

The Continuing Validity of Monetary Policy Autonomy under Floating Exchange Rates*

Edward Nelson
Federal Reserve Board

Economic research in recent years has highlighted the issue of whether a floating exchange rate provides autonomy with regard to monetary policy to a central bank in an economy that is highly open. In particular, Rey (2016) has argued that inflation-targeting advanced economies lack monetary policy autonomy by pointing to results suggesting that U.S. monetary policy shocks matter for the behavior of key financial variables in these economies. In contrast, it is argued in this paper that monetary autonomy *does* prevail in inflation-targeting advanced economies, notwithstanding the reaction of these economies' asset prices to U.S. monetary policy developments. The monetary-autonomy argument—which was advanced by Milton Friedman and rests on the existence of features that are present in new open-economy models—refers to the fact that the monetary authority under a floating rate is able to have a decisive influence on nominal variables in the long run, as well as a short-run influence on real variables. The result that rest-of-world monetary policy is among the other factors affecting the short-run behavior of real variables (including real asset prices) in a small, floating-rate open economy is in keeping with the traditional and appropriate concept of monetary policy

*The author is grateful to Pierpaolo Benigno (the associate editor) and two anonymous referees for extremely useful suggestions, Sarah Baker and Laurie Khalfan for research assistance, and Ben Bernanke, Olivier Blanchard, Guy Debelle, Christopher Erceg, Joseph Gruber, Peter Ireland, Douglas Irwin, Mervyn King, David López-Salido, Ellen Meade, and George Tavlas for helpful comments on earlier drafts. None of these individuals is responsible for any errors. The views expressed here are the author's alone and should not be interpreted as those of the Federal Reserve or the Board of Governors. E-mail: Edward.Nelson@frb.gov.

autonomy under floating exchange rates. It follows that such influences of rest-of-world monetary policy on the home economy are consistent with the celebrated open-economy trilemma.

JEL Codes: E51, E52, F41.

1. Introduction

“Keynes could state the issue as a dilemma [Subsequent history] has forced those of us who have written on this subject more recently to expand Keynes’s dilemma to a trilemma. A country is compelled to choose two of the following three desirable objectives: stable prices (or, more generally, an independent monetary policy), a stable exchange rate (or, more generally, a predetermined path of exchange rates), freedom from exchange controls.”

Friedman (1983, p. 37)

Economic research in recent years has given considerable prominence to the issue of whether a floating exchange rate provides, to a central bank in an economy that is highly open, autonomy with regard to monetary policy.¹ If this autonomy existed, it would mean that the central bank—like its counterpart in a closed-economy or large-economy setting—could use monetary policy to choose a particular long-run inflation rate (perhaps in conjunction with the pursuit of other macroeconomic goals, such as keeping output close to potential). As the foregoing quotation suggests, a standard result in monetary economics is that autonomy of this kind does arise from a floating-exchange-rate arrangement and that the autonomy prevails even in conditions of complete international mobility of capital.²

¹This prominence is evidenced by much of the material in Bordo and Taylor (2017).

²In the present discussion, complete or perfect capital mobility refers to a situation in which official (that is, governmental) controls on private-sector access to foreign exchange are not present. When reference is made here to complete capital mobility, it is not being taken for granted that capital markets in the home economy or foreign economy are free of imperfections or frictions or that agents in the small economy can obtain funds from the foreign economy on exactly the same terms as those available to a comparable agent in the foreign economy.

This result is often contrasted with the situation facing a small open economy when its exchange rate is fixed. In the case of a completely fixed exchange rate and globally mobile capital, monetary policy in the small open economy is directed toward stability of the external value of the currency and cannot be used in pursuit of objectives distinct from that goal.³

The conclusion that monetary policy autonomy can be secured by a floating-rate arrangement has been challenged by Rey (2013). On the basis of empirical evidence, Rey argues that, under unimpeded international capital mobility, *neither* fixed exchange rates *nor* floating exchange rates are associated with monetary autonomy for a central bank. She contends that what many economists—including Milton Friedman in the above quotation—have called the “trilemma” is invalid.⁴ Even with a flexible exchange rate, she suggests, monetary autonomy would be obtainable only if the open economy’s authorities restricted capital account transactions.

Although Rey (2013) focused on emerging economies, her basic argument concerning floating rates would, if valid, apply to emerging economies and advanced economies alike. And indeed Rey (2016) has extended the argument to small- and medium-sized

Indeed, in many new open-economy models, including some of those discussed below, it is assumed that citizens of a small country who borrow from abroad encounter some form of fee or spread that makes their overall international borrowing cost different from the rest-of-world interest rate. Such model features may be appealing for technical reasons (see Schmitt-Grohé and Uribe 2003) and also provide a more realistic account of the borrowing situation facing many small economies, including those that impose no exchange controls. But the inclusion of these model features does not in itself imply a violation of the assumption of complete mobility of international capital.

³Under a fixed exchange rate, monetary developments will still be decisive for the long-run inflation rate, as stressed in McCallum (1996, p. 143). However, with monetary policy choices dictated by the commitment to fix the exchange rate, monetary policy at home will be closely connected to rest-of-world monetary policy, and the economy’s long-run inflation rate will consequently tend to be driven by that of the rest of the world.

⁴Obstfeld (1998, p. 14) credited the use in the research literature of the “trilemma” terminology (to describe the conventional wisdom that monetary policy autonomy, fixed exchange rates, and complete capital mobility are not jointly obtainable, though any two are) to Obstfeld and Taylor (1998). This terminology was, however, used in the same context much earlier by Friedman in the press article quoted at the start of this paper, and this appears to have been the first published instance of such usage.

advanced economies.⁵ Accordingly, the discussion that follows focuses on advanced open economies—in particular, inflation-targeting countries that float their exchange rate.

The monetary-autonomy debate is of great relevance to such economies because both these economies' policymakers and outside observers have routinely accepted the standard argument in favor of autonomy. The United Kingdom, for example, has had a floating exchange rate since September 1992. Shortly after this float began, the Chancellor of the Exchequer, Norman Lamont, proclaimed: "We are floating and we will set monetary policy in this country. . . It will be a British economic policy and a British monetary policy."⁶ The specific monetary policy chosen by Lamont—and continued over the past two decades of Bank of England operational independence—consisted of a strategy of inflation targeting. A second example is provided by Australia, which has had a floating exchange rate since 1983 and an inflation-targeting monetary policy strategy since the 1990s. Beaumont and Cui (2007, p. 1) stated that this experience had been associated with Australia "gaining the expected macroeconomic benefits from exchange rate flexibility," including monetary policy autonomy. The literature critical of the connection between floating and monetary policy autonomy is therefore a major challenge to the conventional wisdom concerning inflation-targeting economies.

In contrast to the conclusion of that literature, the position advanced here will be that a floating exchange rate *does* secure monetary policy autonomy. Consequently, provided that the exchange rate floats, official controls on capital mobility are not necessary to secure such autonomy.⁷ Monetary policy autonomy under flexible exchange rates, it will be argued, is not merely an analytical result.

⁵The term "advanced economies" below will generally be used to refer to these small- and medium-sized floating-rate advanced economies, whose central banks target inflation. Likewise, in the discussion in this paper, the phrase "home economy" or "open economy" will often stand in for "small open economy." Also, the terms "capital controls" and "foreign exchange controls" will be used interchangeably, while "reserves" will refer to commercial banks' reserve balances (a central bank liability) and not to foreign exchange reserves (a central bank asset).

⁶Quoted in *The Economist* (1992).

⁷This does not, of course, preclude the validity of other possible justifications for imposing such controls. See, for example, Pasricha (2017) for an analysis of different motivations for capital controls.

Rather, it has practical validity and aids understanding of monetary and economic behavior in inflation-targeting economies. Results advanced by Rey and others in support of the contrary position do not, in fact, provide persuasive evidence of lack of monetary autonomy. The reason those results are not persuasive evidence is that the existence of monetary autonomy does not preclude, and indeed is highly consistent with, international financial integration.

The Basis of the Counterargument. A quotation from the abstract of Rey (2016) is helpful in bringing out the counterargument advanced here. Rey states: “The paper presents evidence that U.S. monetary policy shocks are transmitted internationally and affect financial conditions even in inflation-targeting economies with large financial markets. Hence flexible exchange rates are not enough to guarantee monetary autonomy in a world of large capital flows.” One could not ask for a clearer articulation of the no-autonomy argument than the two sentences just quoted. But referring to those same sentences also provides a convenient means of expressing the crux of the counterargument, which is simply: The conclusion given in the second sentence does not follow from the first. That is, the word “Hence” connecting the sentences is unwarranted and the second sentence is a non sequitur.⁸

In fact, the transmission of U.S. financial developments (including those arising from U.S. monetary policy shocks or other U.S. monetary policy actions) to financial conditions in other, smaller, advanced economies is fully consistent with the possession of monetary autonomy by the central banks of those economies. The key point, as already suggested, is that monetary policy autonomy under a float can, and likely does, coexist with financial interdependence.

Objectives of the Present Analysis. Elements of the preceding point can be gleaned from some of the critical discussions of Rey (2013). But, to date, the communication of that point has been weakened by being left implicit, by taking the form of a side remark, or by appearing in the context of discussions that make unwarranted

⁸The approach taken here is therefore consistent with, but somewhat different from, that in Taylor’s (2016) defense of monetary autonomy. Taylor focuses on whether the empirical findings offered in recent years against autonomy are artefacts of the estimation sample periods, rather than on whether—if subsequently found to be durable—those results actually point to the absence of autonomy.

concessions to the no-autonomy position.⁹ A first objective of this paper, therefore, is to make the point central and explicit, doing so with specific reference to advanced inflation-targeting economies.

A second, related, objective of this paper is to bring out the shortcomings of the recent case against autonomy under floating exchange rates by comparing this case directly with the *standard* case for floating exchange rates. It will become clear that the results claimed to be at variance with the existence of monetary autonomy do not actually conflict with the basic notion of monetary autonomy advanced by advocates of floating rates.

