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# Why ‘Fiscal Austerity’? A Review of Recent Evidence on the Economic Effects of Sovereign Debt

CATHERINE BONSER-NEAL\*

## ABSTRACT

*Concerns about the economic effect of high sovereign debt levels have motivated policy makers to constrain or reduce the growth of fiscal deficits, a practice commonly known now as “fiscal austerity.” However, what do we know about the economic impacts of sovereign debt? This article provides an overview of some recent empirical economic research into this question. The article first discusses data and estimation challenges confronted by empirical research into the impact of sovereign debt on economic growth. The article then reviews several studies, which vary by country sample, time period studied, and estimation technique employed. The article also reviews recent empirical studies of the economic consequences of sovereign default. The results of this article’s survey suggest that while the bulk of the evidence shows a negative relationship between sovereign debt levels and economic growth, the evidence to date is mixed on whether higher debt burdens cause or are merely correlated with lower economic growth, and on whether there exists a certain ‘threshold’ beyond which this negative relationship arises. Only a few studies have provided evidence on the economic mechanism through which higher debt burdens impact economic growth. This review of the research does, however, reveal stronger evidence that sovereign default episodes have negative impacts on an economy’s growth. The article concludes by raising some important questions to be addressed if we are to better understand the economic impacts of debt.*

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\* Associate Professor of Finance, Indiana University Kelley School of Business—Indianapolis. I would like to thank the participants of the Indiana Journal of Global Legal Studies Conference on Law and the Globalization of Austerity, held September 11–12, 2014 at the Maurer School of Law in Bloomington, IN, for their comments.

## INTRODUCTION

The growth of fiscal deficits and rising debt levels that countries incurred during and following the 2007–2008 Global Financial Crisis have sparked renewed debate among economists and policy makers over the implications of increasing and high sovereign debt levels and the appropriate policies to address such burdens. This debate focuses on the levels at which debt adversely impacts an economy as well as the degree to which any adverse impacts arise. A recent debate in the online VoxEU forum nicely summarizes the two views. On the one hand, some argue that:

[The] debate is not about the desirability of restoring safer fiscal positions after the large increase in gross and net public debt in the last few years. This can be safely taken for granted. The question is whether governments should relent in their efforts to reduce deficits now, when the global economy is still weak, and policy credibility is far from granted.<sup>1</sup>

On the other hand, others argue “[p]ublic debt ratios without retrenchment would become unsustainable, even if ‘this austerity’ implies a temporary loss of employment and output.”<sup>2</sup>

What risks do high sovereign debt levels imply for an economy, and what is considered “high”? How do the answers to these questions vary by time, country, and economic conditions? Such answers are important to the intelligent implementation of policies that seek to slow or reverse such trends. This article reviews some of the recent empirical research on the economic impacts of sovereign debt. Following this introduction, the article reviews some of the trends in sovereign debt, and discusses theoretical links between sovereign debt and economic growth. The article then discusses the empirical research relating debt and economic growth and identifies some of the empirical challenges in measuring this relationship. This review of the empirical research will also examine the key question of whether a certain debt-to-gross domestic product (GDP) “threshold” level exists beyond which debt ratios begin to reduce economic growth. The article concludes with a discussion of empirical studies that examine the consequences of sovereign default.

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1. Giancarlo Corsetti, *Has Austerity Gone Too Far?*, VOX CEPR'S POL'Y PORTAL (Apr. 2, 2012), <http://www.voxeu.org/article/has-austerity-gone-too-far-new-vox-debate>.

2. Daniel Gros, *Austerity is Unavoidable After a Bout of Profligacy*, VOX CEPR'S POL'Y PORTAL (July 19, 2012), <http://www.voxeu.org/article/austerity-unavoidable-after-bout-profligacy>.

## I. SOVEREIGN DEBT: AN OVERVIEW OF RECENT TRENDS AND THEORETICAL PREDICTIONS

Before reviewing the empirical evidence on the relationship between sovereign debt and economic growth, it is useful to understand the evolution of sovereign debt. This section provides an overview of some historical trends, and also discusses potential economic implications of such trends.

### A. Trends in Sovereign Debt

Until recently, postwar concerns over sovereign debt burdens were focused on emerging market countries. Figure 1 shows how, historically, public debt ratios in excess of 60 percent of GDP were common in emerging market countries, but not in developed countries.<sup>3</sup> A sharp rise in fiscal deficits in advanced countries during World War II reversed these trends, with these countries' public debt ratios reaching a high of nearly 90 percent before falling sharply. During the post-World War II era, emerging market debt ratios once again rose above advanced country debt ratios, reaching a peak during the banking and financial crises of the 1980s and 1990s. Advanced country debt ratios averaged less than 40 percent between 1950 and 2006.

The Global Financial Crisis of 2007–2008 changed the post-war observation that sovereign debt burdens were largely the concern of emerging market countries. As government balances deteriorated, public debt-to-GDP ratios in advanced countries surpassed those of emerging markets, rising to levels not seen since World War II.<sup>4</sup> Figure 2 illustrates these sharp declines in the overall government balances of advanced countries during the recent recession. Moreover, Figure 3 shows the International Monetary Fund (IMF) projects this difference in debt burdens to continue, with average public debt-to-GDP levels in advanced countries expected to be 106 percent of GDP in 2015, compared to an average of 41 percent of GDP in emerging and middle-income countries.<sup>5</sup> Among individual countries, debt ratios in Japan, and the southern European countries impacted by the Euro Crisis, have reached historically high debt levels, with Japan's gross public debt-to-

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3. See *infra* Figure 1.

4. See Carmen M. Reinhart et al., *Public Debt Overhangs: Advanced Economy Episodes Since 1800*, 26 J. ECON. PERSP. 69, fig.1; see also Int'l Monetary Fund [IMF], *World Economic Outlook: Coping with High Debt and Sluggish Growth*, at fig.3.1 (Oct. 2012) (showing that debt levels in several advanced economies reached levels comparable to the mid-1940s), available at <http://www.imf.org/external/pubs/ft/weo/2012/02/pdf/text.pdf>.

5. See *infra* Figures 2, 3.

GDP expected to reach 245 percent in 2015.<sup>6</sup> Figure 4 shows that the gross government debt-to-GDP ratio in the United States has reached a level not seen since the World War II decade.<sup>7</sup> Indeed, the U.S. federal debt as a percentage of GDP has nearly doubled over its pre-2008 average.<sup>8</sup> The natural question facing policy makers and researchers is: how do these increases in debt burdens, which have reached postwar historic levels, impact an economy's growth?

### *B. What Does Theory Suggest about the Relationship between Debt and Growth?*

Public debt arises from the need by a government to finance a budget deficit. Different theories of the output effects from a rise in government spending—or the “fiscal multiplier,”—suggest values that range from negative to greater than one, depending on the model and assumptions applied.<sup>9</sup>

Theories of the impact of sovereign debt, however, focus on how the debt levels, which arise from the accumulation of such deficits, can impact output and economic growth. As illustrated in recent surveys, the range of model predictions for the economic impact of sovereign debt is wide.<sup>10</sup> Models that demonstrate a negative effect of higher debt on economic growth typically result from a decrease in investment.

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6. See Int'l Monetary Fund, *Fiscal Monitor: Back to Work—How Fiscal Policy Can Help*, at 1 tbl.1.2 (Oct. 2014), available at <http://www.imf.org/external/pubs/ft/fm/2014/02/pdf/fm1402.pdf> [hereinafter *Fiscal Monitor*].

7. See *infra* Figure 4; see also *Fiscal Monitor*, *supra* note 6, at tbl.1.2 (showing that the U.S. debt-to-GDP ratio increased from 2008 to 2013 and was projected to continue increasing through 2015).

8. See CONG. BUDGET OFFICE, THE 2014 LONG-TERM BUDGET OUTLOOK 1, 5 (2014), available at [http://www.cbo.gov/sites/default/files/45471-Long-TermBudgetOutlook\\_7-29.pdf](http://www.cbo.gov/sites/default/files/45471-Long-TermBudgetOutlook_7-29.pdf).

9. For a concise overview of theories of the fiscal multiplier, see Menzie Chinn, *Fiscal Multipliers*, in NEW PALGRAVE DICTIONARY OF ECONOMICS 1, 2–4 (Steven N. Durlauf & Lawrence E. Blume, eds., 2013), available at [http://www.dictionaryofeconomics.com/download/pde2013\\_F000329.pdf](http://www.dictionaryofeconomics.com/download/pde2013_F000329.pdf).

