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PUBLIC DEBT AND INTERGENERATIONAL EQUITY IN SINGAPORE

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PUBLIC DEBT AND INTERGENERATIONAL EQUITY IN SINGAPORE

Abstract

We explore the concerns of public debt and intergenerational equity in Singapore's context. The central concern of our research is whether the Singapore Government can issue and manage debt while maintaining intergenerational equity. *IPS Working Papers No. 32* (Shih, 2018) listed four principles of intergenerational equity relevant to Singapore's fiscal management of reserves. From these principles, we infer that the Government's current position on public debt follows that of the benefit principle of intergenerational equity, i.e., debt financing is only permitted for infrastructure investments because of its long-term benefits. We argue, however, that the Government should adopt a holistically principled approach to public debt; an approach that considers intergenerational benefits but also considers other conceptions of intergenerational justice including equality, welfare, and reciprocity. In particular, we find that economic research on public debt and intergenerational welfare deserves attention. Intergenerational welfare costs of public debt are low if interest rates are low and if public debt is used to invest in worthy public investment. Further, there may be no intergenerational welfare costs if public investment funded by public debt earns a greater social return than its opportunity cost, the risk-adjusted return on private investment. We therefore specify a Debt Issuance Framework that suggests how debt can be issued, spent and paid back in a manner that is equitable across generations. The repayment of debt ensures that the Government prevents the accumulation of debt and can maintain control over intergenerational equity.

PUBLIC DEBT AND INTERGENERATIONAL EQUITY IN SINGAPORE

1. INTRODUCTION

In Budget 2019, the Government announced that it was evaluating the use of debt financing for large-scale infrastructure projects that the Government would be taking on directly (Ministry of Finance, 2019). Due to the financial crisis caused by the COVID-19 pandemic, parliamentary debate has revisited the question of the issuance of government debt for budget financing. DPM Heng Swee Keat has recently reiterated the Government's position on the use of public debt for government spending (Abdullah, 2020). The Government will only borrow for long-term infrastructure projects, and not for budget deficits or opportunistic reasons such as low interest rates. DPM Heng's views are consistent with the Government's long-term management of Singapore's fiscal reserves, one that emphasises a prudent and disciplined approach to intergenerational responsibility. This disciplined approach has allowed Singapore to maintain a very strong fiscal position with zero net debt; a comparative strength of Singapore's when one recognises the indebted positions other advanced economies are currently placed in.

The COVID-19 pandemic has however caused a severe economic crisis that will test Singapore's public finances. Our central concern in this paper is to examine if the Singapore Government can begin to issue and manage public debt for budgetary reasons and remain fiscally responsible and fair to future generations. To do this, we first locate the Government's current position on public debt within principles of intergenerational equity specified in *IPS Working Papers No. 32* (Shih, 2018). We

infer that the Government's position on public debt follows that of the benefit principle of intergenerational equity, i.e., infrastructure projects are permitted to be financed by debt because they have intergenerational benefits, but current expenditures should be funded by recurrent revenues such as taxes since only the current generation directly benefits from these expenditures.

We show however that a more comprehensive application of the benefit principle would recognise that all forms of public expenditure have intergenerational benefits (Thompson, 2003). Correspondingly, we find that the sole application of the benefit principle may be problematic for intergenerational equity since it seems to suggest that all forms of expenditure can be financed by public debt. We argue instead, that given Singapore's unique position of fiscal strength, the Government should adopt a more holistically principled approach towards public debt, that includes not just a benefiter-pays principle but also considers other conceptions of justice such as equality, welfare and reciprocity.

In particular, we find that the utilitarian argument for intergenerational welfare that is supported by economic theory and research deserves attention. Economic research finds that intergenerational welfare concerns associated with government debt depend on a number of economic factors such as interest rates, growth rates of economies and the marginal product of capital. Current economic research suggests that government debt has low intergenerational fiscal and welfare costs if interest rates are lower than growth rates of economies, and the marginal product of capital is also relatively low (Blanchard, 2019; Wren-Lewis, 2020). However, higher levels of debt in countries have also shown correlations to lower GDP growth (Fatas et al.,

2019). Further consideration therefore needs to be given to what government debt is used for. We concur with Blanchard's (2019) argument that if public debt is used for public good investments, it has no intergenerational welfare costs if the investments funded by debt have positive social rates of return that overcome the hurdle rate of return to private capital investment. The use of debt to finance productive public investments will likely also contribute to GDP growth.

The conclusion from the ethical and economic considerations of our analysis is that the Government can issue and manage public debt while remaining fair to future generations. We suggest a Debt Issuance Framework that specifies how debt can be issued, spent and paid back in a manner that is equitable across generations. We show that debt can be issued and managed equitably if funds raised by debt are spent exclusively on development expenditures (i.e., capital expenditures in Singapore's Budget) and that this debt can be managed equitably by sharing the burden of servicing and amortisation by a combination of user fees and taxes. The suggested Debt Issuance Framework is one such framework of how the Government can issue and manage debt equitably. What we hope to convey through this paper is that Singapore's position on public debt and indeed its overall fiscal management should be amenable to a holistic approach towards intergenerational equity, one that incorporates values of equality, welfare, reciprocity and benefits.

In the rest of this introduction, we outline the structure of this paper and how we arrive at the suggested Debt Issuance Framework:

1) In Section 2, we briefly summarise the global public debt landscape. The purpose of this section is to take note of global economic trends of

government debt and interest rates before considering the issuance of public debt in Singapore.

2) Section 3 details the current use of public debt in Singapore as well as Singapore's fiscal response to the COVID-19 pandemic. We detail directly issued debt by the Government, borrowings by statutory boards, and other contingent liabilities of the Government. We then show that the COVID-19 pandemic will have a significant effect on public finances which may prompt the need for debt financing for certain public expenditures.
3) In Section 4, we analyse the Government's position on public debt from an ethical perspective. We do this by first outlining four principles of intergenerational equity relevant to Singapore, defined in *IPS Working Papers No. 32* (Shih, 2018). We then infer the Government's position on public debt as following the benefit principle. We argue that the Government's position on public debt should not focus on benefits solely but should adopt a more holistically principled approach from the perspective of intergenerational equity.
4) In Section 5, we detail the Economic theory and research into Government Debt. Economic theory states that government debt reduces capital accumulation, which has intergenerational welfare costs. These welfare costs, however, depend on parameters such as interest rates, marginal product of capital and growth rates of economies. We find that economic research encourages the use of debt financing for public investments that provide greater social returns than private investments.
5) In Section 6, we consider how the Government can issue and manage debt equitably across generations. We first analyse common fiscal rules for debt issuance and management. We then suggest a Debt Issuance Framework

that details how debt can be issued, spent and paid back equitably. This includes a simulation of how the debt will be raised and paid back over the period of the issuance.

6) In the Appendix, we include more technical details on debt sustainability, debt-to-GDP ratios and investor base risks, and a full simulation of the Debt Issuance Schedule.

2. THE GLOBAL LANDSCAPE

In this section, our aim is to provide a brief review of government debt globally, before and after the COVID-19 pandemic. We show that trends in the rise of public debt and decreasing interest rates preceded the pandemic. However, COVID-19 will exacerbate these two phenomena due to governments' fiscal needs to tide through the economic crisis brought about by the pandemic.

In response to the 2008–2009 Global Financial Crisis (GFC), governments around the world accumulated debt to support economies amid a low interest rate environment supported by accommodative monetary policy worldwide. Table 1.1 below shows the growth of public debt levels as a percentage of GDP in selected countries from 2007–2015. While public debt levels will fluctuate according to economic crises[1], the trend of increasing outstanding public debt in advanced economies since the GFC is one of considerable concern. Japan and the United States (US) have accumulated public debt levels in excess of their GDP while the

[1] Governments globally typically issue debt to finance primary budget deficits, when current revenues are not sufficient to cover current expenditures. In times of crises, governments practise countercyclical fiscal policy, and tax revenues are expected to fall and fiscal expenditures to rise leading to the greater issuance of public debt (Fatas et al., 2019).

United Kingdom's debt levels have increased by 47 percentage points since 2007. The variation in public debt levels according to countries also highlights the difficulty in assessing how much debt is sustainable. Clearly, as the data shows, every country is able to sustain different levels of debt due to various reasons including currency hegemony and investor sentiment towards sovereign debt (Jonasson et al., 2019).

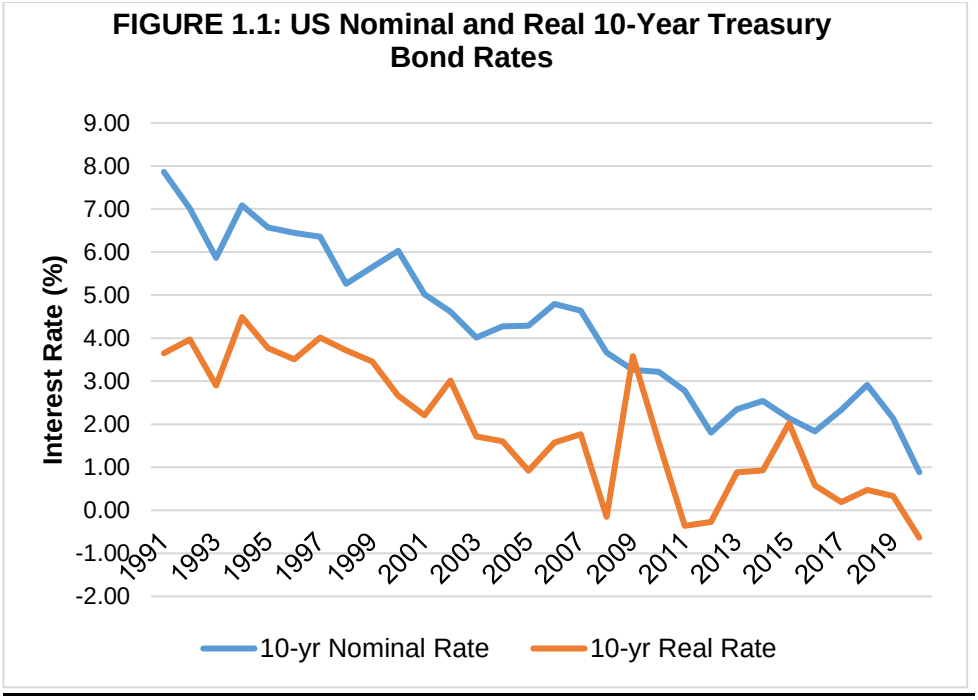
TABLE 1.1: Public Debt Levels as % of GDP (2007–2015)

DEBT (% of GDP)	2007	2008	2009	2010	2011	2012	2013	2014	2015	% CHANGE (2007-2015)
China, People's Republic of	29	27	33	33	33	34	37	40	43	14
Germany	64	65	72	81	78	80	77	74	71	7
Japan	183	192	210	216	232	238	244	249	248	65
United Kingdom	42	50	64	76	81	85	86	88	89	47
United States	64	73	86	95	99	103	105	105	105	41
G-20 Advanced	64	68	79	81	82	85	86	88	92	27
G-20 Emerging	35	35	38	38	38	38	40	42	46	11

Source: IMF Global Debt Database (2020a)

While the rise in public debt may seem concerning, fiscal costs of public debt ultimately depend on the interest rate at which debt is borrowed at. Figure 1.1 shows the decrease in US 10-year Treasury bond rates, nominal and real since 1990. While central banks reduced interest rates in response to the GFC, the figure shows that the downward trend in interest rates preceded the GFC. The figure also shows that real interest rates have been close to or below zero since 2007 (with the exception of 2009 when deflation occurred due to the crisis).

FIGURE 1.1: US Nominal and Real 10-Year Treasury Bond Rates



US Nominal and Real 10-year Treasury Constant Maturity Rate 1990–2020 (Annualised).
Source: FRED, Federal Reserve Bank of St. Louis (2020).

Various reasons have been offered for the steady decrease in interest rates. We briefly summarise some of these points below. Though these reasons are identified separately, they are not necessarily independent of each other and may have all contributed to the low interest rate environment:

- Monetary policy and financial repression (Borio et al., 2017; Reinhart & Kirkegaard, 2012)
- Income growth in emerging market economies leading to higher savings rates (International Monetary Fund, 2014).
- Demand for safe assets increased; increase in riskiness of equities relative to bonds (International Monetary Fund, 2014).
- Secular stagnation: Structurally high savings and low investment in advanced economies (Summers, 2016)

- Sharp and persistent decline in investment rates as a proportion of GDP in advanced economies, related to the decrease in relative price of investment goods to consumption goods (Thwaites, 2015)

The decrease in interest rates is clearly correlated to the rise in global debt levels as countries find it easier to sustain higher levels of public debt when the cost of borrowing is cheap. Both high public debt and low interest rates, however, are expected to continue and be sustained characteristics of advanced economies due to the COVID-19 pandemic. A major reason for this is that with interest rates already close to the zero lower bound, conventional monetary policy is restricted in its ability to boost aggregate output (Furman, 2016). Thus governments and central banks globally will rely on unconventional monetary policy tools such as quantitative easing (QE) and aggressive fiscal policy to mitigate the effects of the crisis. The International Monetary Fund expects global government debt to increase by 18.7 per cent as compared with 10.5 per cent during the GFC, while it projects fiscal deficits to increase to 10 per cent as compared with 4.9 per cent during the GFC (International Monetary Fund, 2020b).

Thus far, we have detailed the rise in global public debt as well as the decrease in interest rates. We now consider some of the concerns associated with these two economic phenomena:

- **High debt levels restrict governments' ability to pursue expansionary fiscal policy**. With debt levels at unprecedented levels, certain governments will find it difficult to pass through fiscal stimulus measures for countercyclical fiscal policies further affecting economic slowdowns (Fatas et al., 2019). This

can be witnessed in budget debates in the US where political parties are unable to reach consensus on fiscal packages (Pramuk, 2020).

