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## Reinhart and Rogoff: Responding to Our Critics

By CARMEN M. REINHART and KENNETH S. ROGOFF

CAMBRIDGE, Mass.

LAST week, we were sent a sharply worded [paper](#) by three researchers from the University of Massachusetts, Amherst, at the same time it was sent to journalists. It asserted serious errors in our article “Growth in a Time of Debt,” published in May 2010 in the Papers and Proceedings of the American Economic Review. In an Op-Ed essay for The New York Times, we have tried to defend our research and refute the distorted policy positions that have been attributed to us. In this appendix, we address the technical issues raised by our critics.

These critics, Thomas Herndon, Michael Ash and Robert Pollin, identified a spreadsheet calculation error, but also accused us of two “serious errors”: “selective exclusion of available data” and “unconventional weighting of summary statistics.”

We acknowledged the calculation error in an [online statement](#) posted the night we received the article, but we adamantly deny the other accusations.

They neglected to report that we included both median and average estimates for growth, at various levels of debt in relation to economic output, going back to 1800. Our paper gave significant weight to the median estimates, precisely because they reduce the problem posed by data outliers, a constant source of concern when doing archival research that reaches far back into economic history spanning several periods of war and economic crises.

When you look at our median estimates, they are actually quite similar to those of the University of Massachusetts researchers. (See the attached table.)

Moreover, our critics omitted mention of our paper [Public Debt Overhangs: Advanced-Economy Episodes Since 1800](#) with Vincent R. Reinhart, published last summer, in The Journal of Economic Perspectives. That paper, which is more thorough than the 2010 paper under attack, gives an average estimate for growth when a country’s debt-to-G.D.P. ratio exceeds 90 percent of 2.3 percent — compared to our critics’ figure of 2.2 percent. (Also see the comparisons posted by the blogger known as [F. F. Wiley](#), including his chart, a copy of which accompanies this essay.)

Despite the very small actual differences between our critics’ results and ours, some commenters have trumpeted the new paper as a fundamental reassessment of the literature on debt and growth. Our critics have done little to argue otherwise; Mr. Pollin and Mr. Ash made the same claim in an [April 17 essay in The Financial Times](#), where they also ignore our strong exception to the claim by Mr. Herndon, Mr. Ash and Mr. Pollin that we use a “nonconventional weighting procedure.” It is the accusation that our weighting procedure is nonconventional that is itself

nonconventional. A leading expert in time series econometrics, [James D. Hamilton](#) of the University of California, San Diego, [wrote](#) (without consulting us) that “to suggest that there is some deep flaw in the method used by RR or obvious advantage to the alternative favored by HAP is in my opinion quite unjustified.” (He was using the initials for the last names of the economists involved in this matter.)

Above all, our work hardly amounts to the whole literature on the relationship between debt and growth, which has grown rapidly even since our 2010 paper was published. A number of careful empirical studies have found broadly similar results to ours. But this is not the definitive word, as a smaller number of just as scholarly papers have not found a robust relationship between debt and growth. (Our paper in *The Journal of Economic Perspectives* included a review of that literature.)

Researchers at the Bank of International Settlements and the International Monetary Fund have weighed in with their own independent work. The World Economic Outlook published last October by the International Monetary Fund devoted an entire chapter to debt and growth. The most recent update to that outlook, released in [April](#), states: “Much of the empirical work on debt overhangs seeks to identify the ‘overhang threshold’ beyond which the correlation between debt and growth becomes negative. The results are broadly similar: above a threshold of about 95 percent of G.D.P., a 10 percent increase in the ratio of debt to G.D.P. is identified with a decline in annual growth of about 0.15 to 0.20 percent per year.”

This view generally reflects the state of the art in economic research, and the I.M.F. goes on to give many more subtleties. We have never complained as the body of work we helped to build has evolved — instead, we have tried to learn from it. In contrast, our critics have politicized the issue, noting the citation of our research by Representative Paul D. Ryan of Wisconsin, the Republican vice-presidential nominee last year.

Our critics seem to suggest that they can ignore everything else we have done because we are somehow going around placing great emphasis on one outlier estimate for growth. This is wrong. We have never used anything but the conservative median estimate in our public discussions, where we stated that the difference between growth associated with debt under 90 percent of G.D.P. and debt over 90 percent of G.D.P. is about 1 percentage point. See, for example, a [Bloomberg Businessweek article](#) from July 2011 that has been cited as evidence that we are fiscal hawks. In that article, we cite only the median.

Some have claimed that where we have really done damage is not in our public statements, but in what we say behind closed doors to policy makers. Some of those discussions have indeed leaked out over time, but they consistently show that our focus has been the median estimate.

We might add that when we give public opinions and especially when we give policy advice, we base our ideas on our entire experience and knowledge of the literature, never just on our own work.