In particular, the discussion in this paper will consider the monetary-autonomy argument used in Milton Friedman's (1953a) case for exchange rate flexibility. That paper's argument is a useful benchmark because Friedman (1953a) is widely accepted as a central reference on the issues discussed here.¹⁰ Bringing his argument explicitly into the current debate highlights the sharp difference between (i) what believers in monetary autonomy under a floating rate thought was implied by autonomy and (ii) what modern researchers have regarded as evidence that autonomy does not prevail under floating rates.

It has been rare for the recent literature on monetary autonomy to cite Friedman's views on the matter. For example, Rey (2013, 2016) does not cite Friedman's work. And when it has characterized Friedman's autonomy argument, the recent literature has sometimes attributed to him the opposite of his actual position.¹¹

Rey (2016) does cite the classic work of Mundell (1963) that provided formal analysis of the incompatibility, for a country allowing complete capital mobility, of fixed exchange rates and an autonomous monetary policy. However, when considering the debate on monetary autonomy, Friedman's contributions provide a

⁹A couple of prominent examples of these studies are considered in section 2.4 below.

¹⁰For example, Krugman (1993, p. 519) judged Friedman (1953a) to be a "seminal paper," while McCallum (1996, p. 213) observed that Friedman (1953a) was "the most famous and influential single piece of writing on exchange rate arrangements." See also Dellas and Tavlas (2018) and Irwin (2017) for analyses of the development of Friedman's article and the historical context in which it appeared.

¹¹See the discussion in section 2.3 below of Obstfeld and Taylor's (2017) portrayal of Friedman's argument.

starker and more apposite counterpoint to Rey's position than does Mundell's work. There are three reasons for this. First, although Rey calls the trilemma the "Mundellian trilemma," the "trilemma" terminology was used in print by Friedman more than 30 years ago, long before it became prevalent; and as discussed below (in section 2.2), he articulated the trilemma concept when laying out the case for floating rates in 1953. Second, as detailed later, Rey materially misstates the properties of the model Mundell developed, as she attributes it to a feature (the central bank's pursuit of stabilization policy using an interest rate instrument) that is infeasible in that model (under both fixed and floating rates) but that is possible, under floating rates, in Friedman's framework.¹² Third, Mundell himself became a strong critic of floating exchange rates (see, for example, Mundell 1968) and so, unlike Friedman, he is not particularly representative of the view that floating rates (alongside capital mobility) are attractive from the point of view of stabilization policy.

In the course of the analysis that follows, it will be shown that the autonomy obtainable under flexible exchange rates in sticky-price models lines up with the autonomy Friedman described in his writings. They have a common implication: asset prices can move together across countries whose exchange rates float, yet this does not imply that an open economy lacks monetary autonomy. A corollary is that empirical evidence that asset prices in inflation-targeting advanced economies respond to U.S. monetary policy actions does not in itself constitute valid evidence against autonomy.

The focus here is therefore on the generic problems with the type of evidence offered of late against autonomy under floating rates. This paper will not review that evidence in detail. Indeed, the empirical findings per se will not be disputed at all.¹³ What will be challenged is the inference that such findings are evidence against the notion that monetary policy autonomy prevails under floating exchange rates. In contrast to Rey's (2016, p. 27) suggestion that

¹²The Mundell-Fleming model does feature monetary autonomy under floating rates. But the autonomy is of a kind that is of questionable practical relevance, because it is one under which the central bank is incapable under floating rates (alongside capital mobility) of managing interest rates.

¹³Nor will there be systematic discussion of the empirical evidence offered *in favor of* autonomy in Klein and Shambaugh (2015) and Obstfeld, Ostry, and Qureshi (2017), for example.

“many more VARs need to be run” before the hypothesis of lack of monetary autonomy can be accepted, the perspective of the present paper is that the hypothesis would not be valid even if Rey’s finding of effects of rest-of-world monetary policy shocks on domestic variables is fully granted.

This paper proceeds, in section 2, by considering the standard argument for monetary policy autonomy under floating exchange rates, with a focus on Friedman’s (1953a) exposition of the argument. Relevant characteristics of new open-economy models under fixed and floating rates are then discussed in section 3. Section 4 reconsiders, in light of the analysis of the preceding sections, the broad evidence presented against autonomy. Section 5 concludes.

2. The Standard Argument for Monetary Policy Autonomy under Floating Exchange Rates

Before proceeding further, a specific characterization of monetary autonomy, and the argument that supports it, is needed.

What precisely is the monetary policy autonomy that floating rates should provide to a small open economy under full capital mobility? The answer—according to the standard case for a floating exchange rate—can be expressed in terms of *aggregate macroeconomic outcomes* as follows: In both the short run and the long run, the central bank can have a decisive influence on the monetary value of economic activity, that is, the aggregate nominal flow of spending on goods and services in the economy.¹⁴ This influence

¹⁴Expressing the central bank’s influence in terms of ability to affect nominal spending may appear counterintuitive, as nominal income is typically not a variable that appears in the structural equations of closed-economy and open-economy models, whereas its individual components—prices and real output—do so. However, it is highly convenient to refer initially to nominal spending because this is a variable that central banks can, under monetary autonomy, affect *at all time horizons* and *across a variety of models*. In particular, under monetary autonomy, an open economy’s central bank is able to set the course for nominal spending, in both the short run and long run, even if it cannot affect real output (as is the case at all horizons in flexible-price models, and in the long run of sticky-price new open-economy models) or cannot set the inflation rate (either because domestic prices and costs are rigidly fixed at all horizons—as they were in some very early open-economy models—or because the home country’s inflation rate is heavily influenced by nonmonetary factors even in the long run—a

can be further categorized in terms of the short-run situation and long-run conditions. In the short run, monetary autonomy, in combination with price stickiness, gives the monetary authority considerable influence over both real and nominal variables. In the long run, monetary autonomy gives the monetary authority commanding influence over nominal variables, even though its influence on real variables is gone (because price stickiness wears off over time, so real variables return to their natural values). The influence over the long-run nominal situation, together with the acceptance by policymakers that they have this influence, has prompted many open economies' monetary authorities to select and pursue a target for their country's long-run inflation rate.

This influence on macroeconomic *outcomes* in turn stems from the fact that, as detailed below, the central bank under a float is able to set a course for its policy *instruments* that does not depend mechanically or solely on the behavior of the exchange rate or on developments abroad.

With that background established, the remainder of this section shows how this concept of autonomy relates to Friedman's (1953a) case for floating exchange rates (section 2.1) and his expression of the trilemma (section 2.2). Then section 2.3 reconsiders the critiques of the autonomy argument in recent literature, while section 2.4 describes the relationship between the defense of the trilemma argument made here with two other recent defenses.

2.1 *Friedman's (1953a) Emphasis on Monetary Policy Autonomy*

The autonomy argument described above was an important component of the Friedman (1953a) case for floating exchange rates alongside full capital mobility.¹⁵ With regard to *macroeconomic outcomes*,

position obviously contrary to the modern consensus, but one apparently held by some advocates of floating rates, such as Meade 1961).

¹⁵The present discussion will not consider Friedman's case for floating exchange rates in toto but, rather, will focus on the monetary-autonomy aspect of that case. A number of aspects of Friedman's case for floating rates (such as his predictions concerning whether stable monetary policies could be counted on to generate fairly stable exchange rates and his contentions about the relationship between speculation and exchange rate stability) have arguably not been borne out by

Friedman stressed that monetary policy autonomy implied that the domestic monetary authority had a decisive influence on the behavior of nominal economic aggregates. Thus, floating exchange rates allowed a country to achieve “monetary stability” and to set the criterion for such stability (p. 200). In particular, Friedman stressed that each individual country separately under floating exchange rates can achieve “avoidance of either inflation or deflation,” and likewise “any one country” can follow a policy of inflation or deflation without that policy choice being imposed on, or inherited by, other countries (Friedman 1953a, pp. 198, 199).

Furthermore, under fixed exchange rates, balance of payments deficits could occur and act as a negative influence on nominal aggregate demand. With prices sticky in the short run, this would create situations of deficient real aggregate demand and above-normal unemployment. Flexible exchange rates, in contrast, implied a zero overall balance of payments. This zero balance in turn made it possible for the domestic monetary authority to make policy decisions that implied a particular path for nominal variables, such as nominal aggregate spending on goods and services. In the short run, this power also gave the monetary authority the ability to influence real aggregate demand, an ability that it might use to pursue full-employment goals (Friedman 1953a, pp. 165–167, 171).

These influences on macroeconomic outcomes—including the long-run behavior of inflation and the short-run behavior of output and other real variables—were in turn traceable to the fact that monetary autonomy gave the central bank prerogatives over the settings of the country’s monetary *instruments*. Friedman primarily articulated this influence on instruments in terms of monetary quantities. In this vein, Friedman (1953a, pp. 181, 200, 201) referred to a monetary authority possessing autonomy as able to “create . . . money,”

events; yet the monetary-autonomy argument may remain valid in the face of such invalid aspects of the Friedman case. Along the same lines, one can accept Obstfeld and Taylor’s (2017) contention that sizable and fluctuating capital flows have been an enduring part of the environment that floating-rate countries face—and to a far greater degree than Friedman envisioned in 1953; yet one could also view flexible exchange rates as a means of securing monetary autonomy in the presence of such capital account fluctuations. Indeed, in his later expositions, in which he acknowledged the continuing volatility of capital flows, Friedman reaffirmed monetary autonomy as an advantage of floating rates (see, for example, Friedman and Friedman 1984).

achieve “currency issue,” and undertake “[m]onetary expansion.” Noting that countries that have domestic macroeconomic objectives, such as full employment and price stability, would seek “control over domestic monetary policy” (p. 180), he observed that such control could be achieved under arrangements in which the rest-of-world developments were not an automatic influence on the domestic monetary base and money stock (p. 199). But, under free trade and full capital mobility, such arrangements were obtainable only under floating exchange rates. Consequently, Friedman regarded a floating rate as conferring to a central bank control over the monetary base and, with that control, also a decisive influence over the money stock.

It is, however, readily possible to express this autonomy in terms of interest rates instead of monetary quantities. As the issuer of the liabilities through which interbank transactions occur, and as an entity that has a commanding influence over the demand/supply intersection in the reserves market, the central bank strongly influences the interest rate at which interbank lending takes place. Thanks to links between different financial markets, such an influence on short-term interbank rates translates into an influence on domestic short-term rates more broadly. If, however—as discussed further below—the central bank is enforcing a fixed exchange rate under conditions of full capital mobility, it in effect cedes this influence on short-term interest rates, because it is obliged to make rates at home move in lockstep with comparable rates abroad.

