Israel’s Fiscal Prospects in the Post-Covid Era

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Abstract

We reassess the fiscal position of the Israeli government and argue that Israel faces two challenges. The first is the need to make fiscal adjustments if interest rates on government debt rise modestly or, as forecast by the Bank of Israel and the Ministry of Finance, the GDP growth rate falls below its pre-Covid levels. The second challenge stems from tail events that impact interest rates and GDP growth rates. One source of concern is the geopolitical risk that Israel will always face. A different and novel concern is that the U.S. may be on a fiscally unsustainable path. To buy partial insurance against these tail events, Israel needs to return to its pre-Covid policy of lengthening the average maturity of government debt.

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1 Introduction

Now is a good time to reassess the fiscal position of the Israeli government. As in most other industrialized countries, government debt rose dramatically in the wake of the Covid crisis. But the real interest rate on Israeli government debt, $r$, remains very low by historical standards. Indeed, $r$ is now lower than the GDP growth rate, $g$. If we knew that $r$ would remain lower than $g$, a government could, in principle, plan on running a perpetual deficit while the debt-to-GDP ratio declined over time.

Two questions naturally arise. First, given reasonable forecasts for $r$ and $g$, is Israel’s fiscal situation sustainable given pre-Covid government deficits? Second, how sensitive is Israel’s fiscal position to rare events that affect the interest rate on government debt and the GDP growth rate?

We argue that if the post-Covid values of $r$ and $g$ are similar to their pre-Covid values, then Israel’s public debt-to-GDP ratio will be stable. But this conclusion is sensitive to the precise value of $r$ and $g$ that we assume. For example, suppose the economy’s growth rate is equal to the long-run forecast of the Bank of Israel or the even lower Ministry of Finance forecast. In that case, post-Covid deficits must be smaller than pre-Covid deficits for the debt-to-GDP ratio to be stable. This sensitivity means that the government must remain ever vigilant with respect to its fiscal situation. Like a gardener tending a healthy fiscal garden, the government needs to be alert for weeds lest they take over.

Rare events are a more serious concern. Storms do happen and can wreak havoc on gardens. Israel is particularly exposed to geopolitical storms. A classic example is the second Intifada which was associated with a prolonged increase in the spread between $r$ and $g$. One cannot preclude the possibility that similar or even more dramatic geopolitical events will occur in the future. A very different tail event emanates from the fiscal behavior of the U.S. There is a serious possibility that the U.S. is on a fiscally unsustainable path. A crisis associated with such a path would lead to a worldwide increase in interest rates and a decline in output growth rates. Our calculations indicate that these rare events would dramatically affect Israel’s fiscal situation requiring substantial and painful adjustments.

Israeli policymakers must consider the tail events as they plan for the future. That does not mean the government should forgo socially beneficial investments with high rates of return. It does mean that policymakers shouldn’t succumb to the Siren-like call of low-interest rates. Instead, they should examine the point at which debt levels expose Israel to undesirable exposure to tail risks.

The fiscal authorities can’t affect geopolitical risk or the behavior of the U.S. govern-
ment. But they can buy some insurance against tail events by substantially increasing the average maturity of government debt. Unfortunately, the Covid crisis moved the government in the opposite direction. The average maturity of consolidated government debt declined by roughly 0.6 of a year because of quantitative easing. The corresponding average maturity of NIS-issued debt fell by about a year. Now that the Covid crisis is over, the fiscal authorities should move back to and beyond the pre-Covid average maturity level of publicly-held government debt.

2 Background

Government debt has risen to historically high levels in all major industrialized countries. Figure 2.1 shows that in the U.S., the ratio of federal net government debt to GDP rose from roughly 30% in the early 1980s to about 100% by the end of 2021. In Israel, that ratio fell from an extraordinary level of 250% to approximately 65% over the same time period.

![Figure 2.1: Government Debt as a Percent of GDP](image)

Even as government debt levels have risen, there has been a secular decline in nominal and real interest rates. Moreover, that decline is manifest across virtually all industrialized countries and for both private and public sector debt at all points along the yield curve.

Figure 2.2 displays quarterly, annualized, benchmark 10-year Israeli and U.S. government bond yields from the mid-1990s to the end of 2021. Despite some twists and turns, U.S. nominal interest rates steadily declined, falling from roughly 7% to about 1.5%. The Israeli case is more complicated. With the onset of the second Intifada in the early 2000s,
Israeli interest rates jumped dramatically, rising from roughly 6% to 12%. After peaking around 2003, Israeli interest rates began a long decline and have now converged to U.S. levels.

