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HARRY JOHNSON'S "CASE FOR FLEXIBLE EXCHANGE RATES" –
50 YEARS LATER

Maurice Obstfeld

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ABSTRACT

Fifty years ago, Harry G. Johnson published "The Case for Flexible Exchange Rates, 1969," its title echoing Milton Friedman's classic essay of the early 1950s. Though somewhat forgotten today, Johnson's reprise was an important element in the late 1960s debate over the future of the international monetary system. The present paper has three objectives. The first is to lay out the historical context in which Johnson's "Case" was written and read. The second is to examine Johnson's main points and see how they stand up to nearly five decades of experience with floating exchange rates since the end of the Bretton Woods system. The third is to review the most recent academic critiques of exchange-rate flexibility and ask how fatal they are to Johnson's basic argument. I conclude that the essential case for exchange rate flexibility still stands strong.

Maurice Obstfeld
Department of Economics
University of California, Berkeley
530 Evans Hall #3880
Berkeley, CA 94720-3880
and NBER
obstfeld@econ.berkeley.edu

1 Introduction

When Gianluca Benigno invited me to speak at the 50th anniversary conference of the Money, Macro and Finance (MMF) Research Group, I was struck at how opportune the time would be to revisit Harry G. Johnson's well known polemic of the 1960s, "The Case for Flexible Exchange Rates, 1969" (Johnson 1969).

My belief rested on four considerations. First, Johnson's piece is exactly a half-century old – making 2019 a good time to re-evaluate in light of the subsequent international monetary experience. Second, it was also 50 years before that Johnson helped to found the MMF's precursor, the Money Study Group – so there is a lot more theory and empirical research to bring to the table, in no small part due to the efforts of Johnson, his colleagues, and their successors. Third, the national context in which Johnson wrote – in which fears of British economic decline eventually led the U.K. government to seek more policy independence by floating sterling, while also seeking supply-side renewal and geopolitical influence through more intimate integration with the rest of Europe – is instructive to recall in these days of Brexit. Finally, the normative implications of exchange-rate flexibility are again under scrutiny in the academic literature, as they have been periodically at least since the Bank of England suspended gold convertibility in 1797. To what extent do the newer insights undermine or validate Johnson's arguments?

Several days after I devised my lecture plan, I emailed Gianluca to ask his opinion of the proposed topic. Only then did he inform me that the MMF organizers had scheduled me to give the Harry G. Johnson Lecture. Evidently, there was no turning back, and what follows is the result.

This paper therefore has three objectives. The first is to lay out the historical context in which Johnson's "Case" was written and read. The second is to examine Johnson's main points and see how they stand up to nearly five decades of experience with floating exchange rates since the end of the Bretton Woods system. The third is to review the most recent academic critiques of exchange-rate flexibility and ask how fatal they are to Johnson's basic argument.

In an earlier paper now almost two decades old (Obstfeld 2002), I reviewed what I saw as the six main academic doubts about the benefits of exchange rate flexibility, ranging from hardy perennials (such as elasticity pessimism) to more new-fangled theories (hysteresis due to sunk costs). In this paper I will review four further critiques that have emerged since. Not surprisingly, these reflect dramatic developments in the international economy in this new millennium: the spectacular growth of international financial markets, the continuing (in some respects, growing) dominance of the U.S. dollar in those markets, the globalization of production, the global financial crisis and its aftermath, and the attempts by the increasingly important emerging market economies to navigate this landscape.¹

I will conclude that while Johnson got many things wrong, he got enough right that the basic case for some form of exchange-rate flexibility still stands strong despite all the critiques. The current system is far from perfect, but in my opinion, the best we can do is to improve what we have in a way that avoids beggar-thy-neighbor spillovers as much as possible. Radical new forms of globally

¹ The "exchange rates no longer work" narrative continues to appear in the press. See, for example, Whiffin (2015).

cooperative macroeconomic policy are not likely to emerge – and indeed, seem more remote than ever after political events of the last few years.

2 The Context of Johnson's Essay

Johnson's 1969 essay drew inspiration from Friedman's (1953) classic argument for exchange-rate flexibility and Johnson said so in the opening footnote: "The title acknowledges the indebtedness of all serious writers on this subject to Milton Friedman's modern classic essay, 'The Case for Flexible Exchange Rates,' written in 1950 and published in 1953"

Friedman's essay is justly famous. A truncated version had appeared in print the year before in the American Economic Association's *Readings in International Economics*, edited by Richard Caves and Johnson himself. Moreover, even the full original publication in Friedman's *Essays in Positive Economics* omits important material from the original typescript, for example, the original use of the term "trilemma" in connection with an open economy's monetary policy constraints.² While Johnson did *not* use the term, the monetary trilemma is indeed a critical framing for any assessment of exchange-rate arrangements, and it lurks throughout Johnson's "Case."

Friedman was not the first academic proponent of market-determined exchange rates. Among his distinguished predecessors were Frank Graham of Princeton and Lloyd Mints of Chicago. But these voices were very much contrary to the policy consensus underlying the postwar Bretton Woods arrangements (see Irwin 2019), and Friedman's assault on orthodoxy was the most systematic and persuasive to date. Over time, increasing numbers of academic economists joined the flexible-rate camp. In his own 30th anniversary look back at Johnson (1969), Cooper (1999, p. 104) summarized the importance of the essay as follows:

[Johnson] both reflected and helped shape the prevalent view among academic economists, if not bankers and government officials, who on the whole remained hostile to exchange rate flexibility.

The context for Johnson's essay differed from that of Friedman's, however, and in two key respects. First, Friedman wrote in the very early phase of the Bretton Woods system, whereas Johnson's piece had the benefit of nearly two decades more of experience and academic debate, including his native

² Irwin (2012, p. 35) points this out, crediting Russell Boyer for providing him with a copy of the original Friedman typescript. In it, Friedman posits the incompatibility of "fixed exchange rates, stable internal prices, and unrestricted multilateral trade." He wrote: "[Keynes] had taken relatively unrestricted multilateral trade for granted, and so had expounded the simple dilemma: fixed exchange rates vs. stable internal prices. This dilemma has now become a trilemma." Decades later, however, as Nelson (2020) points out, Friedman (1983) resurfaced the idea as the incompatibility of "stable prices (or, more generally, an independent monetary policy), a stable exchange rate (or, more generally, a predetermined path of exchange rates), [and] freedom from exchange controls." In connection with the Asian crisis of the late 1990s, Friedman (1998) listed "free capital movement, a fixed exchange rate, [and] independent domestic monetary policy" as the trilemma corners. A third appearance of the term in Friedman's published work – the earliest I have found – was in a 1979 *Newsweek* column reviewing policy options for the U.S. Carter Administration. Its title may have puzzled readers, as the article laid out the trilemma only implicitly.

country Canada's experiment with floating between 1950 and 1962.³ Second, the essay is, in a sense, quite U.K.-centric, not so much in its content, but in its focus on reasons why a medium-sized advanced open economy (like the United Kingdom's) would benefit from a floating rate that eased its balance of payments constraint. Key systemic issues that bedeviled the Bretton Woods system at the time – reserve adequacy, the Triffin dilemma, the U.S. “exorbitant privilege” – do not appear explicitly, despite Johnson's developed views on those topics (Moggridge 2008). Let me take up these points in turn.

Early Postwar Experience

When Friedman wrote in 1950, Western Europe remained mired in trade restrictions and current-account currency inconvertibility, at great cost in terms of economic efficiency. Hoping to help policymakers overcome these obstacles to economic recovery, Friedman originally made his proposal in a report to the U.S. Economic Cooperation Administration, which was responsible for overseeing the Marshall Plan in Europe. Friedman viewed flexible exchange rates as a way to break the inconvertibility logjam, but ultimately members of the Organization for European Economic Co-operation (set up to supervise the distribution of Marshall aid) chose a different path to convertibility based on stable exchange rates and a European Payments Union.

Western Europe ultimately achieved convertibility at the end of 1958 (with Japan following in 1964); it also successfully promoted recovery in a context of overall price stability. For a while, therefore, Friedman's arguments faded into the background: if the goal was to restore economic stability, trade, and growth, Bretton Woods had worked. Quite rapidly during the 1960s, however, strains in the Bretton Woods structure emerged and worsened. The reasons, which are well known, were in no small part due to the system's very success (see, for example, Obstfeld and Taylor 1998). It was against the background of these “internal contradictions” that Johnson penned his essay.

The British Context

Then, there is the British context, which explains why Johnson's essay initially circulated as one of two dueling essays contained in Johnson and Nash (1969). This Hobart Paper of the Institute of Economic Affairs (IEA), entitled *UK and Floating Exchanges*, followed shortly upon Britain's traumatic 14 percent devaluation of the pound sterling in November 1967. Johnson refers to “the prolonged agony of sterling from 1964 to 1967” and Nash notes that since the pound's fall, “repeated currency crises have led to considerable debate on the defects of the international monetary system”

While many view Britain's extended balance of payments crisis as the canary in the coal mine foreshadowing the demise of the Bretton Woods system, it was also the result of many years during which Britain seemed not to share fully the good fortune of its continental neighbors. The 1967 devaluation only extended this poor track record. Accompanying expenditure-reducing policies by Harold Wilson's Labour government, thought necessary to support an eventual trade balance surplus, resulted in sub-potential growth over 1968-1970 and the surprise electoral victory of the Conservatives in 1970.

³ Unfortunately, though, Johnson's essay does not advance or even reference any rigorous empirical analysis.

Starting long before 1967, however, the salience of Britain's balance-of-payments constraint had played a central role in U.K. growth performance, and perhaps made some in Britain more open to the idea of flexible rates. Britain made an ill-advised "dash for convertibility" in 1947 under U.S. pressure, but quickly had to retreat following massive reserve losses. There followed a 30 percent devaluation in September 1949. Britain's short-term sterling liabilities made its external balance sheet exceptionally vulnerable to potential policy missteps and geopolitical events (such as the Suez crisis in 1956-1957). Hirsch (1965, pp. 48-49) counts eight sterling crises in all between 1947 and 1965. The growing prospect of a Labour Party victory in the October 1964 general election and then the victory itself, following two years of "Go for Growth" policies under the Tories, helped to set off the prolonged sterling "agony" to which Johnson referred (Newton 2009), and which culminated in the Wilson government's devaluation three years later.

Broadberry and Crafts (1996) argue that tight external constraints pushed British economic policy in the first postwar decades to center on a social contract that kept unemployment low and inflation relatively contained, but at the cost of lower productivity than might otherwise have been achieved. Partly as a result, growth performance was markedly worse than in continental Western Europe, where economic integration was progressing, or in the United States. Costs of the external constraint were recognized early on. From January 1952, the Churchill government considered a plan to free the pound/dollar rate and restore current-account convertibility for non-U.K., non-sterling area residents. However, the idea was quickly abandoned (Schenk 2010, pp. 102-107). With Britain's predicament prominently in view, Meade (1955) published a powerful essay favoring a system in which "each national government fashions its own monetary and budgetary policies to fit its own plans for domestic stability, international trade and payments being then conducted in relatively free markets at uncontrolled prices for the various national currencies."⁴ He wrote further on this theme during the 1960s. In 1968 *The Economist* called for a floating pound (in an anonymous leader entitled "It's Better to Float").

