Financial turbulence and international investment

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Fifty years ago, an ongoing debate about international monetary reform was initiated by the publication of Robert Triffin's *Gold and the Dollar Crisis*[2]*.* Triffin had identified an apparent inconsistency in international financial arrangements; if the demand for international reserve assets of various foreign countries were to be satisfied, then the United States would incur payments deficits year after year, and the U.S Treasury's gold holdings eventually would be exhausted. But if the United States adopted measures to avoid balance of payments deficits, other countries as a group would not be able to satisfy their demand for international reserve assets. Competition among countries for international reserve assets would be deflationary and lead to declines in prices.

Three groups of proposals were directed at the Triffin dilemma – two would lead to more rapid increases in the supplies of international reserve assets, and the claim for the third was that it would reduce the demand for reserves. One generic approach – the dominant approach – was to produce "paper gold"; a new international reserve asset that would share the attribute of gold in that it would be an asset without being the liability of any institution or government. The motive for the paper gold proposals was the desire to enable the United States to maintain the U.S. dollar parity of $35 an ounce, then viewed as the centrepiece of international financial arrangements. The belief was that the annual or periodic increases in the supply of paper gold would satisfy the increases in the demand for international reserve assets.

The second approach toward increasing the supply of reserves was that the U.S. dollar price of gold be increased to $70 or perhaps to $100, with comparable percentage increases in the price of gold in terms of other most other currencies. (A few countries might use the occasion of the change in the U.S. dollar price of gold to change their parities in terms of the U.S. dollar.) The value of the gold owned by central banks immediately would increase in the same proportion as the increase in the U.S. dollar price of gold. Moreover gold production would be stimulated. Finally the higher price of gold would lead to a reduction in the private demand, and central banks would acquire a higher proportion of annual production.

The third approach to resolve the Triffin dilemma was to abandon the system of adjustable parities for currencies, which would then float, much as the Canadian dollar had from 1950 to 1962. A shock that would have led to a payments deficit if a currency had been pegged instead would lead to a decline in the price of that country's currency; similarly a shock that would have led to payments surplus if the currency had been pegged would have led to an increase in its price. Since central banks would no longer be committed to maintaining the value of their currencies, they would no longer acquire international reserve assets.

International monetary arrangements now incorporate each of the three major sets of proposals. The Special Drawing Rights arrangement embodied a paper gold proposal and was implemented in 1969 when the SDR equivalent of $3 billion of U.S. dollars was produced and attached to the International Monetary Fund; a member country could use its SDR to purchase the currencies of other IMF members. SDR outstanding now total $308 billion. A floating currency arrangement was adopted, initially in August 1971 when the

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[2] Full disclosure: Triffin was my thesis advisor at Yale in the late 1950s.

U.S. Treasury formally closed its gold window and sought to achieve the revaluation of the Japanese yen and the French franc, and then again in February 1973 when the Smithsonian Agreement faltered. The private market for gold was segmented from the official market in the spring of 1968, and then the U.S. gold market window was formally closed in August 1971. Market forces led to an increase in the U.S. dollar price of gold to nearly $200 in 1973 and then to nearly $1,000 in January 1980. In the last few months gold has traded above $1,300; the gold component of central bank reserves is now five or six times larger than the SDR component. Moreover, the supply of international reserve assets has surged, despite the earlier argument that the demand for reserve assets would decline once currencies were no longer pegged.

One dominant feature of the last 40 years is that there have been four waves of financial crises; each wave has involved the failure of banks and other credit institutions in three, four or more countries. These financial crises often have occurred at the same time as currency crisis. The first of these waves of crises was in the early 1980s, when the governments, government-owned firms, and banks in Mexico, Brazil, and 10 other countries failed. Japan in the 1990s was the primary country in the second wave. The most recent wave began in 2007; banks in the United States, Britain, Ireland, Spain, and Iceland tumbled into bankruptcy. Each of these waves of crises was preceded by a wave of credit bubbles when the indebtedness of a group of borrowers increased by 20–30% a year; most of these credit bubbles led to rapid increases in the prices of real estate and stocks. The prices of these assets declined sharply when the credit bubbles were pricked, and financial crises followed. Most of these waves of credit bubbles followed from an increase in cross-border money flows to these countries, which led to the appreciation of their currencies and an increase in asset prices.

These cross-border money flows have been both much larger and much more variable than when currencies were attached to parities. The rates of return to the investors who undertook the cross-border money flows have been adversely impacted by the financial crises.

The first of the six sections of this paper is descriptive and summarizes the turbulence in international financial markets in the last 40 years. The second section is analytical, and highlights the sources of financial crisis. The third section identifies the impacts of structural shocks and monetary shocks on currency values. The fourth section highlights the role of carry trade investors and the impact of their transactions on currency values and asset prices. The fifth section examines the factors that lead to increases in cross-border money flows by carry trade investors. The sixth highlights the risks and the returns of cross-border investments in a world characterized by large movements in currency values. The concluding section summarizes the main features of the paper.

