GLOBAL IMBALANCES
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COLLAPSE OF GLOBALISED FINANCE

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The views expressed in this report are those of the authors writing in a personal capacity and do not necessarily reflect those of CEPS or any other institution with which they are associated. Anton Brender is Associate Professor at Paris-Dauphine University. Florence Pisani teaches at Paris-Dauphine University. They are both economists with Dexia Asset Management.

Translated into English by Francis Wells.

Cover photo: A figure in a window at Lehman Brothers in New York City, 15 September 2008. © Mark Lennihan/AP

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FOREWORD

It is a particular pleasure to be able to present this study to the wider public.[1] Anton Brender and Florence Pisani have discovered a key element in the financial crisis, namely the interaction between the so-called 'global imbalances' and the accumulation of risk in different parts of the world. Their arguments and findings provide a completely new view of the consequences of the large US current-account deficit and the corresponding large surpluses in Asian and oil-exporting economies. Their analysis leads to many important, and sometimes surprising, conclusions.

One key insight from Brender and Pisani is that one should think about these imbalances not in terms of flows but in terms of stocks. At first sight, this distinction might appear minor but it has profound policy implications. When the US deficit first arose in the early years of the last decade, it caused considerable discussion because it seemed counter-intuitive that the richest country in the world should dis-save and its excess consumption be financed by much poorer countries. As time went on, however, the US deficit not only persisted, but it increased. Policy-makers became accustomed to this combination of US deficits and emerging countries' surpluses, and given that global growth was satisfactory, the sense of urgency to address the issue declined over time. Brender and Pisani tell us that the policy response should have been the opposite. As the imbalances persisted, the accumulation of risk continued and the scale of the crisis we experienced was due to the stock of risk that had been accumulated in the meantime. Hence policy-makers should have become more, not less, concerned as the imbalances continued.

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[1] This text derives from two earlier works – *Global Imbalances: Is the world economy really at risk?* and *Globalised Finance and its Collapse* – published by Dexia respectively in May 2007 and April 2009.

From a European point of view, another key insight from Brender and Pisani needs to be emphasised: financial risk generated by international transfers of savings can be accumulated even in a region that does not have an external trade imbalance. This is what happened in the case of the eurozone, which over the last decade had a balanced current account, but whose financial system accumulated risky assets (while selling risk-free ones). This is why Europe was so strongly affected by a crisis that originated in the US: when the risk materialised, large losses arose in the eurozone's financial system as well. This vividly illustrates how financial integration can create an international transmission mechanism in altogether unpredictable ways.

Daniel Gros
CEPS Director
Brussels, January 2010

INTRODUCTION

The world economy is just starting to recover from the most disastrous episode in the history of financial globalisation. The magnitude of the recent catastrophe, measured in terms of forgone production and losses on defaulting loans, is exceptional and many years will be needed to erase the deep scars it left on developed countries' labour markets and public finances. Understanding what happened is essential. This is not an easy task since, as has now often been stressed, to produce such a catastrophe "many things had to go wrong at the same time". It is thus important to try to separate the primary problems from the secondary ones.

We argue here that the main problems were deeply rooted. They are to be found in two closely-linked developments that for many years were both left largely uncontrolled: the increase in the intensity of international transfers of savings – the so-called 'global imbalances' – and a wave of innovations – globalised finance – that have changed the way savings and the risks related to their investment can be transferred. By relaxing the link between the provision of savings and the taking on of the risks generated by the loans these savings were funding, globalised finance provided the infrastructure needed to support the growing international payment imbalances that were the hallmark of this century's first decade. Globalised finance allowed continuously increasing amounts of emerging countries' savings – generated by Asian firms and households as well as by oil-producing countries' governments – invested in 'risk-free' assets to finance loans – often to American (or Spanish) households – that were far from risk-free.

The risks attendant on those loans did not of course vanish: they were borne by the risk-takers of the globalised financial system. Hedge funds, investment banks, off-balance-sheet vehicles, specialised institutions like Fannie Mae or Freddie Mac, etc. functioned here as parts of a genuine 'alternative banking system', taking on the bulk of the liquidity, interest-rate and credit risks that were generated by the mismatch between the

assets that emerging regions' savers were prepared – or able – to invest in and the liabilities issued by developed countries' borrowers. Unfortunately, no one was in charge of keeping a check on either the quantity of risk being accumulated in this way or the quality of the loans generating those risks. The consequence was terrible: the only force that could finally rein in the continuous deepening of the global imbalances was the collapse of globalised finance.

Globalised finance provided the world economy with tools of astonishing power – to judge by the mass of savings it mobilised – but also saddled it with great vulnerability – to judge by the mass of risk it managed to concentrate. The first chapter of our study describes these new arrangements, focusing on the way lending circulates. By transforming loans into tradable securities, securitisation, in combination with the increasing intervention of 'risk-takers', has permitted the introduction of risk-taking chains, capable, like banks, of acting as intermediaries between lenders and borrowers. With the passage of time, the importance of this 'alternative banking system' has in certain economies become comparable to that of the traditional banking sector. It was not until the beginning of the 2000s, however, that these new tools revealed their full potential. Before then, despite the liberalisation of capital movements, international transfers of savings had remained on a modest scale. Since the beginning of the 2000s their intensity has steadily grown, but their direction has been a surprise: instead of flowing from North to South, as many would have expected, their flow went from South to North, and in increasing amounts. The explanation for this awkward fact lies, as explained in Chapter II, in the modalities of the present globalisation. Since the Second World War, financial globalisation moved forward in a rather chaotic way. At no moment was an effort made to put in place a financial system capable of safely supporting international transfers of savings from the developed part of the world to the less developed parts.[2] For lack of such a system and after a number of dramatic crises – first in Latin America, then in Asia – many emerging countries finally chose not to base their development on imported savings. This left the developed regions as almost the only ones liable to absorb the savings surpluses that emerge when in one economy or another there is a tendency to spend less than is earned. Hence, the

[2] The same point is made in Wolf [2008].

unexpected service that financial globalisation in the end rendered to developing countries: during most of the 2000s, instead of providing them with a source of additional finance, it offered them an outlet for their excess savings.

Chapter III starts with an observation: at the beginning of the 2000s, the intensity of international transfers of savings steadily grew, while growth in the emerging economies accelerated strongly. Those two trends were not unrelated. Because of their inability to transform their domestic social and financial institutions as fast as their productive capacities, many emerging economies, especially in Asia, became plagued with an increasing propensity to spend less than they earned. To keep growing at a solid pace, they therefore had to be able to export savings. By combating the chronic overvaluation of their currencies, they achieved this and prevented their growth from being asphyxiated by a savings glut. This called for continuous public interventions to keep the value of their currency in line with their development level, despite increasing current-account surpluses. At the same time, faster emerging world growth imposed strains on most of the commodity markets and by the middle of the decade, another group of emerging economies – commodity-exporters – were also accumulating huge current-account surpluses … and foreign exchange reserves. For lack of a developed financial system, the domestic counterpart of this reserve accumulation in the emerging regions was mainly an increase in private- and public-sector deposits with the local banking system (Chapter IV). Monetary policies, contrary to what was sometimes feared, could be quickly adapted to deal with the domestic liquidity implications of this accumulation but financial strategies could not. The only risk that surplus countries ended up carrying was an exchange risk, the bulk of the other risks being left to be taken on by the globalised financial system.

Chapter V analyses the mechanisms of the interaction between emerging and developed economies that led the latter to let their current account move deeper and deeper into the red. These economies reacted to the headwinds resulting from both the upward pressure on their currencies and the increase in commodity prices by stimulating their domestic demand. The way each responded to the policies implemented was far from uniform, however, and the absorption of the savings glut generated in the emerging world was in fact concentrated in a few countries, the United States in particular. Macroeconomic policies are not sufficient to explain what happened, however. For the import of savings to take place, the risks attached to the lending that these savings financed had to be taken on.

Chapter VI shows that their burden was mainly borne by the risk-taking chains in the alternative banking system. The risk-takers' 'leverage' – the ratio between the risks they took on and the equity capital at their disposal for doing so – then rose appreciably, weakening the solidity of the chains in which they were links. What was even worse was that from the mid-2000s onwards, this risk-taking behaviour could only be explained by an ever-more complaisant attitude towards risk. This made the stability of the system fully vulnerable to a reversal of this attitude.

The 'subprime shock' provided the trigger for what would mutate into the first crisis of globalised finance. Chapter VII analyses the origins of the shock and shows how its propagation led, in the last months of 2008, through the unhindered working of a devastating de-leveraging spiral, to a paralysis of the financial system. The authorities could not prevent this fatal outcome because they were unable to relieve private agents quickly enough of the risks they were no longer able to bear once the aversion to risk started to increase. During this crisis, however, the dollar not only avoided falling into the abyss but even appreciated sharply. Chapter VIII attributes part of this astonishing resilience to globalisation itself: by increasing the size of the portfolios capable of absorbing dollar-denominated debts, globalisation had in fact cushioned the impact on the dollar of the accumulated US deficits and, contrary to what had often been feared, the dollar was far from being in free-fall before the crisis. This explains why its ups and downs throughout the crisis have merely reflected the dramatic fluctuations in global risk-aversion that then took place.

The final chapter draws the lessons from what happened. To see this crisis merely as a fresh illustration of the excesses of finance would be to miss the essential point. This crisis has revealed the shortcomings of an ideology that encouraged the authorities to neglect their functions of regulation and surveillance. It has also shown the dangers of globalisation if unaccompanied by necessary international cooperation. Placing globalised finance at the service of growth is possible, but it requires a form of co-responsibility on the part of governments that goes far beyond mere prudential surveillance.

I. THE INFRASTRUCTURE OF GLOBALISED FINANCE

The deregulation launched at the end of the 1970s brought about a far-reaching transformation of Western financial systems. The circulation of savings and of the risks associated with the investment of those savings had long remained closely linked. This was obviously the case for direct finance operations on the traditional markets for equities and bonds, where the exchange of capital for the securities issued by a firm or a government was inseparable from the taking of the risks involved in the investment. But it was also true of traditional bank intermediation, where the institutions taking in savings on deposit were also those that assessed, took on and held the risks involved in the loans financed by these savings. Financial globalisation has shattered these traditional operating structures. By basing itself on new markets, new products and new players, it enabled loans to be removed from the balance sheets of the banks distributing them while at the same time it gradually eliminated the link between the supply of savings and the taking of the risks related to the lending made with those savings. The globalised form of finance that then developed facilitated an expansion of lending to agents who had no access to financial markets, households in particular. At the same time it broadened the range of investments accessible to savings-collectors other than banks, especially pension funds, mutual funds and life insurers. Aided by the liberalisation of capital movements, these evolutions were accompanied by an intensification of international financial integration.

This chapter briefly sets out the main features of the mechanisms put in place in recent decades – most often on the initiative of private operators – focusing more particularly on credit markets, whose evolution has been most spectacular. Understanding the working of those mechanisms is essential in order to fully grasp the dynamics of the crisis that started in 2007. After initially seeing how progress with securitisation and recourse to

derivatives have modified the way in which loans are financed, but also the way in which the associated risks are borne, it will be shown how this evolution has permitted the creation of a genuine alternative banking system, based on players each of whom takes on one or more of the risks related to these loans without collecting the savings needed to finance them. Increasingly complex risk-taking chains have accordingly come into existence and now embrace the whole planet. Until the beginning of the 2000s, however, this increased international financial interpenetration above all permitted wider circulation of financial risks, with transfers of savings between nations remaining relatively limited, as we shall see.

1. The shattering of the traditional bank intermediation framework

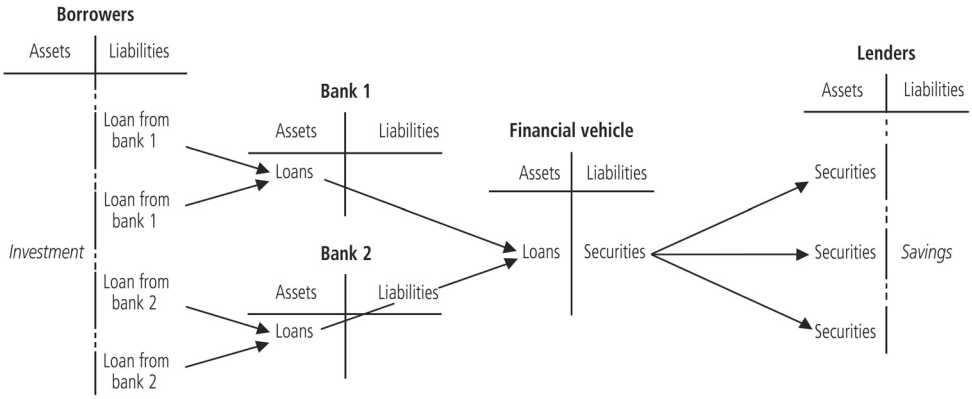
Securitisation has played a central role in the globalisation of finance. In order to understand the way in which it has transformed the functioning of the credit system, let us return to the implications of the granting of a traditional bank loan. By putting at a borrower's disposal a certain amount of means of payment, in this case by crediting his account in its books, the bank provides financing. At the same time, it agrees to take on several types of risk:

- credit risk: if the borrower falls behind in paying the interest or, worse still, defaults, this will mean a loss for the bank;
- interest-rate risk: if the loan granted is at a fixed interest rate and if the bank remunerates its deposits at a variable rate, a rise in the latter will reduce its interest-rate margin; and
- liquidity risk: if its deposits decline unexpectedly before the loan matures, it may have to mobilise liquidity to cope with the problem and this can be costly.

Securitisation offers the bank the possibility of having to finance the loan only provisionally and of relieving itself of all or part of the above risks. To do this, all that is necessary is for it to sell the loans it has already granted to an entity that finances their acquisition through the issue of *securities* that are tradable on a market, bonds in this case. In practice, the loans are acquired by an 'originator' (often an investment bank), which assembles 'bundles' of loans of a given type (mortgages, consumer credit, business loans, etc.) while trying to diversify their origins with the purpose of reducing the overall risk. He then places these bundles on the balance sheet of a legal entity created for the purpose – often described as a 'financial vehicle' –

which becomes the owner. The vehicle then issues securities backed by this set of loans (Diagram 1).

Diagram 1. Securitisation through loan sales



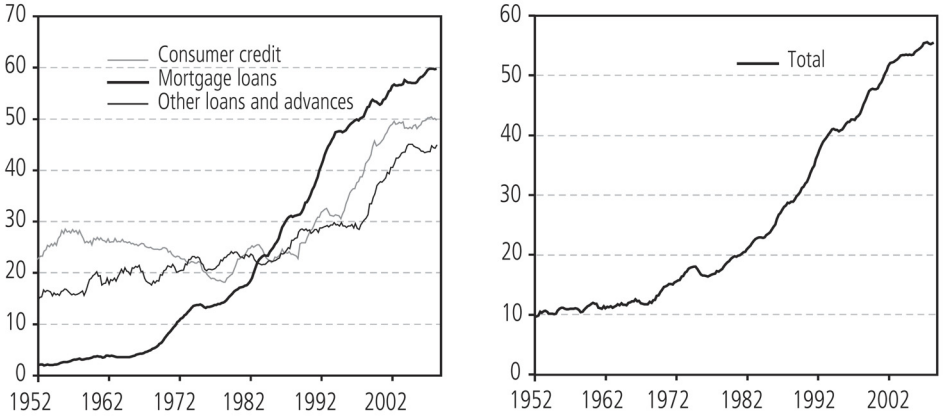
As the original loan contracts are unaffected by the operation, the flow of payments to which they give rise will finance the flow promised to the holders of the securities issued. Once the operation has been completed, the financing of the loans will have been ensured by the issue of these securities and the purchasers of these securities will bear the risks. The attraction for the bank is clear: by selling the loans distributed for slightly more than they cost, it realises a definite margin, while leaving others to finance them and to carry the risks involved, in the hope of course of making a profit. This form of securitisation is notably that of most of the bonds backed by consumer credit or loans to businesses, i.e. asset-backed securities (ABS). A financial institution may nevertheless become involved to relieve the issued securities of part of their risk: for example, the credit risk in the case of most of the mortgage loans distributed in the United States is taken on by certain government-sponsored enterprises (GSEs) – the best-known being Fannie Mae and Freddie Mac. The bonds backed by this guaranteed lending are known as mortgage-backed securities (MBSs).

The modalities of securitisation can be fairly diverse, depending on the financial systems concerned. In Europe, for example, securitisation takes place mainly through the issue of 'covered bonds'. These enable the banks to unload only part of the risks listed above. In Germany, for instance, the *Pfandbriefe* are bonds backed by loans, usually mortgage loans or loans to the local authority sector, issued and guaranteed by authorised banks. Unlike the securitisation outlined in Diagram 1, the bank retains the

loans on its balance sheet and hence also the credit risk. However, the bank does not provide the financing and is therefore relieved of the liquidity and interest-rate risks to the extent that the bonds issued have a maturity close to that of the loans guaranteeing them. As there is no transfer of ownership to an ad hoc vehicle, the risk for the purchaser of the security depends in the first place on the solidity of the issuing bank but also on the prudential norms imposed. In the case of the *Pfandbriefe,* the value of the securities issued cannot exceed 60% of the backing loans and the buyer, in the event of default by the bank, enjoys the rights of a first-rank creditor on these loans. The French *obligations foncières* and the Spanish *cedulas* operate according to a similar logic.

There is nothing new about securitisation. In the United States, the first such issues go back to the early 1970s, when they involved mortgage loans securitised by public bodies (Ginnie Mae or Freddie Mac and later, at the beginning of the 1980s, Fannie Mae). The use of securitisation gathered pace from the mid-1980s onwards: car loans were securitised for the first time in 1984, and credit card lending in 1986. The activity of so-called finance companies – major players particularly in the consumer credit field – has contributed to this development of securitisation inasmuch as it, too, involves substituting financing through issues of securities for financing via bank deposits (these firms in fact make loans, financing themselves on the bond market). Graph 1 shows, for each category of loan, the proportion financed in the United States by issues of securities. After growing steadily from the early 1970s, by the mid-1990s the proportion of mortgage lending financed by securitisation exceeded 50%. The securitisation of consumer credit rose constantly from the end of the 1980s, while that of other types of loans – including in particular those made to businesses – accelerated starting in 1998. In all, more than half the outstanding volume of loans in the United States is today securitised, compared with barely 10% at the end of the 1960s. The consequence of this rise in securitisation for the balance sheets of the deposit institutions is quite clear: in mid-2008 these institutions had on their balance sheets little more than one-third of total mortgage debt, compared with roughly three-quarters in the mid-1970s.

Graph 1. Share of loans financed by issues of securities in the United States, 1952-2008 (%)



Sources: Federal Reserve and authors' own calculations.

In Europe, the issuance of securitised claims was for a long time the hallmark of Denmark (*realkreditobligationer*) and especially Germany. In the mid-1950s, *Pfandbriefe* accounted for the bulk (more than 70%) of German bond capitalisation. The growth of this market was particularly rapid during the 1990s as a result of the rise in the indebtedness of public authorities and later, starting in 1995, as a result of the introduction of the more liquid *Jumbo Pfandbriefe* (today, issues for an amount of more than €1 billion). In the 2000s, however, the reduction in public debt and the slackness of the construction sector brought growth in this market to a halt. Spain, France and Ireland took up the running, however. At the end of 2007, the European stock of such bonds exceeded €2,100 billion[1] and the share of *Pfandbriefe* in this stock had fallen from 80% in 2001 to barely more than 40%.

Alongside these 'traditional' forms of securitisation, 'structured' financing, whose introduction goes back to the early 1980s, has developed rapidly in the past decades. This financial technique is a special form of securitisation that introduces subordination among the securities issued: some will have priority over others for the receipt of payments emanating

[1] This stock does not include the claims securitised in other forms, such as the Spanish MBS (*bonos de titulización hipotecaria*), whose amount – €150 billion in 2007 – was far from negligible compared with the €280 billion of Spanish covered bonds.

from the pool of debts providing the backing for the securities. It therefore makes it possible to modulate the 'risk content' of the various bond tranches issued, with the risks of the *senior* (most protected) tranches shifted onto the *junior* (most exposed) tranches. Most ABS are structured in this way.

The products most emblematic of structured finance are nevertheless the CDOs (collateralised debt obligations). The first issue of these products was made in 1987 by the Drexel Burnham Lambert investment bank, but it was not until the 2000s that they began to expand substantially. Between 2001 and 2007, issues rose from less than $200 billion to over $1,200 billion.[2] With almost $800 billion issued in 2007, the American market has been the most important. Unlike the securitisation operations involving homogeneous portfolios (consumer credit, car loans, mortgages, etc.), the CDOs are generally backed by financial assets of different kinds in order to introduce additional de-correlation of risks (for instance, bank loans, bonds, asset-backed securities and other claims can be bundled together). They can also be backed by credit derivatives. They are 'structured' in tranches carrying varying degrees of risk: the 'equity' tranche, carrying the highest return, is also the one involving the most risk (it is the first to absorb any losses); the 'super senior' tranche, by contrast, carries distinctly smaller return and risk.

In total, the share of securitised loans in total bond issues rose substantially in recent decades. In the United States, the outstanding volume of bonds derived from securitisation exceeded the $12,600 billion accounted for by 'traditional' securities, being made up at the end of 2007 of Treasury debt ($4,900 billion), debt owed by states and local authorities ($2,600 billion) and debts owed by private firms ($5,100 billion, excluding finance companies). According to the Securities Industry and Financial Markets Association (SIFMA), at this same date the outstanding amount of securitised debt was $11,500 billion (including $2,500 billion in the form of ABS and $9,000 billion in the form of MBS), in addition to which there was

[2] More than half this figure of $1,200 billion was accounted for by synthetic CDOs. There are in fact two categories of CDOs: the cash flow CDOs, which give rise to a transfer of financing and credit risk, and the synthetic CDOs involving only the transfer of credit risk [Cousseran & Rahmouni, 2005]. For investors, the synthetic CDOs made it possible to obtain exposure to a credit risk that is normally present only in bank balance sheets. CDOs of this type met the demand, in particular, from investors wanting exposure to the investment-grade non-financial companies (whose issues were fairly sparse).

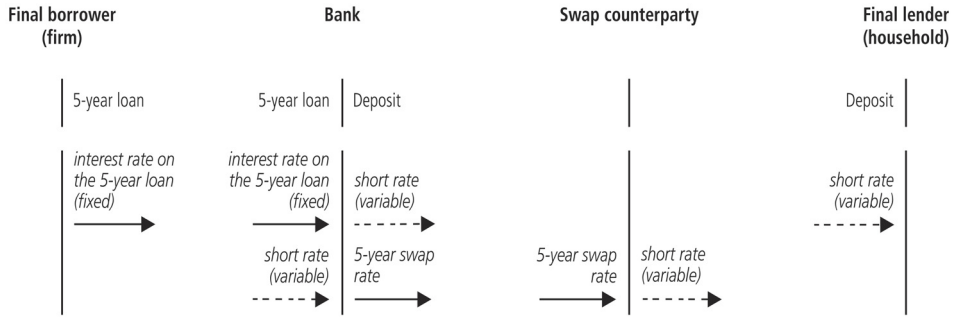
$2,900 billion in the form of securities issued by the GSEs and more than $800 billion issued by the finance companies. For the year 2007 alone, the gross issuance of securitised debt in the United States amounted to nearly $2,500 billion. In Europe in the same year, the corresponding issue volume (essentially in the form of mortgage debt) exceeded $650 billion, which was distinctly more than the volume of corporate debt and as much as that of public debt.

Securitisation is not the only mechanism for the transfer of risk whose expansion has accelerated in recent years. The markets for derivative products posted an equally spectacular surge. Unlike bonds derived from securitisation, these other products are purely supports for the transfer of risk and play no financing role. Buying or selling a contract on a derivatives market in fact involves no transfer of capital of an amount comparable to the amount of risk transferred. For this reason, positions taken on these markets do not appear in the balance sheets of economic agents, being by their nature 'off-balance-sheet'. The nominal sums appearing in the contracts are strictly 'notional' for the purpose of defining the quantity of risk transferred. Contracts for these derivatives are traded either on organised exchanges – in which case the contracts are standardised and there is a clearing-house – or on 'over-the-counter' (OTC) markets, in which case the contracts are 'made to measure' and negotiated directly between the counterparties.

The risks transferred on these markets are essentially interest-rate, exchange-rate and, more recently, credit. Interest-rate contracts, which make it possible to transfer risks related to variations in interest rates, predominate. It was seen earlier that a bank granting a loan financed out of deposits runs the risk of seeing a variation in the rate at which these deposits are remunerated. It can, for the duration of the loan (say, 5 years), hedge against this risk by using an interest-rate swap. Diagram 2 illustrates the exchanges of interest-rate flows to which this operation gives rise. During five years, the bank will pay an interest charge calculated at a fixed rate – that of the 5-year swap – on the notional amount of the contract (in this case, that of the loan); in return, it will receive from its counterparty a variable flow of interest calculated on the same amount but depending on the prevailing short rates. After making this swap, the bank is no longer exposed to the risk of a rise in short rates – it is as if it now pays interest calculated at the fixed rate of the 5-year swap. Its interest-rate margin – the

difference between the rate on the loan and the swap rate – has now become fixed.[3]

Diagram 2. A bank unloads its interest-rate risk exposure by means of an interest-rate swap



Note: For each agent, an arrow going from the left to the central line indicates a flow of interest received and an arrow going from the central line to the right represents a flow of interest paid. The interest flows relating to short rates are indicated by dotted arrows.

