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Do Surging Public Debt Levels Bring Higher (or Lower) Bond Yields?

PERSPECTIVES | JUNE 2021

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- The narrative that rising public debt levels bring higher interest rates, as well as risks of economic and financial disruptions, is a foundation of classical economics.
- However, the experience of Japan and other developed markets suggest an alternate set of outcomes altogether. In recent decades, DM countries have generally operated outside the classical paradigm with high public debt levels bringing *lower* 10-year government yields.
- Even when accounting for real GDP growth, inflation, and growth of the working-age population, high debt levels appear to weigh on DM bond yields.
- In contrast to DMs, the data suggest a mildly positive relationship between debt levels and interest rates for emerging market economies, which could introduce an additional source of variation in EM debt relative to DM debt.

With public debt spiraling higher in many countries around the world, the implications of rising debt burdens for creditworthiness, inflation, and bonds yields are of critical importance for fixed-income investors. Will these higher debt levels bring increased interest rates and larger risk premiums? Or is Japan's experience, which saw rising indebtedness accompanied by falling yields, the more likely outcome?

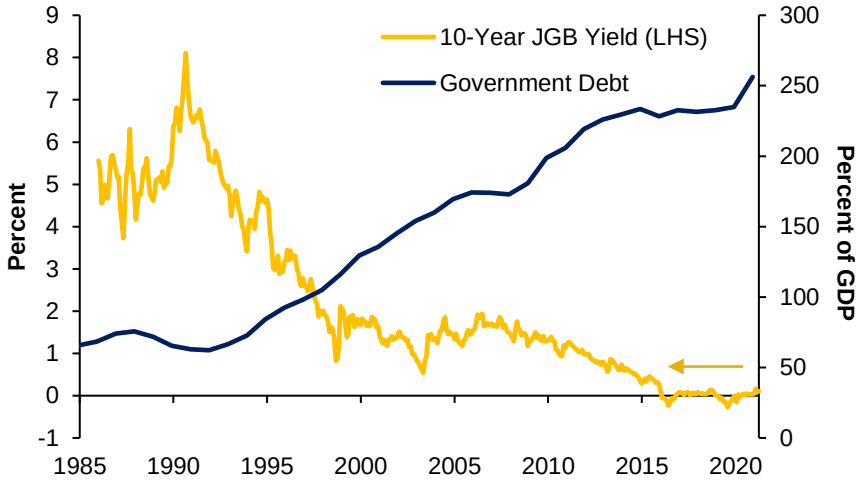
Two Conceptual Frameworks

The classical narrative holds that as government indebtedness increases, bond yields must rise to induce investors to hold the larger stock of debt. Higher debt levels may also increase vulnerability to shocks that disrupt the capacity to manage the debt. This, in turn, may stoke fears of monetization and sharply rising inflation or of outright default and restructuring. In response, inflation expectations and default premiums increase as bond yields rise and the currency weakens.

This classical narrative is a foundational element of the International Monetary Fund's traditional worldview as well as the evaluation frameworks used by credit ratings agencies.

The experience of Japan in recent decades, however, suggests a very different set of outcomes. As shown in Figure 1, Japanese public debt has moved up dramatically over the past 30 plus years, from about 60% to 250% of GDP, but ten-year government bond yields have declined in tandem to near zero.

Figure 1: Japan Government Debt & Bond Yields



Source: PGIM Fixed Income and Haver Analytics

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The pattern observed in Japan and, by our reckoning, mirrored in other developed markets, is that high debt levels create an overhang of uncertainty for the private sector. This uncertainty, in turn, weighs on spending. Households and firms may worry about forthcoming fiscal austerity—either in the form of higher taxes or rollbacks in government expenditures.

Such concerns have often been justified by subsequent events. For example, in an effort to attack Japan's imbalanced fiscal position, the government implemented several high-visibility hikes in the consumption tax, which created headwinds for economic activity. And in the aftermath of the global financial crisis, a broad set of countries felt compelled to absorb doses of fiscal austerity to address their indebtedness.