- **Low interest rates penalise savers**. Savers who are not comfortable with bearing the risk of financial markets will face very low rates of return to their savings. This is sometimes referred to as financial repression. By forcing institutions to hold certain amount of government debt through capital control measures, governments can keep interest rates persistently low such that debt servicing costs are kept low but as a result savers are penalised (Reinhart & Kirkegaard, 2012).
- **Intergenerational tax burden transfers**. High levels of public debt are associated with transferring the tax burdens of today onto future generations and are thus a problem of intergenerational equity. In the US, before the pandemic, America Off Balance (2018) estimated that the current debt burden per person is US$50,000, but that a person born today will likely face a debt burden of US$134,000 when they are 30 years old. The intergenerational transfer will be a global concern as governments borrow more to finance economic stimulus in response to the COVID-19 pandemic. Younger generations face a higher tax burden due to current fiscal policy, and Collins (2020) anticipates that a generational argument over the best policies to reduce government debt in the long run is looming. The intergenerational concern of public debt is our chief concern in this paper and we will analyse the concern in further detail in the following sections.

This concludes the end of Section 2 where we sought to provide a brief summary of public debt globally before and after the COVID-19 pandemic. We showed that public debt is expected to continue growing and be a sustained characteristic of advanced

economies. The low interest rate environment is likewise expected to be sustained as central banks try to support economic growth out of the current pandemic. With the global public debt landscape established, we turn next to evaluate public debt in Singapore.

3. PUBLIC DEBT AND PUBLIC FINANCE IN SINGAPORE

In this section, we provide a brief summary of current public debt in Singapore and the stress that the COVID-19 pandemic will place on public finances. We first detail debt directly issued by the Government and then debt issued by statutory boards and other contingent liabilities faced by the Government. While the Government does not presently issue debt for budgetary reasons, we show that the COVID-19 pandemic will place a strain on public finances for future public spending needs.

3.1 Government-Issued Debt

At present, the Government issues three types of domestic debt securities directly, which are managed by the Monetary Authority of Singapore (MAS). Under the Government Securities Act (1992), the borrowing proceeds from the issuance of these securities cannot be used for government spending but instead are invested.[2] This is because Singapore operates on a balanced budget policy, and does not require borrowings to cover deficits (Ministry of Finance, 2019).

The three instruments issued by the Government have different specific purposes as outlined below:

[2] The proceeds from these debt instruments are invested into the sovereign wealth funds, GIC and Temasek (Ministry of Finance, 2019).

1) Singapore Government Securities (SGS)

SGS bonds are issued for the development of the domestic debt market. By issuing tradeable debt instruments, the Government helps to build a liquid bond market with a robust yield-curve for pricing of private debt securities. SGS bonds consist of short-term one-year Treasury Bills and longer-term SGS bonds with durations between two to 30 years. As of December 2020, outstanding SGS bonds amounts to S$136.3b and a further S$60b in Treasury Bills. The yield curve on these bonds is upward sloping with five-year yields at 0.52 per cent to 30-year yields at 1.17 per cent reflecting the low-risk associated with Singapore sovereign debt (Monetary Authority of Singapore, 2020).

2) Special Singapore Government Securities (SSGS)

SSGS bonds are non-tradeable and are only issued to the Central Provident Fund (CPF) board. Under the arrangements between the Government and the CPF board, surplus CPF funds are placed with the Government through MAS as the central bank for subscription of SSGS. These bonds meet the investment needs of the CPF by providing members with a safe rate of return on their funds, and are guaranteed by the Government. As of October 2020, outstanding SSGS bonds are estimated at S$456b.[3]

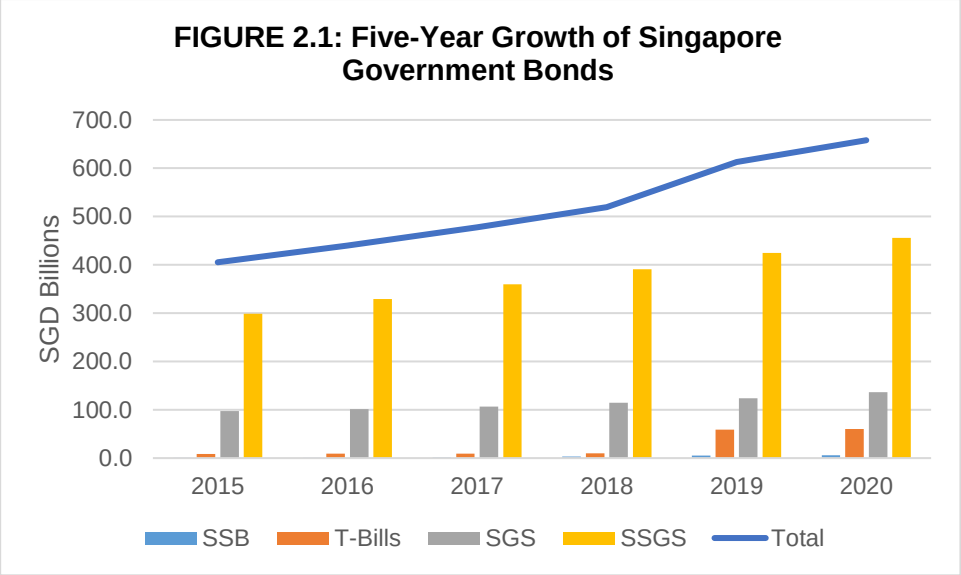
3) Singapore Savings Bonds (SSB)

The SSB was recently introduced in 2015 to provide a long-term savings options to individual investors. SSB bonds are non-tradeable, protecting investors from capital losses. Both the principal and interest payments on the bonds are guaranteed by the Government. As a retail bond option, investment amounts can range from as little as S$500 to a maximum individual holding of S$200,000. Individuals who invest in SSB

[3] Outstanding SSGS bond value estimated from amount due to CPF members (Singstat, 2020a).

bonds are able to redeem their bonds at any time with no penalty. However, to encourage long-term savings, SSB bonds pay coupons that increase over time so the effective coupon rates are higher the longer the bond is held. Outstanding SSB bonds as of October 2020 amounted to S$5.6b, with average interest rates between 1 to 2 per cent if held until maturity of 10 years.

The issuance of these three debt securities are governed by the Government Securities Act (GSA) and Local Treasury Bill Act (LTBA), which as specified do not allow proceeds from the bond issuances to be spent on public expenditure. Until January 2021, the net borrowing limits defined by the GSA and LTBA were S$690b for securities and S$60b for Treasury bills. Total domestic debt as of Q3 2020 stood at S$690b including advance deposits (Singstat, 2020d). In January 2021, the Government announced an increase in the issuance limits to S$960b for securities and S$105b in treasury bills. The increase in issuance limits is not to fund fiscal shortfalls but for the growth in CPF contributions and the continued need for domestic debt market development. In January 2021, 74 per cent of the increase was forecasted to be issued to the CPF, while 26 per cent was forecasted for SGS issuance (Heng, 2021). As Figure 2.1 shows, Government bond growth for the last five years has been steady and primarily reflects the two core needs of SSGS and SGS.



Five-Year Growth of Singapore Government Bonds. Note: SSGS estimated from amount due to CPF Members. Source: Singstat (2020a), Ministry of Finance (2019), Monetary Authority of Singapore (2020).

Even though Singapore's gross debt-to-GDP ratio is high at 132 per cent (International Monetary Fund, 2021), its net debt position is zero since all debt raised is backed by financial assets invested by the sovereign wealth funds. There are therefore no concerns with debt sustainability in Singapore. Owing to its prudent fiscal framework and political stability, Singapore sovereign debt is AAA-rated by the three main rating agencies (Standard & Poor's, Fitch, and Moody's) and was ranked first in Blackrock's Sovereign Risk Index (Ministry of Finance, 2019). Due to this strong credit rating, market demand for Singaporean sovereign debt continues to be strong, as reflected in the low yields offered by SGS as the only tradeable security. The Government has increased issuance of SGS bonds by 5 to 8 per cent in the last five years, but bid-to-cover ratios for SGS bonds and Treasury bills averaged 1.94 and 2.09 from FY2014 to FY2018 reflecting the demand for SGS securities (Ministry of Finance, 2019). The Government has also started issuing six-month Treasury bills in 2019 to meet the growing demand for short-term liquid SGD instruments, which

resulted in the growth of Treasury bills from S$10b to S$58b in 2019 (Ministry of Finance, 2019; Monetary Authority of Singapore, 2020).

3.2 Statutory Board Borrowing and Other Contingent Liabilities

The Singapore Government does not borrow or issue bonds for the purpose of government spending. This has been the case since 1995 when net public debt has been zero. Before this, Singapore had an external debt of S$937m in 1980 when the Government borrowed from the World Bank and Asian Development Bank for the development of Changi Airport and the first MRT lines (Lim, 2019). However, since the late 1990s, public statutory boards have issued bonds on financial markets to finance infrastructure projects. Current borrowing by the various statutory boards are listed below:

1) **Housing and Development Board (HDB):** S$24.4b (March 2020), for the development of housing estates
2) **Land Transport Authority (LTA):** $9b (March 2019), for the development of local transport infrastructure
3) **Public Utilities Board (PUB):** $1.4b (March 2018), for the development of water treatment facilities

According to the Ministry of Finance, such bonds are not guaranteed by the Government (Lim, 2019). Though they may not be explicit guarantees, these bonds continue to trade at low yields reflecting the low risk the market associates with this debt. For example, the HDB, rated Aaa by Moody's, issued a S$700m bond in 2019 at par value with 1.75 per cent coupon (Lam, 2019). We note that the risk of default

of any of these boards is highly unlikely but that even though there is no explicit guarantee, the Government will most likely have to intervene in the event of default.

Separate to statutory board debt, there are also other developments and investments that the Government provides a direct guarantee to and are therefore considered contingent liabilities. The development of Changi East will be financed through the Changi Airport Development fund, set up in 2015, which will secure loans that are guaranteed by the Government to lower borrowing costs. At present the fund has S$5b in funds however it is not clear what percentage of this is through loans (Kaur, 2018). The Government also provides guarantees to debt instruments issued by Clifford Capital, an infrastructure finance company backed by Temasek Holdings. This guarantee is placed with a view to improve the economic performance of Singaporean infrastructure companies. By securing a guarantee from the Government, Clifford is able to secure funds at attractive interest rates, which it then lends to fund qualifying Singaporean companies to further expand infrastructure and maritime projects both domestically and globally. So far, Clifford Capital has issued S$2b in short and medium term bonds (Clifford Capital, 2020).

Totalling the above, the sum of all statutory board lending and contingent liabilities amounts to about S$42b. We note, however, that this may not reflect the total amount of indirect government liabilities. The Government has indicated in Budgets 2018 and 2019 about the increasing use of debt financing for future infrastructure projects, both directly and indirectly. Future infrastructure projects that have been identified to be financed by debt include an integrated waste management facility (to

be built by the National Environmental Agency) and rail networks and infrastructure to be built by LTA.

3.3 COVID-19 and Singapore's Fiscal Response

Having established the public debt landscape in Singapore, we now briefly detail the strain the COVID-19 pandemic has placed on public finances. The need for further expansionary fiscal stimulus in the near future means that the Government needs to consider other funding options for public expenditures.

The current COVID-19 pandemic has caused one of the worst recessions in global history. To protect employment and the larger economy from the financial shock, the Government has released four different budgets outlined below:

1) Unity Budget (February 2020): S$5.6b
2) Resilience Budget (March 2020): S$48b
3) Solidarity Budget (April 2020): S$5.7b
4) Fortitude Budget (May 2020): S$33b

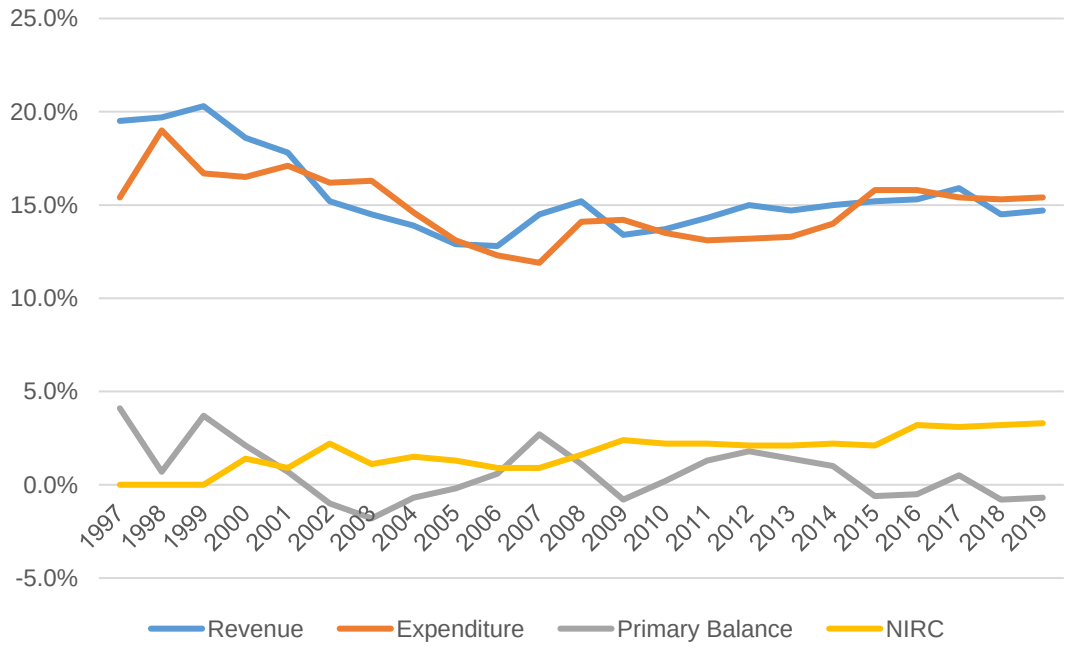
Altogether, the total fiscal package for COVID-19 economic support has been estimated at S$100b, or about 20 per cent of GDP. To fund these packages, the estimated draw on past reserves is S$52b. It also means that the accumulated surpluses earned over the last parliamentary term have been exhausted. According to an MAS study, the four budgets are estimated to help the economy avert an average output loss of 5 per cent or S$23.4b for 2020 and 2021 (Heng, 2020).

