

The Trilemma in Practice: Monetary Policy Autonomy in an Economy with a Floating Exchange Rate

By J. Scott Davis



“For many emerging-market economies, swings in the global financial cycle make the trilemma more of a dilemma. Without restrictions on international capital flows, monetary independence is not possible, even for a country with a floating exchange rate.”

the most important concept in international macroeconomics may be the trilemma of international finance (also called the impossible trinity). The trilemma states that a country cannot simultaneously have an open capital account, a stable exchange rate and autonomous monetary policy (*Chart 1*).

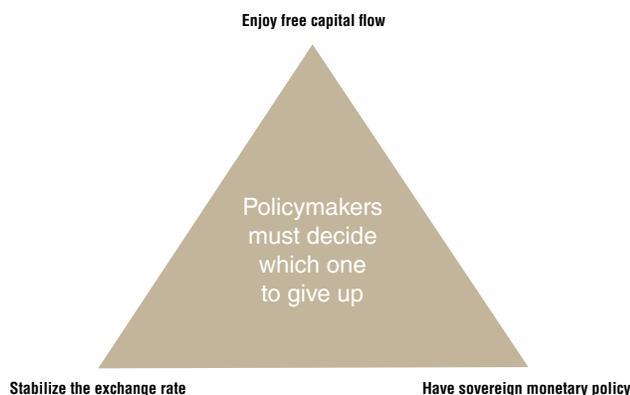
The trilemma is a constraint on monetary policymaking in any country. The United States has chosen to maintain an independent monetary policy and an open capital account, but as a result, the Federal Reserve must allow the value of the dollar to be market-determined. Countries in the euro zone have opted to stabilize their exchange rate, and they enjoy the free movement of capital. But as a result, individual nations no longer have an independent monetary policy.¹ Policymakers in China, on the other hand, have chosen to stabilize the exchange rate and maintain an independent monetary policy; but to make this work, they need to

impose restrictions on international capital flows.²

By the logic of the trilemma, if a central bank allows its exchange rate to float, it should have complete monetary autonomy. While this is certainly true in theory, some have begun to question whether it is actually true in practice. In a recent paper, Rey (2013) discusses the “global financial cycle,” which is the fact that large swings in capital flows into many emerging-market economies are driven by global factors such as risk and risk aversion in major developed markets. These swings in capital flows are exogenous from the point of view of the emerging market receiving the capital, the author argues. For many emerging-market economies, swings in the global financial cycle make the trilemma more of a dilemma. Without restrictions on international capital flows, monetary independence is not possible, even for a country with a floating exchange rate.

The fact that a country with open capital

Chart 1
The Trilemma of International Finance



markets loses monetary policy autonomy when it adopts a fixed exchange rate is purely mechanical. As discussed in Rey's article, swings in trade and capital flows increase or decrease demand for a currency, and a central bank that tries to maintain a stable exchange rate must adjust currency supply to ensure the exchange rate stays constant as demand fluctuates. Adjusting the supply of the currency means adjusting the size of the central bank's balance sheet and, thus, actions to hold down the value of the currency are indistinguishable from accommodative open-market operations.³

The loss of monetary autonomy when a central bank does not try to maintain a fixed exchange rate is less mechanical. Theoretically, without the constraint of trying to stabilize the value of the exchange rate, a central bank with a floating exchange rate can use its balance sheet however it likes. Nonetheless, as shown by Davis and Presno (2014), even when monetary policy is determined optimally to maximize a domestic objective function, optimal policy could still focus on managing volatile capital inflows and outflows. Calvo and Reinhart (2002) discuss a "fear of floating," where even central banks that profess to follow a floating exchange rate policy still actively intervene in foreign-exchange markets to manage the value of their currency.

This is especially true in an environment where a country is subject to large and volatile swings in capital flows. Even though, in theory, the central bank has complete monetary autonomy, in practice, its actions to stabilize the economy in the face of large and volatile swings in capital flows will mean

that the optimally chosen monetary policy is nearly indistinguishable from a policy of exchange rate stabilization.

To see how, in the face of large swings in international capital flows, central banks in countries with floating currencies can end up following policies that mirror exchange rate stabilization, we will examine the actions of some major emerging-market central banks during the global financial crisis and subsequent recovery. The rapidly changing fortunes of the emerging markets during this period can be summed up by examining the path of emerging-market exchange rates (*Chart 2*).

