International Coordination

Jeffrey Frankel

After a 30-year absence, calls for international coordination of macroeconomic policy are back. This time the issues go by names like currency wars, taper tantrums, and fiscal compacts. In traditional game theory terms, the existence of spillovers implies that countries are potentially better off if they coordinate policies than they are under the Nash noncooperative equilibrium. But what is the nature of the spillover and the coordination? The paper interprets recent macroeconomic history in terms of four possible frameworks for proposals to coordinate fiscal policy or monetary policy: the locomotive game, the discipline game, the competitive depreciation game (currency wars), and the competitive appreciation game. The paper also considers claims that monetary coordination has been made necessary by the zero lower bound among advanced countries or financial imperfections among emerging markets. Perceptions of the sign of spillovers and proposals for the direction of coordination vary widely. The existence of different models and different domestic interests may be as important as the difference between cooperative and noncooperative equilibria. In some cases complaints about foreigners' actions and calls for cooperation may obscure the need to settle domestic disagreements.

International monetary cooperation has broken down . . . The U.S. should worry about the effects of its policies on the rest of the world.

—Raghuram Rajan, Governor of the Reserve Bank of India, January 30, 2014

We have strengthened our policy cooperation. We have a shared assessment of our challenges and policy priorities. We are determined to step up our cooperation to: provide significant new momentum to the global economy; boost demand and jobs; and achieve sustained and more balanced growth, both internally and externally. Our macroeconomic and structural policies are mutually reinforcing and address both demand and supply challenges. Our integrated approach is focused on moving towards a more balanced policy framework. We will continue our efforts to foster positive spillovers and we recognise the need to avoid negative ones.

—Brisbane Action Plan, G-20, November 2014

1. Introduction

International macroeconomic policy coordination arguably achieved a peak three decades ago, in the form of a set of initiatives undertaken by Group of Seven (G-7) leaders. These initiatives included the Bonn Summit of 1978, where G-7 leaders agreed cooperatively to reflate their economies so as to strengthen recovery from the 1974–75 global recession; the Plaza Accord of 1985, where G-5 ministers agreed to cooperate to bring down an overvalued dollar; an agreement at the Tokyo Leaders' Summit of 1986 to jointly monitor a set of economic indicators; and a 1987 G-7 ministers agreement at the Louvre to try to put a floor under the newly depreciated dollar. A lively academic literature provided theoretical support for such cooperative solutions, drawing on the tools of game theory.

Then coordination fell out of favor. Academically, critics found a variety of limitations to the case for coordination.[1] Historically, the Germans regretted what they had agreed to at the Bonn Summit, as reflation turned out to be the wrong objective in the inflation-plagued late 1970s. The Japanese came to regret the Plaza Accord when the yen reached historic heights. Many of the other summit communiqués never had much effect, for better or worse.

Another problem was that the structure of the G-7 did not allow a role for the emerging market (EM) countries, whose share of the world economy rose rapidly. Increasingly after 2003 the topic of interest to the United States was manipulation of currencies by China and other EM countries. It was not very useful to discuss such topics if the countries concerned were not represented in the room.

1.1. The G-20 and the Return of Coordination as a Live Policy Topic

Recent years have seen the partial return of international coordination. The representation problem has been addressed by expanding the membership of the meetings to include the larger EM countries in the Group of Twenty (G-20). A G-20 club of finance ministers and central bank governors, which had been founded in 1999 to deal with currency crises in East Asia and other emerging markets, was elevated to the status of leaders' summits, largely at the impetus of UK Prime Minister Gordon Brown. The first two G-20 leaders' summits took place in Washington on November 14–15, 2008, and London on April 2, 2009. Their immediate task was dealing with the global financial crisis that had hit in September 2008 and the ensuing global recession. But those meetings also represented a sea change for global governance in that the G-20 had now superseded the G-7, giving a voice to the large EM countries.

If the G-7 members thought that the newly invited members would quietly follow their lead, then they must have been disappointed. For example, EM representatives declined to join the U.S. Treasury in pressuring China to appreciate its currency. Instead, Brazilian leaders accused the Americans of depreciating their currency as much as anyone. They coined the now-popular term "currency wars."

In light of currency war concerns, G-7 ministers in February 2013 agreed to refrain from unilateral foreign exchange intervention.[2] Though little heralded at the time, this agreement, which we might call a cease-fire in the currency wars, is the most important recent example of international monetary coordination. It is striking to realize that policy coordination today apparently means agreeing *not* to intervene in the foreign exchange market to lower the value of any currency, whereas it meant the opposite at the time of the Plaza Accord. Many would like to go beyond the G-7 "cease-fire" to achieve an agreement that is more permanent, covers more countries, prohibits a wider range of currency-weakening actions, and imposes serious penalties against currency manipulation.

The market "taper tantrum" of 2013—when U.S. long-term interest rates rose in response to Federal Reserve Chairman Ben Bernanke's signal that quantitative easing would soon be phased out—provoked another sort of complaint from Reserve Bank of India Governor Raghuram Rajan: "International monetary cooperation has broken down . . . The U.S. should worry about the effects of its policies on the rest of the world" (January 30, 2014). The monetary part of this paper considers both kinds of concerns, represented by currency wars and the taper tantrum.

Some scholars have begun to return to the subject of coordination.[3] Some, such as Rey (2015), have given new prominence to the point that floating exchange rates do not fully insulate one country from the actions of another, especially if the other is the United States. This seems to suggest that countries should coordinate in the way that Rajan asks.

It is too soon to say whether we will see a full-blown return of international coordination either in the outcomes of meetings of economic policymakers or in academic research. But the subject is "live" enough to merit a reexamination in the wake of such developments as the global financial crisis, unconventional monetary policies, and the currency wars framing.

1.2. Theoretical Framework for Macroeconomic Policy Coordination

International cooperation could be defined broadly—for example, to include regular communication among countries' policymakers. It is good that they meet regularly, exchange information, and don't wait for a crisis to get acquainted.

Countries like Brazil, India, and China have a valid complaint that they are not adequately represented in global economic governance, even though they have long since earned a voice through the size of their economies, to say nothing of population. It is good that the G-7 has been expanded into the G-20, giving large emerging market countries a seat at the table. Similarly, their weight in governance at the International Monetary Fund has been adjusted, although it still lags behind their economic weight.

For the purposes of this paper, coordination is defined in the conventional sense of the Nash cooperative or bargaining solution from game theory, as in the famous "prisoners' dilemma." There is scope for coordination if all parties would be better off under an agreement to put their policy instruments at particular settings, relative to the Nash noncooperative equilibrium where each chooses its policies taking the others as given.[4]

The question of international coordination arises in many areas, including trade policy, energy and environmental issues, public health, and so on. But this paper focuses on macroeconomic policy coordination.

As long as there are spillover effects (one country's actions have an effect on others) and countries don't have enough effective policy levers to counteract them (an important point to which we will return), there is the potential, in theory, for coordination to benefit everyone. This paper accepts that there are indeed spillover effects and yet, in the end, questions the usefulness of some calls for coordination.

It goes without saying that the interests of one country are not the same as the interests of another country. That is not enough to imply a role for coordination. It is appropriate to bemoan a lack of coordination only if a cooperative solution would help each country achieve what it wants. But what does it want?

We begin by observing that there is not much purpose in trying to implement coordination if participants are not clear as to the nature of the failure of the noncooperative equilibrium and the direction in which proposed coordination would move the policy levers. Would coordination consist of an agreement by countries simultaneously to undertake fiscal expansion? (We call this the locomotive game below.) Or fiscal contraction? There is quite a difference. Would coordination entail monetary discipline? (This is an example of the competitive depreciation game, now known as currency wars.) Or monetary stimulus? Advocates of coordination at various times have had in mind each of those four possibilities, and others as well.

It is natural that the character of the spillover and proposed coordination might be different at different times. Even if the basic model of how the economy works were known and unchanging, the nature of the cross-border

externality and proposed coordination would be different in the aftermath of a demand shock than a supply shock, say the 2008 global financial crisis (GFC) versus the 1979 oil shock. Furthermore, the structure of the economy may in fact evolve over time, with the extent of international integration, the rigidity of labor and goods markets, and so forth.[5] Some claim that the importance of spillovers and the case for coordination has been stronger since the GFC because many countries have lost the freedom to lower their interest rates: industrialized countries because of the zero lower bound and emerging market countries because of onerous constraints from imperfect international financial markets.

But the problem of ambiguous signs of spillovers and ambiguous directions of coordination is worse than varying shocks or parameters that shift over time. The problem with the framework may lie in the limited usefulness of the assumption of unified and rational national actors. Typically the difference between domestic interests and foreign interests is not the only cleavage, or even the most important one. Disagreement over the correct model can be just as large. Furthermore, domestic political factions typically disagree with each other, regarding objectives as well as models, as much as they disagree with other countries. Blaming problems on foreigners or on lack of international coordination may make it harder to work out disagreements domestically.

We will consider four possibilities in sequence—covering both fiscal policy and monetary policy, coordinated expansion and coordinated discipline. Ultimately we seek conclusions about the usefulness of coordination when there is disagreement over what exactly is being proposed.

2. Fiscal Policy Coordination

We begin with fiscal policy.

2.1. The "Locomotive Game": When Cooperation Means Joint Expansion

The classic coordination game is one where the noncooperative equilibrium is seen as a general deficiency of demand and cooperation consists of joint stimulus. Coordinated expansion of this sort was attempted, for example, by the G-7 at the London Summit in 1977 and agreed to more concretely at the Bonn Summit of 1978. Germany and Japan acceded to U.S. requests to join it as two more engines or locomotives to pull the global economic train out of the aftermath of the 1974–75 recession. In a pattern that has become familiar, Germany agreed to fiscal expansion only reluctantly (bringing forward a tax cut). One explanation of German reluctance was a difference in perceptions: in their "model," fiscal expansion would not lead to higher growth.[6]

Joint stimulus was again the conceptual framework at the G-20 London Summit of 2009, held in response to the global financial crisis. Less well known is a G-20 meeting in Brisbane, Australia, in November 2014, after a new slowing of global growth which had possibly been abetted by austerity moves in Europe, the United States, and Japan. The Brisbane Summit agreed to "strengthen policy cooperation," including to "boost demand and jobs."