So by 1969, there ample precedent for Johnson's argument that loosening the balance of payments constraint was a necessary condition for the British economy to thrive – although subsequent history would show (as Johnson acknowledged) that a floating exchange rate alone was far from sufficient. Middleton (2002, p. 133) credits Johnson and Nash (1969) with helping to focus the debate over sterling that ended in its June 1972 flotation, because the pamphlet "ignited the spark and caught the attention of the financial community and thus policy-makers."

Well before the debate over Brexit, the United Kingdom displayed a distinct aversion to surrendering policy sovereignty, as seen in its tortured relationship with the entire postwar process of continental European integration. Though Canadian by birth and citizenship, Johnson shared these attitudes. Moreover, he viewed monetary policy as a central arena for the exercise of policy sovereignty. From this perspective, the embrace of flexible exchange rates followed ineluctably: if one believes that management of money growth provides a key to managing inflation (and perhaps

⁴ Meade (1955), like Friedman, linked the prospects for convertibility and open trade to exchange rate flexibility. He boldly asserted, "Free trade and fixed exchange rates are incompatible in the modern world; and all modern free traders should be in favour of variable exchange rates."

other aspects of economic performance), it is natural to desire the autonomy to do so. As Johnson (1969, p. 15) wrote:

[Price stability] is provided under contemporary institutional arrangements through centralization of control of the money supply and monetary conditions in the hands of the central bank, which is responsible for using its powers of control for this purpose.... The system of fixed exchange rates of international exchange, in contrast to a single national money, provides no centralized control of the overall quantity of international money and international monetary conditions.

Middleton (2002, p. 133) writes that arguments such as this one “were calculated to have particular British appeal...” This appeal came partly from the British predilection to “take back control.” Johnson (1969, p. 13) refers to “the shock of devaluation, doubts about whether the devaluation was sufficient or may need to be repeated, resentment of the increasing subordination of domestic policy to international requirements since 1964, and general discontent with the policies into which the commitment to maintain a fixed exchange rate has driven successive Governments....” As Middleton argues, however, the appeal was also due to the Chicago-school economic ideas (including a focus on monetary policy and monetarism) that were starting to make inroads in the United Kingdom. The manifestations included the establishment of important academic beachheads (notably the Money Study Group at LSE and the Laidler-Parkin inflation workshop at Manchester), the proselytizing of the IEA (the original publisher of Johnson’s essay), and support from some influential journalists (Sandbrook 2012, pp. 226-228).⁵

Aftermath

Concerns over national sovereignty and sterling were central to two momentous developments in the United Kingdom in the early 1970s, developments that coexisted uneasily then and clashed increasingly over time: a floating pound and entry into the European Economic Community (EEC), or Common Market. Exchange rate considerations are central to understanding the circumstances under which Britain entered the EEC and the forces that ultimately led to its exit at the end of 2019. Johnson’s “Case” is an intellectual cornerstone of the U.K. approach to European integration.

The Heath government that came to power in June 1970 was conservative in name, but faced with some domestic slack and an improved balance-of-payment position, quickly embarked on a very Keynesian stimulus program. Ultimately, this dash for growth culminated in a further balance-of-payments crisis and abandonment of the sterling peg on June 23, 1972, just two years after the change in government. In the context of a generally disintegrating Bretton Woods system, the move was less salient than the 1967 devaluation had been.⁶

⁵ Johnson himself was skeptical of dividing macroeconomics into warring monetarist and Keynesian approaches, and he had a nuanced view of monetarism’s policy relevance and contributions; see his Ely Lecture to the American Economic Association (Johnson 1971a).

⁶ Oliver and Hamilton (2007) present a detailed and fascinating account of British official attitudes toward and preparations for greater sterling flexibility between 1967 and 1972. They point out (p. 509) that sterling’s 1972 flotation did not especially concern the U.S. administration. Indeed, on the day it happened, President Nixon was conspiring to prevent a full investigation of the Watergate break-in, and when briefed on sterling, he replied, “I

However, the Heath government pursued a second avenue for recharging the British economy (and, hopefully, extending its global political stature), entry into the EEC. This finally occurred on January 1, 1973.⁷ EEC plans had an important impact on currency developments: the speculation that led to the pound's flotation reflected fears that Britain, which had joined the EEC currency "snake" on May 1, 1972, would devalue the pound upon accession to the EEC, in order to enter in a more competitive position. The Werner Report of October 1970 first set out a plan for a single European currency, and entry into the Common Market therefore carried the real possibility of an eventual surrender of monetary sovereignty.

Unlike during 2016-2019, when a large majority of economists argued (accurately, in my judgment) that Brexit would inflict high economic costs on the U.K. economy, many economists from across the political spectrum doubted in 1971-1972 that the economic benefits of Britain joining the EEC would exceed the costs (especially costs due to trade diversion and lost policy sovereignty).⁸ Johnson (1971b) published a furious attack in *The Spectator*, writing:

The generation of a widespread belief that Britain must get into the Common Market to win economic and political salvation is the greatest feat of self-delusion that the British governing classes have put across themselves and the general public since the time of Munich.

Among other reservations, Johnson feared the prospect of a single European currency. He argued that "the commitment involves sacrificing the interests of the country to the interests of the City," and he predicted that in the face of U.K. real appreciation and without nominal exchange flexibility, "the result might well be a gradual drift of population and enterprise to the Continent."⁹ These arguments are consistent with those in his "Case."

With the pound's flotation, Britain also left the EEC currency snake, despite the EEC's aspiration of eventual currency union. This decision reflected a long-term ambivalence about the tradeoff

don't care about it." (His reply to a further briefing that day about speculation against the Italian lira is more colorful and better known.)

⁷ It was Wilson's government that applied for EEC entry in 1967 (the United Kingdom's second application), together with Denmark, Norway, and Ireland. President de Gaulle of France again blocked progress on these applications (he had vetoed UK entry in 1963), but his resignation in April 1969 opened the door to the negotiations that the Heath government concluded.

⁸ Turner (1993, p. 84) reports that in 1971, Johnson and Nicholas Kaldor "sent a questionnaire to six hundred members of the University Association of Teachers in Economics. The *Times* reported [on October 22, 1971] that a narrow majority of the 296 economists who were willing to sign their names to pro- or anti-market letters challenged the idea that the market would bring economic benefits, including a majority of professors at Cambridge and LSE." Khan and Johnson (1972) summarized the results in detail later for readers of *Economica*, advancing some hypotheses about the patterns of responses across the United Kingdom.

⁹ Johnson also warned, "The long-run consequence might be that Britain would become another Switzerland, a specialist in financial services for the European industrial heartland and in a few technologically-advanced industrial activities, but without a major economic and political role in Europe." Kaldor warned of Britain becoming "the Northern Ireland of Europe." Meade (1962) offered a remarkably comprehensive analysis at the time of Britain's first entry application under the Macmillan government. Meade carefully considers the main objections that arose later, including the exchange rate issue, reaching the nuanced conclusion that EEC entry was problematic, but could be a good idea under some conditions. In particular, he placed weight on the possibility of dynamic gains from trade, a likelihood that Johnson (1971b) scornfully rejected.

between economic integration and sovereignty that would haunt the U.K.-Europe relationship for decades to come. Johnson (1973) claimed that by leaving the snake, Britain showed its desire for “independence of and not interdependence with Europe.” Britain’s retention of a floating exchange rate and its own central bank – as the euro area developed and deepened institutions that excluded it – ultimately helped propel the country toward Brexit.¹⁰

3 Where Johnson Over-Promised

Cooper (1999, p. 104) – uncharitably, but not inaccurately – characterizes Johnson’s “Case” as being “based on a series of unfounded assertions and allegations, an idealization of the world of financial markets without serious reference to their actual behavior.” Indeed, the essay is long on *a priori* reasoning about how currency markets *would* work but virtually devoid of any data or empirics on how they *did* work. In fairness, the paucity of postwar floating experience by advanced economies – only one major country, Canada – would have forced Johnson to rely on interwar data of questionable relevance to the conditions likely to prevail after 1969. Although I will argue that Johnson got many important things right despite the informality of his argumentation, he also over-promised in key respects. I begin with some main predictions from the empty portion of the glass.

Exchange Rates and Fundamentals

Johnson argued that exchange rates would not move unless fundamentals did. Moreover, he claimed that they would adjust smoothly and “predictably” to fundamentals, speeded by stabilizing support from speculators. If this is so, then we have a very incomplete view of “fundamentals” – the literature on the exchange rate disconnect is testimony to the difficulty of linking short-term exchange rate movements to observable macroeconomic or financial drivers.

Our modern understanding of speculation builds on the insight that the exchange rate is an asset price (in addition to being a determinant of relative goods prices). According to the asset approach, the exchange rate will adjust sharply and quickly – not smoothly – to news about fundamentals. As noted, however, exchange rates adjust sharply to other things as well, such as expectations that turn out to be erroneous, political and geopolitical events, and tensions and inefficiencies in financial markets.

From the start of floating in 1973, the surprising volatility of floating exchange rates relative to the volatility of observable macro-variables has been perhaps the most salient feature of the global monetary system. Nor is it obvious that stabilizing exchange-rate expectations always dominate, as during the protracted and extreme U.S. dollar upswing of the early 1980s. Limits to arbitrage can be powerful inhibitors of stabilizing speculation.

¹⁰ Of course, the United Kingdom held a first referendum on leaving the EEC in 1975 after Labour returned to power. Hicks and others (1975) contains the views of Johnson, Meade, and many other eminent economists. The Wilson government recommended remaining in the EEC (thereby splitting the Labour party), and in the referendum, two-thirds of voters supported that position.

“Disappearing” Rationale to Intervene in Trade and Payments

As speculative capital flows became more prominent in the 1960s, important advanced economies imposed or tightened controls on capital inflows and outflows. Johnson predicted that under floating rates, the balance-of-payments rationale for intervention in trade and capital movements would “disappear.” Thus, floating would promote not only free trade, as argued by Friedman and Meade, but freedom from capital-flow restrictions.

It is certainly true that flexible rates have allowed most countries to embrace a different resolution of the monetary trilemma, substantially opening up their capital accounts over time (as argued by Obstfeld and Taylor 1998). Ilzetki, Reinhart, and Rogoff (2019) document the trends.

However, Johnson’s was too optimistic that floating rates would push the questions of trade and capital-account restrictions off the table. He underestimated the political importance of exchange-rate induced redistributions of aggregate demand between tradable and nontradable industries. He also underestimated the potential for an adverse interplay between capital inflows and fragile financial sectors.

Large exchange rate swings, whether or not possible to explain through fiscal or monetary policy fundamentals, have sometimes (for example, during the 1980s in the United States) generated strong political pressure for protection in export-oriented industries disadvantaged by an externally strong currency. President Trump’s unhappy tweets about dollar strength, and the threats that tariffs will back up his complaints, furnish a more recent example. The point is that exchange rate changes can have strong and unwanted distributional consequences; as Kindleberger (1970, p. 95) noted in his response to Johnson, “Along with one more variable, there is one more target -- the exchange rate.”