I. Monetary turbulence and financial crises

The striking development since the early 1970s has been the turbulence in the currency market and in national financial markets. The proponents of a floating currency arrangement had suggested that the changes in currency values would be reasonably small and would reflect changes in the differences in national inflation rates, and that the deviations between the market prices of currencies and the shadow prices computed from differences in inflation rates would be smaller than when currencies were pegged. But instead the range of movement in the currency prices has been much larger and the scope of overshooting and undershooting much much larger than when currencies were pegged.

There have been four waves of financial crises; each of these waves involved the failure of banks and other credit institutions in three, four, or more countries at about the same time. The first of the four waves of crises involved the failure of the governments and government-owned firms in Mexico, Brazil, Argentina, and 10 or so other developing countries in the early

1980s to pay the interest on their U.S. dollar indebtedness in a timely way; their currencies depreciated sharply. The domestic banks in these countries failed when many of the borrowers defaulted on their loans to the domestic banks after the currencies depreciated sharply, since the borrowers often had liabilities denominated in the U.S. dollar and their indebtedness surged when their currencies depreciated. The second wave was centred on the failures of banks and credit institutions in Japan in the early 1990s when property prices declined; at about the same time the banks in three of the Nordic countries tumbled in response to sharp declines in real estate prices. The Asian financial crisis was the third wave and involved the failures of banks in Thailand, Malaysia, Indonesia, and South Korea, although banks in Russia and Argentina also failed during this wave. Similarly the financial crisis in Mexico at the end of 1994 and the beginning of 1995 was the bellwether of events that would impact Thailand and Indonesia thirty months later. The fourth wave of failures of banks and credit institutions began in 2007 and 2008 and involved the United States, Britain, Ireland, Spain, and Iceland.

Each of these waves of financial crises followed a period of three, four, or more years when the indebtedness of a similarly placed group of borrowers in different countries increased at the rate of 20–30% a year. Most of the waves of indebtedness resulted from cross-border money flows. Thus bank loans to governments and government-owned firms in Mexico, Brazil, and the other developing countries increased by 30% a year for nearly a decade, and the total external indebtedness of these countries increased by 20% a year. Each of the next three waves led to bubbles in real estate prices Bank loans to buyers of real estate in Japan increased by 25–35% throughout the 1980s; the increases in the price of real estate led to comparably large increases in stock prices. The external indebtedness of most of the countries that were involved in the Asian Financial Crisis and of Mexico had increased sharply in the early 1990s; the money inflows resulted in part because the overhang of bank loans that were default was funded into long-term bonds. Moreover some investment banks had discovered that “emerging market equities were a new asset class”, which led pension funds and mutual funds to buy these securities. Some of these countries had privatized government owned firms, and some of the newly privatized firms were acquired by firms headquartered in the industrial countries. Banks headquartered in the emerging market countries sourced for money from the banks headquartered in the industrial countries because the interest rates were below those in the domestic money markets. The United States, Britain, Ireland, Spain, and Iceland experienced a large money inflows after 2002, and bank loans for real estate purchases in these countries increased rapidly.

Many of the banking crises have been associated with the abrupt depreciation of currencies; the principal exception was that most of the banks and many other financial institutions failed in Japan in the 1990s but there was no crisis in the yen. A second exception is that the financial crisis in Ireland in 2008 was not associated with a currency crisis, because Ireland did not have its own currency. The Greek currency crisis led to a significant depreciation of the euro.

The data on the changes in the prices of currencies belie one of assertions advanced by the proponents of floating exchange rates, that changes in prices of currencies would be systematically related to changes in national differences in inflation rates on a week to week and month to month basis, and in the short run – say intervals of up to four or five years. In the long run, purchasing power parity concept is validated, but at shorter intervals the deviations from the values are suggested by the differences in national inflation rates.

II. The causes of financial crises

Several features of these cross-border money flows should be noted. The first is that the increases in money flows to countries have two immediate impacts. One was that their

currencies appreciated and the second was that asset prices in these countries increased in response to purchases by foreign buyers – who bought the currencies so they could buy securities. Household wealth increased as asset prices increased, which led to higher levels of consumption spending and more imports and a larger trade deficit. Increases in asset prices, household wealth, and imports were an integral part of the adjustment process, which required that the current account deficit increase by an amount that corresponded with the autonomous increase in the capital account surplus.