Table 1 illustrates the locomotive game. Under the noncooperative equilibrium, both the United States and Europe pursue contractionary fiscal policies. Each is afraid to undertake fiscal expansion on its own, because it believes (correctly) that this would lead to a trade deficit. Each would much prefer that the *other* country expand, so that it could receive the boost to demand from exports, rather than from fiscal deficit spending at home. But if everyone pursues fiscal austerity, the world remains in recession, in the upper left square of the 2×2 diagram.

The cooperative solution is for all parties to agree to simultaneous fiscal stimulus, in the form of increases in spending or decreases in taxes. They move to the lower right square in the diagram, where general stimulus leads to general growth, without any country having to achieve a trade surplus at the expense of anyone else. This logic underlay the Bonn G-7 Summit of 1978 and the London G-20 Summit of 2009.

Figure 1 illustrates the standard case for coordination graphically. The horizontal axis measures the policy setting, which we here define to be fiscal stimulus, for the foreign country. For concreteness, assume the foreign country is Germany and the year is 1978 or 2009. The vertical axis measures fiscal expansion for the domestic country. For concreteness, assume the domestic country is the United States. Assume that at the starting point, ***N***, each country chooses its fiscal policy independently. (***N*** stands for Nash equilibrium.)

TABLE 1
The Locomotive Game

	U.S. pursues contractionary fiscal policy	U.S. pursues expansionary fiscal policy
Europe pursues contractionary fiscal policy	Noncooperative "beggar-thy-neighbor" equilibrium: global recession.	U.S. runs trade deficit; complains on behalf of its exporters and import-competing firms.
Europe pursues expansionary fiscal policy	Europe complains on behalf of its exporters and import-competing firms.	Cooperative "locomotive" outcome: nobody achieves a trade surplus, but higher spending lifts all boats.

FIGURE 1

Coordination Entails Both Countries Agreeing to Raise Their Policy Settings

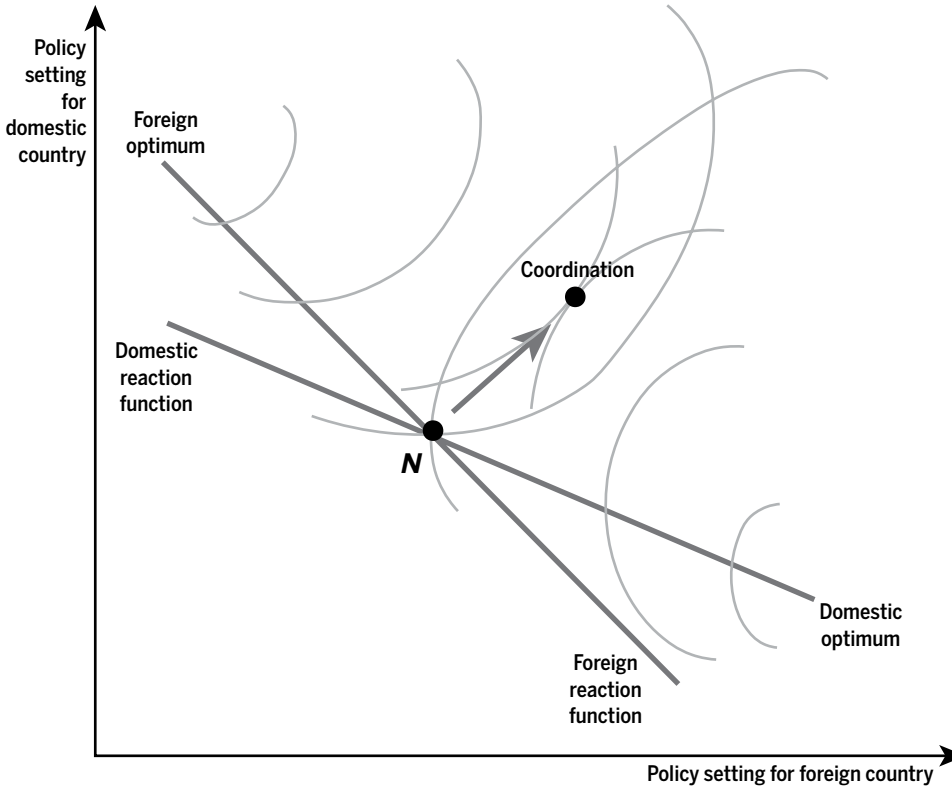


Figure 1 is meant to illustrate the world as American policymakers saw it in 1978 or 2009: a locomotive model. Hypothetically, if the United States could selfishly choose both countries' policy settings to suit its own domestic preferences, its optimum would be in the lower right corner, where Germany and other countries undertake strong expansion, so that the United States enjoys growth led by strong net export demand and is able to hold back on its own fiscal policy and thereby avoid the problems of future debt. The indifference curves that fan out from that domestic optimum represent successively lower levels of satisfaction. Germany will certainly choose some lower level of fiscal expansion than that optimum, and the United States will adjust accordingly. The line representing the domestic reaction function is traced out as the sequence of points where the indifference curves are tangent to vertical lines, because each point represents the choice of U.S. fiscal policy that achieves the highest level of satisfaction corresponding to a particular German fiscal policy setting. It slopes downward

because the less demand is supplied by Germany, the more the U.S. authority needs to substitute its own demand. (They are "strategic substitutes.") The slope is relatively flat because a given U.S. fiscal stimulus has a bigger effect on the U.S. economy than the impact of a same-sized German fiscal stimulus on the United States.

Germany's optimum would be that it hold back its fiscal policy and instead let the United States carry the burden of the fiscal expansion. Its reaction function starts at the upper left and slopes steeply downward. The two reaction functions intersect at point ***N***. This is the Nash noncooperative equilibrium, where each has set its policy optimally taking the other's as given.

From point ***N***, each country would prefer that the other expand, but each holds back from expanding itself for fear of the adverse consequences on its trade balance. So the United States exercises some global leadership and proposes at a summit meeting that all parties undertake fiscal stimulus at the same time, moving northeastward in the graph as indicated by the arrow. This is the locomotive solution. Nobody needs to experience a change in their trade balance, but the coordinated expansion pulls the world out of recession. A cooperative program that is especially well designed will move the global economy to a point such as that indicated as the coordination equilibrium in Figure 1: it is one of the points where the two countries' indifference curves are tangent to each other, indicating that the joint gains are maximized. (From here, neither country can be made better off without making the other worse off.)

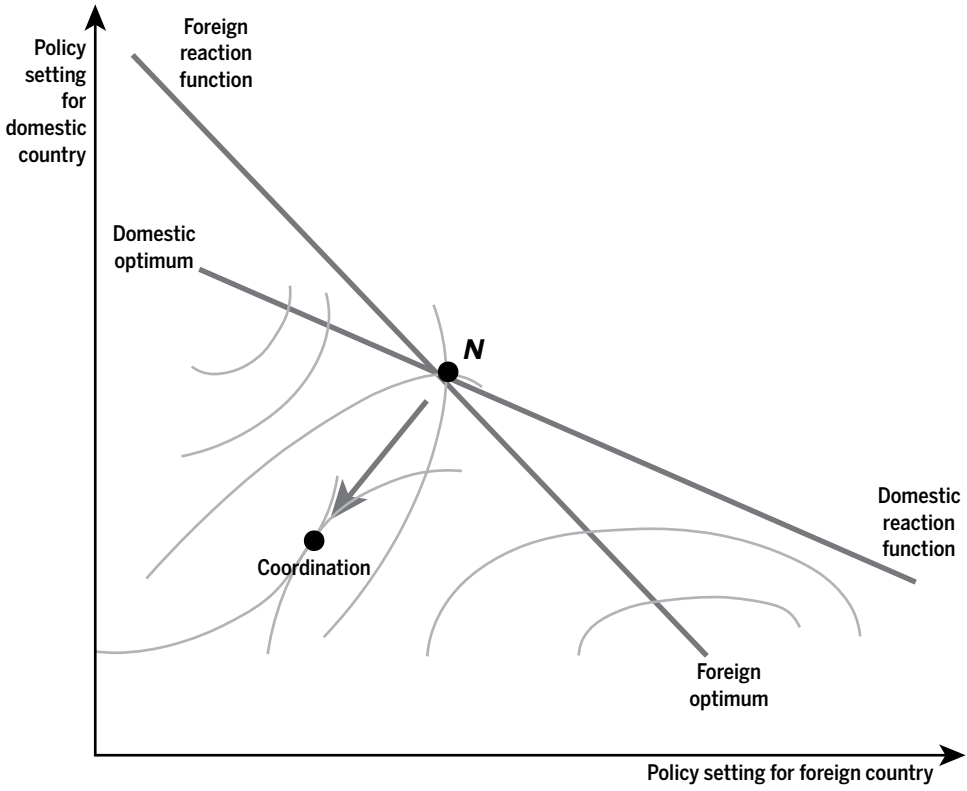
That is the story as the United States and some other countries see it. But it is probably not the framework through which Germany sees things. (See Figure 2.)

The apparent agreement on the desirability of stimulus at the London Summit of April 2009 was short-lived. The United States and China undertook substantially expansionary monetary and fiscal policy at that time, but other countries less so. Then when the euro crisis hit, beginning in Greece in late 2009, the European reaction was that fiscal laxity had caused the crisis, so austerity must be the treatment. In 2010, fiscal expansion went into reverse in many countries—including also the United States, after the Republicans gained control of the Congress and decided that the budget deficit was the main problem. This brings us to the discipline game.

2.2. The Discipline Game: When Cooperation Means Joint Fiscal Rectitude

Some will see the locomotive game as also applicable to the members of the euro zone in recent years. In this view, fiscal austerity in many countries has exacerbated Europe's failure to recover from a steep recession: Germany and

FIGURE 2
Coordination Entails Both Countries Agreeing to Lower Their Policy Settings



other countries should simultaneously increase spending to stimulate a general recovery. But that is not how the Germans see it (if one may continue to generalize about an entire nationality, with apologies). It is not just that they oppose moving to the lower right corner of Table 1. They reject the entire premise of the locomotive game.

The German view is that a country's budget deficit imposes a *negative* spillover on its neighbors. We could call this framework the fiscal discipline game. In one version, countries or their governments are competing for funds in the global marketplace (Chang 1990). Each country that runs a deficit puts upward pressure on global interest rates and so makes it harder for everyone else.

Another version focuses specifically on the moral hazard issues posed when the incentive for individual countries to be fiscally prudent is impaired by the likelihood of some sort of bailout by others in the event of trouble.[7] This may apply globally, if one thinks that an institution like the International Monetary Fund (IMF, or the Fund) is a source of moral hazard, which would explain why

the Fund has traditionally given so much emphasis in its procedures to enforcing budgetary discipline.