Macro-prudential rationales have served to rationalize calls for capital controls. So can competitiveness concerns. Currently, there is a bipartisan proposal before the U.S. Senate to give the Federal Reserve power to tax capital flows with the objective of maintaining a trade balance deficit no greater than 0.5 percent of GDP. The purpose is to weaken the dollar, much more effectively than tariffs on goods or services imports are likely to do.

Long-Run Dominance of Inflation Trends

Johnson believed changes in trend inflation differentials would dominate exchange rate evolution over the long term (p. 18). He (somewhat quaintly) saw countries as having different preferences over a supposed long-run inflation-unemployment tradeoff. These beliefs were far off the mark. Whether measured by CPIs or GDP deflators, real exchange rate changes – that is, deviations from relative Purchasing Power Parity – have been large, including during periods of relatively high inflation differentials. Real exchange rate changes have also been quite persistent, perhaps puzzlingly so. Not only have real shocks been important, their effects on real exchange rates have been long lasting. At the same time, countries’ preferences over inflation have converged considerably.

When the main macroeconomic disturbances are differences in trend inflation, exchange rates in principle can provide full insulation. This property was a major pillar of Johnson’s argument. It is also true that when countries experience shocks to aggregate demand that call for a revision in real exchange rates – such as a long-lived decline in export markets – nominal currency depreciation buffers the real economy and the balance of payments by obviating the need to bring about the

necessary relative-price change through an extended period of domestic deflation. Friedman famously stressed this point, which Johnson echoes, but Johnson’s recognition of the occasional need for long-term real exchange rate changes seems slightly inconsistent with his espousal elsewhere of a version of long-run purchasing power parity.

Johnson did not weigh the possibility of shocks originating in capital markets, for example, shocks to risk premia and global portfolio preferences. These could be fleeting, but not necessarily. Thus, Cooper (1999, p. 117) faults Johnson for not seeing the possibility that “as time goes on flexible exchange rates will gradually evolve from being mainly a useful shock absorber for real shocks into being mainly a disturbing transmitter of financial shocks, increasingly troublesome for productive economic activity.” As Aliber (2018, p. 270) puts it more recently:

The claim of the proponents that the floating currency arrangement was preferable to deal with goods market shocks that would lead to declines in competitiveness cannot be challenged. The proponents ignored that there would be many more money market shocks when currencies were not attached to parities, in part because central banks could pursue independent monetary policies. Changes in investor demand for foreign securities in turn would lead to changes in the market prices of currencies. Moreover, investor demand for foreign securities might change for numerous other reasons. The assumption that is buried in the claims of the proponents is that investor demand for foreign securities would not change, despite the sharp increase in the number of money market shocks as central banks followed independent monetary policies.

There is no doubt that for some (especially financial) shocks, floating rates can be a shock transmitter rather than an absorber, with persistent impact. There is also increasing appreciation of how financial shocks help to determine exchange rates and capital flows (for example, Engel 2016). I will return to this problem, which especially afflicts emerging economies, below. However, recent analyses have also suggested mechanisms through which exchange rate responses to financial shocks may aid efficient international risk sharing (for example, Gourinchas, Rey, and Govillot 2017).

As Cooper (1999) foresaw, there has indeed been an explosion of cross-border financial trade since the mid-1990s, with important macroeconomic implications. But because much of cross-border asset trade is two-way trade, shocks to financial intermediation need not set up the *ex ante* foreign exchange market imbalance that would drive the exchange rate. Interestingly, there is little evidence that exchange rates have become more volatile as international capital markets have expanded. For example, the volatility of day-to-day changes in the nominal effective U.S. dollar has been very high, but trendless across decades, as Table 1 shows.

Table 1 Daily Standard Deviation of Effective Nominal U.S. Dollar Percent Change

<i>1980-1989</i>	<i>1990-1999</i>	<i>2000-2009</i>	<i>2010-2019</i>
0.46	0.39	0.48	0.41

Source: Board of Governors of the Federal Reserve System. Calculated as 100 times natural log change.

Flexibility by Small Countries

While Johnson favored flexible exchange rates for the larger industrial economies, he believed that smaller countries would continue to peg to key currencies. Part of his reasoning was that these

smaller economies generally are more open (hence with prices more exposed to international competition) and in many cases are substantial commodity exporters. In this respect, he proved to be too pessimistic about the prevalence of floating. Many smaller emerging market economies abandoned rigid exchange rates, notably after the Asian crisis, and even commodity exporters such as Australia, Canada, and Chile have found it beneficial to float quite freely, in part because their currencies helpfully depreciate when commodity prices fall (for example, see Laidler and Robson 2004, pp. 164-167, and Lowe 2019).

That said, one could contend that Johnson was partially right in that relatively few smaller flexible-rate economies refrain from foreign exchange intervention; that is, floating generally means *managed* floating, or some variant of crawling peg. One reason is that these countries (in part due to exchange rate flexibility) now have substantially more open capital accounts, and so have more exposure than ever to financial shocks from abroad that might be disruptive by moving exchange rates sharply. According to the “coarse” classification of Ilzetki, Reinhart, and Rogoff (2019), the biggest GDP-weighted share of countries had managed floating or crawling peg arrangements in 2016 (with a heavy weight for China), followed by floats, followed by pegs (the last group at below 20 percent of world GDP). Another reason for reluctance to float *freely* has indeed been a concern with rapid exchange rate pass-through. But I think it is fair to say that emerging markets are more comfortable with greater flexibility of rates today than they were when Calvo and Reinhart (2002) wrote their famous “fear of floating” paper two decades ago.

Johnson did not clearly anticipate that the practice of smaller countries pegging their rates to larger ones – let alone of managed floating – might create a temptation to move exchange rates toward artificially low levels, that is, to manipulate their currencies’ external values for competitive advantage. While Article IV of the International Monetary Fund’s foundational agreement forbids such behavior, the IMF has no enforcement mechanism, even if it were willing to raise the issue with a member country (which historically, it has not). Thus, concerns about currency manipulation have sometimes sparked conflict between governments in recent decades, notably within the China-U.S. relationship (Bergsten and Gagnon 2017). In turn, some emerging-market policymakers have argued that quantitative easing policies by advanced economies, widely adopted after the global financial crisis, amount to exchange-rate led stimulus that harms poorer trade partners (Rajan 2016).

More generally, Johnson gave little consideration to the possibility of negative spillovers or international coordination failures in a world of floating rates. He did not really discuss the *systemic* properties of such arrangements. His implicit assumption seemed to be that if each country regained monetary autonomy, it would have an enhanced capacity to offset foreign shocks, so that any remaining inefficiencies would pale next to those of the Bretton Woods arrangements.

Even had the world evolved into a small number of currency blocs as Johnson envisaged, the empirical record makes it quite doubtful he was right (p. 18) that “the exchange rates between the major currencies would be likely to change rather slowly and steadily.” The historical range of the euro/dollar rate (approximately USD 0.84 to USD 1.58), with some changes occurring relatively rapidly, provides little comfort for Johnson’s *a priori* argument that currency changes between large, diversified areas will be relatively slow and predictable. Even with comparable inflation targets, there is still considerable scope for asymmetric shocks.

Reduced Prestige of Central Bankers

Johnson believed that the fixed-rate system conferred undue influence and importance on central bankers, to the detriment of elected officials directly accountable to the voters. As he wrote (p. 13):

[T]he fixed exchange rate system gives considerable prestige and, more importantly, political power over national governments to the central bankers entrusted with managing the system, power which they naturally credit themselves with exercising more “responsibly” than the politicians would do, and which they naturally resist surrendering.

However, nearly 50 years of floating have done nothing to diminish the prestige of central bankers – quite the opposite, especially after Paul Volcker’s demonstration of how a determined central banker with a free hand could fight inflation.

One interpretation is that Johnson forgot to reckon with the trilemma. A move to floating might deprive central bankers of the need to oversee exchange rates and the balance of payments, but it conferred upon them the no less weighty responsibility to exercise monetary policy. Furthermore, advances in our understanding of dynamic consistency problems – rooted in the monetary mismanagement that floating initially facilitated in the 1970s – created a presumption that central bankers should have a high degree of independence in implementing monetary policy. In a sense, however, Johnson’s missed call on central bankers’ prestige was rooted in a *correct* prediction: that a public unhappy with high inflation might support political or institutional changes conducive to more stable prices.¹¹

Of course, these developments have not banished the issue Johnson raised about the balance of power between unelected central bankers and elected policymakers (see Tucker 2018). Indeed, the global financial crisis heightened concerns on this score, both by revealing the wide extent, distributional ramifications, and fiscal implications of potential monetary policy instruments and by highlighting the central bank’s role as a financial regulator.

4 What Johnson Got Right

The glass is also (at least) half full. I have already noted Johnson’s accurate forecast that public unhappiness with high inflation could bring about change through the political process or institutional evolution. Johnson was also right, in my opinion, on several other important questions.

Good Calls

There are many.

Johnson argued, correctly, that flexible rates can reconcile different governments’ diverse policy preferences – though as noted, even similar objectives among governments do not guarantee global efficiency or political harmony when every government focuses exclusively on *national* welfare.

¹¹ Friedman made this point well before Johnson did, but not in his 1953 paper.

History offers little support to the notion that commitment to fixed exchange rates can induce governments to internalize more fully their policies' foreign spillovers.

Related, Johnson dismissed the idea that fixed exchange rates alone would force policymakers to discipline their monetary and budget policies. When conflicts between the exchange rate and domestic objectives arise, the latter have typically won out, but often not until a currency crisis forces an abrupt exchange rate change. Indeed, fixed rates can be subject to multiple equilibria, a mechanism that was arguably at work even during the euro crisis under supposedly irrevocable parities. Moreover, experience shows that while adopting a currency peg can be essential in ending episodes of very high inflation, success requires a credible exit from fiscal dominance and an eventual exit from the peg. Otherwise, real appreciation can undermine inflation credibility anew.

In response to the critique that unitary currency unions, even one as large as the United States, function well with fixed intra-regional exchange rates, Johnson set out a masterful exposition of the role of fiscal federalism in supporting such arrangements. The implications remain relevant for the euro area.¹² I would also agree with his inclination to downplay critiques of floating based on the interwar experience. He contended convincingly that the chaotic conditions of the time promoted currency instability and made fixed rates difficult to defend. In particular, that those chaotic conditions included trade restrictions and a fall in the volume of world trade does not mean that fluctuating currencies were to blame. Johnson's prediction that flexible rates would not hamper growth in world trade seems to have been borne out by experience.

Johnson rightly explained that currency depreciation need not be inflationary if it served to correct an overvaluation that otherwise would result in domestic price deflation. An important implication was that a floating rate can buffer the economy in the face of internal or external demand shocks, preventing fluctuations in employment and output (if not in the terms of trade). Johnson rightly stressed that under a floating exchange rate, domestic monetary policy and domestic monetary policy alone determines long-run inflation, economic openness notwithstanding. None of this means that a flexible rate can always and fully offset disturbances originating outside the economy. The word "insulate" does not appear in Johnson's essay.

