

Game Strategy in Fiscal Straits

When government debts become large, lessons of game theory might help avoid a crisis

BY RENEE HALTOM

Around the globe, policymakers are growing concerned with projections of high levels of public debt in the near future. In the United States, according to the nonpartisan Congressional Budget Office, government debt held by the public is slated to grow to more than 250 percent of GDP within 30 years if recent tax and spending policies continue. The projected growth in debt is due mostly to programs related to the aging population and health care. That debt level is nearly unprecedented among developed countries in global history. For the United States, it is more than double the record hit during World War II, and more than five times what the debt has averaged since then.

Such projections concern policymakers because of the likelihood that financial markets would cease lending to the government before such debt levels could ever be reached. That would likely force drastic, potentially sudden cuts in spending and spikes in taxes that could significantly hamper economic activity. That is the dominant interpretation of recent events in Europe, where escalating debt projections have been followed by rising borrowing costs for governments, forcing painful fiscal cutbacks and helping to tip the region back into severe recession. The scale of the mismatch between spending and revenues currently projected for the United States in the next several decades means that those managing the government's finances must formulate a plan for a sharp turn in spending and tax policies if they wish to rule out the possibility of having one forced by financial markets in a manner that would be undoubtedly more painful.

The trouble is that there are only three basic ways to reduce government debt: Pay it off with years of budget surpluses, default on it outright, or lower the real value of debt with inflation. The first two are difficult both politically and economically, a constraint that may create pressure on central banks to pursue the third option of letting inflation rise.

Inflation erodes debts with payoffs that are fixed in nominal terms — as more than 90 percent of outstanding U.S. Treasury securities are — since borrowers get to repay loans using dollars that aren't worth as much. Because central banks are the primary body in charge of managing inflation, Treasury officials and lawmakers could try to lean on them to inflate to ease the national debt burden. A central bank might even feel compelled on its own to purchase government debt, paying for it with newly created money.

Such pressures might be especially acute in times of crisis, when central banks are often asked to act quickly to prevent economic collapse. Those purchases, if large enough, could ultimately lead to inflation.

Most countries have taken action over the last 30 years to keep central banks an arm's length from government influence, and most central banks are also legally bound to promoting price stability rather than worrying about government finances. The idea is that if the fiscal authority knows the central bank won't come to its rescue, it will be forced on its own to keep its books in order.

But the relatively new paradigms of independent central banking and inflation targeting have not yet been tested by a fiscal crisis. That is, no one knows what happens to inflation when governments run large, persistent deficits despite an independent central bank that is committed to an inflation goal. In all the theories that show those paradigms as successful ways to keep inflation under control, "there's an asterisk that says, 'Oh, by the way, for this to work, the government has got to go along and adjust future surpluses'" to balance government debt, says University of Chicago economist and finance professor John Cochrane. When they don't, pressure on the central bank to inflate will mount.

Inflation is not a foregone conclusion, however, especially if policymakers can find a way to tie their own hands. That's where game theory comes in. Game theory, a branch of economics that was originated by mathematicians in the 1940s and 1950s, studies the interactions of two or more conflicting parties, ranging from competing businesses, to warring nations, to parents and children. It seeks to predict the parties' likely behavior and to suggest ways for them to achieve objectives that they might not otherwise be able to agree on. In some contexts, game theory shows how the parties can collaborate to achieve their goals. But when their objectives are in conflict, game theory shows how each can try to force the other's hand, sometimes by binding themselves from the ability to acquiesce to the other's demands. A classic example is that of hostage negotiations with terrorists. One could obtain a hostage's release by making concessions to the kidnapper. The trouble is, on a sustained basis that strategy only rewards kidnappings, encouraging more of them. On the other hand, an established policy of outright refusal to negotiate with terrorists — if that pledge is credible — might convince them that kidnappings aren't worth the effort.

Self-restraint with an eye toward long-term goals is a recurring theme when game theory is applied to the policy world, where expectations about future policy drive the behavior of households, businesses, and investors today. Then it can be valuable to create the expectation that policymakers will follow through on promises to make responsible policies even when those policies are no longer in the policymaker's self-interest.

