

# Financial Crises and Aggregate Economic Activity

The effects of adverse selection and moral hazard caused by asymmetric information can help us understand financial crises – major disruptions in financial markets that are characterized by sharp declines in asset prices and the failures of many financial and non-financial firms.

When certain factor(s) hit the financial markets, adverse selection and moral hazard problems worsen. This amplifies the initial impact, leading to malfunctioning of the financial markets and sharp contractions in economic activity.

(Recall the book Kindleberger, Charles P. (1996), Manias, Panics, and Crashes: A History of Financial Crisis. New York: John Wiley and Sons.)

## 1 Six Categories of Causes That Trigger Financial Crises

### 1.1 Asset Market Effects on Balance Sheets

(1) Stock prices  $\downarrow \implies$  Net worth of firms  $\downarrow$

$\implies$  (a) Lower net worth (collateral value) worsens the problem of adverse selection by raising the loss of lenders in case of default

$\implies$  (b) Lower net worth (collateral value) worsens the problem of moral hazard because the firm has not much to lose and shifts toward riskier investment

$\implies$  borrowing and lending  $\downarrow$ ; Investment and aggregate economic activity  $\downarrow$

(2) Unanticipated decline in aggregate price level lowers the net worth of firms because debt payments are usually contractually fixed in nominal terms. An unanticipated decline in the price level raises the value of the firm's liabilities in real terms, and thus lowers net worth of the firm (Debt-deflation (Fischer (1933))).

$\implies$  worsens the problem of adverse selection and moral hazard

$\implies$  borrowing and lending  $\downarrow$ ; Investment and aggregate economic activity  $\downarrow$

(3) Unanticipated depreciation of the domestic currency raises the debt burden of domestic firms who borrow from foreign lenders denominated in foreign currency

⇒ worsens the problem of adverse selection and moral hazard

⇒ borrowing and lending ↓; Investment and aggregate economic activity ↓

(4) Asset price declines may lead to write-down of the value of the asset side of balance sheet of financial institutions. For example, loan losses, write-down of the value of mortgage-backed securities due to decline of house prices, etc.

## 1.2 Deterioration in Financial Institutions' Balance sheets

Financial institutions, particularly banks, play a major role in financial intermediation because they produce information in resolving information asymmetry in the credit markets.

If banks suffer a substantial loan loss

⇒ This erodes bank capital, reducing banks' resources to lend

⇒ Contraction in bank lending

⇒ the problem of adverse selection and moral hazard worsens because the role of financial intermediation is ill-functioning.

## 1.3 Banking Crisis

If the deterioration in bank balance sheet is severe, banks start to fail. Fear may spread and cause even healthy banks to fail, leading to bank panic.

One of the sources of contagion is asymmetric information. When the public cannot tell solvent banks from insolvent banks, fearing for the safety of their deposits (without deposit insurance) and not knowing the quality of their own banks' loan portfolio, depositors withdraw their deposits from their own banks as well.

Failure of a large number of banks means a loss of information production in the financial markets and a disruption of financial intermediation.

The decline in bank lending reduces the supply of funds and raises interest rate, and further worsens the problems of adverse selection and moral hazard.

One way to restore confidence of the public is to sort out good banks from bad banks by

- the government or central bank
- a private clearing house: an example is the clearing house organized by J.P. Morgan in 1893 and 1907 panic. The clearing house acted as the central bank and selectively issue certificates to provide liquidity for the banking system.

## 1.4 Increases in Interest Rates

(1) Interest rate rises significantly

- ⇒ good borrowers may be driven out of the market
- ⇒ adverse selection problem worsens
- ⇒ borrowing and lending ↓; Investment and aggregate economic activity ↓

(2) Interest rate rises significantly

⇒ it affect firms' and households' balance sheet by raising their interest payments and decrease their cash flows.

- ⇒ This reduces their liquidity and their net worth
- ⇒ worsens the problem of adverse selection and moral hazard
- ⇒ borrowing and lending ↓; Investment and aggregate economic activity ↓

## 1.5 Increases in Uncertainty

Uncertainty (failure of a major financial or non-financial institution, recession, or stock market crash) rises

- ⇒ This makes it harder to sort out good borrowers from bad borrowers
- ⇒ adverse selection problem worsens
- ⇒ borrowing and lending ↓; Investment and aggregate economic activity ↓

## 1.6 Government fiscal imbalances

(1) In emerging markets, huge government debt may create fears of default on the government debt. The government may force domestic banks to purchase bonds. When default

on government bonds is likely, bond prices collapse and banks suffer huge losses, causing a large increase in interest rate and weakening the balance sheet of financial institutions.

