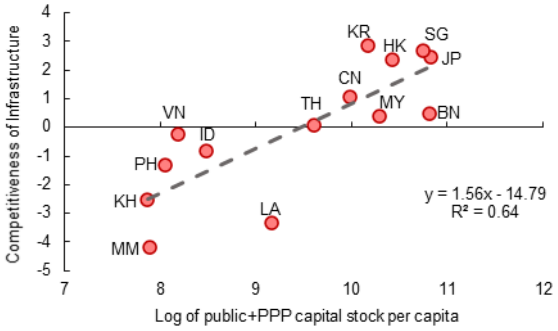
Sources: IMF Investment and Capital Stock Database (ICSD); AMRO staff estimates

Figure 5. Infrastructure Competitiveness



Sources: World Economic Forum (WEF), Global Competitiveness Report (GCR) 2019; AMRO staff calculation
Note: 1. Among many GCR indicators, more relevant indicators are selectively chosen: (i) road connectivity/quality, railway density, airport connectivity, shipping connectivity for transportation; (ii) electricity access/quality, water safety/reliability for utility; (iii) mobile telephone subscription, fixed broadband subscription, and internet users for ICT; 2. Scores are on a 0 to 100, where 100 represents the optimal situation or frontier; 3. For MM, the scores are for 2015-2016.

Figure 6. Public and PPP Capital Stock and Physical Infrastructure



Sources: IMF ICSD; WEF GCR 2019; AMRO staff calculation
Note: 1. Public and PPP capital stock per capita is transformed into a log; 2. The competitiveness of infrastructure is based on the principal component score, estimated from seven indicators of GCR infrastructure; road, airport, electricity, water, mobile telephone, fixed broadband, and internet users.

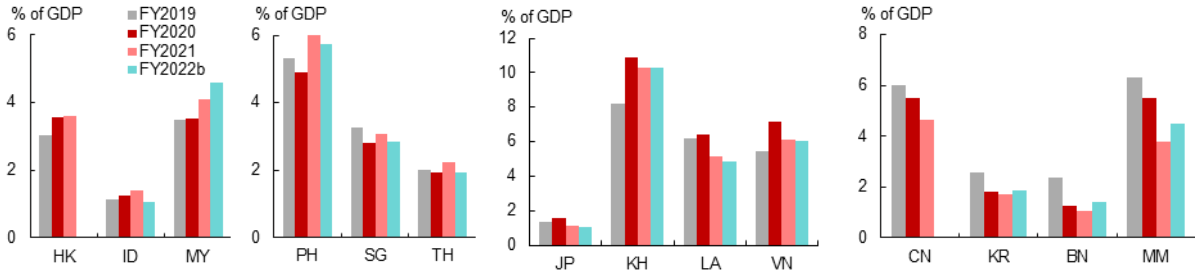
[5] Different economic structures may strongly influence the level of public and PPP infrastructure in relation to GDP. For example, the growth in Lao PDR has been driven by many large-scale hydropower projects, while the business process outsourcing (BPO) services have attributed to the growth in the Philippines in recent years. In Korea and Indonesia, SOEs have actively participated in providing the infrastructure. The participation of the private sector has also been increasing in the advanced countries.

B. Infrastructure Investment during the Pandemic

7. **The evolution of public capital spending during the pandemic has been different across economies**.[6] ASEAN+3 members are categorized into four groups according to the evolution of public capital expenditure during the pandemic (Figure 7):

- **Capital expenditure increased in both 2020 and 2021 (HK, ID, MY):** Public Capex in Malaysia decreased in absolute terms in 2020, but by less than the decline in GDP, followed by the increase in absolute terms in 2021 and 2022. Public Capex growth maintained positive in Indonesia in 2020 and 2021, but turned negative in 2022.
- **Capital expenditure decreased in 2020, but rebounded in 2021 (PH, SG, TH)**: Philippines, Singapore, and Brunei governments cut capital outlays in 2020 to reallocate resources to more urgent spending on healthcare and support for businesses affected by the pandemic and restored public capital expenditure in 2021. Capex is estimated to either moderate (PH, SG) or decline (TH) in 2022, leading to the decrease as a share of GDP.
- **Capital expenditure increased in 2020, but declined in 2021 (JP, KH, LA, VN)**: Cambodia, Japan, and Vietnam increased capital investment spending by including them in the stimulus package or expediting the implementation in 2020. However, the capital expenditure shrank in 2021 and 2022 due to the mobility restrictions (VN) or budget constraints (LA).
- **Capital expenditure decreased in both 2020 and 2021 (CN, KR, BN, MM**): Public Capex declined in absolute value in China and Myanmar in 2020 and 2021. In Korea and Brunei, the public Capex declined sharply in 2020, but increased moderately in 2021 and substantially in 2022.