In addition, as debt levels mount, questions may arise about the government's capacity to respond to subsequent adverse shocks. While fiscal policy has responded aggressively to the pandemic, there was much debate about "policy space" in the years before it erupted. In extreme cases, the private sector may also worry about the government's ability to rollover or otherwise manage its debt. The upshot of all this is reduced private spending, slower growth, and correspondingly lower interest rates.

Our story focuses on increased public debt's "pall of uncertainty", which ultimately weighs on activity and rates through various mechanisms.

This argument is related to, but broader than, the so-called Ricardian equivalence, which says that increases in public deficits are fully offset by a decline in private spending. The private sector sees such deficits, at least implicitly, as an increase in future tax obligations. While such effects are part of what we are describing, our story is broader. It focuses on increased public debt's "pall of uncertainty", which ultimately weighs on activity and interest rates through various mechanisms.[1]

[1] Our paper, "Is Higher Global Inflation Around the Corner?", examines these issues in greater detail.

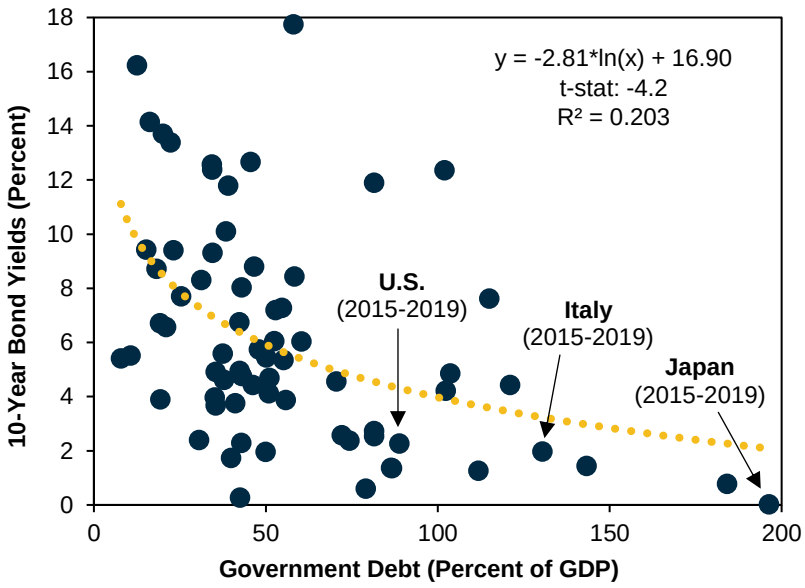
Notably, the various channels highlighted by the classical narrative (those which push rates up) and by Japan's experience (those which push rates down) need not be mutually exclusive. They could all be operating simultaneously, offsetting and mitigating each other. Thus, the key empirical question is not which of these effects is at work but, rather, which is dominant? And, on balance, whether higher public debt levels are associated with higher or lower bond yields?[2]

Debt Levels and Bond Yields

To address these questions, we turn to the data. Figure 2 shows a scatterplot of government debt versus 10-year nominal yields for nine DM countries.[3] Each dot represents a given country's average performance over a five-year period, beginning in the first half of the 1980s. For example, the three dots indicated with arrows represent the United States, Japan, and Italy during the second-half of the 2010s. We use five-year averages in an effort to look through short-term business-cycle dynamics and focus on longer-term relationships.

Figure 2: DM Government Debt & 10-Year Bond Yields*

With the CBO projecting that debt will surge to 150% in coming decades, our framework suggests that, over a long horizon, U.S. yields are likely to fall another 100 basis points.



*Source: PGIM Fixed Income and Haver Analytics. *Each dot is a 5-year average (1980-2019) for one of nine developed markets.*

Our key finding is that for these countries, higher public debt levels are associated with *lower* 10-year yields. The estimated coefficient—which is strongly statistically significant—suggests, for example, that the run-up in U.S. federal debt during the pandemic, from 75% to 105% of GDP, will cut 10-year rates by roughly 95 basis points. U.S. yields averaged 250 basis points in the post-GFC period, so this implies that they will average roughly 155 basis points in the years ahead. Further, with the Congressional Budget Office projecting that government debt will surge to 150% of GDP over the next several decades, this framework suggests that over a long horizon, U.S. yields are likely to fall another 100 basis points, moving closer to those of Japan and Germany.[4]

[2] A related concern is that causality may also run in the opposite direction: Lower yields could reduce the cost of carrying debt and incentivize countries to issue more debt. While this story is sensible over short horizons, the classical framework still suggests that risk premiums should eventually move up in response to rising debt levels. Similarly, it seems difficult to explain Japan's experience over the past 30 years as principally about the declining cost of debt issuance. Nevertheless, given the complexity of these relationships, we will be careful not to speak in terms of strict causality.