The chart plots the value of the exchange rate versus the U.S. dollar for a group of emerging-market economies and for two subgroups—one that actively attempts to stabilize exchange rates and the other that

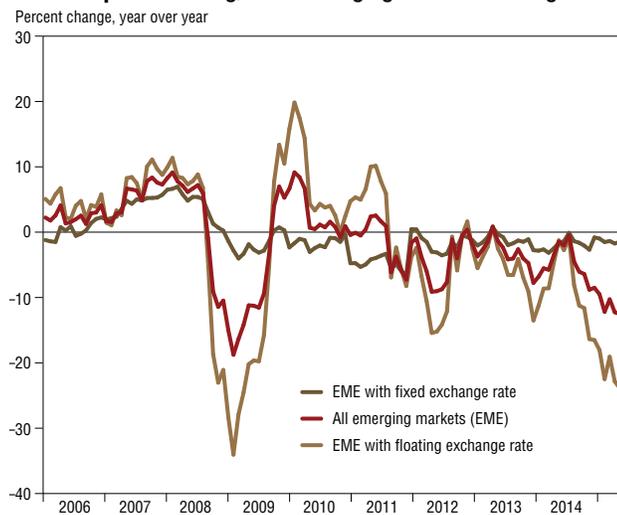
allows its currencies to float.⁴

Floating emerging-market currencies went on a wild ride between 2008 and 2011. The global financial crisis led to a global flight to quality in which capital flows to emerging markets dropped sharply, leading to exchange rate depreciation. However, as we shall see, during the crisis, emerging-market central banks with nominally floating currencies actively intervened in the foreign-exchange market to prevent further exchange rate declines. This intervention is akin to contractionary monetary policy.

The recovery from the financial crisis saw a return in those capital flows, and this led to a sharp appreciation in emerging-market currencies. It was during this period that the term "currency wars" was first used. It was initially coined by Brazilian Finance Minister Guido Mantega in September 2010.

Chart 2

Fed QE Impacts Floating, Fixed Emerging-Market Exchange Rates



SOURCES: International Monetary Fund; author's calculations.

“Many emerging-market policymakers worried that the ultra-accommodative monetary policies in the United States and throughout the developed world were leading to a sharp increase in capital flows into emerging markets.”

At the time, the Federal Reserve was about to embark on a second round of quantitative easing (QE).

Many emerging-market policymakers worried that the ultra-accommodative monetary policies in the United States and throughout the developed world were leading to a sharp increase in capital flows into emerging markets. Abundant liquidity released by programs such as quantitative easing streamed into emerging markets, chasing higher returns, which pushed up the value of their currencies.⁵ However, we shall see that central banks in countries with floating currencies intervened in the foreign-exchange market during this period to slow the appreciation of their currencies. This intervention by central banks with floating exchange rates was nearly indistinguishable from the intervention by central banks with fixed exchange rates.

Capital Flows, Balance of Payments and Exchange Rate Fluctuations

Dramatic capital flow swings into emerging-market economies accompanied the period surrounding the global financial

crisis. Net capital inflows (capital inflows minus capital outflows) into the major emerging-market economies are plotted in Chart 3.

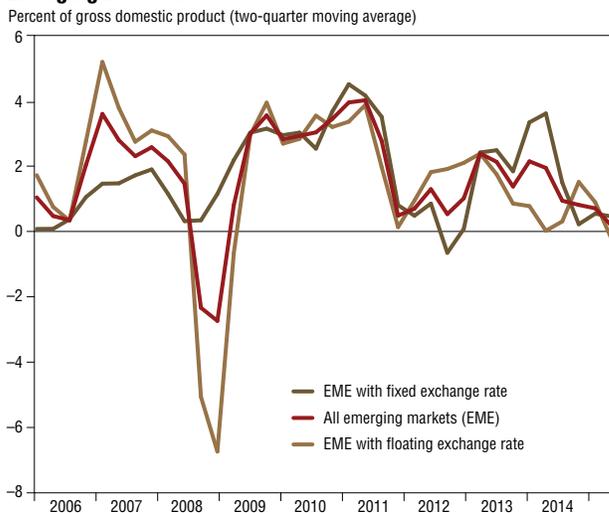
The chart shows a dramatic fall in emerging-market capital flows during the darkest days of the financial crisis in 2008. Just before the crisis, capital moved into emerging markets at a rate of 3 percent of gross domestic product (GDP). However, the chart shows that in late 2008, these capital flows reversed quickly. In late 2008, capital was flowing out of emerging markets at a rate of 3 percent of GDP, and for the subgroup of countries with a floating exchange rate, this rate of capital outflow exceeded 6 percent of GDP.