Figure 7. Capital Expenditure of Government

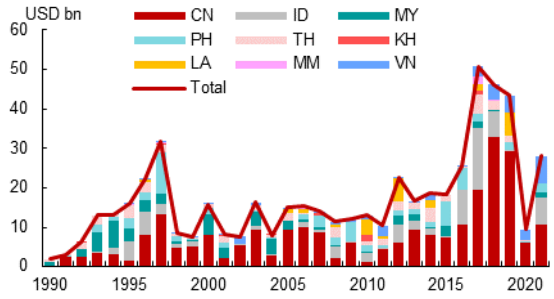


Sources: National authorities; AMRO staff estimates

8. **PPP investments have declined in most EMs and LIDCs as new commitments of projects fell sharply during the pandemic** (Figure 8). According to the World Bank Private Participation in Infrastructure (PPI) database, the total commitment value of PPP projects in the region in 2020 and 2021 recorded 22 percent and 65 percent of 2019, respectively. Despite the smaller number of new projects, annual PPP investment would have remained relatively stable if the ongoing projects continued and the new projects were launched as scheduled during the pandemic (Figure 9). However, the large drop in new commitments will lead to a decline in annual PPP investment in the coming years unless the number of new PPP commitments rebounds sufficiently after the pandemic.

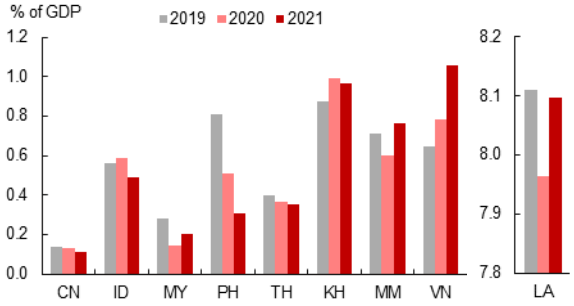
[6] IMF Investment and Capital Stock Database (ICSD) is available until 2019. To assess the public infrastructure investments during the pandemic in 2020 and 2021, the capital expenditure of the central government (central + local government for China, Cambodia, and Vietnam) is used as a proxy for the public capital investments. However, current and capital expenditure category is not available for China and Japan. For China, urban and rural community affairs, agriculture/forestry/water conservancy, and transportation from the functional classification are used as CAPEX. For Japan, public works from the functional classification represent CAPEX.

Figure 8. PPP investment commitments



Sources: World Bank, Private Participation in Infrastructure (PPI)

Figure 9. Annual PPP investments



Sources: WB PPI; AMRO staff estimates

9. **The bottom line is that public infrastructure investments during the pandemic have not significantly changed the trend observed before the pandemic.** Compared to the pre-pandemic, the changes in public capital expenditure from 2019 to 2022 were less than one percent of GDP in most economies. On the other hand, the sharp fall in PPP commitments may delay the infrastructure capital formation in EMs and LIDCs, which already had an infrastructure gap before the pandemic.

10. **Still, member economies face sizeable investment needs for both traditional and new infrastructure**. The additional investment needed through 2030 to reach the SDGs for roads, electricity, water and sanitation has been estimated at 2.7 percent of GDP and 9.8 percent of GDP per year in EMs and LIDCs, respectively (IMF, 2020). Digital infrastructure investment has become more essential to address the health crisis (by introducing contact-tracing, social distancing, cash transfer, e-transactions) and to transform the economic structure adapted to the fourth industrial revolution. Investment needs for mitigation and adaptation to climate change are also sizable. Reducing emissions to a level consistent with an increase in global warming to below a 2°C temperature target (a long-term goal of the 2015 Paris Agreement) would require increasing the public and private sector energy investment (IMF, 2019).