10. See Mark Aguiar & Manuel Amador, *Sovereign Debt: A Review*, in 4 HANDBOOK OF INTERNATIONAL ECONOMICS 647, 649–683 (Gita Gopinath et al. eds., 2014) (surveying literature on sovereign debt, with an emphasis on default); Douglas W. Elmendorf & N. Gregory Mankiw, *Government Debt*, in 1C THE HANDBOOK OF MACROECONOMICS 1615, 1627–1659 (John B. Taylor & Michael Woodford eds., 1999) (discussing the conventional view that government debt stimulates growth in the short term but reduces national income in the long term, and comparing it to the theory of Ricardian equivalence that government debt is irrelevant); Ugo Panizza & Andrea F. Presbitero, *Public Debt and Economic Growth in Advanced Economies: A Survey*, 149 SWISS J. ECON. STAT. 175, 176–193 (2013) (discussing an overview of literature that suggests debt negatively impacts growth but that the impact is small, and arguing that no study has effectively established a causal relationship between debt and negative growth).

According to this “conventional” view, a fall in public savings (equivalent to a rise in the budget deficit) not matched by a rise in private savings will reduce overall national savings. Since national savings are required for investment to take place, a fall in savings will then lead to a fall in investment and, hence, a fall in the country’s capital stock.<sup>11</sup> This effect, commonly known as the “crowding out effect,” implies that public debt is associated with lower economic growth because a lower capital stock will imply a lower future output. Of course, the extent to which government dissavings (or equivalently by a rise in government debt) impacts private savings depends on a number of factors, such as consumer preferences, the relevant time horizon, the openness of the economy, the degree of uncertainty, and the existence of tax effects.<sup>12</sup> Models that extend this simple framework by adding a monetary sector and the assumption of rational expectations capture additional negative economic effects of higher public debt burdens including: the risk of hyperinflation if governments are unable to finance existing debt, the impact of higher future taxes and distortions from those taxes, the risk of a reduction in discipline in the budget process, and, importantly, the risk of a crisis of confidence that increases the likelihood that sovereign default becomes self-reinforcing.<sup>13</sup> In most cases, these models focus on the longer-term implications of high levels of sovereign debt. More recent models, however, suggest that the inflationary effects of debt could be present in the short run.<sup>14</sup> For example, if an expectation that today’s real value of

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11. See Elmendorf & Mankiw, *supra* note 10, at 1629. Elmendorf and Mankiw illustrate this result using the national accounting equation:  $S_p + (T-G) = I + NFI$ , where  $S_p$  is private savings,  $T-G$  is the government budget balance,  $I$  is private real capital investment spending, and  $NFI$  is net foreign investment spending. If the sum  $S_p + (T-G)$  falls, then it must be the case that  $I$  also falls, unless offset by a rise in  $NFI$ . *Id.*

12. See, e.g., Robert J. Barro, *The Ricardian Approach to Budget Deficits*, 3 J. ECON. PERSP. 37 (1989) (discussing these assumptions underlying this result). See also Valerie A. Ramey, *Can Government Purchases Stimulate the Economy?*, 49 J. ECON. LITERATURE 673, 675 (2011) (reviewing some of the key theoretical differences between Neoclassical models and Keynesian models as they pertain to the fiscal multiplier); Michael Woodford, *Simple Analytics of the Government Expenditure Multiplier*, 3 AM. ECON. J.: MACROECONOMICS 1, 2 (2011) (discussing how assumptions regarding the type of taxes levied, the degree of price flexibility, the degree of monetary accommodation of fiscal policy, and expectations about future prices and monetary accommodation impact the size of the multiplier).

13. See Elmendorf & Mankiw, *supra* note 10, at 1630–32. For a more recent example of models which emphasize how increases in debt negatively impact the economy through increases in sovereign risk, see Giancarlo Corsetti et al., *Sovereign Risk, Fiscal Policy and Macroeconomic Stability* (Int’l Monetary Fund, Working Paper No. 12/33, 2012), available at <http://www.imf.org/external/pubs/cat/longres.aspx?sk=25681.0>.

14. For examples of such models that allow for inflation to be impacted over the short-term, see John H. Cochrane, *Understanding Policy in the Great Recession: Some Unpleasant Fiscal Arithmetic*, 55 EUR. ECON. REV. 2, 9 (2011) and Eric M. Leeper & Todd

debt that exceeds the present value of future surpluses will cause a rise in expected future inflation, then people will adjust their spending behavior today.<sup>15</sup> This adjustment in current spending will in turn drive up the price level until the real value of debt equals the present value of future budget surpluses, implying that inflation can rise today as a result of expectations of future debt levels.<sup>16</sup>

Other theories predict that debt will either have little to no impact on the economy (i.e., debt is “neutral”), or that it will have a positive effect. Models in which debt has minimal impact on the economy include those in which consumers act in a “Ricardian” manner such that consumers will offset the impact of a rise in public debt by increasing their own savings, so that total national savings is unchanged.<sup>17</sup> Some models show that it is also possible for an increase in public debt to have a positive impact on growth if an economy is subject to imperfect intermediation, whereby consumers cannot borrow as much or as cheaply as they would like compared to the government.<sup>18</sup> Under these conditions, additional government borrowing can actually increase savings and investment because it leads to additional liquid assets, thereby offering the private sector increased flexibility to respond to economic shocks. The availability of these liquid assets, therefore, enhances economic efficiency, which contributes to economic growth.

The theoretical predictions for the sign of the relationship between debt and growth are dependent on the model, and, hence, on the validity of assumptions about consumer behavior and the structure of the economy. While such models can provide insights into the different factors that may be influencing the debt-economic growth relationship, ultimately, empirical studies are needed to provide information on how—and under what conditions—increases in sovereign debt actually impact economic growth.

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B. Walker, *Perceptions and Misperceptions of Fiscal Inflation*, in *FISCAL POLICY AFTER THE FINANCIAL CRISIS* 255, 271–73 (Alberto Alesina & Francesco Giavazzi eds., 2013).

15. See Cochrane, *supra* note 14, at 18–19. Cochrane further shows that there is no “magic” debt level or threshold that sparks this inflation, and that “even very large debt is possible if people understand there is a plan to pay it off.” *Id.* at 18.

16. See Cochrane, *supra* note 14, at 18.

17. See, e.g., Robert J. Barro, *Are Government Bonds Net Wealth?*, 82 *J. POL. ECON.* 1095 (1974) (discussing whether increased government debt should be considered an increase in household wealth).

18. See Michael Woodford, *Public Debt as Private Liquidity*, 80 *AM. ECON. REV.* 382, 386 (1990).

## II. EMPIRICAL EVIDENCE ON THE IMPACTS OF SOVEREIGN DEBT ON ECONOMIC GROWTH

Before specifying and testing any empirical model of the relationship between sovereign debt and economic growth, several data issues must first be addressed. In particular, how is public debt measured? Should total (central plus regional and local), or simply central government debt be examined? Should one define debt to be total debt issued, whether held by the government or public, or should the focus be on debt held only by the public?<sup>19</sup> Should the measure of debt be calculated on a gross or a net basis?<sup>20</sup> If net debt is the preferred measure, should it be calculated using the market or the face values of government assets? Should debt be defined more broadly to include estimates of *future* social security, military and civil service retirement pensions, and other entitlement obligations? Finally, should the level of debt, whichever measure is chosen, be adjusted to reflect market and economic conditions such as inflation, changes in interest rates, and the business cycle?<sup>21</sup>

In most cases, data availability and a desire for data comparability across countries and time periods guide the measure of debt used in empirical studies. For example, studies have tended to focus on gross total or central debt, rather than on net debt, as a result of concerns with comparability in the calculation of the value of government assets held across countries, or as a result of the lack of data on government assets.<sup>22</sup> Public debt measures used in empirical studies also exclude the estimation of future government liabilities, since such liability estimates are not available for all countries.<sup>23</sup> As a result, the measure

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19. Government debt held in Social Security and Medicare trust funds is an example of government debt not held by the public.

20. Net government debt is gross public debt minus the government's financial assets. Net debt is therefore a measure of what the government would owe after existing assets are sold.

21. For the discussion of this problem, see Elmendorf & Mankiw, *supra* note 10, at 1620-21. They note that higher inflation reduces the real value of the debt, while the level of interest rates influences the market value of existing debt (with the value of debt rising in a period where interest rates are declining). Longer maturity debt is also more sensitive to changes in interest rates than is short-term debt, a result known as the "duration" of a bond.

22. See Panizza & Presbitero *supra* note 10, at 197 for a discussion of this issue. The empirical papers referenced in the next sections use gross, rather than net, debt as a measure of debt.

23. Data on public debt published by the International Monetary Fund, for example, does not include future liabilities in its estimates of gross public debt; the International Monetary Fund encourages countries to include such estimates as a line item in their



of government obligations will be biased downward for some countries with large future liabilities.<sup>24</sup> The public debt data used in empirical studies are generally adjusted to reflect their market, rather than face, values; however, these adjustments do require assumptions and estimation in the cases where the debt is not publicly traded.<sup>25</sup> Finally, the empirical studies surveyed in this article will differ according to whether they use total or central government debt as their measure of a country's debt burden. This choice is often dictated by the availability of historical data. The fact, however, that the two measures of government debt can imply very different debt-to-GDP levels means that empirical tests dependent on particular debt threshold levels will be impacted by the measure of debt employed.