This lesson of game theory points to a few things current policymakers might do to prevent fiscal and economic catastrophe in the face of ever-growing debt. For fiscal policymakers, that could mean committing, somehow, to not running debts beyond control; for monetary policymakers, it could mean committing themselves, somehow, to not stepping in to shoulder the burden. But a fundamental lesson of game theory is that making promises credible can be tricky.

Fiscal Inflation

In most economic models, fiscal policy is of no concern whatsoever for the central bank. Monetary policy is, in normal times, able to undo any effect that fiscal policy has on the economy — for example, raising interest rates to stifle excessive growth if fiscal authorities provide too much stimulus — such that fiscal policy can safely be assumed away to make monetary models neater.

The exception is a troubling line of research that focuses on the pressure central banks face to inflate when the government runs chronic deficits. It's an old idea, first explored in depth in a 1981 article by economists Thomas Sargent and Neil Wallace, now at New York University and Pennsylvania State University, respectively. Theirs was the first formal model showing how fiscal imbalances could lead to inflation, a striking finding because general price increases are traditionally considered to be determined solely by the central bank's goals. The possibility of inflation emerging from fiscal rather than monetary sources to this day does not tend to appear in the models discussed in central bank conference rooms, perhaps because fiscal imbalances as large as those the United States is currently facing have been rare.

The story of how so-called "fiscal inflation" could unfold is straightforward: Investors continue to buy government debt only if it seems likely that fiscal authorities will raise enough surpluses in the future to repay its bondholders. As the total outstanding debt grows, ever greater surpluses are required. Surpluses can grow only so large, however, for both political and economic reasons. At some debt level, the surpluses required will appear simply infeasible to raise.

No one knows what that debt threshold is. It is not easy to form an estimate of just how high taxes can get, or just how weak-willed the central bank might be. But even current debt levels are demonstrating the scale of difficult fiscal choices that will have to be made. Suppose policymakers wanted to reduce gross government debt to 60 percent of GDP from a gross debt level of about 99 percent of GDP in 2011. (Gross debt measures total outstanding debt, whereas

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debt held by the public, the more common debt measure, focuses on debt potentially subject to financial market panic and stood at 68 percent of GDP in 2011.) The International Monetary Fund (IMF) recently estimated that to do so, the United States would need to run a primary budget surplus — the budget minus interest payments on debt — of 5.1 percent of GDP by 2020 and sustain it through 2030. By way of comparison, the United States ran a primary *deficit* of 8.9 percent of GDP in 2010, and the next several decades are when the aging population will hit the government's budget hardest. If financial markets decide the government is no longer likely to repay its debt and investors stop buying, the only way to avoid outright default is for the central bank to intervene.

Of course, the central bank could simply refuse to step in, choosing to let the government default before igniting inflation. But that's a tall order since the circumstances that would likely surround a fiscal crisis — financial market panic, a sharp contraction in fiscal policy, and uncertainty about the future — would also directly jeopardize the central bank's objective of maintaining economic stability. In a debt crisis, even the most conservative central banker may choose to intervene in hopes of stemming a panic before it grows more severe and spills over to the broader economy. This is what the European Central Bank has done by providing liquidity to government bond markets since the debt crisis unfolded in early 2010. Critics argue that move has been not much different than monetizing government debt, the first step toward this scenario of fiscal inflation.

What's more, it may even be possible for inflation to spike in a fiscal crisis even if the central bank does nothing. That's because expectations of the central bank's intervention could have the power to create inflation before a single dollar is printed. Investors in government bonds — such as pension funds, 401(k) account managers, and local governments — typically roll over their investments when they come due. But if they start to suspect the central bank's intention to inflate, they may instead flee government bonds and buy other things since, as Cochrane puts it, "not getting paid back via inflation is very much the same thing as not getting paid via default." As money pours into real assets that are less sensitive to inflation, such as commodities or real estate, their prices will rise. Higher paper wealth will then boost spending on goods and services, leading to general inflation. Similarly, if the general public begins to fear that the central bank will acquiesce to inflate away the real value of the debt, prices and wages would reflect that possibility, creating inflation immediately — before the

central bank has actually engaged in any activity at all.

