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by Horst Siebert

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Abstract: In a series of summits, leading countries of the world will meet to draw up an international arrangement for financial stability. Such a rule system should prevent a financial crisis as we have seen it in 2007 and 2008. It should include appropriate principles of monetary policy, rules for financial soundness and agreements on the role of prudent regulation. The paper discusses the lessons from the subprime crisis, failures of regulation, crisis management in the US and in the EU and considers the problems that have to be solved by an international rule system.

Keywords: Financial instability, lessons from the subprime crisis, failures of regulation, crisis management, elements of an international rule system, role of the IMF.

JEL classification: E2, E3, E5, F02, F33, F37, F4, F5, G2, P00

Horst Siebert
Kiel Institute for the World Economy and
SAIS Bologna Center
24100 Kiel, Germany
Telephone: +49/431/8814-567
E-mail:hsiebert@ifw-kiel.de;
hsiebert@jhubc.it

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In the monetary and financial area of the world economy, rules are necessary because money is not neutral. If money simply were a veil that only hides the real side of the economy, the veil could be lifted, and then the real side of the economy, untouched by money, would become visible. Since money is more than a veil, the real economy is affected by such monetary phenomena as inflation and hyperinflation, deflation as well as by financial and currency crises and, of course, by the malfunctioning of the financial system and bank runs. Consequently, the correct institutional arrangement for the monetary and financial system is a major issue. Such a framework for financial stability has relevance for a market economy similar to the institutional arrangement for competition against endogenous tendencies to monopolies, if they remain uncontrolled. This is the concept of the German Freiburg School whose representatives where ordo-liberals looking for an economic order, and not neo-liberals as they sometimes are interpreted today.

The national aspect of the non-neutrality of money has to be dealt with by national institutional arrangements. To avoid inflation requires a sound monetary policy and the independence of the central bank. These conditions also are called for in order to avoid asset price inflation, i.e. financial bubbles. To prevent a meltdown of assets, a liquidity squeeze and a bank run in a country requires rules of soundness for banks and other financial institutions and makes national supervision necessary. Institutional safeguards are also needed to avoid sovereign default. If national policy does not establish the correct rules or if mistakes are made, the negative impact on the real side of the economy is first of all felt by the country in question, but, of course, it may also spread to other countries.

In a globalized economy, the non-neutrality of money has an international dimension through links between national phenomena of monetary and financial disturbances and a systemic crisis for the world's financial system: national inflationary movements in the price levels affect world inflation and real allocation; monetary policy may cause asset price inflation; likewise a national deflation may have international repercussions; abrupt changes in the exchange rate as the price of national monies impinge on the international division of labor; exchange rate crises spread from one country to another and threaten to develop into an international systemic crisis; financial crises move from the financial center in one country to that of another; bank runs extend from one country to another; this also

applies to liquidity evaporation occurring in the balance sheets of several banks. The cross-border links operate through many mechanisms, among them contagion as a psychological factor or as a consequence of budget restraints of economic agents. In order to reduce the risk of a systemic crisis for the world's financial system, global rules for the international monetary and financial system become necessary.

Severe impact of financial crises on the real side of the economy

Monetary-financial crises have caused severe hardship in the past. In the Great Depression 1929-1933, the US lost one third of its GDP, industrial production halved and unemployment jumped from 1.8 percent of the workforce in 1926 to 24.9 percent in 1933. Stock prices collapsed from an index above 350 in 1929 to 70 in 1932. Consumer prices fell by 20 percent, thus indicating a deflation. The Great Depression represented a major shock to the world economy. World trade declined to about only one third of its 1929 level and the depression spread to the European countries. The entire global financial system got into disarray. In a more recent financial crisis, Argentina lost 20 percent of its GDP in 2001-2002. Economically speaking, the country shrunk. Real wages fell with a similar percentage. Such calamities with a massive impact on the real economy usually go hand in hand with a political crisis. Other recent crises were the Swedish crisis in 1992, the Mexican Peso-Crisis in 1994, the Asian currency crisis in 1997 in Thailand, Indonesia, Korea and other Asian economies, the Brazilian crisis in 1999 and the Turkish crisis in 2001. In these currency crises, the nominal exchange rates changed abruptly with devaluations of 50 percent and more. GDP growth rates became negative. In the course of history, we have seen many other financial crises (Kindleberger 1989), among them the Tulpmania in Holland in the 16th century (Siebert 2007e).

Not all monetary-financial crises spread to other countries. An example is the negative impact of the bursting of the Japanese bubble in December 1989, showing up in a poor Japanese growth performance and increased unemployment in the 1990s, but remaining limited to Japan. In the period 1992-2003, the Japanese economy has been nearly stagnant (with the exception of 1996), the average annual GDP growth rate standing at 1.2 percent. Japan slid into a severe recession in 1998-1999. Japan's accumulated GDP loss for the period 1992-2004 amounted to US$ 13 trillion (in constant 2000 prices), if one assumes that Japan would have continued to expand at its average GDP growth rate of 3.94 percent from the

1980s for the period between 1992 and 2004. This loss constitutes three times Japan's 1990 GDP (Siebert 2007e). Apparently, the negative impact of the Japanese bubble had indirect second-round effects on other countries in Asia and on the world economy since the demand stimulus coming from Japan was reduced. However, the Japanese financial crisis did not directly affect other countries.

Some years ago it was fashionable to argue that financial markets had become more efficient and can deal with risk much better than previously. However, while the technology of risk management of financial institutions may have improved, new risks have arisen, for instance in the derivative market. As the collapse of the hedge fund "Long Term Capital Management (LTMC)" in 1998 showed, masterly expertise may not be sufficient to anticipate all possible outcomes. And the subprime crisis and the ensuing liquidity crisis with the loss of confidence among banks in the years 2007-2008 indicate that risk is far from having disappeared. The impact is massive, affecting the US and Europe (Schmidt, Smith and Walter 2008): the collapse of the German *Industrie Kreditbank* in August 2007; losses at some German state banks; the going under of Bear Stearns in 2008; the sale of Merrill Lynch to Bank of America; the bankruptcy of Lehman Brothers and of more than ten US banks; the disappearance of the concept of investment banks in the US; the nationalization of Fannie Mae and Freddie Mac; the US government taking over the American Insurance Group; the 700 billion US bail out plan intended to take out bad loans from the system; the nationalization of Northern Rock, the mortgage bank Bradford & Bingley and other banks in the UK; the support package for Hypo Real Estate by government and the banking industry in Germany, the support of Fortis by the Benelux countries and additional capital to Dexia being provided by the French and Belgian government. Governments have given additional guarantees for deposits; for instance, Ireland has introduced a state guarantee for all deposits and debt for its six major banks until September 2010. Iceland nationalized the banking sector. The list is not closed at mid-October 2008. Apparently, new endogenous risks of the banking industry have come to the fore. Moreover, quite a few risks for the financial markets consist in changes of politics, which may alter the economic environment of the financial industry completely. Also business cycles still create uncertainty. It would not be wise to base monetary policy and the financial order on the premise that financial crises and currency crises will be gone for good. Older publications on the emergence of financial instability (Minsky 1986) and reports on former crashes (Kindleberger 1989) should have been a warning.