We are glad the debate has sparked a huge interest in the whole topic, and hope research will now evolve even more quickly. We have shared our data with hundreds of researchers and since 2011 have posted the difficult-to-reconstruct historical debt-to-G.D.P. [ratios online](#) in thoroughly documented spreadsheets. The project of posting our data set relating to financial crises is a daunting task. It was the basis for our 2009 book, "This Time Is Different," which was well received throughout the economics profession.

We took great pains to provide the data in as accessible form as possible, including especially meticulous source documentation in the spreadsheets, far more than one sees normally posted with journal papers. So we are simply stunned when bloggers and irresponsible commentators say we have not shared our debt data. Open access to our data has been central to our whole project.

As for the accusations of selective omission of data, there is little appreciation that this is archival research, involving constant judgments at every step. The New Zealand data we used was part of the problem that Herndon et al. allude to biasing the results in favor of lower growth at higher levels of debt. We have since incorporated the correct data in our Journal of Economic perspectives paper. Oddly, Herndon et al. do not mention another data omission. This one was intentional on our part. Back in 2010, we were still sorting inconsistencies in Spanish G.D.P. data from the 1960s from three different sources. Our primary source for real G.D.P. growth was the work of the economic historian Angus Madison. But we also checked his data and, where inconsistencies appeared, refrained from using it. Other sources, including the I.M.F. and Spain's monumental and scholarly historical statistics, had very different numbers. In our 2010 paper, we omitted Spain for the 1960s entirely. Had we included these observations, it would have strengthened our results, since Spain had very low public debt in the 1960s (under 30 percent of G.D.P.), and yet enjoyed very fast average G.D.P. growth (over 6 percent) over that period. We later reconciled this problem for our 2012 paper. This is just an example of what our archival research involves; it is not simply a matter of filling in cells on an Excel spreadsheet from sanitized, easy-to-use databases.

We conclude with a few thoughts to supplement our broader discussion of the issues in our Op-Ed piece. First, we reiterate that the frontier question for research is the issue of causality. Clearly, recessions can cause higher debt, and in some extreme cases drive debt to over 90 percent, though such extreme jumps are rare outside of a financial crisis. We ourselves, in our 2009 book, showed that for postwar systemic financial crises, the average rise in the debt-to-G.D.P. ratio after three years is 86 percent. But in our Journal of Economic Perspectives, we show that the duration of high-debt episodes (debt over 90 percent of G.D.P.) is very long indeed. The paper contains a case-by-case description of each debt overhang episode in advanced economies since 1800. As we note in our essay for The Times, the long duration of the overhangs, averaging 23 years, makes it hard to argue that they are simply the result of recessions driving up debt. We also note in that article that roughly half of all debt overhang episodes are associated with elevated real interest rates, suggesting the kind of vicious feedback loop between debt and growth that the periphery countries of the euro zone are currently suffering. In our view, the only way to break this feedback loop is to have dramatic write-downs of debt.

We also note that a little under half of all cases do not involve higher real interest rates, such as the recent Japanese experience. Our Op-Ed gives reasons debt might still matter, including the way in which it crowds out fiscal space and limits the economy's capacity to respond to shocks. But the root of the problem is still probably the fact that as debt rises, so too does the risk that a turn in interest rates might suddenly take the country from a seemingly safe debt situation to an unsustainable one. The economic literature is replete with examples of this, and many forecasts suggest long-term interest rates will rise significantly over the next decade.

The basic problem for fiscal policy is that interest rates can turn very quickly but debt ratios cannot. So, most countries sensibly exercise some prudence as debt rises. Perhaps they are overly cautious. But the fact that debt levels over 90 percent of G.D.P. are rare (roughly 8 percent of postwar observation in advanced economies) and debt levels over 120 percent of G.D.P. are very rare. It is true that Japan has been an outlier since the 1990s, with gross public debt to G.D.P. exceeding 230 percent. But this ignores the fact that Japan, unlike the United States, is a creditor nation, holding massive dollar reserves that somewhat offset its debt. Until recently, it has always been running a current surplus with the rest of the world while the United States needs to borrow. Some have also used the example of Britain in the 18th century, when gross debt also exceeded 200 percent of G.D.P. Indeed, we include this and any other episode lasting longer than five years for which the data is available.

The graduate students now poring over debt data should consider using the five-year filter used in our 2012 paper. This does not turn out to exclude all that many debt overhang experiences, but it does filter out a few associated with short recessions and postwar remobilizations. The big question today is not how economies do with high debt after a war, but how to handle high debts in peacetime. After a war, when physical capital is destroyed, but human capital remains, it is often possible to rebuild faster. There are also many efficiency benefits from releasing wartime controls and bringing manpower to productive use. But the first few years of such experiences, in any event, might not necessarily capture the problem that one is interested in, of today's peacetime deficits. Again, in our 2012 paper, we explore many reasons debt overhang might matter for growth, at least in theory. But much more needs to be understood.