A second empirical issue concerns the appropriateness of pooling advanced country and developing country debt-economic growth relationships given differences in economic structures. In particular, developing countries tend to have lower debt levels than developed countries, which is "consistent with the presence of credit constraints."<sup>26</sup> Further, these countries experience limitations on the ability to borrow as a result of weaker institutions, the prospects of larger financial shocks, and riskier debt structures.<sup>27</sup> Failure to adjust for such differences in economic structure could lead to incorrect inferences regarding the relationship between debt and growth. As a result, many of the cross-country studies discussed below separate the effects across the two types of country groups, or they include control variables to estimate the relative impact of each country group.

With the above data issues in mind, this section reviews empirical studies of the relationship between sovereign debt and economic growth. First, this section reviews descriptive studies of the empirical correlations between debt and economic growth across countries and time. Next, it discusses the potential for two-way causality between debt and growth, and examines studies that attempt to correct for any empirical biases that arise from this causality. The section concludes with a summary of empirical investigations into the mechanisms through which higher debt levels could impact economic growth.

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data. INT'L MONETARY FUND, PUBLIC SECTOR DEBT STATISTICS: GUIDE FOR COMPILERS AND USERS 4 (2nd ed. 2013), available at <http://www.tffs.org/pdf/method/2013/psds2013.pdf>.

24. For a discussion of the importance of accounting for future liabilities, see *id.* at 4.

25. For a discussion of how the International Monetary Fund adjusts its public debt statistics to reflect market values, see *supra* note 23, at 25.

26. LEE C. BUCHHEIT ET AL., COMM. ON INT'L ECON. POL'Y & REFORM, REVISITING SOVEREIGN BANKRUPTCY 9 (2013), available at <http://www.brookings.edu/research/reports/2013/10/sovereign-debt>.

27. *Id.* at 9.

*A. Descriptive Estimates of the Relationship between Sovereign Debt and Economic Growth*

Early attempts to examine the relationship between sovereign debt and economic growth focused on descriptive statistics of sovereign debt-to-GDP ratios and rates of economic growth across time. In one of the first studies of this kind, Reinhart and Rogoff constructed an extensive historical database of financial crises around the world and the economic factors that may be associated with such crises, including government debt levels.<sup>28</sup> Building on this early work, Reinhart and Rogoff's 2010 study examined the correlation between output growth and debt for twenty advanced economies over the postwar period, 1946–2009, and also over the longer period of 1800–2009 when such data is available.<sup>29</sup> To test for the impact of different threshold levels of debt, the authors split the sample into four categories of (central) government debt-to-GDP percentage ratios (0–30, 30–60, 60–90, >90) and examined real GDP growth rates of the countries falling in those quartiles. Their results indicated that the highest quartile of debt-to-GDP ratio was associated with lower average and median real GDP growth rates over the period in which such debt occurs. When examining this relation over longer periods for a sample of developed countries, a similar conclusion emerged.<sup>30</sup> For emerging market countries, the negative relationship between growth and debt levels occurred within two thresholds for emerging countries: when the debt-to-GDP ratio was in the 60–90 percent category, both the average and the median growth rates were lower. Growth was even lower when debt exceeded 90 percent of real GDP.<sup>31</sup> Though there was considerable variation in the degree to which growth was lower across countries, the result was nevertheless striking in its implications for how debt can have detrimental impacts on the long-term output of countries.

Published during the time of rising developed country deficits and debt, this article's results sparked renewed policy discussions about the dangers of high public debt burdens and provided support for policies of fiscal consolidation or "austerity" to reduce this burden. Researchers who uncovered a coding error and questioned the weighting

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28. See generally CARMEN M. REINHART & KENNETH S. ROGOFF, *THIS TIME IS DIFFERENT: EIGHT CENTURIES OF FINANCIAL FOLLY* (2009) (discussing a quantitative history of financial crises in their various forms). The authors noted that "[a]lthough private debt certainly plays a key role in many crises, government debt is far more often the unifying problem across the wide range of financial crises we examine." *Id.* at xxxiii.

29. See Carmen M. Reinhart & Kenneth S. Rogoff, *Growth in a Time of Debt*, 100 AM. ECON. REV. 573, 575 fig.2 (2010).

30. *Id.* at 575.

31. *Id.* at 576.

methodology used to calculate average and median growth results challenged some of the Reinhart and Rogoff conclusions, however.<sup>32</sup> After correcting the coding error and recalculating the statistics, the researchers found the drop in GDP growth above the 90 percent debt-to-GDP threshold to be much less than what the Reinhart and Rogoff (2010) paper had originally reported, though real GDP growth still remained below the rate that was observed at lower debt-to-GDP thresholds.<sup>33</sup> They also suggested the Reinhart and Rogoff results were sensitive to the time period used for the estimation.<sup>34</sup> While acknowledging the data coding error, Reinhart and Rogoff maintained that their broad conclusions, indicating that higher debt-to-GDP levels are associated with lower economic growth, remained unchanged.<sup>35</sup>

### *B. The Potential for Endogeneity Bias*

Interest in the implications of sovereign debt sparked a number of researchers to further explore and refine the estimation of the empirical link between sovereign debt and economic growth.<sup>36</sup> One important limitation of early descriptive studies was the recognition that there may be bidirectional causality between sovereign debt and economic growth. In particular, do higher debt-to-GDP levels reduce economic growth via some of the channels suggested by theory, or do negative shocks to real GDP growth combine with rising fiscal deficits during a recession to raise the debt-to-GDP ratio, or do both occur? The potential for this bidirectional causality, also known as an “econometric

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32. See, e.g., Thomas Herndon et al., *Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff*, 38 CAMBRIDGE J. ECON. 257, 263–66 (2014). In particular, they argue that since some countries have multiple episodes, the weighting is not balanced across countries and provides a misleading representation of the debt-growth correlation. *Id.*

33. *Id.* at 269 tbl.5.

34. *Id.* at 271 tbl.7.

35. Carmen Reinhart & Kenneth Rogoff, *Reinhart, Rogoff Admit Excel Mistake, Rebut Other Critiques*, WALL ST. J. (Apr. 17, 2013, 7:56 AM), <http://blogs.wsj.com/economics/2013/04/17/reinhart-rogoff-admit-excel-mistake-rebut-other-critiques/>. Reinhart and Rogoff also note that some of the data used in Herndon et al., *supra* note 28, was not available at the time of the writing of their original paper, but that the more recent data was incorporated into their later paper. *Id.* For the authors' later study that incorporates the more recent data, see Reinhart, *supra* note 4 (using more recent data to examine “the growth and interest rates associated with prolonged periods of exceptionally high public debt.”).

36. See generally Markus Eberhardt & Andrea F. Presbitero, *This Time They are Different: Heterogeneity and Nonlinearity in the Relationship Between Debt and Growth* (Int'l Monetary Fund, Working Paper No. 13/248, 2013) and Panizza & Presbitero, *supra* note 10, for a summary of some of these papers.

endogeneity bias," can be illustrated within a simple Ordinary Least Squares (OLS) framework in which Debt (D) and Growth (G) are functions of each other.<sup>37</sup> Specifically, in the regression,

$$1) \quad G = a + bD + u,$$

the coefficient "b" which measures the impact of debt on economic growth will be biased downward if debt is also a function of growth, as in

$$2) \quad D = m + kG + v,$$

and if  $k < 0$ .

In an attempt to address causality concerns that temporary recessions increased the debt burden, Reinhart, Reinhart, and Rogoff's 2012 study refined their earlier results by examining "debt overhangs," or situations where the gross central government debt-to-GDP exceeded 90 percent *for five years or more*, in twenty-two developed countries, with data for some countries going back to 1800.<sup>38</sup> They identified twenty-six cases of "debt overhangs" that met their definition, with many of the cases of gross public debt exceeding 90 percent associated with the costs of war.<sup>39</sup> They found that the "vast majority of high debt episodes—twenty-three out of twenty-six—coincided with substantially slower growth."<sup>40</sup> This impact of debt beyond a certain level, also known as a "threshold" effect has been documented in other descriptive analyses. For example, in its October 2012 World Economic Outlook report, the International Monetary Fund (IMF) found that "countries that crossed the 100 percent threshold typically experienced lower GDP growth than the advanced economy average."<sup>41</sup> The report also noted that economic growth was higher for countries that had decreasing debt burdens for each threshold, and the result was particularly strong for the 90–115 percent debt-to-GDP threshold.<sup>42</sup>

While these results are striking, persistence in both debt levels and growth imply that these descriptive threshold studies remain

37. Ugo Panizza & Andrea F. Presbitero, *Public Debt and Economic Growth: Is There a Causal Effect?*, 41 J. MACROECONOMICS 21, 22 (2014) [hereinafter Panizza & Presbitero, *Causal Effect*].