**Figure 2.2: Nominal Interest Rates on Government Debt**

![Graph showing nominal interest rates on government debt](image)

Note: Benchmark Government Bond Yields, 10 Year Maturity, are here displayed. Data is at quarterly frequency.

Figure 2.3 displays real quarterly, annualized benchmark 10-year inflation-indexed Israeli and U.S. government bond yields from the early 2000s on. Real yields exhibit secular declines like nominal yields, with Israeli rates converging close to U.S. rates. Still, there are substantial periods when the differences between Israeli and U.S. interest rates became substantially larger. For example, in the early 2000s and between 2010 and 2013, the difference between Israeli and U.S. real interest rates became significantly larger. But by 2015, the two rates had essentially converged.

**Figure 2.3: Real Interest Rates on Government Debt**

![Graph showing real interest rates on government debt](image)

Note: Benchmark Government Bond Yields, 10 Year Maturity, are here displayed. Data is at quarterly frequency.
3 Indicators of Fiscal Sustainability

In a world of low-interest rates, what indicators should we look at when assessing the fiscal sustainability of government debt? The traditional canary in the coal mine is the ratio of debt to GDP. But, as the data and the Rogoff and Reinhardt (2010) 90% debacle taught us, no magic number signals fiscal doom.

But surely we should worry about scenarios in which the ratio of government debt-to-GDP is quickly growing to unprecedented levels. After all, there must be some ratio of debt to GDP that is sustainable, at least for a politically feasible future budget surplus. If nothing else, high values of the debt-to-GDP ratio expose a country like Israel and maybe even the U.S. to doom-loop dynamics. If markets anticipate a crisis, they charge higher interest rates on government debt. Higher rates mean higher debt service, which leads the debt to explode even faster, leading to a crisis. Depending on the country in question, a doom-loop crisis could involve a loss of central bank independence, high inflation rates, a depreciated currency, and sovereign default in the most extreme of circumstances. Less dramatically, high debt levels threaten a central bank’s independence. The reason is that under those circumstances, central-bank efforts to reduce inflation through interest rate increases substantially raise the cost of servicing the debt and potentially crowd out items that are high on the wish lists of the fiscal authorities.

The ratio of nominal interest payments to GDP

Fuhrman and Summers (2020) argue that lower interest rates require new measures of a country’s fiscal situation. A fundamental problem with the debt-to-GDP metric is that a government can repay the debt from current and future GDPs. The mismatch of stocks and flows in the debt-to-GDP metric is particularly important in an era of low-interest rates. At interest rates prevailing in 1992, a country with a 60 percent debt-to-GDP ratio paid about 5 percent of GDP in interest. Today, Japan, with a 177 percent debt-to-GDP ratio, will pay about 0.2 percent of GDP in interest. The U.S., with a 100 percent debt-to-GDP ratio, will pay about 2.0 percent of GDP in interest. It cannot be that 60% was a reasonable upper bound for the limit for the ratio of Israeli debt to GDP both now and in 1992.

In designing a new metric for fiscal sustainability, one could adopt a stock-stock perspective that compares a government’s debt to the present value of GDP. This metric captures the idea that a fall in interest rates raises the present value of current and future flows of GDP. That rise makes a given debt level more manageable. However, the stock-stock perspective isn’t workable because it requires reliably forecasting growth and
interest rates into the indefinite future, something we can’t do.

An alternative approach to measuring fiscal sustainability is a flow-flow perspective that considers the cost of servicing government debt relative to income. One flow-flow measure is the ratio of nominal interest payments to GDP. Fuhrman and Summers (2020) argue that we should use the ratio of real interest payments to GDP as our fiscal sustainability metric. This measure corresponds to nominal interest payments as a share of GDP minus the debt that is inflated away each year.

As with the ratio of debt to GDP, there is no magic upper bound for the ratio of real interest payments to GDP. Fuhrman and Summers argue that in practice, we should adjust fiscal policy when the ratio hits 2% for a prolonged period. We certainly want to avoid paths where this ratio is quickly growing to unprecedented levels.