We again turn readers to our print Op-Ed to understand ideas for bringing debt down. To reiterate, there are four solutions: slow growth and austerity for a very long time, elevated inflation, financial repression and debt restructuring. We have long emphasized the need to use the whole tool kit creatively in the aftermath of a once-in-75-year financial crisis. One of us has widely discussed using [financial repression](#) as a means of dealing high debt. Even at the outset of the crisis, one of us advocated mildly high inflation. A [Project Syndicate column](#) in December 2008 advocated [moderately elevated inflation](#) as means of getting the economy moving again, in part by taking some edge off public and private debts. Bill Clinton's 2011 book "Right to Work" cites our proposals to write down subprime mortgage debt on a large scale.

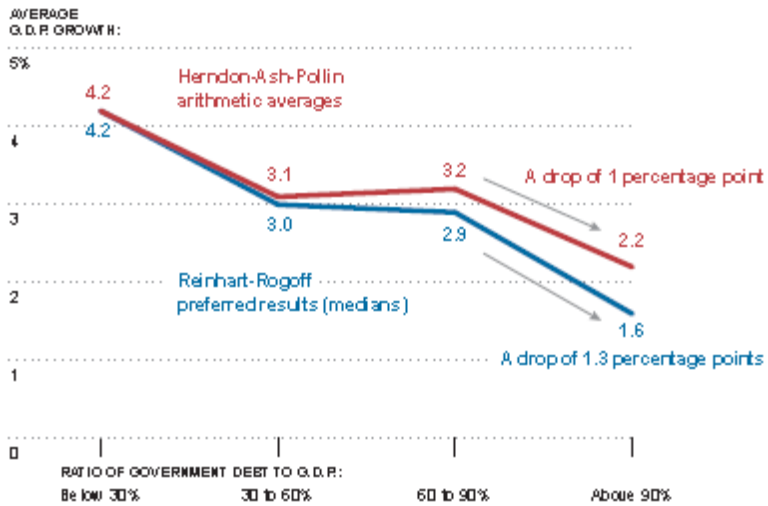
Early on in the financial crisis, in a February 2009 Op-Ed, we concluded that “authorities should be prepared to allow financial institutions to be restructured through accelerated bankruptcy, if necessary placing them under temporary receivership.”

Significant debt restructurings and write-downs have always been at the core of our proposal for the periphery European Union countries, where it seems to us unlikely that a mix of structural reform and austerity will work.

Finally, we view ourselves as scholars, though obviously given the prominence of book, and the extraordinary circumstances of the financial crisis, politicians will of course try to use our results to advance their cause. We have never advised Mr. Ryan, nor have we worked for President Obama, whose Council of Economic Advisers drew heavily on our work in a chapter of the 2012 Economic Report of the President, recreating and extending the results.

In the campaign, we received great heat from the right for allowing our work to be used by others as a rationalization for the country’s [slow recovery](#) from the financial crisis. Now we are being attacked by the left — primarily by those who have a view that the risks of higher public debt should not be part of the policy conversation. Above all, we resent the attempt to impugn our academic integrity. Doing archival research involves making constant judgments and yes, on occasion, mistakes. Learning from them is how science advances. We hope that we and others can learn from ours.

## Comparing the Two Analyses



## The Data

1946-2008 RATIO OF DEBT TO G.D.P.	Reinhart-Rogoff (2010)		Herndon-Ash-Pollin (2013)	
	MEAN	MEDIAN (CHARTED ABOVE)	MEAN (AVERAGE)	MEDIAN
Below 30%	4.1%	4.2%	4.2%	4.2%
30 to 60%	2.8	3.0	3.1	3.1
60 to 90%	2.8	2.9	3.2	3.2
Above 90%	-0.1	1.6	2.2	2.2

1900-2008 RATIO OF DEBT TO G.D.P.	Reinhart-Rogoff (2010, Table 1)	
	MEAN	MEDIAN (CHARTED ABOVE)
Below 30%	3.7	3.9
30 to 60%	3.0	3.1
60 to 90%	3.4	2.8
Above 90%	1.7	1.9

1900-2011 RATIO OF DEBT TO G.D.P.	Reinhart-Reinhart-Rogoff (2012)
	MEAN
Below 90%	3.5
Above 90%	2.3

Sources: Carmen M. Reinhart and Kenneth S. Rogoff, "Growth in a Time of Debt," January 18, 2010; Thomas Herndon, Michael Ash and Robert Pollin, "Does High Public Debt Consistently Stifle Economic Growth? A Critique of Reinhart and Rogoff," April 2013; Cyniconomics