But the best example is the euro zone.[8] Most citizens of Germany and other members in Northern Europe are clearly inclined to think that fiscal profligacy among the Mediterranean members is a negative externality, not a positive one. The suspicion among Northern European taxpayers that they would be called upon to bail out their spendthrift neighbors explains why the cooperative agreements—the 1991 Maastricht treaty, the 1998 Stability and Growth Pact, and the 2013 Fiscal Compact—tried to impose limits on countries' fiscal deficits and debts.

The moral hazard game is illustrated in Table 2. In the absence of internationally agreed constraints on budget deficits, the knowledge of possible ex post bailouts attenuates the incentive to be prudent ex ante. As a result, everyone runs excessive deficits, in the lower right corner of the table. In this case, cooperation consists of agreeing to rules to limit budget deficits and debts, as under the Maastricht treaty, the Stability and Growth Pact, and its revisions.

From the G-7 summits of the 1970s to the euro crisis of the 2010s, many observers have criticized Germany for refusing to cooperate in a move to the lower right cell in Table 1 under the locomotive theory. One interpretation might be that Germany is selfishly holding back, so that it can run a trade surplus (upper right cell in Table 1). But another interpretation is that Germany thinks it is playing the moral hazard game, in Table 2. Seen from its eyes, the upper right cell is the one that results when the Germans alone abide by fiscal rectitude: they uprightly obey the rules while others cheat. The problem is not a lack of sufficient cooperative spirit in one or more governments, but rather a difference in perceptions across nationalities.[9]

Figure 2 illustrates the coordinated discipline game. We start at point ***N*** again, with the policy settings shown to be the same as at the corresponding

TABLE 2
The Moral Hazard Game

	Other euro member runs budget surplus	Other euro member runs budget deficit
Germany runs budget surplus	Cooperative agreement on fiscal rules, to eliminate moral hazard.	Germans fear that they will have to bail out the other member.
Germany runs budget deficit	Other member fears it will have to bail out Germany.	Uncoordinated moral hazard equilibrium: everyone runs excessive deficits because possibility of bailout undermines the disincentive.

point in the preceding graph. But the only thing on which the two sides agree is where the current policy settings are.[10] Germany, which we continue to take as the "foreign country," is puzzled when its neighbors fault it for tight fiscal policy. Germany's view is that it is doing everyone a favor by exercising as much budgetary discipline as it is and that its neighbors' budget deficits are imposing a negative externality. Germany exercises its leadership by proposing a fiscal compact, in which every member agrees to tighten budget discipline simultaneously, moving the economy to the southwest as shown by the arrow. In its view, everyone will be better off at the coordination point. Of course from the viewpoint of Figure 1, this all-around fiscal austerity moves everyone in precisely the wrong direction.

One must conclude that, regarding spillovers and coordination proposals, one person's fiscal vice is another person's fiscal virtue. Perhaps it is clearer what the nature of the spillovers and the direction of potential coordination are when it comes to monetary policy.

3. Monetary Policy Coordination

The Federal Reserve was ahead of other major central banks in easing monetary policy aggressively in response to the global financial crisis. The European Central Bank (ECB), for example, was more reluctant to ease under President Jean-Claude Trichet, from the start of the recession through the end of his term in November 2011. So was the Bank of Japan under Governor Masaaki Shirakawa. Initially the difference in reaction could be explained by the fact that the subprime mortgage crisis and recession had started in the United States in 2007. Others hoped their economies might be "decoupled" from the effects.

Complications soon emerged. The crisis was transmitted to other countries. Calls for coordination began. But, as with fiscal policy, perceptions differed as to what exactly was the nature of the spillover effects of monetary policy and the desirable direction for coordination.

3.1. Currency Wars

3.1.1. Allegations that Foreign Monetary Policy Is Too Loose (e.g., 2010)

When Brazilian Finance Minister Guido Mantega came up with a new, more colorful way of saying "competitive depreciation" in September 2010, he was reacting to currency depreciation in a number of countries against which Brazil competes on global markets. "We're in the midst of an international currency war, a general weakening of currency. This threatens us because it takes away our competitiveness" (September 27, 2010). The new "currency wars" phrase

soon came to dominate the discussion of spillover effects from uncoordinated monetary policy.

At about the same time, the Federal Reserve launched its second round of quantitative easing (in November 2010) and the dollar depreciated (through July 2011). For some G-20 countries like Brazil, the fact that U.S. monetary stimulus sent capital flowing out of the United States and into Brazil, appreciating the *real* against the dollar, was unwelcome because it left Brazilian producers less competitive on world markets.

The U.S. authorities tried to explain that a weak currency that resulted from needed monetary easing, as was the case for the U.S. dollar in 2009–11, was fundamentally different from a weak currency that resulted from foreign exchange intervention, as had been the case for the Chinese renminbi since 2004. But some did not see the distinction as so important. It was all competitive depreciation. In April 2012, Brazilian President Dilma Rousseff continued the currency war accusation, criticizing quantitative easing by the United States and other advanced countries as a "monetary tsunami" that had detrimental effects on others via the exchange rate.

Next, Japan responded to years of deflation and repeated recessions by following in the footsteps of the Fed. Abenomics was born when Japan's parliament was dissolved in November 2012 and Shinzo Abe was elected prime minister on a platform of monetary stimulus. It featured a target of higher inflation implemented via an announced steep path of monetary expansion under a program of "quantitative and qualitative monetary easing" by new Bank of Japan Governor Haruhiko Kuroda, appointed for that purpose in March 2013. The financial markets reacted immediately. The yen set off on a trend of depreciation. The stock market also reacted in the right way, with prices rising as rapidly as the price of foreign exchange.[11]

After another two years, the ECB, now under President Mario Draghi, followed suit, responding to renewed recession in the euro zone economy. The ECB began buying bonds in September 2014 and launched a full version of quantitative easing (QE) on January 22, 2015. The euro immediately depreciated, as had the dollar and the yen in their QE episodes, reaching a low in March 2015.

There is an appealing correspondence among the three successive episodes of monetary stimulus: United States 2010–11, Japan 2012–13, and ECB 2014–15. In each case the central bank decided to take dramatic steps in response to a weak domestic economy, in each case the currency depreciated, and in each case trading partners complained about competitive depreciation.

Many observers worried that such money-fueled currency depreciations—and other similar moves by emerging market and other countries—represented a potentially damaging currency war. They presumably had in mind a game as is illustrated in Table 3a. Here coordination would consist of an agreement to refrain from unilateral monetary expansion: a move from the lower right corner of the 2×2 diagram to the upper left corner.

To see a graphical version of the currency wars game, we can recycle Figure 1, rather than starting over. Simply define the policy levers on the two axes to be the domestic and foreign interest rates. At point ***N***, everyone has set their interest rates too low, afraid to raise them for fear of appreciating their currency and losing trade competitiveness. Coordination would consist of all parties raising interest rates at the same time.

Cooperative solutions can be sought in the form of long-term rules instead of short-term policy adjustments. Another interpretation of the currency wars game is that the solution to the kind of competitive depreciation illustrated in Table 3a might be a system of fixed exchange rates. Avoiding competitive devaluation was a motivation for the Bretton Woods system agreed to in 1944 (more in Section 4.1 below). Frieden (2014) argues that it was also a prime motivation for European Monetary Union in 1999. But it is ironic if some think that the cooperative solution to competitive depreciation is a rule that exchange rates should be fixed, while others think that the solution to the same problem is a rule that exchange rates should float freely. We now turn to the latter view.

3.1.2. Cease-Fire in the G-7 (2013)

As noted in the Introduction, the G-7 partners in February 2013 agreed on a currency war cease-fire that represents the most substantive example

TABLE 3a
The Currency War Game

	U.S. pursues contractionary monetary policy	U.S. pursues expansionary monetary policy
Other country pursues contractionary monetary policy	Superior cooperative equilibrium: everyone agrees to refrain from currency warfare.	Dollar depreciates. Trading partners complain on behalf of their exporters and import-competing firms.
Other country pursues expansionary monetary policy	Dollar appreciates. U.S. complains on behalf of its exporters and import-competing firms.	"Currency war" noncooperative outcome: said to be a bad equilibrium for all, because nobody achieves depreciation and trade stimulus.

of international macroeconomic policy coordination in the last few years. They were responding, under U.S. leadership, to concerns about the Japanese monetary stimulus that was taking place and particularly about some remarks by Japanese officials that one channel of transmission would be a weaker yen.

The first sentence of the 2013 communiqué delegitimizes foreign exchange intervention: "We, the G7 Ministers and Governors, reaffirm our longstanding commitment to market determined exchange rates" (G-7 2013). The second sentence might seem to accept the broadening of the definition of manipulation to include other policies that can affect the exchange rate: "We reaffirm that our fiscal and monetary policies have been and will remain oriented towards meeting our respective domestic objectives using domestic instruments, and that we will not target exchange rates." Interpreted literally, the implication seems to be that monetary stimulus is valid so long as the authorities are not aware that it is likely to depreciate their currency, or at least so long as this is not their purpose. Of course, the authorities in practice are fully aware that depreciation is one of the ways that monetary stimulus is likely to work. But in the absence of mind-reading skills, the communiqué in practice does not effectively rule out monetary stimulus.

The G-7 currency war cease-fire has been not been inconsequential. Since February 2013, G-7 officials have indeed refrained from foreign exchange intervention.

The currency war cease-fire satisfied few of those who worry about currency manipulation, presumably because the language did not go far enough, with respect either to the lack of explicit reference to monetary policy or to the absence of sanctions to enforce the agreement. Some economists (e.g., Bergsten 2015, and Gagnon 2012, 2013) support provisions regarding currency manipulation, enforced by trade sanctions, while some of us are opposed (e.g., Bénassy-Quéré et al. 2014; and Frankel 2016.)

Some U.S. congressmen in 2015 opposed trade agreements like the Trans-Pacific Partnership (TPP) that did not include sweeping language about currency manipulation to prevent trading partners like Japan from doing what it had done under Abenomics. They wanted an international agreement that would ban currency manipulation, even in cases when no foreign currency is purchased, and that would enforce it by trade sanctions. The American auto industry has been especially vocal on this issue.[12] (Pharmaceutical and other corporations were on the other side, knowing that insistence on strong currency manipulation language would doom the TPP.) The U.S. Treasury had to explain that if such a trade agreement had been in place a few years earlier, it could

have been used against American quantitative easing at that time as easily as against subsequent QE by Japan.[13]

3.1.3. Is Monetary Stimulus a "Beggar-Thy-Neighbor" Policy?

Critics who apply the currency war allegation to general monetary stimulus go too far. It cannot be that monetary easing, when a country's authorities judge it warranted by domestic economic conditions, is, per se, presumed illegitimate under existing rules or that some new international agreement should rule it out as a general proposition.