A second feature is that the indebtedness of many of those who had borrowed to buy real estate was increasing at two to three times the rate of growth of their incomes, which meant that that the ratio of their indebtedness to their incomes was increasing at a rapid rate – one which was too high to be sustained. Similarly the external indebtedness of these countries was increasing more rapidly than their GDPs. The third feature was that the rate of increase in the indebtedness of these borrowers was two to three times the interest rate on the loans, which meant that money available to the borrowers from new loans was several times larger than the interest payments on their outstanding loans. The borrowers were in a "sweet spot" because all the money they needed to pay the interest on their outstanding loans came from the lenders in the form of new loans.

This pattern of cash flows could not continue without limit, at some stage the lenders would reduce the rate at which they would extend more credit to the borrowers, who then would have to find a new source of money for the scheduled interest payments. When the flow of money from the lender to the borrower slowed, the borrower's currency would depreciate.

The implications of changes in cross-border money flows on the price of a currency and on the prices of assets in a country can be illustrated by reviewing the experience of Iceland between 2002 and 2008. Iceland had a modest current account surplus in 2002. Then the foreign demand for Icelandic securities increased sharply, more or less at the same time as the foreign demand for securities denominated in the U.S. dollar and the British pound increased. The Icelandic krona appreciated in response to the increase in the foreign demand for Icelandic securities; Iceland's capital account surplus and its current account deficit increased. Moreover the prices of the Icelandic securities increased in response to the purchases by foreign buyers.

The Icelandic sellers of the securities denominated in the krona then had to decide whether to use the money from the sale of these securities to buy other Icelandic securities from other Icelandic investors or to buy consumption goods – they could do both and they did both. To the extent that they purchased other Icelandic securities, the sellers had the same problem. In effect the initial purchases of Icelandic securities triggered a series of purchases by those who sold the securities, who used nearly all of their receipts to buy other Icelandic securities. The prices of these securities, and the financial wealth of Icelandic households increased. Their consumption spending increased, which stimulated an economic boom; Iceland's trade deficit increased sharply.

This series of transactions in Icelandic securities was an integral part of the adjustment process whereby the increase in the Icelandic imports and in the country's current account deficit matched the increase in the country's capital account surplus. The intermediate argument was that Icelandic household wealth increased as the prices of the securities owned by the borrowers increased which led to an increase in household consumption.

Iceland experienced two bubbles at the same time, one in the currency market and a second in its asset markets, both for stocks and for bonds. When the foreign demand for Icelandic krona securities slackened, it was inevitable that the krona would depreciate; at the same time, it was likely that the prices of Icelandic assets would decline in response to the increase in domestic interest rates, since some investors would become distress sellers.

The bubble in the U.S. housing market between 2002 and 2007 was similar to the events in Iceland, although on a much more massive scale. An increase in the foreign demand for U.S. dollar securities lead to an appreciation of the U.S. dollar (although it mostly dampened a

depreciation that otherwise would have occurred). The U.S current account deficit increased, and the ratio of the U.S. current account deficit to U.S. GDP increased by 3–4 percentage points. U.S. real estate prices surged. And then real estate prices started to decline at the beginning of 2007, much as they did in Britain, Ireland, Iceland, and Spain.

Because the rate of increase of the indebtedness of the borrowers in these countries was so much greater than their incomes, it was inevitable that at some stage the lenders would become more cautious about increasing their loans. Similarly, because the rate of increase in the external indebtedness of these countries was so much higher than the increase in their GDPs, it was inevitable that lenders would become more cautious. When the flow of money to these countries slackened, it was inevitable that their currencies would depreciate. The initial depreciation by itself might induce other lenders to become more cautious. The combination of the decrease in the pace of money inflows and the depreciation of the currencies would lead to a decline in asset prices. Economic growth would slow, as households increased their saving in response to the decline in financial wealth.

Hence the increase in the values of the currencies and the increases in asset prices in the countries were not sustainable. And the increases in these prices can be considered bubbles because they were not sustainable.

III. Monetary shocks, structural shocks, and changes in currency values

Large changes in currency values relative to the values based on differences in national inflation rates may reflect more structural shocks such as sharp increases and declines in oil prices or more monetary shocks including changes in inflation and interest rates. Large variations in the prices of currencies can be related to an early literature on currency movements when currencies are not pegged. When Ragnar Nurkse, in his classic *International Currency Experience*, suggested that speculation in the currency market was destabilizing, he probably was referring to the French experience between 1924 and 1926. Milton Friedman responded in "The Case for Floating Exchange Rates" that if speculation had been destabilizing, it would have been unprofitable, and those speculators that had lost money would leave the market. Nurkse's statement centred on the empirical properties of time series of changes in currency values and changes in national price levels. Friedman's statement was derived from "first principles" and hence was not a direct refutation of Nurkse's observation.