During the interwar period, influential economists such as Hayek (1937) and Robbins (1937) (both of the LSE faculty) decried floating rates as a retreat to economic nationalism. Johnson was no proponent of nationalism in *trade* policy, but he recognized that if fixed rates deprived government of the tools to maintain domestic economic stability, measures to intervene directly in trade and payments – measures that would undermine further the efficient international division of labor – would likely follow. In a world of sovereign democracies, full international coordination over monetary as well as trade policy was an impossible combination, and monetary policy, as opposed to direct control over international transactions, was a safer channel through which to pursue national economic objectives. Johnson did not reject, however, the IMF's surveillance and support of the international monetary system, nor did he foresee that a floating pound would necessitate or make advisable U.K. withdrawal from the IMF. In this prediction, he was right: during the 1970s, the IMF

¹² Johnson no doubt had the benefit of Peter Kenen's classic paper on fiscal federalism and optimum currency areas, presented at a University of Chicago conference in September 1966 and published in Mundell and Swoboda (1969). Johnson and Robert Mundell organized the conference.

revised its Articles of Agreement to accommodate alternative exchange arrangements. Indeed, in 1976, the U.K. entered an IMF program (the most expensive one to date) as sterling plummeted on inflation fears.

No Panacea

The essay expresses a vital cautionary truth:

A flexible exchange rate is not of course a panacea; it simply provides an extra degree of freedom, by removing the balance-of-payments constraints on policy formation. In so doing, it does not and cannot remove the constraint on policy imposed by the limitation of total available national resources and the consequent necessity of choice among available alternatives; it simply brings this choice, rather than the external consequences of choices made, to the forefront of the policy debate.

Much research in international finance tries to assess the practical importance of the “extra degree of freedom” that Johnson invoked. As the world has changed economists, have offered changing answers.

5 Why Flexible Exchange Rates May Not Work: Older and Post-Crisis Critiques

In this section, I start with a rapid review of six older accounts of why flexible exchange rates may be relatively ineffective in promoting international adjustment. These all emerged before the mid-2000s. I then take up in more detail four further critiques, advanced more recently, which principally reflect developments in the world economy later on in the new millennium.

Six Older Critiques

My 2002 paper contains a more detailed discussion of these six earlier critiques, together with references:

1. *Elasticity pessimism* is the perennial and generic view that price elasticities in international trade are low, making exchange-rate changes an inefficient way to adjust the trade balance.
2. *The purchasing power parity argument* is in some sense the opposite of the last one, as it argues that elasticities are so *high* (and/or prices so flexible) that nominal exchange rate changes will not cause changes in real exchange rates.
3. *Real wage rigidity* theories hold that wages react immediately to higher import prices, removing the possibility that output rises when the currency depreciates.
4. *Pricing to market*, due to goods-market segmentation and resulting in low exchange-rate pass-through, can impair the expenditure-switching effect of the exchange rate.
5. *Sunk costs and hysteresis* imply that only very large and persistent exchange rate changes will succeed in shifting trade flows.
6. *Local currency pricing* is a variant of pricing to market where the pass-through of exchange rate changes is zero because exporters pre-set their prices in terms of buyers' currencies.

I argued that none of these arguments convincingly undermines the case that exchange-rate flexibility offers a very important degree of freedom for policy. But in the post-crisis era, four newer critiques have emerged.

Four Newer Objections

I take these up in turn: they center, respectively, on the effective lower bound for nominal interest rates, global value chains, the global financial cycle, and dominant currency (mostly dollar) invoicing.

1. Implications of the Effective Lower Bound

At the same time as the effective lower bound (ELB) on the nominal interest rate complicates monetary policy, it can undermine the conventional stabilizing role of the exchange rate for an economy faced with aggregate demand shocks. As in the closed-economy context, the problems are most severe when the central bank cannot credibly omit to a pre-set path for monetary policy.

A convenient way to grasp the issue is to assume a Keynesian world of sticky prices and to consider the real interest parity condition equating the home-foreign real interest difference to the expected real depreciation rate of home against foreign currency,

$$r_t - r_t^* = E_t(q_{t+1} - q_t).$$

Here, q denotes the price of foreign output in terms of home output (making a rise in q a real depreciation of the home currency), and an asterisk signifies a foreign variable. Iterating this forward and assuming the designated limits exist (as in Engel 2016 and others), the date- t real exchange rate is:

$$q_t = \lim_{T \rightarrow \infty} \sum_{s=0}^T (r_{t+s}^* - r_{t+s}) + \lim_{T \rightarrow \infty} q_{t+T} \equiv \sum_{s=0}^{\infty} (r_{t+s} - r_{t+s}^*) + \bar{q}. \quad (1)$$

Suppose the home country real exchange rate is initially at \bar{q} when its economy suffers a country-specific, temporary, and negative aggregate demand shock (which can come from home or abroad, but leaves the long-run real exchange rate unchanged at \bar{q}). Suppose also – and importantly – that the home central bank is at its nominal interest rate ELB, and lacks the credibility to support activity and prices through forward guidance. In this situation, a negative output gap will emerge and the price level will fall, raising the domestic *real* rate of interest, until full employment (someday) returns.

Equation (1) shows that with an elevated path of future domestic real interest rates, the real exchange rate must *appreciate* initially – a direct result of the central bank’s inability to respond with expansionary monetary policy. This appreciation further depresses net exports, worsening the domestic recession in comparison with what a pegged exchange rate would deliver. As Cook and Devereux (2016) point out, a floating rate, far from providing a stabilizing buffer, is destabilizing in this case.

The Cook-Devereux critique is an important caveat, but its implications for exchange rate policy are nuanced. There is no doubt that a central bank entering a liquidity trap will be in a difficult place. And it is also clear that exchange-rate policy does offer one margin along which it can in principle operate effectively, the ELB notwithstanding (as Svensson 2003 observed in connection with Japan’s

experience). But even if one assumes that an authority incapable of committing future monetary policy somehow *could* commit to an exchange rate peg, a permanent peg is clearly not the right answer. Rather, some form of flexibility should be retained.

One reason: for an economy hit by certain deflationary shocks, a floating currency will still depreciate and thus be a partial buffer. Corsetti, Kuester, and Müller (2017) give the example of a small country facing a liquidity-trapped world economy, which then suffers a further fall in demand. If central banks abroad cannot prevent the ensuing deflation – which, under a currency peg, would spill over to the home economy – foreign real interest rates rise. According to equation (1), though, this change leads the home currency to depreciate, somewhat offsetting the shock to its economy.

At best, the liquidity-trap scenario would call for a central bank to put a ceiling on its currency's foreign exchange value, but leave the currency free to depreciate. Indeed, there would be no need to commit even to the ceiling, although if possible, commitment would serve to discourage inflows from speculators betting on a revaluation. However, it is important to note that such inflows would not necessarily be a problem. As opposed to the case of intervention to support a weak currency, the central bank would be gaining reserves. It can do so without limit, in essence conducting a form of unconventional central bank balance sheet expansion. If the resulting quantitative easing stimulates the economy, that would be an advantage, not a cost.

Policy experience conforms to this theoretical argument. Both the Swiss National Bank and the Czech National Bank followed this strategy during the 2010s (on the Czech case, see Al-Mashat and others 2018). The Swiss experience indicates how capital-inflows can complicate policy for a safe-haven currency facing a domestic liquidity trap and foreign turmoil. Japan has sometimes found itself in a similar position: Gaspar and others (2016) sketch the result of an *endaka* or “strong yen” shock to Japan, absent credible forward monetary policy guidance.

Countries where a liquidity trap hamstring monetary policy may contemplate fiscal expansion, including through monetary financing (for example, using the approach sketched by Bartsch and others 2019). In these circumstances, a strict and credible currency peg might hamper the stimulative effects of fiscal policy (see also Corsetti, Kuester, and Müller 2013). That shortcoming would not apply to a flexible, one-sided exchange rate limit.

In short, the Cook-Devereux scenario strengthens the case for managed floating, rather than the case for a fixed exchange rate.

All of that being said, one must consider the vital *systemic* issue – whether a collective action problem of “currency wars” arises when all countries pursue exchange flexibility in a globally deflationary environment. Recent literature has stressed how one large country may transmit its liquidity trap to others by allowing its currency to depreciate, or alternatively, by engineering a bigger current account surplus (see, for example, Caballero, Farhi, and Gourinchas 2020 and Eggertsson and others 2016). Would a world where all countries peg their currencies avoid such negative spillovers? And do such spillovers necessarily result in bad global equilibria?

The interwar gold standard offers one counter-example – that of an unfavorable equilibrium under generally *pegged* exchange rates. Moreover, under generalized floating, the global equilibrium where each country acts in its individual self-interest to weaken its currency could be relatively favorable, as

Eichengreen and Sachs (1985) argued in their classic re-examination of interwar competitive currency depreciation. More generally, the performance of a fixed-rate world in an ELB environment would depend on the details of which anchor currencies countries choose for their pegs, and the policy options and incentives of the anchor countries.

2. Exchange Rates and Global Value Chains

Participation in global value chains (GVCs) grew rapidly through the 1990s and 2000s up to the global financial crisis. Under the GVC model, a country's exports contain content imported from other countries, while those exports, in turn, may be incorporated into further exports from the country that imports them. According to the World Bank, the share of global exports crossing borders more than once rose to a peak of 52 percent in 2008 (World Bank 2019); and with declining transport costs, the number of border crossings per GVC good also rose. The distribution of more finely articulated tasks among countries in line with comparative advantage has the potential to raise productive efficiency. At the same time, it has implications for product pricing, and hence for the transmission of exchange rate changes to activity.

Many have pointed out that in principle, an exchange rate change works differently in a world where exports contain substantial import content. Currency depreciation, for example, normally lowers an export's price as seen by foreign buyers. In a GVC world, however, the depreciation can simultaneously raise the price of the export's import content, thereby confining any price reduction for foreign buyers to the export's domestic value added component. This channel, which weakens the exchange rate's effect in altering export competitiveness, is due to backward GVC linkages. As Georgiadis, Gräb, and Khalil (2019) and Adler, Meleshchuk, and Osorio Buitron (2019) point out, the competitiveness effect of a depreciation is weakened further by forward GVC linkages when a country's cheaper exports are incorporated as intermediates into its own imports.

A simple two-country example illustrates how these effects work together. Assuming that our two countries are symmetric, abstract from productivity growth, and let p_M and p_X be changes in (log) home prices of import and export goods, measured in domestic currency, with asterisks denoting foreign prices. Let e be the change in the (log) exchange rate (the home-currency price of foreign currency) and μ the degree of exchange rate pass-through – possibly 1, but in any case positive.