As far as we know as of October 2008, the financial crisis of the years 2007-2008 entailed four different aspects: It had its root cause in the burst real estate bubble of the US housing market, an artificial over-consumption not supported by real savings, which then led to a liquidity crisis in which financial institutions lost financial assets of about 1.4 trillion US dollar (IMF 2008b). As a consequence, a credit crunch developed so that the real sector was cut off credits. Moreover, consumers and investors lost confidence in their deposits, uncertainty spread and they held off consumption and investment, again affecting the real economy. The crisis intensified the slowdown in the US economy, which was under way for other reasons, and also contributed to the deceleration in European economies.

In the following, we distinguish between rules averting an unstable money, those preventing financial instability, for instance the collapse of banks, and arrangements avoiding currency crises, although all three types of disturbances can be interrelated. Note that such rules have the property of a public good: the financial stability they provide is consumed in equal parts by all. Taking stock of the existing rules in these three areas, the rules for monetary stability are national, or in the case of the ECB, multi-national; international monetary equilibrium is based on an implicit fragile understanding of the major central banks. International rules on financial soundness are evolving only slowly in a trial-and-error process, with national regulations still playing a major role. For the prevention of currency crises we indeed do have an explicit international rule system in the form of the IMF, but it is somewhat ironic that the services of the IMF no longer are in great demand by quite a few countries, putting the IMF's mission into question. I will deal with currency crises in the next chapter.

Which rules for monetary policy?

To prevent monetary and financial crises requires a solid and robust financial architecture.
It is the role of central banks to provide liquidity as a lubricant for a growing economy without causing inflation, including asset price inflation, and to keep the financial system functioning. Inflation and hyperinflation can be avoided by adequate institutional arrangements for the central bank and by an adequate monetary policy. The independence of the central bank is of utmost importance. A basic rule is that public budget deficits must not be financed by printing money. This condition has been repeatedly violated in Latin American

countries in the past. In industrial economies, the interrelations between politics and the central bank are more intricate. The position of the central bank must be strong enough to resist political pressure for an easy money policy and for providing means for the public budget. Governments with high debt will push for low interest rates to reduce their debt burden. This also often holds for governments which want to stimulate investment when they face an election and to governments in distress. A central bank giving in to this pressure jeopardizes price level stability. It loses credibility which is a crucial precondition for stable money. Moreover, an excessive credit expansion endangers monetary stability.

Taking these national institutional conditions as a starting point, an international monetary equilibrium can be understood as being the result of an implicit agreement between the major central banks, the Fed, the ECB, the Bank of Japan and the Bank of England. Central banks usually follow a stability target. While in principle the major central banks have a choice between price level stability and the nominal exchange rate, only smaller countries can choose to fix their exchange rate, normally to an anchor currency. Larger countries or regions usually do not follow suit in their monetary policy to the policy of the anchor country. For instance, if the Fed applies an expansionary strategy, a constant exchange rate would force the ECB to tag along to the Fed's policy, allowing the price level to rise. The ECB then would contravene its target of price level stability and lose its independence.

Among the central banks, the Fed has a special position since the US dollar is the dominating currency, the euro - newly established in 1999 - coming in second place. A leading currency or an anchor currency emerges if a country has a high share of world output, trade and capital flows. Another important condition is that the currency is stable. Such a currency has the prospect of being accepted in many countries (dollar standard, dollarization). Of the total transactions in the international currency markets in April 2007, 86 percent have the US dollar on one side of the transaction, 37 percent the euro where the sum of the percentage shares of individual currencies totals 200 since two currencies are involved in each transaction. The yen and the sterling follow with 17 percent and 15 percent, respectively. The daily average turnover on the foreign exchange market amounts to US$ 3.2 trillion. This figure is adjusted for double counting. The by far most traded currency pair was the dollar/euro – amounting to 27 percent of global turnover; the dollar/yen accounted for 13 percent and the dollar/sterling for 12 percent (Bank for International Settlements 2007). Of the total reserve holdings of all central banks in April 2007 that can be allocated to a

currency (identified reserves), 64.8 percent were held in US dollars, 25.6 percent in euro, 2.8 percent in Japanese yen and 4.7 percent in British pound. Total reserves including unaccountable reserves total US$ 5.7 trillion. Euro holdings only amount to a value of 936 billion US dollar (IMF 2007d).

The anchor country enjoys several advantages: It has lower transaction costs because many transactions are done in its currency. It also has the advantage of seigniorage since foreign central banks and market participants hold its currency. Moreover, the country's financial industry benefits from the currency position. Finally, an anchor country does not have to worry about its exchange rate in the same way other countries have to. Thus, the US can follow a strategy of benign neglect ("The dollar is your problem and our currency"). This means that the US does not have to intervene in the foreign exchange market to keep a specific value of its exchange rate. It can use its monetary policy for internal goals without, within limits, worrying about its balance of payments deficit (or its exchange rate) and it does not bear the burden of financing its balance of payments. It may be tempted to strategically play with the external value of its currency, for instance riding out of international debt through depreciation.

Following this line, however, the US risks to lose the role as anchor since the US dollar drops in value and the US will not be able to attract foreign capital in the future. This, in turn, would reduce the option to finance the US current account deficit in the long run. Nevertheless, the anchor country may take recourse to this way out in special circumstances. This may happen when the central bank uses the interest rate as a temporary stimulus to counter slipping into a national recession or alleviating a sector problem without taking into account the medium-run risk of generating a financial bubble and having the bubble burst. Also witness the US giving up its role as monetary anchor after the Vietnam War which then led to the termination of the Bretton Woods system. A similar case might arise when the US will lose part of its strong economic position with the ascent of China, possibly not scaling down its military expenditures to its new position and financing the deficit through outside money. Apparently, this would put extreme pressure on other central banks, for instance the ECB, to stand to their price level targets. As an indication, look at the Fed's lowering of the interest rate in 2007 and 2008 while the ECB did not follow.

Such extreme cases in which the anchor currency loses its role show that the international monetary equilibrium among major central banks is rather fragile. Explicit institutional rules for restraining the behavior of the central bank of the anchor currency do not exist. Since an explicit understanding on the goal of price level stability and other goals such as preventing asset price inflation is not present, the situation among central banks can viewed as a game: the central banks are checked by each other's behavior; the threat consists in each central bank following a completely independent strategy. As we know, using this threat may not always be strong enough to yield an equilibrium in which price level stability prevails.[1]

In addition to the lenient monetary policy in the US in the last years, the increase in the world's money supply is nowadays also influenced by monetary expansion in China; such an expansion is not completely insulated through the devaluation of the renminbi. A situation with international reserves being ploughed back into the system will lead to a low international real interest rate which partly makes US monetary policy ineffective; admittedly, such a low interest rate is supported by an international savings glut. This point of wrong incentives and constraints from the international monetary system was discussed at several instances in the past, for instance by Rueff (1972). However, a return to the gold standard is not feasible. Attempts for a reference zone system (Williamson 1993) or a universal money (Mundell 2003) are not too promising.