Emerging-market capital flows rebounded in the early days of the recovery, and capital flowed into all emerging markets at a rate of 3 percent of GDP from 2009 through the first half of 2011.

The fundamental balance of payments identity states that a country’s current account plus its capital and financial account must equal the net change in central-bank reserves. The current account measures the net flow of capital into a country because of currently produced goods and services. The current account includes the trade balance (exports minus imports) and the net income from investments held abroad and also some unilateral transfers such as remittances and foreign aid.⁶ The capital and financial account measures the net flow of capital into a country because of private capital transactions (purchase or sale of stocks, bonds, etc.). The sum of these two items measures the net flow of capital coming into a country. If this net flow is not equal to zero, it must end up as an increase or a decrease in foreign-exchange reserves held by the central bank.

The balance of payments identity encapsulates the forces of supply and demand that determine the fundamental value of the exchange rate. The supply is determined by the central bank and the accumulation of reserves on the central bank’s balance sheet; the demand comes from two sources, the current account and the capital and financial

Chart 3
Net Capital Inflows Volatile Among Floating-Rate Emerging Economies



SOURCES: International Monetary Fund; author's calculations.

account (for simplicity, from here on, we will refer to the capital and financial account as the capital account).

When the sum of the current and capital accounts is greater than zero, there is excess demand for the currency. This is referred to as a balance of payments surplus, and it puts upward pressure on the value of the exchange rate. If the central bank does not try to actively manage the exchange rate and allows the currency to “float,” this upward pressure leads to exchange rate appreciation.

When the exchange rate appreciates, foreign goods and assets become cheaper to domestic residents, and domestic goods and assets become more expensive to foreign residents. This change in relative prices in the goods market causes the trade balance, and thus, the current account balance, to fall. This change in relative prices in the asset market causes the capital account balance to fall. The exchange rate will appreciate until the point where the balance of payments is no longer in surplus, the sum of the current and capital accounts is equal to zero and there is no excess demand that pressures the exchange rate.

If, on the other hand, a country’s central bank actively tries to manage the exchange rate, it may respond to this excess demand by increasing the supply of the currency. By increasing the supply of the currency, it expands the liabilities side of its balance sheet. The central bank releases this newly created currency into the market by buying foreign-exchange reserves (usually bonds denominated in U.S. dollars or some other major “reserve” currency). This expands the asset side of its balance sheet.

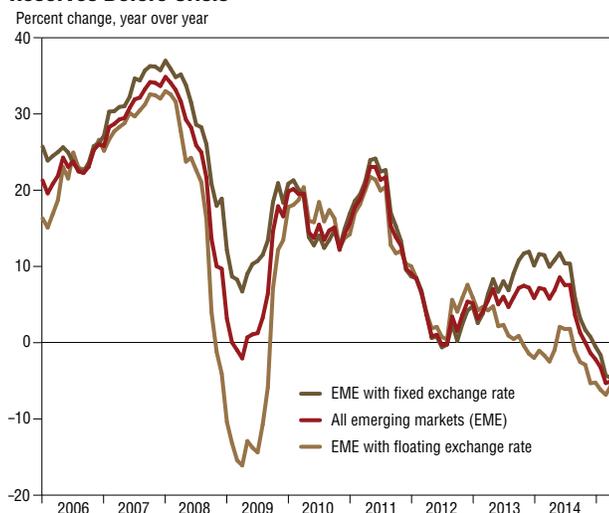
The path of emerging-market central bank reserves over the past 10 years is plotted in Chart 4. During the crisis, reserves fell sharply in countries that followed a policy of allowing their currencies to float. This fall in reserves is a sign that, during the crisis, central banks in these countries were actively engaging in the foreign-exchange market to support the value of their currencies by decreasing their supply in the market. In

response to the sharp drop in capital inflows plotted in Chart 2, these central banks could have allowed the exchange rate to fall further until equilibrium was reached, where the sum of the current and capital accounts was equal to zero. Instead, they chose to intervene by drawing down reserves.

Furthermore, Chart 3 shows that, during the recovery, these same central banks were actively accumulating reserves. We saw earlier how, during the recovery, there was a reversal in emerging-market capital flows and there were large positive net capital inflows into the emerging markets from the middle of 2009 through the middle of 2011. Central banks in all emerging markets—both those that follow a policy of exchange rate stabilization and those that allow their exchange rate to float—accumulated a massive amount of reserves, which grew at around 20 percent per year during the period.