Figure 3.1 displays the ratio of net payments on government debt to GDP in Israel and the U.S. In the U.S., this ratio fell from roughly 3% in 1995 to under 2.0% at the end of 2021. The Israeli case is more complicated. The ratio of net interest rate payments to GDP fell from over 10% to around 4% in 2000. The ratio jumped to over 6% during the second Intifada years before converging to under 2% by the end of 2021.

![Figure 3.1: Ratio of Net Interest Rate Payments to GDP](image)

3.1 On the importance of $r - g$

Regardless of which measure of debt sustainability we focus on, a critical determinant of debt sustainability is the interest rate on government debt $r$, minus the GDP growth rate, $g$. To see why, suppose, as is currently the case, that $r$ is less than $g$ and will remain that
way indefinitely. We consider two scenarios under this assumption.\footnote{The scenarios considered here are the same as those analyzed by Cochrane (2021) for the U.S.}

3.1.1 Scenario 1

Suppose the government borrows, on a one-time basis, a large amount of money to finance expenditures associated with the Covid crisis or a social investment. The government then rolls over the debt, borrowing new money to pay principal and interest on the debt.

In this scenario, government debt grows at the rate $r$. If GDP grows at a rate $g$ higher than $r$, then the ratio of debt-to-GDP slowly declines at rate $r - g$. So, the government never has to repay what it borrowed, say by raising future taxes or lowering future government spending.

3.1.2 Scenario 2

Imagine that the government starts with some positive debt-to-GDP ratio. If $r$ is less than $g$, then the government can run a primary deficit (a negative primary surplus) forever without affecting the size of the debt-to-GDP ratio. The size of that negative primary surplus is equal to $r - g$ times the initial ratio of debt to GDP. For example, the current U.S. debt-to-GDP ratio is 100%. Suppose that from now on, $r - g$ was equal to $-1\%$. Then the U.S. could run a primary deficit equal to 1\% of GDP forever without affecting the debt-to-GDP ratio.

3.1.3 On the empirical relevance of scenarios 1 and 2

Should the previous scenarios make us complacent about the fiscal outlook for Israel and the U.S.? The first scenario is relevant for thinking about a one-time increase in the debt, not ongoing deficits. A one-time expansion of Covid-related debt in Israel might be considered in these terms. In contrast, the U.S. was running large primary deficits before Covid and, by all accounts, will continue to do so after Covid. For a given value of $r - g$, the second scenario contemplates a small, perpetual deficit that doesn’t raise the ratio of debt-to-GDP.

A critical question is: how small is small?
Table 4.1: Average ratio of Budget Deficit to GDP

<table>
<thead>
<tr>
<th></th>
<th>Israel</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995-2002</td>
<td>0.3</td>
<td>-2.5</td>
</tr>
<tr>
<td>2003-2009</td>
<td>-0.55</td>
<td>2.08</td>
</tr>
<tr>
<td>2010-2019</td>
<td>1.20</td>
<td>3.38</td>
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</tbody>
</table>

4 The data on budget deficits and $r - g$

Figure 4.1 displays the quarterly, primary government budget deficit as a percent of GDP for Israel and the U.S. over the period 1995-2021. Table 4.1 reports sample averages of this ratio for different subsamples.

The behavior of the ratio of the budget deficit to GDP is quite different in the two countries. Over the period 1995-2002, the U.S. had a budget surplus equal to 2.5% of GDP on average. After that, the U.S. ran large budget deficits. Over the periods 2003-2009 and 2010-2019, those deficits were on average equal to 2.08% and 3.38% of GDP, respectively. In contrast, over those three periods, the deficit-to-GDP ratio in Israel was 0.3%, -0.55% and 1.20% of GDP. So, over the past twenty years, Israel has been a model fiscal rectitude relative to the U.S.
Figure 4.2 displays the time series on $r - g$. Here $r$ is measured as the quarterly, annualized nominal interest rate on Israeli and U.S. government debt. The variable $g$ is the quarterly, annualized growth rate of nominal GDP. \(^2\) For both Israel and the U.S., $r - g$ was negative after 2010, with an average value of $-2.33\%$ and $-1.49\%$, respectively.