Changes in currency values in the first half of the 1920s were affected by two different factors. At the beginning of the First World War, most governments suspended the convertibility of their national currencies into gold; their currencies depreciated relative to the U.S. dollar in part because their money supplies had increased more rapidly than the U.S. price level. The view in the immediate post-war period was that currencies would again be attached to their prewar parities. Initially investors accumulated German marks in anticipation that the mark would appreciate toward its prewar parity, and then when they reversed their anticipations and sold their marks, the currency depreciated. When the mark collapsed in 1923, the cliché was that speculative pressure was deflected to the French franc. There were two "bear raids" on the French franc, one in 1924 and the second in 1926.

Two meanings can be attached to Nurkse's use of the term "destabilizing speculation" – one is that speculators caused the amplitude of movements in the currency values attributable to shocks in the goods market to be larger than they would have been in their absence; in this sense the speculators are like "tape watchers" or "momentum traders" who followed the cliché that "the trend is your friend". The second meaning attached to this term is that the transactions of speculators would induce changes in domestic income and employment by their impacts on the trade balance.

The logic is that if there are only two groups of participants – goods market traders and the speculators – in the currency market, the transactions of one group cause the prices of currencies to deviate from their long-run average prices, while the transactions of the second group will limit these deviations. Both the goods market traders and the speculators are responding to different shocks and different profit opportunities.

Both the goods market traders and the speculators will be impacted by various shocks. Shocks can be grouped as either structural or monetary; structural shocks include sharp changes in the prices of oil and other commodities, the loss of an export market, a domestic crop failure. Monetary shocks include changes in interest rates and changes in the anticipated inflation rate. If a shock in the form of an increase in the price of imports – say an oil price shock – might lead to a depreciation of the currency – and if speculators believe the shock is temporary, they may buy the currency and limit the depreciation. In contrast if foreign interest rates increase, speculators may move money to the foreign centre which will cause domestic currency to depreciate. Domestically produced goods will become more competitive in both the domestic market and in the foreign market, and the increase in the domestic trade surplus will limit the depreciation of the domestic currency.

Neither Nurkse nor Friedman identified who the speculators were – whether they were banks, trading firms, brokerage firms, insurance companies, or individual investors.

The debate between Nurkse and Friedman was never joined because they differed in the source of shocks. Nurkse implicitly suggested that the shocks originated in the money market, while Friedman believed that the shocks originated in the goods market. An extension of this distinction is whether the goods market shocks are more frequent than money market shocks, and the frequency and severity of each type of shock.

Money market shocks and goods market shocks have different impacts on the combination of changes in the trade balance and the value of the currency. For example, assume that there is a goods market shock in the form of an increase in the price of oil; the country's oil import bill increases and its currency depreciates so that exports will increase to match the increase in the imports. Speculators may buy the currency and limit the depreciation, which is the scenario envisioned by Friedman. In contrast, assume a money market shock in the form of an increase in interest rates in foreign country; investors move money to the foreign country; the foreign currency appreciates or what is the same thing, the domestic currency depreciates. The country's trade surplus increases, which provides goods market traders with the opportunities to arbitrage. The increase in the trade surplus leads to a higher level of domestic income and perhaps an increase in upward pressure on the price level. This is the type of shock envisioned by Nurkse.

The shortcoming of the Nurkse-Friedman debate is that it does not deal with the stylized fact that large changes in the prices of currencies have been associated with significant changes in the cross-border movements of money. Again, returning to Iceland, the sharp appreciation of the currency was associated with a massive flow of money to Iceland; Iceland's current account deficit increased as its capital account surplus increased. The money flow to Iceland might be viewed as consistent with a broad interpretation of Nurkse's view of destabilizing speculation, although Nurkse appears to have been concerned that money flows from a country might put upward pressure on the price level because of the increase in the trade surplus might lead to excess demand. The Iceland experience is one in which the money flows to a country led to increases in consumption spending and investment spending as result of the positive wealth effect.

IV. Carry trade investors and currency movements

One feature of the last 40 years has been large cross-border money movements and the variations in these flows, which is evident from the changes in the trade balances of

individual countries. During the early 1990s, Mexico's current account deficit increased to 6% of its GDP; then the peso depreciated sharply at the beginning of 1995, and Mexico developed a current account surplus that was 4% of its GDP. Iceland went from a current account deficit that was more than 20% of its GDP to a current account balance. Similarly there were large changes in the current account balances of many other countries, although few were as dramatic as those for Mexico and Iceland.

The shocks that led to these changes in the cross-border money flows originated in the financial markets; these shocks included changes in interest rates and in anticipated inflation rates. These shocks have induced changes in cross-border money flows that led to changes in the values of currencies. (If the shocks that had led to an increase in the current and trade deficits had originated in the goods market, the currency would have depreciated as the trade deficit increased.)