III. Effects of Infrastructure Investment on Growth

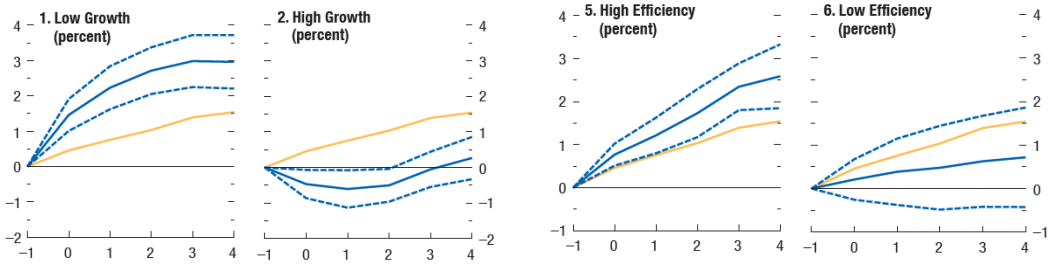
11. **Theoretically, infrastructure investment affects economic growth through aggregate demand and production capacity**. In the near term, it boosts aggregate demand through the fiscal multiplier, and by potentially crowding in private investment, given the highly complementary nature of infrastructures such as transportation, power and utilities, and ICT. On the supply side, higher infrastructure capital stock increases the overall productivity of the economy over the long-term.

12. **The aggregate demand impact of public investment is determined by various factors, including the state of the economy, monetary policy stance, initial stock of public capital, and uncertainties** (see IMF (2020), Gbohoui (2021), and references therein). In general, public investment has larger fiscal multipliers than public consumption, taxes, or transfer. Also, multipliers are larger in recessions when resources are idle and central bank rates hit their effective lower bound. According to IMF (2014), an unanticipated one percent of GDP increase in public investment spending increases the level of output by 0.4 percent in the same year and by 1.5 percent four years after the shock. The multipliers triple in the same year and double in the medium-term during the periods of low growth, while the effects are not statistically significantly different from zero during the high growth period. The initial stock of public capital also affects the magnitude of fiscal multiplier of public investment. Izquierdo et al. (2019) found that the countries with a low initial stock of public capital have significantly

higher public investment multipliers than countries with a high initial stock of public capital. Recently, Gbohoui (2021) found that fiscal multipliers are much higher in periods of high uncertainty. The results suggest that demand reacts strongly to public investment shocks, possibly because they signal a government's commitment to growth and stability, and reduce the policy uncertainty in the medium-term. By raising confidence, a push in public investment is also likely to foster more investment from businesses that might otherwise remain cautious in their hiring and investment decisions.

13. **The efficiency of investment also matters**. Inefficiencies in the investment process, such as poor project selection, implementation, and monitoring, can result in only a fraction of public investment translated into productive infrastructure, limiting the long-term output gains. Many empirical studies find larger multipliers in advanced economies than in emerging and developing countries, mainly due to investment quality and institutional efficiency. IMF (2014) shows that a public investment spending shock increases output by about 0.8 percent in the same year and by 2.6 percent four years after the shock in countries with high efficiency of public investment. However, in countries with low efficiency of public investment, the output effect is about 0.2 percent in the same year and about 0.7 percent in the medium-term.

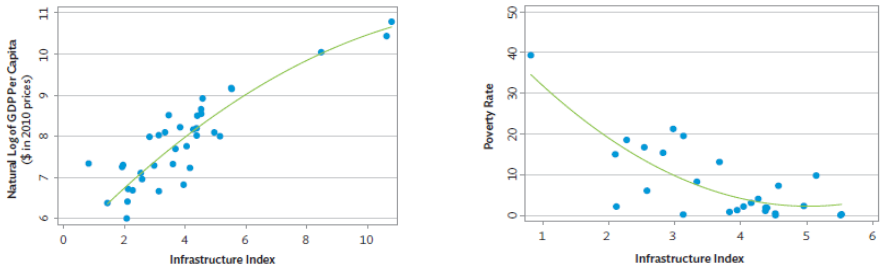
Figure 10. Effects of Public Investment on Output



Sources: IMF, World Economic Outlook (2014)
Note: 1. Shock represents an exogenous 1 percentage point of GDP increase in public investment spending; 2. t = 0 is the year of the shock; 3. Solid yellow lines represent the baseline result. Dashed lines denote 90 percent confidence bands.

14. **Infrastructure availability has a close relationship with development and poverty reduction**. Given that infrastructure capital is a direct input factor for production and contributes to higher productivity growth over time, it is not surprising to see the positive relationship between GDP per capita and infrastructure availability. It is also clear that the essential services or public goods infrastructure significantly benefits the poor. There is a robust negative correlation between infrastructure availability and poverty.[7]

Figure 11. Infrastructure and GDP per Capita, Poverty Rate



Sources: ADB, Meeting Asia's Infrastructure Needs (2015)
Note: The infrastructure index is computed based on the first principal component of infrastructure stocks in roads, airports, electricity, telephone, mobile, broadband, water, and sanitation. Higher values represent greater infrastructure availability.