It is thus clear that, even in the modern day—in which a central bank’s influence on the supply of monetary base tends to be deemphasized in monetary analysis—Friedman’s focus on the consequences for monetary control of different exchange rate arrangements remains vital. That this is so is brought out by the fact that, early in the era of U.K. inflation targeting, King (1994, p. 268) noted that a central bank is well positioned to manage short-term market interest rates whether it operates primarily by changing the volume of commercial banks’ reserve balances or by actions that shift the demand curve for bank reserves.¹⁶ His argument *took for granted*

¹⁶This was the case even when Friedman wrote in the early 1950s, when one tool available to central banks was the reserve-requirement ratio, variations in which could shift commercial banks’ demand curve for reserves.

the existence of a floating-rate regime. For under a fixed exchange rate and full capital mobility, the interest rate in the market for overnight debt must take the value implied by the exchange rate target, and the central bank must acquiesce in conducting operations that deliver that interest rate. This is true irrespective of the operating procedure of the central bank. Therefore, even when the central bank manages short-term market interest rates primarily by altering commercial banks' demand for reserves (via an interest-on-reserves policy, for example), floating exchange rates are required if the central bank's interest rate management is to be used for domestic stabilization purposes. In this connection, Woodford (2010, pp. 43–46) analyzes the case in which the central bank manages domestic short-term market interest rates by varying the interest rate it pays on bank reserves. His analysis takes place under the assumption of a floating exchange rate.¹⁷ That assumption implies that the central bank decisionmaking power over interest rates, derived by Woodford (2001) in a closed-economy setting, carries over to an open-economy environment.

And Friedman himself on occasion pointed to the fact that a float could be viewed as allowing the central bank to choose interest rates for the home economy. For example, in his 1953 article, he noted that key domestic interest rates were “susceptible to direct influence by the monetary authorities” (Friedman 1953a, p. 166). He thus acknowledged that monetary autonomy entailed the opportunity to influence such rates—opening the possibility of management of interest rates to achieve domestic goals.

¹⁷That, under fixed exchange rates, a central bank must allow the domestic short-term rate to move continuously in step with the rate abroad is an implication of the uncovered interest parity (UIP) condition. Under that condition, there is a one-for-one relationship between domestic and foreign short-term interest rates when the expected next-period change in the nominal exchange rate is zero. In terms of domestic securities markets, the forces pushing the home rate in the same direction as the foreign rate remain present when the former rate is managed using an interest-on-reserves arrangement. This can be seen by examining the two methods of managing market interest rates analyzed in Keister (2012). Both methods he considers involve paying interest on reserves, but both also involve the central bank “setting the supply of reserve balances”—something it is not at liberty to do under a fixed exchange rate. Instead, when the exchange rate is fixed, international payments flows will steer reserve balances in a direction that makes the home short-term interest rate move in tandem with the rest-of-world rate.

2.2 *Friedman's Analysis of the Trilemma*

Friedman's (1953a) case for monetary autonomy under floating exchange rates also amounted to an argument for the existence of the trilemma. Friedman's first public use of the term "trilemma" was evidently in the Friedman (1983) quotation that opened this paper.¹⁸ However, he used the term "trilemma" in an early draft version of Friedman (1953a) (see Irwin 2012, p. 35), and the trilemma concept permeates the published discussion in Friedman (1953a). The 1953 article noted that, in the postwar world, foreign exchange controls were a means by which countries, like the United Kingdom, that were committed to implementing demand-management policies had tried to reconcile fixed exchange rates with monetary autonomy (pp. 169, 179). Friedman opposed this third alternative of fixed exchange rates plus exchange controls because of the inefficiency that the controls engendered and because the private sector would likely find ways to evade any fixed set of regulations regarding international transactions (pp. 163, 169). Such parts of Friedman's (1953a) analysis led Dornbusch (1986, p. 31) to judge that the article was a benchmark reference not only for the case against fixed exchange rates but also for the case against exchange controls.

2.3 *What Friedman Did Not Say*

In the context of a discussion of monetary autonomy, it is also important to be clear on what Friedman did *not* say. Such clarity is needed because recent discussions have associated with the monetary-autonomy argument positions that do not, in fact, follow from that argument. The account below of what Friedman did not say proceeds by analyzing what was attributed to the monetary-autonomy argument by Rey (2016) and by Obstfeld and Taylor (2017).

- *Rey (2016)*: Rey (2016, p. 7) implies that monetary autonomy requires that a float "insulate[s] the domestic economy ... from global factors" However, Friedman's (1953a) concept

¹⁸As already implied, the 1983 Friedman article also appears to have been the origin in print of the use of the term "trilemma" to describe the opportunities available to an open economy's central bank.

of autonomy did not entail such comprehensive insulation. Friedman stated explicitly that, under floating, international shocks would still tend to affect real variables in the domestic economy. He contended that, while developments abroad would continue to matter for the home economy under floating exchange rates, a float gave the central bank the option of preventing those developments from operating via “monetary channels,” and that “monetary stability” was still possible for a country whose exchange rate floated, irrespective of the monetary policy pursued abroad (Friedman 1953a, p. 200).¹⁹ What monetary autonomy entailed was the absence of the “domination of internal monetary policy by external forces” (in the words of Friedman, 1953b, p. 203)—not the absence of any dependence of the economy on external forces.

In Federal Reserve Bank of Kansas City (2013, p. 353) Rey said: “We think of the trilemma as[:] if you have a fully free floating exchange rate, you are completely insulated from the external. That has been my interpretation of a trilemma.” As already indicated, however, the standard case for floating exchange rates, along with the implied concept of the trilemma, makes no such wide-ranging claim about the implications of floating exchange rates.

- *Obstfeld and Taylor (2017)*: Obstfeld and Taylor (2017, p. 12), in discussing professional views on exchange rates during the Bretton Woods fixed-exchange-rate era, have stated:

More academic economists began to echo the early calls by Friedman (1953[a]) ... for floating exchange rates, arguing that market-determined rates would tend to eliminate external payments imbalances while insulating countries from foreign inflationary shocks. Their basic argument was that routine exchange-rate flexibility allows

¹⁹In Friedman and Roosa (1967, p. 104), Friedman elaborated that a floating rate did not insulate an economy from those “external events that do require changes in the pattern of production and consumption.” He observed that, in these cases, a floating rate allowed the domestic economy to undergo “adjustment to the change in real factors” abroad, albeit without (permanent) aggregate price-level movements being part of the adjustment process. See also Friedman (1953a, p. 182).

all countries to move to a preferred resolution of the trilemma—as compared with the situation of much more constrained policymaking that they then faced. As Johnson (1969, p. 18) put it: “Flexible rates would allow each country to pursue the mixture of unemployment and price trend objectives it prefers, consistent with international equilibrium, equilibrium being secured by appreciation of the currencies of ‘price stability’ countries relative to the currencies of ‘full employment’ countries.”

The preceding passage surely implies that the Johnson (1969) quotation accurately summarizes the Friedman concept of monetary autonomy. Yet the Johnson quotation is definitely predicated on the existence of a permanently downward-sloping Phillips curve: a permanent state of affairs in which underemployment buys price stability, and in which full employment can be obtained provided that inflation is permitted. But that is not the *Friedman* position.²⁰ Friedman was emphatically not a subscriber to the belief that the Phillips curve was permanently downward sloping, yet it is certainly implied by Obstfeld and Taylor (2017) that he was. It is clear that Friedman did not see floating rates as leaving policymakers free to select a long-run combination of inflation and unemployment from a Phillips-curve menu. Rather, the long-run freedom conferred by floating rates in Friedman’s vision pertained only to the choice of the inflation rate.²¹

²⁰The Johnson (1969) paper was apparently intended in large part to “improve” upon Friedman (1953a) by adding to the case for floating rates an argument drawing upon then-prevalent beliefs that the Phillips curve was permanently nonvertical. In such circumstances, a monetary authority could accept some departure from price stability to obtain full employment, run still-higher inflation to keep the economy in an overemployment situation, or choose price stability at the cost of permanent resource slack. However, such beliefs went out of favor within a few years of the appearance of Johnson’s paper, in part because of Friedman’s own critique of the Phillips curve. Friedman’s belief in the compatibility of full employment and price stability dated back to before the appearance of his 1953 essay. See Nelson (2009, pp. 44, 70) for a detailed discussion of these matters.

²¹Friedman *did* see floating rates as making policymakers better placed to stabilize employment in the short run (see Friedman 1953a, p. 158, and the passages already noted). Such a stabilization role for monetary authorities in no way implies an ability on their part to choose the long-run level of employment.

In addition, the phrase “eliminate external payments imbalances” in the above Obstfeld-Taylor passage captures Friedman’s position only if the “payments imbalances” in question are those for the aggregate balance of payments, not its current account and capital account categories considered individually. Friedman argued that a floating rate would make the overall balance of payments zero. Nonzero current account imbalances (matched by nonzero capital account imbalances) under floating rates are wholly compatible with Friedman’s argument.

Obstfeld and Taylor (2017, p. 15) further state: “Early advocates of floating exchange rates like Friedman . . . clearly oversold the extent to which they could facilitate trade while still insulating a domestic economy from international shocks.” Not only did Friedman not oversell the position attributed to him in this quotation, he did not even subscribe to that position. As indicated above in the discussion of Rey (2016), the Friedman position was *not* one in which a floating exchange rate makes the domestic economy wholly insulated from international shocks.

Friedman confined the macroeconomic variables that could, in the long run, be insulated from foreign influences under floating rates to nominal economic series—the control of which flowed from the central bank’s ability to set the course for monetary instruments. The central bank’s power to adjust policy instruments also raised the possibility that the central bank could exercise a temporary influence on real series in the home economy. In particular, as indicated above, Friedman saw short-run stickiness of prices as bequeathing to monetary policy the ability to influence the course of real variables in the short run. Monetary policy then might, but need not, attempt to offset the effects of international real shocks on domestic real variables in the short run. But, due to the temporary nature of price stickiness, even a monetary policy that attempted to prevent the short-run effects of real foreign shocks on domestic economic activity would not be capable of stopping real factors—including persistent foreign real shocks—from being decisive for the long-run behavior of real variables.