While interest-rate-swap contracts are by far the most important on the OTC markets, credit-risk swaps (better known as credit default swaps or CDS) have in recent years grown particularly rapidly. Less standardised than the interest-rate swaps, they permit institutions to relieve themselves of the credit risk of a claim while retaining it in their balance sheets. These contracts are akin to those of traditional insurance, with the purchaser buying protection against the possibility of default on the part of the borrower. In exchange for a periodical payment to the insurer (the protection seller), the insured party (the protection buyer) will receive a compensatory payment should a 'credit event' occur – default on the part of the borrower, for example, or simply non-payment of interest due. As in the case of securitisation, these instruments make it possible in theory for banks to relieve themselves of the credit risk on loans made, or simply to diversify their exposure.

How large were these markets when the crisis first broke? An idea in the case of the organised markets is given by the 'open' position – the sum

[3] For the sake of simplicity, we leave out of the picture in this whole chapter the counterparty risk – in this case, the risk that the counterparty to the swap will not meet its obligation – despite the fact that this risk played a key role in the 2007-08 crisis.

of the notional amounts underlying the contracts in place. In the middle of 2008, according to the Bank for International Settlements (BIS), this amounted to some $84,000 billion, compared with $14,800 billion 10 years earlier. The development of OTC markets has been more rapid still: in mid-2008 the notional underlying amount for the totality of these contracts was close to $700,000 billion, almost 10 times what it had been in 1998. Comparing the respective sizes of these two types of market is deceptive, however. On the OTC markets, the absence of standardised contracts and of a clearing-house means that it is only possible to unwind a position prior to maturity by taking the reverse position. The initial contract remains in place and a new one is added to it, the result being a corresponding increase in the mass of contracts outstanding. The notional amount of an OTC market therefore resembles the volume of transactions on an organised market more than its open position. The gross market value of outstanding contracts, i.e. their replacement cost at a given date, gives a more exact – and more modest – idea of the size of these OTC markets: in mid-2008, it was 'only' $20,000 billion!

2. The development of an 'alternative banking system'

In less than two decades, securitisation and derivatives have profoundly transformed the way in which loans granted by banks are financed, just as they have the way in which their risks are borne. These transformations have led to the development of a genuine 'alternative banking system'. *Loans granted by banks can now be financed by savings that are no longer collected by deposit institutions alone and the risks attached to these loans can be borne by 'risk-takers' who collect no savings.* The intervention of these risk-takers can take two forms. Some will take on, in one way or another, part of the risks attached to bonds produced by the securitisation industry before they are acquired by the savings-collectors (banks, money market funds, pension funds, life insurance companies). Others will borrow from the savings-collectors the sums needed for the acquisition of claims whose risks they will bear.

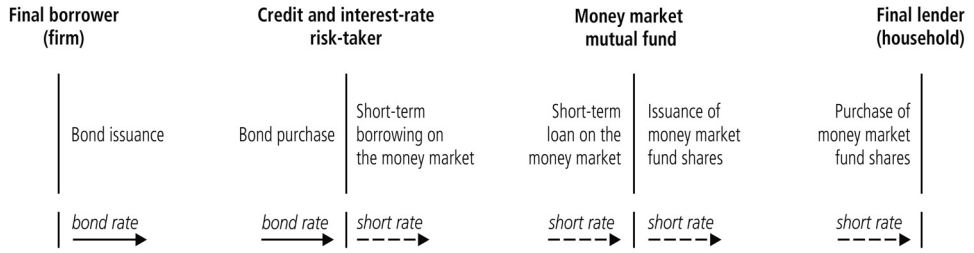
The 'credit-enhancers' work according to the first of these modalities. In the United States, since the beginning of the 1970s, specialised financial institutions – consequently known as 'monolines' – guarantee, against payment of a premium, the bonds issued by municipalities. Relieved of their credit risk, these bonds enjoy a higher rating, i.e. that of the monoline (until 2007, they were always rated AAA). This facilitates their placement with savings-collectors – mutual funds in particular. With the development

of securitisation, the monolines have also begun taking on the credit risk of structured products.

Fannie Mae and Freddie Mac – two of the GSEs referred to earlier – work according to both the modalities mentioned. On the one hand, they guarantee bonds backed by the loans they securitise (hence relieving them of their credit risk). On the other, they issue bonds to finance mortgage loans which they keep on their balance sheets. For these loans, they bear, in addition to the credit risk, two additional risks: an interest-rate risk and a risk related to the prepayment option attached to American mortgage loans. They handle these two latter risks by issuing bonds of longer or shorter maturities – some of which themselves carry a prepayment clause – and by massive recourse to the interest-rate derivatives market (on which they are a major player).

Most of the other risk-takers take part in the process mainly by financing out of borrowing the acquisition of a portfolio of risky assets. Their debt leverage – the relationship between their assets and their equity capital – gives in their case a certain notion of the risks borne. Diagram 3 summarises the operations undertaken by a risk-taker borrowing short term to buy a corporate bond.

Diagram 3. Risk-taking chains: A risk-taker borrows to finance the acquisition of a corporate bond



The risk-taker assumes risks of same nature as a bank lending to a company: a credit risk (he holds the bond and will suffer a loss if the company defaults), an interest-rate risk (because he borrows on the money market at the short-term rate) and a liquidity risk (if some time in the future no one is prepared to lend to him, he will have to sell the security acquired in order to repay his short-term borrowing). In exchange for this risk-taking, he receives, throughout the period during which he maintains his position, the difference between the interest rate on the bond and the

prevailing (variable) short rates. Note that he may possibly wish to keep only the credit risk. In that case, an interest-rate swap could relieve him of the interest-rate risk and a credit line guaranteed by a bank could relieve him of the liquidity risk.

Since the end of the 1990s, in both the United States and in Europe, three main types of risk-takers have been playing a central role: investment banks (also known as 'brokers and dealers'), hedge funds and off-balance-sheet vehicles.

The investment banks are not strictly new and are not, in origin, genuine risk-takers: they are in the first place intermediaries. They facilitate the issuance and circulation of securities (taking a commission on the way) and thus ensure market liquidity. They find their finance either through short-term borrowing against securities or using the deposits of their clients or through bank loans. In recent years, they have expanded rapidly: in the space of 10 years, the size of the balance sheets of American investment banks had almost quadrupled, exceeding $3,000 billion at the end of 2007. This growth was explained in part by their active role in the issuance of ABSs and CDOs. In addition, these banks play a central role on the OTC derivatives markets. In their capacity as dealers acting as counterparties to the transactions, they do not in principle retain the risks acquired. Once a transaction has been carried out with a client, the dealer in fact in most cases looks for another counterparty prepared to take on the reverse position so as to cancel out his initial exposure. If he is unable to find a client ready to take on this risk, he will have recourse to the 'inter-dealer market'. Being at the centre of the circulation of risks, these operators have by no means remained simple intermediaries: between 1987 and 2007, the portfolio of claims and securities held for their own account by American investment banks rose from less than $40 billion to more than $800 billion [O'Quinn, 2008]. Taking into account their high leverage – at the end of 2007, the figure for the five principal American investment banks was close to 30 on average – these institutions were looking less and less like simple intermediaries and more and more like risk-takers. Note that alongside the investment banks, the 'proprietary accounts' of banks and other financial institutions are also the location for risk-taking: their traders are constantly taking positions on markets with a view to making a profit. Their activities in many cases differ from that of the hedge funds only in that they take place within the regulatory framework of the institution to which they belong.

The hedge funds are, by their nature, pure risk-takers (being often in fact identified with speculators). They are able to take positions on the most volatile markets using sometimes very high debt leverage. In order to limit their liquidity risk, they generally ban their clients from withdrawing their capital during a certain period. As they often operate offshore in order to escape domestic regulations, there are no official statistics concerning them. The estimates available suggest that their growth has been particularly rapid in the past two decades: according to Hedge Fund Research, the capital entrusted to these funds rose from less than $40 billion in 1990 to $1,900 billion at the end of 2007. This sum may appear small by comparison with the $85,000 billion of assets held in 2007 by banks throughout the world, but the sums entrusted to the hedge funds constitute 'equity capital'. The comparison therefore has to be made not with the assets, but with the equity capital of these same banks. The ratio arrived at in this way – roughly one-half at end-2005 [Papademos, 2007] – probably gives a more realistic idea of the importance of these funds in the taking of financial risks. Note that, *on average*, they nevertheless have smaller leverage than the banks. A survey by Merrill Lynch has shown that at the beginning of 2008 the average leverage of the respondent funds was of the order of 1.4. The risks borne by these agents nevertheless differ widely from one fund to another: some of them use no debt leverage, while others have debt levels more than 10 times their equity. The largest hedge funds often show even higher figures. At the beginning of 1998, LTCM had leverage of 25 and at the beginning of 2008, Carlyle Capital (bankrupt since early in 2008) had leverage of over 30. However, these figures say nothing about the quantity of risk actually borne by these funds. The capital of LTCM – $4.8 billion – might appear to be low in relation to the size of its balance sheet ($120 billion), but it was even smaller in relation to its off-balance-sheet position. LTCM had in fact signed derivatives contracts involving a notional amount of as much as $1,300 billion [Eichengreen & Mathieson, 1999].

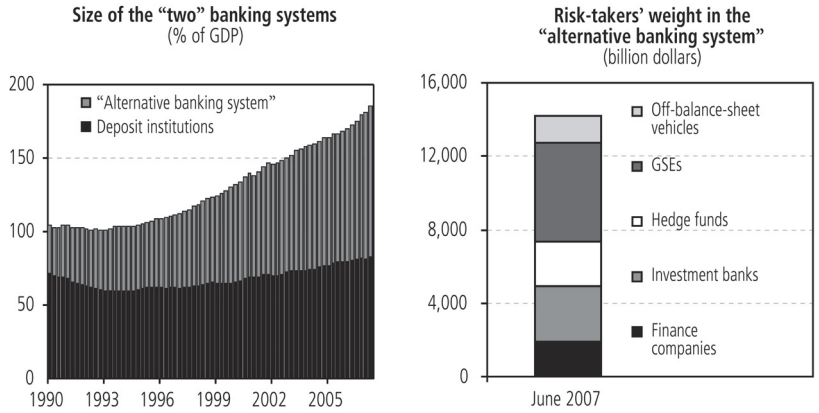
Alongside the hedge funds, the role of the off-balance-sheet vehicles also expanded rapidly in the 2000s. Created by banks in order to derive tax or regulatory advantage,[4] these vehicles enabled them to remove from their

[4] In particular, under the Basel I regulation, if a bank buys ABS, it has to allocate for the purpose an amount of equity capital, regardless of the risk actually associated with these securities. However, if these ABS are held by a vehicle in which the bank is a shareholder, it will receive the difference between the return on the ABS and the financing cost of the vehicle without having to allocate as much equity capital to do so.

balance sheets the drafts, loans or securities for which they no longer in principle had to bear the risks or ensure the financing. These vehicles have taken the form either of 'conduits' or structured investment vehicles (SIVs). The former normally hold types of asset that are simpler – but not always tradable (generally loans or drafts) – than those held by the latter. They find their financing through the issuance of commercial paper backed by the assets of the fund (hence the name asset-backed commercial paper – ABCP – 'conduits'). The financing of SIVs, for their part, is carried out only partly by the issuance of commercial paper. These vehicles in fact also issue longer-term debt securities and have their own equity capital. The assets on their balance sheets include securitised claims but also debt securities of financial institutions or CDOs. Although small in the 1990s, at their peak in July 2007 the SIVs had assets of roughly $400 billion, compared with $1,400 billion for the 'conduits'.

Because of the special nature of their activity, it is difficult to obtain a precise measure of the importance of the totality of these risk-takers in the functioning of the financial system. Nevertheless, Box 1 offers an evaluation for the United States, focusing on the *taking of the credit risk only*. Crude though it may be, the proposed evaluation shows that in mid-2007 the size of the alternative banking system in which these risk-takers participated was, in the United States at least, *comparable* to that of the traditional banking system (Graph 2). This conclusion is all the more important in that, unlike the deposit institutions, *these risk-takers were subject to little or no regulation* (with the exception of the GSEs, which were subject – in principle – to specific surveillance by the US administration).

Graph 2. Size and components of the US 'alternative banking system', 1990-2007*



* See Box 1.

Sources: Federal Reserve, Hedge Funds Research and authors' own calculations.

Box 1. A measure of the size of the American 'alternative banking system' on the eve of the financial turmoil

The objective is to evaluate the importance of the alternative system in the taking of financial risks and to compare it with that of the traditional banking system. The sources used are mainly the Federal Reserve's flow-of-funds statistics and Hedge Funds Research. The approach adopted concentrates on the credit risk. The other risks are therefore ignored, as is the credit risk taken through transactions in derivatives* (as a substantial proportion of these transactions is carried out between risk-takers, the resulting bias is reduced correspondingly). In addition, given the sources used, the 'credit-risk load' relating to the assets taken into account is unknown: a billion dollars' worth of the *equity* tranche of CDOs is here equivalent to a billion dollars worth of the *senior* tranche. Despite its imperfections, the estimate nevertheless suggests that the development of the 'alternative banking system' has been spectacular.

The amounts of credit-risk-bearing assets – financial assets excluding bank deposits, Treasury securities and GSE securities – held by the various risk-takers were as follows at mid-2007:

- $1,900 billion for the finance companies
- $3,000 billion for the investment banks
- $2,500 billion for the hedge funds (applying an average debt lever of 1.5 to all the capital entrusted to them, without separating out the American funds).
- Risky assets on the GSEs' balance sheets were valued at $1,300 billion. However, this figure does not provide a measure of their total risk-taking. These institutions also take on the credit risk of the bonds issued by the GSE pools to which they have sold the largest part of the loans they have bought. In total, the worth of loans these GSEs were carrying the credit risk for roughly amounted to $5,400 billion.
- The case of the off-balance-sheet vehicles is more complicated. On the basis of estimates provided by the IMF [2008] and the evolution of the stock of American ABCPs, the assets held by the American vehicles can be estimated to be some $1,400 billion.

Adding together the amounts obtained for these various categories of risk-takers, one arrives at a total of almost $14,200 billion in mid-2007. By comparison, the amount of risky financial assets held by American deposit institutions (commercial banks, 'savings and loans' and credit unions) was somewhat smaller at the same date, amounting to around $11,300 billion (of which $9,200 billion on the balance sheets of the commercial banks alone).

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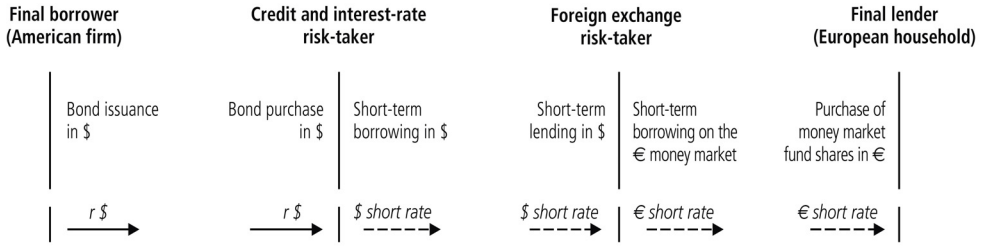
* The calculation also ignores the risk taken by the credit-enhancers (or monolines).

3. An intensification of international financial integration

In parallel with the shattering of the framework of traditional banking intermediation, recent decades have been marked by the gradual disappearance of the frontiers between national financial systems. One after the other, the developed countries, followed by numerous emerging countries, have lifted the barriers to international capital movements. The infrastructure of both traditional and globalised finance then provided the platform for the progress of international financial integration, the only major difference being the emergence of a new risk, namely the exchange risk. This integration in fact brings into contact different monetary spaces. If non-financial agents do not wish to take any exchange risk, capital can circulate between these spaces only if some financial operators agree to take on the risk involved. In the chains described earlier, financial integration will then be reflected in the appearance of an additional link in the form of an exchange-risk-taker.

Diagram 4. An American firm borrows dollars from a European saver



Note: The dollar and euro money markets do not appear in the diagram. For the sake of simplicity, it has been assumed that our risk-takers were in direct relation with each other.

To show this, let us take Diagram 3 above, but let us suppose that the firm is now American and the supplier of savings European. Since neither the firm nor the household wishes to take on the exchange risk, the European savings can only be mobilised if someone is prepared to take this risk. The introduction of an additional link in the chain – a taker of this exchange risk – makes it possible to leave the rest of the chain intact (Diagram 4). As previously, the firm, which has no reason to know where the savings it is borrowing come from, issues a dollar-denominated bond at interest rate *r*. Again as previously, the risk-taker buys this asset and finances the purchase through a loan remunerated at the prevailing (variable) short dollar rate. He therefore takes on a credit risk, an interest-rate risk and a liquidity risk. For these operations to have taken place,

however, it was necessary for each party to find a counterparty. One player was obliged to borrow euros (i.e. mobilise European savings) and exchange them for dollars in order to be able to lend them to the risk-taker buying the bond. This player receives, for a set period, the dollar short rate and pays the euro short rate. This means that he is a taker of the exchange risk. Such an operation will be neutral for him only if, over this same period, the fluctuation in the exchange rate has been precisely equivalent to the difference in short-term interest rates. If the short-term dollar rate is assumed in this case to be higher than the short-term euro rate, our operator will suffer a loss if the dollar depreciation percentage exceeds the interest-rate difference; he will make a profit if the movement is smaller or, *a fortiori*, if the dollar has appreciated.

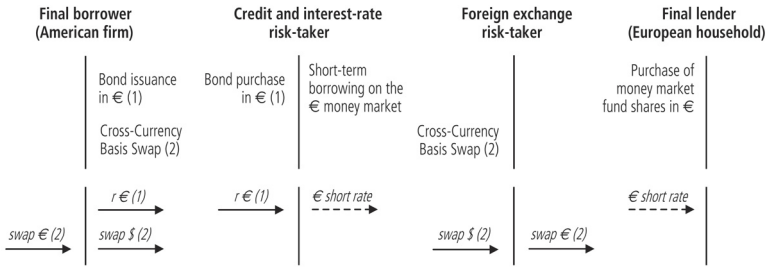
The extension of the risk-taking chains made possible by globalised finance can therefore be placed at the service of international transfers of savings. The operations depicted in Diagram 4 show how savings obtained in Europe can finance investment by an American firm. But these chains can also serve merely to circulate risks and permit improved diversification of both assets and liabilities without any international transfer of savings taking place. For example, an American firm that had already issued substantial amounts in dollars could possibly pay a smaller risk premium by issuing on the European market, especially if, on this latter market, the 'supply' of high-quality credit risk is low in relation to the demand.[5] Box 2 shows how this firm can take advantage of its 'European' risk premium while still not having to take on the exchange risk. This it can do, it should be noted, regardless of the origin of the savings it borrows. Where the savings come from in fact depends, not on microeconomic decisions, but on the macroeconomic behaviour and policies that govern the balance between savings and investment for each country. *The development of the infrastructure of globalised finance facilitates the financing of possible current-account imbalances, but it cannot provoke them.*

[5] The issuance by the German government in September 2009, following Spain and Belgium, of a dollar-denominated bond is an illustration. It allowed the German Treasury to tap a new pool of investors looking for dollar-denominated bonds and trying to find a close substitute for the US Treasury. Taking advantage of a drop in the cost of swapping dollars into euros (the so-called cross-currency basis swap), the German Treasury saved interest equivalent to a couple of basis points.

Box 2. Origin of savings and the exchange-rate risk

The diagram below shows how the risk-taking chain set out in Diagram 4 is modified if, with the savings financing the American firm still European in origin, the bond issue is this time made in euros to enable the firm to benefit from its 'European' risk premium.

An American firm borrows euros from a European saver

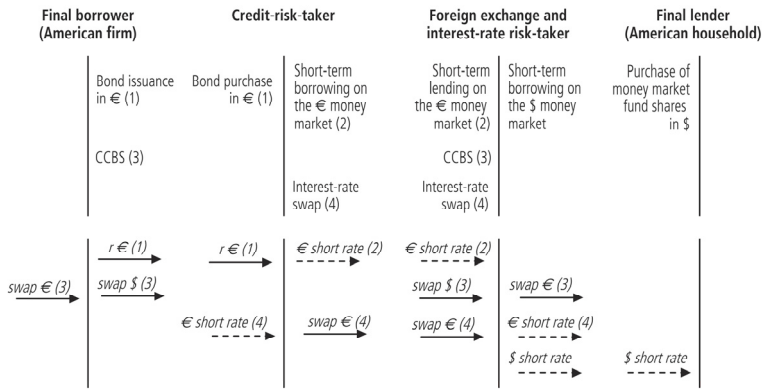


Note: The euro money market does not appear in the diagram. For simplicity, it has been assumed that the European risk-taker borrowed the savings directly from the European household.

The taker of the credit and interest-rate risks is now operating in euros. He buys the bond issued in euros (receiving the fixed interest rate *r€*) and borrows short term the euros needed for the transaction (therefore paying the variable short-term euro rate). As the firm still wishes to borrow in its own currency (the dollar), it will, just after the bond issue, proceed to a currency swap (to be more precise, a 'cross-currency basis swap' or CCBS). This enables it to exchange, for the duration of the bond issue, capital in euros for capital in dollars and hence the related flows of interest. When this swap operation has been completed, the firm therefore pays a fixed interest rate in dollars (*swap $*) and receives a fixed interest rate in euros (*swap €*). At maturity, it will repay the dollars borrowed and will be repaid the euros lent, thus in the end enabling it to repay its initial borrowing. For the duration of the transaction, everything is as if the final borrower had borrowed dollars on the American bond market – paying the swap rate in dollars – but paying its 'European' risk premium (*r€ - swap €*), which is, by hypothesis, lower than the 'American' risk premium (*r$ - swap $*). Finally, there must be an exchange-risk-taker to act as counterparty to the firm's currency swap. Placing dollars at the disposal of the borrower, whereas the final lender has a deposit in euros, necessarily generates an exchange risk! As previously, this operator receives an interest rate in dollars (in this case at fixed rate) and pays a fixed interest rate in euros.

Note that the benefit derived by the American firm (the payment of a lower risk premium on the European market) does not necessarily imply that the savings lent are European. The diagram below in fact shows that the firm can benefit from the same advantage even if the supplier of the savings is American.

An American firm borrows in euros, the savings being American

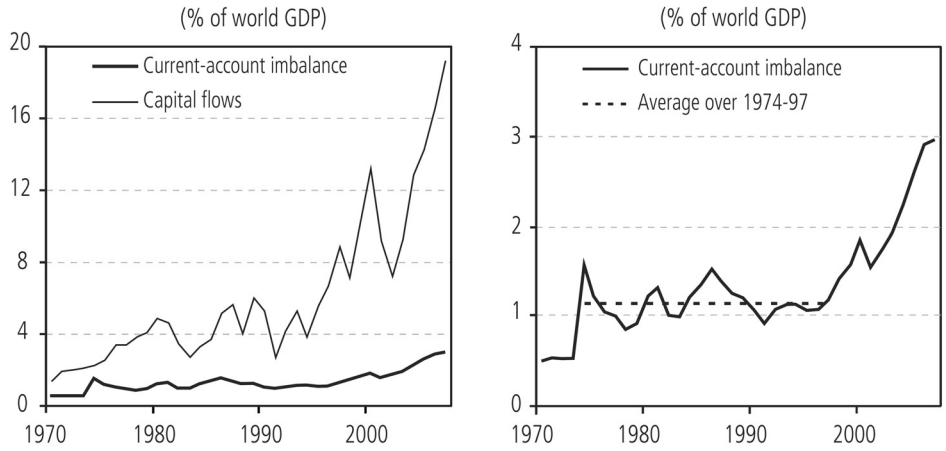


For the borrower, nothing has changed. He continues to borrow on the European market and makes a currency swap. This means that he still pays his risk premium on the European market over and above the swap rate in dollars.

The taker of the interest-rate and credit risks, for his part, continues to borrow euros short term in order to buy the bond that has been issued. For simplicity, it is assumed that this operator wishes to bear only the borrower's credit risk, so he passes on the interest-rate risk by means of a swap. At the end of these transactions, he receives the difference (r€ - *swap* €) in remuneration of the credit risk he held onto. As each of the transactions described must involve a counterparty, another operator must have lent the euros to the taker of the credit risk, borrowed the dollars from the American final lender and acted as counterparty for the interest-rate and currency swaps. To sum up, as the above diagram shows, the latter player receives the difference (*swap $ - $ short rate*). This is the remuneration for the only risk he in fact bears, in this case an interest-rate risk in dollars. Since it did not entail an international transfer of savings, the operation on this occasion generated no exchange risk.

For a long time, *financial integration has in fact been characterised not so much by international transfers of savings as by an expansion of transfers of risk*. Between the early 1970s and the Asian crisis of 1997-98, transfers of savings – measured by the world current-account imbalance – barely increased, fluctuating around 1.2% of world GDP. Over the same period, however, international financial flows rose from 1% of world GDP to more than 8% (Graph 3).

Graph 3. World current-account imbalance and capital flows, 1970-2007



Note: The world current-account imbalance is the half-sum of the absolute values of the deficits or surpluses (for the 181 countries in the IMF database). Similarly, world capital flows are the half-sum of the absolute values of capital inflows and outflows.

Sources: Thomson Datastream and IMF.

With the passage of time, the expansion of these international financial flows has led to an increase in the assets and liabilities of each of the developed economies vis-à-vis the rest of the world. Whether they accumulated current-account surpluses or deficits, these economies now have international financial balance sheets whose scale – measured by the half-sum of their cross-border assets and liabilities – has in many cases become much larger than their GDPs. In the mid-2000s, for example, the international balance sheet of the eurozone was close in amount to that of the United States. And for these two same economies, the gross positions vis-à-vis the rest of the world for major types of transaction – direct investment, portfolio investment and other transactions – were of comparable orders of magnitude (Table 1). The liberalisation of capital movements has contributed not so much to the transfer of savings among Western countries as to making it possible for residents of these countries to improve the diversification of their risks. If Americans buy European equities and Europeans buy American equities, capital flows will be observed in both directions without there necessarily having been significant transfers of savings between the two economies.