[7] While many factors could underlie the negative relationship between infrastructure and poverty, more studies examine how certain infrastructure investments, such as power grid, water treatment, mobile phones, impact the poor. Please see ADB (2017) and references therein.

IV. Effects of Infrastructure Investment on Debt Dynamics

15. **The way that the increase in public infrastructure investment affects the public debt ratio depends on the fiscal multipliers and the elasticity of revenue to output**. The law of motion for the debt ratio, assuming no external debt for simplicity, can be written as:

$$d_t = \frac{1+r_t}{1+g_t} d_{t-1} - pb_t \qquad \text{(Equation 1)}$$

where d_t is public debt-to-GDP ratio; r_t is real effective interest rate; g_t is real GDP growth; and pb_t is primary balance (fiscal revenue (fr_t) – fiscal expenditure excluding interest payments (fe_t)) in GDP share.

Define the fiscal multiplier of expenditure $\mu_{t+j} = \Delta g_{t+j}/\Delta fe_t$, for $j = 0, 1, \dots, n$, where n = the year when the effect of expenditure completely fades out) and the elasticity of revenue to output $\gamma = \Delta fr/\Delta g$, assumed to be constant. Then, the change in debt-to-GDP ratio in response to the change in expenditure can be expressed as follows, with a single quote ($'$) denoting the variable after investment spending increase[8]:

$$d'_t - d_t = -\frac{g'_t - g_t}{(1+g'_t)(1+g_t)}(1+r_t)d_{t-1} - (pb'_t - pb_t) \qquad \text{(Equation 2)}$$

$$d'_t - d_t = -\frac{\mu_t(fe'_t - fe_t)}{(1+g'_t)(1+g_t)}(1+r_t)d_{t-1} - (\gamma\mu_t - 1)(fe'_t - fe_t) \qquad \text{(Equation 3)}$$

$$d'_{t+j} - d_{t+j} = -\frac{\mu_{t+j}(fe'_t - fe_t)}{(1+g'_{t+j})(1+g_{t+j})}(1+r_{t+j})d_{t+j-1} - \gamma\mu_{t+j}(fe'_t - fe_t) \qquad \text{(Equation 4)}$$

In the first year of fiscal expansion, as shown in Equation 3, the effect of the increase in expenditure on the debt ratio depends on the size of the fiscal multiplier (μ) and the elasticity of revenue to output (γ). The contribution of growth to the debt ratio (the first term of RHS) is always negative as long as $\mu > 0$. On the other hand, the contribution of primary balance to the debt ratio (the second term of RHS) is likely to be positive, unless $\gamma\mu > 1$ (that is, the fiscal multiplier or revenue elasticity is sufficiently large). Given typical values of the fiscal multiplier (μ less than 1) and the revenue elasticity (γ close to zero), the fiscal expansion is expected to raise the debt ratio in the first year in most cases. However, from the second year of fiscal expansion, as shown in Equation 4, the debt ratio may continue to decline, reflecting persistent fiscal multiplier effects. Overall, the final debt ratio in the next several years after the initial shock in expenditure will be determined by the country-specific size of the fiscal multiplier (μ) and the revenue elasticity to output (γ).

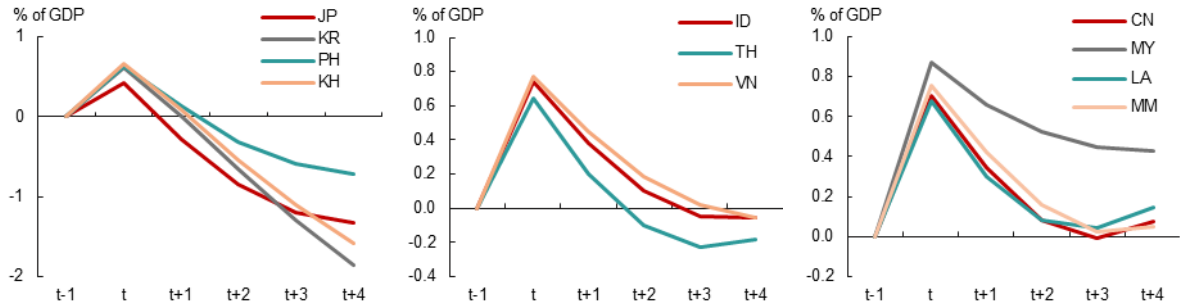
16. **AMRO simulation suggests that the increases in public infrastructure investments may raise the debt-to-GDP ratio in the first year, but eventually reduce it in the medium-term in many member economies** (Figure 12). We first estimate the fiscal multiplier of expenditure by the bucket approach, suggested by Batini et al. (2014), based on the characteristics of member economies.[9] Then, we apply those fiscal multipliers, together with