Rules for financial soundness

Whereas in the area of monetary policy we may interpret the institutional arrangement as a fragile implicit understanding between central banks, only some elements of an international institutional arrangement exist that is needed to prevent or minimize disruptions that can arise in the financial system (Siebert 2007e). Such an institutional design refers to the rules banks set for themselves for their own behavior, rules that are agreed upon by the banking industry, laws and regulation. A core question is how different national institutional arrangements have to be conceived not only to prevent national disruptions, but also to reduce systemic risks for the world financial system. The approaches "stability for the individual institution" and "stability begins at home" are necessary conditions, but they are

[1] On the role of central banks as a lender of last resort see chapter IX Siebert (2009).

not sufficient. Due to the many cross-border links between countries and also between firms, standards have to prevent spillovers, especially contagion. Since financial crises can have a whole set of origins, an efficient institutional arrangement should provide an answer to how all potential origins of financial disruptions can be ruled out. From history we know that a lot of origins can come into play. Often, many of them are forgotten so that pathological learning is typical.

In order to study rules for soundness of the financial system, one needs to look at the functions that the financial system has to perform: allocate savings to investment; finance transactions, investment and infrastructure; transfer, reduce and manage risks; perform maturity transformation within reasonable limits and send reliable signals through prices. These functions should be performed without causing the financial disturbances discussed. Here are some crucial aspects.

Monetary stability. Since an over-expansion of the money supply, detrimental credit-extension and excessive inflation can cause serious disturbances, a reliable, stability-oriented monetary policy is a precondition to prevent financial instability (see above). When this condition is not met and when economic fundamentals are not solid, inflationary expectations and expectations of currency depreciation start to develop. This, for instance, is the lesson that we can draw from the 1997 currency crises in the Asian countries.

Avoiding international risk exposure. Argentina in the 1980s is an example that institutional arrangements which allow provinces to go into international debt may put a country at risk and may lead to sovereign default. This aspect also played a role in the ignition of Brazilian exchange rate crisis in 1989 when the governor of Minas Gerais declared that the province would not pay its foreign debt (Siebert 2005a). Apparently, the lessons are quickly forgotten, as the case of Iceland and Hungary in 2008 show. Moreover, the exposure to foreign debt can aggravate a crisis as we know from the Korean crisis in 1997, when the *chaebols* had accumulated debt in yen.

Balance sheet truth. The Enron case in the US in the year 2001 has made clear that stock markets cannot successfully intermediate between savings and investment if the balance sheets of firms are forged. Under such conditions, share prices are distorted; when the fraud is revealed, stocks are depreciated, in the case of Enron falling from US $ 90 to about 50

cents within a year. Stock owners are betrayed and reputation and credibility of the financial market is destroyed – a crucial precondition for market economies. Financial markets cannot function correctly if they do not provide reliable information. Consequently, balance sheet truth is essential; accounting does not permit compromises. The US Sarbanes-Oxley Act of 2002 attempted to lay down a new corporate governance procedure. Auditing firms have to certify dependable data. The International Financial Reporting Standards have to assure that balance sheets, especially of capital market-oriented enterprises, contain reliable information. The subprime crisis has amply demonstrated that balance sheet truth also applies to the banking sector. Bank balances should reflect risks adequately. Risks should not be put off the balance sheet (see below).

A solid banking system and the responsibility of banks. The financial system of a country must be sound and robust. It has to be organized such that a financial crisis is unlikely to start or to be reinforced. Thus, the crisis in 2008 has shown that a universal banking system is more robust than the investment banking approach. Without soundness of the banking system, bank runs may occur and other financial crises such as the evaporation of liquidity may happen. To prevent this requires standards for commercial banks and other financial institutions including investment banks to be set so that an economy is not easily affected by external shocks; nor should endogenous shocks be possible. The correct expression of risks in the balance sheets of banks, reliable accounting and auditing are relevant issues.

It is in the self-interest of the individual bank and its responsibility to set incentives for its managers and establish norms of behavior that prevent its failure. Established banking principles should not be easily thrown overboard. One such principle is that caution is required when long-term tasks are financed with short-term means. Leverage between borrowed capital and equity should not endanger the bank's existence; a leverage of more than 20: 1, as used by investment banks, proved to be a disaster. An incentive system that generates high commissions for bankers so that they have an interest to develop new financial products and to inflate the bank's balance sheet, is hardly sustainable. Incentive systems of banks should not favor the accumulation of risks; they should take into account the long-run risk position of a bank, including the risk position over the business cycle. In a recession, some loans become non-performing and assets in the bank balance tend to lose value. The risk position also varies with what is happening to other banks and the whole industry. This has been labeled the aggregation problem (Scholes 2008) or the problem of

interconnectedness (Stiglitz 2008) who somewhat loosely also uses the term "pecuniary externalities". We also may simply state that there is a potential for mistakes to be correlated across banks (Geithner 2008). With such interdependencies, financial markets may not be efficient in providing correct price signals. If assets lose value, a bank only has the option to raise additional equity or to sell assets in order to maintain its risk position. Then a bank is severely constrained in its behavior. Witness the situation in 2007 and 2008. Deleveraging by one bank affects the others and the whole industry. Consequently, the bank's risk management has to anticipate how the bank's environment will change, including the probability distribution. A bank has to be aware of risks in the tails of a probability distribution with low probability, but large damage, the "black swans". Moreover, when in a financial bubble the herd is running, those in charge have to stay outside the turmoil and have to remind everyone of the equilibrium that will be sustainable in the long-run, so to say the intertemporal fix point or the transversality condition known from intertemporal optimization models. Such an intertemporal fix point would have prevented such bubbles as Tulpmania in Holland in the 16th century; and it could avoid other financial exuberance (Shiller 2005). Whereas we may look for a better institutional infrastructure to deal with the issue of interconnectedness of risks, it is in the bank's own responsibility to be informed on the changing environment.

The necessity to include long-run aspects in a bank's risk management reduces the possibility to increase profits through technological product innovation. But if a bank does not want to find itself in a position of liquidity shortage, being forced to ask for fresh capital or to sell its assets and thus to lose its decision freedom, it has to include long-run risks in its calculus.

Similarly, it is in the self-interest of the banking industry to come up with international institutional arrangements that prevent bank failures. If false incentives for the behavior of banks are set, if moral hazard prevails and if price signals are misleading, the risk of the banking industry is endogenous.

However, experience shows that it is difficult to obtain voluntary instability-preventing institutional arrangements. One reason is that banks have a strong interest in financial innovation. By developing new financial products, banks can make a profit relative to their competitors. Consequently, they tend to outbid themselves in new products, the industry

exhibiting herding behavior. This causes the need for regulation. Financial innovation is likely to increase the demand for institutional infrastructure. Self-regulation by banks does not represent a viable solution. However, it is an unsolved problem how an efficient institutional design for the financial sector should look like, comprising rules that are self-set by individual banks, those that are agreed upon by the banking industry, laws and regulatory mechanisms.