In other words, central bankers may be powerless to prevent inflation driven by the public's expectations when the government runs debt high enough. There are no economic theories or case studies from history that can reliably tell us at what level of debt these shifts in expectations might occur. The primary sign that it is happening would be rising interest rates on government debt as compensation for the added risks of inflation and default. That was the first sign of crisis in Europe in early 2010. So far, that hasn't happened in the United States despite bleak projections for debt; in fact, government borrowing rates remain at historic lows. That's largely due to the Fed's efforts to stimulate the economy with low interest rates, as well as the global "flight to relative quality" as investors have sought refuge from the financial crisis and sovereign debt problems in Europe. But expectations can shift at any time, and that means low interest rates cannot reliably be interpreted to mean a fiscal crisis isn't on the horizon.

Creating Rules for Fiscal Policy

The aspect of this story that might keep central bankers up at night is that it suggests fiscal policy choices can completely overturn the benefits of central bank independence and inflation-fighting credibility, which economists say have been the key to keeping inflation low over the last 30 years.

Central bank independence and an emphasis on inflation were designed in part to overcome a problem formalized in game theory known as "time inconsistency." That's when an agent has an incentive to promise stakeholders that it is going to do one thing but do something different when the time comes to follow through. For example, since inflation is determined in part by inflation expectations, the central bank can more easily achieve price stability if people are convinced that fighting inflation is its primary goal. But once low and stable inflation has been incorporated into wages and prices, the central bank can renege on its promise by pursuing accommodative policies in an effort to boost economic growth — which can cause inflation. Since the public can foresee the central bank's incentive to renege, the central bank's credibility is bolstered if its discretion is limited. Two ways of doing that are the adoption of explicit inflation goals, and central bank independence, which insulates the central bank from political pressure to stimulate growth at the expense of those goals.

Time inconsistency is an especially important force during a debt crisis. It would be easy for policymakers to assure investors that a budget fix is coming, but then kick the can once market fears have subsided. Because the public can see this plainly, talk must often be backed up with action in order to truly calm markets, and even that can be difficult. As the current European debt crisis unfolded, repeated government pacts, bailouts from international monetary authorities, and fiscal commissions repeatedly failed to reassure markets once and for all that certain sovereign governments would remain a good lending risk.

"In order to make crisis impossible, we have to have a plan for how fiscal authorities will respond" in the event that a crisis starts to unfold, says economist Marco Bassetto at the Chicago Fed. "That plan has to have the property that it would make people regret having not continued to buy government bonds," by adopting a credible plan to ensure the debt gets repaid. That plan would need to be explicit about how fiscal and monetary authorities will behave, and would need to be made sufficiently transparent to the public in advance to have the needed effect on expectations.

One way to establish a credible plan for resolving fiscal imbalances is through the adoption of fiscal rules: permanent, legislated limits on certain budgetary variables. These might include requirements that the government balance its budget on average over a set of years, pay-as-you-go restrictions that force spending increases to be matched with higher taxes or reduced spending elsewhere (like those adopted by Congress, with successful budgetary results, in 1990 and phased out in 2001), or medium-run targets for the debt-to-GDP ratio. Such rules would have to be very hard to modify later on, lest pressure on policymakers be brought to escape their enforcement.

Fiscal rules are a new but growing phenomenon in the global economy. Eighty countries, including 21 advanced economies, have them at the national or supranational level, a dramatic increase from just 20 years ago when only seven countries had them, according to a 2009 report by the IMF. Excessive public debts that accumulated during the 1970s and 1980s encouraged rule adoption in the United States, Canada, and Latin America, while rules in Europe and other regions were spurred to force conservative fiscal policies on monetary union members.

The Challenges of Fiscal Rules

Given that fiscal rules are relatively new, they are still being tested by economists and business cycles, so they still have unresolved issues.

One is the problem of discretion. Even if it were possible, it's not clear that it would be entirely desirable to eliminate discretion from fiscal policy. Many economists argue that budgetary rules ought to include some flexibility in the short run to allow adjustments to economic shocks, like the ability to lower taxes or raise spending in a recession. In fact, the 2009 IMF report argues that allowing for cyclical contingencies actually made fiscal rules more credible in the eyes of markets in the eight developed countries that adopted such structures. Perhaps leaving room for the measures that fiscal policymakers might be inclined to take in a recession made the rules seem more realistic, and therefore less likely to be violated. The IMF also noted, however, that those countries already enjoyed a high degree of market confidence, and the rules also came with strong monitoring and enforcement mechanisms.