[8] The equation is derived assuming no changes in the interest rate and inflation despite the increases in public spending. The elasticity of revenue to output is defined differently from the typical definition of % change over % change, for simplicity. Specifically, $\gamma = \frac{(\varepsilon-1)}{(1+g'_t)(1+g_t)} fr_{t-1}$, where $\varepsilon = \frac{\%\Delta\ of\ FR_t}{g_t}$. If $\varepsilon > 1$, then $\gamma > 0$.

[9] The bucket approach bunches countries into three groups that are likely to have similar multiplier values based on their structural characteristics. This approach is useful for countries where fiscal multipliers are not readily available, making use of general findings from the literature on other countries. See Batini et al (2014) for the methodology and Appendix for the results for ASEAN+3 member economies.

the average revenue elasticity to output between 2015 and 2019, and other macroeconomic indicators, to Equation 3 and 4. In Japan, Korea, the Philippines, and Cambodia, the debt-to-GDP ratio declines substantially in the medium-term, compared to the baseline, mainly due to high revenue buoyancy ($\varepsilon > 1$, equivalently $\gamma > 0$). The size of the reduced debt-to-GDP ratio is also affected by the initial debt level (d_{t-1}) as shown in Equation 3 and 4. Indonesia, Thailand, and Vietnam are also expected to see slightly lower debt ratios 3 or 4 years after the expansion, attributable to the negative contribution from growth persistently affected by the fiscal expansion. However, some economies with low revenue elasticity and/or low fiscal multiplier end up with a similar or slightly higher debt-to-GDP ratio.

Figure 12. Public debt-to-GDP ratio in response to Public Investment Spending



Sources: National authorities; AMRO staff estimates
Note: The figure represents the differences between the debt-to-GDP ratio without additional public investment (baseline) and the debt-to-GDP ratio with an additional one percent of GDP of public investment. For simulation purposes, macroeconomic and fiscal indicators in 2021 are used for t-1 indicators. Projections from t to t+4 periods are based on the author's assumptions, but alternative assumptions do not make significant differences in the results.

17. **The dynamics of the debt-to-GDP ratio should also take into consideration other factors related to fiscal multipliers and revenue elasticity**. The simulation shown above assumes the average fiscal multipliers of general fiscal expenditure, based on the bucket approach. However, as discussed earlier, public investment has larger fiscal multipliers than other spending programs. In addition, the fiscal multipliers of public investment can be higher for the EMs and LIDCs with a low initial public infrastructure stock and lower for the AEs with a high initial public infrastructure stock. It was also found that the effects of public investment on output can be amplified when an economic slack exists, as experienced by most member economies amid the ongoing pandemic, and under high uncertainties. On the other hand, the different levels of investment efficiency across countries will also determine the actual multiplier. For the revenue elasticity, although we assume the average revenue elasticity before the pandemic, some economies may have already implemented revenue-enhancing measures, while others may have seen a downward trend in revenue collection. All these factors will affect the actual movements of the debt-to-GDP ratio driven by the increase in public investment, and at the same time, can guide the authorities on what to consider to maximize the benefits from the public investments while maintaining debt sustainability.

V. Conclusions

18. **ASEAN+3 member economies face the infrastructure investment needs for sustainable growth under evolving economic environments**. EMs and LIDCs with a large infrastructure gap could not speed up the public infrastructure investments or launch new large-scale PPP projects during the pandemic. As the global economy emerges from the pandemic crisis, member economies should strengthen infrastructure investments to seize a growing opportunity in the post-pandemic era and address rising policy issues such as climate change.

19. **Given economic slack and high uncertainties, public infrastructure investments can contribute to boosting the economic recovery and enhancing the growth potential, while maintaining debt sustainability.** Many studies suggest that the fiscal multipliers and long-term effects of public investment may be higher during the recession and under high uncertainties. From the debt dynamics, we show that the higher fiscal multiplier of public investment can lead to a larger decline in the debt-to-GDP ratio in the medium-term, compared to the baseline.