(2) Fears of default on government debt can also trigger a foreign exchange crisis in which domestic value of currency declines sharply when investors pull their funds out of the country. This also worsens the balance sheet of those firms and financial institutions that have debt denominated in foreign currency.

## 2 Dynamics of Past U.S. Financial Crises

To gain insights on today's financial crisis, we examine the patterns of financial crises in the past which had progressed in two and sometimes three stages.

### 2.1 Stage One: Initiation of Financial Crisis

#### 2.1.1 Mismanagement of Financial Liberalization/Innovation

Kaminsky and Reinhart (1996a,b) study a wide range of crises in 20 countries including *5 industrial and 15 emerging countries*. A common precursor to most of the crises considered was financial liberalization and significant **credit expansion**. The resulting expansion in credit is accompanied by a significant increase in the prices for assets such as real estate and stocks.

More precisely, we can roughly divide the liberalization of the financial system into two categories: **financial liberalization** (elimination of restriction on financial markets and institutions, e.g., lift regulations on capital flow and financial firms from other nations (financial globalization), liberalizing interest rates and exchange rates, initiation of new financial institutions, restrictions on financial institutions' portfolio, etc.) and major **financial innovations** (financial derivatives, securitization, subprime residential mortgages, etc.).

In the case of the U.S. subprime crisis, the main source came from the latter (financial innovations), while for many financial crises in emerging economies, it was the former (financial liberalization) that plays the major role.

Basically, financial liberalization or innovation are beneficial in the long run because it facilitate the development of financial markets, leading to more efficient allocation of credit.

(1) However, as mentioned above financial liberalization or innovation is frequently accompanied by credit booms. If rapid credit expansion, particularly to new lines of businesses, is likely to lead to overly risky lending, if credit booms are not properly managed.

(2) Another source of the problem accompanying financial liberalization or innovation is the anticipation of government regulatory forbearance and bailout. In face of financial distress by major financial institutions, governments may be inclined to (a) exercise government regulatory forbearance (relaxing bank capital requirement, expanding deposit insurance coverage, etc.) or (b) to bail out financial institutions, in the name of financial stability and preventing bank panic (Too-Big-To-Fail, Too-Many-To-Fail).

These **government safety net** weakens market discipline for the banks. With a safety net, banks are able to keeping acquiring funds even if they take on excessive risk because depositors know that they will lose nothing if a bank fails. The government safety net therefore increases the moral hazard incentive for banks to take on even greater risk by ignoring the downside risk: if these highly risky loans pay off, the banks will profit a lot; if they do not and the banks fail, taxpayers will pay for the bill. In sum, anticipated government subsidies and bailouts is a major source of moral hazard which leads to ex-ante over-investment and asset price “bubbles,” and ex-post regulatory forbearance (Soft Budget Constraint).

(3) Furthermore, in anticipation of government bailout, those “bad” banks and firms (prone to take high risk and more likely to default) will be more likely to enter the industry, which worsens adverse selection problem.

When the loan losses rise due to risk-taking, the drop in the value of loans drives down the net worth of banks and other financial institutions. With less capital, financial institutions cut back on their lending (deleveraging), leading to a decline in economic activity.

We know that financial intermediaries play a crucial role in information production.

When financial intermediaries deleverage and cut back on lending, the function of information production in the financial system is interrupted. Thus, the ability of the financial system to cope with the asymmetric information is hampered.

### **2.1.2 Asset Price Boom and Bust**

Asset prices, such as stock and real estate prices, could be driven well above their fundamental value due to market psychology (dubbed “irrational exuberance” by A. Greenspan). These asset price “bubbles” are often driven by credit booms.

When the “bubbles” burst, the decline of borrowers’ net worth increases the information asymmetry problem, making borrowers less credit-worthy and causing a contraction in credit.

If banks and other intermediaries are over-exposed to the equity and real estate markets, the decline of asset prices will also lead to a deterioration in financial institutions’ balance sheet, causing them to deleverage, further contributing to the decline in economic activity.

### **2.1.3 Spikes in Interest Rates**

Some 19th century U.S. financial crises were precipitated by increases in interest rates, either by interest rate rises in London or when bank panics led to liquidity crunch that raised interest rates sharply.