Part of this foreign influence on the home economy under floating exchange rates is on (and via) asset prices in the home economy. This asset price response is one consequence of international financial integration. International financial integration is a phenomenon that

needs to be sharply distinguished from monetary policy autonomy—as will be stressed in section 4 below, when Rey’s (2016) empirical results are reconsidered.

Obstfeld and Taylor (2017) conclude in favor of the trilemma, but, as the preceding quotations indicate, they give the impression that Friedman’s reasoning in support of the trilemma was mistaken and that the concept can only be salvaged using different, later arguments. Indeed, they specifically state that Friedman “erred” (p. 15) and offer as the correct position the point that “when faced with external shocks, countries with floating exchange rates still have a shock absorber that countries that peg exchange rates lack and thus can achieve preferred policy outcomes even if they cannot achieve full insulation of their economies (Obstfeld 2015).”²² Their attribution of this point solely to Obstfeld (2015), a paper that does not cite Friedman, alongside the authors’ negative judgment on Friedman’s argument, has a clear implication: that the limited-insulation, “shock absorber” notion is one that supersedes and replaces the argument for monetary policy autonomy under floating rates given in Friedman (1953a). However, as already indicated, Friedman did not make the claims attributed to him by Obstfeld and Taylor (2017), and his vision of the exchange rate’s role actually mirrors the “shock absorber” function that they attribute to Obstfeld (2015). Indeed, Friedman himself on occasion used the “shock absorber” phrase for his conception of a floating exchange rate (see, for example, Friedman 1975).

In sum, in making the case for the ongoing importance of the trilemma and the continuing validity of monetary policy autonomy under floating exchange rates, one can rely on the standard argument for monetary policy autonomy, as outlined in particular in Friedman (1953a).

2.4 Comparison with Recent Endorsements of the Trilemma

It is worthwhile to put the reaffirmation of the validity of monetary autonomy made in this paper in the context of two recent endorsements of the trilemma. This comparison brings out areas of agreement but also highlights the respects in which the case made here

²²From Obstfeld and Taylor (2017, p. 17).

goes further than existing endorsements. The discussions considered are those of Bernanke (2017) and Debelle (2017).

- *Bernanke (2017)*: Bernanke endorses the trilemma and the implication that monetary policy autonomy is obtainable under exchange rate flexibility, even when complete capital mobility connects countries' financial systems (see Bernanke 2017, p. 7). But much of Bernanke's subsequent discussion is concerned with the circumstances under which a central bank decides to assign to monetary policy tasks other than stabilization of domestic economy-wide variables—not with whether stabilization is an available option.

Bernanke (2017, p. 15) indicates that, in the model he considers, the use of monetary policy in a way that makes output equal potential output is an option. He therefore challenges the claim of no autonomy and reaches a result highly consistent with the analysis given above. However, this result is presented in the course of an analysis in which the exchange rate is “the policy control variable” (p. 15), when in fact a defining characteristic of targeting domestic variables under floating rates is that the exchange rate is not controlled.

Bernanke also likens monetary policy autonomy to results obtained under flexible exchange rates “in the standard Mundell-Fleming analysis” (p. 15). However, in the standard Mundell-Fleming analysis the domestic interest rate (but not the money stock) is pinned down by world conditions even under floating rates, provided that capital is internationally mobile. On that dimension, the Mundell-Fleming analysis gives results unlike those that one would normally associate in practice with monetary policy autonomy, as under autonomy one would expect key domestic interest rates to be affected by actions of the home country's central bank. Consequently, a parallel with Friedman (1953a), as above, or with new open-economy models (as in section 3 below) would seem more germane, as these analyses, unlike Mundell's, consider the case in which a float confers on the central bank the ability to choose values for domestic interest rates.

- *Debelle (2017)*: Debelle notes that the Reserve Bank of Australia (RBA) controls a short-term interest rate and argues

that management of this rate can deliver the aggregate-demand and inflation outcomes sought by the RBA in its inflation-targeting strategy. His argument amounts to a denial of the no-autonomy position. But this fact is largely left implicit. Indeed, Debelle (2017) states:

Rey has recently described this state of affairs as a monetary dilemma. . . . That is, we can only set the monetary policy we want if we impose controls on the flow of capital in and out of the country. I don't think the situation is quite as stark as that. There is still a substantial degree of flexibility to set domestic monetary policy appropriately for domestic conditions. But I would certainly agree that the monetary policy decisions of other central banks are a significant factor to be taken into account in our monetary policy deliberations. Another way of stating this is that we don't have the independence to set the neutral rate, which is significantly influenced by global forces, but we do have the independence as to where we set our policy rate relative to the neutral rate.

Although the conditions stated that begin with the sentence starting "But. . ." are presented as though they partially reconcile the Debelle and Rey positions on the situation facing a central bank under floating rates, they do not in fact imply any true concession to the Rey position of lack of monetary autonomy. International factors, including foreign monetary policy, can matter for the evolution of the domestic aggregate variable(s) targeted by a central bank that has monetary autonomy. And taking the neutral interest rate as externally given is a situation that a central bank even in a large or closed economy typically faces. Therefore, for a small open economy, the fact that the central bank does not set the neutral rate does not imply an absence of monetary policy autonomy.

3. Floating Exchange Rates and Monetary Autonomy in Different Model Environments

The conditions associated with monetary policy autonomy that are predicted by the standard argument of Friedman (1953a) are present

in formal dynamic models of the open economy. This is brought out later, when the properties of sticky-price new open-economy models under a float are discussed. As a preliminary matter, however, it is useful to consider the operation of floating exchange rates in flexible-price new open-economy models.

3.1 Floating Exchange Rates and Monetary Autonomy in Flexible-Price Models

Instantaneous full price flexibility is not the environment to which Friedman's (1953a) description of monetary autonomy applied. But the flexible-price case gives insights into the coexistence of international financial integration and national monetary policy autonomy under floating exchange rates.

Flexible prices in the home economy mean that the home monetary authority cannot affect the short-term real interest rate or any other real variable. In addition, home-economy short-term real interest rates will likely move closely with the rest-of-world rate. As is true of both sticky-price and flexible-price models, the uncovered interest parity (UIP) condition, once expressed in real terms, indicates that the spread between the real short-term interest rate and foreign real short-term interest rate can vary only if another term in the condition—such as the expected change in the real exchange rate, or shocks to the UIP condition—also fluctuates (doing so in a way that makes the condition hold). In the flexible-price new open-economy model of Benigno and Thoenissen (2008), for example, there are no UIP shocks and few other features in the model that occasion the real exchange rate to vary much, so domestic and foreign real interest rates largely move in lockstep.

Does the fact that, under floating rates, real interest rates in a flexible-price small open-economy model are insensitive to the country's monetary policy—and are typically linked closely to real rates abroad—mean that monetary policy autonomy is absent from this kind of model? The answer is no. The linkage between real interest rates across countries is a sign of financial integration—not of the absence of monetary policy autonomy. And the central bank's inability in the home economy to affect real interest rates is a manifestation not of lack of monetary policy autonomy, but, instead, of the dichotomy between real and nominal variables that is a feature

of flexible-price models. The central bank in the open economy has the power to set nominal variables even in the face of its inability to affect real variables. Indeed, in Benigno and Thoenissen's (2008) model, the central bank chooses and sets the inflation rate every period.²³

To highlight the prevalence of results of the kind just described, it is useful to mention here two other recent contributions to the new open-economy literature. The first contribution worth highlighting is that of Benigno and Benigno (2008). These authors, for the most part, consider a sticky-price model. However, they are also concerned with behavior of the corresponding flexible-price economy. In particular, they consider the case of floating exchange rates and flexible prices. In this setting, it is feasible and appropriate for the monetary authority to set the inflation rate to zero every period (p. 982). Monetary autonomy—properly conceived—thus prevails under floating rates. At the same time, nominal interest rates enjoy a continuous relationship with rates abroad because of the uncovered interest parity condition (p. 973). The flexible-price version of the Benigno-Benigno model thus exhibits the simultaneous operation of the two quite distinct features of monetary autonomy and financial interdependence.²⁴

A second study whose results underscore the coexistence of these two features is Devereux and Yetman (2010). A concern of that study is to model financial interdependence between countries in such a manner that cross-country financial linkages have nontrivial implications for the behavior of macroeconomic variables in each country. To this end, the authors embed in their model a balance sheet channel that “gives rise to a separate financial transmission mechanism of business cycle shocks that is independent of trade linkages” (Devereux and Yetman 2010, pp. 72–73). They go on to examine

²³In their model, both the home economy and the foreign economy choose an inflation rate of zero. It would be possible, however, for the home economy to choose a different inflation rate from that prevailing abroad. Thanks to the Fisher effect, this would also imply a different nominal interest rate from that abroad, as expected inflation would differ across economies.

²⁴As discussed below, the sticky-price version of the model also demonstrates the coexistence of these two properties.

model dynamics under a variety of specifications of financial market structure. Most of these specifications imply considerable financial interdependence among countries. Yet across specifications, the assumption is maintained of complete flexibility of nominal prices in each country and of floating exchange rates across countries. The model setting is consequently one in which inflation in each country is perfectly controllable by the country's central bank. Therefore, the various model settings in Devereux and Yetman (2010) all correspond to cases in which financial integration across countries coexists with monetary policy autonomy of the central bank in each country.