But negative values of $(r - g)$ are no sure thing. Figure 4.3 displays histograms of the quarterly values of $r - g$ for Israel and the United States for 1997-2021 and 1987-2021. Two features are worth noting. First, negative values of $r - g$ occur regularly in both countries. The percent of periods in which $(r - g) > 0$ in Israel and the U.S. are 34.3 and 28.1, respectively. The percent of periods in which $(r - g) > 1.5\%$ in Israel and the U.S. is 21.8 and 14.6, respectively. Second, the distribution of $r - g$ for Israel is significantly more left-skewed than the U.S. distribution. This fact reflects that Israel is more exposed

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\(^2\) Since we are interested in the difference between $r$ and $g$ it doesn’t matter whether we work with the real or nominal version of these variables.
to geopolitical events like the second Intifada. Tail-risk is a genuine, *in-sample* phenomenon for Israel.

5 How much fiscal space do low values of $r - g$ give Israel and the U.S.?

Abstracting from seignorage revenues, the ratio of net government debt to GDP, $d_t$, evolves according to the difference equation

$$d_{t+1} = d_t \frac{1 + r_t}{1 + g_t} + \frac{s_t}{1 + g_t}.$$ 

Here $g_t$ represents the GDP growth rate between time $t$ and time $t+1$, $r_t$ denotes the interest rate on government debt at time $t$, and $s_t$ represents the ratio of the net, time-$t$ primary government deficit to GDP. According to this equation, other things equal, a higher interest rate drives up future debt-to-GDP ratios, and a higher GDP growth rate drives down future debt-to-GDP ratios.

Figure 5.1 displays the implications of different values of $r - g$ for the ratio of total debt to GDP. Consider first the case of Israel. The orange bar depicts the current Israeli debt-to-GDP ratio, 65%. In constructing the other bars, we suppose that, for ten years, starting from current debt levels, the primary budget deficit in Israel is equal to -1.20% of GDP,
its average value between 2010 - 2019. Suppose that for the next ten years, \( r - g \) is equal to -2.33%, the historical average for 2010-2019. Then, as the green bar shows, the debt-to-GDP ratio would fall from 65% to roughly 62% after ten years. So if the post-Covid years look like the ten years before Covid for deficits and \( r - g \), Israeli could run moderate deficits without weakening its fiscal position. Suppose instead that we base \( r - g \) on the Bank of Israel (BoI) forecasts for \( r \) and \( g \). As of January 2022, the BoI forecast for the long-run growth rate of real GDP and the real interest is 4.1% and 2.9%, respectively. This forecast implies that \( r - g \) is equal to \(-1.2\%\). The blue bar shows that the implied value of the debt-to-GDP ratio would rise to 69%. So whether one expects the debt-to-GDP ratio to rise or fall depends sensitively on one’s views about the future value of \( r - g \).

To further explore this sensitivity, Figure 5.2 displays the implications for the Israeli debt-to-GDP ratio of alternative values of \( r - g \). If \((r - g)\) was zero over the next ten years, the debt-to-GDP ratio would rise from 65% to 77%. More dramatically, suppose that \((r - g)\) was equal to 1.5%, the historical average for Israel over the period 2000-2019. Then the debt-to-GDP ratio would rise to 88% after ten years.

Based on these simulations, we infer that Israel has some space to run moderate deficits. But the extent of the space is quite sensitive to different but plausible values of \( r - g \). So even if we abstract from tail risk, one can’t take the stability of the Israeli debt-to-GDP ratio for granted. The fiscal authorities must be ever vigilant to changes in \( r \) and \( g \) that adversely affect the debt-to-GDP ratio.

Now consider the analog scenarios for the U.S. The average value of the primary budget deficit in the U.S. between 2010 and 2019 is 3.38%. Suppose that for the next ten years, \( r - g \) is equal to -1.49, the U.S. historical average for 2010-2019. Then the debt-to-GDP ratio would rise from 102% to 120%. Suppose instead that we base \( r - g \) on the Congressional Budget Office’s (CBO) forecast for \( r \) and \( g \). As of July 2021, CBO forecast that the long-run (10 years) growth rate of nominal GDP and the nominal interest rate would be 3.78% and 3.47%, respectively. This forecast implies that \( r - g \) is equal to \(-0.3\%\). The blue bar shows that under this scenario, after ten years, the debt-to-GDP ratio would rise to 133%.

Figure 5.2 displays the sensitivity analysis for the U.S. If \((r - g)\) was zero over the next ten years, the debt-to-GDP ratio would rise to almost 136%. Finally, if \((r - g)\) was equal to 1.5%, the ratio would increase to almost 155% within ten years.

