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ABSTRACT

We construct an international panel data set comprising three distinct yet plausible measures of government indebtedness: the debt-to-GDP, the interest-to-GDP, and the debt-to-equity ratios. Our analysis reveals that these measures yield differing conclusions about recent trends in government indebtedness. While the debt-to-GDP ratio has reached historically high levels, the other two indicators show either no clear trend or a declining pattern over recent decades. We argue for the development of stronger theoretical foundations for the measures employed in the literature, suggesting that, without such grounding, assertions about debt (un)sustainability may be premature.

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1 Three Measures of Indebtedness

Over the past few decades, macroeconomists and policymakers have increasingly focused on the ratio of outstanding government debt to a country’s annual gross domestic product (debt-to-GDP) as the primary measure of government indebtedness. During this period, many of the worlds largest economies have experienced significant increases in this ratio, reaching levels that are unprecedented in peacetime. For instance, over the last four decades, the debt-to-GDP ratio has tripled in the United States, doubled in the United Kingdom, and quadrupled in Japan (see Figure 1).

This exclusive focus on debt-to-GDP has led many economists and policymakers to conclude that the current debt levels in these countries are historically high and may therefore be unsustainable. However, what is often overlooked is the central role that debt-to-GDP plays in shaping this narrative. It has effectively become the defining metric of government indebtedness. Whats surprising is that there is little formal justification for using this ratio as the sole determinant of a country’s debt burden. As a result, the decision to emphasize debt-to-GDP over other potential measures of indebtedness is, in fact, arbitrary. What might have happened if economists and policymakers had chosen to focus on a different metric instead?

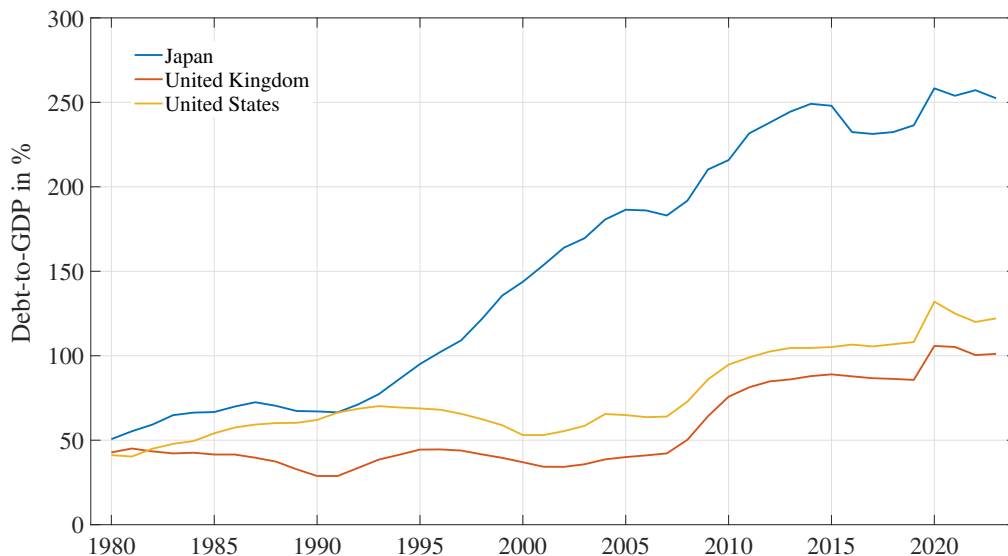


Figure 1: Debt-to-GDP Ratio for the US, UK and Japan.

Would they still conclude that debt levels are historically unprecedented? Our analysis suggests they likely would not. Drawing on the corporate finance literature, we construct two alternative and equally plausible measures of government indebtedness: the ratio of outstanding government debt to total wealth, proxied by the value of stock market equity (debt-to-equity), and the ratio of annual interest expense to gross domestic product

(interest-to-GDP). Figure 2 presents these three measures for the United States since 1900. As the figure illustrates, the three ratios display notably different patterns over this 125-year period. While the debt-to-GDP ratio has recently surpassed levels of indebtedness not seen since World War II, the interest-to-GDP ratio reached comparable levels during the 1985-1995 period. Most strikingly, the debt-to-equity ratio appears to show no clear trend and, if anything, has recently fallen to below-average levels.