Regulation and banking supervision

For the reasons discussed, prudent supervision represents an important aspect of preventing bank failures and financial crises. When a bank run occurs and when customers lose confidence in the reputation of a bank and withdraw their deposits as quickly as possible in order not to lose their funds (as in the case of Northern Rock in the UK in 2007), it is too late. This also applies when liquidity is withheld as in the case of Bear Stearns. Regulation of the financial markets includes a broad spectrum of policy instruments, ranging from capital adequacy requirements, margin requirements and bank reserve requirements to forms of deposit insurance, restrictions on financial products, oversight of market practices (also outside the narrow banking sector), observation of the maturity structure and risk transformation, price controls and governmental fees (Geithner 2008). Regulations intend to improve information for the investor, to assure the stability of the system over time and to prevent financial crises.

National regulators compete with each other, since financial institutions and investors can avoid a regulatory regime by doing their transactions in another country. In this case, regulation may drive the financial industry or a financial product out of a country. One response to this phenomenon is to agree internationally on standards. For instance, the industry can concur on best practices (Institute of International Finance 2008). Another approach is used by the Financial Stability Forum, hosted by the Bank for International Settlement in Basel, in bringing together senior representatives of national financial authorities - central banks, supervisory authorities and treasury departments, international financial institutions, international regulatory and supervisory groupings, committees of central bank experts and the European Central Bank. It seeks to coordinate the efforts of these various bodies in order to promote international financial stability, improve the functioning of financial markets and reduce systemic risk.

The implementation of standards of financial soundness in national institutional arrangements can help to reduce financial disturbances in countries and to limit international repercussions. This holds for instance for the Financial Soundness Indicators of the IMF (IMF 2008a) which, however, only represent recommendations. The Basel II Framework of the Basel Committee on Banking Supervision, agreed upon in 2004 as a consequence of the Asian currency crisis, has established capital adequacy requirements for banks. Banks have to back their claims on the non-bank private sector by an overall limit of eight percent for capital endowment (a bank's capital in terms of shareholders' equity or retained earnings as a percentage of its risk weighted credit exposure), permitting a differentiation between different risk categories of claims. External ratings and standardized internal control mechanisms can be used to assess credit risks. National supervisory authorities are now implementing these rules through domestic rule-making and adoption procedures. The Basel Committee has addressed the home-host information sharing requirements in a 2006 paper that are necessary for the implementation of Basel II (Basel Committee on Banking Supervision 2006).

While the Basel II adequacy requirements have the merit to alert banks to risks in their balance sheets, they also point out how difficult it is to establish clear standards for financial soundness: Unfortunately, the capital adequacy requirements are pro-cyclical since the risks vary with the business cycle. Possibly, such requirements should be not be defined with respect to the levels of risk-weighted assets but to their rates of growth (Goodhart 2008). Moreover, they do not solve the aggregation problem or the problem of interconnectedness, i.e. that the risk position of a bank varies with the risk position of other banks. Consequently, Basel II is far from representing a faultless protection against financial crises. Unfortunately, it did not prevent excessive risk taking and may be considered a regulatory failure (Meltzer 2008).

Some lessons from the subprime crisis

It is amazing that banks have circumvented the Basel II rules, by shifting risky business off their balance sheets. This is astonishing since the Basel II rules were agreed upon internationally in 2004 so that good business practice would have implied that banks follow these recommendations even if they only came in effect in some countries as of 2008. Instead,

banks invented off-shore structured investment vehicles or conduits as independent subsidiaries that were established with a negligible capital endowment, specializing in securization (Borio 2008; Brunnermeier 2008). For instance, the conduit bought up mortgages (or other papers), bundled them up, "securitized" them and offered them on the market to investors as asset backed securities. It issued short-term commercial paper to finance long-term investment, a maturity transformation that can violate another traditional banking principle. The conduit received funds from investors, because the bank sponsoring the conduit granted a credit line to the conduit. In this way, the bank took the conduit off its balance sheet, as the collapse of the German Industrie Kreditbank (IKB) in August 2007 has shown.[2] Investment banks also were involved in securitizing low-value mortgages. As a consequence, banks actually no longer know how much credit risk they have hidden in their books. Nor are markets informed on the risk collected in the banking system. Even without the Basel II rules, banks should have respected the principles of decent behavior, not camouflaging the risk they were exposed to.

The behavior of banks described above including their business model "originate and distribute" represented a period of aggressive risk taking. When some of the risks materialized with the end of the US housing bubble in the fall of 2005, assets melted and liquidity of the banking system evaporated (Borio 2008). Some mechanisms intensified the liquidity spiral, for instance the need for de-leveraging (Brunnermeier 2008). One recommendation is that banks must be aware of their risks; risks must be transparent. Regulation should convince banks to hold stronger cushions of capital and liquidity, which is in their self-interest (Geithner 2008). It has to enforce adequate capital requirements. It should also be absolutely clear that balance sheets of banks have to be consolidated and must include all risks that a bank is exposed to. It is no question that financial supervision has to sharpen the rules for the consolidation of off-balance-sheet vehicles and of the risks associated with them. We need to know which part of the credit remains with the sponsor bank and which part is taken over by the vehicle company or by secondary or tertiary banks to which the assets have been sold; the original sponsor should take over part of the risk (Franke and Krahnen

[2] It is difficult to determine the risk allocation between the credit guarantor, i.e. the sponsor, and the vehicle company. In the case of IKB, the German Industrie Kredit Bank, it is reported the risk allocation is found in a sentence on page 92 of a 400 page contract; it is worded in such a way that it is difficult even for legal experts to understand what it means.

2007). In any case, the conditions under which risks can be shifted through securitization should be evaluated. Furthermore, in their own interest, banks have to improve transparency. Rating agencies must see their role in reducing uncertainty in the financial markets. They have to improve their ratings; rating should be separated from consulting. A rating at a given moment of time cannot be sold as remaining constant under all conditions. Consequently, the role of ratings in the regulatory framework such as Basel II has to be revised; regulation cannot rely on ratings automatically. The conflict of interest of rating agencies being paid by the issuers of the securities they actually rate has to be resolved without introducing new conflicts of interest, for instance being paid by investors (Davies 2008b). Financial supervision should compare the quality of ratings *ex-post*. It also has to improve its own efficiency. More specifically, prudent supervision has to make sure that systemic risks do not accumulate in the financial industry; regulation needs instruments to prevent an increase in these risks. In addition, banks have to make sure that the incentives for bank managers are not biased in favor of high risk exposure and that managers are accountable. Prudent supervision should keep an eye on distorted incentives for bank managers, observe market practices and focus attention to the maturity transformation taking place outside the banking system, also through hedge funds. As the actual crisis shows, there is a price to pay if some financial institutions as investment banks are allowed to be outside the regulatory framework.