Table 1. International balance sheet of the United States and the eurozone at end-2006

(billion dollars)	United States		Euro area	
	Assets	Liabilities	Assets	Liabilities
Direct investment	4,455	3,294	4,149	3,592
Portfolio investment	5,604	5,940	5,768	7,741
- Equities	4,329	2,547	2,555	3,842
- Debt securities	1,276	3,393	3,213	3,899
Other investment	4,310	4,510	5,876	6,212
Reserves	292	2,826	433	
Total	**14,661**	**16,570**	**16,225**	**17,545**
Net investment position		*-1,909*		*-1,319*

Sources: Bureau of Economic Analysis of the US Department of Commerce and European Central Bank.

Financial liberalisation has also been accompanied by an intensification of the 'international division of financial risk-taking' in which the emerging regions have participated [Brender & Pisani, 2001]. The financial systems of the developed countries, regarded as being better managed and supervised than those of the emerging countries, in fact normally attract capital seeking security – and sometimes also anonymity – on the major Western financial centres. At the same time, since the residents in the developed regions tend to be richer and able to bear risks that those of the emerging countries cannot, capital will flow to the latter, for example in the form of direct or portfolio investment (net inflows of direct investment to the emerging countries have amounted annually since the mid-1990s to around 0.6 of a point of world GDP, compared with 0.1 of a point during the 1980s). Here too, for a long time, these financial flows moving in both directions resulted in no lasting transfer of savings between emerging and developed regions.

The end of the 1990s marked a turning point, however. International capital movements have admittedly continued to intensify, but they are no longer merely a vehicle for transfers of risk. They also permit important transfers of savings. Graph 3 gives a measure of the scale of this change: between 1998 and 2007, the world current-account imbalance rose from 1% of world GDP to more than 3%. International financial integration has therefore changed its nature at the same time as the interpenetration of the developed and emerging economies was being strengthened. The following chapter will put these recent changes into perspective, looking at the history of current-account imbalances during the second half of the 20th

century. It will show that during these years, for lack of a true international financial system, international transfers of savings were rather modest in scale, while their direction varied wildly over time: financial globalisation has never been supported by a system designed for the purpose. In this respect, the episode that started at the end of the 1990s and led to the so-called 'global imbalances' was no exception. The substantial transfers of savings associated with those imbalances were facilitated by the infrastructure of globalised finance that was in place. But at no time was this infrastructure designed to provide a solid foundation for such transfers.

II. THE CHAOTIC PROGRESSION TO FINANCIAL GLOBALISATION

The size of the American current-account deficit, like that of the surpluses of the Gulf or Asian countries that have been its counterpart during most of the first decade of this century, justified the widely used expression 'global imbalances'. These imbalances have been a constant source of concern for the G8 governments. Such concern on the part of those who have been promoting financial globalisation might seem puzzling. Was not their aim, in liberalising capital movements between nations, to enable savings generated in one part of the world to be invested in another? Had not the world already seen international payments imbalances of such a magnitude a century earlier? Towards the end of the 19th century, the United States posted current-account deficits for periods of several years. Expressed as a proportion of GDP, the United States' net debt to the rest of the world in 1894 has still not been exceeded today and the country was then far from being an exception in this respect. Argentina, Australia, Brazil, Canada and Russia were also major international debtors before the First World War. Why did deficits this time look more worrying than those of yesterday? Certainly, some of these major debtors, battered by the political and social upheavals of the early 20th century, in the end defaulted. But the largest of them, the United States, met all its commitments. Why should things be any different this time?

Asking the question puts a finger on a particular feature of the pre-1914 globalisation, namely the fact that an economy's position in the international circulation of capital was then closely related to its position in the international division of labour. At that time, countries belonging to the industrial core of the world economy – the United Kingdom, France, Germany – were exporters of manufactures to countries in the periphery, from which they in turn imported raw materials. In a parallel movement, capital flowed from the former to the latter, whose development it

financed. This parallelism was absent at the beginning of this century: the financing of one of the most highly developed countries on the planet became hugely dependent on the capital supplied from much less developed countries. In part, the concern raised by the recent imbalances was being fuelled by this apparent aberration.

Economic logic would in fact have led one to expect, as occurred in the early part of the 20th century, an accumulation of surpluses in the developed regions having their counterpart in growing indebtedness on the part of developing regions. In an article published some while ago – "Why doesn't Capital Flow from Rich to Poor Countries?" – Robert Lucas [1990] points out that, even allowing for the factors liable to reduce the efficiency of the productive capital used in these regions, the discrepancy in wage levels is so large that the return on this capital is bound to be much higher than that seen in the developed countries. And yet, ever since the Second World War this difference has never led to a significant and lasting transfer of savings from the North to the South. Should this really come as a surprise? Does not Lucas himself refer to the need for financial institutions that can make such a transfer possible? In practice, capital never circulates in the vacuum implicitly postulated by theory. The geography of capital circulation is constrained by the monetary and financial infrastructures in place. In this respect, the history of the current-account imbalances that appeared during those decades is enlightening. It shows the extent to which the development and the stability of international savings flows in fact depend on the existing financial and monetary arrangements. It also shows that at no time after the Second World War was any genuine attempt made to create channels capable of directing substantial flows of savings from the North to the South. This, we shall see, partly explains the recent configuration of international payments imbalances and helps understand its vulnerability.

1. Bretton Woods: A world economy lacking a financial system

In the immediate aftermath of the Second World War, the main concern was to permit a revival of international trade, which had suffered badly from the conflict itself and from the economic disorder that had preceded it. This concern led to the organisation, agreed at the Bretton Woods conference, of a truly international monetary system [Aglietta & Moatti, 2000]. For the first time, this was a system based on agreement between nations. The signatories agreed to maintain fixed exchange-rate parities that could be modified only after consultation with the International

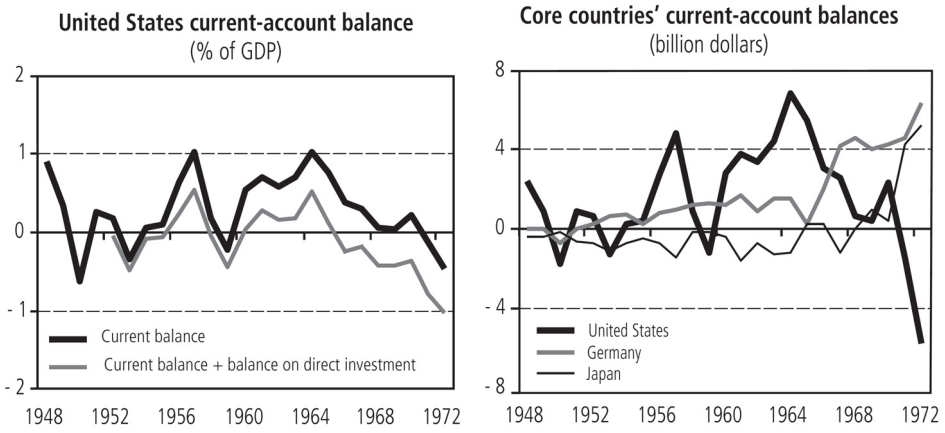
Monetary Fund. At the same time, they committed themselves to implementing policies to prevent imbalances in their current accounts. In addition, each country contributed its quota to the constitution of the Fund's reserves and was in return entitled to draw on these reserves to defend its parity if necessary. The dual principle underlying this new world monetary order – fixed parities and balanced current accounts – did not in fact exclude the emergence of temporary imbalances (related to cyclical leads and lags, for example). The possibility afforded to a country finding itself in this situation of drawing on the Fund's resources meant that it had substantially greater scope for defending the parity of its currency. If, however, after consultation with the Fund the cause of the deficit turned out to be 'structural' rather than temporary, it was possible to decide on a change in parity. *By making current-account equilibrium the norm, the Bretton Woods agreements effectively ruled out significant transfers of savings between countries.*

The first objective of the Bretton Woods negotiators was to re-establish international trade flows, leaving capital movements till later. Meanwhile, the International Bank for Reconstruction and Development (IBRD or World Bank) was to help finance the infrastructure projects most needed for the proper functioning of the war-devastated economies. However, this latter institution was far from having the financial depth to take charge of the capital transfers needed to put these economies rapidly on their feet again. From 1947 on, these transfers would (in part, at least) be made through the Marshall Plan, by means of which in four short years the United States gave some $12 billion to finance the purchases of the American products that were indispensable for getting the European economies going again. This sum – equivalent to roughly 5% of the United States' GDP in 1947 – was all the more substantial when compared with the continuing low levels of trade.

The 1950s and much of the 1960s were to be marked by continuous progress towards commercial integration, accompanied, in conformity with the Bretton Woods reasoning, by occasional trade imbalances and by slow growth in capital movements. The central problem was then how to enable foreign exchange reserves to grow as rapidly as international trade. The rapidity of this latter growth turned out to be incompatible with the cumbersome mechanisms envisaged for increasing the Fund's resources. Each country was then obliged to accumulate, in dollars, the reserves it needed to ensure the stability of its exchange rate. How could this demand for dollars, increasing at the same rapid rate as international trade, be met? The partial answer, in the initial stage, was through the flow of US foreign

direct investment. Up to the end of the 1960s, despite the immense scale of American military expenditure, the United States current-account balance remained in surplus, but no longer to the extent needed to cover the capital outflows involved in the direct investment by American 'multinationals' (Graph 4). In order to finance its external deficit, the United States issued dollar-denominated debt. By this means, it fuelled the increase in international reserves. It was as if central banks in the rest of the world, by accumulating dollar reserves, were lending the United States part of the funds needed for American firms to buy firms in their own countries. This "exorbitant" privilege was denounced by General de Gaulle in the mid-1960s. At the same time he asked in vain for a return to the principles of the gold standard. Fairly soon, however, this source of international liquidity was supplemented and then supplanted by a new source that was to become a key element in the international financial system, namely the *euro-dollar market*.

Graph 4. Current-account balances of the 'core countries', 1948-1972



Note: In the case of Germany and Japan, the figures are for the trade balances, which in the 1950s and 1960s were very similar to the current-account balances of these two countries.

Sources: Federal Reserve and UNCTAD.

Starting at the beginning of the 1960s, this term was used to designate the activity of intermediation *in dollars* carried out by banks *located outside the United States*, mainly in Europe. The origins of this practice are a fairly clear illustration of the makeshift approach through which the principal elements of the present international financial system have been put together. Following the Suez crisis in 1956, speculation against sterling forced the UK monetary authorities to stop British banks making loans in sterling to non-residents. This meant that the City of London found itself

deprived of the major advantage it had enjoyed for a century, namely the use of an international currency. For lack of a currency in which to lend, the expertise built up in London over decades and the intimate knowledge of all those participating to a greater or smaller extent in international trade, could no longer be used for the expansion of banking activity. The arrival of deposits in dollars, linked to the desire of the socialist countries not to hold their reserves directly in the United States, therefore opened up a new possibility. The City was able to take up this possibility all the more easily in that American regulations introduced in 1933 to prevent excessive interbank competition set a ceiling on the remuneration of deposits received by American banks. By offering a slightly higher remuneration, banks in the City were able to attract the deposits they needed in order to develop their lending activity unhindered. Little by little, their lending in dollars was to become a major source of liquidity for the world economy. The (growing) United States balance of payments deficit was then no longer the sole source of dollars available to meet the international demand for reserves. The shortage that had been feared was therefore avoided and from the end of the 1960s on, there was even an excess. Germany and Japan were accumulating growing current-account surpluses (see Graph 4) and speculation began on a fall in the dollar. In order to avoid having to revalue their currencies, central banks intervened on the currency markets. Some of them invested part of the dollars acquired in this way in London, hence further stimulating the development of the euro-dollar market – as well as speculation on a fall in the dollar. The market in this way gave the *coup de grace* to the monetary order established at Bretton Woods and was from now on to play an essential role by making up for the absence of an international financial system.

2. The 1970s: A dangerous makeshift system

The spectacular rise in the oil price in the early 1970s confronted the world economy with a stark and unforeseen financial problem. In practice, the rise constituted a levy on the incomes of oil-importing countries for the benefit of the exporting countries, whose incomes grew to such an extent that many of them were unable to spend more than part of the addition. The transfer of income brought about by the rise in the oil price therefore implied the emergence of a current-account surplus for the oil exporters. For this surplus to be created, the importing countries had to be able, and willing, to allow their current-account deficits to widen. What would have happened had this not been the case? In all logic, the oil countries could

then not have had surpluses! The alternative was a contraction in activity in the oil-importing countries such that the revenue of the exporting countries would fall to equal their expenditure. This meant that the sharp rise in the oil price threatened the world economy with a deflation that the existence of the euro-dollar market was to help to avoid. For the oil shock to be prevented from leading to a deflationary adjustment in the importing countries, there had in fact to be a financial mechanism enabling countries to borrow in order that their expenditure could exceed their income on a lasting basis (Box 3).

Box 3. Spending propensities, current-account balances and international transfers of savings

A reminder of certain accounting definitions will help in understanding the articulation between the configuration of world current-account payment balances and the transfers of savings they imply. The saving propensity δ of an economy is the ratio between what its residents spend – its domestic demand* D – and what they earn – its GDP Y. It can therefore be written:

$$\delta = \frac{D}{Y}$$

If the country's residents spend more than they earn, δ will be greater than unity and their current account will be in deficit. If they have earned less than they have spent, part of their spending has added to the rest of the world's income: the country's residents have imported more goods and services than they have sold, the difference being precisely equal to the excess of their spending over their income. This gives:

$$M - X = D - Y = S$$

where M and X denote respectively the country's imports and exports and S the current trade *deficit*. Dividing these magnitudes by the GDP of the country concerned gives:

$$m - x = \delta - 1$$

In order to be able to spend more than they have earned, the country's residents have to borrow S from the rest of the world. As the rest of the world has, by symmetry, a surplus on current trade, it has spent less than its income. The difference – S – represents saving that it has generated but not used. Instead, it has been 'transferred' to the borrowing country through a series of financial transactions that are traced out in the financial account of the balance of payments.

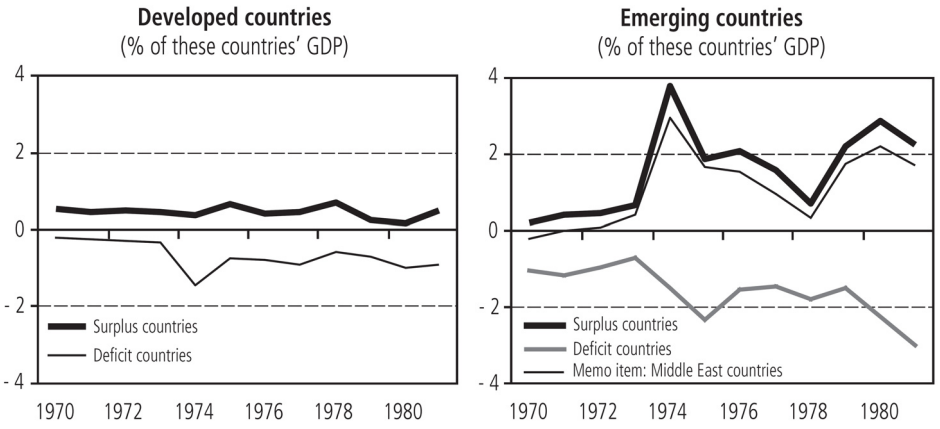
* This demand is of course equal to the sum of consumption, investment and public spending, traditionally designated respectively by C, I and G. This gives: $D = C + I + G$.

This mechanism was provided by the euro-dollar market, through which current-account deficits, the inevitable counterpart of the oil surpluses, could be financed. However, it was not sufficient for this mechanism only to exist. Countries also had to be willing to make use of it for the purpose of actually increasing their borrowing. Even before the collapse of the Bretton Woods order, current-account deficits, small in scale admittedly but nevertheless chronic, had in fact been building up in a group of developing regions. This imposed a permanent financial constraint on their growth, related to their mode of international specialisation. Because they were importers of manufactures and exporters of raw materials, their imports tended to grow in line with the rapid growth in their populations, while at the same time the deterioration in their terms of trade led to relatively slower growth in their export earnings. The inflow of 'oil dollars' enabled them, for a few years at least, to increase their expenditure more rapidly than their earnings! By borrowing heavily in dollars from the international banks, these countries helped the world economy to absorb the oil shocks of the 1970s. The financial mechanisms that made this borrowing possible were unable, however, to master the risks involved – and, indeed, they had never been designed to do so.

During the 1970s, therefore, there was, for the first time since the War, a substantial international transfer of savings by means of financial transactions (and not grants as in the case of the Marshall Plan). The banks that were leading the euro-dollar market provided the underlying support. They financed, in dollars, the borrowing of the developing countries and received, also in dollars, the deposits of the surplus countries. In this way, their intermediation permitted the emergence of a configuration of 'South-South' payments imbalances (see Graph 5). The notion of 'recycling' pure and simple, in which the deposits taken in were then re-lent, is nevertheless deceptive. As in any banking intermediation activity, it is the loans that create the deposits and not the reverse. If the peripheral countries had made no calls on lending from the banks, the oil countries would have had nothing to deposit. By opening credit lines in dollars to the emerging countries, the euro-dollar banks were counting on a steady inflow of deposits enabling them to finance, on profitable terms, the drawings on these credit lines. They were able to make this assumption because their activity was in direct contact with the American money market. If for one reason or another the expected deposits were to go to New York rather than London, the London banks could always borrow the funds they needed on the American money market. The euro-dollar market serving as an international financial system was in reality merely a side loop in the

American banking circuit and its key rates were therefore those of the American money market, set by the American central bank in such a way as best to regulate the United States economy. *No one had any concern for controlling the rate of distribution of loans to the developing countries*. The banks distributing the loans knew the extent of their own claims on each country but had only a vague idea of their competitors' claims on the same country or of its total indebtedness. The conditions governing each debtor country's capacity to pay the total debt service due were therefore also known only vaguely. In the financial euphoria of the late 1970s, loans to developing countries hence grew in a totally unbridled fashion. This led to a dangerous increase in the vulnerability of the countries whose borrowing was making it possible to sustain world demand that had been badly shaken by two oil-price shocks.

Graph 5. Current-account imbalances during the 1970s



Note: The breakdown of the world is based on the one devised by CEPII in its Chelem database, i.e. into 34 zones or countries.

Sources: CEPII-Chelem and authors' own calculations.

October 1979 saw a change at the head of the American central bank. The new Chairman of the Federal Reserve, Paul Volcker, wanted to regain control of inflation, which under the impact of the oil-price rises and thanks to relatively lax monetary policy had been constantly accelerating. American interest rates suddenly shot up to unprecedented levels and the American economy, followed by the rest of the world, plunged into recession. For the countries that had been recent borrowers, the consequences were dramatic. In order to protect themselves against the risk of a rise in interest rates, the banks had been increasingly making their

loans at floating rates. As a result, the rise in Fed rates led to a leap in the interest payable on part of the accumulated debt. At the same time, the world recession led to a reduction in demand for raw materials, whose prices – with the exception of oil – slumped. The foreign earnings of the indebted countries therefore fell just when the cost of their borrowing was increasing. Their relative incapacity to implement firm macroeconomic policies meant that their growth slowed only fairly gradually, meaning in turn that their imports continued to rise and their current-account deficits continued to widen. Already heavily indebted, they were therefore forced to borrow to an even greater extent than before – and, furthermore, at the then prevailing prohibitive interest rates. In the summer of 1982, Mexico became the first country to announce that it was unable to meet its commitments. The first South debt crisis had broken out, exposing the limitations of the 'tinkering' that had enabled the world economy to cope with the oil shock. The evolution of current-account imbalances during the 1980s showed the traces of the crisis. The Latin American countries found themselves suddenly subjected to a rigorous financial constraint and, being unable to repay their debt, were forced to stop borrowing. Their combined current-account deficit disappeared in the middle of the 1980s. At the same time, the surpluses of the oil-exporting countries also disappeared. In an attempt to keep up the oil price despite the decline in demand for oil, the OPEC cartel asked those of its members least in need of finance to cut their production. In 1985, just before Saudi Arabia stopped supporting the oil price, its production was only one-quarter of what it had been in 1980. Its gigantic current-account surpluses were replaced by a deficit.

3. Progress with financial liberalisation and the North-North imbalances of the 1980s

The 1980s saw a revised configuration of imbalances and the introduction of the elements of a new international financial system. Unlike the situation in the 1970s, this time the savings were to flow, not from the South to the South, but from the North to the North (see Graph 6). The disequilibrium that then emerged was in large part the result of divergences between the macroeconomic policies implemented by the major industrialised countries. Several of them opted to put their public finances in order just at the time when the United States was launching a taxation experiment that was to end in a financial debacle.

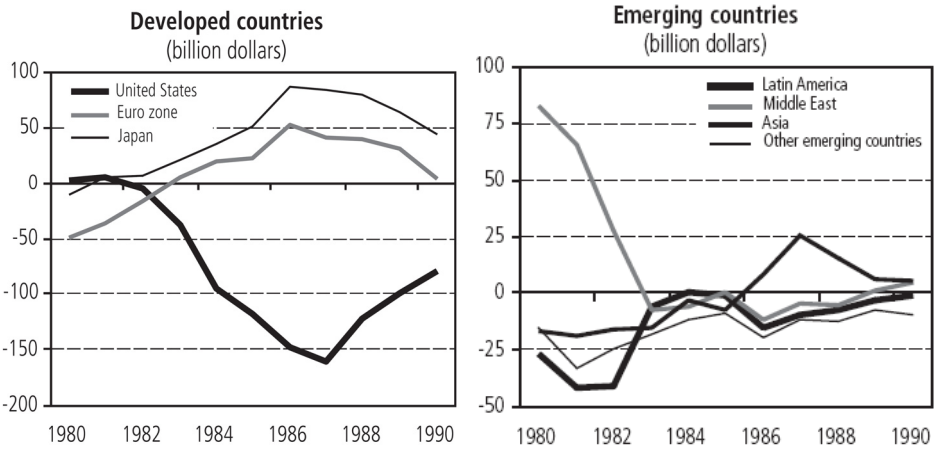
During the second half of the 1970s, Japan and Germany, which were in surplus on current account, had decided to support their domestic

demand by allowing public deficits to widen. The borrowing of these two North governments then combined with the borrowing of the South countries in underpinning world demand. At the Bonn Summit in 1978, they even agreed to increase their deficits still further in order to act as 'locomotives' for the world economy, just before the second oil shock brought growth to an abrupt halt. Throughout these years, the debt of these governments therefore continually increased. The rise in the general level of interest rates from end-1979 on, which affected them all the more in that their inflation remained relatively low, then prompted them to put a rapid end to the upward drift in their borrowing.

For ideological reasons, the arrival of Margaret Thatcher in power led at the same time to a reduction in public expenditure in the United Kingdom. In the United States, on the other hand, President Reagan's policy, for reasons that were equally ideological, generated a rapid widening of the Federal deficit. Convinced of the justification for 'supply-side policies' – one element of which is the belief that growth is stimulated more effectively by tax cuts than by support for demand – Reagan rapidly obtained the agreement of Congress to cuts in personal and corporate taxation without matching reductions in Federal government expenditure. On the contrary, Federal spending continued to rise for the purpose of funding ambitious defence programmes. American economic growth picked up but failed to generate the expected addition to tax revenue. As a result, the Federal deficit ballooned, exceeding 6% of GDP in 1983. It remained large just at a time when the upturn in activity in combination with a sharp rise on the stock market was leading to an increase in corporate investment and a decline in household saving. Lending by the private sector fell, while the public deficit remained high. The current-account deficit then widened to not far off 3.5% of GDP in 1987.

This meant that the United States was a massive importer of savings from the rest of the world. These savings were exported by countries that, having implemented radically different fiscal policies, were experiencing less lively growth. Yet again, if the incomes of the latter were able to exceed their expenditure, it was because the expenditure of the former exceeded their incomes.

Graph 6. Current-account balances in the 1980s



Sources: IMF and authors' own calculations.

During this episode, the forces generated by national policies produced, at the cost of a substantial disequilibrium in current payments, an international transfer of savings which for each country attenuated the negative consequences of the policies they applied. The tight fiscal policies introduced in Japan, Germany and the United Kingdom made it possible to avoid the emergence of inflationary pressures and a damaging interest-rate rise in the United States [Marris, 1985, p. 44]; the expansionary fiscal policy of the United States made it possible to prevent the countries that were restoring fiscal equilibrium from suffering excessive deflationary pressures. This transfer of savings could not have taken place without the support of financial mechanisms. One evolution in particular played an essential role in this respect, namely the liberalisation of capital movements. From the late 1970s, this liberalisation, already in place for the United States and Germany, was introduced in most of the major industrial countries. The United Kingdom abolished all exchange controls in October 1979, Japan eased its controls substantially in December 1980 and the other countries followed suit one after the other. In this way, an international financial system was created *de facto* by the progressive *dismantling of the barriers between the national financial systems*. Each of these systems retained its own specific characteristics, with the levels of key interest rates continuing to be set by the national central banks, but non-financial agents in each country could from then on have free access to other countries' markets and financial intermediaries and invest and borrow in their currencies. As for the financial intermediaries of the countries concerned, they were able to make loans in their national currencies to, and receive deposits from, non-

residents. As a result, the euro-dollar market was transformed into a multi-currency international banking intermediation system (a euro-mark was already in existence in the 1970s, but the German authorities tended to hold back its development). The financial globalisation that then began – of which the liberalisation of international capital movements was only one dimension – profoundly transformed the way in which savings could circulate between countries. In addition, in an initial stage it would considerably facilitate the financing of the American current-account deficit in the mid-1980s.