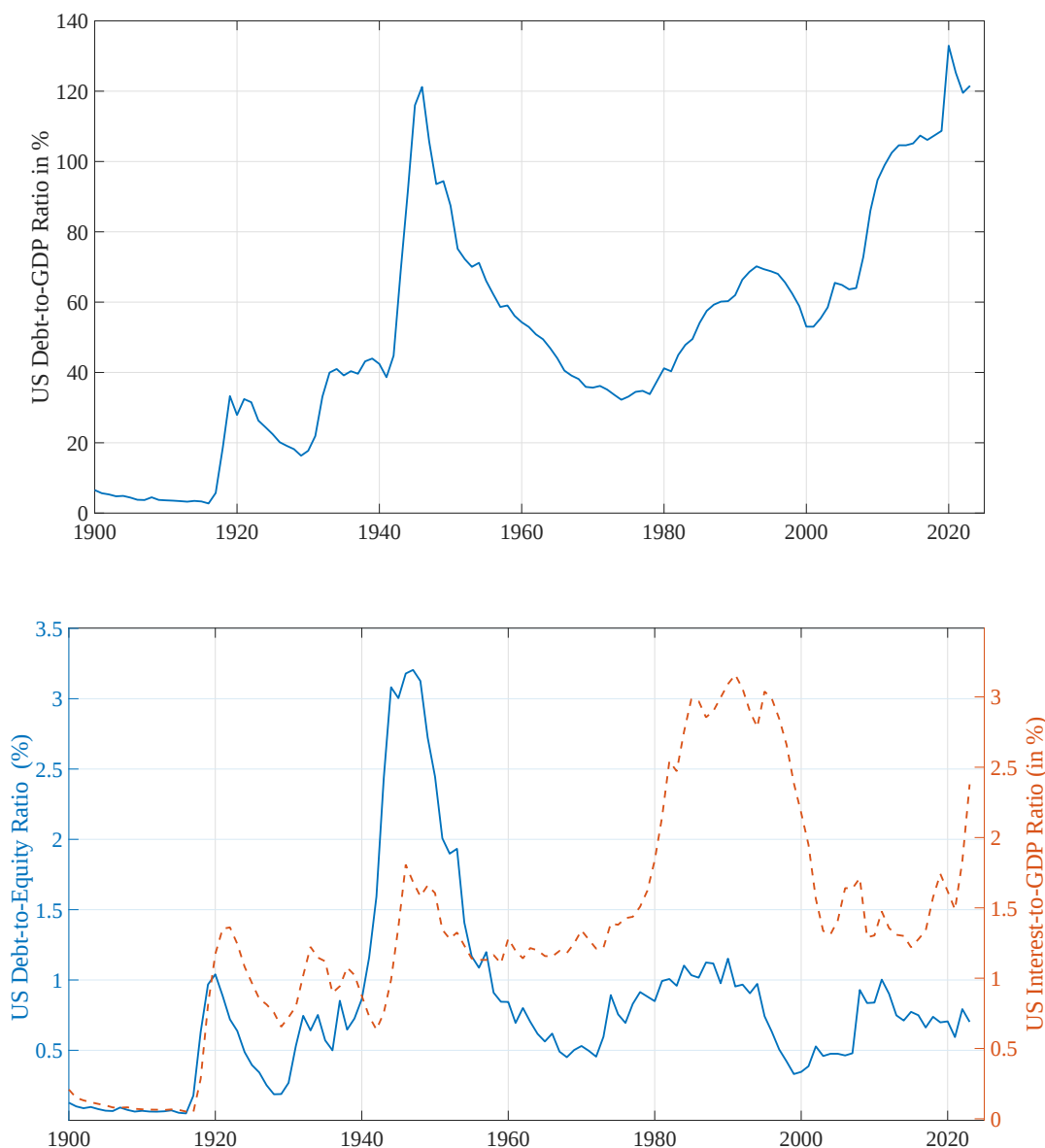


Figure 2: Three Measures of Indebtedness for the United States: Debt-to-GDP (top panel), Debt-to-Equity (bottom panel, left axis) and Interest Expense-to-GDP (bottom panel right axis).

Is the U.S. experience exceptional? The answer is no. Figure 3 reveals that when we

examine the median values of these three measures of indebtedness across 19 countries, which together represent the majority of global public debt (Argentina, Australia, Austria, Belgium, Brazil, Canada, Denmark, France, Germany, Greece, Italy, Japan, Mexico, Netherlands, Russia, Spain, Sweden, United Kingdom and the United States), the results are even more striking. While the median debt-to-GDP ratio has reached levels not seen in the past 125 years, both the interest-to-GDP ratio and the debt-to-equity ratio are currently below their historical averages. This suggests that if economists had chosen to focus on either of these alternative measures, rather than debt-to-GDP, the conversation about debt sustainability among policymakers, academics, and journalists would likely be very different today.