Unfortunately, the subprime crisis had many more origins, exemplifying the difficulty to guarantee financial stability. The low interest rate of one percent during some years, a result of the Fed's expansionary policy, and accordingly the expectation of rising interest rates, represented a stark incentive to take out mortgages. The housing bubble led people to expect that the mortgage could be financed through the increases in wealth from rising house prices. This was similar to the herding behavior in previous bubbles, for instance the Dutch Tulpmania in the 17th century. Mortgage banks and other lenders gave up the principle that a certain percentage of equity – say 20 percent - was needed to obtain a mortgage when buying a house. Over-consumption in the US in constructing new homes did not have a foundation in savings; in that sense, it was artificial. Of course, politicians liked that their voters could live up to the American dream of owing their home. In a way, people were lured into taking out mortgages; predatory lending prevailed. Self-control of the banking industry did not exist nor were standards controlled by regulatory authorities. The industry did not provide mortgage products with which mortgage takers could live once the housing

bubble would die down. These false incentives were exacerbated by Fannie Mae and Freddie Mac, government-sponsored organizations, who bought mortgages from mortgage bankers and other lenders, bundled them up and placed them on the international market; this improved the liquidity position of mortgage banks, enabling them to hand out even more mortgages. Thus, some risks were passed on to these quasi-governmental institutions. The regulatory regime for Fannie Mae and Freddie Mac, established by Congress, namely the Office of the Federal Housing Enterprise Oversight, proved to be inefficient; it represented a signal to the market of an implied governmental guarantee. The institutional arrangement for Fannie Mae and Freddie Mac was flawed from its beginning in 1968; their accounting scandals in 2003 and 2004 were covered up by Congress (Wallison and Calomoris 2008). Meanwhile, the government has completely taken over both institutions. Dividends to shareholders were cut; the taxpayer has to step in. The securitization and the repackaging of bad mortgage loans was one channel through which the US mortgage crisis spilled over to Europe. This is how the US was able to keep its bubble afloat that had no support in real savings, similarly as the current account deficit finances consumption without savings. Another origin of the actual financial crisis was a 2004 decision of the US Securities and Exchange Commission to grant an exemption of its 30 years-long standing rule limiting broker dealers' debt-to-net capital to a ratio of 12-1. It granted the exemption to Goldman Sachs, Merrill Llynch, Lehman Brothers, Bear Stearns and Morgan Stanley, allowing them to lever up to 30 or 40 to 1 (Ritholz 2008). To sum up: The financial crisis in 2007-2008 was not the result of exogenous forces that hit the banking industry; it was an endogenous crisis that developed within the financial system. It also is a result of regulation failure in the US and in Europe where regulators did not recognize the problems that were endangering their banking systems.

Other failures of regulation

The subprime crisis shows that regulation *per se*, for instance Basel II or semi-governmental institutions as Fannie Mae and Freddie Mac, is not a guarantee that financial crises are prevented. On the contrary: Since regulations set incentives, they may well set the wrong incentives and cause moral hazard. Another example is the failure of the 747 savings and loan associations in the US in the 1980s and 1990s; the origin was a government regulation providing special protection to risky loans of these institutions. This was an incentive to go into more risky lending. The failure of US regulators to detect the fraud at Enron is a fur-

ther case (Meltzer 2008). The failure of regulation in Germany to notice the problems at Industrie Kredit Bank and Hypo Real Estate and to act accordingly is other examples. Yet a different aspect is that the regulation of the financial sector depends on other policy instruments. Thus, the financial crises in Sweden in 1992 and in Thailand in 1997 illustrate that a financial crisis is likely to arise if the capital account is liberalized and if, at the same time, the banking sector is not robust and not adequately regulated with respect to prudential standards; then an over-expansion of credit may result. It has now been accepted that there is a sequencing problem in liberalizing the banking sector and the capital account. The liberalization of the capital account should be preceded by an appropriate prudent regulation of the banking sector. For China, for example, this means that the capital account can only be liberalized after the fragile banking system has been made sufficiently robust (Siebert 2007a).

One major reason why regulation often fails is that the regulator does not have the appropriate information. This is the issue of asymmetric information at a given moment of time, it is also the Hayekian problem that the regulator possibly cannot have all the necessary information on future economic conditions; most specifically he cannot have all information on the product innovation of the industry. Another major reason for regulation failure is capture, i.e. that the interest of the regulated seizes the institutional arrangements and dominates the interest of the public. Asymmetric information is one reason why the expertise of those concerned is needed who then use their influence. Regulation may also be captured by the political process, as for example the history of Fannie Mae and Freddie Mac demonstrates. That is why I am skeptical on the Stiglitz proposal (2008) to include those affected by financial products into a regulatory body. The body then may well be captured by its members and politics. After all, we should not forget the good experience we have made with de-politicing institutional arrangements, for instance in the realm of central banks. New regulations, introduced with the best intentions, may have hidden incentive effects which may represent new moral hazards so that the institutional arrangement is not improved (Davies 2008b). Moreover, time inconsistency of political decision-making with shifting preferences is an important factor affecting the regulatory framework and causing its instability.

Regulations may be able to make a financial system more stable. But since they may also set wrong incentives, they can only be justified if net gains exist. Stability of the banking

system is part of efficiency in a long-run interpretation (Geithner 2008). All this requires complex analysis of the impact of regulations. Since regulation failure cannot be excluded, an institutional arrangement also has to make use of the self-interest of financial institutions, their responsibility and the strengthening of market discipline (see below).

Crisis management

Another aspect of a correct institutional design is crisis management, i.e. how authorities should respond to a financial crisis. A distinction must be made between national crises, i.e. those contained in a country such as the deposit-run on Northern Rock, and cross-border crises (Goodhart 2008). In the case of nationally contained crises, a major question is whether the central bank or the government has to step in. Although explicit cross-border bank runs have not occurred lately, the 2007-2008 melt-down of assets and the liquidity evaporation clearly implied cross-border spillovers. While in cross-border spillovers burden-sharing between countries or some form of cooperation becomes an issue, in the actual financial crisis losses of banks largely remained the problem of the individual bank, the national safety nets and of national authorities, i.e. central banks (the Fed in the case of Bear Stearns and the American Insurance Group) or the national public budget (ultimately the taxpayer in the case Fannie Mae and Freddie Mac as well as in the US bail out deal for bad loans and in Germany for the Industrie Kreditbank, Hypo Real Estate and the rescue plan of 500 billion euro). The US and European countries have arranged for deposit guaranties, credit guaranties and capital to be injected into their banks of roughly 3 trillion euro.

Crisis management has followed several paths: In a first response, central banks responded to the liquidity crisis of the banking system by large-scale exceptional injections of liquidity, for instance €95 billion by the ECB and $38 billion by the Fed on a single day, August 9, 2007. Massive further injections followed, often undertaken in a coordinated manner. These injections represented short-run overnight liquidity or liquidity for two weeks or even months in which the central banks accept securities against liquidity (repurchase agreement). Along the same line, central banks lowered the interest rate, for instance in a concerted action on October 8, 2008. In a second response, the Fed reacted with providing credit (see below). In a third reaction, governments increased the guarantee for deposits. They came up with bail out plans for individual banks, providing a guarantee or supplying fresh capital, and with rescue plans for the banking sector altogether, taking out bad loans

from the banks' balance sheets and offering to buy preferential shares of banks, partly nationalizing them. All these measures did not address the crisis in the US housing market and over-consumption, the origin of the crisis. The mark-to-market accounting rules are changed somewhat by the Securities Exchange Commission and by the European Commission in the fall of 2008. While mark-to-market accounting indeed makes it more difficult for banks to withstand the crisis, the change in accounting rules may invite accountants to hide problems, even if their methods of evaluation have to be communicated to the regulatory authorities.