These cross-border movements of money are initiated by "carry trade investors", who acquire foreign securities with the intent to own them for extended periods. Carry trade investors are like arbitragers in financial markets, they seek to profit from the difference in interest rates on comparable securities denominated in different currencies; they realize that they may incur losses from the depreciation of the foreign currencies – but obviously they believe that the values in the interest rate differential term is larger than the value in the currency term. Carry trade investors do not believe that "all the information is in the price"; instead they believe that the interest rate differential overstates the anticipated or likely change in the value of the currency during the term to maturity of their investments. The difference in the two streams of interest income can be considered the revenues for carry trade investors, and the anticipated change in the price of the currency is the cost.

At times the interest rate term and the currency term are additive. For example, assume that interest rates in a country increase, perhaps because its central bank has adopted a more contractionary monetary policy. The carry trade investors move money to the country, and its currency appreciates. The carry trade investors profit both from the additional interest income and the gain from the appreciation of the currency. In periods of two or three years, the additional income from the appreciation of the currency may be larger than from the difference in interest rates. In the long run, however, the interest rate differential and the currency term are offsetting, and the currencies of the countries identified with higher interest rates depreciate.

Carry trade transactions come in 57 varieties. Mrs. Watanabe took the money from one of her yen deposits in Tokyo to acquire a U.S. dollar annuity from AIG. Citibank used funds obtained from the sale of dollar deposits in London to fund its U.S. dollar loans to the Government of Mexico. Nomura acquired dollars in the offshore market to buy the IOUs of the Landsbanki of Iceland. Individuals in Reykjavik financed the purchase of autos by signing IOUs denominated in the Japanese yen and the Swiss franc because interest rates were lower than those on the Icelandic kronor. Similarly individuals in Poland have financed their purchases of homes by borrowing Swiss francs, and individuals in Australia have borrowed the yen to finance their home purchases.

Carry trade investors who bought Icelandic krona IOUs in 2002 and 2003 and 2004 profited from the appreciation of the krona as well as from the excess of interest rates krona securities over the interest rates on U.S. dollar securities. Similarly Icelandic borrowers who sold IOUs denominated in the U.S. dollar or the euro profited from the saving in interest costs.

The efficient market view is that the cross-border money flows surge whenever there is new "news"; the price of the currency changes immediately until there is no longer an excess return attached to the cross-border movement of money. However, the appreciation of the currency of a country that experience an inflow of money is slowed or dampened because of transactions in the goods market; as the currency appreciates, the opportunities for goods market arbitrage increase. Hence the anticipated excess return remains.

Carry trade investors can be distinguished from the Friedman's speculators and from some of the speculators noted by Nurkse. Friedman's speculators trade currencies for banks and other financial firms; they seek to profit from changes in the prices of currencies. These speculators hold their positions for a relatively short time – a few minutes, a few hours, a few days. A few of these traders are market makers, many are day traders, and a few are proprietary traders. The hallmark of these traders as a group is that their anticipated revenues are from changes in the prices of currencies, while their costs are the difference between domestic and foreign interest rates. The market makers provide both bid and offer for transactions of a standard size; while it may seem that they are providing a service, the information in the order flow is of high value. This group makes its money from the immense volume of transactions – and they make money regardless of whether their domestic currency appreciates or depreciates.

Consider the returns to the goods market traders, the carry trade investors, and speculators. The goods market traders profit from the arbitrage opportunities presented by the divergence in national price levels created by changes in the values of currencies, the greater the overshooting and undershooting, the larger their profit opportunities. Their trade transactions require that they buy and sell currencies as an intermediate transaction prior to the payment for the purchase of goods, and they may incur a cost for these transactions. Similarly, carry trade investors must buy foreign currencies before they can buy foreign securities; they incur a cost. The speculators profit from their market making activities, and from changes in currency values.

Casual empiricism suggests that the trading revenues of the major international banks have increased sharply since 1980 and perhaps from the early 1970s. Some of these revenues are from trading securities and some are from trading currencies and some from trading commodities. The volume of currency transactions is many times larger than the volume of trade or the volume of trade and investment. Most of the transactions of the speculators are with other speculators. Moreover developments in technology and competition have led to declines in the bid-ask spreads. The increase in the revenues seem larger than the amount that can be attributed to the bid-ask spreads; the implication is that a large share of these profits must have come from revaluation gains on their positions.

How can the currency traders and the carry market traders both profit at more or less the same time? Obviously they can't in terms of cash flows – the currency traders take money off the table, minute by minute and hour by hour, and stuff their profits in a sock. Some of that money may be placed on the table by the goods market traders; the costs of using the currency market are like transport costs. The carry trade investors are indifferent because they are continually re-valuing their positions on the basis of current prices. The carry trade investors earn money for an extended period – until the bubble is pricked, the currencies depreciate sharply, and firms and banks fail.