Despite these extraordinary fiscal stimulus measures, the pandemic is still expected to have substantial and enduring impacts on the real economy. AMRO (2020) predicts that while stimulus measures are expected to mitigate severe damages to capital and production capacity, the labour market will continue to suffer from the economic downturn. Governments need to step in not just to secure jobs but also to prepare workers for the digital transformation that lies ahead in coming years. It is also likely that more monetary policy measures will need to be undertaken for financial sector stability and company liquidity concerns (AMRO, 2020). We also note that there will also be a rise in healthcare and research expenditures to prepare for future pandemics and building greater stability in the Singaporean economy. For example, the Government has recently committed S$25b of research and development funding as part of RIE 2025, a 25 per cent increase in research funding compared with the last five-year term (Chuang, 2020). Outside of these labour and R&D expenditures, the Government will also need to continue to boost the economy through other fiscal stimulus measures across sectors. The overall outlay on public expenditure is therefore expected to increase over the next few years.

The economic crisis caused by COVID-19 will not just affect the public expenditures but also tax revenues, therefore increasing the strain on the Government's primary balance. Economists have predicted total tax collection to drop by 10 per cent in 2020, with the bulk of the loss coming from the loss of corporate income tax and GST revenues due to the economic crisis (Lim, 2020). The planned GST increase has also been placed on hold because it will not be feasible to increase consumption tax rates in the present weak economy. The delay in GST implementation is not without concern because Government's primary balance had already been under stress due to the increased social spending needs of an ageing population. As we show in

Figure 3, the primary balance has been close to zero since the early 2000s and was negative in 2018 and 2019. To balance the overall budget, Net Investment Returns Contribution (NIRC) was introduced in the year 2000 and has been steadily increasing as a percentage of GDP to its current value of 3 per cent. The increase in the contribution of NIRC to support the government revenues in the budget was constitutionally passed because of the recognition of spending needs owing to an ageing population (Chia, 2014; Shih, 2018). Thus, while the trend of a stressed primary balance preceded the pandemic, the crisis caused by the pandemic exacerbates the strain on Singapore's primary balance.

FIGURE 3: Government Fiscal Position as % of GDP (1997–2019)



Government Fiscal Position as % of GDP. Operating Revenue consists primarily of tax revenues; Expenditures are current and development expenditures; Primary Balance = Revenue – Expenditures; NIRC: Net Investment Returns Contribution. Source: data.gov.sg (n.d.)

As we showed in Section 2, the COVID-19 pandemic and the ensuing economic crisis have caused severe strains to governments' public finances worldwide. Despite previously running balanced budgets and having a strong fiscal position backed by sizeable reserves, Singapore's public finances will certainly be stressed as the Government aims to get the economy back on track in this new parliamentary term from 2021 to 2025. While our analysis in this section showed that the Government does not currently issue debt for budgetary reasons, we recognise that the Government needs to consider other funding options for public expenditures in light of the economic and public health crisis. In the next section, we begin to consider if and how the Government can start to issue public debt and remain fiscally responsible to future generations.

4. PUBLIC DEBT AND INTERGENERATIONAL EQUITY

In this section, we consider if the Government can issue and manage public debt while being fiscally responsible to future generations. To do this, we first consider Singapore's fiscal management from the perspective of intergenerational equity and infer the Government's current position on public debt to follow that of the benefit principle. We then consider the different types of public expenditures and how they may confer benefits to citizens across generations. Lastly, we provide our analysis of the ethical considerations of public debt and intergenerational equity. We suggest that the Government's position on public debt should not focus solely on intergenerational benefits; instead, the approach should be a holistically principled one that is supported by values of equality, reciprocity and welfare.

4.1 Fiscal Management in Singapore: An Intergenerational Equity Perspective

To begin our analysis on public debt and intergenerational equity in Singapore, we first recognise Singapore's long-term fiscal management of reserves. The Government has consistently run balanced budgets and further does not issue public debt for budgetary reasons. The primary reason for Singapore's prudent and disciplined approach towards fiscal management has been out of a responsibility for future generations.

IPS Working Papers No. 32 (Shih, 2018) sought to provide clarity to the discourse on fiscal management of Singapore's reserves. To do so, the paper proposed four principles of intergenerational equity relevant to Singapore's fiscal management of reserves. These principles offer different arguments of what a fair allocation of resources between generations would require. Our intention in listing these principles is not to suggest for any one principle in particular, but only to note the arguments offered by each with respect to intergenerational equity.

Principles of Intergenerational Equity

1) **Sufficientarian Principle**

   A sufficientarian principle states that each generation should maintain a minimum threshold of resources for future generations; a sufficient threshold after which present generations do not have further obligations to future generations. An example of a substantive sufficientarian principle is John Rawls' (1999, p. 255) "Just Savings Principle". The Just Savings Principle specifies that each generation's obligation to the next generation is only to preserve the institutions of justice for future generations, such that members

of future generations are guaranteed their basic liberties. After this threshold is met, current generations do not need to save anymore but instead should focus on achieving justice today (Campos, 2018). However, specifying a sufficient threshold as Rawls does is problematic, for it has been argued that any threshold chosen can be determined to be arbitrary (Meyer, 2020).

2) Intergenerational Equality

The principle of intergenerational equality instead suggests that intergenerational equity is not about ensuring each generation has enough, but rather that fairness is about minimising inequality *within* members of each present *and* future generation. A strict interpretation of this principle could find that any action by the current generation that results in unequal access to resources in future generations as unjust. A less strict interpretation could suggest that present generations have an obligation to prioritise actions that will benefit the worse off across generations (Campos, 2018). Since inequality is usually replicated across generations, reducing inequality in the present generation goes some way to reducing inequality in future generations (Shih, 2018). In summary, this principle is concerned with achieving equality in the distribution of resources within and across generations.

3) Reciprocity Principle

The principle of reciprocity states that fairness requires that each generation returns what they had received from previous generations to the future generation. Accordingly, this is a form of indirect reciprocity because each generation owes something to future generations and not to whom they had received it from. No generation should therefore deplete resources entirely;

rather, they should pass on what they have received. This principle has similarities with a Libertarian position since it bears resemblance to the Lockean proviso that “enough and as good is left for others” (Locke, 1988, Section II).

4) Benefit Principle

Lastly, the benefit principle is a relatively straightforward principle that states that each generation should pay for what it benefits from, and not pay for what it does not benefit from (a “benefiter-pays” principle). In its simple form, it maintains that future generations should not have to pay, through taxation, for social spending that benefits present generations. In the context of fiscal management, this would mean that current spending should be financed out of current taxes and capital spending should be financed over life of capital (Elmendorf & Mankiw, 1998). However, there are problems with the simple application of the benefit principle because it is generally accepted that future generations can benefit from current spending too (Thompson, 2003). More comprehensive applications of the benefit principle therefore recognise that benefits from both current and capital expenditures extend across generations.

In the context of Singapore’s long-term fiscal management, Shih (2018) argued that aspects of all four principles are in play in the political debate and practice on the use of Singapore’s fiscal reserves. For example, the rule to cap Net Investment Returns Contribution (NIRC) at 50 per cent for current expenditure appeals to a sufficientarian position of ensuring a minimum threshold of resources is available for future generation needs. Similarly, the “responsible steward” argument commonly promoted

in Singaporean politics hints at the role of the reciprocity principle. Shih (2018) argued that Singapore practises a more demanding form of the reciprocity principle because present generations are not being asked to merely transfer to future generations what they have received from past generations. Instead, the obligation demanded of current generations is to mimic the sacrifices of past generations to save and accumulate for future generations. Lastly, it was argued that though the benefit principle would seem to indicate that older Singaporeans have legitimate claim to the fiscal reserves owing to the fiscal surpluses earned in the past, this would ignore the role of the demographic dividend[4] in earning the surpluses. This demographic dividend cannot be said to have been earned by any one generation, and instead should be used to fund the reverse demographic dividend as Singapore's demographics shift towards an ageing population (Shih, 2018).

As we have noted earlier, the Government's position on public debt is that borrowing for expenditure will only be permitted for long-term infrastructure investments which have benefits across generations, while recurrent spending needs such as healthcare and education must be funded by recurrent revenue streams such as taxes (Ministry of Finance, 2020b). We therefore infer that the Government's position on public debt to follow the simple application of the benefit principle. Under the simple application, debt that is incurred through spending on healthcare, pharmaceutical subsidy and social safety provision for the current generation but which has to be paid for by the next generation of taxpayers violates the "benefiter-pays" principle (Thompson, 2003). However, as we have elaborated in the definition

[4] A demographic dividend comes about because of a significant increase in the working-age population, coupled with a significant decrease in fertility which produces a high ratio of workers to dependents (Turner, 2017). In Singapore, the effective labour force grew by 3.26 per cent annually from 1960–2000, while effective dependents grew by 2.49 per cent annually over the same period. The demographic dividend is estimated to have contributed between a third to 38 per cent of GDP per capita growth in Singapore between 1967 and 2004 (Bloom & Williamson, 1998; Gee et al., 2018; Shih, 2018).

of the benefit principle above, the simple application of the principle obscures the fact that some current expenditures can generate benefits across generations.

Our interest in this paper is to analyse and propose feasible recommendations to the issuance and management of public debt while maintaining intergenerational equity. Since we have inferred that the Government's position on public debt follows that of the benefit principle, a useful first step of our analysis is to evaluate the benefits of both capital and current expenditures and how they may extend across generations. By doing so, we aim to evaluate how forms of public expenditures may be financed by debt yet remain consistent to principles of intergenerational equity relevant to Singapore.

4.2 Public Expenditures and Benefits

For purposes of our analysis, we will classify three forms of expenditures: long-term infrastructure spending, current spending and development expenditures.[5] Further, in order to define benefits, we use welfare as a measure of benefit and assume that income is an acceptable measure of welfare (Murphy & Nagel, 2002, p.17). With these assumptions in place, the amount a generation benefits from a policy is the welfare (income) improvement to the generation before and after a specific policy. Though this assumption may seem problematic, it is useful for the purpose of analysis and the assumption will be relaxed at times to further develop our arguments.

[5] We define current expenditures as non-capital expenditures, development expenditures as capital expenditures, and infrastructural expenditures as large-scale public good investments.

Infrastructure Investments

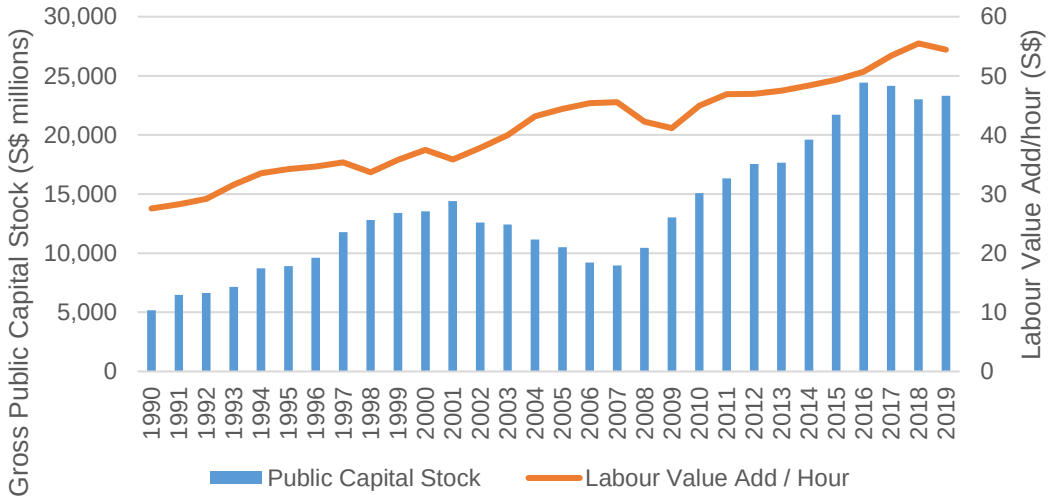
We begin by considering the benefits of long-term infrastructure investments. In economics literature, there are two arguments for infrastructure investments that can be classified as the macroeconomic and microeconomic arguments (Bourne, 2017).

The macroeconomic argument supports infrastructure investment because of its supposed effects as a fiscal multiplier; that every dollar spent on infrastructure increases GDP by more than a dollar (a fiscal multiplier greater than 1). Empirical results, however, do not always support the hypothesis that infrastructure has the desired multiplier effects of more than 1. In fact, in the long run, infrastructure investments may even have negative fiscal multipliers if investment funds are allocated to the wrong projects (Bourne, 2017). The macroeconomic argument for infrastructure investment is therefore not strong; there may be cases where infrastructure has less effective multiplier effects by crowding out private investment and therefore not resulting in the desired growth in GDP and welfare.

The microeconomic argument instead proposes that long-term infrastructure investment boosts productivity thus boosting long-run economic growth and welfare (Bourne, 2017). There is greater consensus on this argument for it is quite clear that improved infrastructure would improve labour productivity. An improved highway, for example, would increase labour productivity due to time and convenience factors. Figure 4.1 shows the long-run relationship between Singapore's gross capital stock and labour productivity. Of course, this does not indicate that public investment is the sole cause of improved labour productivity; improved education and other social conditions have also contributed to the growth in productivity. But Figure 4.1 does however suggest that there is a positive relationship between public investment and

labour productivity, and therefore infrastructure investment contributes to long-run economic growth and welfare across generations. The microeconomic argument is strengthened once we remove the income-as-welfare assumption and note that governments have a role to play in providing infrastructure that are public goods that achieve non-financial social goals. An example of such a public good that has intergenerational benefits is the development of infrastructure, which supports long-term sustainability of the natural environment and resources.

FIGURE 4.1: Long-Run Relationship Between Public Capital Stock and Labour Productivity



Gross Public Capital Stock and Labour Productivity. Source: Singstat (2020b; 2020c).

It is clear from our analysis that long-term infrastructure investments have intergenerational benefits for it improves long-run productivity, output and welfare.