The phrase "beggar-thy-neighbor" is applied to policies that one country uses to raise net exports at the expense of its trading partners. But a noncoordinated world in which each country chooses its monetary policy independently, subject to the choices of other countries, is very different from the beggar-thy-neighbor problems of a noncoordinated world in which each country chooses its tariffs independently. Even in the case of deliberate efforts to depress the value of one's currency through foreign exchange intervention, currency war worries may be overblown.

Ambiguous Effect on the Trade Balance. For one thing, the principle that monetary stimulus in one country shifts the trade balance in its favor and in this way may hurt other countries is much less clear than many seem to think. The exchange rate effect of monetary expansion should indeed work that way (the "expenditure-switching" effect). But there are other effects of monetary expansion: it raises spending and income. A low interest rate is the most obvious channel of transmission to spending. The income effect raises demand for imports, and for tradable goods more generally, which has the opposite effect on the trade balance from the exchange rate effect. The net effect is ambiguous both in theory and empirically.[14] Empirical models tend to agree only that the net effect on the trade balance is small.

It could well be that monetary expansion in one country is transmitted *positively* to other economies and that therefore the net effect is beneficial under conditions of excess supply, i.e., conditions of weak growth, unemployment, and low inflation. In that case the proper game theory analysis would not be a currency war framework like Table 3a. Rather it would be something more like the locomotive framework of Table 1, where cooperation consists of joint reflation rather than joint monetary restraint. (The axes in Figure 1 could be interpreted as the degree of monetary expansion.) We will consider a version appropriate to monetary policy, in Table 3b.

But perhaps coordination is not even necessary to achieve this outcome. The 2008 global recession called for easier monetary policy than had been

TABLE 3b
The Eichengreen Interpretation of Competitive Devaluation

	U.S. maintains monetary discipline (e.g., stays on the gold standard)	U.S. devalues and moves to an easier monetary policy (e.g., 1933)
Europe maintains monetary discipline (e.g., stays on the gold standard)	Tight monetary policy leaves the world in recession (e.g., the Great Depression).	
Europe devalues and moves to an easier monetary policy		All are in fact better off. Each fails to raise its trade balance, but lower interest rates stimulate global recovery (e.g., via a higher value of gold).

appropriate a few years before all around. The reaction to Fed easing, capital flows, and upward pressure on other currencies was a corresponding monetary easing in many of those other countries in order to dampen or prevent the appreciation of their respective currencies. To that extent, the objective of global monetary expansion was achieved without the benefit of coordination.

To consider decisions such as whether central banks should cooperate, modern monetary theory would prefer to think in terms of the setting of long-term rules rather than the setting of policies at a particular point in time.[15] But the ambiguity of spillover signs and the small welfare implications of coordination carry through to the case of cooperative setting of rules, according to Obstfeld and Rogoff (2002).

Asymmetries in Appropriate Monetary Stance. What if the foreign countries don't want the sort of monetary stimulus that the originating country wants, because they aren't experiencing the same conditions of excess supply? The Brazilian economy in 2010, for example, could be characterized as suffering from excess demand, in danger of overheating. The obvious answer for Brazil under such circumstances is to refrain from monetary ease, or at least to refrain from lowering interest rates as far as the United States, and to let its currency appreciate. Such international asymmetries in economic conditions are exactly what floating rates are designed to accommodate automatically.

For Milton Friedman (1953), one of the great attractions of a system of floating exchange rates was facilitation of the decentralization of policymaking to the national level. It would allow each country to take responsibility for managing its own economy. He considered this appropriate not just economically but also politically: national officials could be held democratically accountable by their own citizens.

The stronger Brazilian *real* will hurt Brazil's exporters and importing-competing firms—cutting into prices, profit margins, output, and employment

in those sectors. But if the economy is indeed up against capacity constraints and suffering from excess demand, there is no reason to let the sectors of the economy that depend on domestic demand suffer the entire burden of adjustment via higher interest rates. The burden should be shared between interest-sensitive sectors (such as construction) and currency-sensitive sectors (such as agriculture). The latter will complain. But the tension is inherent, and blaming the problems of exporters on foreigners does not help a country to think clearly about the tradeoffs or to deal with them.

To be more concrete, Brazil's structural budget deficit was too large in 2010. Taking the budget as given, somebody in the private sector was going to get crowded out. The question was who—the tradable sector via a high currency or the nontradable sector via a high interest rate? The government attempt to blame exporters' troubles on currency wars or U.S. arrogance may have distracted from the fundamental problem.

Implications of the Zero Lower Bound. One characteristic of the post-2008 revival of interest in international monetary policy coordination that is new is the constraint that short-term interest rates in advanced countries have been near zero and cannot be pushed much lower.[16] The loss of the interest rate instrument can have important implications for the nature of spillovers and coordination.[17]

If the only channels of transmission of monetary policy were the short-term interest rate (influencing domestic demand) and the exchange rate (influencing net foreign demand for domestic goods), then the loss of the former instrument would be momentous indeed. The ability of a central bank to stimulate domestic spending would be lost; it might be left only with the ability to switch spending between domestic and foreign goods. Policy would become a zero-sum game via the trade balance, where one country's gain was another country's loss.

Fortunately we don't live in that world. There are other channels of monetary transmission to domestic demand beyond the short-term interest rate. Four of the most important price signals are long-term interest rates, corporate interest rates, equity prices, and real estate prices. There may also be mechanisms that operate without price signals, particularly the credit channel.

These channels can be influenced by the instruments of unconventional monetary policy. The two broad categories of unconventional monetary policy are forward guidance and quantitative easing. Forward guidance has the potential to reduce expectations of future short-term interest rates and thereby to reduce long-term interest rates. Quantitative easing can also reduce long-term interest rates and can more directly reduce borrowing costs in nongovernment sectors, when the central bank buys corporate or asset-backed securities.

One approach is to announce an inflation target, one that is above the inflation rate that is already expected. If the announcement is believed, then it will reduce the real interest rate and thereby stimulate demand, even with the nominal interest rate stuck at the zero lower bound (ZLB). Absent any other mechanism, it is not clear why an inflation target should be believed. But given the existence of long-term interest rates and the other aforementioned channels for boosting demand, they can be reinforced by an explicit intention to let higher demand show up in higher inflation, thereby reducing the real interest rate. In this sense a generous inflation target is a complement to the other channels, rather than a substitute for them.

The menu of possible channels means that central banks are not confined to the two channels of the short-term interest rate and the exchange rate. It follows that even when the interest rate channel is constrained, monetary policy need not be a zero-sum game internationally. None of these channels is certain, however, so perhaps the ZLB helps explain the post-2008 fears of currency wars.

Competitive Depreciation/Currency Manipulation. When currency weakness is not just a side effect of monetary stimulus but is the deliberate effect, for example, of central bank sales of domestic currency in the foreign exchange market, is it a clear "beggar-thy-neighbor" policy that calls for enforced rules against currency manipulation?

Stipulate—as we have been assuming—that because a depreciation of the currency raises the country's price competitiveness on world markets, it stimulates the country's net exports—perhaps with a delay of a year or two—and thus that it achieves a switching of world spending toward the goods and services of the originating country, which comes at the expense of spending on goods and services of other countries. To be careful, notice that we are assuming that the "switching" effects that the exchange rate has via the trade balance dominate any other contrary effects that the exchange rate may have.[18]

It is then easy to see why deliberate steps to depreciate the currency are often viewed as a classic "beggar-thy-neighbor" policy, analogous to putting up tariffs against imports. Each country tries to "export unemployment" to its trading partners. And it might seem a short step from there to the view that everyone would be better off in a cooperative regime where they all agreed to refrain from deliberate intervention to depreciate their currencies, by analogy with agreeing to refrain from protectionist trade barriers. But the analogy may be misplaced.

The Precedent of Competitive Devaluations in the 1930s. The classic examples of both kinds of beggar-thy-neighbor policies—protectionism and

competitive devaluation— came in the 1930s. The Smoot-Hawley tariff enacted by the United States in 1930 was emulated by other countries, collapsing global trade. Meanwhile, Britain, the United States, France, and others pursued competitive devaluations in the early 1930s, as each in turn took its currency off the gold standard.

President Franklin Roosevelt rejected the wishes of the others to cooperate in stabilizing exchange rates at the London Economic Conference of 1933.[19] The conventional wisdom at the time and subsequently was that the tariffs and devaluations both represented similar failures of international cooperation.

The disasters of the 1930s motivated the architects of the postwar system who met at Bretton Woods in 1944 to adopt both the principle of free trade and the principle of pegged exchange rates. Exchange rates were adjustable in the event of fundamental disequilibrium, but to devalue otherwise would be unfair currency manipulation under Article IV of the IMF Articles of Agreement.

Eichengreen and Sachs (1985, 1986), however, offered a powerful revisionist interpretation of the exchange rate developments of the 1930s. They argued that, unlike the tariffs, the devaluations were not collectively damaging but may actually have been beneficial. Each of these devaluations was not just a reduction in the value of the currency in terms of other currencies but also in terms of gold. When each country had taken its turn, the net effects on exchange rates largely canceled out, but the net effects vis-à-vis gold did not. Each country was left with a currency that was worth less in terms of gold, which is to say that the price of gold was higher in terms of each currency. As a result the nominal value of gold reserves was raised. Since gold reserves were the ultimate backing for the money supply, this allowed an expanded money supply in each country and lower interest rates, which is just what the world needed at the time of the Great Depression.

Some version of this dynamic may also have applied in the aftermath of the 2008 global financial crisis, as noted above: after the Federal Reserve aggressively eased, the efforts by other countries to dampen the appreciation of their own currencies against the dollar had the effect of propagating monetary easing worldwide.[20]

Origins of the Language of Manipulation. Calls for international cooperation to prevent competitive depreciation often take the form of proposals to adopt strictly enforced rules against currency manipulation. Language on currency manipulation, for better or worse, was internationally agreed long ago.