### **2.1.4 Increase in Uncertainty**

Financial crises in U.S. were mostly initiated when uncertainty is heightened, either because of a recession, stock market crash, or the failure of a major financial institution (e.g., the bailout of Bear Stern in March 2008, the failure of Lehman Brothers and bailout of AIG in Sep. 2008).

## **2.2 Stage Two: Banking Crisis**

With worsening business conditions and uncertainty about their banks’ health, depositors start to run their banks, and a banking crisis or even a bank panic ensues.

Bank panics were a feature of all U.S. financial crises during 19th and 20th centuries before World War II: 1819, 1837, 1857, 1873, 1884, 1893, 1907, and 1930-33. For example, during the Great Depression a sequence of bank panics erupted from Oct. 1930 until March 1933, and more than one-third of U.S. banks, a total of more than 9000 banks, went bankrupt. The amount of total outstanding commercial loans fell by half from 1929-1933.

### **2.3 Stage Three: Debt deflation**

When the economic downturn leads to a sharp decline in general price level, the spiral decline of economic activity continues. When this **debt deflation** occurs, i.e., a subsequent unanticipated decline in the price level, firms net worth further deteriorates because of the increased burden of indebtedness (in real terms).

The problem of debt deflation was particularly prominent during the Great Depression: during 1930-33 the price level declined by 25%. This not only kept the economy from recovering quickly, but also dragged the U.S. economy into deeper and prolonged recession. During the period of economic contraction, the investment spending declined by 90% and the unemployment rate rose to 25%.

## **3 The Subprime Financial Crisis of 2007-2008**

The main underlying forces behind the financial crisis of 2007-2008 in U.S. are mismanagement of financial innovation in the subprime residential mortgage market and a bust of “bubble” in house prices.

### **3.1 Financial Innovations in Mortgage Markets**

The advance of computer technology and new statistical techniques, allowing for cheaply bundle and quantify the default risk of the mortgages into a standardized debt security, have stimulated **securitization** in residential mortgages, credit card debts, etc. in the

past several decades. The most prevalent type of securitization is **mortgaged-backed securities**.

Financial innovations, including further development in financial engineering, in late 1990s and early 2000s have led to enhanced quantitative evaluation of the credit risk for a new class of riskier residential mortgages. This leads to a development of new, sophisticated financial instruments products, i.e., **structured credit products**, that are derived from cash flows of underlying assets and can be tailor-made to have particular risk characteristics for investors with differing preferences toward risk.

Sub-Prime Mortgages are mortgage lending for borrowers that do not meet Fannie Mae or Freddie Mac guidelines (FICO score  $< 620$ , who has become delinquent on some form of debt repayment in the previous 12 to 24 months, or who has even filed for bankruptcy in the last few years). These mortgages tend to be initiated by subprime originators (mortgage companies or brokers) that are owned or controlled by major financial institutions.

### 3.2 House Price “Bubble” Forms

The development of the subprime mortgage market was at first acclaimed as a “democratization of credit” and helped raise U.S. homeownership rates to the highest levels in history.

In particular, the **adjustable rate** sub-prime mortgages are designed so that (Gorton (2008))

- Both borrowers and lenders can benefit IF house prices are appreciating over short horizon.
- After the initial 2-3 years of paying a lower fixed interest rate, homeowners must refinance with the same lender and pay a higher floating interest rate (LIBOR+markup) and the lender has the option to provide a new mortgage, depending on the current value of the house.

The design of subprime mortgage is particularly sensitive to changes in house prices. When house prices are rising, subprime borrowers could refinance their houses with even



greater loans when their homes appreciated in value. Subprime borrowers were also unlikely to default because they can always sell their houses to pay off their debts. Thus, investors of securities backed by subprime mortgages had high returns. The rapid growth of subprime mortgage market raised the demand for houses and further fueled the boom in housing prices.

### **3.3 The Role of the Shadow Banking System**

#### **3.3.1 Investment Banks**

Glass-Steagall Act 1933 separated commercial banking and investment banking, because underwriting (by investment banks) was considered to have conflict of interests with commercial banking and was held liable for the 1929 bank panic. The separation was then weakened by bank holding Co. (BHC) and now considered against the economy of scope. It was repealed by GLB Act 1999.

Investment banks invest in MBSs, derivatives, and structured products. Investment bankers act as security underwriters (asset-backed securities (ABSs), mortgage-backed securities (MBSs), structured credit products, ...), dealers, brokers, and also consultants on transactions such as mergers and acquisitions. However, investment bankers still have conflict of interest in providing both *brokerage* and *underwriting* services because the bank is attempting to simultaneously serve two client groups (security-issuing firms and security-buying investors). They are much less regulated than commercial banks (e.g., no capital adequacy requirement), and are highly leveraged.