38. See Reinhart et al., *supra* note 4, at 78 tbl.2, for a commentary on specific country episodes of debt overhang.

39. *Id.* at 77.

40. *Id.* at 70.

41. See IMF, *supra* note 4, at 108.

42. *Id.*

susceptible to the endogeneity problem mentioned above: that is, disentangling the direction of causality between debt and growth may be difficult, especially during periods of sustained recession or low growth.<sup>43</sup> Furthermore, it is possible that there is no direct link between debt and growth, but rather a third factor (e.g., a banking crisis) that is driving both.

More sophisticated econometric techniques have, therefore, been employed in an attempt to determine the direction of causality, as well as to control for and identify possible “third factors” which may in fact be driving some of these descriptive empirical results. These econometric refinements can be grouped into four types.<sup>44</sup> First, researchers have attempted to isolate the predictive effect of debt-to-GDP ratios on economic growth via regressions of *future* real GDP growth rates on past debt-to-GDP levels.<sup>45</sup> Second, studies have tried to isolate or control for “fixed effects” of countries (to control for country factors that are unchanged over time but may be influencing the empirical results) or time periods (to control for similarities across countries in a given year which are impacting the results). Researchers have also used fixed effect models to attempt to control for factors such as demographics, the level of financial development, the existence of banking crises, the level of savings, and the openness of the country to trade that may impact the estimation of the debt-economic growth relationship.<sup>46</sup> Third, several papers have tested whether the relationship between debt-to-GDP and growth is nonlinear, so that only debt levels above a certain amount or threshold have an impact on growth, and some of these papers have estimated, rather than specified, these threshold levels.<sup>47</sup> Finally, studies have used econometric methods such as instrumental variable techniques to control for endogeneity and the simultaneous nature of the relationship between debt and growth.<sup>48</sup>

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43. See Reinhart et al., *supra* note 4, at 80.

44. See Panizza & Presbitero, *supra* note 10, at 182–192 (reviewing econometric modifications to early empirical studies, focusing on controls for covariates of debt and growth, endogeneity, and nonlinearity).

45. See, e.g., Stephen G. Cecchetti, M.S. Mohanty & Fabrizio Zampolli, *The Real Effects of Debt* 10 (Bank for Int’l Settlements, Working Paper No. 352, 2011); Manmohan S. Kumar & Jaejoon Woo, *Public Debt and Growth* 1, 10 (Int’l Monetary Fund, Working Paper No. 10/174, 2010).

46. See, e.g., Panizza & Presbitero, *Causal Effect*, *supra* note 37, at 36; Cristina Checherita-Westphal & Philipp Rother, *The Impact of High Government Debt on Economic Growth and its Channels: An Empirical Investigation for the Euro Area*, 56 EUR. ECON. REV. 1392, 1395 (2012); Cecchetti et al., *supra* note 45, at 14.

47. See, e.g., Cecchetti et al., *supra* note 45, at 16; Eberhardt & Presbitero, *supra* note 36.

48. Instrumental variables estimation involves using a variable, or an “instrument,” which is correlated with the independent explanatory variable which suffers from the

The results of studies that incorporate these methods are discussed below.

### C. A Summary of Empirical Results

The characteristics and results of recent empirical studies of the relation between debt levels and economic growth can be broadly distinguished from each other along four dimensions: (1) the countries and type of debt examined, (2) the existence of a "threshold effect" and how it is estimated, (3) the examined time horizon of the relationship between debt and growth (short-term, medium-term, or long-term), and (4) the extent to which methods to address the endogeneity and simultaneity problem in the estimation are used.<sup>49</sup> Such differences in the samples, the years covered, and the methodologies employed have led to varied conclusions on the debt-growth relationship, as shown below.<sup>50</sup>

#### 1. Empirical Support for a Negative Impact of Debt on Economic Growth

Several empirical studies that have found support for the hypothesis that higher debt-to-GDP levels tend to reduce economic growth, especially above thresholds of around 90 percent.<sup>51</sup> Using data on general government debt for eighteen OECD countries over the period from 1980 to 2010, joint authors Cecchetti, Mohanty, and Zampolli found that, even after controlling for endogeneity and other influences on growth, "a 10 percentage point increase in the ratio of public debt-to-GDP was associated with a 17–18 basis point reduction in the

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endogeneity bias, but which is not impacted by the dependent variable. Commonly used instrumental variables techniques include Two-Stage Least Squares, and Generalized Method of Moments (GMM). See Checherita-Westphal & Rother, *supra* note 46, at 1397 tbl.3, for an example of this method applied to the debt-to-GDP estimation.

49. Eberhardt & Presbitero, *supra* note 36, at 5.

50. See *id.* at 44, tbl.A1, for a categorization of the empirical literature according to the method, sample, and results. A summary of empirical results is also provided in Panizza & Presbitero, *Causal Effect*, *supra* note 37, at 22.

51. See Deniz Baglan & Emre Yoldas, *Government Debt and Macroeconomic Activity: A Predictive Analysis for Advanced Economies 7* (Fed. Reserve Bd., Div. of Research & Statistics & Monetary Affairs, Fin. And Econ. Discussion Series, Working Paper No. 2013-05, 2013); Anja Baum et al., *Debt and Growth: New Evidence for the Euro Area*, 32 J. INT'L MONEY & FIN. 809, 820 (2013); Mehmet Caner et al., *Finding the Tipping Point: When Sovereign Debt Turns Bad*, in SOVEREIGN DEBT AND THE FINANCIAL CRISIS: WILL THIS TIME BE DIFFERENT? 63, 73 (Carlos A. Primo Braga & Gallina Vincelette eds., 2010); Cecchetti et al., *supra* note 45; Checherita-Westphal & Rother, *supra* note 46; Eberhardt & Presbitero, *supra* note 36, at 5; Kumar & Woo, *supra* note 45.

subsequent average annual growth.”<sup>52</sup> They found further support for their hypothesis that growth improves with low levels of debt, and that higher debt-to-GDP levels in the top quartile were associated with lower future real GDP growth rates. The debt thresholds used in the tests were specified by the researchers, however, rather than estimated from the data itself.

Joint authors Baglan and Yoldas also examined the relationship between central government debt and growth in twenty advanced OECD countries, using the 1954–2008 portion of the data used in Reinhart and Rogoff’s 2010 original paper. They attempted to correct for the potential endogeneity bias using a fixed-effects panel regression technique combined with a recursive demeaning procedure.<sup>53</sup> In addition, rather than specify arbitrary threshold levels, these authors used techniques that allowed them to test for and estimate threshold effects in the debt-to-GDP empirical relationship. When the country data for all debt levels were pooled together, their results failed to demonstrate a statistically significant relationship between debt and economic growth.<sup>54</sup> However, when the sample was split into two groups based on their average debt-to-GDP ratios, the authors found a low threshold (18 percent debt-to-GDP ratio) for low-debt countries, beyond which growth tended to fall.<sup>55</sup> For the high debt-to-GDP country group, they found that “for a 10 percentage point increase in the debt-to-GDP ratio, annual output growth slows between 2 and 48 basis points per year.”<sup>56</sup>

In contrast to studies that focus on a sample of OECD countries, Checherita-Westphal and Rother’s 2012 study focused on estimating the relationship between general gross government debt levels and economic growth in twelve Eurozone countries over the 1970–2008 period. The authors argued that their data on debt and GDP were all measured in a consistent manner, and, hence, were more homogeneous in measurements than other studies that use OECD data.<sup>57</sup> In addition, they believed their focus on Eurozone debt-to-GDP relationships contained relevant information helpful to understanding the recent

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52. Cecchetti et al., *supra* note 45, at 14. The sample used in their paper also differs from that used in Reinhart & Rogoff, *supra* note 29, in that it uses general (rather than central) government debt over a shorter period, 1980–2010. In addition, the growth equation uses overlapping five-year averages of the per capita income growth rate as a way to reduce the impact of cyclical movements. *Id.* at 9.

53. Baglan & Yoldas, *supra* note 51, at 2.

54. *Id.* at 6.

55. *Id.* at 7.

56. *Id.* at 7.