20. **For better economic outcomes, policy measures to improve investment efficiency and enhance revenue collection should be strengthened**. Considering that the macroeconomic impact of public infrastructure investment depends largely on the investment efficiency, the authorities should pay more attention to strengthening the design and management of infrastructure projects by: (i) choosing projects based on rigorous cost-benefit analysis; (ii) monitoring and reviewing the implementation of projects to address the potential risks and issues preemptively; and (iii) improving the coordination and cooperation among public and private stakeholders. These measures should also be considered for the design and management of PPP projects. For revenue enhancement, the authorities should enhance the tax system to be properly aligned to the economic structure and improve the efficiency of tax administration by maximizing the collection capacity and strengthening tax compliance. Introducing new taxes (such as carbon tax) and increasing tax rates could also be considered.

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Appendix: Fiscal Multipliers of Member Economies by the Bucket Approach, suggested by Batini et al. (2014)

According to Batini et al. (2014), the "bucket approach" bunches countries into three groups that are likely to have similar multiplier values based on their structural characteristics. The fiscal multipliers are found from studies to be higher if the countries have the following characteristics: low trade openness, high labor market rigidities, small automatic stabilizers, fixed/quasi-fixed exchange rate regimes, low/safe public debt level, and effective public expenditure management. The fiscal multipliers are estimated as follows:

Step 1: Assign a value of one for each characteristic if the indicators are higher or lower than the thresholds.

Step 2: Sum the scores to determine the likely level of the first-year multiplier (low, medium, or high) in "normal" times, and select the fiscal multiplier within the range, considering other factors, such as empirical findings (low: 0.1 – 0.3, medium: 0.4 – 0.6, high: 0.7 – 1.0).

Step 3: Scale up or down the range assigned through the scoring method depending on the conjunctural characteristics, such as the business cycle (up to 60%) and the monetary policy stance (up to 30%).

The results are presented in the table below.

		CN	JP	KR	HK	ID	MY	PH	SG	TH	BN	KH	LA	MM	VN
Step 1. Structural Characteristics (Score)	1. Low trade openness (Import/Domestic Demand < 27.7%)	1	1	0	0	1	0	0	0	0	0	0	0	0	0
	2. High labor market rigidities (Labor market flexibility by WEF < 4.5)	1	0	1	0	1	0	1	0	1	0	0	1	1	1
	3. Small automatic stabilizers (Public spending/GDP < 37.0%)	1	0	1	1	1	1	1	1	1	1	1	1	1	1
	4. Fixed/quasi-fixed FX regime (FX arrangement: not floating)	1	0	0	1	0	0	0	1	0	1	1	1	1	1
	5. Low/safe public debt level (Public debt-to-GDP < 85/70/40%)	1	0	1	1	1	1	1	0	1	1	1	0	0	1
	6. Effective public expenditure (Efficiency of govt spending by WEF > 3.4)	1	1	1	1	1	0	1	1	1	0	1	0	0	0
Step 2. First-year Multiplier in Normal Times	Total Score from Step 1	6	2	4	4	5	2	4	3	4	3	4	3	3	4
	Country Category based on Total Score	High	Low	Med	Med	High	Low	Med	Med	Med	Med	Med	Med	Med	Med
	Fiscal Multiplier in Normal Times	0.8	0.2	0.6	0.6	0.7	0.2	0.6	0.4	0.6	0.4	0.6	0.4	0.4	0.6
Step 3. Conjunctural Characteristics	Business Cycle (Output Gap/Minimum)		1.3		6.7	3.7	9.5	6.0	2.1	20.4		26.9	58.5	43.3	
	Monetary Policy Space (ZLB)		30.0		10.0				10.0	10.0					
Step 4. Fiscal Multiplier from t to t+4	μ_t	0.80	0.26	0.60	0.70	0.73	0.22	0.64	0.45	0.79	0.40	0.76	0.63	0.57	0.60
	μ_{t+1}	0.96	0.32	0.72	0.84	0.87	0.26	0.76	0.54	0.95	0.48	0.91	0.76	0.69	0.72
	μ_{t+2}	0.80	0.26	0.60	0.70	0.73	0.22	0.64	0.45	0.79	0.40	0.76	0.63	0.57	0.60
	μ_{t+3}	0.48	0.16	0.36	0.42	0.44	0.13	0.38	0.27	0.48	0.24	0.46	0.38	0.34	0.36
	μ_{t+4}	0.16	0.05	0.12	0.14	0.15	0.04	0.13	0.09	0.16	0.08	0.15	0.13	0.11	0.12