V. The sources of financial instability

The much greater variability in cross-border money flows since the early 1970s can be attributed to a larger number of shocks. Some of these shocks might be structural, including sharp changes in the price of oil, dramatic increases or decreases in the rates of return on a particular group of assets, and changes in financial regulations. Some of these shocks might be monetary, including significant changes in anticipated inflation rates, or in interest rates, or in currency values.

One of the principal arguments advanced by the proponents of a floating currency arrangement is that in the absence of parities, national central banks would be able to follow "independent" national monetary policies; they would no longer be constrained by the need to minimize their payments imbalance at their established parities. When currencies were

pegged, national inflation rates were closely linked because countries could not finance large trade deficits. Because currencies are no longer attached to parities, national inflation rates are more likely to differ – and the larger possible difference in these rates means that the scope for changes in these differences is much larger. When interest rates change relative to the inflation rate, carry trade investors may recognize an exceptional profit opportunity.

The necessary condition for a significant increase in cross-border money flows is a shock that leads to an increase in the return on securities available in a particular country, or a shock that leads to a relaxation of restrictions that previously had restricted investor purchases of certain securities, or a change in controls on cross-border money movements. One of the two sufficient conditions for an increase in cross-border flows involves the willingness of carry trade investors to take on the risks associated with the cross-border movements of money, and the other is a pool of money that these investors can access. The large payments imbalances since the mid-1960s have led to a surge in international reserve assets which is an enormous pool of accessible money. (Central banks are more likely than others to hold funds in the offshore deposits.)

That there have been four waves of credit and asset price bubbles in 40 years suggests that there may be a connection between several of these waves – more precisely, between the implosion of one wave of bubbles, and the formation on another wave. That three, four, or more countries have been involved in each of the several waves of credit bubbles suggests a common cause. The shock that preceded the first wave of credit bubbles in the 1970s was a surge in the world inflation rate that led to significant increases in commodity prices and in the anticipated rates of growth of GDP in the countries that produce primary commodities. The shock that preceded the bubble in Japanese real estate and stocks was the decline in interest rates on US dollar securities, which lead to an increase in money flows toward Tokyo and a tendency toward the appreciation of the yen. The Japanese authorities relaxed restrictions on bank loans for real estate. The shock that led to the surge in money flows to the Nordic countries was the relaxation of restriction that limited the ability of banks headquartered in these countries to source for money in the offshore market. Several shocks contributed to the increase in money flows to the emerging market countries in the early 1990s, including the appreciation of the yen, and the liberalization of restrictions that had limited the ability of banks headquartered in these countries to source for money in foreign markets. The sharp depreciation of the Thai baht and the currencies of other emerging market countries in mid-1997 contributed significantly to the bubble in U.S. stocks. The shock that led to a rapid increase in the supply of credit available for real estate in the United States, Britain and other countries was the surge in China's trade surplus.

One feature of these shocks is that the adjustment process induced by the flow of carry trade money to these countries leads to increases in their rates of growth of GDP as a result of increases in consumption spending and investment spending in response to higher levels of household wealth. It is as if there is a feedback loop; an initial shock leads to increases in cross-border money flows, and then the increases in wealth induced by these flows lead to the more rapid growth of GDP – which induces carry trade investors to move more money abroad.

Although the cross-border money movement is induced by the increase in the rates of return, the primary impact of this movement is to finance higher levels of consumption spending – the story is that the increase in wealth induced by the money inflow leads to a decline in domestic saving as consumption spending increases.

Because currencies are not pegged, changes in national monetary policies lead to changes in anticipated values for currencies and induce changes in cross-border money flows; a move to more contractionary monetary policies may attract money because of the higher inflation-adjusted rate of return and the downward revision in the anticipated inflation rate. In this way the appreciation of the currency in response to the adoption of a more contractionary policy may be like a self-fulfilling prophecy.

Once a shock leads to an increase in the anticipated returns on securities denominated in a group of currencies or a reduction in the restrictions on the cross-border movement of money, the conditions are appropriate for the formation of a bubble. The money is there, and the initial movement of money across national border is likely to enhance the anticipated returns on the money market arbitrage. No one foresees the inevitable crunch because the rate of increase in indebtedness is not sustainable.

VI. Managing wealth in turbulent times

Keynes wrote several articles in the mid-1920s that questioned whether British foreign investment "paid" – whether British GDP was higher because London-based firms increased their investments abroad and because households bought foreign securities. His argument centred on the distinctions between private rates of return and social rates of return. One was that when the British owned the New York subway and the subway went bankrupt, the equity investors lost all their money and the American bondholders became the owners. (If the Americans had owned the equity and the British had owned the bonds, the conclusion would have differed.) His second point was that the private rate of return to the owners of the foreign investments was higher than the social rate of return to Britain as a country, and for two reasons – one is that the U.S. government rather than the British government would collect the taxes on the investment. His second was that the capital stock available to British workers was smaller because of the capital outflow, which involved a comparison between the decline in domestically produced GDP and the return to Britain on its foreign investment. His third argument was that anticipated rates of return by the first to invest abroad were lowered by others who followed them and increased their investments.