#### **3.3.2 CDOs and SIVs**

A **collateralized debt obligation (CDOs)**, a certain type of Special Purpose Vehicle (SPV, created to fulfill specific objectives, such as securitization or risk-sharing, typically used by the sponsoring corporations or financial institutions to isolate the firm from financial risk), can be considered a financial intermediary which acquire funds by issuing different classes of bonds (tranches A-D, i.e., paying out cash flows from mortgage-backed securities in different tranches) and equities, and lend out by buying MBSs (mortgage-backed securities), corporate loans, and other ABSs (asset-backed securities). CDOs are

typically issued by investment banks.

A CDO can also be considered as a type of asset-backed security and structured credit product. Thus, an investment in a CDO is therefore an investment in the cash flows of the assets, and the promises and mathematical models of this intermediary, rather than a direct investment in the underlying collateral. In this way, it differentiates a CDO from a mortgage or a mortgage backed security (MBS).

Tranches of sub-prime MBSs were repackaged into securities by CDOs. Products of CDOs are popular among asset managers and investors, including insurance companies, mutual fund companies, investment trusts, commercial banks, investment banks, pension funds, hedge funds, SIVs, asset-backed commercial papers conduits (ABCPs), other CDOs ( $CDO^n, n \geq 2$ ), etc., all over the US, European and Asian markets, where, for example, a  $CDO^2$  slices and dice risk even further, paying out cash flows from other CDOs.

The issuer of the CDO, typically an investment bank, earns a commission at time of issue and earns management fees during the life of the CDO. A major factor in the growth of CDOs was the 2001 introduction by David X. Li of Gaussian copula models, which allowed for the rapid pricing of CDOs.

A **structured investment vehicle (SIV)** is a fund (a financial intermediary) which borrows money by issuing short-term securities, such as **asset-backed commercial papers (ABCPs)**, at low interest and then lends out by buying long-term securities, such as MBSs, ABSs, etc., at higher interest, making a profit from the difference in interest rates. During the subprime crisis, some SIVs were unable to roll over their short-term securities and were facing severe liquidity crisis. As a result, most of their sponsoring banks rescued these SIVs and brought them onto the banks' balance sheets.

### 3.4 Agency Problem Arise

Securitization is based on the “originate-to-distribute” model, in which mortgage originator, typically a mortgage broker, sells the loan to another financial institutions. Mortgage loans are then pooled in Real Estate Mortgage Investment Conduits (REMICs), which are a type of special purpose vehicles (SPVs), for issuing residential mortgage-backed securities (RMBSs).

In this way, the mortgage originator transfers credit risk to market participants by way of securitization. This fosters moral hazard problem because the mortgage originator has little incentive to maintain high **lending standard**. The more the broker originates, the more fee he makes, which leads them to expand credit to credit-unworthy borrowers.

Besides, adverse selection problem also became severe. With the rapid increase in mortgage securitization and the continuing rise in house prices, it also attracts

- (a) risk-loving speculators obtain cheap credit to acquire houses for arbitrage,
- (b) other mortgage brokers lower lending standards to originate more loans to earn more fees,
- (c) investment banks underwrite more subprime mortgage-backed securities and structure credit products like CDOs to make more fees, and
- (d) credit rating agencies (subject to conflict of interest) grant good ratings to these subprime mortgage-backed securities to make more fees.

Studies have shown that the behavior of cyclical lending standards by intermediaries, i.e., a systematic tendency for lending standards to vary from tightness to laxity over the business cycle, bears important implications for the dynamics of aggregate fluctuations. The cyclical **lending standards** (based on interest rates, size and duration of loans, percentage of total loans collateralized, etc.) leads to the procyclicality of bank credit, that is, lending increases significantly during business cycle expansions, and then falls considerably during subsequent downturns. As noted by A. Greenspan, “the worst loans are made at the top of the business cycle” and that at the bottom of the cycle, “the problem is not making bad loans. . . it is not making any loans, whether good or bad, to credit-worthy customers.” (Chicago Bank Structure Conference, May 10, 2001). Moreover, the procyclical bank credit resulting from cyclical lending standards is found to exert considerable influence on the dynamics of aggregate fluctuations (Asea and Blomberg (1998)). This is because the easing of bank credit standards in good times raises the proportion of potentially problem loans in the future, which tends to pave the way for a downturn in the economy. Weinberg (1995) and Keeton (1999) find that those periods in which exhibited unusual strong loan growth tend to precede rising delinquencies and charge-offs.