2 Implications

We do not take a position in this article on whether current levels of indebtedness are high, optimal, or sustainable. To answer that question, it is crucial that economists use a measure that accurately captures the object of interest. The fact that three equally plausible measures of indebtedness yield different results suggests that this condition has not been met in this case. In light of this, we propose a framework for determining a reliable measure of indebtedness.

Debt-to-GDP is a ratio that compares a stock to a flow. While it is not unusual for economists to use stock-to-flow ratios, it is well understood that strong stationarity assumptions are necessary for such ratios to be informative. For example, when calculating a company's dividend-to-price ratio, economists rely on assumptions about growth and risk premia to make the ratio meaningful in comparisons or time-series analyses. A similar issue arises with the debt-to-GDP ratio: for time variation in this measure to provide insights into debt sustainability, one crucial assumption is that debt and GDP are cointegrated. Given recent long-term trends in growth and interest rates, this assumption is unlikely to hold in the data we study.

In a non-stationary world with secular trends, it could be more informative to study flow-to-flow and stock-to-stock measures. For example, growth rate changes are presumably reflected in equity valuations and the interest rate governments pay on debt. So it is possible for both debt-to-equity and interest-to-GDP to be informative about debt sustainability even when growth rates fluctuate. Furthermore, corporate valuations (the present value of future cash flows) is one important indicator of taxable future cash flows (wealth). But with that said, it is hard to justify the use of any of these measures without knowing the set of assumptions that are required for the measure to be informative. That discussion is largely absent in the academic literature on the subject.

As a starting point for future research, we draw on insights from the corporate finance literature, which addresses a related issue: the optimal capital structure of firms. Both literatures—corporate finance and macroeconomics—started out similarly, concluding that in perfect markets with fully rational participants, the level of debt does not affect real