Current Expenditures

Having considered the benefits for infrastructure, we now consider the benefits of current government expenditures. Unlike infrastructure investments, which typically are provided as a public good provided to all, current social spending is typically targeted at segments of population who are worse-off in some category (Murphy &

Nagel, 2002). There is a range of expenditures here to be considered. In Singapore alone, some examples are unemployment or employment benefit programmes such as Workfare, education support for lower-income families, healthcare, tax credits (e.g., GST vouchers), to name just a few. These forms of fiscal policy measures have direct impact on individuals' employment, productivity, well-being among other subjective indicators (Murphy & Nagel, 2002). Yet, these expenditures also provide benefits to the community of the current generation as a whole, because one person's greater well-being can improve the cohesiveness and congeniality of a community. The benefits to current generations from current fiscal expenditures are clear, given the above reasons.

In contrast, the benefit of current expenditures to future generations is not immediate or obvious. However, similar to our argument above about community benefits from fiscal policies, certain types of current expenditures such as education and healthcare can increase human, social and cultural capital.[6] These intangible forms of capital are later transferred to future generations and plays an integral role in future generations' well-being on an individual and societal level. Consider current educational spending in Singapore. Current spending on education will continue to develop a robust educational system that future generations will inherit, both directly as a result of their family's greater education but also indirectly in the general improvement of a country's educational level. This point about the educational system is critically important when we remember that future generations have to maintain or improve the social, political and legal institutions of justice that they

[6] Human capital is the stock of habits, knowledge, social and personality attributes embodied in the ability to perform labour so as to produce economic value. Social capital is the effective functioning of social groups through interpersonal relationships, a shared sense of identity, a shared understanding, shared norms, shared values, trust, cooperation, and reciprocity. Cultural capital is the accumulation of knowledge, behaviours, and skills that a person can tap into to demonstrate one's cultural competence and social status. (These definitions are from *Wikipedia*, retrieved January 21st, 2020.)

inherit. If educational investment is not continuous, then this will slowly lead to a degradation of the necessary human capital to maintain the necessary institutions for a well-functioning society.

Similar arguments can be made about healthcare expenditures and wage supports to lower-income families. The improvement to the health and productivity of current generations will be transferred to future generations both as a direct transfer from families and from the nation's stock of human and social capital. There is also a necessary transfer of cultural capital to future generations that needs to be similarly maintained for it provides Singapore with a national identity to foster greater cohesiveness. Therefore, our argument is that current expenditures do not just benefit current generations, but they grant benefits that extend to future generations too.

Development Expenditures

A third class of expenditures to consider is what is referred to as "development expenditures" in Singapore's annual budgets. Based on our definition of expenditures, development expenditures are capital investments that are not large-scale or long-term investments such as infrastructural investments. In the Singapore Budget, these expenditures are spread out across the different ministries depending on their use. For example, the development of Singapore Institute of Technology (SIT) is under the Ministry of Education's development expenditure budget while the development of a new emergency building in Singapore General Hospital (SGH) is under the Ministry of Health's budget.

If we consider the case of SIT and SGH above, clearly these are capital expenditures that have capital lives of 10 years or more. However, development expenditures would also include IT infrastructure improvements, among other types of capital equipment purchases. The capital lives of IT infrastructure and equipment are arguably less due to the nature of progress in the technology sector. Development expenditures are therefore similar to non-current assets with different capital lives in corporate accounting practice. In corporate practice, financing such assets are usually mixed by debt and equity. These assets are then expensed as depreciation according to its useful accounting life. A government, however, is not a corporate entity and must bear in mind intergenerational concerns in financing such expenditures and therefore the accounting measures of the government may not follow that of corporate practice.

Yet, given that these expenditures have long capital lives, they are likely to have benefits and welfare improvements that extend over generations too. An example to consider from Singapore is the development of a new building for the National Cancer Centre Singapore (NCCS), which had a total development expenditure of S$609m (Ministry of Finance, 2020a). Clearly, the investment in developing the facility is necessary for the improvement of patient care, research output and cancer awareness. These benefits will not be limited to current generations, because future generations can benefit from both from the direct and indirect benefits of the facility. Facilities such as the NCCS may exist and continue to operate for over 30 years therefore future generations may use the facilities directly. Research output generated at the NCCS will contribute to a scientific body of knowledge that extends

across generations. Further, like current expenditures, improvements in the health and care of current generations will be transferred to future generations.

Not all development expenditures will have similar benefits across generations. Investments in IT infrastructure may not be maintained for use by future generations, and so the benefit accorded to future generations from IT improvements are mainly indirect. Therefore, development expenditures do have benefits to future generations but the type of investments accord different benefits across generations. Investments with longer capital lives are likely to have greater direct benefits to future generations, but other investments may only have indirect benefits.

4.3 Analysis

- We considered three types of public expenditures and the benefits that they accord within and across generations. Our analysis shows that all forms of expenditure (infrastructural, current and development) have benefits that can extend across generations.
- However, different forms of expenditures have different intergenerational benefits. Long-term infrastructural expenditures such as airports can have direct benefits to future generations, as future generations will directly use the infrastructure. Current expenditures, on the other hand, can only have indirect benefits to future generations predominantly through a transfer of human, social and cultural capital.
- Development expenditures can have both direct and indirect benefits to future generations depending on the capital life of these expenditures and

investments. The development of SIT as a new institute of higher learning is likely to have a direct and indirect benefit on future generations, but the improvement of IT infrastructure will likely only have an indirect benefit to future generations. These examples further cement the argument that different expenditures have different intergenerational benefits.

- A simple application of the benefit principle would argue that infrastructural investments are the only investments to be financed by debt since its direct benefits extend across generations. In this manner, the simple application deems that future generations should not pay for expenditures that they do not directly benefit from (Thompson, 2003).
- A more comprehensive application of the benefit principle would recognise that all forms of expenditure can have benefits to future generations, be it direct or indirect benefits. This suggests that all forms of expenditures can be financed by debt, since all generations benefit from all expenditures.
- While this argument may apply to developing countries that require funding for overall macroeconomic growth and development, it may not necessarily apply to more developed countries. Advanced countries are at the frontier of human capital development and the marginal increase to human capital development from current public expenditures is likely to be less than in developing countries.
- If the benefit principle were to be applied solely, the principle only seems sound if the price to be paid by each generation for the benefit that they derive is a fair price (Thompson, 2003). However, it is too uncertain and difficult to determine a fair price across generations and across different types of expenditure. This exercise is further complicated when one recognises that

different generations have different preferences and therefore different marginal utilities of government expenditures.

- Therefore, we believe that relying on the benefit principle on its own as an approach to public debt issuance and financing is problematic. The exercise of accurately determining the benefit or welfare improvement to each generation is near impossible.
- As *IPS Working Papers No. 32* suggests, other principles of intergenerational equity are in play in Singapore's long-term fiscal management. These principles of reciprocity, equality and welfare should be considered in the Government's position on public debt.
- Therefore, we believe that the Government should adopt a holistically principled approach in analysing the fairness of debt financing for public expenditures. A holistically principled approach will pay attention to benefits, but is also supported by other forms of justice, such as equality, welfare and reciprocity.

Our argument is strengthened by recognising that Singapore's situation is unique as a city-state that has been extremely disciplined and prudent in its fiscal management to date. The Government needs to pay close attention to how it manages and spends funds raised from public debt issuance, to ensure that intergenerational equity is maintained. To elucidate by example, we consider a few cases. As we have highlighted earlier, past generations of older Singaporeans have saved and accumulated for future generation's welfare. Further, previous generations had never borrowed to fund current expenditures. If the Government were to now issue debt to finance consumption vouchers as a fiscal stimulus to the COVID-19 crisis, it would violate the principle of reciprocity because current generations would be acting

against the sacrifices of past generations. At the same time, however, if the Government issues debt to finance a programme in unemployment insurance, it could improve intergenerational equality. Children of unemployed parents have a greater chance of social mobility if their parents are supported by a government-provisioned unemployment insurance programme. These examples support the view that debt financing of public expenditures and its consequence on intergenerational equity in Singapore is not just a matter of which generation benefits, but necessarily must consider the implications of expenditures on reciprocity, equality and welfare.

Therefore, our argument in this section is that the Government needs to consider a holistic conception of intergenerational equity when determining the justice and fairness of debt financing for public expenditures. In particular, we believe that the intergenerational welfare argument as provided by economic theory and research should be given attention. We turn to this analysis in the next section.

5. ECONOMICS, PUBLIC DEBT AND INTERGENERATIONAL WELFARE

The previous section argued that the Government should adopt a holistically principled approach to public debt with consideration to intergenerational welfare. A utilitarian perspective to intergenerational welfare would argue for the greatest possible aggregation of welfare across generations (Dasgupta, 2020). Welfare considerations, as measured by individual or aggregate utility,[7] are ubiquitous in economic theory and research, and there has been significant theoretical and empirical research on the topic of public debt, intergenerational welfare and GDP

[7] Here on we will assume the standard assumptions for consumer utility in economics — that consumers maximise utility according to a convex set of preferences and are subject to an intertemporal budget constraint.

growth. In this section we present and analyse economic theory and research on government debt, paying attention to both the fiscal and welfare costs.

5.1 Conventional Economic Theory and Government Debt

Under conventional economic theory, as government debt rises, public savings decreases. This decrease in public savings is not reciprocated by an equivalent increase in private savings and therefore as a result, long-term capital accumulation decreases (see explanation in text box). This is commonly referred to as the “crowding out” effect of government debt; government debt “crowds out” private investment (Elmendorf & Mankiw, 1998).

Conventional Economic Theory of Government Debt (Elmendorf & Mankiw, 1998)

Assuming the Government is subject to an intertemporal budget constraint,*

Expenditure Measurement of GDP: $Y = C + G + I + NX$ (1)

Budget Constraint of Private Sector: $Y = C + S + T$ (2)

*Current Account and Capital Account: $NX = NFI$ (3) ***

Combining (1), (2) and (3):

$$C + G + I + NFI = C + S + T$$

$$I + NFI = S + (T - G)$$

$$\text{Total Investment} = \text{Total Savings}$$

Government issues debt to spend more or reduce taxes. As public savings (T - G) falls, theory predicts private savings (S) will not increase as much so capital stock (I + NFI) will decrease.

Where:
Y = GDP/Output
C = Consumption
S = Savings (private)
T= Taxes
G = Government Expenditure
NX = Net Exports
NFI = Net Foreign Investment
**The Government is subject to intertemporal budget constraint such that any tax cut or spending increase financed by debt in one period must be paid back at some future period by taxes.*

***Equation (3) states that net flow of goods into an economy has to equal the net flow of capital in the economy.*

Under conventional theory, the decrease in capital accumulation resulting from the issuance of public debt increases the marginal product of capital (MPK). As MPK increases, the demand for capital investment increases, thus raising the interest rate for future generations (Elmendorf & Mankiw, 1998). The negative welfare consequence for future generations is therefore the higher price of money (interest rates) faced by future generations. Reduced capital accumulation would also decrease long-term wealth and decreases labour productivity, thereby affecting the average real wage and total labour income (Elmendorf & Mankiw, 1998). Empirically, however, the “crowding out” effect predicted by theory does not occur as stated. This is because the microeconomic behaviour of economic agents (i.e., firms, consumers

and the government) differs from the predictions of theory. We demonstrate this by briefly detailing Japan's experience with rising public debt in the following case study.

Case Study: Government Debt, Interest Rates and Capital Accumulation in Japan

- *Japan has run deficits since its financial bubble burst in 1989.*
- *Government deficits have been financed by growing net savings; reducing consumption or investment.*
- *Japanese households have been net lenders to the economy (8% of GDP in 1980s; 3% in 2019)*
- *Corporate sector used to be net borrowers (4-8% until 1992). Net lenders since 1992 (11% in 2011, 5% in 2018).*
- *Mediocre average growth rate of 1% from 1990-2020.*
- *Interest rates did not rise as predicted by theory. However, capital accumulation did reduce and long-run GDP growth has been weak. Thus arguably increasing debt has had intergenerational costs.*

Source: Hung (2020)

Our interest in demonstrating the case of Japan is only to show that the complexity of the relationship between government debt and intergenerational welfare is not as straightforward as predicted by theory. In Japan's case, we note that interest rates have been kept low by both fiscal dominance and financial repression. Fiscal dominance is the Japan government's reliance on the Bank of Japan to keep interest rates low through monetary policy. Financial repression occurs because the government requires banks and pension funds to buy Japan Government Bonds as part of capital controls, keeping interest rates low due to the required demand from the institutions (Smith, 2015).

As Japan's case shows, the effect of government debt on intergenerational welfare is not a straightforward one and depends on a number of factors. In the rest of this section, we briefly summarise other strands of economic research that have investigated the relationship between government debt, GDP growth and intergenerational welfare, before providing our own analysis on the matter.

5.2 Fiscal Costs of Government Debt

One common argument in economics that supports rising government debt is the fiscal cost argument. This is the argument that debt is not a fiscal burden on future generations if interest rates are lower than growth rates because of the feasibility of debt rollovers. The feasibility of debt rollovers means that governments can continue to issue debt and still achieve decreasing debt-to-GDP ratios without having to raise taxes on future generations because the interest costs of debt are lower than growth rates of the economy (Wren-Lewis, 2020). Thus much of the debate among economists on debt and fiscal sustainability is on the relationship between interest rates (*r*) and growth rates (*g*); if *"r – g"* is negative, then the issuance of more debt is not seen to be problematic (see Appendix 8.1). Note that this argument does not address the welfare concern of reduced capital accumulation but is only concerned with the fiscal cost of debt.

A more extreme version of the fiscal cost argument is that suggested by Modern Monetary Theory (MMT). MMT states that governments can effectively borrow as much as required for spending and budget deficits, provided interest rates are favourable and sufficient demand for government securities exists. As we have stated, MMT is an extreme version of the fiscal cost argument, and has not been empirically proven to be free of negative consequences such as inflation.

5.3 Secular Stagnation and Expansionary Fiscal Policy

The second, and related, argument to the fiscal costs of debt is that at low interest rates, governments can actually improve future generations' welfare by borrowing to

finance expansionary fiscal policy and increase long-run GDP growth (Wren-Lewis, 2020). This follows the argument of Summers (2016) who has suggested that developed countries are in a state of secular stagnation where GDP growth levels have not recovered to levels before the Great Financial Crisis of 2008–2009 (GFC). A characteristic of this stagnation in growth is that real interest rates have been persistently low reflecting a high supply of savings and low demand for investment.