In all of the previous scenarios, the U.S. debt-to-GDP ratio will rise to unprecedented peacetime levels. Yes, \( r - g \) may be negative. But it is simply not negative enough to compensate for the large deficits that the U.S. has been running.
Figure 5.1: Historical-budget based net debt scenarios

The long-term forecast of $(r-g)$ for Israel is constructed as the Bank of Israel’s forecast for the real interest rate in 2030 minus its forecast for real GDP growth in 2030. The long-term forecast of $(r-g)$ for the U.S. is constructed as Congressional Budget Office’s forecast for the 10-Y treasury rate in 2030 minus its forecast for nominal GDP growth in 2030.

Figure 5.2: Historical-budget based net debt scenarios

United States
- 2021 Value
- Scenario 2010-2019 $(r-g)$
- Scenario Long-Term Forecast $(r-g)$

Israel
- 2021 Value
- Scenario $(r-g) = 0\%$
- Scenario $(r-g) = 1.5\%$
6 The fiscal-alarm frontier

Each of us has views about how large government deficits will be in the post-pandemic era, and what values of \( (r - g) \) are plausible over the next decade. So it’s useful to know the answer to the following question. Given an assumed value for future deficits in the next decade, what is the maximum value of \( (r - g) \) such that the debt-to-GDP ratio doesn’t grow? The fiscal-alarm frontier displays the answers to this question for different values of the future deficit.

Figure 6.1: Fiscal-alarm frontiers, Israel and the U.S.

Consider the U.S. case. The X-axis of the orange diamond is located at the average value of the U.S. deficit-to-GDP ratio over the period 2010 - 2019. The corresponding value of the Y-axis shows what \( r - g \) would have to be for the debt-to-GDP ratio to be constant. The Y-axis value of the red diamond is drawn at the average value of \( r - g \) over the period 2010-2019. Since the red diamond lies above the orange diamond, the U.S. debt-to-GDP ratio would grow even if the post-Covid values of \( r - g \) were equal to their very low pre-Covid values.

Now consider the case of Israel. The X-axis of the orange diamond is located at the average value of the Israeli government deficit-to-GDP ratio over the period 2010 - 2019. The corresponding value of the Y-axis shows what \( r - g \) would have to be for the Israeli debt-to-GDP ratio to be constant. The Y-axis value of the green diamond is drawn at the average value of \( r - g \) in Israel over the period 2010-2019. Since the green diamond lies below the orange diamond, the Israeli debt-to-GDP ratio would contract if the Israeli government continued to run pre-Covid like moderate deficits.

One cannot be overly sanguine about the Israeli case. As we saw in the previous section, the debt-to-GDP ratio isn’t stable if growth is equal to the BoI’s estimate. To
make this point even more sharply, we draw the Y-axis value of the red dot at the value of $r - g$ implied by the Ministry of Finance’s (MoF) estimate of the long-run value of $g$ (3.2%) and the BoI long-run estimate of $r$ (2.9%). Note that the MoF estimate of $g$ is lower than the BoI’s and reflects MoF’s view that the future growth of GDP will be substantially lower than it was during the ten years that preceded Covid. The X-axis is located at the average value of the Israeli government deficit-to-GDP ratio over 2010 - 2019. Notice that the red diamond lies substantially above the fiscal alarm frontier. So both the BoI and MoF estimate of future growth imply that the Israeli debt-to-GDP ratio isn’t stable if the government continues to incur pre-Covid like deficits. Of course, the BoI and the MoF may be incorrect in their estimate of $g$. Nevertheless, this calculation illustrates the sensitivity of inference about the sustainability of the debt-to-GDP ratio to alternative but plausible assumptions about $r - g$.

A similar story about the fiscal situation of the two countries emerges if we use Fuhrman and Summers’s (2020) preferred metric, the ratio of real net interest payments to GDP. In what follows, we assume that the deficit-to-GD ratio equals its 2010-2019 average value.

For Israel, if $r - g$ were equal to its average 2020-2019 value, the ratio of net interest payments to GDP would fall slightly from its 2021 value. However, if $r - g$ were zero, the ratio would rise to 2.03% after ten years. Finally, if $(r - g)$ increases to 1.5%, the ratio would rise to 3.68%, requiring substantial fiscal policy adjustments. In sharp contrast, the U.S. would significantly exceed the 2% Fuhrman-Summers threshold even if $(r - g)$ was zero for the decade. And if $(r - g)$ was equal to 1.5%, the ratio of real net interest payments to GDP would exceed 4% within ten years. That is a recipe for a crisis.