In the industrialised countries, the strong economic development in the post-war period led to the accumulation of financial wealth by households. Until the end of the 1970s, residents in each country had been unable to invest this wealth in other than their own national economies and their own currencies. The liberalisation of capital movements permitted the geographic and monetary diversification of this investment. Since financial markets in the United States were much more developed than in other countries, this led to substantial demand for American securities and the United States was able to finance a substantial part of its deficit by selling bonds to the rest of the world. These bonds were all the more readily purchased in that their American issuers – either the government or companies – were highly appreciated as borrowers and that interest rates on these dollar-denominated securities were distinctly higher than on bonds of similar quality denominated in marks or yen. Nevertheless, by no means were all the transfers of savings in the mid-1980s made through this single channel. While Japan, which had a saving surplus, was indeed a net purchaser of bonds, the same was not true of Germany, which was a net seller of bonds to the rest of the world. How was it possible, notwithstanding, for Germany to place part of its savings at the disposal of the United States? Simply because it lent even greater sums through other channels – mainly short-term lending by German banks. This illustrates one of the characteristic features of the international financial system that took shape following the liberalisation of capital movements, namely the fact that transfers of savings do not necessarily take place through a visible and identifiable channel. They are in fact the net balance of an increasingly complex set of transactions. A country can now very well receive capital from the rest of the world in one form or another and be an exporter of capital nonetheless. For this, all that is needed is for it to lend even greater amounts in other forms. The difference between these outflows and inflows – which is precisely equal to its current-account surplus – measures the amount of domestic savings placed at the disposal of the rest of the world.

Financial liberalisation has therefore opened up a multitude of channels making the national financial systems interdependent. During the 1980s this enabled the American savings deficit to be financed, without tension or major problems, by the surpluses generated elsewhere in the world. Admittedly, things were somewhat more hectic in currency terms, with the dollar initially rising strongly and then falling to an extent that could have turned into a major crisis, had it not been for the concerted action of the authorities. It nevertheless remains true that during this period none of the regions concerned experienced worrying tendencies in either inflation or growth[1] and, with the help of the decline in the dollar, the American current-account deficit finally decreased.

4. The premature financial liberalisation by emerging countries and the crises of the 1990s

A further stage in the process of financial liberalisation took place at the beginning of the 1990s, bringing with it a new configuration of international financial imbalances. In this process, the emerging regions were once again to play a central role. The international organisations, strongly influenced by the ideology of the 'Washington Consensus', induced them to cut restrictions on capital movements [Aglietta & Moatti, 2000]. The breaking down of barriers launched in the North in the preceding decade now spread to the regions of the South, bringing their financial systems into the international network. Through the channels opened up in this way, capital flowed in response to the attraction of the economic dynamism that was characteristic of these regions, as well as the prospect of attractive returns. The crisis that broke out in Asia in 1997, spreading subsequently to Russia and Latin America, was a reminder of the extent to which liberalisation of capital movements on its own falls short of creating an international financial system. The case of the emerging Asian countries that were at the heart of this crisis illustrates the dangers inherent in overlooking this point.

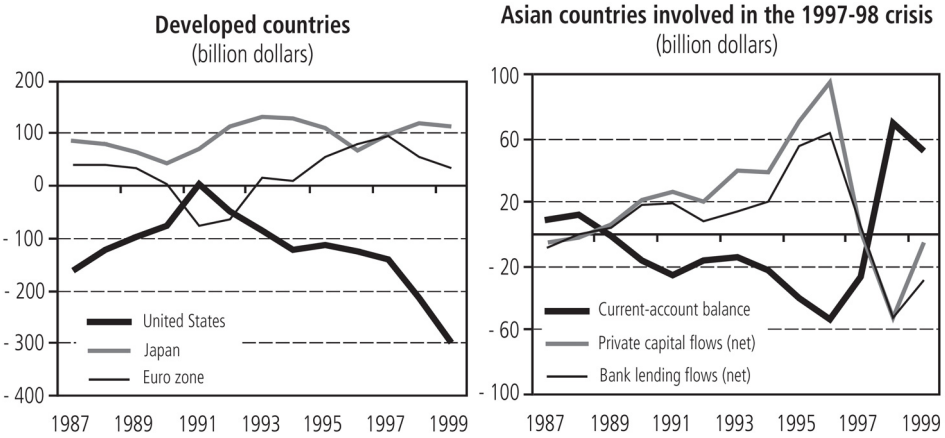
Starting in the early 1990s, these countries in fact found capital arriving not only in the form of direct or portfolio investment but also as loans to their banks by banks elsewhere in the world. Even so, their

[1] However, keeping Japanese interest rates low in order to support the dollar contributed to the formation of the real estate and stock-market bubbles that burst at the beginning of the following decade.

current-account deficits did not immediately widen, because an appreciable part of these inflows went into increasing the foreign exchange reserves of the monetary authorities and another part into financing capital outflows by their residents. In the middle of the 1990s, however, things began to change. On the other side of the world, countries wanting to join the European Monetary Union rapidly cut back their public deficits, thus liberating a savings potential that would only partly be used in their own economies. The growth upturn in these countries remained hesitant and until 1997 private-sector net lending declined only slowly, more slowly in fact than the public deficits. A savings surplus was created and the combined current-account surplus of European countries rose from virtually zero in 1994 to $100 billion in 1997.

For this to be possible, however, there had to be reductions in surpluses or increases in deficits elsewhere in the world. In fact, during these years the American current-account deficit and the Japanese current-account surplus remained relatively stable at around $100 billion in each case. It was therefore essentially the increase in the current-account deficit of the 'emerging' countries in Asia that constituted the counterpart of the burgeoning European surplus. From 1995 onwards, these countries in fact abandoned the caution they had previously displayed and allowed their deficits to widen (see Graph 7). For the first time in many decades, there was a significant flow of savings from the North to the South. However, the fragile nature of the channels through which it flowed was rapidly exposed.

Graph 7. Current-account balances in the period 1987-1999



Sources: IMF and IIF.

Interbank lending played a central role in the increase in Asian countries' external borrowing. In 1995 and 1996, bank loans accounted for almost two-thirds of their capital inflows. This may seem a natural channel: domestic banks are in fact better placed to appreciate the needs and creditworthiness of local borrowers, or at least of those whose size and reputation are not sufficient for them to raise funds on the market. If other banks provide the local banks with the resources they lack, the financing of small firms will be facilitated as a result. The integration of national banking networks in a vast worldwide network then makes it possible for excess resources collected in the countries of the North to fund the distribution of credit in the regions of the South. For the system to function properly, however, the channels of circulation have to be sufficiently robust.

As was seen in Chapter I, a feature of lending between different currency areas is that one of the parties has to bear a foreign-exchange risk. In this case, Asian banks borrowing in foreign currencies and lending in their national currencies were the ones bearing this risk. Inasmuch as the loans received from Western banks were short-term and those granted to finance the projects of local borrowers were generally for more than one year, the local banks also had to take on a liquidity risk: if at some stage in the future the loans they received were not renewed, they would be obliged to repay the sums involved without being able themselves to demand premature reimbursement. Lastly, like any bank making loans, they took on a credit risk. The interconnection of emerging banking networks to the Western banking network therefore led, from the mid-1990s onwards, to a concentration of risk in the Asian countries' banks.

In this case, too, no one was responsible for seeing that this concentration did not become excessive. The international authorities continued to operate under the illusion that Western banks would not fail to ensure that the banks to which they lent were sound. However, a lender's concern is not to know whether the borrower is taking excessive risks, but merely whether he himself is doing so. As long as the loans granted represented only a reasonable proportion of their balance sheets, Western banks had no reason to set limits on their supply of lending. For their part, the emerging banks that were allowed in this way to take on a substantial volume of risk had neither the resources nor the will to assess these risks correctly. The pegging of currencies to the dollar that had been the practice for several years had dulled their perception of the exchange risk. Above all, these banks failed to observe the prudential rules imposed

on Western banks, and their supervision by the local authorities was fairly lax.

The second half of the 1990s therefore opened in an atmosphere of euphoria. A substantial proportion of the lending made in Asia was used to finance real estate speculation and the installation of new industrial capacity. As a result, growth in domestic demand and credit distribution, and rises in real estate and stock market prices came to be mutually self-supporting. This situation, with current-account deficits steadily widening, lasted until 1997 and the outbreak of the crisis in Thailand. In the following months, the Asian countries that had been following the same path were all affected. With banks refusing to renew their loans, these countries were obliged to repay their debts. Assistance from the IMF gained them a little respite but in the end they had little choice: reimbursement meant returning the savings that had been received and for this purpose current-account deficits had to be replaced by surpluses. Steep devaluations combined with drastic contractions in domestic demand succeeded in bringing about this transformation in just a few quarters. But this would not have been possible had not countries elsewhere in the world, principally the United States, absorbed the returned savings by letting their own current-account deficits widen. From then on, the forces that led to the development of the 'global imbalances' were in place and financial globalisation became a reality.

5. From one globalisation to another

Decade by decade, a network of international financial relations has taken shape. Supported by the infrastructure of globalised finance, it has finally permitted international transfers of savings on a scale once more comparable to those seen before the First World War. However, this has taken place in a profoundly different global framework.

The monetary order underlying the present financial globalisation is very different from that seen before the First World War. The liberalisation that has occurred in the past 25 years has brought into contact monetary areas that remain distinct from each other, each one managed by its own central bank. With the notable exception of the eurozone, there is no integrated international monetary area similar to the one that existed at the time of the 'first globalisation'. The gold standard was characterised not only by the fixed parities of the various national currencies in relation to gold, but also by the particular role played by the Bank of England in regulating world activity [Aglietta et al., 1990]. London was the hub of a

network for the acceptance of commercial drafts drawn throughout the world in order to finance international trade. This provided the Bank of England with a source of information on the world business cycle that gave it a privileged place in the functioning of the system. When world trade – closely linked to industrial activity – was expanding strongly, the volume of drafts discounted by British banks also expanded. These banks then borrowed on the money market and this fairly soon brought about a rise in 'Bank Rate'. In order to prevent downward pressure on their currencies, the other central banks then followed suit. In this way, the stability of exchange rates led to de facto coordination of the monetary policies of the participating countries and to relative harmonisation of business cycles, guided by the Bank of England. If the cycle in one economy diverged from the others', its central bank nevertheless continued to base its rates on British rates. This was the price that all participants were, in principle, prepared to pay for exchange-rate stability. The situation was therefore totally different from the present organisation [Obstfeld & Taylor, 2002]: capital movements are now once more free, as they were then, but each country implements a policy suited to its own economic situation – at the risk of movements in its exchange rate.

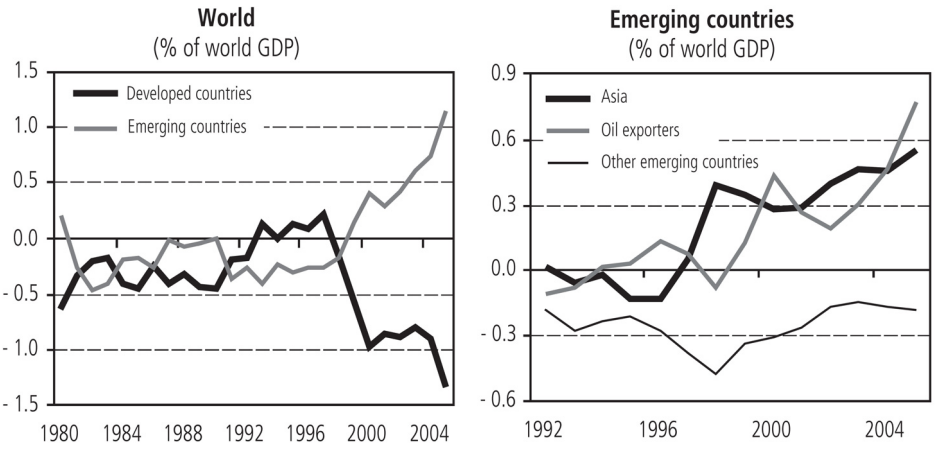
The contrasts between the general financial organisation of the first globalisation and the second – the one currently in operation – are equally clear-cut. The existence of a monetary area that was unified by the gold standard was accompanied by a situation in which there was a handful of major financial centres located in countries that formed the industrial core of the world economy and where savings were abundant. Borrowers from the peripheral countries came to these centres to issue shares and bonds – either denominated in the centre's currencies or subject to a gold clause – at least until such time as their economic development was sufficiently advanced for them to have a financial centre of their own capable of directly attracting European savings [Flandreau & Sussman, 2002]. By this means, international capital movements directly financed the development of the infrastructure – mines, railways, urban development – of the regions that were then 'emerging' and in so doing also financed their current-account deficits. Movements of bank capital, for their part, played a relatively minor role, reduced essentially to the short-term financing of foreign trade operations. *International capital movements were therefore mainly a vehicle for transfers of savings*. Immediately before the 1914 war, the accumulated total stock of international liabilities was $45 billion (roughly 20% of world GDP), of which the *net* creditor position of the core industrial countries accounted for more than half [Schularick, 2005]. At the end of

2005 the total stock of the accumulated liabilities was around $50,000 billion, more than equivalent to the world's GDP, but the sum of net creditor positions was less than one-tenth of this amount. In other words, capital movements five times as intense as in 1914 have led in recent decades to transfers of savings of the same intensity as at that time. This feature of the present financial globalisation is of crucial importance [Lane & Milesi-Ferretti, 2006]: to a large extent the accelerated expansion of capital movements served to ensure not so much the transfers of savings as the international circulation of financial risks.

There is one final feature distinguishing the present globalisation from its predecessor, relating to the nature of the international division of labour between developed and emerging regions. Like the financial integration, trade integration is much more intense today than it was then. The trade between developed and emerging regions reflects forms of specialisation that result in its being, to a greater extent than before, one of the mechanisms by which the sharing of world income takes place. Naturally, we still find peripheral regions with which the core countries exchange, as previously, manufactured goods for raw materials. The general and rapid expansion of requirements for raw materials has in fact recently enabled this 'traditional' periphery to stem the long-term deterioration in its terms of trade. Since 2003 the prices of the periphery's exports have risen particularly rapidly. The evolution of the oil price has been significant in this respect, almost trebling between 2003 and 2006. Moreover, this trebling, unlike what happened in the 1970s, has not been due to supply limitations imposed by the oil-exporting cartel, but to a lack of available capacity to meet the rapid growth in demand. The original feature of the present international division of labour lies elsewhere, however. Alongside the peripheral countries with a traditional type of specialisation, others have emerged that have no raw materials to export and which, far from being a destination for immigration like the 'emerging' countries of the first globalisation, have large populations, these in fact being their sole competitive asset. Thanks to their low wage levels, these countries have gained a foothold in the international division of labour by exporting manufactured goods with a high labour content. Very soon, however, they have gone up the production chain in the direction of more capital-intensive goods, and then sideways into other industries that are also relatively labour-intensive at the downstream end. China is now following this path, once taken by Japan and later Korea. Such countries have a particularly dynamic industrial specialisation and abundant domestic saving but only crude financial systems. The value of their

currencies provides them with an instrument for regulating their terms of trade in such a way as to facilitate full employment in their economies, and to achieve this goal they do not hesitate to interfere with the free operation of the currency markets.

Graph 8. Current-account balances, 1980-2005



Note: The Asian newly industrialising countries (NICs) have been classified as emerging countries.

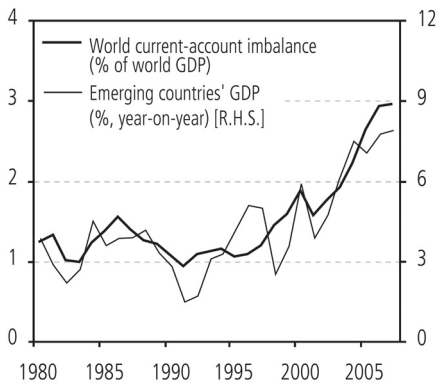
Sources: IMF and authors' own calculations.

Since the latter part of the 1990s, the flows of savings circulating in the world economy have therefore been initiated by forces very different from those operating during the first globalisation. The paradoxical positioning of the emerging countries in the global current-account imbalances is clearly visible from Graph 8. After 1998, their surpluses grew steadily. It is the role financial globalisation played in the development of their economies that we shall now analyse.

III. FINANCIAL GLOBALISATION AND DEVELOPMENT

At the end of the 1990s, economic growth accelerated in spectacular fashion in the emerging regions. This acceleration has coincided with the increase in the intensity of international transfers of savings (Graph 9). Moreover, far from being confined to a few exemplary economies, it has been fairly general. At the same time as the growth of the emerging countries has quickened in pace, the growth differentials among them have narrowed. To what extent and by what channels has financial globalisation contributed to this evolution?

Graph 9. International transfers of savings and growth of emerging regions, 1980-2007



Note: The world current-account imbalance is the half-sum of the absolute values of the current-account surpluses or deficits of 181 countries.

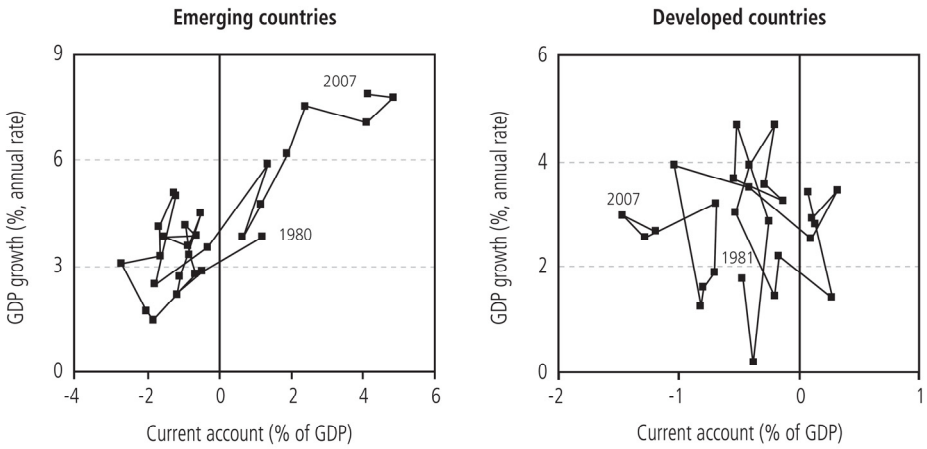
Sources: IMF and authors' own calculations.

The partisans of financial liberalism had long proposed an answer to this question. For them, greater financial openness brings to the emerging regions the capital and the know-how they lack for their development. By

enabling these regions to import savings and production techniques from the more advanced regions, greater financial openness improves their supply-side conditions and increases their labour productivity.

Obviously, this is not exactly what happened. While world transfers of savings have indeed risen sharply just when the growth of the emerging regions was accelerating, the direction taken by these transfers has been the opposite of that expected! Globalisation nevertheless played a decisive role here. To be convinced on this point, it is necessary merely to note the correlation that appeared, taking this time just the emerging regions, between growth and the current-account balance. The acceleration in their growth starting at the end of the 1990s is indeed very closely associated with an *improvement* in their current-account balance (see Graph 10). It was by permitting these regions to *export* and not import savings that globalisation contributed to this acceleration (the more so since exporting savings did not preclude importing technologies and know-how through inflows of foreign direct investment).

Graph 10. Current accounts and growth, 1980-2007



Note: The definition of the emerging countries used here is that of the IMF. The inclusion of the four 'Newly Industrialising Countries' (NICs) leads to a similar result.

Source: IMF.

After examining in more detail the link between exports of savings and the macroeconomic performance of the emerging regions, this chapter will take a brief look at the way in which financial globalisation has contributed to their development, before finally analysing the role played by foreign exchange policies in these evolutions.

1. Development and transfers of savings

In order to assess the link between the macroeconomic performances of the emerging economies and transfers of savings, it is useful to have a measure of performance that is less crude than GDP growth. A growth rate of 5% a year can be remarkable for a relatively developed country but mediocre for one that is less so (especially if the population of the latter is rising more rapidly than that of the former). To mitigate this difficulty, a 'frontier' has been defined that gives the growth in GDP per head that an economy at a given level of development, *properly managed and having access to all the necessary savings*, can hope to sustain over the medium term.

Box 4. Definition of a 'frontier' in terms of GDP growth per head

This frontier has been constructed empirically on the basis of observations for the years 1980-2007 and for the 181 economies in the IMF database. Each point on the graph below corresponds:

- in its abscissa, to the GDP per head, measured on a PPP basis and in constant 2000 dollars (using the United States' GDP deflator), for a given country and a given year; and
- in its ordinate, to the country's annual average growth in real GDP per head for the next five years, calculated using national data in local currency.

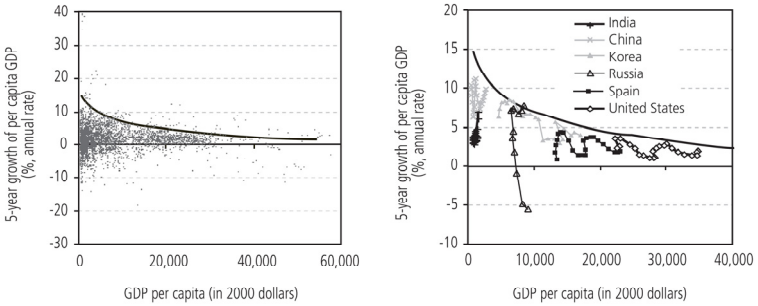
To draw the frontier, the points were first ranked in increasing order of GDP per head. They were then regrouped, respecting this order, by 'buckets', after which a search was made within each bucket for the maximum growth of GDP per head *above* which only a small percentage of the points in the bucket remain. This growth rate then defines the 'observation' associated with the bucket. The curve of the graph was then estimated on the basis of this set of observations. Given the wide dispersion of points for very low GDPs per head, the first two buckets comprise 1,400 and 700 points respectively and the maximum growth rate taken, in both cases, is such that only 1% of the growth rates in the bucket exceed it. The subsequent buckets consist of 70 points and the growth rate taken is such that only 5% of the growth rates in the bucket exceed it. Given the low density of observations for high GDPs per head, the final bucket (GDP per head greater than $30,000) is excluded.

The equation of the frontier, estimated on the basis of the 23 observations obtained in this way, is as follows:

$$\textit{5-year growth of GDP per head} = -3.36 \log \textit{(GDP per head)} + 37.84$$

Altering in reasonable proportions the size of the buckets or the accepted percentages for above-limit growth rates modifies only slightly the result of the estimate and never affects the conclusions drawn in the text.

Growth frontier and GDP per capita, 1985-2007



Sources: IMF and authors' own calculations.

In order to illustrate the functioning of this frontier, the right-hand graph shows evolutions for certain individual countries. For example, it can be seen that India is clearly just at the start of a long road. Its very low GDP per head has grown moderately, at a rate of only close to 5% until the mid-2000s. China, for its part, has succeeded in considerably accelerating its productivity gains – between 1980 and 2007, the rise in China's GDP per head was twice as fast as India's – and its level of development has progressed appreciably. In the coming years, if China manages to remain close to the frontier, its productivity growth will slow down to the rates seen in Korea in the early 1990s. Korea, for its part, in the mid-2000s reached where Spain was a decade earlier, and Spain is now where the United States was in 1985.

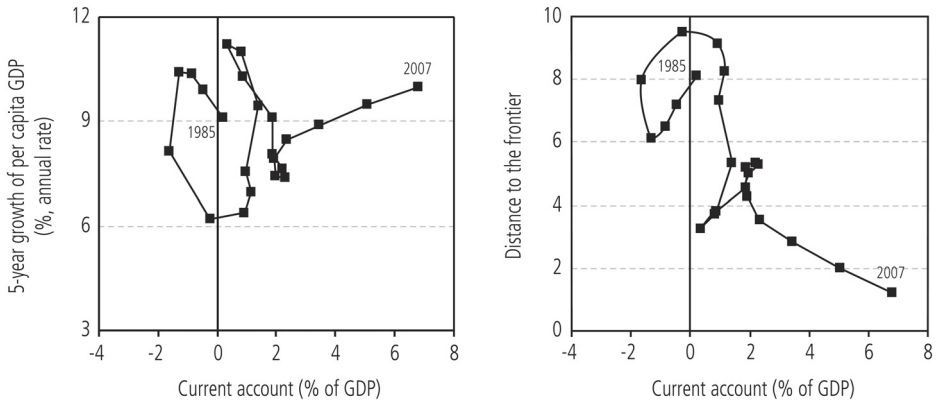
The shape of this frontier (see Box 4) reflects a widely-held intuitive view, namely that the less developed a country is, the greater its potential for growth. By investing in a sustained manner, it can increase the available capital per worker. Since its initial stock of capital is low, the marginal productivity of this investment will be high. At the same time, recourse to the more advanced countries' production techniques, management methods and economic policy instruments will make it possible to increase total factor productivity [Kose et al., 2008]. In those countries that manage to maintain the necessary investment effort while at the same time mastering the imported techniques and keeping control of their growth, labour productivity can for several years grow at a very rapid rate. As development proceeds, this rate progressively declines: the marginal productivity of capital falls at the same time that an increasing share of

investment starts to go into replacing old equipment, while catch-up margins become more difficult to achieve, the management of the economy becomes more complex, and so on.

For a country that is 'emerging', sticking close to this frontier is not easy, however. This is clearly shown by the point cloud in Box 4. While, by construction, virtually all these points are located below the frontier, in many cases the distance from it is substantial, many points in fact even being situated below the horizontal axis, in other words corresponding to periods during which, averaged over five years, output per head has decreased. This can be seen to be the case especially for countries at low levels of development. For a country whose GDP per head is less than $10,000, there is a real risk of experiencing a lasting downward trend in its standard of living and for a country whose GDP is less than $1,000, the likelihood is greater still, as indeed is the extent of the decline threatening it.