[3] These countries include the United States, Germany, France, Italy, Spain, Japan, the United Kingdom, Australia, and Canada.

[4] Our work below looks at a broader set of variables—and suggests a somewhat smaller effect of higher debt levels—but this channel remains robust.

More broadly, these results confirm our hypothesis that in recent decades DM countries have generally operated outside the classical paradigm. Even with high and rising debt levels, markets have generally viewed default risk in these countries as remote (or nonexistent).[5] And, given the typically restrained pace of economic performance, coupled with credible central bank policies, markets have continued to see inflation as remaining well contained.

But an obvious question regards the robustness of this relationship. Is the regression picking up the actual effect of higher debt levels on bond yields, or is something else going on? One possibility is that the last several decades have seen debt levels rise as growth and inflation rates have fallen. Given this correlation, debt levels may simply be proxying for other variables, which could have also played a role in pushing rates down.[6]

An Expanded Framework

With this in mind, we expand the regression framework to also include real GDP growth, inflation, and growth of the working-age population (Figure 3). Notably, the resulting coefficient on government debt remains negative and statistically significant (at the 10% level), albeit somewhat smaller in magnitude than in Figure 2. *The bottom line is that high debt levels seem to weigh on bond yields even controlling for these additional factors*.

Figure 3: Government Bond Yields (Percent)

Dependent Variable	10-Year Nominal Yield	10-Year Real Yield
CPI Inflation	1.156	0.156
(Percent)	(14.0)	(1.9)
GDP Growth	0.513	0.513
(Percent)	(2.5)	(2.5)
Government Debt	-0.797	-0.797
(Log: Percent of GDP)	(-1.7)	(-1.7)
Working-Age Population Growth	-0.569	-0.569
(Percent)	(-1.1)	(-1.1)
Observations	70	70
Adjusted R-Squared	0.802	0.169

Sources: PGIM Fixed Income. Note: Regressions include an unreported constant; t-stats shown in parentheses.

A point of additional GDP growth tends to push up nominal and real rates by 50 bps, while every point of inflation is associated with an additional 15 bps in real rates.

Looking at the regression's other results, we find that the coefficient on inflation is strongly significant and somewhat above one. Investors expect to be fully compensated for higher inflation and, in addition, demand a further premium to account for the increased uncertainty that inflation brings.

As an alternative perspective, the second column considers real bond yields (i.e., nominal yields minus inflation). Since this is just a reformulation of the previous equation, the regression coefficients are unchanged (except that the coefficient on inflation falls by one). Even so, this framing is intuitively helpful as it sheds light on the drivers of real interest rates.

Importantly, a point of additional real GDP growth tends to push up nominal and real rates by 50 basis points, while every point of inflation is associated with an additional 15 basis point

[5] The upsurge in Italian and Spanish rates during the European Sovereign Debt Crisis of the early 2010s is an important exception to this statement.

[6] As argued above, we see the evidence as indicating that higher debt levels create uncertainties that weigh on growth and inflation. Thus, the question becomes whether higher debt levels influence bond yields through channels distinct from their effects on growth and inflation.

premium in real rates. Notably, working-age population growth enters insignificantly and with the wrong sign, suggesting that the effects of demographics on bond yields operate mainly by affecting the three other variables.[7]

To shed further light on these results, Figure 4 reports the contributions of each of these variables to the decline in interest rates between the second half of the 1980s and the second half of the 2010s in the United States, Japan, and Germany. This exercise yields some important insights:

- Despite differentiated national experiences over this 30-year period, the three countries recorded surprisingly similar declines in 10-year sovereign yields, ranging from 530 basis points (Japan) to 650 basis points (the United States).
- The model predicts a *larger* decline in Japanese rates than actually occurred, hinting that frictions once Japan's rates neared zero may have prevented an even sharper fall.
- The model accounts for a little over half of the observed decline in U.S. rates. Other factors—potentially including strengthened Federal Reserve credibility, declining inflation expectations, and diminishing term premiums—also seem to have been at work.
- For Germany, the key explanatory variables were comparatively little changed, and the model predicts only a 110 basis point decline in rates. We hypothesize that German rates have been pushed down by factors, including a strong safe-haven bid, especially from elsewhere in the euro area, and pressures from the decline in U.S. and Japanese rates.
- Finally, higher debt levels are estimated to have played a small but meaningful role in the decline in rates in all three of these countries.[8]

Despite differentiated national experiences, the U.S., Japan, and Germany recorded surprisingly similar declines in 10-year sovereign yields.

Figure 4: Estimated Contribution to Change in Bond Yields

	1985-1989*	2015-2019*	Change	Contribution
United States				
10-Year Bond Yield (%)	*8.8*	*2.3*	*-6.5*	
CPI Inflation (%)	3.6	1.6	-2.0	-2.4
GDP Growth (%)	3.8	2.4	-1.4	-0.7
Gov't Debt (% of GDP)	46.6	88.8	42.3	-0.5
Japan				
10-Year Bond Yield (%)	*5.4*	*0.0*	*-5.3*	
CPI Inflation (%)	3.9	0.5	-3.4	-3.9
GDP Growth (%)	5.0	1.0	-4.0	-2.1
Gov't Debt (% of GDP)	55.2	196.3	141.1	-1.0
Germany				
10-Year Bond Yield (%)	*6.6*	*0.3*	*-6.3*	
CPI Inflation (%)	1.3	1.2	0.0	0.0
GDP Growth (%)	2.7	1.7	-1.0	-0.5
Gov't Debt (% of GDP)	21.0	42.5	21.5	-0.6

Source: PGIM Fixed Income. *Period Average

In sum, the sweep of our empirical work provides little support for those who worry that surging debt levels are likely to bring correspondingly higher DM bond yields and escalating

[7] We consider such linkages in our earlier paper, "The Economics of Global Aging: Gray Skies, Rays of Policy Hope?", December 2018.
[8] With debt levels having risen significantly further during the pandemic, the model projects that further downward pressures on rates are likely in store.

government financing costs. Instead, Japan's experience seems a better template for these countries in the years ahead.

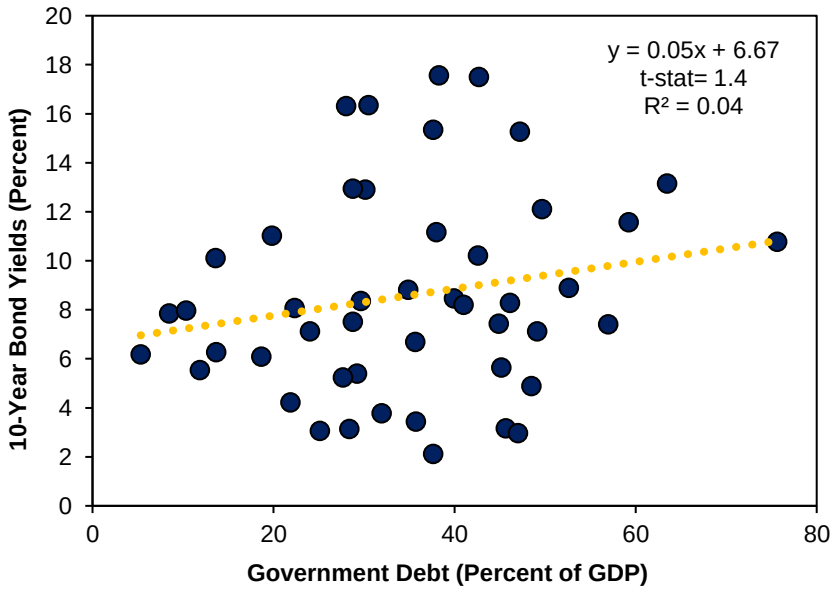
A Look at the Emerging Markets

The sweep of our empirical work provides little support for those who worry that surging debt levels are likely to bring correspondingly higher DM bond yields.