Summers' argument is that expansionary fiscal policy should be integrated with facilitative monetary policy to boost GDP growth rates. Empirically, Fatas and Summers (2017) have shown that fiscal consolidations in developed OECD countries after the 2008–2009 GFC have been self-defeating. Borrowing less may not only have lowered output growth, but it may also have increased debt-to-GDP ratios in the presence of hysteresis from the GFC.[8] This has led Summers to recently point out, "It is the irony of our moment that prudence requires the rejection of austerity" (Summers, 2019).

It should be noted as well that the secular stagnation argument is primarily concerned with the growth of long-run GDP and less with the intergenerational welfare concern of reduced capital accumulation. Summers (2016) does encourage borrowing for investment purposes, a point which we will return to later. However, the secular stagnation argument raises an important question to see if there is a relationship between rising government debt and GDP growth, which is explored further in Section 5.5.

[8] Hysteresis here refers to the phenomenon that the GFC has had a persistent negative effect on long-run GDP growth (Fatas & Summers, 2016).

5.4 Blanchard (2019): Public Debt and Low Interest Rates

Blanchard (2019) has presented one of the most recent and important research papers in contribution to the concern of public debt and intergeneration welfare. Unlike the fiscal cost and secular stagnation arguments, Blanchard considers both the fiscal cost and welfare costs of government debt. The *fiscal* cost, he argues, is low or negligible since risk-free interest rates (borrowing rates of advanced economies) have historically been lower than corresponding growth rates of economies. Governments of advanced economies can rollover debt by issuing more debt to pay off existing debt and achieve decreasing debt-to-GDP rates without ever having to raise taxes.

The *welfare* cost instead acknowledges that increasing government debt will reduce capital accumulation, as we have highlighted earlier under the theoretical calculations of aggregate savings, capital and output. However, Blanchard points out that government debt has two effects on welfare through the reduction of capital accumulation: the first is the welfare effect *given* prices of labour and capital. In each period people will make consumption and investment decisions based on current prices. The second effect on welfare is *through* the changes in prices of labour and capital; the welfare effect of the changes in prices (wages and interest rates) faced by consumers, driven by previous consumption and investment decisions. Blanchard's argument is that it is the risk-free interest rate that determines welfare of the first effect, and the marginal product of capital (the risky rate of return on capital)

that determines intergenerational welfare of the second effect.[9] The intuition in his argument is clear: both the risk-free and risky rates of return to capital matter for intergenerational welfare because they both reflect the return from investing and accumulating capital, only differing in the risk associated with investing in capital.

Blanchard's calculations show that intergenerational welfare costs are determined by the relationship of safe interest rates, growth rates of the economy and by the rate of return on capital. The central argument of his paper is that the intergenerational welfare costs of government debt are low if safe rates are far below growth rates, and growth rates not much lower than the marginal product of capital. Again the intuition is simple, government debt reduces capital accumulation, but reduced capital accumulation is only bad for intergenerational welfare if the returns to capital investment are high. Empirically, in the US, Blanchard shows that safe rates have historically been below growth rates. The marginal product of capital (MPK) has also been higher than growth rates of the economies thus making the welfare impact of government debt ambiguous. However, Blanchard believes that the MPK may have been overestimated and thus he believes that both the fiscal and welfare costs of government debt have been low, or lower than commonly thought (Blanchard, 2019).

5.5 Government Debt: The Good and the Bad

As we have shown so far, the debate on whether government debt is good or bad for economies has yet to reach any theoretical consensus. Fatas et al. (2019) present an

[9] Blanchard's (2019) argument are based on formal mathematical calculations of utility and welfare, which are omitted here. There are further assumptions, for the calculation of welfare, made on the elasticity of substitution between labour and capital that have been omitted.

empirical review of why governments borrow, and try to determine when borrowing can be good or bad for economies.

The authors consider both tax smoothing and countercyclical fiscal policy to be good reasons to borrow. Countries should accumulate debt to finance large and lumpy expenditures to smoothen tax burdens. Countercyclical fiscal policy should also be used as an economic stabilisation feature since monetary policy is not likely to be able to always boost aggregate demand. Public debt can therefore be good if it used to finance productive investments. However, debt accumulation during recessions should also be followed by debt reductions in good times. Governments should also issue debt to develop domestic debt markets and to provide markets with a safe asset as Singapore does (Fatas et al., 2019).

Bad reasons to borrow include political budget cycles and intergenerational transfers. Politicians who want to stay in power are tempted to pursue expansionary fiscal policy both in good times and bad times. Voters who do not understand the intertemporal nature of fiscal policy will be tempted to vote for politicians who cut taxes or increase expenditures. Similarly, governments, or voters, who are not concerned with future generations will be suspect to accumulate debt and leave tax burdens on future generations. In this vein, Yared (2018) shows a positive cross-country correlation between the growth rate of public debt and ageing of a population. The implied reasoning is that countries with aging populations will want to borrow more to spend for the increased needs of the older generations.

Regardless of the good or bad reasons to borrow, high levels of government debt can have adverse effects on the economy. They may limit the ability of governments to run countercyclical fiscal policy, reduce private sector investment (crowding-out), tighten credit constraints, create the expectation of future tax increases, or increase uncertainty in an economy. Empirically, Fatas et al. find a negative relationship between government debt and GDP growth; high levels of Debt-to-GDP are correlated with low GDP growth. However, they acknowledge that high debt probably does not cause low GDP growth; both variables may simply reflect a weak macroeconomic framework (Fatas et al., 2019). This is the “endogeneity conundrum” coined by Reinhart et al. (2009) who indicate that debt and GDP growth are not exogenous from one another. While it may be difficult to find a clear causal link from high public debt to low GDP growth, Fatas et al. believe that some countries may be paying the price in terms of lower growth and greater output volatility because of excessive debt accumulation.

5.6 Analysis

In summary:

- Conventional economic theory predicts that increasing government debt reduces capital accumulation and increases interest rates thus negatively affecting intergenerational welfare. While theory does not corroborate exactly in real life, the case of Japan shows that increasing debt has reduced aggregate capital accumulation.
- The fiscal cost and secular stagnation argument both do not find government debt problematic in low interest rate environments. The general arguments

are that at low interest rates, governments can borrow to increase growth rates of economies beyond their fiscal costs.

- Blanchard's (2019) argument instead recognises the intergenerational welfare costs of increasing government debt. Capital accumulation is reduced as a result of increasing debt, but what matters for intergenerational welfare is how productive, or how valuable this reduced capital accumulation is.
- Fatas et al. (2019) do not find a clear causal link between debt accumulation and lower GDP growth but they do believe that high levels of government debt are having adverse effects on economies, either through lower growth or greater output volatility.
- The economic considerations thus far are concerned with government debt in general and have not paid specific attention to the type of expenditure government debt is raised for. Fatas et al. (2019) as well as Summers (2016) have encouraged that the funds raised by debt be used in productive investments that would boost GDP growth.
- Blanchard (2019) suggests that if public debt is used for investments in public goods, then the relevant consideration for welfare is the risk-adjusted *social* rate of return on public investment to the risk-adjusted rate of return on private investment. Intuitively, this holds because government debt crowds out private investment. Debt for public investment should only be raised if the social return on public investment overcomes its opportunity cost: the return on private investment.
- All of these economic arguments are fundamentally utilitarian in reasoning. As with any ethical argument, utilitarian principles are not free of concerns. With respect to intergenerational welfare, the chief concern is for the requirement of the social planner (i.e., the government) to assign a generational discount

rate weighing how much to factor each generation's welfare in its aggregation to maximise welfare.

- The choice of discount rate raises ethical and practical concerns. From an ethical perspective, the choice of discount rate could be deemed to be politically driven by different generations. As a practical concern for Singapore, if a strict discount rate in favour of future generations is in place, governments may not be able to tap into financial reserves in times of severe crises.
- Rawls (1999) has also suggested that a utilitarian doctrine may direct us to demand heavy sacrifices of poorer generations for sake of later generations if the returns to capital are sufficiently high. Lastly, the utilitarian arguments we have detailed do not consider the fairness of the distribution of income growth, which separately may also affect intergenerational welfare.
- However, the arguments in economic theory and research deserve attention and provide a quantitative standard to interpret the intergenerational welfare costs of public debt with. In this regard, Blanchard's (2019) analysis seems to be the most comprehensive argument since he considers both the fiscal and welfare costs of government debt.
- The key takeaway from economic research is that the intergenerational welfare costs of public debt cannot be determined more generally but rather depend on interest rates, growth rates of economies, the marginal product of capital, and importantly what expenditures the debt is used to invest in.

The economic considerations presented in this section play an important role in our larger question of public debt and intergenerational equity. This is because of an

asymmetry of power relations between present and future generations. Present generations can affect future generations by their choices and decisions, while future generations are not able to do the same to past generations (Meyer, 2020). It is therefore important that present generations follow effective economic policies to not *unfairly* affect the welfare of future generations. In the context of fiscal management, this could mean that governments are permitted and perhaps even encouraged to borrow if debt financing will boost long-term welfare and GDP growth. This is not to be opportunistic, but rather to be prudent in recognising the welfare obligations to both present and future generations as a form of intergenerational equity.

Nevertheless, even if economic conditions are favourable for debt issuance and financing of expenditures, governments should adopt fiscal rules to ensure debt does not accumulate in economies and result in negative consequences. We turn to the analysis of fiscal rules associated with public debt as well as a suggested Debt Issuance Framework for Singapore's public debt issuance and management.

6. DEBT ISSUANCE AND MANAGEMENT

Our argument so far has been that the Government should adopt a holistically principled approach towards public debt and intergenerational equity. This means that the Government need not restrict itself to how expenditures have benefits that extend across generations but should also pay attention to intergenerational welfare, equality and reciprocity. The economic analysis showed that government debt's welfare costs depend on economic parameters and what debt is used to invest in.

Our suggestion is that the Government can issue and manage public debt and remain fiscally responsible to future generations, if it adopts a disciplined approach to public debt that accounts for the ethical and economic analyses we have considered. In this section, we first consider the risks associated with public debt portfolios. We then analyse common fiscal rules in place to control government-issued debt. We then propose a Debt Issuance Framework that outlines how the Government can issue, spend and repay public debt in a manner that is equitable across generations.

6.1 Public Debt Management: Objectives and Risks

As noted by the International Monetary Fund, the main objective of public debt management is to ensure the government's financing needs and its payment obligations are met at the lowest possible cost over the medium to long run, consistent with a prudent degree of risk (Jonasson et al., 2019). According to this objective, managing cost and risk involves a trade-off. This is because transactions that appear to lower debt servicing costs often embody significant risks for the government and can limit its capacity to repay lenders (Jonasson et al., 2019). A useful first step for our analysis therefore is to identify the risks inherent in a portfolio of public debt.

Key Risks:

1) **Valuation Risks**: Debt portfolios will at any time be valued differently based on market determinants (e.g., supply, demand, inflation).
2) **Interest Rate Risks**: Affects debt management primarily through increases in debt servicing.

3) **Currency Risk**: Currency risks are mitigated by borrowing in own currency but relative exchange rates may still affect returns to foreign creditors and so factor into the investment attractiveness of the debt instrument.
4) **Investor Base Risk**: The composition of holders of public debt matters for foreign capital flows. If a large proportion of debt is held by foreigners, the portfolio of debt issued is inherently more suspect to sudden capital flights which would then lead to an increase in borrowing costs for governments. This risk is explored further in detail with its connection with debt ceilings in Appendix 8.2.
5) **Maturity Risk**: The longer the maturity profile, the lower the financial burden on governments to repay their debt.

Given the inherent risks involved in the issuance of public debt, governments typically implement robust debt management protocols, management teams and a complementary set of fiscal rules for the management of public debt. As we have noted earlier, government-issued debt in Singapore is managed by MAS.

6.2 Fiscal Rules for Government Debt

Broadly, the function of fiscal rules are to impose constraints on fiscal policy through numerical limits on budgetary aggregates (Schaechter et al., 2012). Rules aim at correcting distorted incentives and pressures to overspend so as to ensure fiscal responsibility and debt sustainability. By imposing constraints, fiscal rules can also serve roles in economic stabilisation and intergenerational equity (Schaechter et al., 2012). In Singapore, the most dominant fiscal rule is the Balanced Budget Rule (BBR) that states that the Government operates on a balanced budget over each term of Government, typically a five-year cycle (Ministry of Finance, 2019). However,

as Singapore has not previously issued debt for budget purposes, there are no formal fiscal rules pertaining to debt in Singapore.

We will first consider general fiscal rules that are commonly used for the issuance and management of public debt. Our analysis will consider how these rules can mitigate the key risks we have identified in Section 6.1 for the purpose of public debt issuance and management in Singapore. Thus for our purposes, consideration must be given to the relative strengths of Singapore's fiscal and monetary position.

1) **Borrowing Currency rule**

   A borrowing currency rule would state a fixed list of currencies that governments can borrow in. The key risk for governments to mitigate is the volatility of relative exchange rate risks. It is generally thought to be safer when borrowing in one's own currency for the simple reason that governments can manage the money supply to meet its financing needs. In Singapore, we recognise that monetary policy for managing economic growth and price stability is controlled by the MAS's management of Singapore's currency against a basket of currencies, the Singapore Dollar Nominal Effective Exchange Rate (S$NEER) (Monetary Authority of Singapore, n.d.). Since the MAS manages the domestic currency and adjusts it according to the country's economic needs, it is relatively safer for the Government to borrow in Singapore dollars.

   Such a borrowing currency rule would also mitigate Investor Base risks as domestic investors are more likely to invest in local-currency denominated

securities. Although the Government has the capability to issue US dollar-denominated debt, which would be more attractive to foreign investors, the Singapore dollar is a valued currency reflected by the strength of the exchange rate and strong local institutional demand for Singapore dollar securities. Having an investor base that values the debt instruments limits the risk of capital flights in market fluctuations. Our recommendation therefore is that the Government should only borrow in Singapore dollars as this limits both exchange rate and investor base risks.