IMF Article IV deals with obligations concerning exchange arrangements. After the members of the Fund ratified the move to floating exchange rates in the Jamaica Communiqué of January 1976, they agreed on a framework for

mutual surveillance under what is called the 1977 Decision on Surveillance over Exchange Rate Policies, and they amended Article IV in 1978. Principle A of the 1977 Decision and Section 1(iii) of Article IV both require that each member shall "avoid manipulating exchange rates or the international monetary system in order to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other members."[21]

Most of the time it is very difficult to tell whether a currency is undervalued, overvalued, or correctly valued—even for specialists, let alone politicians. Price criteria such as purchasing power parity may point one direction, for example, even while measures of external balance such as the current account or balance of payments can point the opposite direction. It is even harder to ascertain whether a currency is being deliberately manipulated for unfair competitive advantage.

Manipulation of the Renminbi. The United States has since 2003 been pressuring China to allow the value of the renminbi to be determined more freely in the foreign exchange market and to allow the currency to appreciate against the dollar.[22] These two objectives were consistent from 2003 until 2014: the country ran surpluses on the current account and the financial account, and so the People's Bank of China bought reserves in the foreign exchange market to resist market-driven appreciation of the currency. Many have claimed that China's refusal to allow appreciation in 2003–04 and its intervention to dampen appreciation thereafter constituted unfair manipulation of the currency for competitive advantage. The animus stems from concerns over the U.S. trade deficit, where China is following in the path that was earlier tread by Japan (villain to some, scapegoat to others).

Studies have also fingered other countries for having intervened excessively to counteract market-induced appreciation, including in recent years Switzerland, Korea, and Singapore. But China continues to be the overwhelming focus of concern, at least among American politicians.

The meaning of the word "manipulation" is open to dispute, since it plays no role in economic theory. The 1977 IMF Decision refers to the intent behind the actions of the authorities. Etymologically, the root of the word is the Latin for "hand," which suggests active steps rather than a passive acceptance of developments. Some claim that a country that has in the past chosen a fixed exchange rate regime cannot now be accused of manipulation just because it doesn't allow appreciation: no deliberate action has been taken.

In this view, if a country opts to peg, it cannot be accused of manipulation. This is so even when future developments leave the currency "undervalued," whether because such factors as the Balassa-Samuelson effect or low inflation

have rendered a once-appropriate exchange rate level no longer appropriate, or because the anchor currency, in this case the dollar, has in the meantime depreciated against other relevant currencies. A fixed exchange rate is a legitimate choice for any country under Article IV. It is pointed out that smaller countries with long-time fixed exchange rates are seldom accused of manipulation.

Many, on the other side, claim that China's decision to cling to a peg when the currency could as easily be allowed to appreciate was a deliberate choice with the intent to gain competitive advantage on world markets, and that it frustrates balance of payments adjustment, with adverse effects on the rest of the world. They point out that "protracted large-scale intervention in one direction in the exchange market" is one of the criteria the 1977 Decision specifies the Fund shall consider "as among those which might indicate the need for discussion" with a member over its exchange rate policy.[23]

Frankel and Wei (2007) tested econometrically two competing hypotheses regarding the Treasury's biannual reports on whether individual trading partners are manipulating currencies for unfair advantage. The first hypothesis is that the determinants are legitimate economic variables consistent with Article IV. The second hypothesis is that the determinants of the Treasury decisions are variables suggestive of domestic American political expediency. The econometric results suggest that the Treasury verdicts are driven heavily by the U.S. bilateral deficit with the country in question, though some of the other legitimate variables also turn out to be quite important. The U.S. Congress did legally mandate in 1988 that the bilateral balance should be an important consideration. But the bilateral balance does not appear as one of the criteria in the 1977 Decision or Article IV of the International Monetary Fund, the original source of the "manipulation" language.

The value of the renminbi was sufficiently low in 2000–05 that it could be judged as undervalued by a variety of criteria—a rare instance of such clarity. For example, international price comparisons (the purchasing power parity criterion) showed it to be undervalued even if one took into account the Balassa-Samuelson relationship, which observes that goods and services tend to be cheaper in lower-income countries. Estimates of the undervaluation were in the range of about 25–35 percent.[24] But the currency did appreciate between 2005 and 2011, by 25 percent in nominal terms against the dollar and more in real terms. International price comparison data for 2011 suggested that the renminbi was no longer too cheap.[25] The IMF (2015b) confirmed that the renminbi was indeed no longer undervalued.

Whether because of the end of undervaluation or for other reasons, capital began to flow out of China rather than in. Perhaps investors were beginning to

conclude that the period of export-driven super-high growth in China was coming to an end. By mid-2014, China was running a deficit on the overall balance of payments. This meant that it was no longer gaining reserves—intervening to resist market-driven appreciation as it had over the decade 2003–13. Rather, in July 2014 the People's Bank of China started to lose reserves, intervening to resist market-driven depreciation.

Despite this sea change in China's external accounts, some Americans continued to worry about Chinese currency manipulation. They continued to ask that China move toward a market-driven exchange rate and that it appreciate its currency, failing to notice that these two requests had become contradictory under the new circumstances. For a few days in August 2015, the Chinese authorities allowed the exchange rate to move more strongly in the direction that the market was pushing—precisely as the Americans had been long asking. Unsurprisingly, the result was a depreciation of the renminbi against the dollar. Even with this demonstration that their thinking had gone wrong somewhere, American politicians continued to accuse China of keeping its currency artificially low and continued to demand that President Obama negotiate enforceable prohibitions on currency manipulation in international agreements.

3.2. "Competitive Appreciation" Game

Fears at times that countries are keeping their interest rates too low or otherwise seeking to depreciate their currencies have a mirror image in fears at times that countries are keeping their interest rates too *high* or otherwise seeking to *appreciate* their currencies. We now consider this case.

3.2.1. Concerns that Monetary Policy Is Too Tight

Sometimes concerns about lack of cooperation in monetary policy take the form of fears that U.S. monetary policy is too tight and that there is unwelcome downward pressure on nondollar currencies. Consider what provoked Reserve Bank of India Governor Raghuram Rajan to make the 2014 complaint that appears in epigram form at the top of this paper. In the aftermath of the 2013 "taper tantrum," he was displeased at spillover effects on emerging markets resulting from a Fed exit out of QE and an increase in U.S. longer-term interest rates:

> *Central banks should assess spillover effects from their own actions . . . For example, this would mean that while exiting from unconventional policies, central banks would pay attention to conditions in*

> *emerging markets . . . [T]he Fed policy statement in January 2014, with no mention of concern about the emerging market situation, and with no indication Fed policy would be sensitive to conditions in those markets sent the probably unintended message that those markets were on their own.* (April 10, 2014)

Fears of the coming Fed decision to raise U.S. short-term interest rates continued to afflict emerging markets in 2014 and 2015: lower EM equity prices, bond prices, currency values, and dollar commodity prices.[26]

One can see in history the reason for concern. The Volcker tightening of 1980–82 helped precipitate the international debt crisis of 1982, and the Greenspan tightening of 1994 helped precipitate the Mexican peso crisis later that year.[27] In response to such crises, cooperation might call for generalized monetary ease, in the manner of simultaneous interest rate reductions of 1987 (post stock market crash), 1998 (post Asia crisis), and 2009 (post global financial crisis).

Rajan's 2014 worry that Fed tightening would hurt emerging markets is in some sense the opposite of the Brazilian complaint in 2010 about spillover effects of *loose* U.S. monetary policy. That doesn't necessarily make either one of them wrong. Both could be right: The externalities could run in different directions at different times. Low U.S. real interest rates contributed to EM flows in the late 1970s, early 1990s, and early 2000s, before they once again did so in the aftermath of the 2008–09 global recession. Each was followed by crises in some emerging markets. Perhaps it is the complete cycle, alternating credit boom and bust, that is the problem.[28]

There are historical precedents among advanced countries as well for concerns regarding an increase in U.S. interest rates and a resulting appreciation of the dollar. The fear used to be that the U.S. tightening would come at the expense of exporting inflation to other countries. This was one interpretation of the strong dollar in the early 1980s, which provoked complaints among trading partners and eventually led to one of the most renowned coordination agreements: the Plaza Accord of September 1985, in which G-5 ministers agreed to bring the dollar down.[29]

What had been the motive in the early 1980s for keeping interest rates high? Countries might have a variety of motivations for seeking to attract foreign capital and appreciate their currencies—for example, to ward off speculative attacks when there is a general contagion in global financial markets. At the time of the early 1980s, the policy priority was to bring down inflation.

A monetary contraction that appreciates the currency is particularly helpful at putting downward pressure on the consumer price index through lower prices of commodities and other imports.[30]

Of course it is not possible for every country to raise its interest rate above everybody else's to attract a net capital inflow or to appreciate its currency. The outcome of attempts to do so might be a world with too-high interest rates. The corresponding 2×2 game is illustrated in Table 4. In this telling, cooperation consists of an agreement to simultaneously lower interest rates.

For a graphical illustration of the competitive appreciation game, return to Figure 2, with the axes defined as the domestic and foreign interest rates. At the noncooperative point ***N***, everyone's interest rate is too high. Coordination consists of everyone agreeing to cut interest rates.

Why did the United States agree to cooperate in bringing down the dollar in 1985, whereas it had rebuffed European requests for cooperative foreign exchange intervention at the Versailles and Williamsburg G-7 summit meetings in the preceding years? One answer is that the new Secretary of the Treasury, James Baker, was more open temperamentally to the idea of international coordination than his predecessor, Don Regan (and the Under Secretary of the Treasury, Beryl Sprinkel). But another answer is that Regan and Sprinkel did not believe in a model in which the strong dollar and U.S. trade balance were affected by U.S. monetary policy, fiscal policy, or foreign exchange intervention or even that the trade deficit was a problem. Their view was that the trade deficit and its counterpart, the net flow of capital to the United States, were instead the result of a favorable national climate for market capitalism under President Ronald Reagan; that it was therefore a good thing; and that in any case sterilized foreign exchange intervention has no effect on the exchange rate.[31] A third answer is that the domestic interest groups in the tradable goods sector which were hurt by the strong dollar did not succeed in making enough political headway to force an accommodation until 1985.[32]

TABLE 4
The "Exporting Inflation" or Competitive Appreciation Game

	U.S. raises interest rates	U.S. keeps interest rates low
Other country raises interest rates	Noncooperative equilibrium: High interest rates everywhere. The world remains stuck in recession.	Dollar depreciates, raising U.S. CPI inflation.
Other country keeps interest rates low	Dollar appreciates, lowering U.S. CPI inflation at the expense of other countries.	Cooperative equilibrium: Low interest rates everywhere. Exchange rates unchanged, but growth is sustained.