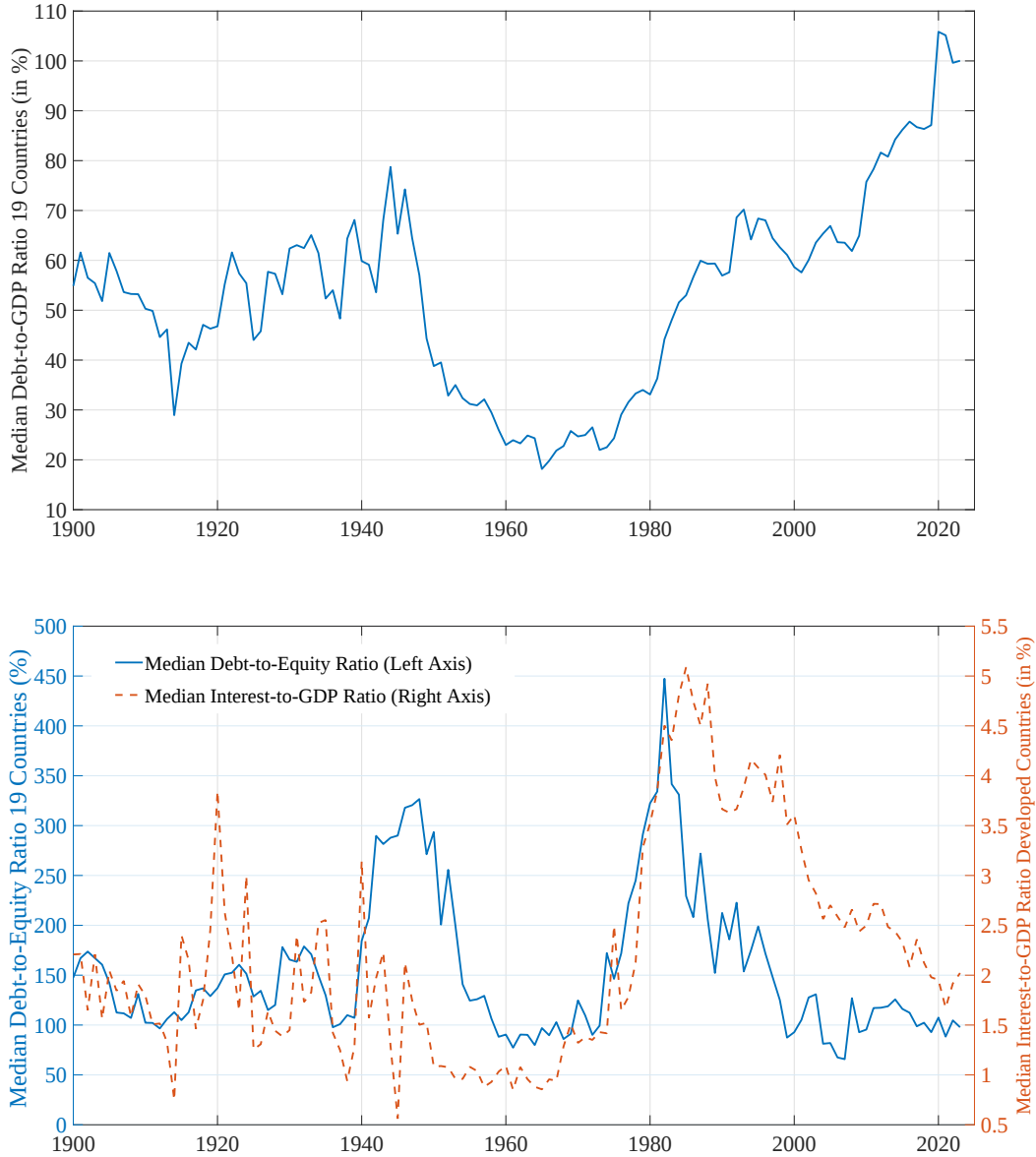


Figure 3: Three Median Measures of Indebtedness Across 19 countries: Debt-to-GDP (top panel), Debt-to-Equity (bottom panel, left axis) and Interest Expense-to-GDP (bottom panel right axis).

outcomes. In corporate finance, this result is known as the Modigliani-Miller Proposition, and in macroeconomics, it is referred to as Ricardian Equivalence. In both cases, economists observed that neither principle fully explained the empirical evidence. However, the two literatures diverged from that point. In corporate finance, economists sought to identify which assumptions failed and used those insights to refine corporate capital structure decisions and derive optimal levels of indebtedness. In macro, Ricardian Equivalence was viewed as an artifact of the strong assumptions required to derive it. Since few believed

these assumptions held in practice, no effort was made to determine which assumptions were responsible for the empirical failure of the theory. As a result, the literature has developed general notions that government debt is important for both economic growth and the likelihood of default, but little understanding of why seemingly low debt-to-GDP ratios (such as 40%) can trigger sovereign debt crises in countries like Argentina, while Japan, with a debt-to-GDP ratio of 250%, appears to face no such risk.

Without identifying the key departures from the assumptions that lead to the failure of Ricardian Equivalence, it is impossible to determine which measure of indebtedness would be informative in studying these issues. For instance, to assess the optimal level of government debt, it is essential to first understand why government debt matters. No one would argue that sovereign default is not associated with bad economic times. However, in a perfect market, there is no inherent one-directional causality. Continuing the analogy with corporate finance, in perfect markets, firm default is also coincident with firm economic distress. But, to infer causality, some form of friction is needed. The existing literature has focused on identifying these frictions and evaluating whether they are large enough to create a causal link between financial distress and subsequent economic distress.

3 Conclusion

In this article we have presented evidence of a panel of international government debt levels and have evaluated trends in the past 125 years according to three different measures (1) Debt-to-GDP, (2) Interest-to-GDP and (3) Debt-to-Equity. We find that these three different measures paint a very different picture regarding public indebtedness. This suggests that important future research, both theoretical and empirical, is warranted to reconcile these differing conclusions.

Theoretically, it is important to further explore the frictions that make indebtedness relevant to real economic outcomes. Empirically, it can be informative to see what these three different ratios predict going forward. While some of the literature focuses on debt sustainability and the prediction of government default, other focus on a somewhat different (though related) question: to what extent does government indebtedness affect future economic growth rates? Finally, research can focus on further sharpening the empirical measures themselves. Undoubtedly more comprehensive wealth measures can be constructed across countries, expanding upon the simple stock market capitalization measure we have used in this paper. Private equity valuations, real estate and other important components of wealth should be included in the denominator. Also, alternative measurements of GDP could be helpful in reconciling the different measures.