3.2 Floating Exchange Rates and Monetary Autonomy in Sticky-Price Models

Having considered these examples of flexible-price models, let us now turn to a situation in which a home economy has (temporarily) sticky prices. New open-economy models suggest that—depending on the precise specification of price stickiness and whether the stickiness applies to the entire price index or only to a subset of prices—the monetary authority may or may not have the ability in this environment to make the inflation rate equal to its target rate on a period-by-period basis. But irrespective of whether it can set the inflation rate every period in these sticky-price models, the central bank can set the long-run inflation rate equal to its target. Also irrespective of whether the central bank can set the inflation rate every period, it can set the nominal interest rate every period and, if desired, make it different from the rest-of-the-world nominal interest rate in any period. These generic features of sticky-price new open-economy models attest to the fact that the central bank has monetary policy autonomy under floating exchange rates in these models.²⁵ For example, in the sticky-price version of the Benigno and Benigno

²⁵In Woodford's (2010) model, the combination of the assumed forms of nominal rigidity, international transactions, and the consumption bundle implies that the real interest rate (at all maturities) in the home economy is equal every period to the rest-of-world rate. This is so, even though in the corresponding *closed-economy* model with nominal rigidity the central bank *would* be able to influence the real interest rate in the short run. However, as discussed presently, in other new open-economy models the domestic real interest rate can be influenced by the small economy's central bank. And, as Woodford stresses, even in

(2008) model, floating rates allow each of the two countries in the model to follow rules for the short-term nominal interest rate that respond solely to their own country's inflation rate and output (see their proposition 2, p. 978).

Inflation-targeting central banks tend to emphasize their ability, via monetary policy actions, to make the short-term real interest rate deviate, in the short run, from the corresponding rate prevailing abroad. For example, Debelle (2017) clearly indicates that the RBA can influence Australian short-term real interest rates and so can make them behave differently from rest-of-world rates.²⁶ In the area of modeling, Romer (2000, p. 164) argues that it is vital for a realistic characterization of a small open economy that, under floating rates, the small open economy's central bank is able to generate differences between the path of the home short-term real interest rate and the path of the rest-of-world rate. Relatedly, Clarida (2019) and Holston, Laubach, and Williams (2017) provide empirical evidence that variation across countries in real policy interest rates might be warranted by country-specific shocks to the short-term natural real rate of interest.

In new open-economy models with floating rates, it is not a trivial matter to obtain settings in which the central bank can make movements in the real—and not just the nominal—short-term interest rate differ in the short run from those in the rest of the world. However, such settings are obtainable in certain variants of the new open-economy model of Erceg, Gust, and López-Salido (2010), for example. It is still the case in this environment that there is a *tendency* for the real interest rate to move in step with that abroad. But the central bank can, if it chooses, offset part or all of the influence of rest-of-world factors on the domestic real short-term interest rate by taking monetary policy actions that affect the domestic short-term interest rate (both nominal and real). The quid pro quo of

his model (which is based on that of Clarida, Galí, and Gertler 2002), the domestic central bank has monetary autonomy under floating exchange rates because it can always make the paths of the inflation rate, the nominal interest rate, and nominal aggregate demand depart from those prevailing abroad.

²⁶Similarly, in a paper written shortly after his service as Governor of the Bank of England, Mervyn King suggested that central banks can make real interest rates in their country different from rest-of-world rates in the short run (see King and Low 2014, p. 3).

varying the home economy's short-term real interest rate in relation to the rest-of-world real rate is that the expected change in the real exchange rate will be nonzero.²⁷

Now consider a special case of the above scenario: one in which prices are sticky not only at home but also in the rest of the world. Then the foreign central bank can affect foreign real interest rates. In addition, as already noted, there is a tendency, other things being equal, for real interest rates to move in step across countries. In combination, these model features imply that monetary policy actions in the rest of the world that affect the rest-of-world real short-term interest rate will tend to produce the same movement in the short-term real interest rate in the home economy. But such a situation does not mean that the central bank in the home economy lacks monetary policy autonomy. Foreign monetary policy is a force affecting the short-term real interest rate at home; but the central bank at home can itself exert an influence on the short-term real rate, possibly in a manner that offsets foreign influences on that rate.

The central bank therefore has monetary autonomy in sticky-price models with floating exchange rates. It can use monetary policy to set the long-run inflation rate and, thanks to sticky prices, is also able to pursue a stabilization goal for real output and can influence the short-term real interest rate. By choosing monetary policy's reactions to shocks, the central bank can shape the economy's overall short-run response to domestic and foreign real shocks and can make that response different from the response that would prevail in a fixed-exchange-rate regime.²⁸

²⁷This of course means that the UIP condition is satisfied.

²⁸Banerjee, Devereux, and Lombardo (2016), for example, find that a monetary policy based on domestic goals is feasible under floating exchange rates (and full capital mobility) in their model, and they highlight one such policy that gives better economic outcomes than those prevailing under fixed exchange rates. Their conclusion does include the statement (p. 296) that "the benefits of flexible exchange rates and inflation targeting are very unlikely to hold in a global financial environment dominated by the currency and policy of a large financial center, such as [in] the current situation." This statement is an unwarranted concession to the no-autonomy position. The Banerjee-Devereux-Lombardo model results do affirm the existence of monetary autonomy under floating rates. The "benefits of flexible exchange rates" that the authors suggest do not hold in their model are features that are not part of the (properly stated) monetary-autonomy argument. (For example, the authors find that capital flows matter for economic

It may seem like too much emphasis has been given in the preceding paragraphs to the central bank's capacity to make short-term interest rates at home deviate from those abroad. After all, Rey (2016), while arguing against monetary autonomy, is willing to grant the ability of an open economy's central bank to affect short-term interest rates at home. But, in fact, the argument against autonomy is crucially undermined once it is established that central banks can set a country-specific course for short-term interest rates, as this is tantamount to establishing that monetary policy is not automatically and rigidly driven by external developments.

Rey (2016, pp. 24–25) takes as a violation of monetary autonomy her proposition that it is not possible, “relying on the domestic interest rate alone[,] to achieve both output stabilization and financial stability.” Such a proposition is not, in fact, a contradiction of monetary autonomy. Monetary autonomy does not imply the possibility, under a float, of perfect stabilization of multiple goals using monetary policy. Instead, as emphasized earlier, monetary autonomy allows an open economy's monetary authority to select for their country a particular long-run inflation rate.²⁹ Beyond that basic decision, the monetary authority in a floating-rate economy would likely also use its autonomy to imbue monetary policy with other country-specific characteristics. The interest rate instrument can be deployed to achieve (or to trade off, in the event of a conflict) different macroeconomic-stability objectives—implying “the use of monetary policy for stabilization purposes,” as Obstfeld and Rogoff (1995, p. 74) put it. The central bank can use monetary policy in pursuit of these macroeconomic stabilization objectives, and it can secure its desired long-run inflation rate, even in conditions in which monetary policy abroad is an influence on domestic economic activity.

Adding financial stability to the goals assigned to the country-specific monetary policy might well introduce a further tradeoff for monetary policy—in particular, between output stabilization and financial stability. But the existence of this tradeoff would not imply

activity in a floating-exchange-rate economy—a result not denied in the standard autonomy argument.)

²⁹In practice, the selection would need to be one consistent with the central bank's statutory mandate.

lack of monetary autonomy. Indeed, even in a closed economy—in which the central bank invariably has monetary autonomy—a conflict could emerge between continuous achievement of output stabilization and a continuous condition of financial stability.

3.3 The Case in Which There Are Interest Rates Other Than the Policy Rate

In the sticky-price new open-economy models described above, the asset variables in the home economy that appear explicitly in the model equations are typically the exchange rate and a short-term security yield (which is used by the domestic monetary authority as a policy instrument). In practice, of course, an open economy has a broader spectrum of asset prices, among them equity prices and prices of longer-term securities. Some indication of how these asset prices might be expected to behave under a floating-exchange-rate regime is therefore in order. This is especially warranted in view of the fact that, as discussed in the next section, Rey (2016) sees the behavior of broader asset prices in advanced inflation-targeting economies as inconsistent with claims that the central banks of those economies possess monetary autonomy.

Let us first consider the situation in which there is no activity in longer-term securities markets by either the home or foreign central bank. The case of central bank purchases of longer-term securities will be considered subsequently.

In the environment laid out above—floating exchange rates, full capital mobility, and central banks' reliance on a short-term interest rate instrument—does evidence that international factors affect the domestic economy's asset prices, such as equity prices or prices of longer-term securities, constitute evidence against monetary autonomy? It would do so if the argument for autonomy claimed that, once a nation chooses to float its exchange rate, international factors, including capital flows, affect the exchange rate but have no effect on other asset prices in the home economy. However, the standard argument does not contain this claim. As stressed above, the standard concept of monetary autonomy instead involves the more modest claim that the home monetary authority can choose a course for its policy instruments—thereby influencing real conditions in the

short run and nominal conditions in both the short run and the long run.

As already indicated, international capital mobility encourages co-movement of asset prices. It is in that light that Friedman and Friedman (1984, p. 127) noted that, under floating rates, a capital inflow puts downward pressure on domestic interest rates. What monetary autonomy provides is the opportunity for the central bank *also* to affect domestic interest rates. In particular, and as assumed here, a small country's central bank could undo the influence of international factors on the short-term interest rate and instead set a value for that rate, which consequently becomes the central bank's policy instrument. But for a given path of the current and expected policy rate, other asset prices in the small open economy will be function of world variables (*inter alia*), including rest-of-world monetary policy. For example, equity prices and the term-premium component of longer-term rates will likely have such a connection to world variables.

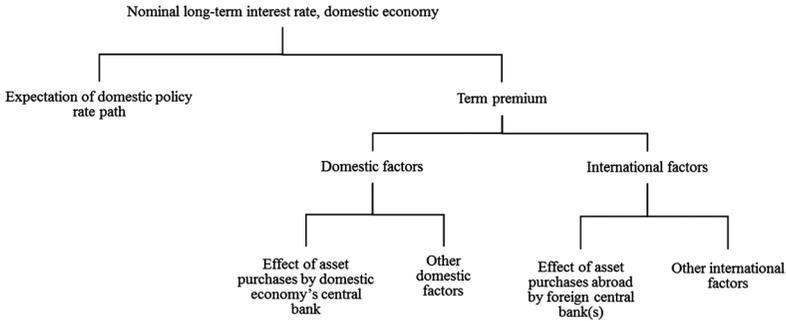
Long-Term Interest Rates and Asset Purchases. Although Rey (2016) considered the international effects of a conventional U.S. monetary policy shock, the validity of the trilemma has also been discussed in the context of the Federal Reserve's large-scale asset purchases.³⁰ As is well known, these purchases, which took place principally from 2008 to 2014, were an unconventional monetary policy operation initiated by the Federal Open Market Committee (FOMC) and consisted of acquisitions of U.S. longer-term government securities, made with the intention of lowering the term premiums in the interest rates on these securities.³¹ It is worth laying out how the notion of monetary autonomy in floating-rate small economies endures in the presence of asset purchases by a large economy's central bank. In what follows, it will be taken for granted that asset purchases are indeed capable of lowering term premiums.