As in the case of the locomotive game, fiscal discipline game, and competitive depreciation game, the success of the Plaza initiative in 1985 had as much to do with changes regarding which domestic interest groups and which perceptions held sway as it did with a Nashian triumph of cooperation over international fractiousness.

4. Do We Really Need International Policy Coordination?

It was suggested in Section 3.1.3 that floating exchange rates could allow each country to choose whatever monetary policy it deems appropriate for its own economy and, thus, render international monetary coordination unnecessary. This long-standing textbook proposition, originally proclaimed to a skeptical world by Friedman (1953), has recently been challenged anew.

4.1. Trilemma or Dilemma?

The international economists' framework of the trilemma, or impossible trinity, says that countries can have monetary independence if and only if they are willing either to give up financial integration or to give up a fixed exchange rate. The logic is that with full financial integration and full currency integration, a small country has to accept that its interest rate will be dictated by the foreign interest rate. But if the exchange rate floats, the claim is, a country can choose its own monetary conditions, and international coordination may not be necessary (e.g., Bénassy-Quéré et al. 2014). For example, floating-rate Poland was apparently insulated from the foreign shock of 2008–09, in contrast to the fixed-rate Baltic countries.

The impossible trinity has recently been challenged by Rey (2015). She points out that floating rates have not been sufficient to insulate other countries from a global financial cycle originating in financial shocks in U.S. interest rates[33] or investor attitudes toward risk.[34] When the Fed raises interest rates, interest rates in other countries go up as well.[35] International monetary policy coordination would be one way to address this problem. (Rey herself views coordination as "out of reach" in practice.[36])

In other new theoretical models as well, capital market imperfections may prevent floating rates from performing the shock absorption role claimed in traditional macroeconomic analysis.[37] Some find that in such circumstances capital controls or macroprudential regulatory policies can be welfare improving. But macroprudential policies may themselves need to be coordinated internationally.[38] The tightening of capital requirements or other regulations on domestic banks in one country may cause a "leak" abroad, in the sense that some of the projects that might previously have been funded by domestic banks may now

be financed from abroad.[39] This suggests one justification for capital controls. Engel (2015b) concludes that the leakage may call for international coordination of macroprudential policy, as under the Basel III agreement.

Others have responded to the attack on the trilemma. Klein and Shambaugh (2015) adduce evidence supporting the traditional view that "a moderate amount of exchange rate flexibility does allow for some degree of monetary autonomy, especially in emerging and developing economies." Di Giovanni and Shambaugh (2008) find that, while foreign interest rates have a negative impact on domestic gross domestic product (GDP) in pegged countries, flexible exchange rates insulate against them. Aizenman, Chinn, and Ito (2010, 2011) find that exchange rate stability is associated with less monetary independence and more output volatility. Obstfeld (2015) finds that the correlation between local and U.S. short-term interest rates falls to zero for countries with flexible exchange rates.

The proposition that a floating exchange rate fully insulates a country from foreign shocks is a straw man. It is true that the property may hold in a textbook model without financial integration. The reason is that trade surpluses and deficits are the most fundamental channel of transmission across countries; but if there are no private capital flows and no official reserve transactions, then the exchange rate adjusts to make sure that the trade balance is continuously zero. This textbook theorem is a straw man in that no country is in fact cut off from capital flows. For this reason alone, it would be hard to find an economist who claims that a floating rate guarantees that a country will feel no impact from external shocks.

The important question is not whether a floating rate is sufficient to insulate a country's economy from foreign shocks if its policymakers are passive. A more important question is rather whether floating offers enough independence that the officials, *after adjusting their policy settings in response to the shock,* can attain their objectives as well as before the shock.

Even this is a bit of a straw man. An external shock like the global financial crisis or some other "risk-off" shift in financial markets may well hit every country, regardless of its exchange rate regime. But the question for coordination is whether the big players like the United States or the euro zone or China would set macroeconomic policies differently if they were taking into account the interests of other countries than they do in the pursuit of their own economic interest. Strong economic performance in the big countries usually benefits the rest of the world as surely as it benefits themselves.

4.2. Targets and Instruments

This leads to the task of counting policy instruments and policy goals. A well-known theorem says that a country in general can attain its goals if it has as many independent policy instruments as it has goals. Assume first that the country has a single instrument, namely monetary policy, and a single goal, namely internal balance—defined as output at potential, unemployment at the natural rate, or inflation at its target. Then a floating exchange rate allows it to achieve its goal better than a fixed rate. Even when impacted by a foreign shock, the country can adjust its monetary policy setting so as to achieve a desired level of overall demand, output, and inflation.

That reasoning, however, assumes that the country does not care about the composition of output between the sector that is sensitive to domestic demand (particularly as reflected in the interest rate) and the sector that is sensitive to net foreign demand (particularly as reflected in the exchange rate). Assume now that the country has a second goal: external balance, as defined by a target for the trade balance (or it could be the balance of payments). In this case the single monetary policy instrument is not enough to achieve both goals.[40] A case for coordination of monetary policy then stands, in theory. But one must ask how important the trade balance spillover effect is in practice, if neither officials, nor citizens, nor economists and their models agree on what is the sign of the effect of monetary policy on the trade balance. We don't know if the exchange rate effect is larger or smaller than the spending effect. Thus each country doesn't really know if it should want its neighbors to adopt looser or tighter monetary policies. We saw similarly in Section 2 that countries disagree as well over whether fiscal stimulus is a virtue or a vice.

4.3. Different Models, Different Interest Groups

The wide range of models wreaks havoc with international coordination in a number of ways. First, if different countries have fundamentally different models in mind, the officials might not even be able to carry on a coherent discussion of the potential gains from coordination and how to achieve them. In graphical terms, if one negotiator sees the world in terms of Figure 1 and the other in terms of Figure 2, they don't even understand why their interlocutors are making the proposals they are making, since they seem to leave everybody worse off. (Think of the dialogue of the deaf between the government that was elected in Greece in January 2015 and its euro partners.) It is good for them to talk, in part because exchanging views makes it more likely that they will improve their

perceptions. But it is not likely that they will be able to come to an agreement unless it is phrased so vaguely that everyone can interpret it as they want.[41]

Second, the existence of such a wide variety of models forces us to confront the likelihood that any given model is very likely to be wrong. Negotiators will be able to come up with a coordinated package of policy changes that each believes will leave their own country better off, and perhaps will be able to ignore that they don't understand why the other side wants to make the deal. Under these conditions, international coordination can take place. But it could make things worse—when it moves policy settings in the wrong direction—as easily as better.[42]

The optimistic view is that officials may narrow the differences in their perceptions if they come together to negotiate. But this hope should be counterbalanced by a pessimistic possibility: Model perceptions could be endogenous with respect to interests. As Ostry and Ghosh (2013) point out, each country has an incentive to claim to believe in whatever model suits its interest in the bargaining process. (If Germany, for example, wants to maximize the amount of demand for its goods that comes from abroad rather than domestically, it suits its purposes in international discussions to subscribe to a model in which fiscal expansion has little effect.) Officials may genuinely come to believe the models that suit their positions; the psychologists would call this a desire to avoid cognitive dissonance. In this way international negotiations could actually harden differences in perceptions.

Even aside from international differences in perceptions, disagreements among domestic interest groups can also wreak havoc with the basic theory of international coordination. Within each country the interests of the tradable sector—which usually means manufacturing and agriculture—may be in opposition to the interests of other sectors. A country may suffer from excessive budget deficits due to a failure of political economy. The consequent crowding out of the private sector may take place not only via a higher interest rate and its negative effect on domestic demand but also via an appreciation of the currency and a loss in net exports. The tradable sector will complain that foreign currencies are undervalued. But talk of unfair currency manipulation by foreigners or currency wars is likely to be unproductive in this case. It may prevent a meaningful domestic discussion over the fundamental problem, the budget deficit.

Consider the complaints of the tradable sector in Brazil when the currency *(real)* was so strong in 2010. The country's leaders naturally found it easier to blame the capital inflow and strong *real* on easy monetary policy on the part of a Federal Reserve that was heedless of international spillover effects than to admit that its own fiscal policy was too loose and that the interest rate, capital

inflows, currency appreciation, and trade deficit were natural concomitants. It would have been better to have a clear understanding and debate domestically about the tradeoffs than to call for international coordination.

Or consider more recent complaints of the auto industry in the United States about unfair currency manipulation by major trading partners. Associated efforts in the U.S. Congress to put prohibitions on currency manipulation into international trade agreements may be misguided. Supporting the idea that the problem may lie in perceptions is the fact that some proponents do not seem to understand that the Bank of Japan, the European Central Bank, and (since mid-2014) even the People's Bank of China have not in fact been intervening in the foreign exchange market to depress the value of their currencies.

These and other examples undermine the calls for international coordination. When two players sit down at the board, they are unlikely to have a satisfactory game if one of them thinks they are playing checkers and the other thinks they are playing chess.

REFERENCES

Agrippino, Silvia, and Hélène Rey. 2014. "World Asset Markets and the Global Financial Cycle." National Bureau of Economic Research Working Paper 21722.

Aiyar, Shekhar, Charles Calomiris, and Tomasz Wieladek. 2012. "Does Macro-Pru Leak? Evidence from a UK Policy Experiment." National Bureau of Economic Research Working Paper 17822.

Aizenman, Joshua. 1998. "Fiscal Discipline in a Union." In *The Political Economy of Reform*, eds. Federico Sturzenegger and Marc Tommasi. Cambridge, MA: MIT Press, pp. 185–208.

Aizenman, Joshua, Menzie Chinn, and Hiro Ito. 2010. "The Emerging Global Financial Architecture: Tracing and Evaluating New Patterns of the Trilemma Configuration." *Journal of International Money and Finance* 29(4), pp. 615–641.

Aizenman, Joshua, Menzie Chinn, and Hiro Ito. 2011. "Surfing the Waves of Globalization: Asia and Financial Globalization in the Context of the Trilemma." *Journal of the Japanese and International Economies* 25(3), pp. 290–320.

Bénassy-Quéré, Agnès, Pierre-Olivier Gourinchas, Philippe Martin, and Guillaume Plantin. 2014. "The Euro in the 'Currency War'." Les Notes du Conseil d'Analyse Économique (CAE Note) 11, January.

Bergsten, C. Fred. 2015. "The Truth about Currency Manipulation: Congress and the Trans-Pacific Partnership." *Foreign Affairs*, Op-ed piece, January 18.