A way out off the crisis comes if housing prices, the value of bad loans or other asset prices have fallen so low that it becomes a bargain to buy; then the market will reverse itself. As the case of Wachovia shows, the government-orchestrated solution of selling the bank to Citigroup for 2.2 billion dollars was inferior to the $11.7 billion take-over through Wells Fargo, representing a market solution. Other factors would be that an economic upswing, population growth and immigration will increase the demand for housing and ease the US housing crisis. In addition, the hope for a solution is that the actual loss of confidence is irrational. Thus the Ted-Spread, a measure of the probability of default, was so high at the end of September, that "AAA-rated 10 year bonds were priced as if the probability of default of the bluest of blue chips was 39 percent" (Hassett 2008). This is unrealistic. Consequently, the intertemporal fix point should tell investors that the time for a bargain has come.

Crisis management in the US

In addition to providing liquidity, the Fed has started to extend credits. This happened when it gave a credit of 29 billion US dollar to J. P. Morgan to acquire Bear Stearns and when it introduced a two-year credit line of 85 billion US dollar to the insurer American Insurance Group, receiving equity participation notes amounting to 79.9 percent of the firm's capital. The insurer was taken over by the government. In October 2008, the Fed added a second credit line of $ 37.8 billion. Moreover, Morgan Stanley und Goldman Sachs now have access to the Fed's support after they have given up their special status of investment bank. The Fed has also set up a 28-day Treasury Security Lending Facility which offers Treasury general collateral to the Federal Reserve Bank of New York's primary dealers in exchange for other program-eligible collateral, including mortgage-

backed securities and investment grade corporate securities. This facility may be used in connection with the 200 billion dollar package for Fannie Mae and Freddie Mac, however so far only reaching much smaller volumes. In addition, the Fed will directly lend to corporations for a limited time, and not only to banks; this has happened for the first time since the Great Depression. It will also buy up companies' short-term debt; the power to do so was bestowed on the Fed during the Great Depression as part of the Federal Reserve Act. It has to be seen which moral hazards will follow for the financial system in the future from the large liquidity injections and from the Fed's extension of credits. In principal, there is a goal conflict for central banks between price level stability and guaranteeing the functioning of the financial system. This especially applies to the credits provided by the Fed, since they come close to the Fed providing money to the governmental budget; the Fed's credits substitute tax money. Lending directly to firms endangers the Fed's own exposure. It is open how these unusual interventions, intended to restore confidence among banks, will affect inflationary expectations, possibly leading to a loss of confidence of the public towards the monetary authorities. It also has to be seen to what extent they will be the seed for a new crisis in which confidence in the Fed and the US dollar will weaken.

The main argument for the measures of the Fed was that the damage would have been much larger, had the financial system collapsed. This argument is also used for the interventions of the US government, nationalizing Fannie Mae und Freddie Mac, taking over the American International Group and introducing a bail out arrangement that will take out bad loans from the system in the magnitude of 700 billion US dollar; the program is spread over three stages. Following the UK example (see below) and the Swedish experience of 1992 (Ergunor 2007), the US government will buy preferred shares from financial institutions, thus partly nationalizing the banking industry. The premise is that the market will not be able to find out off the crisis and that bankruptcies would aggravate the problem (for the opposite opinion see Miron 2008).

The 700 billion bail-out approach is similar to the Resolution Trust Company which took over bad loans in the savings and loan crisis at the end of the 1980s. Its key element consists in the government buying up bad loans which it will sell later on. A process has to be set up for buying up toxic assets, such as mortgage-backed securities from financial institutions, most likely through reversed auctions in which the lowest-valued securities will be

bought up. The design of such auctions is complicated because the financial institutions having the bad loans can play strategically against the government. How to take out non-performing loans out off a banking system is a complex matter as the Japanese experience shows (Nakaso 2001). The 700 billion dollar measure was sweetened by extending bank deposit insurance up to $250,000 (which may imply emergency lending to the Federal Deposit Insurance Corporation) and by adding new tax breaks. In addition, federal resources will be used to help home owners at the risk of foreclosure. Whereas there is no alternative to the bail out, it represents a consequence of the housing bubble and institutional failure, especially of the set-up of Fannie Mae and Freddie Mac whose institutional flaws are covered up by the bail out. Also note that the US bail out plan only addresses the liquidity squeeze, but does not solve the housing crisis.

The funds to buy up the bad loans and to buy preferential shares in banks will come from governmental bonds, but in the end, the American tax payer will have to foot most of the bill, unless the stakes taken in US financial institutions by the government will regain value. To finance the program through bonds is doable as long as the American state remains credible; but the future maneuvering space of government will be restricted. It is still up in the air whether the 200 billion US dollar support announced for Fannie Mae und Freddie Mac will be sufficient; the debt of Fannie Mae und Freddie Mac is estimated at five trillion US dollar, partly supported by real values. If this would be the relevant figure, the share of US debt in GDP would rise by 36 percentage points to 100 percent, when OECD data are used. Through the bail out arrangement of 700 billion US dollar, the share will increase by another 5 percentage points. The condition for success of the bail out arrangement is that all uncertainty disappears.

In crisis management, one has to be aware that short-run measures may change the characteristics of the institutional arrangement with a long-run impact on the incentive system and adverse moral hazards. A case in point is the impact of the generous liquidity support, necessary in the short run to reintroduce confidence, on the Fed's exposure and the possible impact on inflation. The question arises to what extent the Fed's policy and the US bail out plan actually keep the bubble going without requiring a fundamental correction of the artificial over-consumption in the US housing market. Moreover as we know from the Savings and Loan crisis in the US, strengthening deposit protection will represent a new moral hazard for the behavior of banks, in the actual case by introducing a bias in favor of savings

and against investment in the long run. In the case of Europe, deposit protection represents a distortion to the benefit of those institutions that are close to the government such as semi-public savings banks. Strengthening capital requirements, of course, comes at higher costs for the public (Davies 2008a).

In looking at the way out of the financial crisis, it should not be forgotten that other disturbances of the financial system may occur. Thus, American households may find themselves in a trap in their leasing finance of gasoline-intensive cars which they may have to give up when energy prices rise and when environmental policy mandates the internalization of environmental costs. Adjustment of this situation may have an impact on the automobile industry. Prepaying consumption through credit cards is another story. Moreover, it cannot be excluded that somewhere in the world a currency crisis erupts or that the fragile Chinese banking system creates new problems.

Crisis management in the EU

In Europe, being exposed to a liquidity crisis but not to a housing crisis like the US, the response to the crisis was overwhelmingly national except for liquidity provided by the ECB in the euro area. Thus, Ireland has given a state guarantee for all deposits and debt for its six major banks until September 2010. Other countries followed. The Benelux countries injected capital into their Fortis bank, and Belgium and France provided capital for Dexia. The UK nationalized Northern Rock and took over the mortgage bank Bradford & Bingley which then was sold. The UK also came up with a three-pronged rescue plan, whose basis is to raise the low capital endowment of UK banks. The government offers to take a stake in the banks, up to 75 billion pounds, providing capital in buying preferred shares that pay a fixed interest or underwriting issues of ordinary shares. This means partly nationalizing the banks if they are unable to raise the required capital themselves. Banks participating have to lower their dividends and managers' salaries. In addition, banks that meet the capital thresholds are offered government guarantees amounting to as much as 250 billion pounds, allowing them to renew their bonds when they mature. Furthermore, the government will add 100 billion pounds to the Bank of England short and medium term loan scheme, in which banks can obtain short-term liquidity.