Figure 6.2: Ratio of Net Interest Rate Payments to GDP
The previous calculations provide some reason for Israelis to be optimistic about their fiscal future. If Israel’s post-Covid fiscal policy looks like its pre-Covid policy, Israel won’t hit the fiscal-alarm frontier as long as \((r - g)\) is less than roughly -0.7%. Modest adjustments would be necessary if future growth was somewhat lower along the lines forecast by the BoI. But these comforting conclusions miss a critical point: Israel is subject to critical tail events stemming from geopolitical risk and the risk that the U.S. is on an unsustainable fiscal path.

7 Tail-events

Israel is a small, open economy whose average, long-term real interest rates are primarily determined outside its borders and whose growth rate is heavily affected by external events. Moreover, because of its location and history, Israel is subject to substantial geopolitical risks that affect the interest rate on government debt and GDP growth rate. The geopolitical risks are obvious. We know that the second Intifada led to a sustained rise in \(r - g\). It is unreasonable to attach zero probability to a similar event in the future or a shock stemming from hostile regimes. A different kind of tail event arises from the troubling fiscal position of the United States. In principle, the U.S. could fix its fiscal problems. After all, the U.S. collects only 31 percent of GDP in general revenue, well below the OECD average of 37 percent. So the fiscal capacity is there. The question is: does the U.S. have the political ability to fix its fiscal problems? We see no indication whatsoever that it does. If anything, the signs point in the other direction.

We cannot dismiss the possibility that markets might, at some point, conclude that the U.S. is on an unsustainable fiscal path. In that event, the interest rate on U.S. debt will jump up. In the ensuing chaos, the U.S. growth rate \(g\) will fall. Almost certainly, such a crisis would lead to a rise in benchmark Israeli interest rates and a fall in the growth rate of Israeli GDP. The net effect would be a persistent rise in the Israeli-relevant value of \(r - g\).

To assess the potential importance of these tail events, we consider the evolution of Israel’s debt-to-GDP ratio under different assumptions about \(r - g\). Figure 7.1 presents the results of various experiments. In all cases, we assume that the deficit-to-GDP ratio in Israel is equal to its value over the period 2010-2019, an assumption that is optimistic if tail events manifest themselves in large military expenditures. For reference, the blue line shows the evolution of the debt-to-GDP ratio assuming \(r - g\) is equal to its average value in the period 2010-2019. Consistent with the discussion above, the debt-to-GDP ratio exhibits a moderate long-term decline in this scenario.
The orange line depicts the evolution of the debt-to-GDP ratio based on the BoI long-term forecasts of $r - g = -1.2\%$. Again, consistent with the analysis above, the debt-to-GDP ratio rises over time, approaching 70% in 10 years and 80% in the long run. The yellow line corresponds to the pessimistic scenario where we assume $r - g = -0.3\%$. Recall that this value emerges from the MoF forecast of $g$ (3.2\%) and the BoI forecast of $r$ (2.9\%). Note that the debt-to-GDP ratio grows very quickly, eventually exceeding 100%.

One plausible tail event is a geopolitical crisis that raised $r - g$ for five years to 4.0\%. This value coincides with the rough average of $r - g$ over the second Intifada period, 2001-2005. We assume that after five years, $r - g$ reverts to -1.2\%, the value implied by the BoI long-run forecast of $r$ and $g$. Note that the debt-to-GDP ratio rises to about 85% within five years and then climbs more slowly, eventually exceeding 90%. So even assuming that the deficit was unaffected by the crisis, there would be an alarming deterioration in Israel’s fiscal situation.

Quantifying the risk from a U.S. fiscal crisis is truly a trip into the unknown. We suspect the consequences would be much more severe than the tail event just discussed.

Figure 7.1: Evolution of Israeli Debt to GDP: Tail Risks
8 Insurance

What can Israel do to minimize the fiscal damage from tail risks? At a minimum, it can buy some insurance by lengthening the average maturity of government debt. By analogy, suppose you were taking out a mortgage and saw that long-term rates were incredibly low. Would you take out a variable rate mortgage, especially if you were worried about a possible rise in rates? Of course not: you would lock in low, long-term rates. In this spirit, Israel should lengthen the maturity of its debt structure, locking in historically low rates on government debt.