57. See Checherita-Westphal & Rother, *supra* note 46, at 1394.

Eurozone Crisis.<sup>58</sup> In an attempt to correct for the possible endogeneity bias, the authors estimated the impact of debt-to-GDP on real GDP growth one and also five years ahead.<sup>59</sup> They also employed nonlinear and instrumental variable techniques. They found debt levels above 90–100 percent of GDP to be associated with lower economic growth, but that the errors around this threshold suggested negative growth effects could be present at a lower 70 percent threshold. These conclusions are consistent with the results of earlier studies that focused on OECD countries. Baum, Chechertia-Westphal, and Rother's 2013 study considered further refinements to the methods used to determine the appropriate threshold levels, and also examined the short-term (one year) impact of general government debt-to-GDP on real GDP growth in the twelve Euro Area countries over the 1990–2011 period.<sup>60</sup> They solved for a debt threshold and found that debt was associated with a positive impact on one-year-ahead economic growth below the threshold, consistent with a short-term positive effect of deficit spending on GDP. However, this economic impact fell toward zero as the debt level approached the debt threshold, and the effect became negative for countries with high debt-to-GDP levels above the estimated threshold.<sup>61</sup>

The studies discussed above, all of which have incorporated more precise econometric techniques, have focused on developed countries. Additional studies have conducted similar tests over a broader sample of developed and developing countries to determine the sign of the debt-growth relationship.<sup>62</sup> Joint authors Kumar and Woo, for example, examined a broader panel of thirty-eight developed and emerging market countries between 1970 and 2007.<sup>63</sup> Using a variety of estimation methods to address biases that arise from endogeneity and threshold concerns, and controlling for other economic influences, they found that higher gross general government debt was associated with lower future economic growth.<sup>64</sup> In addition, Kumar and Woo found

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58. *See id.* at 1395. The twelve Euro countries include the original eleven members plus Greece, using the European Commission's AMECO database of as of 2009. The authors claim that an advantage of their sample is that the debt and growth data are more homogeneous due to the application of common methodology in the construction of the government debt and GDP numbers.

59. *See id.* at 1395.

60. Baum et al., *supra* note 51, at 812–13.

61. *See id.* at 815 tbl.2. They obtain two estimates of the threshold beyond which higher debt reduces growth: the nondynamic model suggests a threshold of 72% of GDP, while the "dynamic" threshold model yields a threshold of 95% when estimated over the 1990–2010 period.

62. *See, e.g.,* Caner et al., *supra* note 51, at 64; Kumar & Woo, *supra* note 45, at 4.

63. Kumar & Woo, *supra* note 45, at 8.

64. *Id.* at 13.



evidence of a negative threshold effect above 90 percent debt levels, a result consistent with the original Reinhart and Rogoff article.<sup>65</sup>

Caner, Grennes, and Koehler-Geib's 2011 study examined the relation between gross general government debt in a broader group of seventy-five developing and twenty-six developed countries over the 1980–2008 period.<sup>66</sup> They also employed econometric techniques to estimate thresholds, and they found support for a threshold effect of around 77 percent for the entire sample, along with a somewhat lower threshold of 64 percent for the developing countries.<sup>67</sup> As the debt-to-GDP ratio exceeded those levels, economic growth was reduced. However, they did not explicitly control for the endogeneity bias, instead relying on the inclusion of the initial 1980 debt-to-GDP level as a partial control for the long-term impact of growth on debt.

Finally, Eberhardt and Presbitero's 2013 study revisited the issue of nonlinearity and thresholds in the relation between debt and growth by seeking to determine if differences across country patterns impact the results.<sup>68</sup> They noted that even if higher debt-to-GDP negatively impacts growth, this growth effect will differ across countries according to the reasons underlying the accumulation of such debt (e.g., borrowing for investment or nonproductive spending), and the economic conditions and level of development of the country.<sup>69</sup> As a result, they tested for within-country threshold effects, in contrast to a single threshold effect for all countries. Their paper also took into account time series issues that arise from the longer-term relationship between debt and economic growth using an error correction model that distinguishes between these shorter- and longer-term effects. Using a sample of gross general government debt on 105 developed and emerging countries from 1972 to 2009, they found evidence that countries with higher debt-to-GDP ratios have lower economic growth over the longer run, though they failed to find a specific debt threshold for that relationship.<sup>70</sup> Further, they found that the debt-growth coefficients differ across countries, suggesting that panel data estimation that aggregates these country effects into a single coefficient ignores the diversity of the country results.<sup>71</sup>

The studies discussed above, though differing in country sample, econometric technique, and strength of the relationship between debt

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65. *Id.* at 18.

66. Caner et al., *supra* note 51, at 64.

67. *Id.* at 73.

68. Eberhardt & Presbitero, *supra* note 36, at 5.

69. *Id.* at 8.

70. *Id.* at 20.

71. *Id.* at 25 (“The commonly found 90% debt threshold is likely to be the outcome of empirical misspecification—a pooled instead of heterogeneous model—and subsequently a misinterpretation of the results”).

and growth, are broadly supportive of the existence of a negative effect of high debt levels on future economic growth. Other studies, which have employed different adjustments for the endogeneity bias or different estimations of the debt threshold levels, however, have attained results that cast doubt on the robustness of this relationship.<sup>72</sup> These alternative results are discussed below.

## *2. Evidence Questioning the Robustness of the Debt-Growth Relationship*

Using data on central government debt from 1790 to 2009 as well as OECD data on general government debt from 1960 to 2009, Egert's 2013 study estimated several threshold models to determine whether an identifiable threshold for a negative relation between debt and economic growth exists.<sup>73</sup> While he found a negative relationship between central government debt and growth over the 1790–2009 period, the results revealed imprecision in the estimation of the number and the magnitude of the thresholds.<sup>74</sup> In addition, the endogenously determined debt-to-GDP threshold varied between 20–50 percent, depending on whether central or general government debt was used, and there was significant heterogeneity in the threshold levels across countries.<sup>75</sup> Hence, while the study provided support for a negative relation between debt and growth, the estimation of the precise threshold for when this negative relationship appears was subject to considerable uncertainty.

Pescatori, Sandri, and Simon in their 2014 study estimated the empirical relationship between debt levels and economic growth over a longer term by testing for the impact of gross general government debt-to-GDP levels that exceed a range of thresholds on real GDP growth five, ten, and fifteen years later.<sup>76</sup> This research differs from earlier studies by focusing on the predictive effect of debt-to-GDP levels above a number of thresholds on medium to longer-term future growth, rather than on contemporaneous and near-term economic growth. Using a new IMF data set of developed countries in which they allowed each country

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72. See Balázs Égert, *The 90% Public Debt Threshold: The Rise and Fall of a Stylised Fact* (OECD Econ. Dep't., Working Paper No. 1055, 2013); Andrea Pescatori et al., *Debt and Growth: Is There a Magic Threshold?* (Int'l Monetary Fund, Working Paper No. 14/34, 2014); Tito Cordella et al., *Debt Overhang or Debt Irrelevance?*, 57 INT'L MONETARY FUND STAFF PAPERS 1 (2010); Panizza & Presbitero, *Causal Effect*, *supra* note 37, at 23.

73. Egert, *supra* note 72, at 12.

74. *Id.* at 13.

75. *Id.* at 18.

76. See Pescatori et al., *supra* note 72.

to have multiple, but not overlapping, episodes, they failed to find evidence of a strong negative impact on growth over the medium term, and they did not find evidence supportive of a particular threshold at which debt has a negative influence.<sup>77</sup> The authors did, however, find some evidence that countries with high and increasing debt burdens faced lower growth and greater output variability than countries with high but decreasing debt burdens, and they concluded that the trajectory of the debt burden may matter more than the level itself.<sup>78</sup>

Finally, joint authors Cordella, Ricci, and Ruiz-Arranz and joint authors Panizza and Presbitero both explored whether other factors that might influence both debt and economic growth may be behind the observed debt-to-GDP relationship.<sup>79</sup> Examining seventy-nine developing countries over the 1970–2002 period, Cordella, Ricci, and Ruiz-Arranz estimated the extent to which country characteristics, in particular the quantity and quality of the investment, and the “quality” of institutions (defined using the CPIA, or Country Policy and Institutional Assessment, of the World Bank), were the source of the empirical debt-growth relationship.<sup>80</sup> If high debt levels reduce the levels of investment or if they reduce the quality of the investment in the country, then lower economic growth will tend to follow.<sup>81</sup> They used techniques to control for any endogeneity bias and found that developing countries with “good” policies and institutions were more likely to be sensitive to the accumulation of debt above certain levels, while countries with “poor” policies and institutions demonstrated little relationship between debt and growth. Further, they found that the negative impact of debt on growth in countries with good policies occurred at thresholds of between 20–80 percent of GDP.<sup>82</sup> Beyond the 80 percent level, debt appeared to become irrelevant as a factor for determining growth.<sup>83</sup> In countries with “poor policies and institutions,” however, the negative effect of debt on growth disappeared beyond the 15 percent debt-to-GDP level.<sup>84</sup> Their results suggested that the amount of debt does not alter the economic growth trajectory for countries with poor institutions and investment prospects.