The German government sold Industrie Kredit Bank with a loss of about nine billion euro and arranged financial support of 50 billion euro together with the private sector for Hypo Real Estate in October 2008.[3] Hypo Real Estate ceded assets amounting 42 billion euro to the federal government. The government's guarantee will be implemented through a special purpose vehicle set up by the German Bundesbank. Incidently, the Bundesbank has created a liquidity facility, accepting securities of Hypo Real Estate up to 20 billion euro, similar to the liquidity window introduced by the Fed. The German government also gave a political guarantee for deposits, promising a full guarantee without putting it into law.

In addition, Germany came up with a similar rescue plan as that of the UK with a volume of 500 billion euro, about the same amount as the US bail-out plan of 700 billion dollar. It contains 80 billion euro for the capitalization of banks according to which the government offers to buy preferential shares in financial institutions if they need capital. The government will also give credit guarantees of up to 400 billion euro for which banks pay interest. All this will be done on a case-by-case basis. The funds are available until December 2009. The government will establish a special fund which will administer the program and can give the guaranties. It is independent, but receives support from the Bundesbank. The government will impose conditions on the behavior of banks participating in the program. It limits manager income to 500,000 and forbids boni and dividends. Supposedly, the finance minister can intervene in the bank's business model, requiring for instance that credits are given to small- and medium-sized enterprises. The special fund will be financed by bonds. It is reminiscent of the German Unity Fund which eventually was integrated into the state's budget. The upper estimate for the costs to the budget lies at 20 billion euro. These costs will be split between the federal government and the Länder. The law was passed on October 17 by the *Bundestag* and the *Bundesrat.*

In light of the fact that representatives of the German government were represented in the supervisory board of the failed banks and that financial supervision did not recognize the coming crisis of some German banks, it is somewhat surprising that the government is confident that it can avoid policy and regulatory failure in the administration and operation of the special fund. So far, it was not the expertise of government to run banks. Moreover, the nitty-gritty case-by-case discretionary decisions may prove to be open to mistakes and to be

[3] The Saxony state bank was sold requiring a guarantee of 2.75 billion euro from the state of Saxony.

bureaucratic. Also, it is open whether the upper limit of budget costs will be upheld. Finally, the rescue plan presupposes that the general public does not lose confidence in what the government is doing.

National responses create difficulties in the EU's single market, representing a distortion for the financial sector going counter the spirit of integration. One country's solution represents another country's problem. For instance, the deposit guarantee of Ireland was an incentive for British depositors to move their accounts to Ireland so that the UK had to follow with its own guarantee. Through such spillovers, national solutions are interlinked. This is why EU finance ministers have agreed on the guideline that national governments in the EU-27 should provide deposit guarantees of up to 50 thousand euro. Apparently, this guideline does not cover the different approaches of EU members. Moreover, other approaches of crisis management in the EU are not uniform. Thus, liquidity injections by the ECB positively affect only the euro-area banks. The main reason why in spite of the spillovers EU crisis management has remained national (within agreed upon guidelines) lies in the fact that any bail out of the banking sector has to be supported by the national capacity to tax; due to the EU's federal structure and the condition that direct taxation is national being subject to the EU anonymity rule, any bail out can only be supported nationally. Therefore, a joint EU rescue plan with burden-sharing would run into the problem that it would open the road to the EU level deciding on the spending of national tax revenues. The time is not ripe for that. One would rather not see a major border-crossing financial crisis in the European Union or even in the euro area. It would be difficult to imagine how burden-sharing can be arranged in such a situation and which role the ECB and fiscal cooperation could play. In principle, in the euro area with cross-border banking groups, the Lamfalussy framework attempts to provide a regulatory and supervisory setup to ensure financial stability (ECB 2008); it can be viewed as representing a survey of issues in a nutshell that may arise internationally.

Crisis management in Europe has political consequences. Take Germany. In view of a rescue package of 500 billion euro for the banking sector, anti-recession programs or subsidies for specific sectors are easily accepted by public opinion, in spite of their failure in the past. Sarkozy has proposed national bail out plans for European industry. This is not far from the destabilizing actions that are known from the 1930s. It would involve high costs if the

world economy now would return to protection and if the established rule system for the international division of labor on the world's product market was endangered.

Drawing up a new financial architecture

For crisis management, it would be good to know how the rule system will look like in the long run. Drawing up a new financial order can be analyzed with principal-agent theory in which the principal sets the rules and incentives but cannot observe the behavior of the agents, including their efforts and their options to avoid following the rules. The politician is the principal defining the rules for financial institutions, the agents. As we know from principal-agent theory, it is a complicated task to write the rules.

It is open on which basic elements of a rule system the countries of the world can agree in the planned financial summits among the G-8 plus Brazil, India, China and other states. Countries assign different roles to their financial industry and to financial innovation in their economic strategies. In the past, countries have used quite different approaches in the institutional arrangement of their financial industry and in financial supervision.

In spite of the different approaches, it is conceivable that a new set of rules emerges in which countries can agree on some general principles and on some technical points for financial systems, as discussed above: Balance sheet truth must hold. Financial institutions should not be allowed to take risks off the balance sheet. Capital adequacy requirements, i.e. a bank's capital in terms of shareholders' equity and retained earnings as a percentage of its risk weighted credit exposure, must take into account the long-run sustainability of a financial institution; a value of 10 percent seems appropriate. Such requirements have to adjust to adverse situations in the business cycle and in the interconnectedness of risk positions within the financial industry. They also have to be set higher for more risky activities. Levers between debt to own equity should be limited; they should not exceed 12:1, a ratio in force in the US before 2004. In securization, the originator of a loan should retain part of the original risk, say 10 or 20 percent. Incentive systems for bank managers should be oriented at the long-run sustainability of a financial institution. Prudent supervision has to become more effective. It must be put into a position to prevent systemic risk; it must have the instruments to avert systemic risks, for instance through stress tests. Prudent supervision has to prevent a situation in which a country accumulates too much foreign debt (see

Iceland and Hungary in 2008) or if a country's banking industry accumulates too much risk exposure through loans to other countries. Ratings have to be improved. At the same time, regulators should not rely automatically on ratings. All in all, the financial sector should not distance itself too much from the real economy.