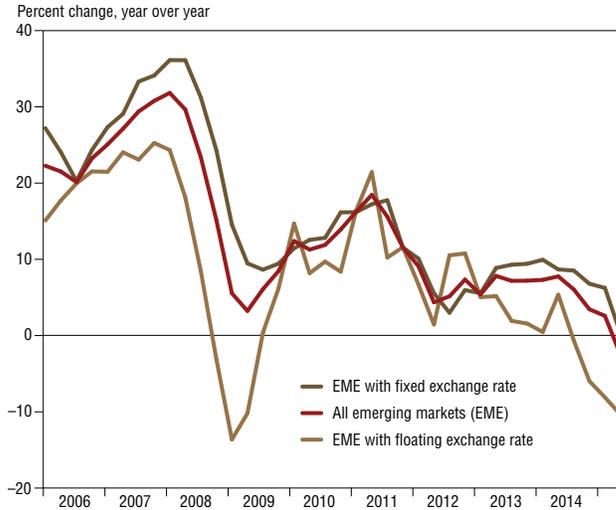
Capital inflows during the 2009 to 2011 period put upward pressure on the value of emerging-market currencies. Central banks that follow a policy of exchange rate stabilization were mechanically accumulating foreign-exchange reserves to relieve this

Chart 4
Emerging-Market Central Banks Accumulate Reserves Before Crisis



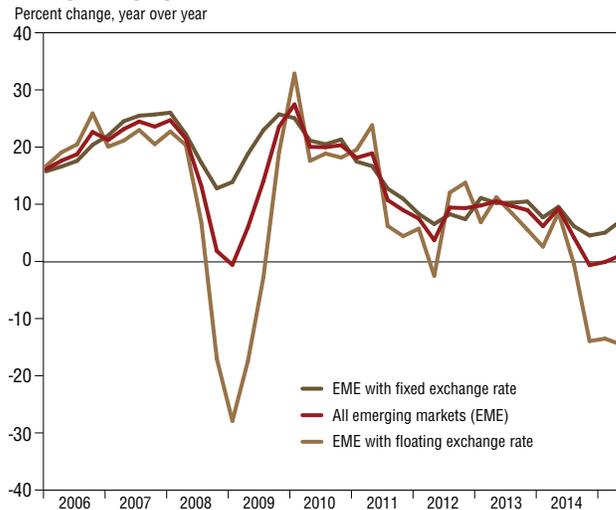
SOURCES: Haver Analytics; author’s calculations.

Chart 5
Emerging-Market Central-Bank Balance Sheet Growth Slows



SOURCES: Haver Analytics; author's calculations.

Chart 6
Post-Crisis M1 Money Supply Growth Similar
Among Emerging Markets



SOURCES: Haver Analytics; author's calculations.

upward pressure. The chart shows that, at the same time, central banks in countries that allow their exchange rates to float were also following a policy of accumulating reserves that was nearly indistinguishable from countries that fix their exchange rates.

Monetary Autonomy?

During the crisis, central banks in countries with a floating exchange rate intervened heavily in the foreign-exchange market and drew down reserves to stabilize their exchange rates. During the recovery, when capital inflows reversed, the same central banks accumulated reserves to relieve some of the upward pressure on their currencies. The effect of this on central-bank balance sheets is shown in Chart 5. The chart shows that emerging-market central-bank balance sheet growth slowed sharply during the 2008–09 period.

For countries that follow an exchange rate stabilization policy, balance sheet growth fell from 35 percent per year in early 2008 to 10 percent per year by 2009. To maintain a stable exchange rate in the face of a sharp drop in capital inflows, central banks in countries with a fixed exchange rate were forced to slow the growth in their balance sheets during the crisis. This is part of the mechanical monetary tightening that is required to maintain a stable exchange rate and is simply a consequence of the constraints on monetary policy autonomy imposed by the trilemma.

Countries that follow a policy of allowing the exchange rate to float should have been free to engage in monetary loosening during this period. However, the chart shows that, for this group of floaters, balance sheets went from a 20 percent expansion in early 2008 to a contraction of 15 percent in 2009. Therefore, countries that allowed their exchange rate to float and should have had complete monetary autonomy still engaged in sharp monetary tightening during the crisis.

Similarly, central banks in countries that float their currencies rapidly expanded their balance sheets during the 2010–11 recovery.