In their 2014 paper, Panizza and Presbitero argued that earlier studies did not adequately control for the endogeneity problem because

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77. *Id.* at 9.

78. *Id.* at 10.

79. See Cordella et al., *supra* note 72; Panizza & Presbitero, *Causal Effect*, *supra* note 37.

80. See Cordella et al., *supra* note 72, at 5.

81. See, e.g., *id.* at 6.

82. *Id.* at 18.

83. *Id.* at 12.

84. *Id.*

the instruments used were likely to be poor substitutes for the influence of debt and may also be highly persistent.<sup>85</sup> Using an instrumental variables approach and a new instrument for public debt, they failed to find a negative effect of debt on economic growth for a sample of OECD countries over the 1980–2009 period.<sup>86</sup> Furthermore, they found no evidence supporting the existence of a threshold effect. However, they noted that while they did not find evidence of a negative relationship between debt and growth, this lack of evidence did not imply “countries can sustain any level of debt. . . . [T]he effect of debt may depend on how it is accumulated, on its composition, and on its structure.”<sup>87</sup>

Overall, the empirical evidence suggests that the strength of the relationship between sovereign debt-to-GDP levels and economic growth is mixed, with comparisons made more difficult by differences in time periods and country samples studied, in debt measured, and in the empirical methods employed. While the bulk of the evidence supports some negative relationship between debt levels and future longer-term economic growth, the strength and magnitude of this relationship varies across time and country sample, and the evidence fails to support a single threshold level beyond which higher debt burdens become detrimental to economic growth.

### 3. *How Can Debt Impact Growth?*

Given the mixed results on the empirical effect of public debt on economic growth, research has recently focused on examining the mechanism, rather than on just the pairwise relationship, for determining how sovereign debt levels can impact economic growth. These studies have focused on whether higher public debt levels impact expectations of default, interest rates, factor productivity, or the “fiscal multiplier.” For example, joint authors Aguiar and Amador showed that political “impatience” or the preference for spending now versus later, plus perceptions that the government will default and expropriate capital, can reduce investment spending, which then reduces growth.<sup>88</sup> Joint authors Broner, Erce, Martin, and Ventura proposed a model in which high levels of sovereign debt in the presence of creditor discrimination and financial frictions can lead to the displacement of private debt by public debt (also commonly known as “crowding out”),

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85. See Panizza & Presbitero, *supra* note 37, at 23.

86. *Id.* at 27.

87. *Id.* at 37.

88. See Aguiar & Amador, *supra* note 10, at 16.

which in turn reduces economic growth.<sup>89</sup> In their model, preferential treatment was given to domestic over foreign creditors of sovereign debt, which in turn lead to higher expected returns to domestic creditors, and as a result to the higher cost of borrowing for investment.<sup>90</sup> Baum, Checherita-Westphal, and Rother's 2013 study looked further at the economic impacts of higher debt by examining how debt affects estimates of the long-term real interest rate.<sup>91</sup> They found a positive impact, further supporting the "crowding out" hypothesis that higher debt could be affecting growth through the costs of borrowing for investment purposes.<sup>92</sup> Finally, joint authors Kumar and Woo and joint authors Checherita-Westphal and Rother both estimated the impact of debt on total factor productivity.<sup>93</sup> They found evidence that higher debt-to-GDP levels negatively impact total factor productivity, a result consistent with how debt could negatively impact the economy.

Another mechanism through which the level of debt can negatively impact the economy is through its influence on the size of a country's fiscal "multiplier." In particular, if concern about high debt levels encourages greater private savings, then the fiscal multiplier of any government spending stimulus will be reduced. While a thorough discussion of factors affecting the fiscal multiplier is beyond the scope of this article, recent evidence does suggest that higher debt has reduced fiscal multipliers significantly.<sup>94</sup>

Together, these results are consistent with the evidence that shows a negative impact of higher sovereign debt levels on economic growth. However, additional research is needed to determine the means through

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89. See Fernando Broner et al., *Sovereign Debt Markets in Turbulent Times: Creditor Discrimination and Crowding-Out Effects*, 61 J. MONETARY ECON. 114 (2014).

90. *Id.* at 116. But see Mark L.J. Wright, *Comment on "Sovereign Debt Markets in Turbulent Times: Creditor Discrimination and Crowding-Out Effects" by Broner, Erce, Martin and Ventura*, 61 J. MONETARY ECON. 143 (2014) (noting that the decreases in output observed in Europe may not be the result of a fall in the capital services, as one would expect if the crowding out hypothesis were to explain the fall in output. Rather, simply growth accounting categorizations suggest that most of the decrease in output appears to be associated with decreases in labor services and in total factor productivity).

91. See Baum et al., *supra* note 51.

92. *Id.* at 819.

93. See Checherita-Westphal & Rother, *supra* note 46, at 1403; Kumar & Woo, *supra* note 45, at 19.

94. See, e.g., Ethan Ilzetzki et al., *How Big (Small?) Are Fiscal Multipliers?*, 60 J. MONETARY ECON. 239 (examining quarterly data on forty-four countries over the 1960–2007 period and finding evidence that fiscal multipliers in high-debt countries (debt greater than 60% of GDP) are actually negative over the longer-run); Christiane Nickel & Andreas Tudyka, *Fiscal Stimulus in Times of High Debt: Reconsidering Multipliers and Twin Deficits* (European Cent. Bank, Working Paper Series No. 1513, 2013) (finding complementary results for seventeen European countries).

which this impact occurs, rather than on the direct effect of debt on growth, in order to better understand the conditions under which a country's economic growth rate is adversely impacted by higher debt burdens.

### III. WHAT ARE THE ECONOMIC CONSEQUENCES OF SOVEREIGN DEFAULT?

The previous section reviewed evidence on whether increases in sovereign debt-to-GDP ratios lead to lower economic growth. However, what happens to a country's economy when its debt rises to the level that triggers a default episode? An understanding of the implications of default episodes can provide additional insight into the motivations for fiscal consolidations, or "austerity" measures.

Before estimating the economic effects of default, one must first decide on the definition of what constitutes a sovereign default.<sup>95</sup> Defined narrowly, default occurs when the sovereign borrower breaks the terms of the debt contract. Defined broadly, default occurs whenever the borrower either breaks the terms of the contract, or requires new terms that are less favorable to the borrower.<sup>96</sup> Because researchers also group country defaults into episodes on the basis of these definitions, the definitions used will affect the measurement of both the number and the duration of default episodes.<sup>97</sup>

Once defaults have been defined, the next task is to estimate the economic effects of these defaults. One way to measure the economic impact of default is to examine an economy's economic growth rate following episodes of default. Borensztein and Panizza conducted such a study, testing the relationship between growth and default in eighty-three countries between 1972 and 2000.<sup>98</sup> Their results showed that sovereign default was associated with a 1.2 percentage point decrease in growth, with the impact of the default being concentrated in the first year of the default.<sup>99</sup> However, as in the debt-growth empirical literature, this result could reflect an endogeneity bias if there is bidirectional causality between default and economic growth such that low growth also leads to sovereign debt repayment problems. It is also

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95. See Michael Tomz & Mark L. J. Wright, *Empirical Research on Sovereign Debt and Default* 13 (Nat'l Bureau of Econ. Research, Working Paper No. 18855, 2013).

96. *Id.*

97. *Id.* at 13–14 (noting their default definition implied a continuous default period for Mexico between 1982 and 2000). *But cf.* Eduardo Borensztein & Ugo Panizza, *The Costs of Sovereign Debt*, 57 INT'L MONETARY FUND STAFF PAPERS 683, 683 (2009) (identifying four separate default episodes).

98. See Borensztein & Panizza, *supra* note 97.

99. *Id.* at 693.

possible that the observed correlation between defaults and economic growth actually reflects third factors that impact both default and growth, such as a banking or currency crisis or a shock to the country's terms of trade, all of which can lead to repayment problems and lower economic growth.<sup>100</sup> As a result, it is necessary to look beyond the simple default-growth correlation to understand the factors that are likely to be the source of the loss in economic growth following a sovereign default.

One obvious possible economic cost of default is the disruption in capital market access and increases in the cost of borrowing.<sup>101</sup> Evidence has shown such disruptions do occur, though the extent and length of the disruption to capital market access has varied across country episodes and the associated time period.<sup>102</sup> For example, by defining market access to include access to the bond or syndicated bank loan market, joint authors Gelos, Sahay, and Sandleris found that being in default negatively impacts market access to credit, and that the average country took 4.7 years during the period from 1980 through 2000 to regain market access following default.<sup>103</sup> However, the length of the exclusionary time falls in half when considering only the latter post-1990 sample.<sup>104</sup> Joint authors Borensztein and Panizza, after controlling for economic conditions such as per capita income, GDP growth, inflation, and fiscal and external balances, also found that episodes of default tended to be associated with both a decrease in the country's credit rating and an increase in the borrowing costs, but that the increases were concentrated in the year of and following default.<sup>105</sup> Joint authors Cole and Kehoe, however, suggested that the reputational impacts of default extended beyond the sovereign debt market.<sup>106</sup> They developed a model in which the reputational costs of default have spillover effects that extend to areas such as private foreign investment, as well as military, environmental, and economic alliances.<sup>107</sup>

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100. *Id.* at 693–694.