Bergsten, C. Fred. 2016. "Time for a Plaza II?" In *International Monetary Cooperation: Lessons from the Plaza Accord after Thirty Years*, eds. C. Fred Bergsten and Russell Green. Washington, DC: Peterson Institute for International Economics.

Blanchard, Olivier, Jonathan D. Ostry, and Atish R. Ghosh. 2013. "International Policy Coordination: The Loch Ness Monster." *iMFdirect* (blog), December 15, International Monetary Fund. https://blog-imfdirect.imf.org/2013/12/15/international-policy-coordination-the-loch-ness-monster/

Blanchard, Olivier, Jonathan D. Ostry, Atish R. Ghosh, and Marcos Chamon. 2015. "Are Capital Inflows Expansionary or Contractionary? Theory, Policy Implications, and Some Evidence." National Bureau of Economic Research Working Paper 21619.

Branson, William, and Julio Rotemberg. 1980. "International Adjustment with Wage Rigidity." *European Economic Review* 13(3), pp. 309–341.

Caballero, Ricardo, Emmanuel Farhi, and Pierre-Olivier Gourinchas. 2015. "Global Imbalances and Currency Wars at the ZLB." National Bureau of Economic Research Working Paper 21670.

Calvo, Guillermo, Leo Leiderman, and Carmen Reinhart. 1996. "Inflows of Capital to Developing Countries in the 1990s." *Journal of Economic Perspectives* 10(2), pp. 123–139.

Chang, Roberto. 1990. "International Coordination of Fiscal Deficits." *Journal of Monetary Economics* 25(3), pp. 347–366.

Chinn, Menzie. 2013. "Global Spillovers and Domestic Monetary Policy." Bank for International Settlements Working Paper 436, December.

Cooper, Richard. 1969. "Macroeconomic Policy Adjustment in Interdependent Economies." *Quarterly Journal of Economics* 83(1), pp. 1–24.

Cooper, Richard. 2001. "International Cooperation in Public Health as a Prologue to Macroeconomic Cooperation." In *Can Nations Agree? Issues in International Economic Cooperation*, eds. Richard N. Cooper, Barry Eichengreen, Gerald Holtham, Robert D. Putnam, and C. Randall Henning. Washington, DC: Brookings Institution.

Devereux, Michael, and James Yetman. 2014. "Capital Controls, Global Liquidity Traps and the International Policy Trilemma." *Scandinavian Journal of Economics* 116(1), pp. 158–189.

Di Giovanni, Julian, and Jay Shambaugh. 2008. "The Impact of Foreign Interest Rates on the Economy: The Role of the Exchange Rate Regime." *Journal of International Economics* 74(2), pp. 341–361.

Edwards, Sebastian. 2015. "Monetary Policy Independence under Flexible Exchange Rates: An Illusion?" *The World Economy* 38(5), pp. 773–787. (Also NBER Working Paper 20893.)

Eichengreen, Barry. 2013. "Currency War or International Policy Coordination." *Journal of Policy Modeling* 35(3), pp. 425–433.

Eichengreen, Barry. 2014. "International Policy Coordination: The Long View." In *Globalization in an Age of Crisis: Multilateral Economic Cooperation in the Twenty-First Century*, eds. Robert Feenstra and Alan Taylor. Chicago: University of Chicago Press.

Eichengreen, Barry. 2015. *Hall of Mirrors: The Great Depression, The Great Recession, and the Uses—and Misuses—of History.* Oxford: Oxford University Press.

Eichengreen, Barry, and Jeffrey Sachs. 1985. "Exchange Rates and Economic Recovery in the 1930s." *Journal of Economic History* 45(4), pp. 924–946.

Eichengreen, Barry, and Jeffrey Sachs. 1986. "Competitive Devaluation and the Great Depression: A Theoretical Reassessment." *Economics Letters* 22(1), pp. 67–72.

Engel, Charles. 2014. "Policy Cooperation, Incomplete Markets and Risk Sharing." Paper presented at the 15th Jacques Polak Annual Research Conference, hosted by the International Monetary Fund, Washington, DC, November 13–14.

Engel, Charles. 2015a. "International Coordination of Central Bank Policy." University of Wisconsin Working Paper. Forthcoming in *Journal of International Money and Finance.*

Engel, Charles. 2015b. "Macroprudential Policy in a World of High Capital Mobility: Policy Implications from an Academic Perspective." National Bureau of Economic Research Working Paper 20951.

Farhi, Emmanuel, and Ivan Werning. 2014. "Dilemma not Trilemma? Capital Controls and Exchange Rates with Volatile Capital Flows." *IMF Economic Review* 62(4), pp. 569–605.

Feldstein, Martin. 1988. "Thinking about International Economic Coordination." *Journal of Economic Perspectives* 2(2), pp. 3–13.

Fischer, Stanley. 1988. "International Macroeconomic Policy Coordination." In *International Economic Cooperation*, ed. Martin Feldstein. Chicago: University of Chicago Press.

Forbes, Kristin, and Francis Warnock. 2012. "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment." *Journal of International Economics* 88(2), pp. 235–251.

Frankel, Jeffrey. 1988. "Obstacles to International Macroeconomic Policy Coordination." *Journal of Public Policy* 8(3–4), pp. 353–374.

Frankel, Jeffrey. 1994. "The Making of Exchange Rate Policy in the 1980s." In *American Economic Policy in the 1980s*, ed. Martin Feldstein. Chicago: University of Chicago Press, pp. 293–341.

Frankel, Jeffrey. 2006. "On the Yuan: The Choice between Adjustment under a Fixed Exchange Rate and Adjustment under a Flexible Rate." *CESifo Economic Studies* 52(2), pp. 246–275.

Frankel, Jeffrey. 2016. "The Plaza Accord, 30 Years Later." In *International Monetary Cooperation: Lessons from the Plaza Accord after Thirty Years*, eds. C. Fred Bergsten and Russell Green. Washington, DC: Peterson Institute for International Economics. (Also NBER Working Paper 21813, December 2015.)

Frankel, Jeffrey, and Katharine Rockett. 1988. "International Macroeconomic Policy Coordination When Policymakers Do Not Agree on the Model." *American Economic Review* 78(3), pp. 318–340.

Frankel, Jeffrey, Sergio Schmukler, and Luis Servén. 2004. "Global Transmission of Interest Rates: Monetary Independence and Currency Regime." *Journal of International Money and Finance* 23(5), pp. 701–733.

Frankel, Jeffrey, and Shang-Jin Wei. 2007. "Assessing China's Exchange Rate Regime." *Economic Policy* 22, pp. 575–614.

Frieden, Jeffry. 1991. "Invested Interests: The Politics of National Economic Policies in a World of Global Finance." *International Organization* 45(4), pp. 425–51.

Frieden, Jeffry. 2014. *Currency Politics: The Political Economy of Exchange Rate Policy.* Princeton, NJ: Princeton University Press.

Friedman, Milton. 1953. "The Case for Flexible Exchange Rates." In *Essays in Positive Economics*, ed. Milton Friedman. Chicago, IL: University of Chicago Press, pp. 157–203.

Gagnon, Joseph. 2012. "Combating Widespread Currency Manipulation." Peterson Institute for International Economics Policy Brief 12-19, July.

Gagnon, Joseph. 2013. "Currency Wars." *Milken Institute Review* 15(First Quarter), pp. 47–55.

Ghosh, Atish, and Paul Masson. 1988. "International Policy Coordination in a World with Model Uncertainty." *IMF Staff Papers* 35(2), pp. 230–258.

Glick, Reuven, and Michael Hutchison. 1993. "Fiscal Policy in Monetary Unions: Implications for Europe." *Open Economies Review* 4(1), pp. 39–65.

Goldstein, Morris, and Nicholas Lardy. 2005. "China's Role in the Revived Bretton Woods System: A Case of Mistaken Identity." Peterson Institute for International Economics Working Paper 05-2.

Group of Seven. 2013. "Statement by G7 Finance Ministers and Central Bank Governors." February 12. http://www.g8.utoronto.ca/finance/fm130212.htm

Guiso, Luigi, Helios Herrera, and Massimo Morelli. 2016. "Cultural Differences and Institutional Integration." *Journal of International Economics* 99(S1), pp. S97–S113.

Hamada, Koichi. 1976. "A Strategic Analysis of Monetary Interdependence." *Journal of Political Economy* 84(4), pp. 677–700.

Ilzetski, Ethan, and Keyu Jin. 2013. "The Puzzling Change in the Transmission of U.S. Macroeconomic Policy Shocks." London School of Economics.

International Monetary Fund. 2006. "Article IV of the Fund's Articles of Agreement: An Overview of the Legal Framework." IMF Legal Department, June 28.

International Monetary Fund. 2015a. "2015 Spillover Report." June 8.

International Monetary Fund. 2015b. "People's Republic of China: Staff Report for the 2015 Article IV Consultation." IMF Country Report 15-234, August 14.

Jeanne, Olivier. 2014. "Macroprudential Policies in a Global Perspective." In *2013 Asia Economic Policy Conference: Prospects for Asia and the Global Economy*, eds. Reuven Glick and Mark Spiegel. San Francisco: Federal Reserve Bank of San Francisco. (Also NBER Working Paper 19967.)

Kalemli-Ozcan, Sebnem, Elias Papaioannou, and Fabrizio Perri. 2013. "Global Banks and Crisis Transmission." *Journal of International Economics* 89(2), pp. 495–510.

Kehoe, Patrick. 1987. "Coordination of Fiscal Policies in a World Economy." *Journal of Monetary Economics* 19(3), pp. 349–376.

Kessler, Martin, and Arvind Subramanian. 2014. "Is the Renminbi Still Undervalued? Not According to New PPP Estimates." RealTime Economic Issues Watch (blog), Peterson Institute for International Economics, May 1. http://blogs.piie.com/realtime/?p=4300

Klein, Michael, and Jay Shambaugh. 2015. "Rounding the Corners of the Policy Trilemma: Sources of Monetary Policy Autonomy." *American Economic Journal: Macroeconomics* 7(4), pp. 33–66. (Also NBER Working Paper 19461.)

Landmann, Oliver. 2015. "EMU and the Cyclical Behavior of Fiscal Policy: A Suggested Interpretation." University of Freiburg Department of International Economic Policy Discussion Paper 29, December.