Suppose further that α is the share of domestic value-added in exports and w the change in the (log) domestic nominal wage. Then the following equations show how wages and the exchange rate feed into import and export prices, measured in the domestic currencies:

$$\begin{aligned} p_M &= p_X^* + \mu e, \\ p_M^* &= p_X - \mu e, \\ p_X &= \alpha w + (1 - \alpha)p_M, \\ p_X^* &= \alpha w^* + (1 - \alpha)p_M^*. \end{aligned}$$

Solving for the four prices gives:

$$\begin{aligned}
p_M &= \frac{\alpha w^* + \alpha(1 - \alpha)w + \alpha\mu e}{\alpha(2 - \alpha)}, \\
p_M^* &= \frac{\alpha w + \alpha(1 - \alpha)w^* - \alpha\mu e}{\alpha(2 - \alpha)}, \\
p_X &= \frac{\alpha w + \alpha(1 - \alpha)w^* + \alpha(1 - \alpha)\mu e}{\alpha(2 - \alpha)}, \\
p_X^* &= \frac{\alpha w^* + \alpha(1 - \alpha)w - \alpha(1 - \alpha)\mu e}{\alpha(2 - \alpha)}.
\end{aligned}$$

These solutions make clear how the exchange rate's expenditure-switching powers are muted by GVCs (effectively, by $\alpha < 1$), even when pass-through is complete ($\mu = 1$). For example, a home currency depreciation (a rise in e) has a muted effect on import prices in comparison with the case without GVCs, because it is simultaneously a foreign currency appreciation, which lowers the price foreign exporters pay for their imported intermediate inputs and thereby makes those foreign exports somewhat cheaper. We can see that the exchange-rate effect on import prices is muted because, in the equation for p_M above, $\frac{1}{2-\alpha} < 1$ provided $\alpha < 1$. Analogously, a home depreciation tends to raise the domestic-currency price of home exports by raising the cost of their imported content, an effect absent when $\alpha = 1$.

Overall, then, the short-run exchange-rate-induced worsening in the home terms of trade is

$$\frac{d(p_M - e - p_M^*)}{de} = \frac{2\mu}{2 - \alpha} - 1,$$

whereas this derivative would be larger and equal to $2\mu - 1$ in a model without GVCs. For example, in an extreme case where domestic value-added is only half of export value, the pass-through of the exchange rate to the terms of trade would be only $\frac{4\mu}{3} - 1$ in this two-country model.

Georgiadis, Gräb, and Khalil (2019) and Adler, Meleshchuk, and Osorio Buitron (2019) present panel evidence consistent with these predictions. Georgiadis, Gräb, and Khalil show that exchange-rate pass-through to import prices is lower when a country's trade partners are more embedded into GVCs, and that pass-through to export prices is higher when backward linkages into GVCs are more extensive. Adler, Meleshchuk, and Osorio Buitron document that greater GVC integration reduces the elasticity of gross trade volumes with respect to exchange rates.

These findings do not necessarily imply, however, that exchange rates are less powerful on net as an aid to international adjustment. As Adler, Meleshchuk, and Osorio Buitron suggest and support empirically, countries that participate more extensively in GVCs also have larger values of gross exports and imports (i.e., total trade values inclusive of imports destined for reprocessing into exports). This regularity conforms to intuition – there is no inherent reason why higher GVC participation, essentially a change in the technology of trade, should entail lower value-added owing to the tradable sector. However, this effect on its own tends to *raise* the expenditure-switching power

of the exchange rate. Adler, Meleshchuk, and Osorio Buitron conclude that the two effects of GVCs – lower trade elasticities and higher gross trade volumes – approximately offset each other, leaving the adjustment efficacy of the exchange rate unchanged.

An analytical detour clarifies the relation to classical treatments of trade elasticities. More importantly, a careful analysis throws light on the GVC channel’s implications for the ratio of net exports to GDP – the key ratio through which the exchange rate directly affects aggregate demand.

To simplify and highlight the specific role of GVCs, assume pass-through is complete ($\mu = 1$), as in the standard Mundell-Fleming framework. Assume further that the *volume* of home exports, X , depends on the prices foreign customers face, $X = X\left(\frac{E}{P_X}\right)$, where $X'\left(\frac{E}{P_X}\right) > 0$. (Upper-case letters are exponentiated lower-case logs.) Correspondingly, suppose that the *volume* of home imports, M , is a function of P_M , with $M'(P_M) < 0$. Let NX/Y be the ratio of net exports to GDP, where

$$NX = P_X X - P_M M.$$

We are interested to know the effect of a percentage change in the exchange rate, $de = dE/E$, on NX/Y , because that effect measures the expenditure-switching power of the exchange rate – that is, the net stimulative boost that the trade channel delivers. Define the “traditional” export and import volume elasticities by $\eta_X = \left(\frac{E}{P_X}\right) X' \left(\frac{E}{P_X}\right) / X$ and $\eta_M = -P_M M'(P_M) / M$. We can easily read the exchange rate elasticities of trade prices, $\varepsilon_X = \frac{dp_X}{de}$ and $\varepsilon_M = \frac{dp_M}{de}$, from the relationships derived earlier. Then the exchange rate effect on the net export ratio (holding GDP constant) is:

$$\frac{dNX/Y}{de} = \frac{P_X X}{Y} [\varepsilon_X + \eta_X(1 - \varepsilon_X)] + \frac{P_M M}{Y} (\varepsilon_M \eta_M - \varepsilon_M) \quad (2)$$

Absent global value chains, $\varepsilon_X = 0$ and $\varepsilon_M = 1$, so that if trade is balanced ($P_X X = P_M M$), a currency depreciation raises net exports when the Marshall-Lerner condition holds: $\eta_X + \eta_M > 1$. Equation (2) differs from the Marshall-Lerner condition by accounting for GVC effects on trade prices and through them, on trade volumes and values (the latter dependent on modified “J-curve”-type effects, which, in the GVC case, work through export as well as import prices). Equation (2) also allows for unbalanced trade.

Equation (2) shows how GVC price effects dampen the volume elasticities of the exchange rate, which become $\eta_X(1 - \varepsilon_X) < \eta_X$ and $\varepsilon_M \eta_M < \eta_M$. The novel J-curve effect working through export prices, on the other hand, raises the net stimulus from depreciation, as does a reduction in the traditional import-side J-curve effect. So it is not obvious that the net result is to lower the power of currency depreciation to raise aggregate demand. For this to be true, η_X or η_M has to be reasonably large. A sufficient condition, for example, would be for both of these elasticities to exceed 1. A necessary condition is that at least one of the trade volume elasticities exceeds 1. For the true elasticity pessimist, GVCs therefore make the exchange rate’s role unambiguously *more* effective.

Equation (2) also shows that when GVCs raise export and import volumes, that effect will tend to raise in proportion the exchange rate's stimulus to net exports. The net overall effect of GVCs is therefore indeterminate – although as noted above, there is scant evidence that it is negative on net.

Segments of GVCs sometimes reside with a single multinational enterprise (MNE). MNE responses to exchange rates open up a further avenue for currency movements to shift world demand toward depreciating countries, namely, sourcing decisions for intermediate imports that can be produced (or assembled) in multiple locations. Rangan and Lawrence (1999) presented evidence of this channel two decades ago, but updated studies would be welcome.

3. The Global Financial Cycle

The rapid growth of global financial flows and increasing financial openness have combined to make countries more vulnerable to disturbances originating in world capital markets. Several researchers point to a global financial cycle of exuberance and retrenchment, driven in substantial part by the issuer of the world's dominant currency, the Federal Reserve. The global financial cycle finds expression in strong co-movements of asset prices, bank leverage, cross-border dollar lending, and capital flows in general. U.S. dollar strength is associated with generally tighter financial conditions globally, and hence with downswings in the cycle (Bruno and Shin 2015).

Miranda-Agrippino and Rey (2019) document that a high-frequency measure of U.S. monetary policy surprises has important effects globally, even for countries with floating exchange rates. They find that a contractionary U.S. shock reduces world asset prices, induces delevering by financial intermediaries, and reduces cross-border credit flows and domestic credit. These channels add up to a powerful multiplier amplifying U.S. monetary shock effects across international markets. Given the size and scope of international financial transactions, it is hard to believe that these effects do not at times swamp the more mundane net export effects of associated dollar movements.

The financial spillovers can be especially destabilizing for emerging markets (Rajan 2016). There, higher global liquidity can lead to a buildup of financial fragilities that emerge when capital inflows reverse. Dollar liabilities amplify the domestic effects of the global cycle in many emerging economies because dollar weakness flatters balance sheets and eases financial constraints, whereas dollar strength can tighten domestic financial conditions with rapid force. For such countries, allowing the currency to appreciate in the face of a capital inflow surge does not prevent an easing of domestic credit conditions, because the resulting fall in the domestic-currency value of dollar liabilities raises borrowers' net worth and expands their access to loans. Thus, Calvo and Reinhart (2002) listed foreign-currency liabilities as one reason for emerging markets' "fear of floating."

Rey (2014) has most forcefully made the case that for financially open economies, floating exchange rates may do little to mitigate the effects of the global financial cycle. In her phrase, fixed versus flexible may not matter too much, so that the trilemma becomes a dilemma. Absent highly effective macroprudential policies, monetary policy cannot function effectively unless countries deploy capital controls to weaken links with the global cycle. And there are good reasons to think that macroprudential policy, difficult as it is, is even harder with an open capital account.

There is a sense in which this argument turns the trilemma argument in Friedman's 1950 manuscript on its head. Friedman claimed that only if one allows the possibility of restricting international

payments can one (in principle) reconcile a fixed exchange rate with internal macroeconomic stability. Rey's claim is that *unless* one restricts international payments, flexible rates will not deliver internal stability much better than fixed rates – internal stability may *require* shutting out the global cycle.¹³ Looked at another way, the main dilemma is between capital mobility/internal instability and capital controls/internal stability. With capital mobility, even flexible rates cannot effectively deliver internal stability.

One can make cogent arguments for capital controls (sometimes) and macroprudential policies (always), but these arguments do not erase the advantage of flexible exchange rates over rigidly fixed rates.¹⁴ As I argued in an earlier paper (Obstfeld 2015), one should conceptualize a central bank's job as using available instruments to hit a usually larger number of targets, necessitating a tradeoff among the various policy goals. Even in a closed economy, for example, central banks must balance price stability against financial stability concerns, which at times may point to conflicting directions for monetary policy. Capital mobility will likely make policy tradeoffs harsher. But fixing the exchange rate, for most economies, does not improve the tradeoff. Quite the opposite: unless capital controls are imposed anyway, a fixed rate makes the tradeoff worse. It eliminates Johnson's precious "extra degree of freedom" – freedom to change the policy interest rate, freedom to refrain from defending a peg in the face of speculation.

For an emerging economy, managed floating is likely to be a part of effectively navigating the policy tradeoff. In work on emerging economies that we did at the IMF, Jonathan Ostry, Mahvash Qureshi, and I (2019) found that between 1986 and 2013, the transmission of global financial shocks to domestic credit, house price growth, banking sector leverage, and domestic output is dampened under both managed flexibility and fully flexible arrangements, in comparison with pegged regimes.

Figure 1 shows more generally how real exchange rates respond to output growth surprises for a sample of the largest EM economies. The chart measures on its horizontal axis April to October revisions in current-year IMF *World Economic Outlook* real GDP growth projections. The chart's vertical axis measures percent changes in real effective exchange rates over the same months, data coming from the IMF's *International Financial Statistics* and the Bank for International Settlements (increases are appreciations). There are two panels, comparing the real exchange rate responses to output surprises in countries with more and less flexible exchange rate arrangements.