Similarly, starting early 2000s, the subprime lending expanded its credit to borrowers with heterogeneous characteristics (high loan-to-value ratios or zero-downpayment, unwilling to disclose financial status, high loan-to-income ratio): the subprime lending no longer focused on only poor credit borrowers, but also on borrowers who would have been considered prime based on their FICO score, but are perceived to have higher credit risk because of other characteristics (Gerardi (2007)). Recent studies (Mian and Sufi (2008), Dell’Ariccia et al. (2008), Jimenez et al. (2006)) show that before the eruption of the crisis, financial institutions substantially lowered their lending standards: sharp decrease in **denial rates**, sharp increases in mortgage **loan-to-value (LTV)** and **loan-to-income** ratios (i.e., lower collateral requirements).

### 3.5 Information Problem Surface

The structured products  $CDO$ ,  $CDO^2$ , ... can get so complicated that it is hard to value the the cash flows of the underlying assets for a security.

We can consider  $CDOs$  as re-securitization of MBSs and ABSs and  $CDO^n$  as a series of primary markets in which securities are re-securitized. This creates several serious problems.

(1) The losses of information to investors are more and more as the chain of re-securitization stretches longer and longer (Gorton (2008)).

(2) Even credit rating agencies are not able to assess the risk of these structured products precisely.

(3) There is basically no secondary markets for these structured products and the liquidity of these products are very low.

### 3.6 House Price “Bubble” Burst

As mentioned above, the easing of bank credit standards in good times raises the proportion of potentially problem loans in the future, which tends to pave the way for a downturn in the economy (Asea and Blomberg (1998)).

Those studies that find financial institutions substantially lowered their lending standards before the crisis also find that those areas where subprime mortgage **delinquency**

**rates** and **default rates** rose more sharply during the crisis had experienced larger credit booms and larger house price appreciation, and higher mortgage securitization rates ex ante. And this relationship is linked to a dramatic decline in lending standards (Mian and Sufi (2008), Dell’Ariccia et al. (2008), Jimenez et al. (2006)).

When house prices declined sharply, many subprime borrowers found their mortgage were “underwater,” i.e., the value of a house falls below the amount of mortgage debt. In this case, homeowners have strong incentives to walk away from the houses leaving their debts behind. Defaults on mortgages shot up sharply, and financial institutions **foreclosed** the houses and put them on the market for sale. This further depressed the price of houses, and eventually led to more foreclosure.

### **3.7 Crisis Spread Globally**

Although the problems of subprime mortgages originated in the U.S., the wake-up call came from Europe. In August 2008, Fitch and S&P announced ratings downgrade on some of the MBSs and CDOs, the asset-backed commercial papers market came to a halt. Even though the European Central Bank and the Federal Reserve injected huge liquidity into the financial system, banks began to hoard cash and were willing to lend to each other.

The TED spread, a measure of liquidity in the interbank lending market, shot up to a historical high. The TED spread is the difference between the three-month T-bill interest rate and three-month Eurodollars contract as represented by the three-month London Interbank Offered Rate (LIBOR), where LIBOR is a daily reference rate in the London interbank market. The drying up of short-term credit led to the first major bank failure in the U.K. in over 100 years when the Northern Rock, which relied more on wholesale short-term borrowing (Repos and ABCPs) rather than deposits, collapsed in September 2008.

### **3.8 Banks’ Balance Sheet Deteriorate**

As the decline of house prices accelerated, defaults and foreclosures on mortgages rose rapidly. Thus, the value of MBSs and CDOs collapsed, leading to ever-larger write-offs

at banks and other financial institutions.

The balance sheet of these financial institutions deteriorated because of losses from their holdings of these securities and also because these institutions (such as Citi Corp.) had to take back onto their balance sheet some of the SIVs they had sponsored. This is because SIVs finance their investment on long-term securities, such as MBSs, ABSs, etc. by issuing short-term **asset-backed commercial papers (ABCPs)**. **Runs** on SIVs by not rolling over their ABCPs led to collapses of these **virtual banks**.

With weaker balance sheets, banks and other financial institutions had to deleverage. The function of information production in the credit market is lost, and thus adverse selection and moral hazard problem worsen.