The textbook answer to the question whether foreign investment pays is an extension of the argument about the gains from trade; both the capital-exporting country and the capital-importing country gain, and a lot of country-specific factors determine the shares of the gain to each country. This textbook answer is in a "real economy" – one without money.

There are three primary characteristics of cross-border money flows when the currencies have been floating. One is that the risk of these flows has increased because of the much larger range of movement in the prices of currencies. A second is that the economic booms in the money-receiving countries are associated primarily with increases in consumption spending. The third is that there is a likelihood of financial failure when the bubble implodes.

The implicit assumption was that the increases in the flows of money to a country would be associated with an increase in the investment in the country. One of the unique features of cross-border money flows since the early 1970s is that they have been associated primarily with increases in household consumption or an increase in the fiscal deficits in the countries that have experienced increases in money inflows. For example, the bank loans to Mexico, Brazil, Argentina, and other developing countries in the 1970s primarily financed increases in the fiscal deficits of the governments in these countries and increases in the capital expenditures of government-owned firms. The surge in money flows to the United States after 2002 contributed to an increase in the supply of credit available for real estate; a significant part of this credit financed mortgage equity withdrawals. One feature of this period was that the household savings rate declined sharply and was not significantly different from zero; in effect the increase in the supply of foreign saving available to Americans induced a set of market developments that led to a decline in the household saving rate. The surge in money flows to Iceland enabled the domestic banks to finance large loans to firms that wanted to invest abroad; increases in household consumption accounted for 90% of the increase in the current account deficit.

The implication is that cross-border money flows have not been primarily associated with increases in investment and in the rate of economic growth in the countries that have

received the money inflows. Still it may be that some countries have been able to achieve somewhat higher rates of economic growth, since they are no longer obliged to maintain parities for their currencies. Nevertheless there appears to have been a disproportionate increase in the risk relative to the increase in return from cross-border investments. Hence there has been a significant reduction in the "all-in" return available to the carry trade investors from the sum of the additional interest income and the currency losses and gains relative to the risk of revaluation losses and credit defaults.

These statements about increases in return and increases in risk follow from first principles. Obviously investors who get the timing right – who buy low and sell high and repatriate their money before the bubble implodes – will have a much higher rate of return. A few investors can pursue this strategy, however if many were to produce this strategy, the currency would depreciate and the bubbles would implode.

Consider the market in junk bonds otherwise known as high-yield bonds as a metaphor. Promises were made about a large supply of "free lunches" on junk bonds or high-yield bonds by Michael Milken in the 1980s, who convinced investors that there was market inefficiency because the rating agencies did not rank these bonds, and hence there was an excess return on these bonds. The excess return persisted until the market in these bonds collapsed, which occurred soon after the savings and loan associations and insurance companies that were managed by Milken's buddies were no longer the "buyers of last resort" for these bonds. Subsequent studies have shown that the additional interest income was not sufficiently large relative to the credit losses that investors incurred.

The same point is made by considering the appropriate premium for selling flood insurance in New Orleans. How should the underwriters set the appropriate premium – high enough to cope with the losses due to the floods that occurs every 10th year? But then the premiums will not be large enough to reimburse the losses due to the exceptional flood that occurs every 50th year. If the premiums are set to cover the losses from the more frequent, less severe floods, they may be too low to cope with the more severe floods. The most severe flood may lie in the future.

The dominant implication of the increase in risk relative to return on cross-border carry trade investments is that market participants should devote more attention to determining the currency composition of their assets and liabilities that minimizes their exposure to loss from changes in currency values. The managers of the international reserves of central banks are in a position much like multinationals and other firms involved in international trade; they first need to determine the currency composition of their reserves that minimizes their exposure to gain and loss from changes in the price of currencies, and they then need to determine whether the anticipated interest income from maintaining a different composition is worthwhile in terms of the exposure to loss from changes in currency values.