Country-year observations are broken into two buckets. The first is country-years with "more flexible" exchange rate arrangements, corresponding to categories 3, 4, and 5 in the "coarse" annual classification of Ilzetki, Reinhart, and Rogoff (IRR, 2019). The second category is country-years with "less flexible" arrangements, corresponding to categories 1 and 2 in IRR.¹⁵ A complete country list appears as an appendix.

¹³ Cooper (1999) foreshadows Rey's dilemma argument, arguing that neither fixed nor flexible rates can function well with unlimited capital mobility.

¹⁴ For a recent model of interactions that can link a currency peg, capital controls, and prudential concerns, see Schmitt-Grohé and Uribe (2016).

¹⁵ IRR define category 2 as pre-announced crawling pegs and pre-announced crawling bands no wider than ± 2 percent. So even this category has some flexibility, especially because "pre-announcements" often change *ex post*. The IRR classification is available through 2016 at this URL: <https://www.ilzetki.com/irr-data>

Figure 1 **Flexible Exchange Rates Play a Buffering Role for Emerging Markets**



Source: IMF. *International Financial Statistics*, and BIS

For the group of country-year observations with more flexible exchange rate arrangements (left panel), the implied statistical relationship between growth surprises and real appreciation is significantly positive; that is, negative output surprises lead to real currency depreciation. The slope coefficient is 2.82 with a standard error of 0.79. For observations with more rigid exchange rate arrangements (right panel), the relationship is insignificantly positive. The slope coefficient is 0.51 with a standard error of 0.75. The exchange rate on average does not serve as a growth buffer for these countries. Of course, depreciation might be less benign in the presence of dollarized liabilities, but by achieving lower inflation in recent decades (Bems and others 2018), many EMs have been able to reduce dollarization and even graduate to issuance of domestic-currency government debt.

One important caveat: even though countries with more flexible exchange rates retain considerable control over short-term domestic nominal interest rates, international financial markets seem to enforce a high international coherence of changes in *long-term* nominal rates (Obstfeld 2015). The coherence of long nominal rates owes to four main factors:

- a. Trendless behavior of long run expected real exchange rates, driving international convergence in real interest rates over the longer term (as in Del Negro and others 2019).
- b. High coherence in term premium movements, reflecting global shocks including shocks to risk aversion (e.g., Hellerstein 2011).
- c. Convergence in inflation targets and outcomes, including across EM countries.
- d. Arithmetic: An exchange rate change of 10 basis points is consistent with an annualized one-month interest differential of about 120 basis points, based on pure interest arbitrage. However, the currency movement that would allow the same interest differential in annualized 10-year interest rates is on the order of 1200 basis points, a very big change.

4. Dominant Currency Pricing

In a world of sticky nominal prices, the choice of invoice currency can become a main determinant of exchange rate pass-through to import prices and export competitiveness. In turn, the duration of pre-set money prices determines the persistence of exchange rate effects. Models incorporating local currency pricing highlighted the importance of invoicing practices.

Goldberg and Tille (2006) pointed out the extent of invoicing in the U.S. dollar and (to a lesser degree) the euro, even in trade between countries that do not use those currencies. As they noted, when prices are sticky in invoice currencies, invoicing choices will affect the transmission from exchange rates to exports and imports. Gopinath (2016) points to evidence that prices set in invoice currencies remain insensitive to exchange rates over a long horizon of as much as two years. This makes the choice of invoice currency a first-order factor in international adjustment.

For the United States, with most exports *and* imports invoiced in dollars, a dollar depreciation will immediately make exports cheaper for foreign customers, but will not immediately push up import prices. All trade balance adjustment takes place through export expansion – making depreciation a relatively painless way for the U.S. to adjust a trade deficit toward balance.

Many other countries, especially smaller ones, face imports invoiced in the two major currencies and invoice their exports similarly. For these countries, a depreciation of domestic currency against the dollar (all else equal) will immediately raise the price of imports in proportion; Gopinath (2016)

presents evidence consistent with this type of complete pass-through. However, domestic currency depreciation against the dollar will not make exports more competitive, as their prices are insensitive to the exchange rate change. This will likely make trade-balance adjustment through depreciation a more painful affair than in models with producer-currency pricing.

There are two caveats to this case of a country whose entire trade is invoiced in dominant currencies. A home depreciation raises the domestic-currency price of exports in proportion, and therefore raises profits in the export sector, promoting entry and an expansion of export supply. But that supply-curve shift will only play out over time, and is not the mechanism modeled in short-run models such as Mundell-Fleming. More immediately, however, and consistent with a short-run positive impact on the economy, the rise in domestic-currency export prices raises the ratio of exports to GDP. So not all trade balance adjustment need take place through import compression.

Writing early in the 1980s, Kenen (1983) could still reaffirm “Grassman’s Law” (Grassman 1976) – that exporters prefer to invoice in their national currencies. Clearly, the dollar’s dominance has grown over the subsequent decades. At least four factors underlie this growth. First, the United States stabilized inflation after the early 1980s. Second, the euro was born, supplanting most major national currencies in Europe and narrowing the range of dollar alternatives, but not effectively challenging the dollar. Third, emerging and developing economies, more likely to invoice their exports in a dominant currency (especially the dollar) and to import goods invoiced similarly, have become a larger share of the world economy.¹⁶ Finally, the tremendous growth of international banking and international financial markets, with the dollar dominant as a funding and vehicle currency, has likely played an important role. In an important paper, Gopinath and Stein (2018) model the complementarity between the dollar’s dominant roles in global trade and finance.

Some caution is in order before drawing strong policy conclusions, however, because as Goldberg and Tille (2016) and Gopinath (2016) emphasize, the choice of invoice currency is potentially endogenous with respect to policy choices. Careful transaction-level studies by Goldberg and Tille (2018) and Corsetti, Crowley, and Han (2018) illustrate the nuanced determinants of invoicing choices at the micro level as well as the potential role of policy factors in driving them.

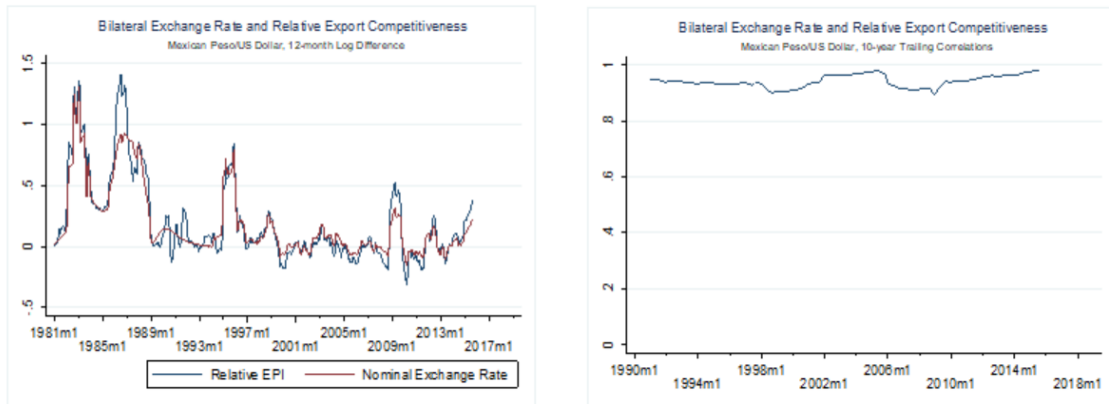
A central implication of the dominant currency paradigm is that movements in a country’s U.S. dollar exchange rate should have a muted impact on the relative price of U.S. exports and its own exports (to the extent the latter are invoiced in dollars). Thus, when foreign export price indexes are expressed in dollars, their ratios to the U.S. export price index should be at most moderately correlated with the domestic currency price of the dollar. In contrast, the correlation is high in the traditional Mundell-Fleming framework with producer currency pricing and sticky prices.

Figure 2 shows monthly IMF data on relative dollar export prices and the dollar exchange rate for a selection of countries. For each country, the left-hand panel shows the two relative prices, the right-hand panel a trailing ten-year correlation coefficient. What is striking in these data is the consistent pattern of quite high correlations. It seems that when a country’s currency depreciates against the

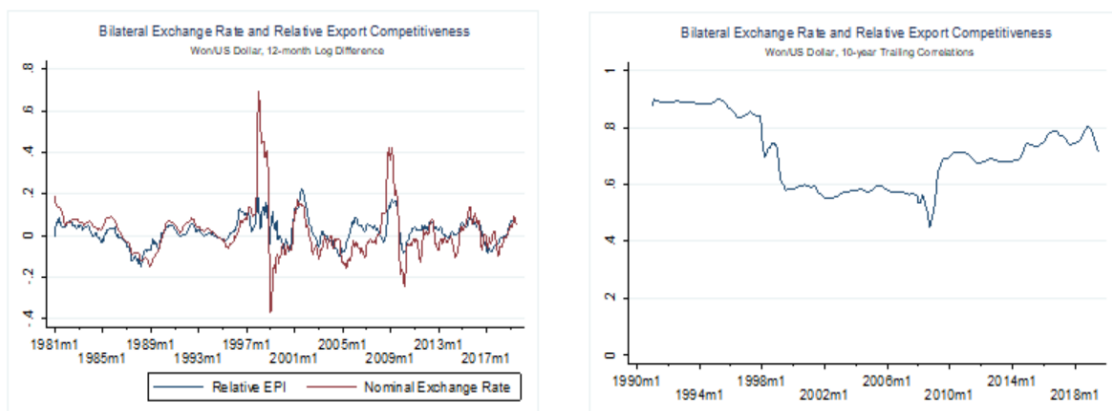
¹⁶ This development has directly raised the share of trade invoiced in dominant currencies, but has likely also done so indirectly by enhancing the strategic complementarities from such invoicing. The channel is akin to what Krugman (1984) models.