Because of global trading in securities, the behavior of U.S. longer-term interest rates is likely one influence on longer-term interest rates in smaller countries. Therefore, in the presence of asset purchases, foreign central bank purchases likely become one of the

³⁰See, for example, Taylor (2016, p. 242).

³¹Such a lowering was designed to provide stimulus to aggregate spending and so help bring U.S. economic outcomes closer to the FOMC's statutory objectives.

Figure 1. Influences on the Nominal Longer-Term Interest Rate in a Small Open Economy



factors affecting domestic as well as foreign term premiums. This is a way in which foreign monetary policy actions matter for the behavior of domestic long-term interest rates even when the exchange rate floats and short-term interest rates at home are set by the domestic monetary authority.

Does such an influence of foreign monetary policy on domestic longer-term interest rates imply a violation of monetary policy autonomy? The answer is no. For one thing, it remains the case under a float that monetary policy is not automatically and rigidly driven by external developments, and the central bank in the home economy can consequently choose a course for the short-term interest rate. But suppose—to take an extreme case—that the long-term interest rate in the domestic economy is the *only* interest rate or asset price that matters for aggregate demand in the open economy. In the presence of an influence of foreign monetary policy on this rate, it is still the case that there is monetary policy autonomy, because the home central bank is *also* able to influence the longer-term rate.

As usual, the longer-term interest rate can be decomposed into an expectation of the path of the short-term interest rate (which, by assumption, is the policy rate) and a term-premium component. See figure 1. The term premium is in turn affected by domestic and international factors. The international factors include the foreign central bank's asset purchases (that is, its purchases of securities

issued by the government of its own country—purchases that produce a reaction of foreign term premiums, which in turn influence domestic term premiums). But the central bank in the home economy can itself affect longer-term interest rates at home through two means: by affecting the expected path of its policy rate and by its own asset purchase program. This central bank can therefore affect aggregate demand even when the long-term interest rate is the key rate for aggregate demand and when the long-term rate is partially determined by international factors.

4. Reconsideration of Empirical Evidence on Monetary Policy Autonomy

The discussion in the preceding sections implies that monetary autonomy is perfectly consistent with international financial integration. Monetary autonomy does not mean that there are no capital flows or that those flows do not affect domestic interest rates and asset prices. A central bank concerned with managing short-term interest rates can, through its market operations, enforce its will on a particular short-term market interest rate. The central bank thereby has a considerable influence on other domestic short-term interest rates. But both domestic and international forces will drive the overall constellation of asset prices.

It is thus evident that the case for floating exchange rates does not correspond to, or embed, a claim that a floating-rate country obtains *financial* independence from the rest of the world. On the contrary, provided that there is international capital mobility, one should observe financial integration across countries irrespective of the exchange rate regime. This bears very much on the validity of much of the case made against the feasibility of monetary policy autonomy under floating exchange rates. We will see that criticisms of autonomy have failed to take into account adequately, in the interpretation of evidence and in associated policy conclusions, the fundamental distinction between financial interdependence and monetary autonomy. In mischaracterizing what the monetary-autonomy argument claims about floating rates, the critique has invalidly taken international influences on domestic asset prices as evidence against monetary autonomy.

In an open economy with a floating exchange rate, it is to be expected that many asset prices will largely move in tandem with asset prices abroad and will be influenced by capital flows. Such financial integration does not preclude, or constitute evidence of the absence of, monetary policy autonomy for a small country whose exchange rate floats. The evidence that has been offered that open-economy central banks lack autonomy is, at bottom, based on the invalid premise that such autonomy implies a complete disconnection of asset-price movements across economies.

Nor does the argument for monetary autonomy suggest that the exchange rate is the only variable in the economy that adjusts to shocks from abroad. The exchange rate regime matters for how the economy responds to these international shocks. But a floating rate in itself does not insulate the economy's level of real output from the influence of international shocks in the short run, and it cannot prevent long-run adjustment of output to international shocks. Additionally, the cyclical behavior of nominal variables—like aggregate nominal spending and inflation—will likely be influenced by international shocks under a floating-rate regime. However, the central bank will be able to exercise a decisive influence on nominal variables over longer periods.

In light of these points, let us now consider the results of Rey (2016), which she sees as evidence against the existence of monetary autonomy in floating-rate advanced economies.

4.1 Rey's (2016) Evidence against Monetary Autonomy Reconsidered

As already stressed, a prominent means by which central banks are viewed as exercising monetary autonomy entails managing a short-term interest rate in their economies and making decisions on that rate in light of developments in domestic economic variables. However, in contending that inflation-targeting economies lack monetary policy autonomy, Rey (2016) does not focus on relationships between policy rates. She finds only mixed evidence of effects of U.S. monetary policy shocks on other advanced economies' policy rates and downplays the worth, as a metric for judging monetary policy autonomy, of cross-country co-movements of policy rates

(see Rey 2016, pp. 7, 22, 24, 26).³² Rather, she concentrates on reactions of domestic financial variables other than the policy rate in arguing that advanced economies lack monetary policy autonomy. Specifically, Rey (2016) conducts a vector autoregression (VAR) analysis of the effects of U.S. monetary policy shocks on key variables in several inflation-targeting advanced economies: the United Kingdom, Canada, Sweden, and New Zealand. In what she regards as a contrast with the notion that these nations' central banks can achieve domestic objectives under a float, she finds that financial variables other than the policy rate respond to a U.S. monetary shock.

In evaluating this evidence, it is worth beginning with one domestic variable that, although it is not actually included in her VAR analysis, Rey (2016, p. 10) highlights as affected by foreign factors (specifically, by U.S. monetary policy): credit growth. She stresses

³²Rey is critical of other work on monetary autonomy that centers on the cross-country connections between policy rates. Indeed, her criticism includes the curious statement (Rey 2016, p. 24): "The trilemma, by focusing exclusively on the interest rate, seems to miss a potentially important channel of transmission of monetary policy in international markets." The reason this statement is curious is that, as already noted, the Mundell (1963) article cited by Rey as a key reference on the trilemma actually presented a model in which the monetary authority had *no* ability to influence interest rates under floating rates (a setting also described in Fleming 1962, p. 372). The Mundell (1963) reference is therefore itself sufficient to establish that the trilemma concept and the literature associated with it cannot be regarded as "focusing exclusively" on interest rates.

In a similar vein, Rey (2016, p. 7) specifically states that in the Mundell-Fleming model a floating exchange rate gives the central bank the power to control domestic interest rates. In fact, in the Mundell-Fleming model under full capital mobility, interest rates never differ from those abroad, irrespective of exchange rate regime. In early work by Mundell (such as Mundell 1960, 1961) a small open economy used the interest rate as its policy instrument, but his most celebrated contributions in the 1960s on the flexible-rate/fixed-rate distinction did not treat the interest rate as chosen by a small economy's central bank. (Indeed, in Mundell and Swoboda 1969, pp. 262–63, Mundell actually repudiated the practice of treating the interest rate as a policy instrument in an open economy.) It was not Mundell but other authors (including Friedman, as indicated above, and many contributors to the more recent new open-economy literature) who associated monetary autonomy with the ability of the central bank to influence the (or an) interest rate.

All this said, it is indeed the case that caution is needed in considering research that judges the existence or extent of monetary policy autonomy on the basis of cross-country correlations of policy rates. Such work has limitations discussed in section 4.2 below.

that credit growth in floating-rate open economies is influenced by international factors, operating via capital flows. However, it is almost a truism that a capital inflow will increase a country's credit growth irrespective of exchange rate regime, and this truism can hardly be regarded as evidence against monetary autonomy. A net capital inflow will tend to increase a country's overall external liabilities; and, usually, part of this increase in liabilities will take the form of borrowing from abroad. Therefore, *ceteris paribus*, capital inflows will tend to increase credit growth in the domestic economy. Under floating rates, the existence of this mechanism does not imply lack of monetary autonomy on the part of the home economy's central bank. On the contrary, under floating rates the capital inflow does not compromise the central bank's ability to manage short-term interest rates and, in particular, does not prevent the central bank from making short-term rates differ from those abroad.

Rey (2016, p. 13) nonetheless sees capital flows as violating monetary autonomy for the following reason: "As capital flows respond to U.S. monetary policy, they may not be appropriate for the cyclical conditions of many economies." But such a scenario actually has no bearing on the matter of monetary policy autonomy. An influence of capital flows on the domestic economy's business cycle is a case in which a development other than domestic monetary policy affects aggregate demand. It does not imply that the central bank is not itself incapable of affecting (real and nominal) aggregate demand. Provided that the central bank has this capability, it can, if it desires, take actions that offset other forces, including capital flows, affecting aggregate demand. That is, under floating exchange rates, the central bank is able to set the short-term nominal interest rate in response to the economic outlook, including any effect that capital flows have had on the outlook. Furthermore, and in contrast to the fixed-rate case, the central bank under floating rates is able to decide, via its monetary policy response, whether capital flows are permitted to have any lasting influence on nominal variables.

Let us now consider the key domestic financial variable (other than the policy rate) included in Rey's (2016) VAR analysis.³³

³³Rey (2016) also shows responses to U.S. monetary policy shocks of inflation-targeting countries' output and consumer price index. It is consistent with monetary autonomy for output to be responsive to international shocks (including,

This is the “mortgage spread”—defined as the spread between the mortgage interest rate and the long-term government bond rate.

Central banks in open economies certainly tend to take the position that the mortgage interest rate is an important interest rate that their own actions influence. But Rey’s results do not actually contradict this position. She finds that U.S. monetary policy shocks are a factor affecting the spread in open economies between the mortgage interest rate and the long-term government bond rate. Nothing in this result precludes the home central bank’s monetary policy from being an important factor affecting the *absolute level* of mortgage interest rates.