Central-bank balance sheets grew 10 to 20 percent per year between 2009 and 2011. The rate of balance sheet expansion for central banks with a fixed exchange rate is nearly identical. At a time when policymakers were talking about currency wars and fears of overheating in many emerging markets, emerging-market central banks in countries with a floating exchange rate were following a highly accommodative monetary policy.

The effect of this central-bank balance sheet contraction and subsequent expansion on M1 money supply growth in the emerging-market economies is shown in Chart 6.⁷ It illustrates how, in emerging markets with a floating exchange rate, money growth slowed sharply during the global financial crisis in late 2008 and then increased sharply during the 2009–11 period. It is interesting to note that money growth has been nearly identical in the two subgroups of emerging markets since early 2010.

Regaining Lost Monetary Autonomy

It is important to note that a central bank in an economy with a fixed exchange rate has to intervene in the foreign-exchange market by selling reserves in response to a capital inflow decline and a balance of payments deficit, but a central bank with a floating exchange rate does not.

It is certainly true that a central bank with a floating exchange rate can respond to a drop in net capital inflows and retain monetary policy independence by allowing the exchange rate to depreciate to the point where the sum of the current and capital accounts is again zero. But in reality, the pain of this balance of payments adjustment may be too great, particularly in an environment of volatile shifts in capital flows. A sharp drop in capital inflows is also referred to as a “sudden stop” and usually entails a sharp tightening in credit in the economy. The central bank may sell reserves to fill the gap left by this drop in capital inflows. Even though this causes the central bank’s balance sheet to shrink and is, thus, contractionary monetary policy, it may be worth it to stave off the effects of a sudden

stop. Similarly, the central bank may respond with expansionary monetary policy in response to an increase, or a “surge,” in capital inflows. Without central bank action to accumulate foreign-exchange reserves, this surge could lead to unwanted credit expansion and an overheating economy. Knowing this, a central bank with a floating exchange rate may find it worthwhile to sacrifice monetary independence and use its balance sheet to “manage” this surge in capital inflows by accumulating foreign-exchange reserves.

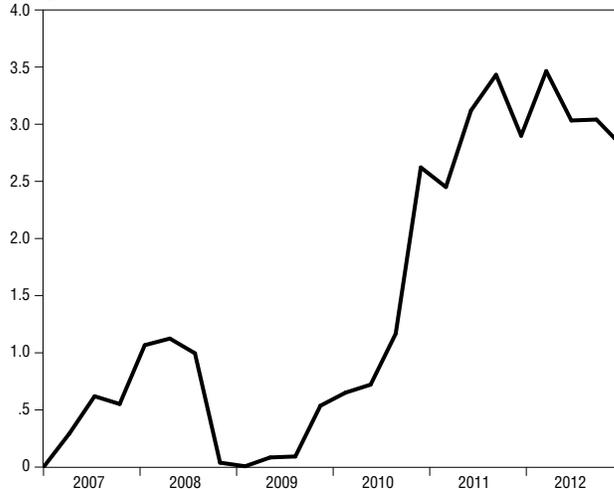
With the aim of managing volatile swings in capital inflows and retaining monetary policy autonomy, a number of emerging-market central banks have used capital-flow management measures (capital controls) to “manage” volatile capital flows while leaving the size of the central-bank balance sheet untouched, thereby retaining monetary policy autonomy. These are commonly described as “sterilized” foreign-exchange interventions. When discussing how a central bank will adjust its holdings of foreign-exchange reserves and the direct effect on balance sheet size, we are considering unsterilized intervention. If instead a central bank adjusts the size of its foreign-exchange holdings to keep the currency stable but at the same time performs the exact opposite open-market operation in the domestic bond market, it can then intervene in the foreign-exchange market without affecting the size of its balance sheet.

For instance, in response to an increase in capital inflows that would push up the value of the exchange rate, the central bank absorbs those capital inflows by buying foreign-exchange assets. In an unsterilized intervention, it would finance the purchase by expanding the liability side of its balance sheet (i.e., “printing money”). In a sterilized intervention, the central bank will instead finance the purchase of foreign-exchange assets by selling domestic-currency bonds on its balance sheet, replacing one central bank asset for another and leaving the overall size of its balance sheet unchanged (i.e., a foreign-exchange intervention without printing money).

“At a time when policymakers were talking about currency wars and fears of overheating in many emerging markets, emerging-market central banks in countries with a floating exchange rate were following a highly accommodative monetary policy.”