Figure 2 Relative Export Prices and the U.S. Dollar Exchange Rate

Mexico



Korea



Japan

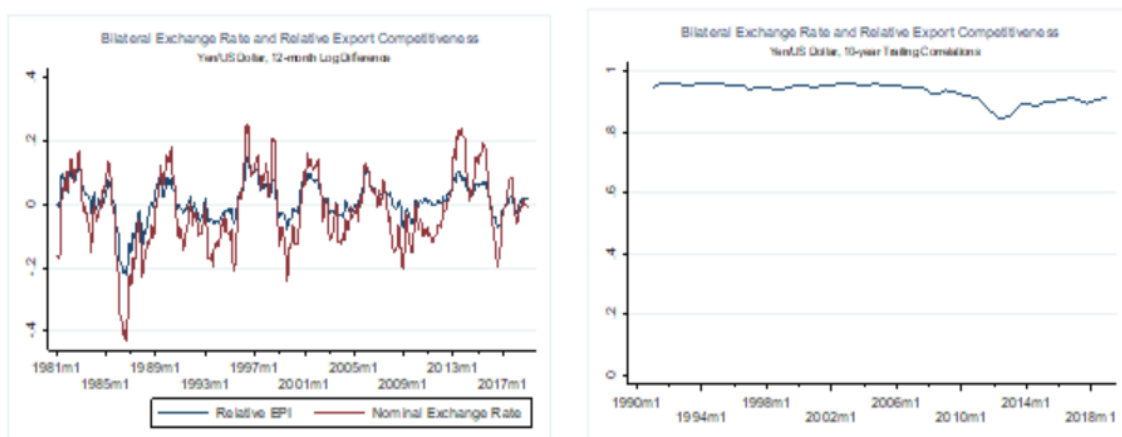
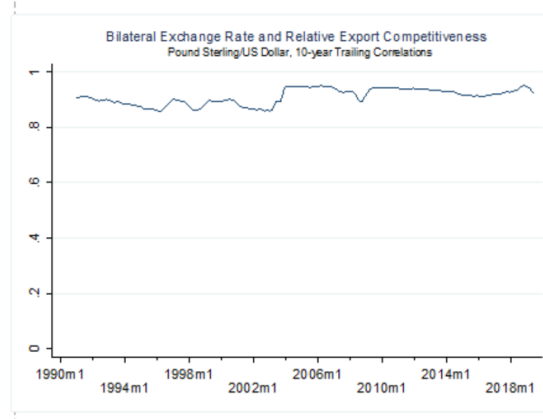
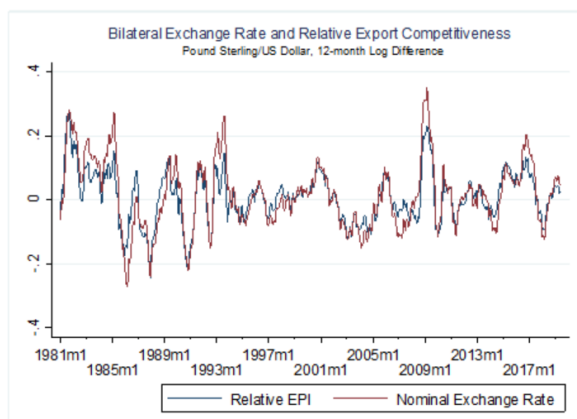
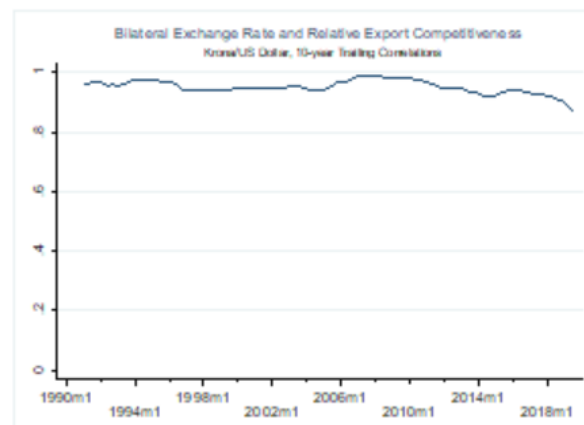
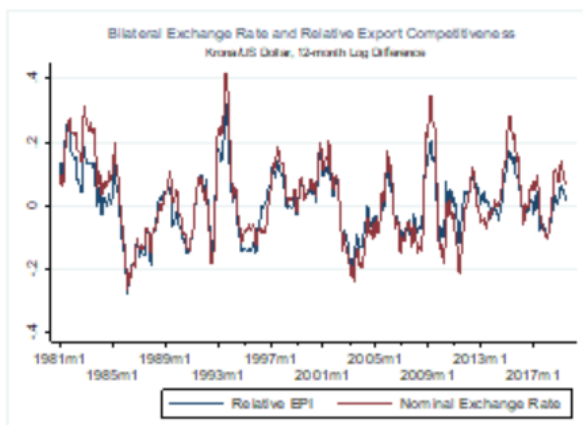


Figure 2 Relative Export Prices and the U.S. Dollar Exchange Rate (Continued)

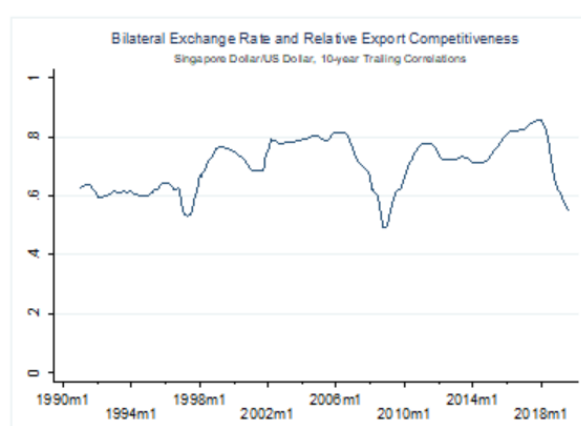
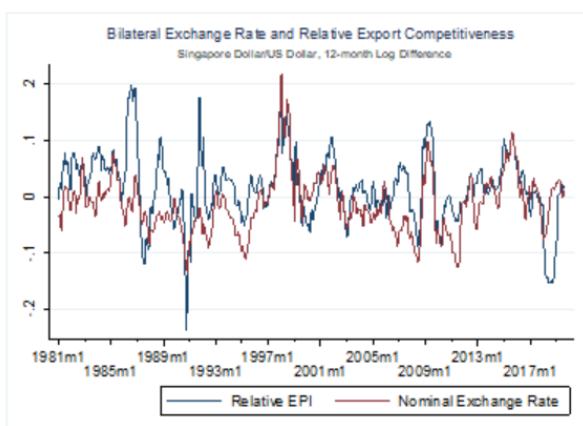
United Kingdom



Sweden



Singapore



Source: IMF, *International Financial Statistics*

dollar, this corresponds reliably to a rise in the competitiveness of its exports relative to U.S. exports.

This pattern would be hard to understand if all six countries had a majority of exports invoiced in dollars. It could be that we are seeing reverse causality, with the exchange rate being driven by changes in relative export prices. It is hard to believe that this would be the case for all six countries, or that terms-of-trade shocks are the most important shock driving exchange rates (as opposed to expectations about monetary policy, capital-account shocks, and so on). Surely we need to do more research before we jettison conventional models, models that also suggest flexible exchange rates can provide a buffer against real demand shocks.

6 **Where Do We Stand?**

In the light of a half century's further experience with international monetary arrangements, I conclude that Johnson's main argument still stands. Exchange-rate flexibility, despite the occasional tensions and messiness, remains the best way to reconcile the citizenry's insistence on macroeconomic policy sovereignty with relatively free international commerce and payments. To paraphrase Winston Churchill – himself a central figure in 20th-century exchange rate history – a system with flexible exchange rates, like democracy itself, can be called the worst form of system, “except for all those other forms that have been tried from time.”

That is not to say the system could not be improved and made more efficient through closer multilateral cooperation. But let's face facts: the biggest economic payoff to enhanced global cooperation these days is in areas such as climate and public health. That is where political leaders should be using their capital.

We have learned that for most countries, the idea of a credibly fixed exchange rate is chimerical. Experience has shown that fixed rates invite speculative attack, and not just in cases where the peg is inevitably doomed by unsustainable government policies. Johnson understood that a currency peg by itself cannot bestow governmental credibility, so that the *vulnerable* peg is the true counterfactual to a more flexible system. He also understood that a flexible exchange rate by itself does not solve all policy problems. Nonetheless, even without pure floating, the “extra degree of freedom” that exchange rate flexibility offers remains essential for a wide range of countries.

In short, the demise of the case for flexible exchange rates has been greatly exaggerated.

Appendix

Countries covered by Figure 1:

Algeria
Argentina
Brazil
Chile
China
Colombia
India
Indonesia
Malaysia
Mexico
Nigeria

Pakistan
Peru
Philippines
Poland
Romania
Russia
Saudi Arabia
South Africa
Thailand
Turkey
Ukraine

References

- Adler, Gustavo, Sergii Meleshchuk, and Carolina Osorio Buitron. "Global Value Chains and External Adjustment: Do Exchange Rates Still Matter?" IMF Working Paper WP/19/300, December 2019.
- Aliber, Robert Z. "The Case for Flexible Exchange Rates Revisited." In Philip Hartmann, Haizhou Huang, and Dirk Schoenmaker, eds., *The Changing Fortunes of Central Banking*. Cambridge: Cambridge University Press, 2018.
- Al-Mashat, Rania, Kevin Clinton, Douglas Laxton, and Hou Wang. "Czech Republic: Transition to the Frontier." In Tobias Adrian, Douglas Laxton, and Maurice Obstfeld, eds., *Advancing the Frontiers of Monetary Policy*. Washington, D.C.: International Monetary Fund, 2018.
- Bartsch, Elga, Jean Boivin, Stanley Fischer, and Philipp Hildebrand. *Dealing with the Next Downturn: From Unconventional Monetary Policy to Unprecedented Policy Coordination*. SUERF Policy Note 105, October 2019.
- Bems, Rudolfs, Francesca Caselli, Francesco Grigoli, Bertrand Gruss, and Weicheng Lian. "Is Inflation Domestic or Global? Evidence from Emerging Markets." IMF Working Paper WP/18/241, November 2018.
- Bergsten, C. Fred and Joseph E. Gagnon. *Currency Conflict and Trade Policy: A New Strategy for the United States*. Washington, D.C.: Peterson Institute for International Economics, 2017.
- Broadberry, S.N. and N. F. R. Crafts. "British Economic Policy and Industrial Performance in the Early Post-War Period." *Business History* 38 (4, 1996): 65-91.
- Bruno, Valentina and Hyun Song Shin. "Cross-Border Banking and Global Liquidity." *Review of Economic Studies* 82 (April 2015): 535--564.
- Caballero, Ricardo J., Emmanuel Farhi, and Pierre-Olivier Gourinchas. "Global Imbalances and Policy Wars at the Zero Lower Bound." National Bureau of Economic Research Working Paper 21670, February 2020 (revised).
- Calvo, Guillermo A. and Carmen M. Reinhart. "Fear of Floating." *Quarterly Journal of Economics* 117 (May 2002): 379-408.
- Cook, David and Michael B. Devereux. "Exchange Rate Flexibility under the Zero Lower Bound." *Journal of International Economics* 101 (July 2016): 52-69.
- Cooper, Richard N. "Exchange Rate Choices." In *Rethinking the International Monetary System*. Federal Reserve Bank of Boston Conference Series. Boston, MA: Federal Reserve Bank of Boston, 1999, pp. 99-136.
- Corsetti, Giancarlo, Meredith Crowley, and Lu Han. "Invoicing and Pricing-to-Market: A Study of Price and Markup Elasticities of UK Exporters." Centre for Economic Policy Research Discussion Paper 13282, November 2018.

Corsetti, Giancarlo, Keith Kuester, and Gernot J. Müller. “Floats, Pegs and the Transmission of Fiscal Policy.” In Luis Felipe Céspedes and Jordi Galí, eds., *Fiscal Policy and Macroeconomic Performance*. Santiago, Chile: Central Bank of Chile, 2013.

_____. “Fixed on Flexible: Rethinking Exchange Rate Regimes after the Great Recession.” *IMF Economic Review* 65 (August 2017): 586-632.