Obstfeld, Maurice. 2015. "Trilemmas and Tradeoffs: Living with Financial Globalization." In *Global Liquidity, Spillovers to Emerging Markets and Policy Responses*, eds. Claudio Raddatz, Diego Saravia, and Jaume Ventura. Santiago, Chile: Central Bank of Chile, pp. 13–78.

Obstfeld, Maurice, and Kenneth Rogoff. 2002. "Global Implications of Self-Oriented National Monetary Rules." *Quarterly Journal of Economics* 117(2), pp. 503–535.

Ostry, Jonathan, and Atish Rex Ghosh. 2013. "Obstacles to International Policy Coordination and How to Overcome Them." International Monetary Fund Staff Discussion Note 13/11. Forthcoming in *Journal of International Money and Finance.*

Oudiz, Gilles, and Jeffrey Sachs. 1984. "Macroeconomic Policy Coordination among the Industrial Economies." *Brookings Papers on Economic Activity* 1, pp. 1–75.

Portes, Richard. 2012. "Monetary Policies and Exchange Rates at the Zero Lower Bound." *Journal of Money, Credit and Banking* 44(s1), pp. 157–163.

Rajan, Raghuram. 2015. "Competitive Monetary Easing: Is It Yesterday Once More?" *Macroeconomics and Finance in Emerging Market Economies* 8(1–2), pp. 5–16.

Rey, Hélène. 2015. "Dilemma Not Trilemma: The Global Financial Cycle and Monetary Policy Independence." National Bureau of Economic Research Working Paper 21162.

Rogoff, Kenneth. 1985. Can International Monetary Policy Cooperation Be Counterproductive? *Journal of International Economics* 18(3–4), pp. 199–217.

Sachs, Jeffrey. 1985. "The Dollar and the Policy Mix: 1985." *Brookings Papers on Economic Activity* 1, pp. 117–86.

Subacchi, Paola, and Paul Van den Noord. 2012. "Grappling with Global Imbalances: When Does International Cooperation Pay?" *Oxford Review of Economic Policy* 28(3), pp. 444–468.

Subramanian, Arvind. 2010. "New PPP-Based Estimates of Renminbi Undervaluation and Policy Implications." Peterson Institute for International Economics Policy Brief 10-8, April.

Tabellini, Guido. 1990. "Domestic Politics and the International Coordination of Fiscal Policies." *Journal of International Economics* 28(3–4), pp. 245–265.

Taylor, John B. 1985. "International Coordination in the Design of Macroeconomic Policy Rules." *European Economic Review* 28(1–2), pp. 53–81.

Taylor, John B. 2013. "International Monetary Policy Coordination: Past, Present and Future." Bank for International Settlements Working Paper 437.

Taylor, John B. 2016. "A Rules-Based Cooperatively-Managed International Monetary System for the Future." In *International Monetary Cooperation: Lessons from the Plaza Accord after Thirty Years*, eds. C. Fred Bergsten and Russell Green. Washington, DC: Peterson Institute for International Economics.

NOTES

1 See, for example, Feldstein (1988), Fischer (1988), Frankel (1988), Ghosh and Masson (1988), Kehoe (1987), Oudiz and Sachs (1984), Rogoff (1985), and Tabellini (1990).

2 See Group of Seven (2013).

3 See, for example, Blanchard, Ostry, and Ghosh (2013), Eichengreen (2014), Engel (2014, 2015a), Ostry and Ghosh (2013), Subacchi and Van den Noord (2012), and Taylor (2013, 2016).

4 The seminal early applications of basic game theory to international macroeconomic policy coordination were by Cooper (1969) and Hamada (1976). The rise of game theory was to produce a number of Nobel Prizes in Economics, notably that awarded to John Nash in 1994.

5 Ilzetski and Jin (2013) argue that international transmission from the United States to the rest of the world has mysteriously switched sign in recent years. Kalemli-Ozcan, Papaioannou, and Perri (2013) see the sign of the transmission as different during periods of financial crisis such as 2008–09 than during normal times.

6 Branson and Rotemberg (1980) attributed the gap in understanding to a German perception that their aggregate supply curve was vertical, possibly because of institutions that made real wages rigid. Among the other reasons why some don't believe that fiscal expansion leads to higher income are Ricardian equivalence, import leakage, crowding out via higher interest rates, and loss of creditworthiness.

7 See, for example, Aizenman (1998).

8 See, for example, Glick and Hutchison (1993).

9 Guiso, Herrera, and Morelli (2016) document basic cultural differences between Germans and Greeks in perceptions regarding cheating.

10 They may not even agree on what are their current policy settings. In 2009, for example, Germany saw its fiscal stance as already more expansionary than the United States saw it, because a stronger social safety net gives Germany bigger "built-in stabilizers" than the United States, and hence more countercyclical fiscal policy, even before any deliberate shifting of spending or tax policy levers. This is another of many examples of differences in perceptions.

11 The stimulus seemed to pay off at first, with a rapid return to positive gross domestic product (GDP) growth in 2013. Growth again turned sharply negative in the second quarter of 2014, but a rise in the consumption tax seemed the obvious culprit.

12 In particular, Ford Motor Company (Bergsten 2016).

13 China is of course a more common target of allegations of unfair currency manipulation, although it is not in the TPP. The renminbi depreciated against the dollar during 2014–15. But this depreciation was the result of a slowing Chinese economy, monetary stimulus, and capital outflow, and not the result of intervention by the People's Bank of China which (since June 2014) has supported the currency rather than vice versa. Thus China during the year 2014–15 has been the fourth example in the sequence of the United States, Japan, and the ECB. China is considered in a separate subsection because it is so widely criticized for intervening to keep the value of its currency down, which is what it had done massively during the preceding ten years.

14 See, for example, Blanchard et al. (2015).

15 See, for example, Taylor (1985, 2016).

16 Monetary theorists shifted in a few short years from considering Keynes's liquidity trap to be an irrelevant artifact of the history of thought to considering the zero lower bound to be virtually the defining characteristic of monetary policy in the wake of the global financial crisis.

17 See, for example, Caballero, Farhi, and Gourinchas (2015), Chinn (2013), Devereux and Yetman (2014), Engel (2014), Landmann (2015), and Portes (2012).

18 In some countries, especially emerging markets or developing countries, a depreciation of the currency has contractionary effects, which may be big enough to offset the expansionary switching effect on the trade balance. These include especially balance sheet effects (if the depreciating country has large debts denominated in foreign currency) and the effect on the local-currency price of oil or other imported inputs. If these contractionary effects of depreciation were important, it would seem to follow that an appreciation of other currencies—because the dollar is depreciating—would have expansionary effects on their economies. Beggar-thy-neighbor would be converted to "enrich-thy-neighbor."

19 See Eichengreen (2015).

20 See Eichengreen (2013).

21 In principle, Keynes got his way at Bretton Woods in one respect: the obligation is meant to fall on countries seeking to keep the values of their currencies down so as to preserve a balance of payments surplus, as much as on those seeking to keep the values of their currencies up thereby preventing adjustment of a balance of payments deficit. International Monetary Fund (2006, p. 15): "The term 'in order to prevent balance of payments adjustment' is sufficiently broad to cover situations where a member is manipulating its exchange rate in a manner that makes it either overvalued or undervalued." In practice, however, the economic and political pressure on a surplus country to adjust its currency upward has always been far less than the pressure on a deficit country to adjust its currency downward.

22 Frankel and Wei (2007) consider U.S. pressure on China that began in 2003 regarding the exchange rate.

23 See, for example, Goldstein and Lardy (2005). China is not the only one. Ted Truman coined the phrase "competitive non-appreciation" to describe the noncooperative equilibrium in which countries intervene to prevent market-driven appreciation of their currencies, but are not actually depreciating.

24 See, for example, Frankel (2006) and Subramanian (2010).

25 See Kessler and Subramanian (2014).

26 U.S. monetary tightening is more likely to have a contractionary effect on floating-rate EM economies if they have previously incurred dollar-denominated debt, because depreciation of their currencies against the dollar has an adverse balance sheet effect. The lesson to avoid dollar-denominated debt is one that many of them learned from the crises of the 1990s. A much more general lesson is the admonition that each country should "get its own house in order."

27 This was just as Calvo, Leiderman, and Reinhart (1996) had predicted. The annual spillover report of the International Monetary Fund (2015a, pp. 6–16) considers the impact of U.S. interest rates and exchange rates on others.

28 See Rajan (2015).

29 For a consideration of the Plaza Accord on its 30th anniversary, see Frankel (2016) and other papers written for a conference on that occasion.

30 Thus Sachs (1985) interpreted high interest rates and the strong dollar in terms of the competitive appreciation game.

31 On this last point in particular, a fair number of economists would support their position. There is as little agreement today on whether sterilized foreign exchange intervention can affect the exchange rate as there ever was, although that seems surprising in light of recent concerns over currency manipulation by China and other emerging market countries.

32 Manufacturing and agriculture interests had been complaining about the strong dollar for several years. Their complaints and support in Congress for action to protect them reached a high pitch in 1984–85. It is not quite as obvious who were the interest groups on the opposite side from the strong-dollar complaints of the tradable sector. But it has been suggested that the sectors arrayed in support of the status quo included the banking and financial sector, the real estate sector, and the defense community. See Frankel (1994, pp. 321–327), and Frieden (1991, p. 448).

33 See Agrippino and Rey (2014).

34 See Forbes and Warnock (2012).

35 Among many references, see Edwards (2015) and Frankel, Schmukler, and Servén (2004). Even countries that claim to float may in fact care about the exchange rate objective and so choose to tighten when the Fed tightens.

36 She therefore favors restoring a measure of independence by capital flow management tools, that is, capital controls or macroprudential regulation or both.

37 See, for example, Farhi and Werning (2014).

38 See Jeanne (2014).

39 See Aiyar, Calomiris, and Wieladek (2012).

40 What if the country also has a second instrument, such as fiscal policy? That will work for a single country: two instruments can achieve two goals. But of course one country's trade surplus is someone else's deficit. If two countries have inconsistent goals for the same trade balance numbers, no amount of policy instruments will solve the problem. The best that can be done in a world of n countries is to observe that $n - 1$ (smaller) countries can each achieve their trade balance goals if the nth country (the United States, as conceived under the Bretton Woods system) is willing and able to be the residual.

41 Cooper (2001) has pointed out, by way of precedent, that countries in the 19th century were unable to agree on any sort of international cooperation regarding public health (e.g., procedures for quarantines) until they eventually came to believe in a common model of disease (human contagion).

42 See Frankel and Rockett (1988).