As a final perspective, Figure 5 replicates the scatterplot above using data for major EM economies. As before, each observation represents the average government debt level and local-currency bond yield during a five-year period. We consider eleven EM countries with data beginning as early as the 1980s (for South Africa) and expanding as the domestic bond markets in these countries come on line.[9]

The outcome indicates that, in contrast to DM, rising debt levels continue to contribute to higher EM sovereign yields to a degree. Although the coefficient falls short of statistical significance, the results hint that EM investors have continued to require increased compensation to hold rising levels of debt.

Figure 5: EM: Government Debt & 10-year Bond Yields*



Source: PGIM Fixed Income and Haver Analytics. *Each dot is a 5-year average (1980-2019) for one of eleven emerging markets. (Two observations for which inflation averaged over 20% are excluded).

Concluding Thoughts

We have documented an important divergence in the performance of the DM and EM countries. For the emerging markets, there still seem to be hints of bond-market pressures associated with rising debt levels. For the developed markets, in contrast, such pressures have been distinctly absent. Instead, the macroeconomic headwinds arising from higher debt levels have driven rates down—or, at a minimum, we see no evidence that markets have charged a premium.

This result points to an important question: what factors explain this divergence? On the DM side, we see three forces at work. First, the threat of outright default or restructuring is indeed remote. These countries have their own central banks or, for Europe, access to significant fiscal backstops. They are also rich countries with ample resources to manage even heavy

[9] These countries include the following (with dates they enter the sample in parentheses): Chile (2000), Brazil (2005), Mexico (1990), China (2000), India (1995), Indonesia (2010), South Korea (2000), Poland (1995), Russia (2000), South Africa (1980), and Turkey (2005).

debt burdens, and their potential cost of default would be high. Second, over the past several decades, DM central banks have thoroughly defused inflation. The structural drag from weak aggregate demand and firms' limited pricing power has made sustained inflationary overshoots unlikely.[10] Third, the demand for DM sovereign debt is high. This demand flows from aging populations looking for vehicles to store savings, from financial institutions satisfying regulatory requirements and seeking to protect their balance sheets, and from sizable demands from central banks' QE policies.

While such forces are also in play for the emerging markets, their effect is somewhat attenuated relative to the DMs. Further, the EM asset class has had recent experience with defaults and restructurings, as well as with countries living through episodes of elevated inflation. As such, these kinds of risks may seem more imminent and material.

A related question consequently emerges: does this divergence make EM assets more or less attractive? On the one hand, it suggests that fiscal excesses in these countries are still likely to be punished by the market. This could introduce an additional source of variation in EM debt relative to that of DM. On the other hand, if such pressures successfully leverage more coherent economic policies, they could support better performance and higher returns over the medium term. Further, the fact that markets are pricing such risks creates opportunities for investors to generate relative return by choosing credits that successfully navigate debt-management challenges.

The fact that markets are pricing EM fiscal excesses creates opportunities for investors to generate relative return.

A final question regards the durability of this divergence. The bull case is that the EMs are gradually converging to DM-like fundamentals. This is certainly true of some of the strongest credits in the EM universe, such as Korea, Poland, and Chile. The bear case is that the markets are too sanguine in their pricing of DM risks—and that such premiums will eventually return there as well—the only question is when.

A third view, which seems an attractive middle ground, is that there are in fact deep and persistent differences between DM and EM, which the markets are seeking to price. Even so, it would not surprise us if some additional fraction of the EM asset class becomes more DM-like over time. Further, we broadly share the markets' assessment that the DM countries will successfully manage their high and rising debt burdens—but this is something that we will continue to watch closely.

[10] Consistent with this, we expect the current onslaught of inflationary pressures to be transitory. For details, please see, "The Jump in U.S. Inflation is Here. This is Where It May Head Next," May 12, 2021.

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Source(s) of data (unless otherwise noted): PGIM Fixed Income as of June 2021.

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