Chart 7
Capital Controls in Emerging Markets with a Floating Exchange Rate

Average number of capital control measures, normalized to 0 in first quarter 2007



SOURCE: "The Two Components of International Capital Flows," by Shaghil Ahmed, Stephanie Curcuru, Frank Warnock and Andrei Zlate (2015), mimeo.

But these two actions—buying foreign-currency-denominated bonds and selling domestic-currency-denominated bonds—cause the interest rate on foreign-currency-denominated bonds to fall and the interest rate on domestic-currency bonds to rise. If there are no capital account restrictions, private investors will simply buy domestic-currency bonds and finance them by selling foreign-currency bonds. This is the exact opposite of what the central bank is doing! Without capital account restrictions, private investors will act in a way to exactly offset any sterilized intervention by the central bank, rendering it ineffective. Consequently, absent capital account restrictions, the only way to effectively stabilize the value of the exchange rate is through an unsterilized intervention, which requires the central bank to adjust the size of its balance sheet and, therefore, entails the loss of monetary policy autonomy.

Chart 7 plots the GDP-weighted average of the number of capital flow management measures applied in the emerging-market countries with a floating exchange rate during the global financial crisis and subsequent

recovery. The chart shows that these measures were reduced in late 2008 in response to the crisis. Emerging-market central banks were trying to attract capital, not repel it. The number of capital controls increased significantly starting with the recovery in the second half of 2009. This was during the period when emerging markets were seeing large capital inflows, and many emerging markets responded by trying to block them by using legal restrictions.

The evidence for the effectiveness of capital controls is mixed. Klein (2012) and Klein and Shambaugh (2015) argue that permanent fixed capital controls (which Klein refers to as "walls") can be effective, but temporary capital controls (which Klein refers to as "gates") are less effective.

However, many emerging-market central banks with a floating exchange rate have attempted to impose capital flow management measures over the past few years, particularly during the recovery and surge of capital inflows into emerging markets in 2009 to 2011. The fact that so many emerging-market central banks turned to capital controls to "manage" capital flows is an indication that even though the exchange rate was allowed to float, these central banks were finding that their monetary autonomy was restricted. The theory of the trilemma states that a country with a floating exchange rate should have complete monetary independence. But the actions of many central banks over the past few years show that in practice, in an environment of volatile capital flows, monetary independence is limited, even when an exchange rate is allowed to float.

Notes

¹ The trilemma is a constraint on monetary policymaking not only at the national level, but at the subnational level. Texas has a stable exchange rate vis-à-vis the other 49 states, and there is free movement of capital within the United States. As a result, the Federal Reserve Bank of Dallas cannot set monetary policy independently of the rest of the Federal Reserve System.

² As Chinese policymakers begin to loosen these controls and allow greater international holding of the Chinese yuan, a feature of the recent decision to include the currency

in the Special Drawing Rights (SDR), they will be forced to either allow the currency to float or sacrifice monetary independence.

³ This describes an “unsterilized” foreign-exchange intervention by the central bank. In a “sterilized” intervention, the central bank intervenes in the foreign-exchange market without adjusting the size of its balance sheet. However, the sterilized intervention is only effective when sufficient capital flow restrictions are in place. This form of intervention is further explored later in this article as part of a discussion of how some emerging-market countries are resorting to capital controls to insulate themselves against swings in the global financial cycle.

⁴ Countries that fix their exchange rate are defined as ones that receive a score of 1–2 on the course classification scheme in Ilzetki et al. (2008). Countries that float are ones that receive a score of 3–4 on this course classification scheme.

⁵ Whether programs like quantitative easing had such an effect on emerging-market currencies and interest rates is a topic of much controversy. Rey (2013) argues that quantitative easing has had such an effect. In a recent lecture, former Federal Reserve Chairman Ben Bernanke (2015) disagrees with this assessment. Bernanke’s argument is based partially on recent research from economists at the Board of Governors that argues that quantitative easing had no more of an effect on emerging-market currencies and financial markets than normal monetary loosening in the United States (Bowman, Londono and Sapriza, 2014).

⁶ This article focuses on the financial aspects of the current account, where the current account measures the net flow of capital coming into a country because of currently produced goods and services. The trade balance is the largest component in the current account. For more discussion of trade and its effect on exchange rates, see the article by Michael Sposi in this report.

⁷ M1 is the most liquid definition of money and includes currency in circulation as well as demand deposits and checking account balances.

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