2) Interest Rate Rule

The general consideration is whether governments should issue fixed versus floating rate debt securities. To mitigate interest rate risk, fixed rates ensure that governments are not susceptible to market fluctuations in borrowing rates. In this context, it is useful to recall that the nominal interest rate is expected to remain low for the medium-term at the very least, while real interest rates (adjusted for inflation) have been very low for over 20 years (Thwaites, 2015). In Singapore's case, we note that given the country's strong credit rating, the Government can effectively issue fixed coupon bonds at a low interest rate for the duration of the bond and still be an attractive option to institutional investors.

3) Maturity Rule

As indicated earlier, shorter-term debt increases the fiscal burden on governments to repay debt. Typically, however, governments rollover these fiscal burdens by issuing more debt. The risk involved is that as a government continues to rollover and refinance bonds, the market may view the debt

issued as inherently more risky and investors may require a higher return on the risk (Blanchard, 2019).

As with the other risks, Singapore's fiscal strength ensures that the Government can issue longer-dated securities and remain an attractive investment option for investors looking to decrease risk in their investment portfolios. We note that 30-year SGS bonds issued by MAS from 2018 to 2020 have had bid-to-cover ratios ranging from 1.99 to 2.85 reflecting the demand for these securities (Monetary Authority of Singapore, 2020).

4) Debt-to-GDP Rules

The most common fiscal rule implemented in countries is to place a ceiling on the amount of debt the entire economy can sustain. Typically, this means that governments set a target percentage of the total debt owed relative to the economy's GDP. For example, South Korea held a long-term rule of public debt not exceeding 40 per cent of GDP (Lee, 2020).

The strength of this fiscal rule is its direct link to debt sustainability (see Appendix 8.1), and its convenience in communicating and monitoring (Schaechter et al., 2012). However, the disadvantage of the debt-to-GDP rule is that it can be procyclical and therefore fail to incorporate features of economic stabilisation (Schaechter et al., 2012). In economic upswings, governments are able to borrow more if the debt ceiling has not been met. Conversely, if economies are already at their borrowing limits, they will not be able to borrow more to pursue countercyclical fiscal policy. In the case of

South Korea, borrowing limits had to be raised from 40 per cent to 60 per cent to fund the Government's response to the COVID-19 pandemic (Lee, 2020).

A broader concern with debt ceilings is that it is not clear what level of debt each country is able to sustain. In Appendix 8.2 we consider how countries more resilient to capital flights and debt runs are able to sustain higher levels of debt. However, given the uncertainty in determining an appropriate debt ceiling, it is not clear why fiscal planners would want to confine themselves to such a fiscal rule.

We have outlined several fiscal rules commonly in place to manage public debt risks. We have further suggested that the debt-to-GDP rule, despite being a simple tool to monitor and track, is not an adequate fiscal rule for the equitable management of public debt. Most pertinently however, the above fiscal rules do not factor in conditions on how debt should be serviced and repaid. We believe that a key part of an intergenerational equitable solution to raising public debt is ensuring debt servicing and repayment follows a disciplined approach. This explains the reasoning for our Debt Issuance Framework which we detail in the next section.

6.3 Debt Issuance Framework

In a seminal paper on the aims of fiscal policy, Elmendorf and Furman (2008) argue that fiscal policy should be "timely, targeted and temporary" (p.19). Our suggestion also is that an equitable solution to public debt should be targeted and paid back. In this final sub-section, we suggest a Debt Issuance Framework that outlines how debt should be issued, spent and paid back.

6.3.1 Issuance

- We propose that the Government makes its maiden debt issuance to finance expenditure. For the purposes of this analysis, we assume that S$20b in debt is issued per annum over the next term of Parliament from 2021 to 2025.
- The immediacy of the need to issue debt in 2021 is so the Government can continue to invest in the country's development despite the severe economic setback of the COVID-19 pandemic and the strain the pandemic will have on public finances as we highlighted in Section 3.
- The S$20b sum is roughly equivalent to projected development expenditures in the 2020 annual budget. Further information on development expenditure is given in Section 6.3.2 on expenditure.
- Debt should be issued under SGS securities but the issuance should be marked as different to current SGS/SSGS/SSB issuance. This is because this issuance will be earmarked for development expenditures and thus not invested in the sovereign wealth funds as previous issuances have. However, there is no need to create a new debt instrument for SGS bonds are already well established in the market.
- Correspondingly, there should be a budgetary disclosure of the borrowing as well as a disclosure of the Use of the Borrowing. The need for public communication and understanding is required as the Government shifts away from its previous stance on public debt.
- As discussed earlier, bonds issued should be 30-year fixed-coupon Singapore dollar-denominated bonds for which there is strong demand in the market. A 30-year bond duration or similar suitably lengthy maturities will also

allow for greater tax smoothing of the debt servicing as we will discuss in repayment in Section 6.3.3.

6.3.2 Expenditure

- Funds raised by this SGS debt issuance should be spent exclusively on budgeted development expenditure.
- Development expenditures are capital investments into public goods and infrastructure and typically have capital lives of 10 years or more. As we have highlighted earlier in Section 4, certain development expenditures can have direct benefits to both current and future generations. Development expenditures that do not have long capital lives also have indirect benefits to future generations.
- Development expenditures that have been approved and budgeted are also assumed to have positive social rates of returns. This point is key, for as Blanchard (2019) notes, debt raised for public investment should overcome the hurdle rate, which is the return on private investment.
- Development expenditures are therefore intergenerationally equitable expenditures to raise debt for. They have direct and indirect intergenerational benefits and can be advantageous for intergenerational welfare if it overcomes the opportunity cost of private investment. Reduced private capital accumulation, the main intergenerational welfare cost of government debt, is not a concern if public investments funded by government debt achieves a higher social rate of return than private investment (Blanchard, 2019).
- Examples of recent development expenditures include the National Cancer Centre Singapore (with overall project cost of S$609m), Singapore Institute of Technology (S$427m) and the Deep Tunnel Sewerage System (S$610m).

- There is also a growing need for funding for climate change protection and mitigation measures, all of which will fall under development expenditures and thus would be able to be funded by newly issued debt.

6.3.3 Repayment

- We specify a repayment of debt issued for development expenditures for 2021–2025.
- Repayment is a key part of an equitable solution to public debt because it maintains control over intergenerational equity. By preventing debt rollovers (issuing more debt to pay off existing debt), fiscal discipline is instilled into debt issuance ensuring future generations are not burdened with insurmountable levels of public debt.
- Debt should be repaid according to a priority framework of repayment that follows the below:

1) User Fees & Surpluses

To the extent that development expenditures result in the development of facilities that generate revenues through user fees, user fees must first be used to meet operational budgetary concerns of the respective developments. Surpluses from operational budgets can then be used for debt servicing and repayment.

To elucidate by example, if government-issued debt is used to develop the National Cancer Centre Singapore (NCCS), user fees generated by NCCS should first be used for the operational sustainability. Where surpluses are earned, these can then be used to contribute to the servicing and repayment of debt raised for the development of NCCS.

User fees and surpluses should be the primary source of repayment for intergenerational equity purposes, for it allows those who directly benefit from the developments to fund the main costs of development. However, the obvious concern here is the practical difficulty of achieving sustainable profits that are sufficient for both operations and debt servicing.

2) Tax Smoothing

As we expect operational surpluses from user fees to be limited for the servicing of debt raised, we suggest tax revenues to be the next source of funds for debt repayment.

Barro (1979) shows that it is optimal for a government to borrow to finance extraordinary expenditures such that taxes are smoothened over time instead of heavy distortionary taxes. Given that the economic cost of tax distortions are undesirable, a smoothing of marginal tax rates over time will generally minimise the deadweight cost of taxation (Barro, 1979; Auerbach, 2009).

Therefore, our suggestion is that Government should forecast debt servicing and amortisations schedules and smoothen the tax burden for the servicing and amortisation of debt over time. This is an exercise in prudent financial and economic forecasting but has important applications over equity and efficiency on taxpayers and economic growth.

3) Amortisation

In relation to our point on debt rollovers, we suggest that a fiscal rule be set in place such that debt is amortised evenly over the duration of the development's useful life. This is similar to approaches used in corporate amortisation and depreciation. The amortisation rule will ensure fair and equitable management of public debt raised and ensure that taxes used to repay debt are not distortionary but rather smoothened over time. Further, as we have emphasised, by preventing debt rollovers, amortisation ensures that tax burdens of debt servicing are not passed on to future generations.

6.3.4: Debt Repayment Schedule

- We now detail how the suggested Debt Issuance Framework will work in practice, and what the respective financial burdens are across generations.
- Suppose the Government issues S$20b per annum for 2021–2025, bonds issued are 30-year bonds at 1.875 per cent, and GDP growth of the economy is forecast at 2 per cent per year.

TABLE 6.1: FY 2021-2025 Development Expenditures SGS Issuance

BOND ISSUANCE		2020 GDP (S$m)	$ 482,187	GDP GROWTH RATE		2%
SGS BOND ISSUANCE		FY2021-2025 DEVELOPMENT EXPENDITURES				
ISSUANCE START DATE		2021	2022	2023	2024	2025
DEVELOPMENT PERIOD	Years	10	10	10	10	10
FUNDS RAISED	SGD Mn	20,000	20,000	20,000	20,000	20,000
CUMULATIVE DEBT RAISED	SGD Mn	20,000	40,000	60,000	80,000	100,000
Tenor (years)	30					
COUPON P.A.	1.875%					
MATURITY	Years	30	30	30	30	30

- Outstanding debt due rises from year 2021 to 2025 reaching a peak of S$90b in 2025 before decreasing until 2055 when debt is fully repaid. Debt servicing

and amortisation using tax revenues begins from the first period, 2021. As a percentage of GDP, the debt issued reaches a maximum of 17 per cent of GDP in 2025 but slowly decreases after. However, this debt is raised for investments and not current expenditures.

FIGURE 6.1: Outstanding Debt Due

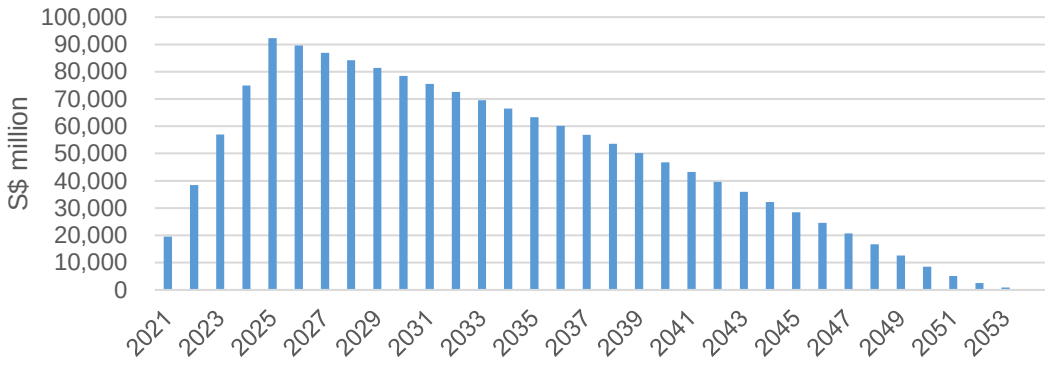
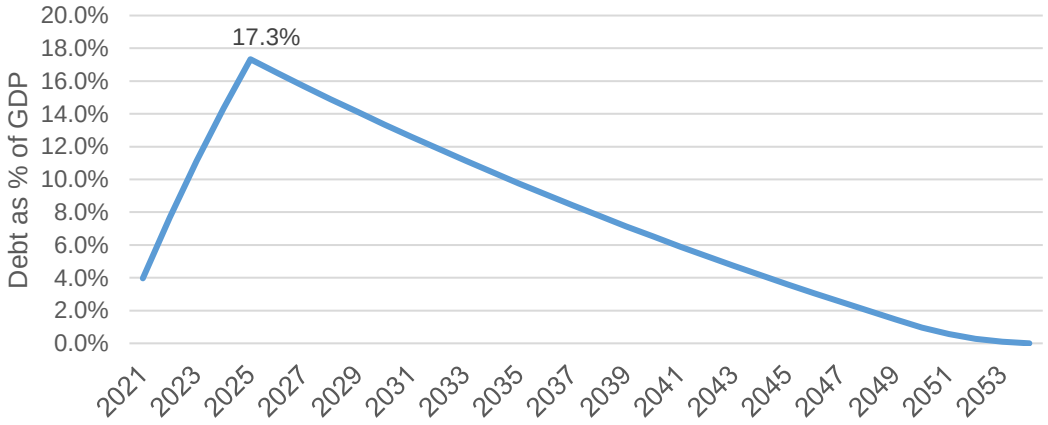


FIGURE 6.2: "Investment Debt" to GDP ratio



- Debt is amortised and serviced from year 1. Total debt servicing reaches a peak of S$4.4b in 2025, but slowly decreases after this. In relative terms, the debt servicing at its peak is 0.8 per cent of GDP or about 5 per cent of total Government expenditure in 2019, but slowly declines over time. The kinks

reflect the rise in debt from 2021 to 2025 and corresponding decline in 2050 to 2054 when debt is repaid.