101. Jonathan Eaton & Mark Gersovitz, *Debt with Potential Repudiation: Theoretical and Empirical Analysis*, 48 *REV. ECON. STUD.* 289, 304 (1981) (acting as the first to model the impact of reputation costs and to examine some of the empirical economic impacts).

102. See Tomz & Wright, *supra* note 95, at 18, for a discussion of studies measuring access to capital markets following a default. As the authors note, measuring such impacts is complicated by two world wars, which also disrupted access to capital markets.

103. See R. Gaston Gelos et al., *Sovereign Borrowing by Developing Countries: What Determines Market Access?*, 83 *J. INT'L ECON.* 243, 250 (2011).

104. *Id.* at 249. However, the authors note that this latter number could be biased downwards because they consider only countries that regained access, and some countries that had defaulted within that time period had not regained market access.

105. Borensztein & Panizza, *supra* note 97, at 701.

106. See Harold L. Cole & Patrick J. Kehoe, *Models of Sovereign Debt: Partial Versus General Reputations*, 39 *INT'L ECON. REV.* 55, 55 (1998).

107. *Id.* at 69.

Default can also decrease income if it leads to restrictions on the ability to engage in or finance international trade.<sup>108</sup> Rose in his 2005 study examined the impact of sovereign debt renegotiations under Paris Club agreements and found an economically and statistically significant decrease in trade occurred.<sup>109</sup> Borensztein and Panizza's 2009 study also provided evidence that defaults were associated with a significantly negative impact of debt on trade credit, but that the effect was limited to the first or second year following default.<sup>110</sup> They found that after controlling for trade credit, default was associated with a large and statistically significant decrease in bilateral trade flows.<sup>111</sup> Zymek in his 2012 article provided further support for the adverse impact of default on trade. His paper examined a panel of developed and developing countries and found for both groups a stronger adverse impact of sovereign default on the exports of sectors more dependent on external financing.<sup>112</sup>

Sovereign defaults can also adversely impact an economy due to the effects of such defaults on a country's banking system.<sup>113</sup> In particular, domestic banks that hold sovereign debt as assets will see a sharp decrease in the value of their assets in the case of a sovereign default, and this fall in assets will in turn lead to a decrease in bank lending and an increase in the insolvency risk of the bank.<sup>114</sup> Joint authors Borensztein and Panizza tested the impact of default and found that a sovereign default lead to an eleven percent increase in the conditional over the unconditional probability of a banking crisis.<sup>115</sup> Other studies provided some additional insights and evidence on the links between

108. See Jeremy Bulow & Kenneth Rogoff, *Sovereign Debt: Is to Forgive to Forget?*, 79 AM. ECON. REV. 43, 43 (1989), who motivate their model by discussing this potential cost.

109. See Andrew K. Rose, *One Reason Countries Pay Their Debts: Renegotiation and International Trade*, 77 J. DEV. ECON. 189, 205 (2005). The 'Paris Club' is a group of 20 developed countries whose role is to "find coordinated and sustainable solutions to the payment difficulties experienced by debtor countries." CLUB DE PARIS, <http://www.clubdeparis.org/en/> (last visited Apr. 27, 2015).

110. See Borensztein & Panizza, *supra* note 97, at 710.

111. *Id.* at 711.

112. See Robert Zymek, *Sovereign Default, International Lending and Trade*, 60 IMF ECON. REV. 365, 378 (2012). *But see, e.g.*, Jose Vicente Martinez & Guido Sandleris, *Is it Punishment? Sovereign Defaults and the Decline in Trade*, 30 J. INT'L MONEY AND FIN. 909 (2011) (finding that the effect of the decrease in trade, and subsequent sovereign defaults, does not lead to a larger decline in bilateral trade with creditor countries affected by the default).

113. See generally REINHART & ROGOFF, *SUPRA* NOTE 28 (discussing episodes of banking crises and sovereign default).

114. Borensztein & Panizza, *supra* note 97, at 713.

115. *Id.* at 713.



sovereign defaults and banking crises.<sup>116</sup> Brutti's 2011 study showed that when banks hold government bonds to boost their liquidity, a sovereign default can trigger a liquidity crisis that then hurts the domestic banking system and the economy.<sup>117</sup> In line with Brutti's prediction, the empirical results showed that firms with greater dependence on external finance experience sharper contractions following a sovereign default.<sup>118</sup>

Joint authors Gennaioli, Martin, and Rossi also modeled the links between the banking sector and sovereign debt. They showed that banks' desire to hold public bonds as assets to back up loans and investments implied that a sovereign default has adverse consequences for the banking sector.<sup>119</sup> Examining 101 examples of sovereign defaults, they found that sixty-seven percent were associated with banking crises and a sharp fall in private credit.<sup>120</sup>

Finally, recent research has shed light on the linkages between sovereign and corporate default.<sup>121</sup> Joint authors Das, Papaioannou, and Trebesch examined how sovereign default risk can impact a private firm's access to capital.<sup>122</sup> Bai and Wei's 2012 study also found that sovereign risk, as measured by credit default swap (CDS) spreads in thirty countries, increased corporate CDS spreads.<sup>123</sup> Hence, sovereign default risk appears to have a wider impact on a country's economy

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116. See, e.g., Filippo Brutti, *Sovereign Defaults and Liquidity Crises*, 84 J. INT'L ECON. 65 (2011); Nicola Gennaioli et al., *Sovereign Default, Domestic Banks, and Financial Institutions*, 69 J. FINANCE 819 (2014).

117. Brutti, *supra* note 116, at 65–66.

118. See *id.* at 70.

119. Gennaioli et. al, *supra* note 116, at 821.

120. See *id.* at 842; see also Ricardo Correa & Horacio Sapriza, *Sovereign Debt Crises* (Bd. of Governors of the Fed. Reserve Sys., Int'l Fin. Discussion Paper No. 1104, 2014), available at <http://www.federalreserve.gov/econresdata/ifdp/2014/index.htm> (discussing the sovereign debt-banking crisis channel).

121. See, e.g., Udaibir S. Das et al., *Sovereign Default Risk and Private Sector Access to Capital in Emerging Markets* (IMF Working Paper No.10/10, 2010), available at [http://www.imf.org/external/pubs/cat/wp1\\_sp.aspx?s\\_year=2010&e\\_year=2010&brtype=default](http://www.imf.org/external/pubs/cat/wp1_sp.aspx?s_year=2010&e_year=2010&brtype=default); Jennie Bai & Shang-Jin Wei, *When is There a Strong Transfer Risk from the Sovereigns to the Corporates? Property Rights Gaps and CDS Spreads* (Fed. Reserve Bank of N.Y. Staff Report No. 579, 2012), available at [http://www.newyorkfed.org/research/staff\\_reports/sr579.html](http://www.newyorkfed.org/research/staff_reports/sr579.html).

122. Das et al., *supra* note 121, at 27 (summarizing their findings that sovereign defaults negatively impact corporate borrowing in emerging economies over the 1980–2004 period, and that increases in perceived sovereign risk reduces corporate borrowing over the more recent 1993–2007 period).

123. Bai & Wei *supra* note 121, at 4 (noting that after controlling for other influences, a 100 basis point increase in a country's sovereign credit default swap (CDS) spread leads to an average 71 basis point increase in corporate CDS spreads, with the transfer effect being stronger in firms with state ownership).

through its impact on the risk and costs of borrowing by firms in the economy.