This 'frontier' will now be used as a yardstick to measure the recent 'performance' of various developing countries or regions. For each one, the performance over a given five-year period will be regarded as better, the closer the growth rate of its GDP per head has been to the 'frontier' rate. In other words, the gap between the observed and the 'frontier' rate will constitute the measure of its performance. As illustration, a country that, like China, manages to maintain high productivity gains, period after period, even though its GDP per head is rising rapidly, will see its distance from the frontier narrow and its 'performance' improve. What is the link between the performance defined in this way and the transfers of savings made possible by globalisation? If one compares the performance of the Chinese economy with the evolution in its current-account balance (see Graph 11), the initial observation concerning the role of transfers of savings is clearly confirmed: the Chinese economy has steadily approached the frontier since it became an *exporter* of savings and its distance from the frontier has even been close to zero since its current-account balance has exceeded five GDP points.

Graph 11. Growth, distance to the frontier and current account for China, 1985-2007

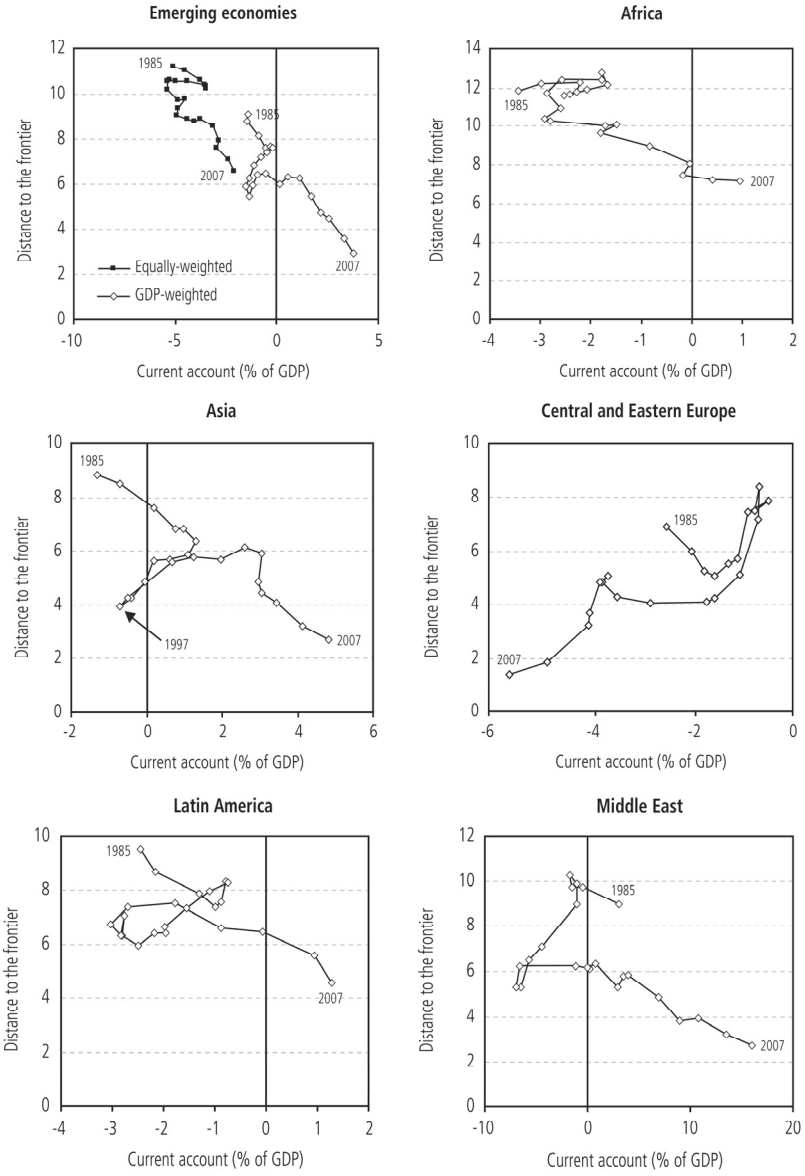


Note: The distance to the frontier (right-hand graph) is measured by the difference (multiplied by 100) between the 'frontier' rate defined in Box 4 and the observed five-year average growth rate of GDP per head. The current-account balance is the average for the same five years.

Sources: IMF and authors' own calculations.

This case is spectacular, but there is nothing exceptional about it. Graph 12 confirms that the link between international transfers of savings and economic performance takes the same direction for the whole of the emerging economies. Looking at the evolutions *on an unweighted average basis* for 154 emerging countries, one sees that their average distance from the frontier has narrowed continuously since the end of the 1990s – i.e. productivity gains have come close to the highest achieved in the past by countries at the same level of development – at the same time as the average intensity of the imports of savings *was declining*. A similar relationship can be seen for all the main developing regions with the exception of countries in Central and Eastern Europe. Since the end of the 1990s, these countries have also come closer to the frontier but with a significant worsening of their current-account balances, that is by importing more savings.

Graph 12. Growth, distance to the frontier and current account for emerging countries, 1985-2007



Note: The weighting used is that of the country in the zone's GDP, measured in current dollars (using PPP dollars gives very similar results). The distance from the frontier is measured by the difference (multiplied by 100) between the 'frontier' rate defined in Box 4 and the observed five-year average growth rate of GDP per head. The current-account balance is the average for the same five years.

Sources: IMF and authors' own calculations.

2. The unexpected contribution from financial globalisation

While financial globalisation has indeed contributed to the development of the emerging countries, the nature of this contribution has not been the one commonly expected. In most cases, the recent improvement in their performance has been accompanied by a reduction in their imports of savings [Prasad et al., 2007]. In fact, with one exception, each of the major emerging regions taken as a whole has become a net exporter of savings. How can this apparent paradox be explained?

The history of the initial phases of the current globalisation gives part of the explanation [Kose et al., 2006]. As was seen on at least two occasions, at the end of the 1970s and in the mid-1990s, emerging countries imported significant quantities of savings. On both occasions, their growth accelerated for a few years until a crisis brought this inflow of foreign savings to a sudden halt and forced them, in order to repay the accumulated debt or pay the interest on it, to reduce their domestic demand sharply, at the cost of a far-reaching destabilisation of their activity. These sudden stops had a substantial economic and social cost [Calvo & Reinhart, 2000]. Graph 12 illustrates the point in the case of the Asian countries that bore the full brunt of the more recent of these two crises. In the mid-1990s they approached the frontier at the same time as their current-account deficit was widening and they subsequently had to move sharply away from it at the end of the decade, to enable their current-account balance to improve substantially.

In part, these repeated crises stem from the tenacious a priori ideological beliefs of the promoters of liberalisation of capital movements. For them, this liberalisation is bound on its own to enable the 'invisible hand' of the market to ensure improved allocation of savings at world level. Hence the conviction that the development of countries where the return on capital is still relatively low may be encouraged by their mere integration into the globalised financial system. This purely abstract vision of the mechanisms that allocate savings at world level ignores the imperfect, even crude, character of the practical arrangements through which the risks related to the operations involved are assessed, taken on and managed. This imperfection has been particularly marked in the case of international transfers of savings towards the countries of the South. It was as if on each occasion the guiding 'invisible hand' found the associated risk invisible as well.

At the time of each of the crises, this purblindness was manifested by both lenders and borrowers. For example, at the end of the 1970s those who

lent to the Latin American countries made no effort to assess the risks attached to their repayment capacity. All eyes were entirely focused on maintaining shares of a rapidly expanding market and no one showed any concern for the size of the total debt that was building up. As for the borrowers, they preferred to avert their gaze from the dangers of a situation in which, borrowing in dollars and mainly at variable rate, they were combining exchange risk and interest-rate risk. This was all the more dangerous in that, as seen in the preceding chapter, a rise in American interest rates would simultaneously add to their debt burden and reduce their capacity to service it by limiting their export receipts. Some 15 years later, at the time of the Asian crisis, the Western banks had learnt the lessons – for themselves, at least – of this dramatic episode. For the most part, they lent short term, thus shifting onto the borrowers an additional risk, namely that of liquidity. They did so all the more easily in that no public surveillance system existed to limit the risks taken by the borrowers, i.e. the local banks. When the crisis broke out, only a harsh contraction of domestic demand and a steep decline in the exchange rate made it possible to generate in the space of a few months the current-account surpluses needed for the repayment of the borrowing.

After this second crisis, a certain number of countries, notably China, tried to base their development on a substantial degree of financial autonomy. Rather than import savings for the purpose of more rapid development of their productivity, they preferred self-reliance, generating these savings for themselves. In this, they were helped by their strategy of insertion into the international division of labour. Along the lines of the strategy adopted a few years earlier by the Asian 'tigers', this consisted of exploiting their low manpower costs to position themselves massively on the assembly stages of the various manufacturing chains (apparel in the case of textiles, for example). These more labour-intensive stages are the ones where the maximum competitive advantage can be derived from low wage costs. Countries adopting this strategy then serve as workshops for the rest of the world, the inputs needed for these exports being imported, initially at least. The resources they derive to finance their development therefore correspond only to the national *value added* contained in their exports. If they want to become financially independent – if they do not want to import savings – this value added has to be sufficient to finance the purchases of foreign equipment and raw materials required for their development.

In order to maintain firm growth and remain close to the frontier, countries will then need to keep exports rising rapidly as their

development progresses. For this purpose they have to remain competitive as workshops. This they will only succeed in doing if, year after year, their labour costs remain relatively low, with wage rates not growing faster than productivity. This moderation in wage growth (and hence in household expenditure) is needed to maintain competitiveness but also to ensure countries' financial autonomy: if they export large amounts but at the same time their consumption rises rapidly, they will not be able without external savings to finance the investment needed, at their stage of development, to remain close to the frontier.

For countries managing to achieve this level of savings, the rapid growth in exports makes it possible to purchase from abroad, *without borrowing*, the goods and services needed for their development and for the functioning of economies that are growing rapidly in size. Quite soon, however, if the countries' growth potential increases appreciably, the role of exports may change: stimulating their expansion now becomes a means of bolstering the demand for the products of domestic firms whose productive capacities are expanding rapidly. This need may make itself felt if domestic agents' savings remain substantial to the point of exceeding what can usefully be invested in the economy. Out of force of habit, concern for the future or absence of a social welfare system, but also owing to the impossibility of borrowing for lack of a developed financial system, households may keep their savings ratio relatively high [Chamon & Prasad, 2008]. If, moreover, the distribution of income has remained tilted too far in favour of the corporate sector, domestic savings will fairly rapidly show a surplus. Keeping the installed capacity fully utilised and absorbing the new arrivals on the labour market will then only be possible if this savings surplus can be exported. *At this stage, the contribution of financial globalisation becomes essential*.

At the beginning of the 2000s, China's current-account surplus soared. This explosion resulted from the contrast between the rapid evolution in its industrial structure and the much slower changes in spending behaviour and in the allocation of national income. China's industrial development in fact accelerated. As the Asian tigers had done some years earlier, China began to make for itself an increasingly large share of the inputs contained in its exports. Not only did the latter continue to grow rapidly but they contained an increasing proportion of national value added. China's share of world income increased as a result, but this increase was not matched by growth in domestic spending, especially because profits as a share of GDP were constantly increasing [Zhou, 2009]. The fact that China was able nevertheless to remain close to the frontier and

to fully mobilise a rapidly-growing production potential was because it was then able to export its savings surplus and enable its firms to find abroad the demand that was lacking domestically.

The acceleration in the growth of the heavily-populated Asian regions had one unexpected consequence, namely a reversal of the long-term downward trend in commodity prices. In the space of a few years, demand for primary products became so large as to create tensions on the various markets. One after another, raw materials saw their prices rise: oil, in the first place, followed by industrial commodities and finally foodstuffs. Given that, for most of these products, both supply and demand are, in the short term at least, relatively price-inelastic, these rises were steep and violent. Here again, one result was a substantial change in the allocation of world income. In particular, the rise in the oil price was a source of massive transfers of income towards the exporting countries, which saw their current-account surpluses soar. Like the Asian countries, these oil-exporters, most of them emerging countries, became exporters of savings at the same time as their growth was accelerating.

The mechanisms operating at this point are nevertheless simpler. In part they relate to the desire of many producing countries, with bitter memories of past experience, to put into reserve at least part of their additional earnings. By their nature, prices of raw materials are particularly volatile and the 1980s revealed the income declines brought about in the oil-exporting countries by the drop in the price. In the mid-2000s, the speed of the rise, especially for oil, was such that, even if they had not wanted to build up their reserves, the exporting countries would not have been able to spend the totality of their earnings. The fact that the inertia of import spending was greater than that of export earnings automatically led, given the steady rise in prices until the summer of 2008, to a rise in the exporting countries' current-account surpluses. Their investment, their productivity gains and their growth rates admittedly rose rapidly as well but their spending continued to lag behind their incomes, so that they became exporters of savings on a massive scale. It was financial globalisation that enabled them to do so. In its absence, this accumulation of financial surpluses would have been impossible.

In the end, the European emerging countries are the only ones for which globalisation seems recently to have played the role expected by the advocates of greater financial openness. Since the end of the 1990s, their distance to the frontier has steadily narrowed at a time when their external deficits were widening. This evolution is reminiscent of what happened in

an earlier period in Latin America and Asia and necessitates questioning the way in which the risks related to these transfers of savings were taken and borne. In the meantime, these countries provided an outlet for the savings surpluses of the other emerging regions. Their contribution in this respect was nevertheless modest. In total, they imported in 2007 only one-seventh of the $850 billion of surpluses achieved in that year by the other emerging regions.

3. The role of exchange-rate policies

Exchange-rate policies – or their absence – played an essential role in the evolutions described here, especially for the emerging countries that are exporters of manufactures. The exchange rate is a relative price that is determined on a market. However, in the case of a country just starting its development, this market is particularly crude, with private supply and demand for currencies depending almost entirely on the country's trade flows. Left to itself, the foreign exchange market will balance the supply of foreign currencies from national exporters, on the one hand, and the demand emanating mainly from importers, on the other. Exporting savings in these conditions is extremely difficult. For such exports to take place, the value of exports of goods and services must exceed that of imports. However, when such a situation starts to take shape, equilibrium on the currency markets implies a rise in the exchange rate. Such a rise, by eroding exporters' earnings in national currency,[1] immediately reduces the country's income while at the same time making it less competitive. Left to itself, the currency market is therefore the source of a powerful force opposing the formation of a savings surplus, a force that will be all the more powerful in that the emerging country's take-off is highly likely to attract foreign capital and this, combined with exporters' demands for national currency, will further increase the upward pressure on the exchange rate. For an emerging country to be able to export savings on a large scale, it is therefore necessary that action be taken by a public authority to counter this upward pressure, in part at least. By acting as counterparty to the private net sales of foreign currencies against its own, this authority accumulates foreign exchange reserves. Since the beginning of the 2000s, the Asian countries and also the Middle Eastern countries

[1] For most of the products they export, the emerging countries are in fact in the situation of 'price-takers', with their prices depending on those of the rest of the world.

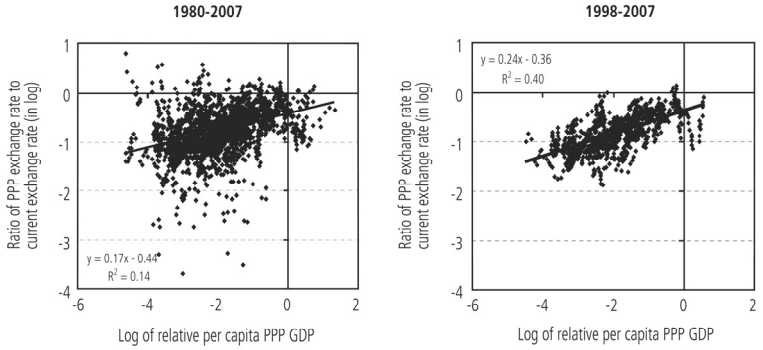
have intervened on the markets for their currencies on a massive scale. For the manufactures-exporting countries, the attitude towards the movements in their real exchange rate played a decisive role in the evolution of their current accounts described above. *The countries that have actually succeeded in controlling their currencies' real exchange rates are also those which, as we are about to see, have generated current-account surpluses; conversely, those whose real exchange rates have appreciated too rapidly saw their deficits widen*.

In order to judge the extent of over- or undervaluation of a country's currency, one can compare its current exchange rate with its purchasing power parity rate (both expressed in units of national currency per dollar). For the sake of simplicity, let us call the price ratio obtained in this way the country's 'real' exchange rate, adopting the terminology used notably by Cheung et al. [2006]. According to this measure, most emerging countries' currencies are substantially undervalued. However, this measure ignores the link between the country's exchange rate and its relative development. Box 5 provides a reminder of the existence of a relationship between a country's level of development and its real exchange rate: the less developed the country, the more its 'real' exchange rate appears to be undervalued. For a correct assessment of the over- or undervaluation of an emerging country's currency, it is therefore necessary to have a yardstick that takes into account its level of development. This yardstick is defined in Box 5 by a regression line – estimated using the point cloud of available observations – relating the real exchange rate to the relative level of development.

Box 5. Development, exchange rates and the current-account balance

For reasons widely identified in the literature (existence of transaction costs, non-tradable goods and services, etc.) there is no reason to expect absolute purchasing power parity to exist between countries with significantly different levels of development. The graph below, using purchasing power parity (PPP) data taken from the World Bank's International Comparison Program (ICP) for 2005, shows the link between the relative level of development (ratio of the country's GDP per head for a given year to that of the United States for the same year) and the real foreign exchange rate (ratio of the PPP exchange rate to the current exchange rate): on average, the less developed a country is, the more its current exchange rate appears to be undervalued compared with the PPP rate.

Exchange-rate norms and relative development



Note: Exchange rates are expressed in national units per dollar. When the variable log(PPP exchange rate / current exchange rate) is greater than 0, the current exchange rate is lower than the PPP rate and the country's currency is overvalued.

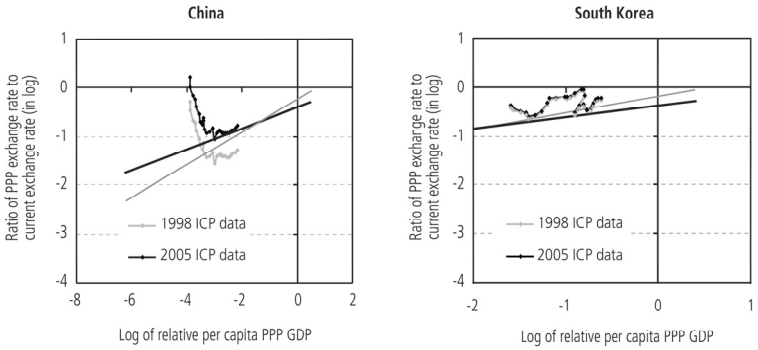
Sources: IMF and authors' own calculations.

To define the relationship between level of development and undervaluation of the exchange rate, we estimated, using panel data, the following equation for the period 1980-2007 or for shorter periods:

$$\log(PPP\_rate_{it}/current\_rate_{it}) = a + b\log(relative\_percapita\_GDP_{it}) + f_t + u_{it} \qquad (1)$$

The panel comprises 111 emerging countries out of a sample of 146 countries (only the 12 largest African countries, accounting for more than three-quarters of the zone's GDP valued at PPP, and with each one representing at least 2%, were included). The coefficient b is significant. The time fixed effects (measured by f_t) are also significant, even though their introduction makes little change to the value of the coefficient b. The 'quality' of the regression improves appreciably from the early 1990s on. Moreover, the coefficient b is stable (close to 0.24) starting from this time. The estimate is also robust to modifications in the sample: the estimate of the coefficient b remains similar if one removes from the sample all the countries whose share of the PPP GDP of each zone is below 2%, as well as all the commodity-exporters (leaving 40 countries out of the original 111). The estimate was carried out using new PPP data (from the 2005 ICP). In the literature, the estimated value of the coefficient b is a little higher, generally ranging between 0.25 and 0.35 (see in particular Cheung et al. [2006]). The new data modify in particular the assessment concerning the Chinese currency: whereas the old PPP data indicated a marked undervaluation of the yuan (of about 30% as from 1994), this undervaluation disappears when the new data are used (see graph below). For Korea, on the other hand, the two estimates are closer: the won appears overvalued prior to the Asian crisis of 1997-98, then approaches its 'equilibrium level' in 1998, before deviating from it again as from 2002 and especially 2005.

Exchange-rate norm and relative development level:
The cases of China and South Korea, 1980-2007



Note: The solid black line is estimated using the ICP 2005 PPP data, the shaded line using the ICP 1998 PPP data. The two regression lines are estimated for the period 1998-2007.

Sources: IMF and authors' own calculations.

Equation (1) obtained above makes it possible to calculate a variable of relative over- or undervaluation of the various countries' exchange rates:

$$\log(under\_overval_{it}) = \log(PPP\_rate_{it} / current\_rate_{it}) - (\hat{a} + \hat{b}\log(relative\_percapita\_GDP_{it}) + \hat{f}_t) \quad (2)$$

Note that this variable is, in its underlying principle, the same as that used in Rodrik [2007]. Rodrik, however, goes on to test the influence of this variable on emerging countries' growth, whereas we test its effect on their current-account balances.

For this purpose, we estimate, still using panel data, the following equation:

$$CA_{it} = a + \beta \log(under\_overval_{it}) + f'_i + f'_t + u_{it} \quad (3),$$

where CA_i is the ratio of the current-account balance of country i to its GDP, f'_i the country fixed effects and f'_t the time fixed effects.

Over the period 1980-2007, the coefficient β is not significant if one estimates the equation on the original universe of 146 countries (including the commodity-exporting countries). It becomes significant, however, if the sample is reduced to the 105 non-commodity-exporting countries. Keeping only the largest of them (those whose share of their zone's PPP GDP exceeds 2%), leaving 40 countries in the sample, improves the results still further. The estimated value of coefficient β increases appreciably – from -4.2 to -9.6 (columns 2 and 5 of the table) – if the estimation period is reduced to the years 1995-2007.

The following table recapitulates the results obtained:

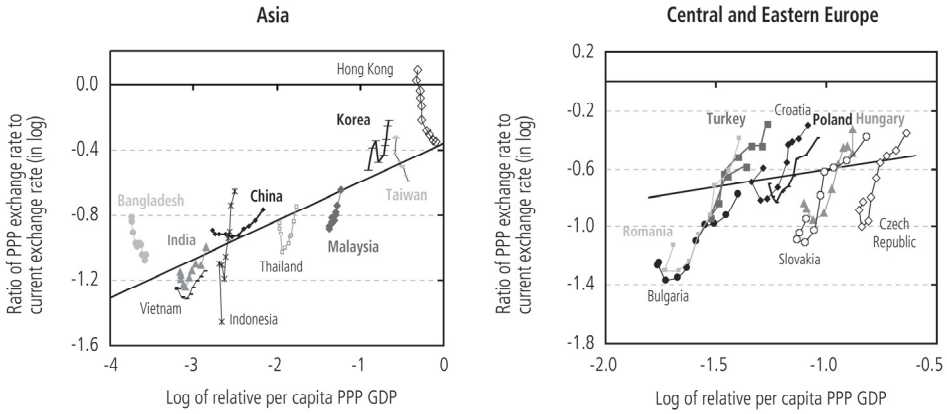
	(1) 105 countries 1980-2007	(2) 40 countries 1980-2007	(3) 28 countries 1980-2007	(4) 105 countries 1995-2007	(5) 40 countries 1995-2007	(6) 28 countries 1995-2007
log (*under-overval*)	- 1.52*	- 4.20*	- 5.80*	- 5.84*	- 9.61*	- 10.04*
Student's t	- 3.18	- 7.16	- 9.73	- 5.45	- 11.02	- 10.39
Constant	- 4.59*	- 2.15*	- 1.53*	- 4.08*	- 2.06*	- 1.65*
Student's t	- 30.78	- 13.01	- 10.05	- 21.05	- 13.76	- 9.66
Country fixed effects	yes	yes	yes	yes	yes	yes
Time fixed effects	no	no	no	no	no	no
Number of observations	2,542	924	626	1,349	512	359

* Significant at the 1% level.

Note: The list of commodity-exporting countries is that adopted by the IMF (World Economic Outlook, April 2008, p. 237). The sample of 28 countries is obtained by keeping, out of the 40 countries, only those of Latin America, Asia and Central and Eastern Europe.

Graph 13 shows, for countries in two emerging regions, the evolutions since 1998 in their real exchange rates in relation to the above yardstick. The contrast between the Asian and European countries comes out clearly. As their development has progressed, most Asian countries have succeeded either in maintaining a relative undervaluation of their exchange rate or, in the case of those countries whose currencies were overvalued, in reducing this overvaluation. The cases of Bangladesh and Hong Kong are particularly clear-cut: between 1998 and 2007 the relative overvaluation of their currencies (measured by the distance from the estimated regression line) fell from some 50% to 15% and 3%, respectively. The evolutions in the Chinese currency are also noteworthy: in relation to the yardstick, the yuan did not seem undervalued at the time, at least on the basis of the latest PPP data. Above all, since 1980 China has succeeded, at the same time as its economy was developing and being opened up, in reducing the overvaluation of its exchange rate from more than 150% in 1980 to around 5% in 2007. Over the same period, the exchange rates of the Eastern European countries were tending to follow the opposite path, rising at the same time as their GDP per head. For example, whereas Turkey's relative GDP per head rose rapidly from 2001 on, the Turkish lira went from a relative undervaluation of 20% to an overvaluation of more than 35% in 2007. A similar movement can be seen for most of the other emerging European countries.