A major systematic problem for an institutional arrangement is that in the long run, a bankruptcy procedure for financial institutions should be introduced in which the government credibly commits itself not to bail them out, if the worst case comes. An important element of such a rule is that in the case of failure the owners of the bank will lose their capital and that its managers will be replaced by the regulator. Due to the pervasive impact of a bank failure on the general public, it will be extremely difficult to give credibility to such a rule. Without such a rule, however, the actual financial crisis will soon be forgotten and a cycle of pathological learning will start again. Another issue of an international rule system consists in preventing national rule systems being captured by the national political process, i.e. the financial system being used for political goals. Last but not least, international rules for the financial sector should prevent that a bubble arises that allows an artificial financing of over-spending (over-consumption; over-investment) and that has no basis in real savings (as in the case of the US housing market). [4]

Yet a further important aspect of a financial rule system is that international spillovers are typical for the financial industry. In order to prevent that one country's solution represents another country's problem, some type of cooperation is needed, for instance in the European Union. Internationally, coordination among national regulatory authorities is needed as among competition authorities. There is demand for an increased role of the IMF. This Bretton Woods institution indeed represents an international forum where finance ministers and central bankers meet and where they can exchange views, for instance on crisis management. The IMF can also help those countries that will experience balance of payments or currency problems as a consequence of financial crises, for instance if emerging countries are affected and need a credit. Moreover, the IMF's surveillance can monitor financial stability and the situation of the banking industry, needing data support from national supervisors and authorities and from the Financial Stability Forum. The IMF can write a joint report with the Financial Stability Forum on the status of the financial

[4] The US credit card sector is another example.

industry, pointing potential problems (Draghi 2008). The IMF can alert the public and hope that national supervisors will intervene. However, the IMF has no sanctions at its disposal to stop national banking systems from running into trouble. To cede sovereignty in the area of prudential supervision including concrete sanctions to an international body is unlikely to happen. It would mean giving a crucial policy instrument out of the nation's hand. Countries are reluctant to cede sovereignty to the IMF in light of the IMF's approach to the Asian currency crisis. Indeed, the IMF is not in a position to apply the polluter-pays-principle when a country starts a financial bubble that artificially leads to over-consumption and over-investment. Another crucial aspect is that any bail out will have to be backed by national tax money; states are unwilling to cede sovereignty in this realm. See the experience of the European Union. Thus, the IMF cannot play the role of the world economy's chief regulator. For the same reason, it cannot be the world's central bank; countries would not cede monetary authority to the IMF.

Hedge funds

It is up in the air how hedge funds will fare in the actual financial crisis, especially when several options like selling short are taken away from them. When this manuscript is closed, it is unknown whether problems may be hidden in the hedge funds' balance sheets. It is also open whether the finance summits attempting to find a new financial rule system will accept the business model of hedge funds.

The term hedge fund denotes institutions that specialize in financial arbitrage, exploiting unused financial market opportunities. This includes among other things currency arbitrage, arbitrage in time (long and short positions), between locations (seeking assets that are mispriced relative to global alternatives), between products (a convertible bond and equity, buy and sell undervalued securities) and between securities that have deviated from some statistically estimated relationship. Derivatives, i.e. financial contracts whose value is derived from other contracts using leverage, play an important role. Besides derivatives, currency arbitrage is another field. For instance, hedge funds take credits in yen at an extremely low interest rate, swap yen against US dollars and euros with higher interest rates and exchange these back into yen ("carry trade"). This depresses the yen and fuels the other currencies. Hedge funds are lightly regulated; they receive their capital from wealthy individuals and institutional investors such as foundations, endowments and pension funds.

Sometimes the term hedge fund is used to include private equity funds which collect financial capital in order to buy up enterprises. Indeed, hedge funds have some similarity to equity funds when they are involved in merger arbitrage, i.e. in arbitrage between an acquiring public company and a target public company. Nevertheless, equity funds should be considered as representing real capital flows.

Hedge funds play an important role. In specific market segments, for instance in trade with credit-derivates, they supply risk capital and allow to limit credit risks for individual investors, for instance when a discount certificate introduces a floor in the stock market index, thus providing some certainty for individual investors. In this way, they permit a more efficient risk allocation. They can lower market risk by spreading it on more shoulders. They make financial markets more liquid and ease price formation, providing information on risk-taking behavior of individuals. For institutional investors, as pension funds and insurance companies, who have invested in hedge funds, they represent an interesting opportunity. Also banks provide capital to hedge funds in the form of credits. The number of hedge funds world wide is estimated at 9000. Their assets are put at 1.6 trillion US dollar.

In contrast to improving risk allocation, hedge funds can represent a risk for the stability of financial markets. This is the case when the risk positions taken show up to be unsustainable, i.e. in the case of a misjudgment by the hedge fund. This, for instance, happens if the statistically estimated relationship that is used to determine the deviation of the value of securities proves to be wrong. Such a situation arises when market trends change and when the change is not incorporated in the econometric models. A case in point is the „Long-Term Capital Management“, which lost 4.6 billion US dollar in a few months in 1998. It had to be bailed out by the Fed. In 2006, Amaranth, speculating on natural gas prices, burnt 6.6 billion US dollar within a week. Hedge funds are said to have unusually high returns. However, it should be noted that quite a few hedge funds have short lifetimes. If returns only reflect hedge funds that have survived, the performance of the industry is definitively overestimated. Hedge fund managers' remuneration is heavily weighted towards performance incentives; they are paid on the basis of annual results. In contrast, unusual events - black swan events - usually happen every five or ten years. Consequently, hedge funds managers have high incomes, while the investors often take the loss.

Market risk increases when hedge funds with wrong estimates move in the same direction. Then a financial crisis will be amplified. The financial market is also affected when hedge funds fail; this applies for banks who have extended credits. Under these conditions, it no longer holds that market risk is reduced through hedge funds. This is the issue of systemic risk for the global financial system caused by hedge funds. Accordingly, the ECB (2006: 142) warns that "... the increasingly similar positioning of individual hedge funds within broad hedge fund investment strategies is another major risk for financial stability which warrants close monitoring despite the essential lack of any possible remedies. This risk is further magnified by evidence that broad hedge fund investment strategies have also become increasingly correlated, thereby further increasing the potential adverse effects of disorderly exits from crowded trades."

Hedge funds cater market participants who are willing to take on high risks if they get high returns. Whereas the typical public investment company in the US, for instance a mutual fund, is required to be registered with the Securities and Exchange Commission (SEC) and underlies a set of limitations, hedge funds are open to accredited investors only. Usually, they are exempt from any direct regulation by regulatory bodies. Moreover, hedge funds flock to regulatory havens, such as the Cayman Islands, Dublin, Luxembourg, the Channel Islands, the British Vergin Islands and Bermuda. The Cayman Islands are estimated to be home to about 75 percent of world’s hedge funds, with nearly half the industry's assets under management.

Given these conditions, policy measures to reduce the systemic risk arising from hedge funds are difficult to come by. One approach is to require hedge funds to register in a country; if they then go offshore, it signals to the customer that a higher risk is involved and that these funds will not be bailed out. Another approach is to make national banking systems, including all financial intermediaries, more robust. Accordingly, credits given to hedge funds and derivatives should be adequately reflected in the risk evaluation of banks and their balance sheets. A dialogue with the hedge funds industry, possibly with the largest 100 funds, should lead to a code of conduct of hedge funds. The global hedge fund industry should review and enhance existing sound practice benchmarks for hedge fund managers in the light of expectations for improved practices set out by the official and private sectors. Part of such a code of conduct can be a self commitment of the industry to submit

to an external rating. More systematic and consistent data on core intermediaries' consolidated counterparty exposures to hedge funds should be developed as an effective complement to existing supervisory efforts (Financial Stability Forum 2007).

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