With regard to long-term government bond rates themselves, these—like equity prices—fall into the category of domestic asset prices that one would expect to be influenced by world conditions, including U.S. monetary policy shocks, even when the exchange rate floats and the central bank has monetary policy autonomy. This point was discussed in section 3.3 above. Nothing in Rey’s results is inconsistent with the notion that longer-term rates are *also* affected by domestic factors, including the actions of the home central bank.

In sum, Rey’s (2016) empirical findings are consistent with financial integration of the kind that one should observe when a small open economy possesses the features of international capital mobility, floating exchange rates, and monetary policy autonomy. It follows that results indicating that movements in asset prices in the economy are linked to those in the rest of the world do not constitute evidence against that economy’s monetary policy autonomy.

Rey (2016, p. 13) states: “Although seeing a lot of comovement in asset prices worldwide may just be reflecting market integration, the fact that these comovements are to some extent caused by U.S. monetary policy is important.” Such co-movements and their source may indeed be important. But these factors do not refute the existence of monetary policy autonomy. Their existence does not obstruct the home central bank from affecting the actual real policy rate.

in the short run, foreign monetary policy shocks that affect real asset prices and output in the foreign economy). And while, under monetary autonomy, it is possible for monetary policy to make nominal variables such as the consumer price index (CPI) immune from foreign influences over long periods, autonomy does not imply that the CPI and CPI inflation are insensitive to international shocks in the short run.

The central bank is then in a position to reinforce, accommodate, or offset international shocks that affect the domestic economy's level of aggregate demand. In Wicksellian terms, international shocks are among the factors determining the natural value of the real policy rate in the domestic economy: such shocks affect the value of the actual policy rate consistent with keeping output at potential. But their existence does not prevent the home economy's monetary policy, as reflected in the central bank's choice for the policy rate, from influencing aggregate demand.³⁴

4.2 Interrelations of Policy Rates across Countries

Let us now return to the situation in which monetary policy is centered on management of a short-term interest rate. A great deal of research on testing and indexing monetary policy autonomy focuses on the strength of the correlations of short-term interest rates across countries under different exchange rate regimes.³⁵ For example, Edwards (2017, p. 10), like many others, notes that lack of monetary policy autonomy implies a situation in which a small country's policy rate must keep in step with the short-term nominal interest rate prevailing in the rest of the world, and his tests of monetary autonomy rest on the premise that autonomy is associated with statistical independence of the home policy rate and the rest-of-world rate. The same notion underlies such investigations as Aizenman, Chinn, and Ito (2008) and Klein and Shambaugh (2015).

There are, however, grounds for believing that, outside the extreme cases of correlations of zero or unity, positive correlations of policy rates across countries are not informative about the degree of monetary policy autonomy. To be sure, a perfect or near-perfect positive correlation of a small country's policy rate with the policy rate abroad is very likely testament to fixed-exchange-rate conditions (formally or de facto) and to a corresponding lack of monetary autonomy. And the ability of an open economy's central bank to make its policy rate wholly uncorrelated over long periods with that

³⁴This is consistent with Debelle's (2017) account, quoted in section 2.4, of the situation facing the Australian monetary authorities.

³⁵For an early study in this vein, see Throop (1980).

in economies abroad does point to the likelihood that it possesses monetary autonomy.

In contrast, the intermediate case of an imperfect positive correlation is unlikely to be informative about autonomy. Findings that, under capital mobility and floating rates, policy rates are correlated across countries, or results indicating that the domestic policy rate responds to foreign variables, do not in themselves amount to a refutation of the existence, availability, and practical importance of monetary policy autonomy in small open economies whose exchange rates float.

To see this, it is useful to put aside the case in which the small open economy's central bank decides to follow a monetary policy strategy not solely oriented toward domestic aggregate goals. This case includes the possibilities that the central bank implements a managed exchange-rate float or responds to developments in the trade sector—as Bernanke (2017) argues might be the situation in some emerging economies. Such possibilities will be bypassed, as they are unlikely to pertain to the advanced economies—focused upon here—that target inflation and float their exchange rate. The monetary authorities in these latter economies likely instead fit Debelle's (2017) characterization of being concerned with “very much domestic” objectives.

In the case of these domestic-objectives-focused economies, a positive correlation between policy rates and those abroad might emerge under monetary autonomy for two basic reasons. First, there could be policy rate responses to international shocks that matter for—and might tend to destabilize, absent an appropriate policy response—domestic variables like inflation or the output gap.³⁶ Second, a positive correlation could arise from the central bank's response to shocks to domestic spending and production that have an international component, in the sense of being correlated with the corresponding shocks elsewhere. For example, taste or technology shocks might have a global component.

³⁶Such a domestic policy response to international shocks might be brought about via the policymakers' belief in the importance of the exchange rate for the behavior of domestic variables. For example, King (1997, p. 227) observed that in U.K. inflation targeting, exchange rate behavior was “an important component of our assessment of the economy and the prospects for inflation.”

The point that a policy strategy focused on domestic economic stability might involve responses to global shocks has occasionally been acknowledged, but not stressed, in studies that focus on policy rate correlations in judging the validity of the trilemma (see, for example, Klein and Shambaugh 2015, p. 38). It receives more emphasis in Obstfeld (2015, p. 14). However, the shocks possessing a global component likely go beyond the financial shocks that Obstfeld nominates as candidates. Global financial shocks certainly are a plausible source of cross-country macroeconomic interaction—especially if cross-country financial channels of the kind modeled by Devereux and Yetman (2010) are important—and could lead to correlations across countries of policy rates; but, as already indicated, shocks to spending on goods and to the supply side also likely have an important global component.

The reasoning outlined above implies that, even though monetary autonomy can make an open economy's policy rate statistically independent of policy rates abroad, a strictly positive, but imperfect, correlation with policy rates abroad need not signify the absence of monetary autonomy.

5. Conclusion

In a closed-economy model, the monetary authority is able to exert a decisive influence on the course of nominal variables in the long run and, if there is price stickiness that wears off over time, it is also able to influence the course of real variables in the short run. If a small economy's central bank in an open-economy model has these same abilities when it lets its exchange rate float, then it is appropriate to conclude that the central bank in that model has monetary policy autonomy under a float. It has been argued above that the central bank does have such autonomy under floating rates in standard new open-economy models and that, furthermore, this autonomy is of practical relevance, aiding understanding of policy behavior and economic outcomes in floating-rate, inflation-targeting advanced economies.

Monetary autonomy for a central bank, as expounded by Friedman (1953a) in his case for floating exchange rates, means that the central bank has prerogatives regarding the creation of the total amount of base money, irrespective of the monetary policy pursued

abroad. A corollary of this is that, for a small open economy whose exchange rate floats, variations in trade balances, in capital flows, or in monetary developments abroad have no automatic implications for the setting of monetary policy instruments. Consequently, the economy's central bank is in a position to pursue stabilization policies (typically, in practice, via the management of a short-term interest rate). That situation holds under floating exchange rates in actuality, as well as in sticky-price new open-economy models under the assumption of floating.

Monetary autonomy does not imply that asset prices at home (including interest rates other than the policy rate) are insensitive to international factors, including developments in monetary policy abroad. On the contrary, everything else equal, financial integration will create tendencies for real yields in the home economy to move closely with those in the rest of the world. When prices are sticky in the rest of the world, foreign monetary policy will be one influence, in the short run, on rest-of-world real yields and so on domestic real yields, without any violation of monetary autonomy in the home economy.

In light of these properties and implications of monetary autonomy, it is clear that empirical evidence like that recently offered as evidence against the practical importance of monetary autonomy does not, in fact, amount to valid evidence against autonomy. As this paper has stressed, empirical findings put forward as contradicting monetary autonomy—such as the influence of foreign monetary policy shocks on domestic asset prices—are, in qualitative terms, features that can be found in new open-economy models in which the monetary authority possesses autonomy under floating exchange rates and complete capital mobility.

Rey (2016) finds that U.S. monetary policy shocks affect asset prices and other financial conditions in advanced inflation-targeting economies. Such evidence confirms that foreign monetary policy likely is one of the sources of international shocks that affect output and aggregate demand in open economies. But, as indicated above, monetary policy autonomy does not require that the domestic economy is unaffected by shocks abroad, including, in the short run, foreign monetary policy shocks. It only requires that the central bank at home is itself able to affect the domestic economy by influencing aggregate demand.

Edwards (2017) and others find that policy rates in small open economies are related to those abroad, even under conditions of floating exchange rates. But, as has also been indicated above, although a float enables the central bank to create deviations in the policy rate from policy rates abroad, its pursuit of domestic objectives may lead it, on occasion, to make the policy rate move with rest-of-world rates. Consequently, although a lack of correlation between the home policy rate and that abroad may be testament to monetary autonomy in the home economy, a significant positive correlation can be consistent with the operation of an autonomous monetary policy, directed at domestic objectives, in that economy.

The analysis given here reaffirms the standard result that if an open economy floats its exchange rate, it secures monetary policy autonomy. Controls on international capital movements are not needed for autonomy. The result that monetary autonomy prevails whether capital controls are imposed or not does not, of course, mean that financial conditions in the home economy are the same with or without such controls. On the contrary, capital controls modify—and likely reduce—the influence of rest-of-world developments on asset prices and on other financial conditions in the home economy. It is possible that the authorities of an open economy could see merit, on net, in such a situation—perhaps on financial stability grounds.³⁷ Nevertheless, such considerations do not bear on the validity of the dilemma/trilemma distinction—which pertains to monetary policy's power. The linkage between the economy's asset prices and those in the rest of the world should be clearly distinguished from the central bank's ability to carry out a stabilization policy that shapes the path of aggregate demand and inflation. Provided that it has that power in a floating-rate setting (even without capital controls),

³⁷It is tempting to add that, as asset prices are among the factors that influence aggregate demand, capital controls imply greater scope for the monetary authority in its demand management. But it bears repeating that monetary autonomy refers to monetary policy's ability to affect aggregate demand; provided that policy has this ability under a float, monetary autonomy prevails. Capital controls might mean that there are fewer forces that monetary policy needs to offset to stabilize aggregate demand; the monetary authority may feel that the task of stabilization policy is thereby made easier. But monetary autonomy would prevail even without imposition of these controls.

a central bank in an open economy does possess the monetary policy autonomy described by the trilemma.