The solid orange and blue lines in Figure 8.1 display the average maturity of bonds issued by the U.S. Treasury and the Israeli government. The data underlying these lines do not net out purchases by the Federal Reserve Board or the BoI. So they don’t represent the average maturity of consolidated government debt. See Greenwood, Hanson, Rudolph, and Summers (2015) for an analysis of how to calculate the duration of consolidated government debt.

Note that the average maturity of U.S. debt declined from almost 5.8 years at the onset of the Covid crisis to 5.2 years. In contrast, the average maturity of Israeli government debt increased from about 8.2 years percent to over 9.3 percent.
The solid blue and red lines in Figure 8.2 display the average maturity of foreign currency and NIS - denominated Israeli government debt. Note that the average duration of foreign currency-denominated debt rose sharply from 8.8 to 15.6 years. However, the average maturity of NIS - denominated debt slightly declined from 6.2 to 6.1 years. So the overall rise in the average maturity of Israeli government debt entirely reflects the behavior of foreign currency-denominated debt.
The Federal Reserve Board and the BoI responded to the Covid crisis via vigorous quantitative easing programs. In such a program, a central bank buys government bonds and other government-guaranteed securities at the long end of the yield curve. The goal is to lower longer-term interest rates. The central bank pays for the longer-term assets with overnight reserves. The latter can be thought of as zero-maturity liabilities. So, the net effect of these operations is to lower the average maturity and effective duration of the consolidated government debt held by the public.

In both countries, the size of the operation was very large. For example, the Federal Reserve’s Balance sheet expanded by roughly 4.5 trillion dollars between March 2020 and March 2022. Over the same period, the BoI purchased approximately 80 billion NIS worth of bonds. Figure 8.2 displays the percentage of outstanding Israeli and U.S. government debt held by the BoI and the Federal Reserve System. In both cases, quantitative easing and other measures led to a sharp rise in the percentage, peaking at roughly 12.4% and 21%, respectively.
Quantifying the exact impact of quantitative easing on the average maturity of outstanding government debt is a non-trivial task. See, for example, Greenwood, Hanson, Rudolph, and Summers (2015) for a careful analysis of how quantitative easing affected the duration of U.S. government debt over the period 2007-2014. Here we use the following back-of-the-envelope calculation. Suppose that the Central Bank buys $X\%$ of government bonds by issuing zero maturity reserves. For simplicity, we assume that the Central Bank buys government bonds of different maturities in the same proportion as they appear in the government balance sheet. Then the overall adjusted maturity of government debt held by the non-central bank public is

$$
(1 - X_t) \ast (\text{Unadjusted Average Maturity}_t) + X_t = \text{QE Adjusted Maturity}_t
$$

We compute $X_t$ as the ratio of negotiable government bonds purchased by the Central Bank during Covid as a percent of total outstanding negotiable government bonds in year $t = 2020, 2021$. We assume the unadjusted average maturity in 2020 and 2021 because we
don’t have data for the latter date.

The dotted lines in Figures 8.1 and 8.2 show the QE-adjusted maturity of U.S. and Israeli government bonds. Suppose that the average maturity of the government bonds purchased by the monetary authority is the same as the overall maturity of all outstanding government debt. Then these lines also provide a lower bound for the average maturity of the government’s consolidated debt. Based on our rough calculations, quantitative easing lowered the overall average maturity of U.S. and Israeli government debt by 0.5 and 0.6 years. The average maturity of NIS-issued debt fell by about a year.

These stark changes move in the opposite direction of buying insurance against fiscal tail events. There were certainly good reasons for the Federal Reserve Board and the BoI to engage in large quantitative easing programs during the Covid crisis. But the program led Israel to depart from a prior policy in which the government was increasing the average maturity of its debt. Now that the Covid crisis is over, it would be wise for Israel to move back to and beyond pre-Covid average debt maturity levels.

9 Conclusion

Israel was a model of fiscal responsibility in the ten years before Covid. In recognition of this fact, the interest rate on Israeli government debt fell to record low levels. Looking forward, Israel faces two challenges. The first challenge is the need to make adjustments if interest rates rise modestly or growth falls below its pre-Covid levels. The second challenge stems from tail events that impact interest rates and growth rates. Geopolitical risk will always be a fact of life for Israel. A novel first-order concern is that the U.S. is on a fiscally unsustainable path. The U.S. might put its fiscal house in order. But it might not. Responsible leadership must take the latter possibility into account.

References

[1] Cochrane, John H., \( r - g \), manuscript, Stanford University.