In fact, instating external enforcement groups has proven to be one way to retain some discretion but also maintain credibility. The point is perhaps best expressed through

counterexample: Europe passed the Stability and Growth Pact (SGP) in 1997 to create explicit annual deficit limits of 3 percent of GDP for countries wishing to join the euro monetary union. Once joining the euro, however, it turned out to be not all that painful for countries to deviate from the rule. There were no national-level institutions designed to stop countries from running higher deficits, and the European institutions in charge of enforcement above the national level were given increasing discretion to waive punishments. As a result, the rules weren't successful at constraining governments' behavior, nor at stopping financial markets from running on government debt in the spring of 2010.

Other countries have found success with a more informal kind of enforcement through independent fiscal commissions that very publicly call attention to budgetary lapses. About one-fifth of advanced economies with fiscal rules have them. Sweden's Fiscal Policy Council, one of the most well-known examples, has no official authority, but has garnered enough institutional prominence that Sweden's Parliament can't avoid responding to its warnings. Chile, the Netherlands, and Hungary have similar setups. (The CBO partially serves this purpose in the United States by publishing accounting analyses of the budget, but it does not function as a government watchdog.)

Perhaps the biggest hurdle to adopting fiscal rules is that there is substantial disagreement within the economics profession and policy circles alike about what makes good fiscal policy. "Economic theory doesn't tell us whether we should have more or less redistribution, or more spending on public goods, more taxes, or less of both," Bassetto notes. "That's an area that is very much about the preferences of a city or country." Monetary rules are easy by comparison. All economists agree that very high inflation is bad, and it is easier to design an institutional arrangement centered on getting that one thing right, he says.

Compared to monetary policy, there is comparatively little research on fiscal policy. "I am constantly amazed at how profoundly ignorant we are about fiscal stuff," says economist Eric Leeper of Indiana University. But Leeper argues that it's a mistake to relegate all of fiscal policy to the political realm, and that a more scientific approach may be possible when it comes to some basic fiscal questions: Should there be a debt target? If so, what should it be? How quickly should you return to it after a lapse? What are the effects if you return to it through tax versus spending changes? "These are, to me, all scientific questions, not political questions. There are no obvious distributional effects of having a given debt-to-GDP ratio," for example, he says.

Fiscal rules may be hard to implement successfully, but that may not be a sufficient reason to shy away from having them in the first place, since the lack of any clear fiscal strategy could make expectations of an inflationary outcome more likely. Markets know that the government would desire opacity when it has no intention of trudging the

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tough path toward fiscal sustainability. In that instance, "an explicit plan may make it clear that there's no way to avoid bad scenarios," Bassetto says. Yet when there is no explicit plan for wrangling chronic deficits with fiscal retrenchment, markets may be more liable to suspect that the *implicit* plan is for monetary policy to give in.

If all else fails, another strong lesson from game theory is that where policy rules are imperfect or absent, a strong reputation can help fill the void. No fiscal rule can possibly be specific enough to cover every possible budgetary and economic scenario, but that's less of a problem if there are policy leaders in place who have a reputation for prioritizing fiscal sustainability, argues Bassetto. "What those decisions have to be on a day-to-day basis needs to be explained less if you know that you have somebody in charge who has that as a goal."

In fact, when the public comes to expect long-run fiscal sustainability, it can actually reduce the total price tag of fiscal reform compared to when that adjustment takes place as a result of financial market panic and emergency cutbacks. Italy faced such long-term reforms in the 1990s when it sought entrance to the euro monetary union, which required deficit reduction under the SGP's rules for euro entry. At the time, borrowing rates for 10-year Italian government bonds were relatively high at more than 13 percent, due in part to inflationary expectations from the untenable fiscal situation, according to research by Bassetto. If Italy could assure markets that the central bank would not bail out fiscal policy with inflation, the resulting decline in interest rates would relieve strains on government finances in the short run and put the euro area's deficit-to-GDP target in easy reach, he argued in a 2006 study. To create those expectations, Italy installed central bank technocrats in its government with strong reputations for fiscal and monetary conservatism. "They still had to do some fiscal adjustment, but once markets started to believe that an adjustment would take place, the magnitude wasn't very big" compared to adjustments that took place during previous fiscal crises, Bassetto says. "It was mostly managing expectations just enough that interest rates would come down."