References

- Aizenman, J., M. D. Chinn, and H. Ito. 2008. "Assessing the Emerging Global Financial Architecture: Measuring the Trilemma's Configurations Over Time." NBER Working Paper No. 14533 (December).
- Banerjee, R., M. B. Devereux, and G. Lombardo. 2016. "Self-Oriented Monetary Policy, Global Financial Markets and Excess Volatility of International Capital Flows." *Journal of International Money and Finance* 68 (1, November): 275–97.
- Beaumont, C., and L. Cui. 2007. "Conquering Fear of Floating: Australia's Successful Adaptation to a Flexible Exchange Rate." IMF Policy Discussion Paper No. 07/2 (July).
- Benigno, G., and P. Benigno. 2008. "Exchange Rate Determination under Interest Rate Rules." *Journal of International Money and Finance* 27 (6, October): 971–93.
- Benigno, G., and C. Thoenissen. 2008. "Consumption and Real Exchange Rates with Incomplete Markets and Non-Traded Goods." *Journal of International Money and Finance* 27 (6, October): 926–48.
- Bernanke, B. S. 2017. "Federal Reserve Policy in an International Context." *IMF Economic Review* 65 (1, April): 5–36.
- Bordo, M. D., and J. B. Taylor, eds. 2017. *Rules for International Monetary Stability: Past, Present, and Future*. Stanford, CA: Hoover Institution Press.
- Clarida, R. 2019. "The Global Factor in Neutral Policy Rates: Some Implications for Exchange Rates, Monetary Policy, and Policy Coordination." *International Finance* 22 (1, Spring): 2–19.
- Clarida, R., J. Galí, and M. Gertler. 2002. "A Simple Framework for International Monetary Policy Analysis." *Journal of Monetary Economics* 49 (5, July): 879–904.
- Debelle, G. 2017. "Global Influences on Domestic Monetary Policy." Speech given to the Committee for Economic Development of Australia (CEDA), Adelaide, July 21.

- Dellas, H., and G. S. Tavlas. 2018. "Milton Friedman and the Case for Flexible Exchange Rates and Monetary Rules." *Cato Journal* 38 (2, Spring/Summer): 361–77.
- Devereux, M. B., and J. Yetman. 2010. "Leverage Constraints and the International Transmission of Shocks." *Journal of Money, Credit and Banking* 42 (s1, September): 71–105.
- Dornbusch, R. 1986. *Dollars, Debts, and Deficits*. Cambridge, MA: MIT Press.
- The Economist*. 1992. "About-Face." September 26, p. 30.
- Edwards, S. 2017. "Monetary Policy Independence under Flexible Exchange Rates: The Federal Reserve and Monetary Policy in Latin America—Is There Policy 'Spillover?'" In *Rules for International Monetary Stability: Past, Present, and Future*, ed. M. D. Bordo and J. B. Taylor, 1–41 (chapter 1). Stanford, CA: Hoover Institution Press.
- Erceg, C. J., C. Gust, and D. López-Salido. 2010. "The Transmission of Domestic Shocks in Open Economies." In *International Dimensions of Monetary Policy*, ed. J. Galí and M. Gertler, 89–148 (chapter 2). Chicago: University of Chicago Press.
- Federal Reserve Bank of Kansas City. 2013. "General Discussion: 'Dilemma Not Trilemma: The Global Financial Cycle and Monetary Policy Independence'." In *Global Dimensions of Unconventional Monetary Policy*. Kansas City, MO: Federal Reserve Bank of Kansas City.
- Fleming, J. M. 1962. "Domestic Financial Policies under Fixed and under Floating Exchange Rates." *IMF Staff Papers* 9 (3, November): 369–80.
- Friedman, M. 1953a. "The Case for Flexible Exchange Rates." In *Essays in Positive Economics*, ed. M. Friedman, 157–203. Chicago: University of Chicago Press.
- . 1953b. "Why the Dollar Shortage?" *The Freeman* 4 (6): 201–3. <https://mises.org/library/freeman-december-1953>. Reprinted with additions in Milton Friedman, *Dollars and Deficits: Inflation, Monetary Policy and the Balance of Payments*. Englewood Cliffs, NJ: Prentice-Hall.
- . 1975. "Six Fallacies." *Wall Street Journal*, June 30, 11.
- . 1983. "The Keynes Centenary: A Monetarist Reflects." *The Economist* June 4, 17–19.

- Friedman, M., and R. D. Friedman. 1984. *Tyranny of the Status Quo*. New York: Harcourt Brace Jovanovich.
- Friedman, M., and R. V. Roosa. 1967. *The Balance of Payments: Free Versus Fixed Exchange Rates*. Washington, DC: American Enterprise Institute for Public Policy Research.
- Holston, K., T. Laubach, and J. C. Williams. 2017. "Measuring the Natural Rate of Interest: International Trends and Determinants." *Journal of International Economics* 108 (S1, May): S59–S75.
- Irwin, D. A. 2012. *Trade Policy Disaster: Lessons from the 1930s*. Cambridge, MA: MIT Press.
- . 2017. "The Missing Bretton Woods Debate over Flexible Exchange Rates." NBER Working Paper No. 23037 (January).
- Johnson, H. G. 1969. "The Case for Flexible Exchange Rates, 1969." *Review* (Federal Reserve Bank of St. Louis) 51 (6, June): 12–24.
- Keister, T. 2012. "Corridors and Floors in Monetary Policy." Liberty Street Economics blog, Federal Reserve Bank of New York, April 4.
- King, M. 1994. "Monetary Policy Instruments: The U.K. Experience." *Quarterly Bulletin* (Bank of England) 34 (3, September): 268–76.
- . 1997. "Monetary Policy and the Exchange Rate." *Quarterly Bulletin* (Bank of England) 37 (2, June): 225–27.
- King, M., and D. Low. 2014. "Measuring the 'World' Real Interest Rate." NBER Working Paper No. 19887 (February).
- Klein, M. W., and J. C. Shambaugh. 2015. "Rounding the Corners of the Policy Trilemma: Sources of Monetary Policy Autonomy." *American Economic Journal: Macroeconomics* 7 (4): 33–66.
- Krugman, P. 1993. "Exchange Rates." In *Fortune Encyclopedia of Economics*, ed. D. R. Henderson, 518–22. New York: Warner Books.
- McCallum, B. T. 1996. *International Monetary Economics*. New York: Oxford University Press.
- Meade, J. 1961. "The Future of International Trade and Payments." *Three Banks Review* 13 (50, June): 15–38.
- Mundell, R. A. 1960. "The Monetary Dynamics of International Adjustment under Fixed and Flexible Exchange Rates." *Quarterly Journal of Economics* 74 (2, May): 227–57.

- . 1961. “Flexible Exchange Rates and Employment Policy.” *Canadian Journal of Economics and Political Science* 27 (4, November): 509–17.
- . 1963. “Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates.” *Canadian Journal of Economics and Political Science* 29 (4, November): 475–85.
- . 1968. “A Plan for a World Currency.” In *Next Steps in International Monetary Reform: Hearing Before the Subcommittee on International Exchange and Payments of the Joint Economic Committee, Congress of the United States, Ninetieth Congress, Second Session, September 9, 1968*, Joint Economic Committee, U.S. Congress, 14–28. Washington, DC: U.S. Government Printing Office.
- Mundell, R. A., and A. K. Swoboda, eds. 1969. *Monetary Problems of the International Economy*. Chicago: University of Chicago Press.
- Nelson, E. 2009. “Milton Friedman and U.K. Economic Policy, 1938–1979.” Working Paper No. 2009-017A, Federal Reserve Bank of St. Louis (April).
- Obstfeld, M. 1998. “The Global Capital Market: Benefactor or Menace?” *Journal of Economic Perspectives* 12 (4, Autumn): 9–30.
- . 2015. “Trilemmas and Trade-offs: Living with Financial Globalisation.” BIS Working Paper No. 480.
- Obstfeld, M., J. D. Ostry, and M. S. Qureshi. 2017. “A Tie That Binds: Revisiting the Trilemma in Emerging Market Economies.” IMF Working Paper No. 17/130 (June).
- Obstfeld, M., and K. Rogoff. 1995. “The Mirage of Fixed Exchange Rates.” *Journal of Economic Perspectives* 9 (4, Fall): 73–96.
- Obstfeld, M., and A. M. Taylor. 1998. “The Great Depression as a Watershed: International Capital Mobility Over the Long Run.” In *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century*, ed. M. D. Bordo, C. D. Goldin, and E. N. White, 353–402 (chapter 10). Chicago: University of Chicago Press.
- . 2017. “International Monetary Relations: Taking Finance Seriously.” *Journal of Economic Perspectives* 31 (3, Summer): 3–28.
- Pasricha, G. K. 2017. “Policy Rules for Capital Controls.” BIS Working Paper No. 670 (November).

- Rey, H. 2013. "Dilemma Not Trilemma: The Global Financial Cycle and Monetary Policy Independence." In *Global Dimensions of Unconventional Monetary Policy*. Kansas City, MO: Federal Reserve Bank of Kansas City.
- . 2016. "International Channels of Transmission of Monetary Policy and the Mundellian Trilemma." *IMF Economic Review* 64 (1, May): 6–35.
- Romer, D. 2000. "Keynesian Macroeconomics without the LM Curve." *Journal of Economic Perspectives* 14 (2, Spring): 149–69.
- Schmitt-Grohé, S., and M. Uribe. 2003. "Closing Small Open Economy Models." *Journal of International Economics* 61 (1, October): 163–85.
- Taylor, J. B. 2016. "Rethinking the International Monetary System." *Cato Journal* 36 (2, Spring/Summer): 239–50.
- Throop, A. W. 1980. "Managed Floating and the Independence of Interest Rates." *Economic Review* (Federal Reserve Bank of San Francisco) 6 (3, Summer): 6–23.
- Woodford, M. 2001. "Monetary Policy in the Information Economy." In *Economic Policy for the Information Economy*, 297–370. Kansas City, MO: Reserve Bank of Kansas City.
- . 2010. "Globalization and Monetary Control." In *International Dimensions of Monetary Policy*, ed. J. Galí and M. J. Gertler, 13–77. Chicago: University of Chicago Press.