Del Negro, Marco, Domenico Giannone, Marc P. Giannoni, and Andrea Tambalotti. “Global Trends in Interest Rates.” *Journal of International Economics* 118 (C, 2019): 248-262.

Eggertsson, Gauti B., Neil R. Mehrotra, Sanjay R. Singh, and Lawrence H. Summers, “A Contagious Malady? Open Economy Dimensions of Secular Stagnation.” *IMF Economic Review* 64 (November 2016): 581-634.

Eichengreen, Barry and Jeffrey Sachs. “Exchange Rates and Economic Recovery in the 1930s.” *Journal of Economic History* 45 (December 1985): 925-946.

Engel, Charles. “Exchange Rates, Interest Rates, and the Risk Premium.” *American Economic Review* 106 (February 2016): 436-474.

Friedman, Milton. “The Case for Flexible Exchange Rates.” In *Essays in Positive Economics*. Chicago: University of Chicago Press, 1953.

_____. “President Carter’s Trilemma.” *Newsweek*, October 1, 1979: 54.

_____. “The Keynes Centenary: A Monetarist Reflects.” *Economist*, June 4, 1983: 17-19.

_____. “Markets to the Rescue.” *Wall Street Journal*, October 13, 1998.

Gaspar, Vitor, Maurice Obstfeld, Ratna Sahay, and others. “Macroeconomic Management When Policy Space is Constrained: A Comprehensive, Coordinated, and Consistent Approach to Economic Policy.” IMF Staff Discussion Note SDN/16/09, September 2016.

Georgiadis, Georgios, Johannes Gräb, and Makram Khalil. “Global Value Chain Participation and Exchange-Rate Pass-Through.” European Central Bank Working Paper Series 2327, November 2019.

Goldberg, Linda S. and Cédric Tille. *The International Role of the Dollar and Trade Balance Adjustment*. Occasional Papers 71. New York: Group of Thirty, 2006.

_____. “Micro, Macro, and Strategic Forces in International Trade: Invoicing: Synthesis and Novel Patterns.” *Journal of International Economics* 102 (2016): 173-187.

Gopinath, Gita. “The International Price System.” In *Inflation Dynamics and Monetary Policy*. A Symposium Sponsored by the Federal Reserve Bank of Kansas City. Kansas City, MO: Federal Reserve Bank of Kansas City, 2016.

Gopinath, Gita and Jeremy C. Stein. “Banking, Trade, and the Making of a Dominant Currency.” National Bureau of Economic Research Working Paper 24485, April 2018.

- Gourinchas, Pierre-Olivier, Hélène Rey, and Nicolas Govillot. "Exorbitant Privilege and Exorbitant Duty." Manuscript, 2017. URL: http://helenerey.eu/Content/Documents/duty_23_10_2017.pdf
- Grassman, Sven. "Currency Distribution and Forward Cover in International Trade." *Journal of International Economics* 6 (May 1976): 215-221.
- Hayek, Friedrich. *Monetary Nationalism and International Stability*. London: Longman, Green, 1937.
- Hellerstein, Rebecca. "Global Bond Risk Premiums." Staff Report 499, Federal Reserve Bank of New York, June 2011.
- Hicks, John and others. *Crisis '75 ..?* Hobart Occasional Paper Special 43. London: Institute of Economic Affairs, 1975.
- Hirsch, Fred. *The Pound Sterling: A Polemic*. London: Victor Gollancz, 1965.
- Ilzetzki, Ethan, Carmen M. Reinhart, and Kenneth S. Rogoff. "Exchange Arrangements Entering the 21st Century: Which Anchor Will Hold?" *Quarterly Journal of Economics* 134 (May 2019): 599--646.
- Irwin, Douglas A. *Trade Policy Disaster: Lessons from the 1930s*. Cambridge, MA: MIT Press, 2012.
- _____. "The Missing Bretton Woods Debate over Flexible Exchange Rates." In Naomi Lamoureaux and Ian Shapiro, eds., *The Bretton Woods Agreements*. New Haven, CT: Yale University Press, 2019.
- Johnson, Harry G. "The Case for Flexible Exchange Rates, 1969." *Review*, Federal Reserve Bank of St. Louis (June 1969): 12-24.
- _____. "The Keynesian Revolution and the Monetarist Counter-Revolution." *American Economic Review (Papers and Proceedings)* 61 (May 1971a): 1-14.
- _____. "Common Market: The Case Against." *The Spectator*, February 13, 1971b: 10.
- _____. "The United States and the Disunited States: The Crisis of the International Economic System." In Douglas Evans, ed., *Britain in the EEC*. London: Victor Gollancz, 1973.
- Johnson, Harry G. and John E. Nash. *UK and Floating Exchanges*. Hobart Papers 46. London: Institute of Economic Affairs, 1969.
- Kenen, Peter B. *The Role of the Dollar as an International Currency*. Occasional Papers 13. New York: Group of Thirty, 1983.
- Khan, Mohsin S. and Harry G. Johnson. "The Common Market Questionnaire, October 1971." *Economica* (New Series) 39 (August 1972): 316-322.
- Kindleberger, Charles P. "The Case for Fixed Exchange Rates, 1969." In *The International Adjustment Mechanism*. Federal Reserve Bank of Boston Conference Series. Boston, MA: Federal Reserve Bank of Boston, 1970, pp. 93-108.
- Krugman, Paul. "The International Role of the Dollar: Theory and Prospect." In John F. O. Bilson and Richard C. Marston, eds., *Exchange Rate Theory and Practice*. Chicago: University of Chicago Press, 1984.

- Laidler, David E. W. and William B. P. Robson. *Two Percent Target: The Context, Theory, and Practice of Canadian Monetary Policy since 1991*. Policy Study 38. Toronto: C. D. Howe Institute, 2004.
- Lowe, Philip. “Remarks at Jackson Hole Symposium.” Jackson Hole, WY, August 25, 2019. URL: <https://www.rba.gov.au/speeches/2019/sp-gov-2019-08-25.html>
- Meade, James E. “The Case for Variable Exchange Rates.” *Three Banks Review* 27 (November 1955): 3-27. Reprinted in Susan Howson, ed., *The Collected Papers of James E. Meade. Volume III: International Economics*. London: Unwin Hyman, 1988.
- _____. *UK, Commonwealth and Common Market: A Reappraisal*. Hobart Papers 17, 2nd edition. London: Institute for Economic Affairs, 1962. Reprinted in Susan Howson, ed., *The Collected Papers of James E. Meade. Volume III: International Economics*. London: Unwin Hyman, 1988.
- Middleton, Roger. “Struggling with the Impossible: Sterling, the Balance of Payments and British Economic Policy, 1949-72.” In Arie Arnon and Warren Young, eds., *The Open Economy Macromodel: Past, Present and Future*. Norwell, MA: Kluwer Academic Publishers, 2002.
- Miranda-Agrippino, Silvia and Hélène Rey. “US Monetary Policy and the Global Financial Cycle.” Manuscript, Bank of England and London Business School, March 2019. URL: http://www.helenerey.eu/RP.aspx?pid=Working-Papers_en-GB&aid=224384170_67186463733
- Moggridge, D. E. *Harry Johnson: A Life in Economics*. Cambridge: Cambridge University Press, 2008.
- Mundell, Robert A. and Alexander K. Swoboda, eds. *Monetary Problems of the International Economy*. Chicago: University of Chicago Press, 1969.
- Nelson, Edward. “The Continuing Validity of Monetary Policy Autonomy under Floating Exchange Rates.” *International Journal of Central Banking* 16 (March 2020): 81-123.
- Newton, Scott. “The Two Sterling Crises of 1964 and the Decision Not to Devalue.” *Economic History Review* 62 (February 2009): 73-98.
- Obstfeld, Maurice. “Exchange Rates and Adjustment: Perspectives from the New Open-Economy Macroeconomics.” *Monetary and Economic Studies*, Bank of Japan 20 (December 2002): 23-46. URL: <https://www.imes.boj.or.jp/english/publication/mes/2002/me20-s1-4.pdf>
- Obstfeld, Maurice. “Trilemmas and Trade-offs: Living with Financial Globalisation.” BIS Working Papers 480, January 2015. URL: <https://www.bis.org/publ/work480.pdf>
- Obstfeld, Maurice, Jonathan D. Ostry, and Mahvash S. Qureshi. “A Tie That Binds: Revisiting the Trilemma in Emerging Market Economies.” *Review of Economics and Statistics* 101 (May 2019): 279-293.
- Obstfeld, Maurice and Alan M. Taylor. “The Great Depression as a Watershed: International Capital Mobility over the Long Run.” In Michael Bordo, Claudia Goldin, and Eugene White, eds., *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century*. Chicago: University of Chicago Press, 1998.

Oliver, Michel J. and Arran Hamilton. “Downhill from Devaluation: The Battle for Sterling, 1968-72.” *Economic History Review* 60 (August 2007): 486-512.

Rajan, Raghuram. “Towards Rules of the Monetary Game.” Speech at the IMF/Government of India Conference “Advancing Asia: Investing for the Future,” New Delhi, March 12, 2016. URL: <https://www.bis.org/review/r160316a.htm>

Rey, Hélène. “Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence.” In *Global Dimensions of Unconventional Monetary Policy*. A Symposium Sponsored by the Federal Reserve Bank of Kansas City. Kansas City, MO: Federal Reserve Bank of Kansas City, 2014.

Rangan, Subramanian and Robert Z. Lawrence. *A Prism on Globalization: Corporate Responses to the Dollar*. Washington, D.C.: Brookings Institution, 1999.

Robbins, Lionel. *Economic Planning and International Order*. London: Macmillan, 1937.

Sandbrook, Dominic. *Seasons in the Sun: The Battle for Britain, 1974-1979*. London: Penguin Books, 2012.

Schenk, Catherine R. *The Decline of Sterling: Managing the Retreat of an International Currency, 1945-1992*. Cambridge: Cambridge University Press, 2010.

Schmitt-Grohé, Stephanie and Martín Uribe. “Downward Nominal Wage Rigidity, Currency Pegs, and Involuntary Unemployment.” *Journal of Political Economy* 124 (October 2016): 1466-1514.

Svensson, Lars E. O. “Escaping From a Liquidity Trap and Deflation: The Foolproof Way and Others.” *Journal of Economic Perspectives* 17 (Fall 2003): 145-166.

Tucker, Paul. *Unelected Power: The Quest for Legitimacy in Central Banking and the Regulatory State*. Princeton, NJ: Princeton University Press, 2018.

Turner, Marjorie S. *Nicholas Kaldor and the Real World*. Armonk, NY: M. E. Sharpe, 1993.

Whiffin, Andrew. “FT Study Shows Danger to Global Trade from EM Currency Weakening: Benefits of Depreciation on Exports May Have Evaporated.” *Financial Times*, August 31, 2015. URL: <https://www.ft.com/content/0256e374-4bf9-11e5-b558-8a9722977189>

World Bank. *Trading for Development in the Age of Global Value Chains: World Development Report 2020*. Washington, D.C.: 2019.