FIGURE 6.3: Debt Service Ratio / GDP

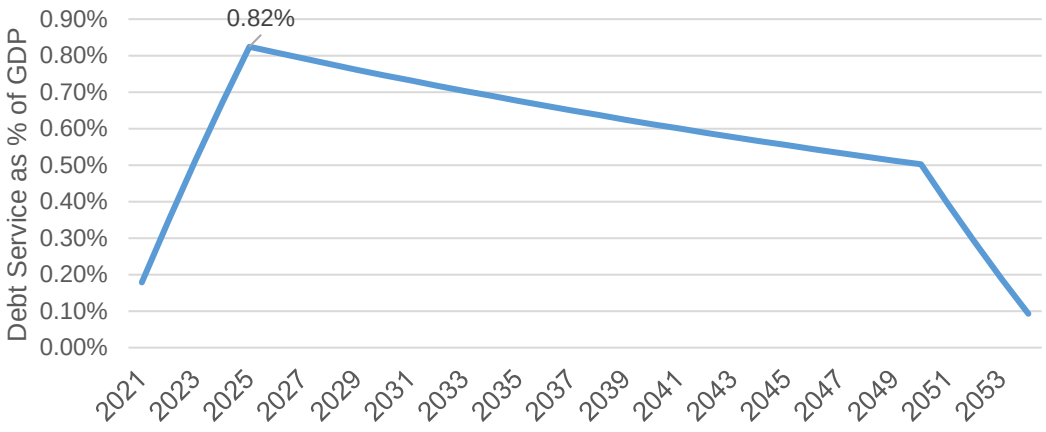
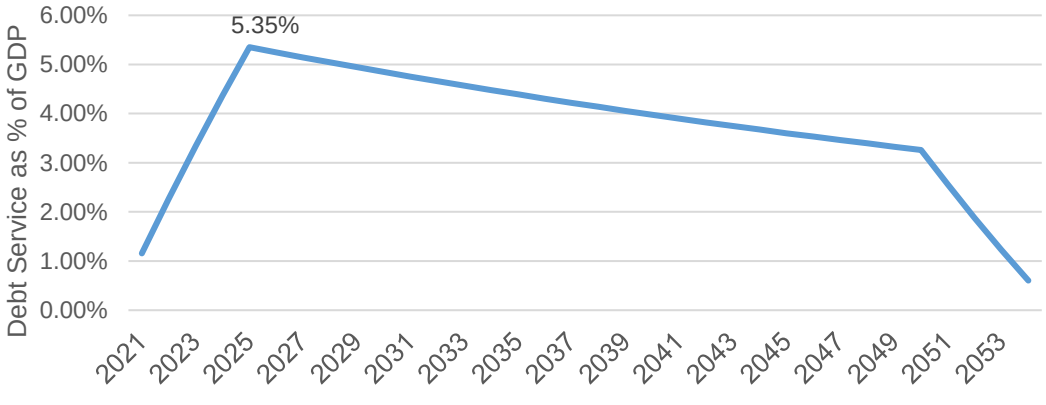
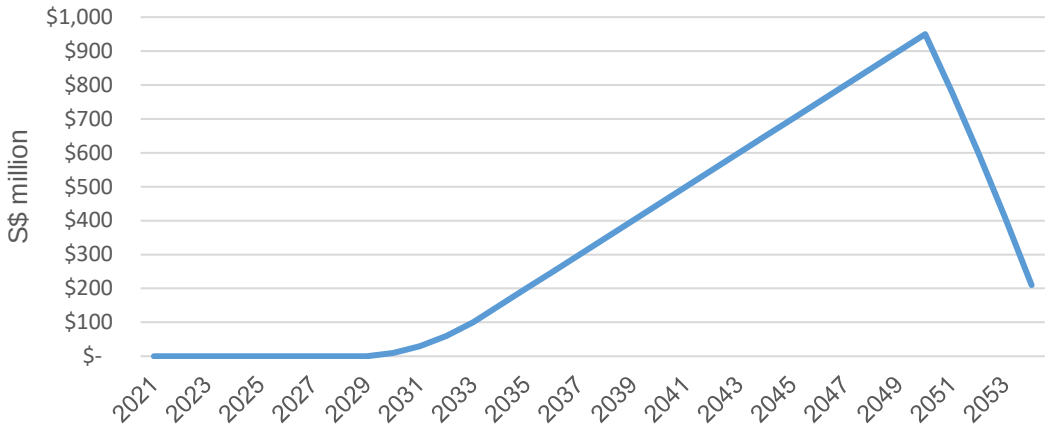


FIGURE 6.4: Debt Service as % of Government Total Expenditure (2019)



- User fees begin to contribute to debt servicing after 10-year development periods. User fee contributions are assumed to grow 0.05 per cent per year, growing from S$100m in 2033 to S$950m in 2050. User fees decline from year 2050 onwards as the assumed development assets reach the end of their useful lives (this may be a conservative assumption for some assets).

FIGURE 6.5: User Fees Contribution



- The bulk of the debt repayment (amortisation and interest servicing) is paid for by tax revenues. The tax burden increases from 2021 to 2025 as debt issued increases. Tax burden reaches a peak of S$4.4b in 2025 but then is smoothened through 2050 and slowly decreases to S$3.5b over this period. The maximum tax burden in 2025 is less than 1 per cent of GDP. Assuming the Government maintains a marginal tax and transfer rate of 15 per cent of GDP (see Figure 3, Section 3.3), this is equivalent to 6 per cent of Government tax revenues.

Figure 6.6: Tax Burden Over Time

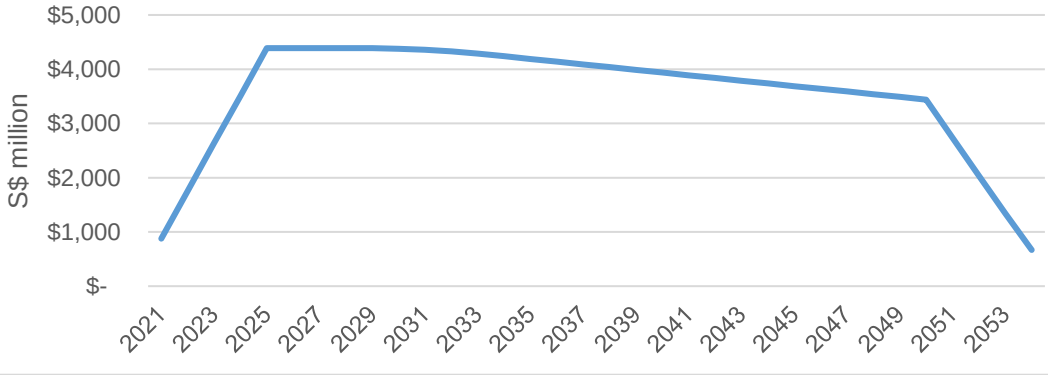
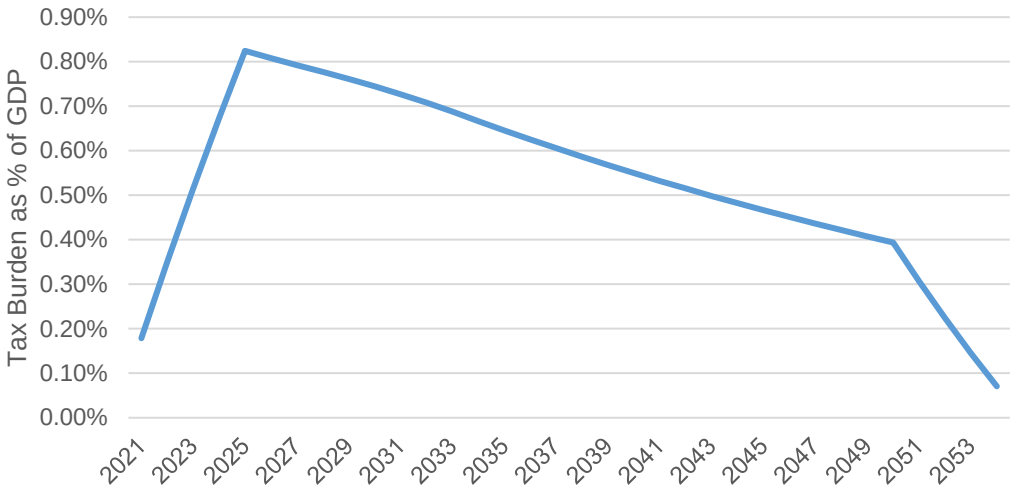


FIGURE 6.7: Tax Burden as % of GDP



- Under our assumptions, the tax burden to finance debt servicing is comparatively smaller than requiring development expenditures to be financed by current tax revenues. Where the tax burden in our simulation is between S$3.5b to S$4.5b per annum, funding development expenditures with current tax revenues would amount to S$20b per annum. This gives the Government additional fiscal space to continue to invest and pursue expansionary policy for the country.

The Debt Issuance Framework we have suggested and simulated in this section shows one way the Government can begin to issue debt to create fiscal space but still maintain intergenerational equity among taxpayers in Singapore. Debt issued is raised exclusively for development expenditures, and debt servicing and amortisation uses a combination of user fees and taxes. This ensures that those that directly benefit from the developments contribute to the debt repayment. Further, by smoothening the tax burden over time, the Government can ensure that younger generations also contribute to the development of these investments as these

projects typically have long capital lives. Smoothening the tax burden also ensures taxes are not distortionary to markets, and in our example debt repayment only requires a maximum of 6 per cent of Government tax revenues.

We believe that the Debt Issuance Framework we have outlined is complementary to Singapore's other fiscal rules. While it allows for development expenditures to be funded by debt, it also ensures the debt is paid back over duration of the bond. For this reason, we believe the Debt Issuance Framework is superior to debt-to-GDP ratios as a fiscal rule that the Government can adopt for the financing of development expenditures. Noting Singapore's unique position as an advanced economy which has maintained a highly disciplined and prudent approach towards fiscal management to date, the Debt Issuance Framework ensures that Singapore's long-term fiscal management is not harmed by the issuance of debt.

Our suggested framework is only one way the Government can begin to issue and manage debt for expenditures and remain fair to all generations. However, through the example we have shown in this paper, we hope to convey that Singapore's position on public debt and indeed its overall Fiscal Management should be amenable to a holistic approach towards intergenerational equity, one that incorporates values of equality, welfare, reciprocity and benefits.

7. CONCLUSION

To conclude, we summarise our main findings for this paper before considering further points of research interest from this paper.

Our central concern in this paper is to determine how the Government can issue and manage debt in a manner that is equitable across generations. In Section 2, we briefly detailed the global public debt landscape. We showed that public debt levels in advanced economies had increased to worrying levels in response to the 2008–2009 GFC. The rise in debt is correlated to a low interest rate environment, but the trend of decreasing interest rates is a long-term trend that reflects a high supply of savings and low demand for investment in advanced economies. We then showed that both high global debt levels and low interest rates are expected to be sustained characteristics of advanced economies given the fiscal response of advanced economies to the severe economic crisis caused by COVID-19.

In Section 3, we then detailed the public debt landscape in Singapore. We showed that Singapore has a high gross debt-to-GDP ratio but that all of the funds from debt raised by the Government have been invested into the sovereign wealth funds, and form part of Singapore's reserves. We also showed that various statutory boards borrow to fund various capital and infrastructural investments and that the Government had already acknowledged the need to incorporate more debt financing for public expenditures before the COVID-19 pandemic. We then showed that the economic crisis caused by COVID-19 has placed a significant strain on public finances in Singapore by increasing the need for expansionary fiscal policy and reducing tax revenue collections. Our finding is that due to the strain on public finances, the Government may need to issue debt for certain public expenditures.

In Section 4, we located the Government's position on public debt within principles of intergenerational equity specified in *IPS Working Papers No. 32*. We inferred that the

Government's position on public debt followed that of the benefit principle. However, we argue that the benefit principle seems to suggest that all forms of expenditure could be financed by debt since all forms of expenditure can have benefits (direct or indirect) that extend across generations. Further, the exercise of determining the benefit to each generation from expenditures is problematic. Our argument therefore is that the Government should adopt a more holistically principled approach to public debt that include benefits, but is supported by other conceptions of justice relevant to Singapore such as equality, welfare and reciprocity. The reasoning for our argument is that Singapore's unique position as an advanced economy with a strong fiscal position requires that the Government pay attention to more than just a benefiter-pays philosophy.

In Section 5, we considered economic theory and research on public debt and intergenerational welfare. Conventional theory holds that government debt crowds out private investment leading to an increase in interest rates. Theory, however, does not realise as predicted in real life due to the innumerable variables of economic agents in the market. Blanchard (2019) presents a thorough and comprehensive research paper that accounts for both the fiscal and welfare costs of government debt. Both fiscal and intergenerational welfare costs of government debt are low if the risk-free and risky returns to capital accumulation are low. If debt is used for public investment, then what matters for intergenerational welfare is the rate of return on public investment versus the return on private investment. Similarly, Fatas et al. (2019) argue that public debt can be good if used to finance productive investment. Theory and research therefore seem to concur that debt can be good for economies when used to finance investments that produce positive social returns that outweigh the opportunity cost of crowded out private investment.

The economic and ethical considerations of our analysis lead us to suggest a Debt Issuance Framework in Section 6 that outlines how debt can be issued, spent and paid back equitably across generations. The Debt Issuance Framework specifies that debt raised should be spent exclusively on development expenditures that are capital expenditures with positive social rates of return. We suggest the use of a combination of user fees and taxes to service and amortise debt raised to fund these expenditures. This is an equitable solution across generations because development expenditures have benefits that extend across generations and can be intergenerational welfare improving, assuming they have positive social rates of returns. Further, by incorporating user fees, we ensure that those who directly benefit from the developments contribute to the development. Smoothening the tax burden of debt servicing and amortization for these developments over bond durations ensures that debt does not accumulate and that younger generations pay their fair share of the tax burden.

The suggested Debt Issuance Framework is meant as a tool to explain how Singapore can issue and manage public debt equitably. The framework is suggested for use in 2021 due to the severe economic crisis caused by COVID-19. However, the framework need not be restricted in its use to only the near-term concerns of Government. The framework shows how fiscal management and intergenerational equity in Singapore can be managed flexibly, adopting a holistically principled approach that incorporates values unique to Singapore such as reciprocity, equality, welfare and benefits. Future research into Singapore's long-term management of fiscal reserves can use a similar holistically principled approach to consider other

debatable aspects of fiscal management, including the further use of Net Investment Returns Contribution (NIRC) to public expenditures.

8. APPENDIX

8.1 Debt Sustainability

Debt sustainability is measured according to how an economy can manage its debt repayment and financing needs. Thus what matter are the interest rates, growth rates, and the primary surplus of economies.