Graph 13. Real exchange rates and development, 1998-2007



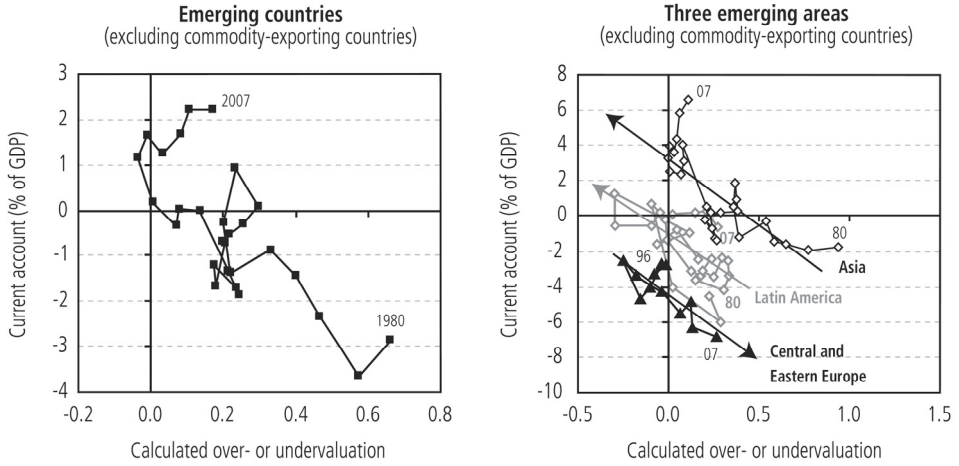
Note: When the variable log (PPP exchange rate/current exchange rate) is greater than 0, the country's currency is overvalued in PPP terms. The regression line shown on the graphs is that estimated in Box 5.

Sources: IMF and authors' own calculations.

What effects have these evolutions in real exchange rates had on the current-account balances of the various countries? Graph 14 gives an illustration of this in the case of the totality of the emerging countries other than the commodity-exporters (105 countries out of a total of 146). Between 1980 and 2007, at the same time as the relative overvaluation of their currencies was being reduced (from more than 60% to around 17%), the current-account balance of this group of countries improved substantially, from a deficit of 3 GDP points to a surplus of 2 points. A second observation, taking major regions and again excluding commodity-exporters, once more shows the contrast between the Asian and Latin American countries and those of Central and Eastern Europe. The former followed the same path as the emerging countries taken as a group (reduction in the overvaluation of the exchange rate and accumulation of current-account surpluses). The latter, by contrast, saw, on average, an appreciation in their exchange rate between 1996 and 2007 and a deterioration in their current-account balances. A more refined analysis, using panel data, confirms the impression given by Graph 14. For the sample of 105 non-commodity-exporting countries, there is a clear relationship between the current-account balance and the under- or

overvaluation of the currency.[2] If one applies a filter to the sample so as to retain only the 'largest' non-commodity-exporting countries, the relationship, from 1995 on, becomes even more distinct (Box 5).

Graph 14. Exchange-rate policies and current accounts, 1980-2007



Note: Over- or undervaluation is defined in Box 5. The weighting used to calculate the aggregates is that of the share of the zone's GDP measured in current dollars. The Central European countries are shown only for the period 1996-2007.

Sources: IMF and authors' own calculations.

By controlling the appreciation of their exchange rates, the manufactures-producing emerging regions succeeded in exporting substantial quantities of savings. For a time at least, globalisation enabled them, by bolstering demand for the products of domestic firms, to take full advantage of their growth potential, despite too slow an evolution in their institutions. At the same time, globalisation enabled the commodity-producing countries to benefit from a sharp rise in prices by accumulating current-account surpluses. The next chapter will describe the monetary policies and financial strategies of these regions. It will be seen, in particular, that these countries are far from having taken on the totality of the risks associated with their export of savings.

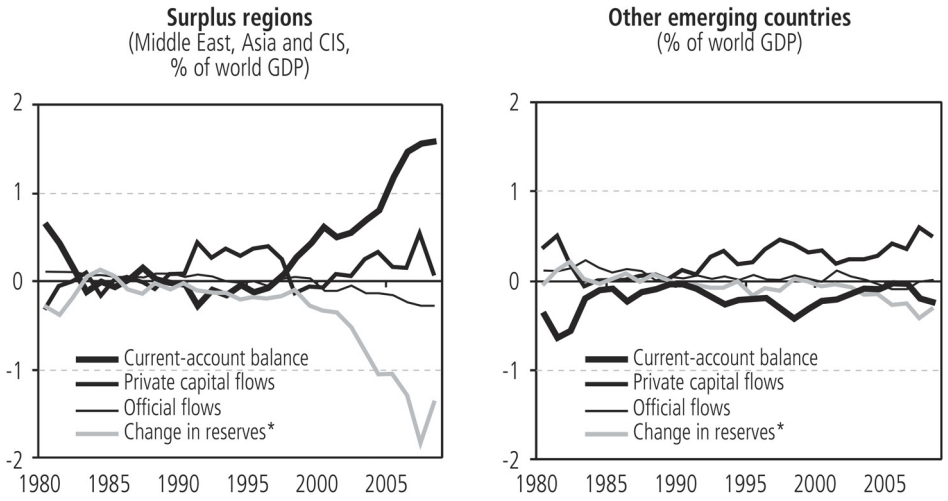
[2] The introduction of commodity-exporting countries into the sample obviously affects the results: the link between exchange rates and current accounts disappears, with the oil-exporters posting substantial surpluses in 1980 and then again starting in 2002, as a result of the evolution in the oil price and independently of movements in their exchange rates.

IV. MONETARY POLICIES AND FINANCIAL STRATEGIES OF THE SURPLUS EMERGING COUNTRIES

In the middle of the 2000s, the flow of savings made available by the emerging regions to the rest of the world amounted to more than 1.5% of *world* GDP (Graph 15).[1] What is even more exceptional than the size of this flow is its share of the savings of the surplus regions. On average, in the middle of the 2000s these regions exported practically *one-fifth* of their savings. The infrastructure of globalised finance played a decisive role in this respect, making it possible for them to transfer savings on a massive scale even though their financial systems were still very crude and the investments made by their savers took relatively risk-free forms. Their integration in the globalised financial system took place, as we shall see first, essentially through increases in the foreign currency reserves of their monetary authorities, without the countries having to take on risks other than the exchange risk. Given the amounts involved, however, this integration, as we shall see later, required them to adapt the conduct of their monetary and fiscal policies. It will then be shown how these countries have started to try to improve the return from this savings surplus placed at the disposal of the rest of the world by gradually taking on, through their sovereign wealth funds, additional financial risks.

[1] This figure is the grand total of the current-account balances of the three surplus emerging *regions* and not, as in Chapters I and III, only of the surplus *countries* in these regions. In 2007, the current account of the surplus Asian countries amounted to 0.9% of world GDP, that of the Middle Eastern countries to 0.5% and that of the countries making up the CIS to 0.2%, giving a total of 1.6% of world GDP. The remainder was accounted for by the developed countries (notably Germany and Japan) and equivalent to roughly 1.4% of world GDP.

Graph 15. Current accounts of emerging regions, 1980-2007



* A negative figure indicates a positive accumulation of exchange reserves.

Sources: IMF and authors' own calculations.

1. Current-account surpluses and accumulation of reserves

Graph 15 shows the past evolution of the balance of payments of developing regions, distinguishing those that have been in surplus since the end of the 1990s from those that have not. As the data are expressed as percentages of world GDP, it is easy to see that the positions of the deficit regions, especially on current account, do not carry much weight. As shown earlier, only a very small portion of the savings surpluses of the emerging countries has served to finance the requirements of the other emerging regions. If one now examines the counterparts of the current-account surpluses of the surplus regions, one striking point emerges, namely that practically all their surplus is reflected in an increase in their currency reserves. It is tempting to explain this by the obstacles that many of these countries place on outflows of private capital. When these outflows are impossible, a current-account surplus will necessarily lead to an increase in reserves of the same amount (assuming net official movements to be zero). The incomplete liberalisation of movements of private capital thus explains, in part at least, why the savings of the emerging regions were not exported through private channels. Given the amount of capital needing to be recycled by these regions and given their financial underdevelopment, the experience of the developed countries nevertheless

suggests that even total liberalisation would not have been sufficient to avoid a substantial accumulation of reserves.

The size of the current-account surpluses of the emerging regions, relative to that of their economies, is in fact extremely large, amounting in 2007 to close to 10 GDP points for China and 20 points for the Middle Eastern countries. It has to be remembered that, in an emerging economy, only a small minority of private non-bank agents has access to the know-how needed to make financial investments abroad. This means that it is difficult, however wealthy this minority may be, for it to be, year after year, the source of capital outflows on a sufficient scale to exceed by several GDP points the private capital that flows into these regions once they start to develop. In order to put things in perspective, portfolio investment abroad by American agents has represented on average since the beginning of the 1990s only 1.5 GDP points. Bank loans could obviously serve as vehicles for the export of the surpluses of the emerging countries, as has been the case, for example, in Germany. In 2007, that country's current-account surplus exceeded 7 GDP points. As the central bank was not accumulating reserves, the totality of this surplus was reflected in outflows of private capital, mainly via banking flows. The Japanese case in some respects resembles that of Germany.[2] Since 1998, Japan has registered an annual current-account surplus of around 3 GDP points. As in Germany, the outflows of long-term capital – taking the form of direct rather than portfolio investment – accounted on average for only a small portion of this surplus. And, again as in Germany, the current-account surplus has, since the mid-2000s at least, been exported largely through outflows of banking capital.

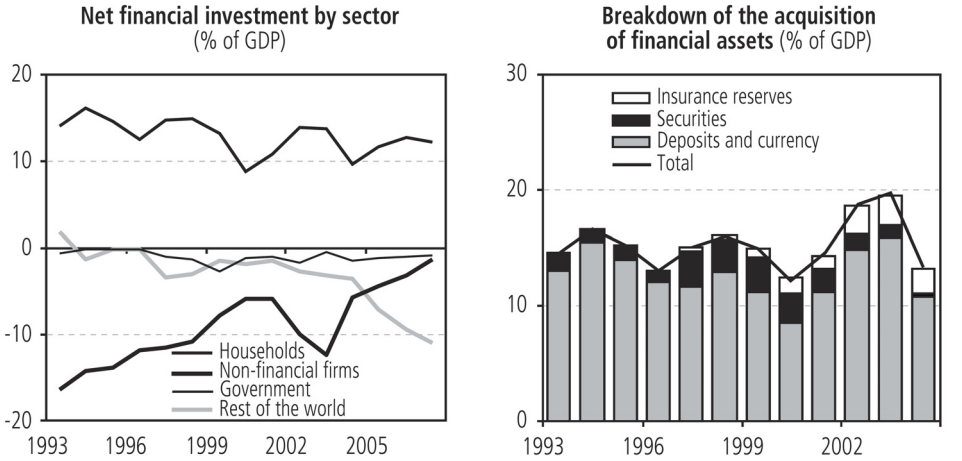
This way of recycling current-account surpluses implies, however, a financial system that is developed and internationally integrated, something that the emerging regions, by definition, do not yet enjoy. In their case, therefore, it is difficult for private capital outflows, even if unhampered, to be adequate in relation to the surpluses to be recycled. *Initially, most of the recycling can only take place in the form of an increase in the foreign exchange reserves of the public authorities*. This does not necessarily mean that exported savings are always public. Their exact origin differs, as

[2] The Japanese authorities, however, regularly intervened on the foreign exchange market. In particular, the Bank of Japan accumulated reserves at a huge pace for a few months around the end of 2003, in order to limit the rise in the yen.

we shall see, depending on whether the countries are exporters of manufactures or of raw materials.

China, which on its own accounts for almost half the current-account surplus of the emerging regions, is a good illustration. Households play an essential role in the formation of the country's savings surplus (Graph 16). For almost a quarter of a century now, the difference between what households earn and what they spend has amounted to at least 10% of GDP. However, this does not explain the recent *growth* seen in Chinese current-account surpluses. The evolution in the corporate borrowing requirement has played a key role here: since the beginning of the 2000s, this requirement, which had previously absorbed almost the total lending capacity of households, has steadily declined at the same time as the current-account surplus was increasing. It was as if, with firms no longer needing the savings that Chinese households were placing at their disposal, these savings were exported to the rest of the world.

*Graph 16. Financial savings of Chinese agents and the composition of their acquisition of financial assets, 1993-2004**



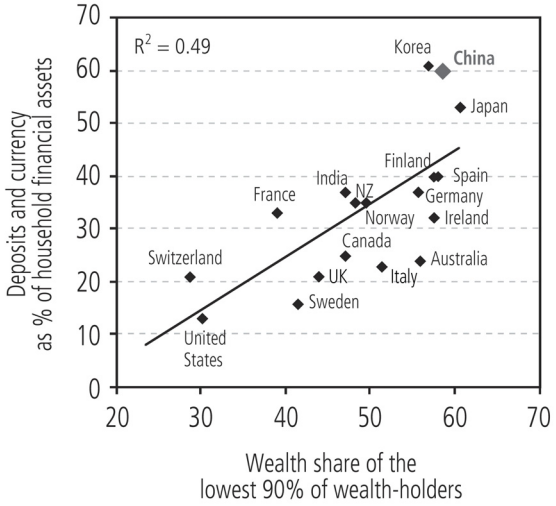
* The flow-of-funds data were available only up to 2004. On the left-hand graph, the figures for 2005 to 2007 are estimates.

Sources: National Bureau of Statistics of China and authors' own calculations.

This change of outlet for a substantial portion of Chinese households' savings took place without any change in the nature of the vehicles used. In the mid-2000s, more than two-thirds of their financial investment – as indeed in the case of firms – took the form of bank deposits (see Graph 16). For the most part, therefore, Chinese savings are held in non-risky form.

One can see this as an almost automatic consequence of the country's financial underdevelopment. For lack of other savings vehicles, Chinese agents can only hold notes or deposits. This aspect of financial behaviour is, however, to be found also in much more developed economies, those where financial wealth is distributed in fairly egalitarian fashion. When a substantial portion of the wealth is held by the relatively less well-off, concern for security wins out and relatively risk-free investments predominate. This is the case for Japan and Korea but also, to a certain extent, for Germany. When, on the contrary, a small number of individuals hold a large proportion of the wealth, their capacity to take financial risks is high and the relatively risk-free and low-yield investments – bank deposits – tend to take a smaller proportion. This is the case, in particular, for the United States. Graph 17 shows, for the 20 or so countries for which data are available, an inverse correlation between the concentration of financial wealth and the share of deposits in total investments. In China, the high proportion of relatively risk-free and low-yield investments seems to be consistent with the relatively egalitarian distribution of wealth prevailing in the first part of the 2000s.

Graph 17. Wealth concentration and share of 'non-risky' investments



Note: The data are taken from the UNU-WIDER project and relate to the early 2000s.
Sources: Davies et al. [2006] and OECD.

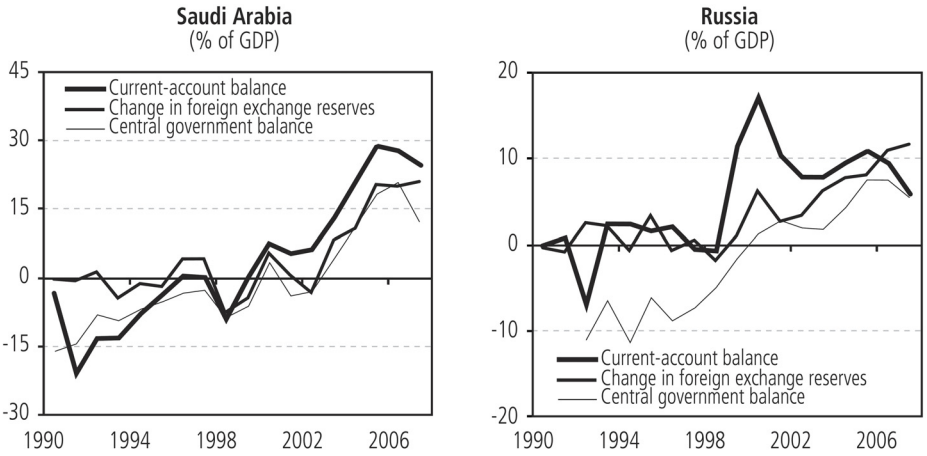
The counterpart of the substantial build-up of China's reserves is therefore to be found in that of savings by Chinese households – and recently also firms – that are mostly invested in very liquid forms with the

local banking system. Before examining the implications of this situation for the manner of conducting monetary policy, it remains to be seen in what way it resembles that seen in the commodity-exporting emerging regions. Here too, for lack of comprehensive data, the observation will be restricted to two cases: Saudi Arabia and Russia.

Saudi Arabia by itself accounts for almost one-quarter of the surpluses of the commodity-exporting countries in the mid-2000s. Unlike China, its exported savings are public. The Saudi government receives directly part of the oil revenues that constitute its main budgetary resource. These sums are credited to its account with the monetary authority – the Saudi Arabian Monetary Agency (SAMA). Budget expenditure is then debited to this account and the unspent portion – the budget surplus – appears on the liability side of the authority's balance sheet. It is therefore by deciding the amount it spends that the Saudi government fixes the amount of savings exported. It does so in a concern to permit steady growth in domestic demand, regardless of fluctuations in the oil price. Graph 18 shows the broadly parallel evolutions in the country's current-account balance, public surplus and increase in foreign exchange reserves prevailing over the period of widening global imbalances.

The Russian case differs from the Saudi case only to the extent that the oil levy represents a less overwhelming portion of the country's budget resources, Russia having a more developed non-oil sector and also because the rouble exchange rate is managed flexibly in relation to the dollar and the euro, whereas the Saudi riyal is pegged to the dollar. The principle is the same, however: the budget revenue is deposited with the Bank of Russia and the public surplus to a large extent explains the current-account surplus and the variations in the exchange reserves (although part of the current-account surplus has also in this case been used to repay the country's external debt). As in the case of Saudi Arabia, these public savings are held mainly in liquid form with the central bank. *The liquid nature of the domestic counterpart of the accumulated reserves is a feature common to most of the emerging regions.*

Graph 18. Current account, public balance and foreign exchange reserves in Saudi Arabia and Russia, 1990-2007



Source: IIF.

2. Accumulation of reserves and monetary policy

The exchange-rate policies implemented by the surplus emerging countries heavily influence the conduct of their monetary policies. Those that have liberalised their capital account and, like Saudi Arabia, have a target based on pegging to a foreign currency, in this case the dollar, have to track the changes in the interest rates of the foreign central bank concerned, in this case the Federal Reserve. Otherwise, the flows of short-term capital, driven by differences in interest rates, would exert pressure on the country's exchange rate. To a large extent, the tuning of the economy is then based less on monetary policy than on the fiscal policy decisions mentioned earlier.

The constraints exerted by the exchange-rate policies implemented by countries like China that have not liberalised a substantial proportion of capital movements are just as real, but of a different nature. When the central bank of an emerging country intervenes on the currency market to curb the rise in its currency by buying that of another country, it is issuing money. The amount issued can be huge, because it is often close to that of the country's current-account balance. The continuous accumulation of foreign exchange reserves therefore poses a very concrete problem for monetary policy: how can the evolution in activity and domestic prices be controlled if, with the banks awash with central bank money, there is

nothing to curb their distribution of lending? In order to solve this problem, the Chinese authorities have put in place, in highly pragmatic fashion, a series of arrangements which in combination have made it possible to avoid, taking good years with bad, any slippage in inflation related to excessive issue of money on the part of the central bank.

The first of these arrangements, consisting of control of bank lending, is the most traditional. It directly puts a limit on the increase in the outstanding loans of the various banks. Such controls are a very crude instrument for regulating the expansion of lending and can only be really effective in one direction (curbing) while at the same time introducing numerous distortions into the allocation of resources [Aglietta & Landry, 2007]. However, since the Chinese surpluses began their sharp rise, the central bank has introduced other arrangements aimed at regulating the expansion of lending by more indirect means, via the liquidity of the banking system. Since the central bank's objective is to manage the exchange rate of the yuan, the size of its interventions, and hence its injection of liquidity, are defined by the imbalance on the foreign exchange markets that is itself the reflection of the country's current-account surpluses. Being unable to decide the amount of money creation linked to these interventions, the central bank has to try to ensure that the liquidity of the banks does not enable them to lend more than is needed to keep the economy close to full employment (Box 6). This it does by 'mopping up', i.e. sterilising, any excess liquidity resulting from its interventions on the currency markets.[3]

Two instruments have been used for this purpose. In 2003, the Chinese central bank started to issue sterilisation bonds. These can be relatively costly instruments, since the remuneration has to be sufficiently attractive for the banks to take them up. Starting in the middle of the 2000s, at a time when the Chinese current-account surplus was growing strongly, the central bank introduced a more direct instrument, namely regular adjustments of the ratio of compulsory reserves that financial institutions have to hold with it. These reserves are proportional to the deposits received by the institutions. By managing in this way the liquid resources of the deposit institutions, the central bank can regulate the amount they

[3] It is indeed the excess liquidity that has to be sterilised and not necessarily the totality of the counterpart of the exchange-rate interventions. For example, part of the money supply issue is 'naturally' absorbed by the steady growth in demand for notes – which account for a substantial portion of the liabilities of the central bank.

lend. However, as in the case of the credit controls, regulating the ratio of compulsory reserves is more effective in limiting supply than in stimulating it. The Chinese central bank also sets the interest rates for the remuneration by the banks of their deposits and the interest rates on their lending, meaning that it sets their intermediation margins. This gives it an additional lever not only for curbing the distribution of lending but also possibly encouraging it.

Box 6. Accumulation of reserves and monetary policy: The Chinese case

How can a monetary policy aimed at regulating the level of domestic lending be conducted when the bulk of the issue of currency by the central bank is the counterpart of interventions on the foreign exchange market? Examination of the Chinese case is particularly relevant here: at the end of August 2008, more than three-quarters of the asset side of the central bank's balance sheet consisted of claims on the rest of the world (primarily foreign exchange reserves, counterpart of the current-account surplus). On the liability side, in addition to the bonds – often called sterilisation bonds – issued by the central bank for the purpose of mopping up the surplus liquidity (21% of the liabilities), there were the currency in circulation (17%) and, especially, the reserves of the financial institutions (42%). It is primarily by adjusting the reserve requirement of these financial institutions that the Chinese central bank managed to control the amount of loans distributed.

Balance sheet of the Chinese central bank
(100 billion yuan, end of August 2008)

Assets	Liabilities
Foreign assets **154**	**Currency** **34**
Claims on financial corporations 20	**Deposits of financial corporations** **84**
	Bonds 42
Claims on government 16	Deposits of government 28
Other assets 8	Other liabilities 10
Total 198	Total 198

Source: People's Bank of China (PBoC).

Let us suppose, for simplicity, that the net external assets (*EA*) are the only asset item in the central bank's balance sheet, with, on the liability side, the currency in circulation (*CUR*) and the reserves of the financial institutions (*RES*). These same reserves appear on the asset side of the balance sheet of the financial institutions alongside their other domestic assets (*DA*), essentially loans; on the liability side of these balance sheets figure the deposits (*DEP*). We assume that all the savings are held in cash or in deposits. The balance sheets of the central bank and the financial institutions are then as follows:

Central bank balance sheet

Assets	Liabilities
EA	CUR
	RES

Financial corporations' balance sheet

Assets	Liabilities
DA	DEP
RES	

If the currency in circulation represents a fixed share α of Chinese GDP (denoted by Y) and if deposits represent a share γ, this gives $CUR = \alpha Y$ and $DEP = \gamma Y$. Let us denote by ρ the compulsory reserve ratio ($RES = \rho DEP$). The assets and liabilities in the balance sheets of the financial institutions being equal, $DA = DEP - RES$, i.e.:

$$DA = (1-\rho)\gamma Y \qquad (1)$$

In the same way, one deduces from the balance sheet of the central bank:

$$EA = (\alpha + \rho\gamma)Y \qquad (2)$$

Equations (1) and (2) make it possible to write:

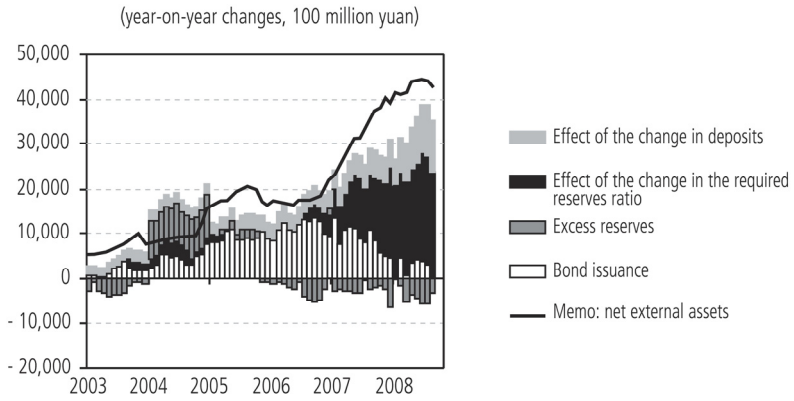
$$DA = \frac{(1-\rho)}{\left(\rho + \frac{\alpha}{\gamma}\right)} EA \qquad (3)$$

Equation (3) establishes a relationship between the accumulation of net external assets by the central bank and of domestic assets by the financial institutions (the lending to the economy): α and γ being given, the central bank can, by modifying the compulsory reserve ratio ρ, control the quantity of lending that the financial institutions can make to domestic agents. All other things remaining equal, by increasing the compulsory reserve ratio, the central bank reduces the possible quantity of lending. Now let $\overline{EA}$ be the accumulation of net external assets. The compulsory reserve ratio will have to be such that the domestic lending permits the economy to operate at full employment. The level $\overline{DA}$ of domestic lending required is such that, increased by the savings transferred to the rest of the world, it equals the domestic savings that is 'desired' at full employment, which is to say $\alpha\overline{Y} + \gamma\overline{Y}$. The compulsory reserve ratio $\overline{\rho}$ is therefore:

$$\bar{\rho} = \frac{1}{\gamma}\left(\frac{\overline{EA}}{\overline{Y}} - \alpha\right)$$

The graph below shows how, since 2003, the Chinese central bank has used various items on the liability side of its balance sheet to regulate liquidity. The calculations are approximate insofar as it was assumed that all the financial institutions were subjected to the same reserve ratio (which is in fact slightly differentiated, lower for the rural institutions, higher for problem institutions). Since 2006, the central bank has conducted its policy mainly by adjusting the compulsory reserve ratio, with the role of its bond issues gradually diminishing.