### **3.9 Failure of High-Profile Firms and Bailout Packages**

Failures of some high-profile financial firms in late 2008 raised the uncertainty in the marketplace. The stock prices collapsed and the crisis accelerated. Subsequent failures of many financial and non-financial firms raised the unemployment rate. The economy came into a deep recession.

The U.S. government and the Federal Reserve coordinated to offer a series of bailout packages and relief programs, injecting a huge amount of liquidity into the markets (See other handouts).

## **4 Dynamics of Financial Crises in Emerging Economies**

### **4.1 Stage One: Initiation of Financial Crisis**

#### **4.1.1 Mismanagement of Financial Liberalization/Globalization**

As discussed earlier, Kaminsky and Reinhart (1996a,b) study a wide range of crises in 20 countries including *5 industrial and 15 emerging countries*, and finds that a common precursor to most of the crises considered was **financial liberalization** and significant **credit expansion**.

In the case of emerging economies, opposed to the U.S., the main source of financial crises are often sown when these countries engaged in **financial liberalization** – elimination of restriction on financial markets and institutions, including lift regulations on capital flow and financial firms from other nations (financial globalization), liberalizing interest rates and exchange rates, initiation of new financial institutions, restrictions on financial institutions’ portfolio, etc.).

Emerging economies tend to have weaker supervision by regulators and a lack of expertise in the screening and monitoring of borrowers by banking institutions. The lending boom following from financial liberalization can lead to even riskier lending. Furthermore, the capital inflows often add fuel to the lending booms.

Since banks play an even important role in the financial system of emerging economies, the decline of bank lending due to the eruption of a financial crisis leads to a larger lending crash, more severe asymmetric information problems, and ever more decline in economic activity.

Given this scenario, are lending boom and bust inevitable outcomes of financial liberalization/globalization in emerging economies?

In fact, it is **institutional weakness**, that is, weak supervision, poor corporate governance, lack expertise in screening and monitoring, together with government safety net and forbearance (anticipated government guarantee or bailout) that causes the problem. If prudential regulation and supervision to limit excessive risk-taking were strong, the boom-bust cycles of lending and asset prices would be much diminished.

However, powerful business interests that own financial institutions and contribute to politicians’ campaigns are often able to persuade/coerce politicians (agents) to weaken supervision ex ante and bail them out ex post, leaving the taxpayers (principals) to bear the costs of bailouts.

#### **4.1.2 Severe Fiscal Imbalance**

The other path through which emerging economies experience a financial crisis is government fiscal imbalances. A recent example is Argentina in 2001-2002. Others include Russia in 1998 and Turkey in 2001.

When a government has to finance its spending spree by issuing more government debts, banks, particularly in many emerging economies, may be forced to hold more of their own government's bonds. When the government faces larger and larger fiscal imbalances, investors may lose confidence in the ability of the government to repay its debt, causing the price of these government bonds to plummet. Banks that hold a substantial amount of these bonds find their net worth declining. The deterioration of banks' balance sheet cause bank failures and may even lead to a bank panic.

## **4.2 Stage Two: Currency Crisis**

Two key factors – deterioration of bank balance sheet and fiscal imbalances – can trigger the speculative attacks on the exchange rate and plunge the economies into a full-scale, vicious downward spiral of currency crisis, financial crisis, and meltdown.

### **4.2.1 Deterioration of Bank Balance Sheet**

Speculators in the foreign exchange market are able to detect the troubles in a country's financial sector and realize that these governments have very limited ability to defend the currency. When banks and other financial institutions are in distress, raising interest rates to defend the currency can only increase the indebtedness of banks and further weaken banks' balance sheet.

Thus, speculators will seize an almost sure-thing bet because the currency has only one way to go. Once the country's central bank has exhausted its holding of foreign reserves in intervening in the foreign exchange market, the government can do nothing but allows the currency to devalue.

### **4.2.2 Fiscal Imbalances**

Fiscal imbalances can lead to a deterioration of banks' balance sheet and help produce a currency crisis; at the same time, it can also directly trigger a currency crisis. When foreign and domestic investors suspect the government's ability to repay its debt, they will start to pull money out the country, leading the currency to plummet.



### **4.3 Stage Three: Full-Fledged Financial Crisis**

When many firms and financial institutions have debt denominated in foreign currency, as is typical in many emerging economies, an unanticipated depreciation or devaluation in their currency will result in increases in their indebtedness in terms of domestic currency, weakening their balance sheets. Thus, the institutional structure of debt markets in emerging economies interacts with the currency devaluation can propel the economies into full-scale financial crises. A concurrent banking and currency crisis is called a “twin crisis.”