Debt Sustainability Dynamics (Den Haan, 2020)

D = nominal government debt
Y = nominal GDP
S = nominal primary surplus (revenues less expenses before interest payments)
r = nominal interest rates
g = nominal growth rate of GDP

Tomorrow's debt equals today's debt times interest minus the primary surplus

$D_{t+1} = (1 + r) D_t – S_{t+1}$

Divide through by Y_{t+1} (tomorrow's GDP)

$$(D_{t+1} / Y_{t+1}) = (1+r) (D_t / Y_{t+1}) – (S_{t+1} / Y_{t+1})$$
$$= (1+r) [D_t / Y_t] [Y_t / Y_{t+1}] – (S_{t+1} / Y_{t+1})$$
$$= [(1+r)/(1+g)] D_t / Y_t - (S_{t+1} / Y_{t+1})$$

In real terms, with $d_t = D_t/Y_t$ and $s_t = S_t/Y_t$

$$d_{t+1} = (1+r-g) d_t – s_{t+1}$$

To see how debt dynamics work with interest rates, growth rates and primary surplus, consider:

Case I: Interest rates (r) > growth rates (g)

- $s < 0$ in every period => debt level explodes
- $s = 0$ in every period => debt level explodes
- $s < (r-g)d_t$ in every period => debt level still explodes, surplus is too small.
- $s = (r-g)d_t$ in every period => debt level is constant
- $s > (r-g)d_t$ in every period => debt level becomes smaller

Case II: *r < g*

- $s \geq 0$ in every period => debt level decreases
- $s < 0$ but $s > -(g-r)d_t$ => debt level decreases, even with a deficit you can have stable debt levels

• $s < -(g-r)d_t$ in every period => debt increases but stabilises. Interest rates could then increase leading to higher costs of debt servicing.

Source: Den Haan (2020)

8.2: Case Study: Debt-To-GDP Ratios And Investor Base Risks (Jonasson et al., 2019)

Emerging market debt can be vulnerable to market volatility when investors suddenly stop buying or start selling their holdings. However, recent experience, especially with the European debt crisis following the GFC, shows that advanced economies can be suspect to investor outflows as well. At the same time, some advanced countries have seen their debt levels grow but still see low borrowing costs.

Arslanap and Tsuda (2014) developed a risk index that focuses on stability of investor demand, called the Investor Base risk index. The index measures sovereign risk based on the composition of investor base and how investors change holdings of the sovereign debt. Countries with a high share of domestic investors, such as domestic banks and central banks, and foreign central banks, will receive lower scores indicating lower risk. High scores are given to sovereigns whose debts are held by foreign private investors and are more liable to capital flights.

A stylised framework of the index is presented below and examples of countries that fall into each quadrant are provided based on their index scores at the end of 2009, at the height of the GFC.

		Demand Side Risk Indicator	
		Low	**High**
Supply Side Risk Indicator	**High**	**Quadrant I** **High Debt But Resilient to a Run** Examples: Japan USA UK Germany	**Quadrant II** **High Debt and Prone to a Run** Examples: Greece Italy Portugal Spain
	Low	**Quadrant III** **Low Debt and Resilient to Run** Examples: Korea Australia Denmark	**Quadrant IV** **Low Debt but Prone to a Run** Examples: New Zealand Netherlands Finland

Source: Arslanap & Tsuda (2012); Jonasson et al. (2019). Countries are listed at their risk index levels at end of 2009.

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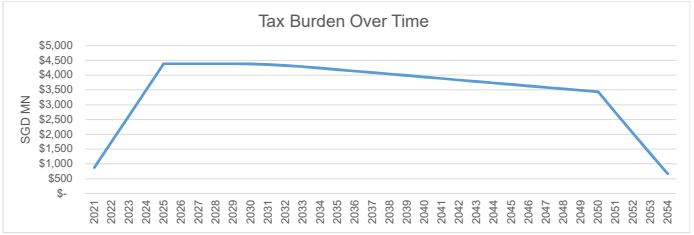
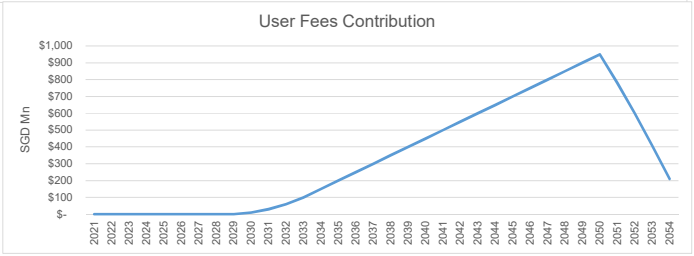
APPENDIX 8.3: DEBT ISSUANCE SCHEDULE

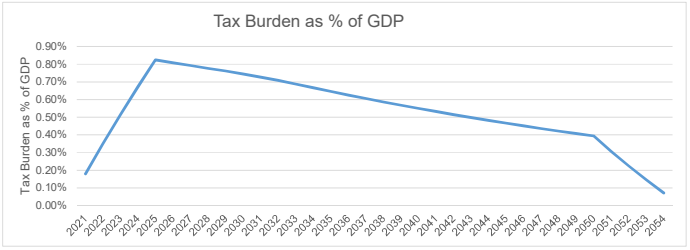
Time Period			1	2	3	4	5	6	7	8	9	10	11	12	13	14
BOND ISSUANCE		**2020 GDP (S$m)**	$ 482,187	**GDP GROWTH RATE**			2%									
SGS BOND ISSUANCE		**FY2021-2025 DEVELOPMENT EXPENDITURES**														
ISSUANCE START DATE		**2021**	**2022**	**2023**	**2024**	**2025**										
DEVELOPMENT PERIOD	Years	10	10	10	10	10										
FUNDS RAISED	SGD Mn	20,000	20,000	20,000	20,000	20,000										
CUMULATIVE DEBT RAISED	SGD Mn	20,000	40,000	60,000	80,000	100,000										
Tenor (years)	30															
COUPON P.A.	1.875%															
MATURITY	Years	30	30	30	30	30										
USER FEE CONTRIBUTIONS																
YEAR		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
USER FEE GROWTH (AFTER	0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.05%	0.05%	0.05%	0.05%	
REPAYMENT																
AMORTIZATION	SGD Mn	$ (503)	$ (1,015)	$ (1,537)	$ (2,068)	$ (2,610)	$ (2,659)	$ (2,708)	$ (2,759)	$ (2,811)	$ (2,864)	$ (2,917)	$ (2,972)	$ (3,028)	$ (3,085)	
INTEREST SERVICING	SGD Mn	$ (375)	$ (741)	$ (1,097)	$ (1,443)	$ (1,779)	$ (1,730)	$ (1,680)	$ (1,629)	$ (1,578)	$ (1,525)	$ (1,471)	$ (1,417)	$ (1,361)	$ (1,304)	
DEBT SERVICING	SGD Mn	$ (878)	$ (1,755)	$ (2,633)	$ (3,511)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	
REVENUES																
USER FEES	SGD Mn	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10	$ 30	$ 60	$ 100	$ 150	
TAXES		$ 878	$ 1,755	$ 2,633	$ 3,511	$ 4,389	$ 4,389	$ 4,389	$ 4,389	$ 4,389	$ 4,379	$ 4,359	$ 4,329	$ 4,289	$ 4,239	
OUTSTANDING DEBT																
OUTSTANDING DEBT DUE		19,497	38,482	56,946	74,878	92,268	89,609	86,901	84,142	81,331	78,467	75,550	72,578	69,550	66,465	

STATISTICS

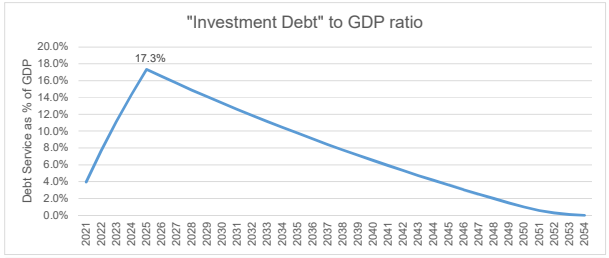
GDP S$m (2019)	$ 507,565															
GDP S$m (2020)	$ 482,187															
GDP FORECAST	2%	$ 491,830	$ 501,667	$ 511,700	$ 521,934	$ 532,373	$ 543,021	$ 553,881	$ 564,959	$ 576,258	$ 587,783	$ 599,539	$ 611,529	$ 623,760	$ 636,235	
INTEREST SERVICE RATIO	% GDP	0.08%	0.15%	0.21%	0.28%	0.33%	0.32%	0.30%	0.29%	0.27%	0.26%	0.25%	0.23%	0.22%	0.20%	
DEBT SERVICE RATIO	**% GDP**	**0.18%**	**0.35%**	**0.51%**	**0.67%**	**0.82%**	**0.81%**	**0.79%**	**0.78%**	**0.76%**	**0.75%**	**0.73%**	**0.72%**	**0.70%**	**0.69%**	
Tax Burden to GDP ratio		0.18%	0.35%	0.51%	0.67%	0.82%	0.81%	0.79%	0.78%	0.76%	0.74%	0.73%	0.71%	0.69%	0.67%	
Investment Debt to GDP ratio		4.0%	7.7%	11.1%	14.3%	17.3%	16.5%	15.7%	14.9%	14.1%	13.3%	12.6%	11.9%	11.2%	10.4%	
Debt service as a percentage of Government Expen		1.16%	2.27%	3.34%	4.37%	5.35%	5.25%	5.14%	5.04%	4.94%	4.85%	4.75%	4.66%	4.57%	4.48%	
Government Total Expenditure	78,180															
Government Total Expenditure	15.4%															

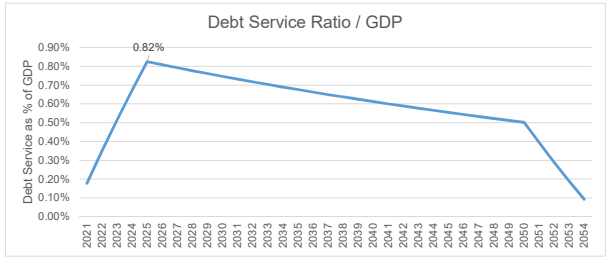


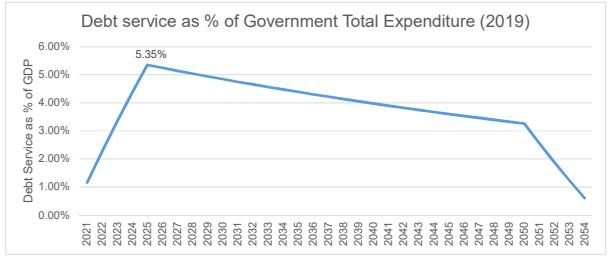




	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%
	$ (3,142)	$ (3,201)	$ (3,261)	$ (3,322)	$ (3,385)	$ (3,448)	$ (3,513)	$ (3,579)	$ (3,646)	$ (3,714)	$ (3,784)	$ (3,855)	$ (3,927)	$ (4,001)	$ (4,076)	$ (4,152)	$ (3,352)	$ (2,537)	$ (1,707)	$ (862)
	$ (1,246)	$ (1,187)	$ (1,127)	$ (1,066)	$ (1,004)	$ (940)	$ (876)	$ (810)	$ (743)	$ (674)	$ (605)	$ (534)	$ (462)	$ (388)	$ (313)	$ (236)	$ (159)	$ (96)	$ (48)	$ (16)
	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (4,389)	$ (3,511)	$ (2,633)	$ (1,755)	$ (878)
	$ 200	$ 250	$ 300	$ 350	$ 400	$ 450	$ 500	$ 550	$ 600	$ 650	$ 700	$ 750	$ 800	$ 850	$ 900	$ 950	$ 780	$ 600	$ 410	$ 210
	$ 4,189	$ 4,139	$ 4,089	$ 4,039	$ 3,989	$ 3,939	$ 3,889	$ 3,839	$ 3,789	$ 3,739	$ 3,689	$ 3,639	$ 3,589	$ 3,539	$ 3,489	$ 3,439	$ 2,731	$ 2,033	$ 1,345	$ 668
	63,323	60,122	56,860	53,538	50,153	46,705	43,192	39,613	35,967	32,253	28,469	24,614	20,687	16,686	12,611	8,459	5,106	2,569	862	0
	$ 648,960	$ 661,939	$ 675,178	$ 688,681	$ 702,455	$ 716,504	$ 730,834	$ 745,451	$ 760,360	$ 775,567	$ 791,078	$ 806,900	$ 823,038	$ 839,499	$ 856,289	$ 873,415	$ 890,883	$ 908,701	$ 926,875	$ 945,412
	0.19%	0.18%	0.17%	0.15%	0.14%	0.13%	0.12%	0.11%	0.10%	0.09%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%	0.02%	0.01%	0.01%	0.00%
	0.68%	**0.66%**	**0.65%**	**0.64%**	**0.62%**	**0.61%**	**0.60%**	**0.59%**	**0.58%**	**0.57%**	**0.55%**	**0.54%**	**0.53%**	**0.52%**	**0.51%**	**0.50%**	**0.39%**	**0.29%**	**0.19%**	**0.09%**
	0.65%	0.63%	0.61%	0.59%	0.57%	0.55%	0.53%	0.51%	0.50%	0.48%	0.47%	0.45%	0.44%	0.42%	0.41%	0.39%	0.31%	0.22%	0.15%	0.07%
	9.8%	9.1%	8.4%	7.8%	7.1%	6.5%	5.9%	5.3%	4.7%	4.2%	3.6%	3.1%	2.5%	2.0%	1.5%	1.0%	0.6%	0.3%	0.1%	0.0%
	4.39%	4.30%	4.22%	4.14%	4.06%	3.98%	3.90%	3.82%	3.75%	3.67%	3.60%	3.53%	3.46%	3.39%	3.33%	3.26%	2.56%	1.88%	1.23%	0.60%







The risk index is useful because it provides a framework to understand why some countries are able to maintain higher levels of debt without running into financial crises. For example, the US and Japan have been able to maintain high levels of debt because of high demand for their securities. Japan's demand has been driven by domestic institutional investors while the US' demand is established by its perception as a safe haven asset. Further, countries with high levels of private foreign investors such as those in Quadrant II are more susceptible to debt crises as was the case at the end of 2009 (Jonasson et al., 2019). Jonasson et al. (2019) note that this index was developed in hindsight, and while markets did view each sovereign's debt in 2009 according to this framework, it may not always hold true in the future.

We expect Singapore, on a net debt basis, to be in Quadrant III if the Government decides to start issuing debt for budgetary reasons. This is because of the attractiveness of Singapore sovereign debt and its current composition of investors are primarily domestic institutional investors.

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