Change in items on the liability side of the central bank balance sheet



Source: Thomson Datastream, PBoC and authors' own calculations.

In Saudi Arabia, the SAMA has recourse to monetary policy instruments that are similar to those used by the Chinese central bank (Box 7). For example, in response to the inflationary pressures that began to build up in the summer of 2007, it mopped up excess liquidity by issuing Treasury bonds, by raising the compulsory reserves ratio from 7% in October 2007 to 13% in May 2008 and by raising from 2% to 4% the reserves ratio on savings and term deposits. It also maintained measures for controlling consumer credit. In Russia, the interventions of the central bank remained for a long time largely unsterilised, leading to an accumulation of excess reserves on the part of the banks. Faced with the rise in inflation from 7.5% at the beginning of 2007 to over 15% in the spring of 2008, the Bank of Russia raised its interest rates and its compulsory reserves ratio, but not sufficiently to bring the then very rapid growth in lending to a halt.

Box 7. Monetary policy instruments used by the Saudi Arabian Monetary Authority

For a long time, Saudi Arabia had neither a banking system nor a formal monetary system. The only currency in circulation was foreign, and, notably because of the Koranic laws, the role of the banks was limited to a few elementary functions, in particular that of foreign exchange broker for the pilgrims visiting Mecca. The discovery of oil deposits in 1939 profoundly modified the operation of the Saudi economy: the public coffers filled, government expenditure rose strongly and foreign banks arrived on the scene. These transformations hastened the creation of a central bank and a genuine monetary and banking system.

The Saudi Arabian Monetary Authority (SAMA) was set up in October 1952, with the technical assistance of the United States. Its main mission is to ensure the stability of the external value of the currency (today the rate of exchange of the riyal versus the dollar). This objective must enable it to achieve price and financial stability. Since May 1981 and the abandonment of the SDR as reference, the riyal has been effectively pegged to the dollar. The last devaluation of the riyal goes back to 1986, when the exchange rate changed to one dollar for 3.75 riyals from the previous 3.65. To counter the downward speculative pressures on the currency, the central bank has raised its interest rates several times and even intervened on the forward currency market on two occasions (in 1993 – when oil prices fell very low in the wake of the first Gulf War – and in 1998 at the time of the Asian crisis).

The pegging of the exchange rate and the liberalisation of capital movements obviously limit the capacity of the SAMA to implement an autonomous monetary policy (its role is in fact secondary in economic matters). The central bank is not, even so, deprived of means of action to control the liquidity of the system. The Banking Control Law subjects the commercial banks to reserve constraints requiring them to set aside a minimum proportion of liquid assets (*statutory liquidity ratio*) – set at 20% of their sight and term deposits. They must also maintain a minimum cash reserve of unremunerated deposits (*cash reserve ratio*) – proportional to the size of the deposits of their clients.*

This last instrument is used both for prudential purposes (the banks must have sufficient liquidity to face possible withdrawals), and as a tool of monetary policy. In practice, this tool has been little used, with the ratio remaining fixed at 7% throughout the period from February 1980 to November 2007. The SAMA has only used this lever more recently, raising the ratio from 7% to 13% in May 2008 to curb the slippage in observed inflation, and then lowering it to 7% in November 2008 in response to the financial turbulence and the fall in the oil price. To control banking liquidity, the SAMA had recourse in particular to repo operations (to inject liquidity) or reverse repo operations (to withdraw liquidity).

For lack of an extensive bond market, it intervened until the end of the 1980s by means of a Bankers' Security Deposit Account (bonds issued by the central bank and discountable with it). The development of a liquid market for public securities meant that the central bank had new instruments at its disposal, notably Treasury bills from November 1991 onwards. These have the advantage of being usable to finance a possible public deficit and of being purchasable by agents other than just the commercial banks. Indeed, they quickly replaced the bonds of the central bank. Within the framework of its liquidity management operations, the SAMA can also, at its discretion, use public funds to make deposits directly with the banks. This it does especially to control longer-term liquidity, but sometimes also to help banks finding themselves in difficulty. The SAMA has one last tool at its disposal, namely exchange-rate swaps. These operations, when carried out at market price, do not in general have an impact on the riyal exchange rate: they are, in their underlying principle, similar to open market operations. Like the reverse repo operations, they make it possible to absorb excess liquidity in riyals and to provide the liquidity in dollars needed by the banking system. At the same time as it continued to raise its compulsory reserve ratio, the SAMA in the spring of 2008 carried out such operations in order to reduce domestic liquidity.

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* See in particular Muhammad Al-Jasser and Ahmed Banafe (1999), "Monetary policy instruments and procedures in Saudi Arabia", *Policy Papers*, Bank for International Settlements, March, pp. 203-217.

3. Accumulation of reserves and financial strategy

How did emerging countries invest these accumulated reserves? The available data, albeit sparse, indicate that they invested the largest part in liquid assets carrying very low credit risk. Table 2 shows the breakdown of total world foreign exchange reserves. In June 2007 they totalled almost $6,000 billion, 90% of this being accounted for by the emerging countries and Japan (since 2002, virtually the entire rise in the stock of reserves is due to these countries). A little less than 30% consists of deposits with banks or with the Bank for International Settlements (BIS). The bulk (72% in mid-2007, equivalent to more than $4,300 billion) was nevertheless invested in securities. IMF data (Securities Held as Foreign Exchange Reserves or

SEFER) provide an indication of the nature of these securities.[4] The largest portion (76% in 2006) consisted of bonds – in fact, mainly public or semi-public securities (Box 8) – 22% of money market securities and less than 2% of equities. This shows that the reserves were massively invested in liquid assets carrying no credit risk. To a large extent, therefore, the export of savings by the emerging countries was carried out without their taking any risk other than an exchange risk. The return on savings exported in this way will then depend solely on the evolution in exchange rates and the relative levels of interest rates in the country and abroad. Given that the currencies of these countries would normally tend to appreciate steadily in line with their level of development and that their interest rates are generally higher than those of the developed countries, there is only a low probability that this return will be positive.

Table 2. Data on the composition of world foreign exchange reserves

(as of June 2007)	billion dollars	% of total reserves
World reserves (IMF)	5,774	
SAMA reserves*	156	
Total foreign exchange reserves	**5,930**	
of which		
Emerging countries	*4,500*	*76*
Japan	*898*	*15*
of which		
Deposits	1,358	
Adjusted deposits**	**1,646**	28
Securities	**4,284**	72

	billion dollars	% of total securities
Securities held as reserve assets (SEFER survey, December 2006)		
Money market securities	560	22
Bonds	1,955	76
Equities	43	2
Total	**2,558**	**100**

* Saudi Arabia's official exchange reserves amounted to only $24 billion in mid-2007, but were close to $180 billion including SAMA's $156 billion of investment in overseas securities or deposits not attributed in its balance sheet to the 'quasi-sovereign funds'.

** The figure for bank investments carried out by the monetary authorities understates the size of deposits, notably because the definition of monetary authorities applied by the BIS is 'narrow', excluding the Japanese Ministry of Finance and the Chinese State Administration of Foreign Exchange. When adjusted by applying the ratio calculated by Wooldridge [2006], the reserves placed on deposit are estimated to have been close to $1,650 billion in mid-2007.

Sources: BIS, Thomson Datastream and IMF.

[4] These data are non-exhaustive and cover roughly two-thirds of the world reserves held in the form of securities at the end of 2006. They nevertheless somewhat overestimate the amount of reserves held in this form since they include, in addition to securities held by the monetary authorities, those held by the international organisations.

Box 8. The nature of the securities held in foreign exchange reserves

The SEFER data referred to in the text provide little detail concerning the nature of the debt securities held by the monetary authorities. The United States data (Treasury International Capital System or TIC) make it possible, in part, to make up for these shortcomings. They give more information on the nature, but also on the maturity, of the securities held by the official sector. The coverage of the TIC survey is different from that of the IMF, however, in that it includes only the American securities held in the reserves and especially in that the official sector includes the sovereign wealth funds. Even so, these data provide certain useful indications.

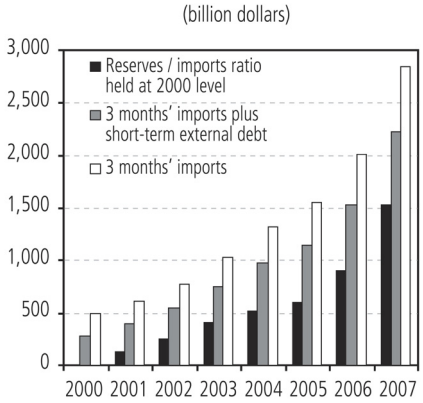
Of the $2,800 billion of American securities held by the foreign official sector in 2007, 87% were public or semi-public (those of the GSEs) and less than 4% were private bonds. The survey therefore confirms that the bulk of the securities held by the official sector carry no credit risk. Admittedly, the share taken by corporate bonds has risen slightly since the beginning of the 2000s – from 1.5% in 2000 to 3.5% in 2007 – but it remains low. The proportion of equities is larger than in the SEFER survey (the difference being explained notably by the inclusion of the assets of the sovereign wealth funds). At close to 10%, this share has nevertheless remained stable since the mid-1990s. To sum up, while the official authorities' appetite for credit risk has increased slightly in recent years, it remains modest.

It would seem, on the other hand, that since 2000, the official authorities have agreed to take on more interest-rate risk than previously. Admittedly, more than half their portfolio of debt securities is still composed of securities with maturities of less than three years (and 66% with maturities of less than 5 years). The average maturity of their portfolio has nevertheless tended to rise recently, from 3.6 years in 2004 to more than 6 years in 2007. This increase is mainly explained by purchases of GSE securities with substantial residual maturity (28% have a maturity of more than 25 years). As these securities often carry prepayment options, however, this residual maturity overestimates their actual maturity.

There is no reason, however, why these accumulated excess savings should remain permanently and in totality in liquid form. Since the beginning of the decade, the amount of reserves held substantially exceeded that of transaction cash balances and of the precautionary balances that a country is likely to aim to hold if it is to avoid being financially vulnerable. In order to handle without strain the dis-adjustments occurring between the moment when the export receipts are received and the moment when the payment for the imports takes place, a country needs cash holdings in foreign currencies generally estimated to

amount to 3 months' imports. This need for transaction cash balances is not the only one an emerging country may wish to satisfy by its holding of reserves. The experience of recent decades has shown the reality of the liquidity risk related to the ever-possible non-renewal of short-term international loans. To guard against this, the 'Greenspan-Guidotti rule' recommends that emerging countries hold reserves equal to the amount of their short-term external debt [Jeanne & Rancière, 2006]. Adding in the needs related to these two motives (transactions and precaution) gives an order of magnitude of the amount of foreign currency a prudent country may wish to hold in liquid form. When this amount is subtracted from the total reserves actually accumulated by the surplus countries, one obtains an estimate of their surplus liquidity in foreign currency. In 2007, this was close to $2,200 billion (Graph 19). The same graph also shows the results of other reasonable estimates for excess liquidity, in a range between $1,500 and $3,000 billion. By investing these excess reserves in less liquid assets, the countries in question can hope to derive, over the long term at least, a better return but at the cost of taking increased risk [Rybinski & Sowa, 2007]. This implies the drawing up and implementation of a financial strategy by each of them.

Graph 19. Three measures of excess reserves for Asian countries, the Middle East and Russia, 2000-07*



* The excess liquidity in foreign currencies is calculated by subtracting from the surplus countries' foreign exchange reserves a calculated amount of 'required' reserves. These calculations take three forms: one based on maintaining the ratio of reserves to imports at the observed 2000 level (7.2 months' imports); one assuming that the required reserves are equal to 3 months' imports plus the external short-term debt; and one assuming them to be equal only to 3 months' imports.

Sources: IMF, Thomson Datastream and authors' own calculations.

In the case of countries that exploit non-renewable deposits of raw materials, this concern is only one component of an approach aimed at deriving the greatest possible benefit, over the long term, from their mineral resources. Taking into account the size of their endowments, their current and prospective demographic situations and the expected evolutions in the demand for, and prices of, the raw materials they export, they have to decide the rate of extraction of these resources and the way in which they use the resulting income. The government has to take into account not only the interests of the present population but also, to a certain extent at least, those of future generations. This is all the more necessary if the country does not have the benefit of a diversified range of activities. If all its mineral wealth is used today solely for the benefit of the present generation, future generations will be condemned to a wretched existence. The government has a key role to play here in ensuring that part of the proceeds from the exploitation of the country's resources actually serves the interest of future generations, either by investing in the economy for the purpose of diversifying activity and increasing productivity, or by investing abroad to provide a future source of income. This role is generally entrusted to specialised public agencies, namely the sovereign funds. Many commodity-producing countries have such agencies, many of them created several decades ago.

A good example is the organisation set up by Kuwait. As in the case of Saudi Arabia, the Emirate's budget service – in this case the General Reserve Fund – receives all the tax revenue (and in particular the revenue derived from oil production), decides expenditure and holds all the public assets. In 1976, a second fund – the Future Generations Fund – was created, with half the assets of the first fund transferred to it. Since then, the second fund receives each year 10% of total tax revenue and any drawing down of its assets requires specific legislation. These two funds operate according to two clearly distinct logics: the first acts as a short-term stabiliser aiming to tune the economy while at the same time smoothing out the volatility of oil revenues; the second aims to ensure an inter-generational transfer. The assets of both funds have since 1982 been managed by the Kuwaiti sovereign fund known by its acronym KIA (Kuwait Investment Authority), having as its objective a satisfactory return. In 2008, the KIA's assets under management exceeded $200 billion, with the Future Generations Fund accounting for 80% of this total.

By no means have all the commodity-producing countries set up organisations as explicit as this. For example, in Saudi Arabia, it is SAMA that acts as both central bank and sovereign fund. The totality of the

Kingdom's assets are held on its balance sheet and the liability side simply distinguishes between various public accounts: the government's own account, those of the pension fund, the development fund, etc. In the case of Russia, a stabilisation fund was set up in 2004 with the aim of short-term smoothing of the income derived from oil and gas. In early 2008, this was divided into two in order to hive off a National Prosperity Fund intended to receive the share of oil income exceeding a predetermined threshold (due to fall from 6.1% of GDP in 2008 to 3.7% from 2010 on). The sums received in this way were supposed to be invested for the longer term in forms riskier than those adopted hitherto. The fact that this decision was taken in 2008, when Russia had already built up reserves amounting to almost $500 billion, highlights one particular point: the increase in the revenue of commodity-exporters in the mid-2000s was so rapid that they were unable to immediately put in place a strategy for the investment of the 'excess' portion of their reserves.[5]

Much the same was true of China, but for different reasons. Here too, it was not until the accumulated reserves exceeded $1,400 billion that a sovereign fund was created (in September 2007). This was the China Investment Corporation (CIC). Its financing is based on mechanisms radically different from those adopted by the commodity-producers. The government has issued bonds in yuan for a total of roughly $200 billion and with the proceeds it has bought currencies (and also long-term shareholdings) from the central bank and these have been allotted to the CIC. The aim is to generate a return higher than that on government bonds. At a later stage, once its initial endowment has been fully invested, the resources of this sovereign fund may be increased, at the government's discretion, using the same mechanism.

In 2008, according to Morgan Stanley, the total assets of emerging-countries' sovereign funds exceeded $2,500 billion (for comparison, their exchange reserves were around $5,500 billion). Information concerning the allocation of these funds is sparse. Seven of them, handling half the total assets of the sovereign funds, publish no information on the breakdown of their portfolios. Even so, it is reasonable to think that most of these funds hold a substantial proportion of risky assets, notably foreign. Between the

[5] During the financial turmoil of 2008, Russia intervened to stabilise its currency. Despite massive interventions, its reserves were still above $400 billion by the spring of 2009 (after reaching $600 billion in mid-2008).

beginning of 2007 and 2008, most of the investments 'disclosed' by the sovereign funds in fact consisted of shares of financial institutions. *The asset allocation of these funds therefore differs appreciably from that of the exchange reserves* and is more akin to that of pension funds or mutual funds. In general, unlisted firms (private equity), real estate or investment in other emerging countries account for a substantial portion of their portfolios. For example, the data available concerning the Singapore fund Temasek (one of the more transparent) show that in March 2008, 35% of its portfolio was invested in domestic assets, 41% in Asian countries and 23% in OECD countries (excluding Korea). In terms of sectoral allocation, financial services predominate (with 40%), ahead of telecoms (24%), transport (10%) and real estate (7%). At the same time, 21% of the portfolio's assets consisted of shares in unlisted companies.

As collectors of long-term savings, the sovereign wealth funds are, by their nature, investors with a long time-horizon whose stabilising role for the financial markets can be considerable. The data set out above show that their build-up, until 2008 at least, was relatively slow by comparison with the growth in the national exchange reserves. If the increasing tendency for the emerging countries' 'excess' reserves to be directed towards these funds is confirmed, the 'bias' in favour of liquidity seen in the allocation of their financial investments will diminish. They are however in most cases designed to take risks essentially through the purchase of listed or unlisted shares and property investments and have been little inclined to take on credit risk (buying hardly any private claims). As will be seen, the saving surpluses of emerging regions have largely found their counterpart in issues of private *debt* by the Western countries. This means, not only that the emerging countries have taken relatively little financial risk,[6] but that their preferences failed to coincide with the nature of the risks to be taken. The rise in international current-account imbalances in the 2000s was then bound to be accompanied by an ever-increasing need for credit-risk-takers. The two following chapters will explore the mechanisms that have led the developed economies to borrow the savings exported by the emerging regions while at the same time taking on the risks associated with this borrowing.

[6] Some emerging countries, however, made some significant investments in shares of Western financial institutions.

V. THE MECHANICS OF INTERNATIONAL TRANSFERS OF SAVINGS

Financial globalisation has enabled the emerging regions to build up substantial savings without having to bear all the risks involved. *This would not have taken place if the economies in the rest of the world had not, in one way or another, made it possible.* Indeed, how could the surplus regions have spent less than they earned if others had not spent more? The emerging regions' savings surplus could not have been built up if there had not been a counterpart in the form of an increased financing requirement in the developed countries. However, it was not sufficient for the latter to import these savings. Since the emerging regions' surplus was for the most part invested risk-free, it was also necessary that the developed regions take on the risks that the emerging regions did not. In order for savings invested risk-free to finance investments that are risky by nature, someone somewhere has to take on the associated risks. This has probably been the most original, and the least emphasised,[1] contribution of globalisation. By considerably facilitating the circulation of financial risks, it has enabled the developed world to relieve the emerging countries of a significant part of those risks related to the investing of their savings surplus – at the cost, obviously, of an accumulation of risks in the globalised financial system. This chapter examines the forces that have pushed the developed economies to absorb the emerging regions' savings while the next will show how the Western financial system could – and was led to – take on ever more risk.

[1] The pioneering paper of Caballero & Krishnamurthy [2009] is an exception.

1. The forces behind international transfers of savings

How have the developed regions been led to import the savings that the emerging economies have been exporting since the end of the 1990s? Is the rise in their indebtedness the automatic consequence of forces emanating solely from the emerging regions? Or is the explanation to be found also in the policies implemented in the developed countries in reaction to these forces or others? A variety of replies to these questions have been put forward.

At the beginning of the 2000s, a first series of analyses [Dooley et al., 2003], noted that the recent interpenetration of the financial balance sheets of the developed and emerging regions resembled in some respects what had been seen at the time of the system of fixed exchange rates introduced by the Bretton Woods agreements. With the US dollar being at the time the reserve currency, the rest of the world – Europe and Japan, principally – accumulated in dollars the reserves they needed to cope with the rapid expansion of international commerce in much the same way that the emerging countries are doing today. The counterpart of this accumulation, like today, was a deficit in the American balance of payments. The financial complementarity set up in this way between the United States and the rest of the world explains why the American deficit, for many long years, was not accompanied by downward pressure on the dollar. The fact that the current situation resembles this earlier one is, from this standpoint, reassuring. However, the resemblance cannot throw light on the mechanisms that have, for a decade now, led the United States to build up current-account deficits. During the 1960s, the formation of foreign exchange reserves on the part of the rest of the world was in fact financed more by outflows of private capital than by a deficit in the United States current account (see Graph 4 in Chapter II). The transfer of savings towards the United States has remained on a modest scale. It would therefore be vain to seek in the evolutions of this period an explanation of the mechanisms that have recently led the United States, and certain other developed countries, to import savings on a massive scale.

A series of empirical studies [Warnock & Warnock, 2005] have attempted, starting from the same observation as Dooley et al., to show how the accumulation of foreign exchange reserves by the emerging regions could have induced a current-account deficit in the developed regions, the United States in particular. The reasoning is seductive: by buying hundreds of billions of dollars' worth of US Treasury securities, the monetary authorities in the emerging countries pushed up their prices and

hence pushed interest rates down. This decline increased the wealth of American agents and at the same time stimulated their borrowing. The resulting rise in the propensity to spend led automatically to a widening of the American deficit. By buying Treasury securities, the emerging countries therefore directly forced the United States to import the savings they exported! This analysis has the advantage of simplicity. However, its theoretical and empirical underpinnings are less solid [Wu, 2008] than the multitude of studies that apparently confirm it would suggest. In particular, it provides, at best, only part of the explanation being sought. The United States' current-account deficit in fact began to widen in 1998, at the time of the outbreak of the Asian crisis, when the dollar reserves of the rest of the world were not increasing. Long rates nevertheless fell sharply, leading to additional spending that tended to stabilise the American economic situation. The steep decline in United States' exports, linked to the collapse in Asian countries' demand and in their exchange rates, was then offset by a substantial rise in American residential investment. The resulting increase in the American current-account deficit then helped enable the crisis-ridden Asian countries to accumulate the current-account surpluses needed to repay their debts.

Caballero et al. [2006], in order to throw light on this particular episode, have shown the mechanisms by which, in a globalised financial system, savings flows can be set in movement from the developing to the developed regions. Their analysis introduces forces that are quite different from the previous ones, with the authorities' desire to control the evolution in their exchange rates by accumulating reserves playing no role. The authors adopt the framework of a general equilibrium model with two financially open regions, one emerging and the other developed. The quality of the savings vehicles available in each region, which is at the heart of their reasoning, is summarised by the share of national income that the institutions in the respective regions make it possible to pledge to those holding these savings vehicles. This share will normally be higher, the more reliable the legal and accounting frameworks, as well as the rules of corporate governance. These institutional characteristics being given, this portion is assumed to be fixed. Any increase in the demand for financial assets – i.e. savings vehicles – issued in the region will therefore lead, assuming unchanged prospects for income growth, to a rise in the prices of these assets and a decline in their yield, identified in this case as the interest rate. In attempting to account for the evolutions seen following the Asian crisis, the authors then show how, starting from a situation of equilibrium, a sudden deterioration in the quality of the financial assets of the emerging

region leads it to export savings at the same time as it leads the developed region to import savings. This deterioration is in fact reflected in a decline in the share of the emerging region's national income that is committed to the remuneration of these assets. The return on them accordingly falls and, with the help of globalisation, a decline in world interest rates follows. This in turn pushes up the value of the developed region's assets and its agents, having become wealthier, save less. The shock therefore produces a lasting current-account deficit for the developed region financed by the 'export' of savings vehicles (i.e. inflows of capital). Now that the value of its financial assets has suddenly fallen, the emerging region, for its part, needs to 'import' savings vehicles. In order to acquire those 'made available' by the developed region it will save more and achieve a current-account surplus. Since the analysis is carried out in a general-equilibrium framework, macroeconomic policies, by construction, play no role. The growth potentials and the quality of the savings vehicles of the different regions are sufficient to create financial complementarity between them.

This analysis is based on reasoning that is specific to a long-term equilibrium model. As the share of national income committed to the remuneration of financial assets is assumed to be given, shocks related to increased demand for savings vehicles can only be absorbed through variations in the prices of these assets. In practice, however, the developed economies have at their disposal mechanisms that make it possible, in the short term at least, to meet increased demand for savings vehicles by new issues. In an economy threatened with under-employment, monetary policy can, for example, stimulate private borrowing or the government can itself borrow to bolster activity. There is nothing automatic about this, however. The maintenance of full employment results from the policies implemented and the way in which the economies respond. It is impossible to understand the continuous widening of the American current-account deficit since the end of the 1990s without taking into account the strength of the economic stabilisation mechanisms with which this economy is endowed and the determination with which policies to keep it close to full employment were applied. *The financial complementarity between emerging and developed regions is based not so much on the superiority of the financial assets issued by the latter as on that of their system of macroeconomic regulation*. When China, faced with the very rapid progress in its production potential, curbs the appreciation of its currency in order to avoid the deflationary shock that would otherwise result from the inertia of its agents' spending behaviour, it 'exports' its demand-management problem to the rest of the

world. The latter is in fact able to 'import' it because it can, through additional borrowing, cope with a possible shortfall in demand.

2. The consequences of the oil countries' limited absorptive capacity

To understand how this new type of complementarity between emerging and developed economies had been working until the recent crisis, let us begin by looking at the forces related to the rises in the oil price. These rises, as we have already seen, played an important role during the 1970s. At that time, their deflationary impact had been largely countered by borrowing on the part of countries in the South. More recently, it has been the developed countries that provided the counterweight: their current-account deficit has been partly the product of the mechanisms that enabled the world economy to absorb the oil shock in the early part of this decade without any marked slowdown.