Starving the Beast with Monetary Policy

In the absence of binding fiscal rules, what choices do monetary authorities have to prevent fiscal inflation? Some economists argue that inflation targeting could help. Inflation targeting is the practice of adopting an explicit numerical target for inflation. In the parlance of game theory, an inflation target allows the central bank to "move

first” by making a commitment that is hard to exit. That might encourage fiscal authorities to deal with budgets on their own.

There is some evidence that this can be successful. Comparing inflation-targeting and non-targeting countries, a 2012 study by Jan Libich at Australia’s La Trobe University, Michal Franta of the Czech National Bank, and Petr Stehlík at the University of West Bohemia found that, after the adoption of an explicit inflation target, monetary policy grew less accommodative to debt-financed fiscal shocks in Canada, the U.K., and Australia. In contrast, in non-targeting countries, the degree of accommodation over the same period didn’t change much. It even increased in the United States, a non-targeting country. Monetary outcomes improved in each of the inflation targeting countries, as did fiscal performance within one to three years post-adoption of the inflation targeting regime.

There is anecdotal evidence, too, that fiscal policymakers pay attention to the limitations created by an inflation target. New Zealand’s central bank, the pioneer of inflation targeting, obtained the deference of fiscal policymakers after announcing in 1989 that it would adopt the regime the following year. In 1990, the government, faced with losing re-election prospects, pitched an expansionary budget to the populace. Don Brash, then head of New Zealand’s central bank, immediately made it clear that the expansionary fiscal policy would be countered with firmer monetary conditions to keep inflation in check. “I was later told by senior members of the Opposition National Party that the Bank’s action in tightening conditions in response to the easier fiscal stance had had a profound effect on thinking about fiscal policy in both major parties in Parliament,” Brash said in a letter to Libich, Stehlík, and Andrew Hughes Hallett of George Mason University and the University of St. Andrews, which was later reprinted in a paper presented at the 2012 meetings of the American Economic Association.

To be sure, central bankers hoping to bring fiscal policymakers into line with such a move may be taking a risk — the risk that elected officials could in turn strike back at the central bank’s independence.

Libich argues that another way inflation targeting might

encourage fiscal sustainability is by garnering political support for fiscal reform. One reason fiscal reforms are difficult is that they are feared by politicians since they are perceived as hurting re-election outcomes. Libich and Stehlík showed in a 2012 paper how the central bank’s public commitment to an inflation target may act as a credible threat of a costly policy tug-of-war. The target “better exposes to voters the undesirable inflationary consequences of excessive fiscal policy, and thus improves the government’s incentives to implement necessary long-term fiscal reforms,” Libich says.

Still, it is not certain that inflation targeting is a silver bullet to preventing fiscal inflation. Though studies reveal a correlation between the two, the adoption of inflation targeting may instead signal broader support for policy overhauls that make tougher policies, including the fiscal variety, as a practice more feasible. And some nations, such as Sweden, adopted inflation targets around the same time as important fiscal reforms, making it statistically unclear which reform was the greater factor in successful monetary and fiscal outcomes.

Perhaps more important, central bankers can’t constrain fiscal policymakers in any meaningful sense. Nothing but democracy can prevent fiscal authorities from choosing to run chronic deficits or ignore the coming demographic demands on fiscal resources, essentially forcing the central bank’s hand. “There’s an accounting constraint on this game,” as Cochrane puts it. “If economies don’t want to default and don’t want to do structural reform [to produce surpluses], the rules of accounting don’t leave any other option” but inflation. That leaves open the possibility that financial market expectations will shift toward an inflationary outcome as debt grows, no matter how strong the central bank’s credibility or monetary rules.

In the end, resolving large government debts without the significant macroeconomic pain associated with inflation, debt default, or sudden fiscal retrenchment requires longer-run fiscal reforms before a crisis is at the door. Those reforms might be bolstered by a credible commitment to keeping fiscal policy sustainable, making fiscal policy the next great example of how game theory has improved policy outcomes. **RF**

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