#### CONCLUSION

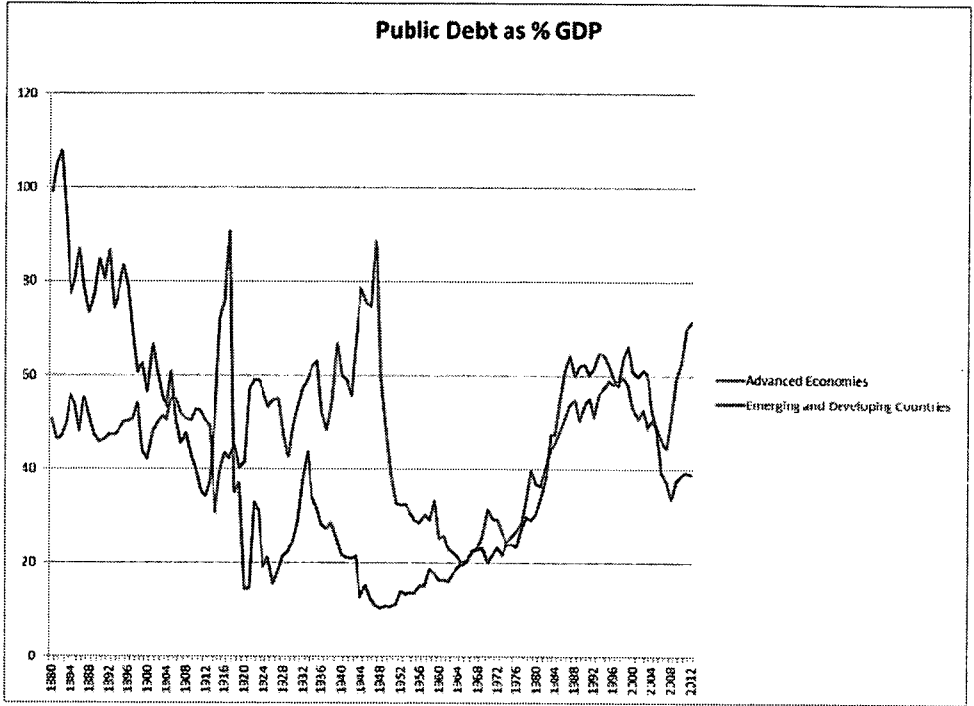
The use of fiscal "austerity" measures has sparked an active debate about the needs for such measures. An important motivation for these policies has been a concern regarding the longer-run economic impacts of the growth and levels of sovereign debt. This article reviews some of the recent evidence on the link between sovereign debt and economic growth. The results of this article's survey suggest that, while the bulk of the evidence demonstrates a negative relationship between debt and economic growth, the evidence is nevertheless mixed on whether higher debt burdens are the cause of lower growth, whether there exists a well-defined threshold debt-to-GDP level effect, and which economic factors may ultimately be behind the negative impact of higher debt burdens on economic growth. The empirical results are also sensitive to the countries and the time period examined, and to the empirical methods employed. The evidence of negative economic impacts of sovereign default episodes is stronger, though the magnitudes of the effects also depend on the sample and time period.

As noted by Panizza and Presbitero's 2013 study, however, "saying that there is no evidence that debt is bad for growth is different from saying that there is evidence that debt does not matter for growth."<sup>124</sup> Many theoretical models suggest reasons why debt beyond a certain level may hinder economic growth or lead to higher inflation, and prudent policy makers should take into account these possible impacts in their decision-making processes. The challenge to future empirical research is to better understand the mechanisms through which debt impacts growth, and to identify the conditions under which these mechanisms are likely to be operative. Additional cross-country research based on similar measures of debt, taking into account the different economic structures and stages of financial development (as well as endogeneity issues) is therefore needed to deepen our understanding of the economic effects of sovereign debt burdens.

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124. Panizza & Presbitero, *supra* note 10, at 198.

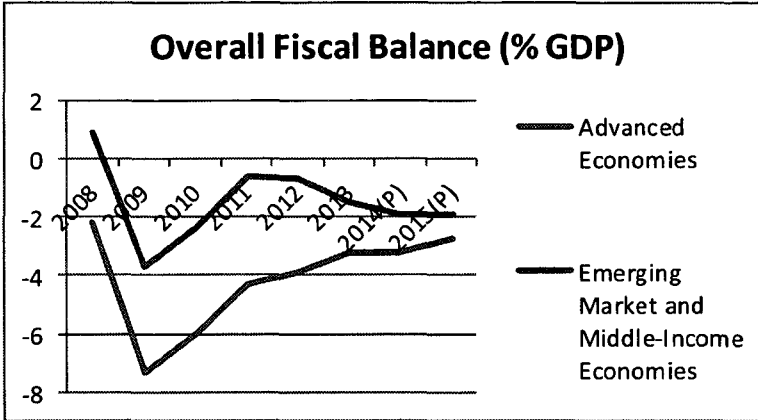
**Figure 1: Public debt as a percent of GDP, advanced economies vs. emerging and developing countries, 1880–2012<sup>125</sup>**



Source: *IMF Data Mapper: Historical Public Debt Database*, INT'L MONETARY FUND, <http://www.imf.org/external/datamapper/index.php?db=DEBT>.

125. Values are medians of nominal GDP-weighted Gross Government Debt as a percentage of GDP.

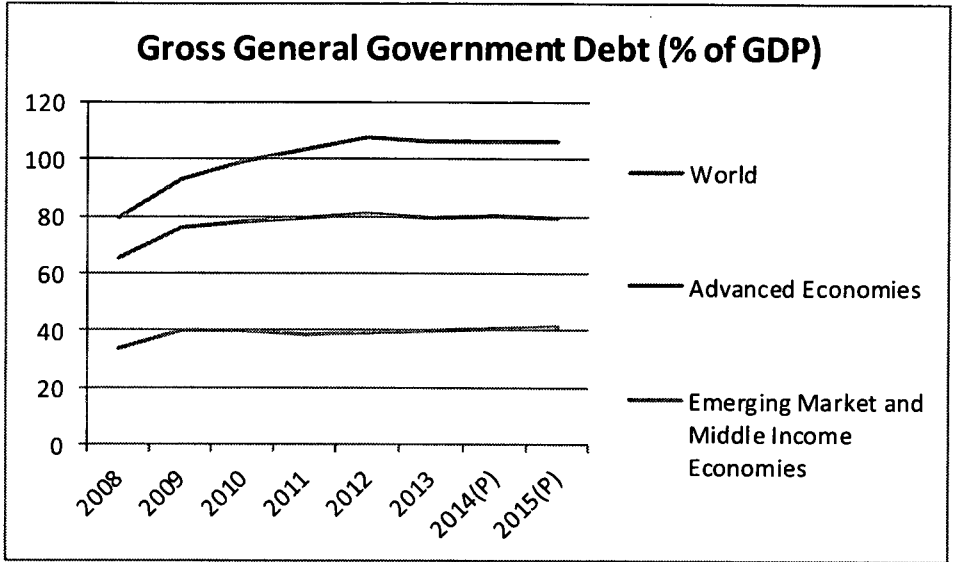
**Figure 2: Overall fiscal balance as a percent of GDP, 2008–2015<sup>126</sup>**



Source: IMF, *Fiscal Monitor: Back to Work—How Fiscal Policy Can Help*, at Table 1.1a (Oct. 2014), available at <http://www.imf.org/external/pubs/ft/fm/2014/02/pdf/fm1402.pdf>.

126. The 'P' for years 2014 and 2015 refers to 'projection'. For the list of countries designated as 'Advanced Economies' and as 'Emerging Market and Middle Income Countries', see *Fiscal Monitor*, *supra* note 6, at 60.

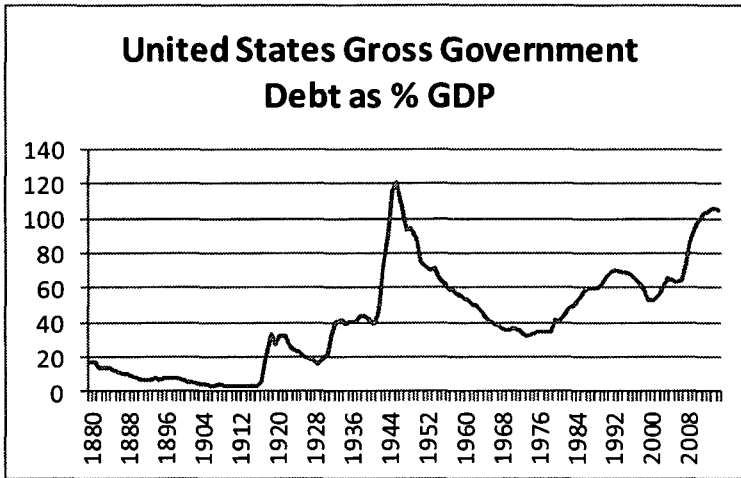
**Figure 3: Gross general government debt as percent of GDP, 2008–2015<sup>127</sup>**



Source: IMF, *Fiscal Monitor: Back to Work—How Fiscal Policy Can Help*, at Table 1.2 (Oct. 2014), available at <http://www.imf.org/external/pubs/ft/fm/2014/02/pdf/fm1402.pdf>.

127. *Id.*

**Figure 4: Gross government debt as percent of GDP**



Source: IMF Data Mapper: Historical Public Debt Database, INT'L MONETARY FUND, <http://www.imf.org/external/datamapper/index.php?db=DEBT>; IMF, *Fiscal Monitor: Back to Work—How Fiscal Policy Can Help*, at Table 1.2 (Oct. 2014), available at <http://www.imf.org/external/pubs/ft/fm/2014/02/pdf/fm1402.pdf>.