VII. Summary and conclusion

During the 1960s the dominant concern of those involved in international finance was that the shortage of international reserve assets would lead to deflationary pressures on national economies. The waves of credit bubbles since the 1970s reflect in part the surge in the supply of international reserve assets. There have been four waves of financial crisis since the early 1980s; each of these waves has led to the failures of large number of banks in three, four, or more countries at the same time as many borrowers defaulted on their loans. The first wave occurred in the early 1980s and involved the governments of and government-owned firms in Mexico, Brazil, and 10 other developing countries. The inability or unwillingness of these borrowers to repay in a timely way led to a depreciation of their currencies, and domestic firms with liabilities denominated in the U.S. dollar failed because of the large revaluation losses on these loans, which contributed to the failure of the

domestic banks. The second wave of financial crises occurred in the early 1990s, when banks and other financial institutions failed in Japan and three of the Nordic countries – Finland, Norway, and Sweden. The Asian Financial Crisis that began in mid-1997 was the third wave; the financial turmoil in Mexico at the end of 1994 was a prelude to the collapse in values in Asia. The fourth wave of crises that began in 2008 resulted from the sharp decline in real estate prices in the United States, Britain, Ireland, Iceland, and other countries; the decline in the value of mortgages and mortgage-related securities led to large losses by mortgage bankers, investment banks, and commercial banks, and other lenders.

Each of these waves of crises followed from increases in the indebtedness of a group of borrowers at rates of 20–30% a year for three, four, or more years. Each of these four waves of credit bubbles involved the cross-border movement of money; the principal exception was that the rapid increases in real estate prices in Japan followed from the rapid growth in the domestic supplies of money and credit. In contrast, the rapid growth in the credit in the Nordic countries in the late 1980s resulted from money inflows as domestic banks sourced money in the offshore market.

One central aspect of the period since the early 1970s has been that the range of movements in the prices of currencies has been much larger than the range that would have been forecast based on contemporary or lagged differences in national inflation rates. These very large changes in the value of currencies have resulted from changes in cross-border money flows; increases in the money flows to countries have led to extensive appreciations of their currencies.

The increases in cross-border money flows to countries have two immediate effects – their currencies appreciate and the asset prices in these countries increase in response to purchases by those who had moved money to these countries. The increases in asset prices were an integral part of the adjustment process; asset prices and household wealth increased until the increase in consumption spending and in imports led to an increase in the current account deficit that matched the autonomous increases in money inflows. The counterpart of the increase in the money flows to the country was that its savings rate declines as household consumption spending increased.

The increase in the indebtedness of the borrowers in these several waves was several times higher than the increase their incomes and GDPs; similarly the increase in the indebtedness was several times higher than the interest rate on the indebtedness. As long as the indebtedness of the borrowers was higher than the interest payments, the borrowers were in the sweet spot, since all the money needed to pay the interest on the indebtedness came from the lenders in the form of new loans. But it was inevitable that the lenders would reduce the rate of growth of new loans, which automatically would lead to a depreciation of the currencies of these countries.

The minimum requirement to generate a bubble is that the rate of the flow of money to a country is too high to be sustained; when the rate slackens, it is inevitable that the currency depreciates and interest rates increase, in part in response to the decline in the supply of credit.

Three factors have contributed to the four waves of bubbles. One is that since the early 1970s, there has been a large pool of “idle money” parked with the international banks, available to be tapped by those who have concluded that they enhance their own returns by taking on credit risk or currency risk. This pool has been inflated by the large payments imbalances since the late 1960s. The second is that there have been a series of shocks at national borders, which either have increased the anticipated returns available on securities in certain countries or increased the scope for cross-border investment by reducing restrictions at the border. The third is that the early stages of cross-border money flows enhance the returns in countries that receive the money, so that the flows are self-justifying – at least for a while.

Bibliography

Aliber, Robert Z., *The New International Money Game*, Palgrave, Basingstoke, sixth edition, 2005.

Federal Reserve Bank of Boston, *The International Adjustment Mechanism*, conference series No. 2, Proceedings of a Conference held in October 1969.

Friedman, Milton, and Robert V. Roosa, *The Balance of Payments: Free Versus Fixed Exchange Rates,* American Enterprise Institute for Public Policy Research, Washington, 1967.

Friedman, Milton, "The Case for Floating Exchange Rates", reprinted in *Essays in Positive Economics*, University of Chicago Press.

International Monetary Fund, *International Financial Statistics*, Washington.

Kemp, Murray C. "Foreign Investment and the National Advantage – the Lending Country", Economic Record, XXVIII, March 1961. reprinted in *The Pure Theory of International Trade*, Prentice Hall, Englewood Cliffs, 1964.

Kindleberger, Charles P. and Robert Z. Aliber, *Manias, Panics, and Crashes*, Palgrave, fifth edition 2005.

Nurkse, Ragnar, *International Currency Experience: Lessons of the Inter-War Period*, League of Nations, Princeton University Press, 1944.

Sohmen, Egon, *Flexible Exchange Rates*, revised edition, Chicago, 1969.

Triffin, Robert*, Gold and the Dollar Crisis*, Yale University Press, New Haven, 1960

Sohmen, Egon, *Flexible Exchange Rates*, revised edition, Chicago, 1969.

Triffin, Robert*, Gold and the Dollar Crisis*, Yale University Press, New Haven, 1960.