To demonstrate how this operated, let us consider a world consisting of two regions, the developed countries (subscripts d) and the oil-producing countries (subscripts p), with, for the sake of simplicity, only one currency, that of the developed countries. Trade between the two groups is summarised by the share μ that each group has in the spending D of the other. As these shares are given (in the form of import propensities), the incomes of the two regions can be written as follows:

$$Y_d = (1 - \mu_d)D_d + \mu_p D_p$$

$$Y_p = (1 - \mu_p)D_p + \mu_d D_d$$

Each region is characterised by a propensity δ to spend its income Y. When this propensity is greater than unity, agents in the region spend more than their total income (their gross domestic product) and the region has a deficit on current account. We have:

$$D_d = \delta_d Y_d$$

$$D_p = \delta_p Y_p$$

Propensities to spend are here taken as a decreasing function of income. In other words, the higher the income, the greater the proportion that is not spent. In the developed countries, this propensity is a function of other variables as well: for a given level of income, a decline in interest rates, for example, increases the proportion of income that is spent. The

spending behaviour of the oil countries, for their part, is characterised by limited absorptive capacity: if their incomes suddenly rise – because of a surge in oil prices – their spending is unable to keep up. To take this feature into account in a simple manner, it is assumed that above a certain income their expenditure no longer rises and remains fixed at $\widetilde{D}_p$.

Let us take as the starting point a situation in which activity in the developed countries is at its full-employment level $\overline{Y}_d$, in which the oil countries' domestic spending is at its maximum level $\widetilde{D}_p$ and in which the oil price is such that trade between the two groups is in balance ($\mu_d \overline{Y}_d = \mu_p \widetilde{D}_p$). For each group, spending is then equal to income ($\delta_d = \delta_p = 1$). What happens if the oil price now suddenly rises steeply? The share of the domestic spending in the developed countries that provides income to the oil countries increases to $\mu_d + \Delta\mu_d$ (where $\Delta\mu_d > 0$). Let us suppose, in order to isolate the origin of the resulting deflationary effect (linked, it should be noted, not to the rise in the oil price, but to the limits on the oil countries' absorptive capacity), that the developed countries' propensity to spend remains unchanged. The level of their income is then defined by:

$$Y_d = (1 - \mu_d - \Delta\mu_d)\delta_d Y_d + \mu_p \widetilde{D}_p,$$

or, if δ_d remains equal to unity:

$$Y_d = \frac{\mu_p \widetilde{D}_p}{\mu_d + \Delta\mu_d} < \overline{Y}_d.$$

The level of activity in the developed countries is therefore below what it had been previously: *if these countries' propensity to spend is unchanged, their current account remains in balance, but they are no longer operating at full employment*. What are the conditions for a return to the earlier level of activity? The answer emerges clearly from the equations: economic agents in the developed regions now have to borrow in order to be able to spend more than their income. In other words, for $Y_d = \overline{Y}_d$ to hold again, their propensity to spend must rise to:

$$\delta_d = \frac{1 - \mu_d}{1 - \mu_d - \Delta\mu_d} > 1$$

If the developed countries' propensity to spend rises to this level, the deflationary shock will be absorbed. In this case, the countries remain at full employment, but at the cost of creating a current-account deficit. It will be seen from this analysis how a transfer of savings might take place. If the

rise in the oil price brings the oil countries' earnings above their absorptive capacity, these countries become *virtual* exporters of savings. For this virtual situation to become reality, however, the rest of the world has to be prepared to borrow and to spend more than its income. The developed countries will then be importing the savings of which the oil countries were potential exporters.

Admittedly, the forces generated by the oil shock will tend to reduce the income of the developed regions and hence to increase their propensity to spend, but there is no reason why, by itself, this pressure should be sufficient to bring the spending propensity δ_d to the level needed to bring these countries back to full employment. For this to happen, they must implement economic policies and have at their disposal financial systems enabling those agents willing to borrow to do so in practice.

3. The response to deflationary pressures coming from the emerging Asian economies

The rise of Asian countries as exporters of manufactures – China being the most obvious example – is creating for the rest of the world an adjustment problem analogous to that posed by the rises in the oil price. Like the oil exporters, these countries are also potential exporters of savings and, also as in the case of the oil exporters, this potential can only be realised if the rest of the world is prepared to go further into debt. To show this, we shall again reason on the basis of a world consisting of two regions, this time the developed countries and the emerging Asian countries (subscripts *a*). As previously, the formation of income of each region can be written as a function of the propensities to import and the domestic demands:

$$Y_d = (1 - \mu_d(e))D_d + \frac{1}{e}\mu_a(e)D_a$$

$$Y_a = (1 - \mu_a(e))D_a + e\mu_d(e)D_d$$

However, this time the proportions μ are a function of the exchange rate e used to convert one currency into the other. When e rises, the currencies of the developed countries appreciate and their propensity to import μ_d rises, while μ_a, the Asian countries' propensity to import, diminishes. As these ratios are defined in relation to spending in national currencies, the imports of each region have to be converted into the currency of the other in order to provide the value of the exports. As

earlier, the demand D is in each region related to income by a propensity to spend δ that is a decreasing function of income:

$$D_d = \delta_d Y_d$$

$$D_a = \delta_a Y_a$$

It is now necessary to define, for each of the two regions, a 'full-employment' level of activity $\overline{Y}$. Unlike the oil countries, the emerging Asian countries have large and largely under-employed populations. Strictly speaking, the level $\overline{Y}_a$ corresponds not to full employment but to the level of employment aimed at by the authorities. Let us now assume, in line with Chapter III, that savings behaviour, financial mechanisms and economic policies in these regions are such that, unless their economies are substantially below 'full employment', *the propensity to spend income* δ_a *is always less than unity*. If these economies are running at full employment, their agents will therefore not spend the totality of the income $\overline{Y}_a$ being formed.

This level of full-employment activity can only be attained on condition that they *export their savings surplus*. Like the oil countries, they will be able to do this only if the rest of the world is prepared to borrow. In order to induce these other countries to do so, the manufactures-exporting emerging regions have one lever to hand, namely their exchange rates. By using this instrument they can provoke a policy reaction on the part of the developed regions that will in the end make it possible for both regions to operate at full employment, but at the cost of increasing the current-account disequilibrium.

In order to depict the sequencing involved, let us start by defining a reference exchange rate $\bar{e}$ as the rate that ensures current-account equilibrium between the two regions, *assuming that each region spends the totality of its full-employment income*. By definition, therefore, we have propensities to import associated with the reference exchange rate, $\mu_a(\bar{e})$ and $\mu_d(\bar{e})$, such that

$$\mu_a(\bar{e})\overline{Y}_a = \bar{e}\mu_d(\bar{e})\overline{Y}_d$$

The exchange rate $\bar{e}$, which one might be tempted to call the equilibrium exchange rate, is a highly theoretical reference rate. To say that the current account of the Asian emerging regions is in balance means in fact that these countries' spending exactly equals their income. However, as

we have seen, at full employment their propensity to spend δ_a is less than unity. What happens, then, if the reference exchange rate prevails and the *developed* regions spend their full-employment income? Given the definition of $\bar{e}$, the emerging region's level of activity is determined by the following relationship:

$$Y_a = (1 - \mu_a(\bar{e}))\delta_a Y_a + \mu_a(\bar{e})\overline{Y}_a$$

If δ_a is less than unity, it can be verified that Y_a is bound to be less than $\overline{Y}_a$. *If spending by the developed countries is equal to their full-employment income, the demand for the emerging countries' exports, at the reference exchange rate, will be insufficient to enable the latter to attain full employment.*

Things might be different if the emerging countries manage to bring the exchange rate below this reference level. Let us again take as starting point the situation in which the developed countries spend their full-employment income. What happens if the Asian countries' currencies depreciate compared with the reference level and move from $\bar{e}$ to $\bar{e} + \Delta e$? This depreciation brings about a shift of market shares in their favour and they will now experience an increase in world demand for their products. As we have seen, if $\Delta e > 0$, $\mu_d(\bar{e} + \Delta e) > \mu_d(\bar{e})$ and $\mu_a(\bar{e} + \Delta e) < \mu_a(\bar{e})$. This additional demand stimulates activity in the Asian countries and brings it closer to the desired level $\overline{Y}_a$. Let us suppose that Δe rises to the point at which these countries do indeed attain this level of activity $\overline{Y}_a$. If the developed regions still spend only their full-employment income, their level of activity will be:

$$Y_d = (1 - \mu_d(\bar{e} + \Delta e))\overline{Y}_d + \frac{1}{\bar{e} + \Delta e}\mu_a(\bar{e} + \Delta e)\delta_a \overline{Y}_a$$

It can be verified that this level of activity Y_d is necessarily less than $\overline{Y}_d$: the market shares gained by the one side are lost by the other, so that it is no longer possible for the developed regions to be at full employment. If these regions have room for manoeuvre in economic policy and have at their disposal financial systems that are efficient – and whose capacity for risk-taking is not saturated – they will nevertheless be able to respond to this 'undervaluation' of the Asian countries' currencies by increasing their propensity to spend. They will then find themselves again at full employment, but with a propensity to spend that is greater than unity and hence with a current-account deficit.

This shows the possibility opened up by international financial integration when it is combined with trade integration. It enables countries to experience rapid development despite the structural weakness of their domestic demand provided that they manage to maintain the exchange rate of their currency at a proper level and are able to meet the resulting foreign demand for their products. For a country like China, the 'right' exchange rate is the one that ensures full employment despite having a propensity to spend income that is structurally insufficient *(δ_a <1)*. This full employment will nevertheless be impossible unless the developed countries' propensity to spend their income rises correspondingly *(δ_d > 1)*. For there to be export of saving from one region, the other region has to be prepared to import it! The complementarity established in this way between emerging and developed regions is however far from natural, as the proponents of the thesis of a 'new Bretton Woods' [Dooley et al., 2003] seem to imply.

4. The contrasting responses of the developed economies

To fully absorb the deflationary pressure induced either by an increase in the price of oil or a shift in market shares in favour of emerging countries, an upward adjustment in the developed regions' propensity to spend is required. Exactly how this can be obtained is by no means obvious. δ_d is in fact the result of the interplay of three variables: the share s of the income Y saved by private agents, the share i they devote to investment spending and the proportion g represented by the government deficit. By definition

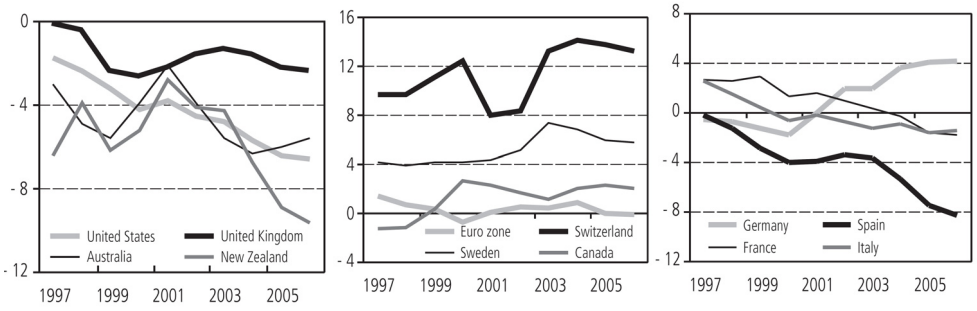
$$\delta = 1 - s + i + g$$

Clearly, fiscal policy can play a stabilising role: by increasing its own propensity to spend its income, the government also normally increases the propensity of the country as a whole. As was pointed out in Chapter II, in coping with the first oil shock substantial use was made of fiscal policy, especially in Germany and Japan. However, the room for manoeuvre in fiscal policy is not unlimited: if public borrowing is already high or if the burden on future budget spending is causing concern, it will be necessary to know just how far the government should go in borrowing for the purpose of maintaining full employment today – especially as monetary policy is another instrument that can contribute to the adjustment being sought. If the respective behaviours of savings and investment – encapsulated here by the variables s and i – are sensitive to interest rates, a cut in the central bank's key rate will normally lead to an increase in the private sector's propensity to spend $1 - s + i$. However, there is nothing

automatic about this, either. In the first place, the decision has to be taken to make the cut. For instance, if inflation is already high, central banks may well hesitate to adopt a more accommodating monetary policy just when the rise in the oil price is threatening to aggravate matters. And even if inflation is not giving cause for concern and a policy of lower interest rates is in fact adopted, this does not by itself ensure that the necessary adjustment will occur: the final effect of the decline in key rates will depend on the nature of the transmission channels in place.

In the financially advanced economies, these channels are numerous and diverse. The value of households' financial wealth can be increased by the rate cut, in which case 'wealth effects' will tend to reduce the savings ratio *s*. If much of the borrowing is at floating rate, redistribution effects may come into play, in that if the borrowers' marginal propensity to spend exceeds that of the lenders, the result will be a rise in the overall propensity to spend. In countries where recourse to borrowing for the purposes of consumption is widespread, the increase in loan-financed purchases of durable goods will also reduce *s*. The decline in rates will also affect the financing of investment, especially housing investment. Productive investment is, for its part, mainly sensitive to the evolution in corporate profits and firms' expectations of demand for their products: if the economy is confronted with a deflationary shock, these two variables will be adversely affected and it would be vain to hope that a cut in rates will immediately encourage firms to borrow in order to invest. By contrast, the reduction in mortgage interest rates will normally act as an incentive to households to take out long-term loans to finance the purchase of a first or second home. A substantial proportion of the effects of rate cuts on private agents' propensities will in fact operate through this channel. The quality of this transmission depends, however, on the nature and condition of each country's financial arrangements for the distribution of this type of loan. *The configuration of current-account balances across developed countries underlying the 'global imbalances' has largely reflected the disparities in this compartment of their financial systems.*

Graph 20. Developed countries' current-account balances, 1997-2006 (% of GDP)



Source: IMF.

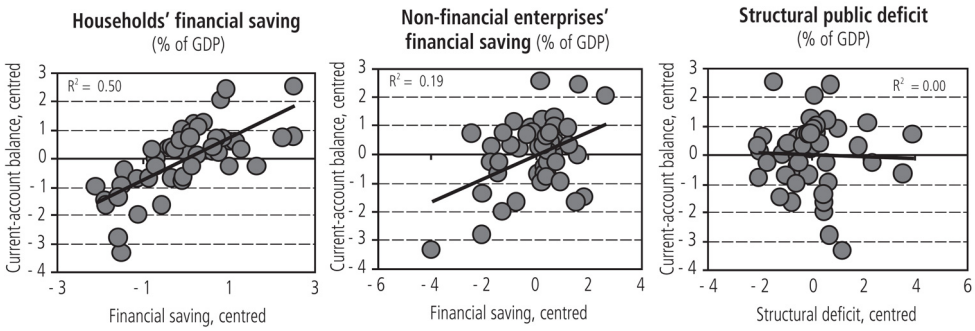
As can be seen from graph 20, the evolution of the current-account balances of the developed regions (excluding Japan) since the end of the 1990s has indeed shown marked contrasts. At one extreme, the United States, but also certain smaller English-speaking countries (Australia and New Zealand), have seen a marked deterioration in their current-account balances. By contrast, the eurozone remained in equilibrium, while Switzerland and the Scandinavian countries have seen their surpluses increase. The existence of equally spectacular contrasts among eurozone countries should be stressed. Since 1997 the German balance has improved by almost five GDP points, whereas the Spanish balance has deteriorated by more than 7 points.

These contrasts are all the more remarkable in that, over the same period, the developed economies have been confronted with the same deflationary forces: not only those just referred to, emanating from the Asian and oil-exporting countries, but also those generated internally following the bursting of the stock-market bubble in 2000. Their responses to these forces have had two features in common: first, at no time did they try to control their exchange rates through continuous intervention and, second, they all relaxed their monetary policies. Why then did their current-account balances move so differently? In other words, why has the "global saving glut" alluded to by Ben Bernanke [2005] been channelled only to a small number of countries, the most prominent among them being the United States?

Part of the answer is to be found in the important differences in the way households can borrow in developed countries. While financial liberalisation has led to standardisation of the terms on which the large firms can fund themselves, the terms for borrowing by households – and

small firms – remain heterogeneous, even within the eurozone: the same deflationary shock was countered in all countries by monetary easing, but the responses of household borrowing differed widely. The resulting adjustment that took place in the developed economies can be clearly discerned from Graph 21, which depicts the relationship between the current-account deficit of a country and the financial savings of its various agents for the period 2000-05. The wide differences in households' responses to the fall in interest rates largely explain the contrasts in evolutions in the current-account balances. *It is the financial behaviour of households, not of governments or enterprises, that best explains the evolution in current-account balances over those years.*[2]

Graph 21. Current-account balances, private financial savings and public deficits for the period 2000-2005



Note: Points represent annual data for the following countries: Germany, France, Italy, Spain, Belgium, the United States, the United Kingdom and Australia. The data have been centred on the respective average values for each country for the period in question. Tests carried out on non-centred panel data show that the hypothesis of absence of fixed effects by country is rejected. Following the introduction of fixed effects, the household financial savings variable remains very significant in explaining current-account balances.

Sources: National central banks and authors' own calculations.

Since the end of the 1990s, therefore, a rise in household borrowing in the developed regions has enabled the world economy to absorb a series of deflationary shocks or pressures. Faced with the continuous pressure from the emerging Asian countries, and given the recessionary consequences

[2] The same was not true of the period 1995-99, for which the behaviour of enterprises' financial savings explains part of the differences seen between countries, with the role of household behaviour or fiscal stimuli providing very little explanation.

after 2000 of the bursting of the stock-market bubble and the rise in oil prices from 2004 on, many developed countries adopted accommodating monetary policies that encouraged borrowing. United States monetary policy, in particular, led to a massive issuance of debt. In the mid-2000s, the *flow* of borrowing by American households reached 10 GDP points, more than twice the average flow in previous decades.[3] And if the surge in energy prices that provoked two world recessions in the 1970s has not led to a third one, this was mainly because this time the rise in the oil bill could be financed entirely on credit. Over the years, the developed economies, and especially the American economy, have helped to keep the world close to full employment. By allowing their liabilities vis-à-vis the rest of the world to increase, they provided the counterpart for the latter's asset accumulation.

[3] Note that a side effect of this policy was to prompt companies as well to borrow, although not so much to invest as to buy back their shares. Taking advantage of low interest rates to restructure their balance sheets, they substituted debt securities for equities that were devalued as a result of the loss of confidence connected with the bursting of the stock-market bubble.

VI. TRANSFERS OF SAVINGS AND GLOBALISATION OF RISK-TAKING

By issuing an impressive amount of debt to help keep the world economy close to full employment despite mounting deflationary pressures, the Western economies played their part in the building of the global imbalances. This financial complementarity between the emerging and developed regions could not have taken shape, however, if the risks involved in this massive issue of debt had not been taken in charge by the globalised financial system. Because the risks related to any financing operation could now be broken down into separate elements, this process was considerably facilitated, with the emerging countries able to export their savings using the infrastructure of globalised finance. This meant that their financial underdevelopment was not a problem from this point of view. They merely had to 'plug into' the Western risk-taking chains. This chapter will show how the global financial system could – and was led to – carry the risks emerging countries did not take on; at the same time, it will point out the fragility of the chains that were put in place.

1. The globalisation of the risk-taking chains

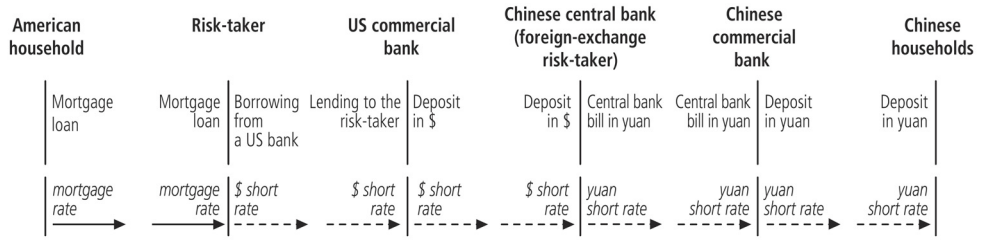
We shall first see how the risk-taking chains described in Chapter I have provided the required link between the borrowers and the savers that were at the two ends of the global imbalances. How has this intermediation function been performed from a microeconomic point of view? What were the risks involved and who carried them? To answer these questions, we will reason on an item of Chinese savings – a deposit by a household – having as its counterpart an item of American borrowing – a loan taken out by a household in order to buy a house.

When an American bank makes a mortgage loan, it creates a deposit in dollars and acquires in exchange a claim on a household. The latter uses the deposit to pay for its property purchase, thus putting the deposit into

circulation in the American economy. Since the latter is in deficit vis-à-vis the rest of the world, the deposit – or another deposit indistinguishable from it – will leave the economy as payment to a Chinese exporter, who will exchange these dollars with his central bank for yuans that he will use to pay his workers. These workers are none other than our Chinese savers, who will place the sums in question on their bank accounts. The loan made in the United States will therefore permit the formation of their savings – or those of other Chinese savers. Loans always create deposits, even if the loan is American and the deposit is Chinese.

By itself, an accommodating American monetary policy stance aimed at keeping the economy close to full employment – of the type described in the preceding chapter – will never be sufficient to enable an American household to obtain a loan. For this to happen, someone has to take on the risks involved. If no one is prepared to do so, the loan will not be made and the savings that would be the counterpart will not be formed. However, as we have seen, globalisation enables a 'chain' of operators to take on these risks. Diagram 5 depicts one of many possible such chains. This chain acts as a substitute for the intervention of an (improbable) single intermediary who would transform short-term deposits in yuans into fixed-rate dollar-denominated mortgage loans.

Diagram 5. A 'global' chain of risk-takers



The American mortgage loan constitutes the start of the chain. One can assume that it has been bought by a risk-taker who then receives the interest paid by the borrower. By definition, the risk-taker did not have the wherewithal to buy the mortgage claim with his own resources. He therefore borrowed short term (say, for three months) the sum needed from an American bank. In making this transaction, he takes on several of the types of risk referred to here: in the first place, *an interest-rate risk*, since he is borrowing short term at a variable rate, but receiving a fixed rate; second, *a credit risk*, since a payment delay, and, even more, a payment default, will mean that he makes a loss; lastly, *a liquidity risk*, in that if for one reason or

another the bank does not roll over his three-month loan – and if he finds no replacement – he will be obliged to sell his claim and possibly suffer a loss. Note that he can unload this risk by asking a bank to guarantee him a line of credit, but obviously at a cost that will reduce his profit margin.

It now remains to be seen where the money lent to our risk-taker comes from. For the answer, we have to look this time at the Chinese part of the chain. In exchange for yuans, the central bank has bought the dollars from the Chinese exporter and invested them at three months with an American commercial bank. This investment is the counterpart of the loan granted to the risk-taker by this same commercial bank. The deposit by the Chinese central bank completes the dollar part of the chain, with the American commercial bank taking the risk of lending at three months to the risk-taker and being remunerated by the spread between the interest on this loan and the interest rate it pays to the Chinese central bank for a deposit of the same maturity. It still remains to complete the yuan part of the chain. To finance its acquisition of dollars, the central bank has issued debt in yuans, say in the form of a three-month bill. This bill has been purchased by the Chinese commercial bank, with household deposits constituting the counterpart. In this chain, the Chinese commercial bank takes no risk – if the Chinese savers have opted to invest their savings at three months – and its margin is certain.

The Chinese central bank is an essential link in the chain. It buys dollars in exchange for yuans, receives a three-month dollar interest rate and pays a three-month yuan rate. Its role is then that of the exchange-risk-taker referred to in Chapter I. It is its policy of not allowing the exchange rate to appreciate by too much under the impact of the Chinese current-account surplus that prompts it to play this role. Its intervention binds together the various links in the chain. The particular way in which the dollars purchased on this occasion are invested 'risk-free' is of little importance. If, instead of a deposit with an American commercial bank, the Chinese central bank acquires, everything else remaining equal,[1] a Treasury bill, the seller of the bill will hold a deposit in its place.

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[1] As long as we assume of course that the counterpart of the Chinese savings is to be found in the issuance of a mortgage loan and not a Treasury bill, i.e. as long as we assume that it is not an increase in the public deficit that explains the deterioration in the US current-account balance. The whole problem we analyse in this chapter stems from the fact that the counterpart of the savings invested risk-free in the emerging world was mainly credit-risk-loaded debt issued in the advanced countries.

The above example has been deliberately oversimplified. In order to make the illustration more concrete, a single operation has been isolated. In reality, the credit-risk-taker will never lend directly to a household, but will buy a bond backed by the mortgage claims produced by the securitisation industry. The reasoning obviously remains unchanged and the precise form and length of the chain also leave it unaffected. Let us suppose that the Chinese central bank, instead of making a deposit with a commercial bank, buys 5-year bonds issued by Fannie Mae. This institution, as we have seen, has a portfolio of mortgage loans that it finances by issuing bonds, thus playing the role of risk-taker in the above diagram. By issuing a 5-year bond, however, it reduces its interest-rate risk and its liquidity risk; by buying the bond, the Chinese central bank takes on the risks that Fannie Mae wanted to unload. This considerably shortens the risk-taking chain. For a time at least, the intervention of the American commercial bank is no longer necessary.

This illustrates the variety of possible chains. In fact, there is nothing to prevent the commercial bank mentioned earlier that receives the deposit from the Chinese central bank from taking on all the other risks related to the mortgage – liquidity risk, interest-rate risk and credit risk. This will be the case if, after granting the loan, it simply keeps it on its books. It can, however, arrive at a similar result – taking on, against remuneration, the risks mentioned – without having to have them on its balance sheet. For this purpose, all it has to do is create an ad hoc financial vehicle – a so-called 'conduit' – of which it is the sponsor. This vehicle will buy mortgage loans, financing itself by borrowing short term and merely benefiting from a line of credit from the bank. As credit-risk- and interest-rate-risk-taker, the vehicle will generate a margin, but without necessarily being subjected to the same prudential constraints as the bank.

This raises a key question, namely the robustness of the risk-taking chains that ensured the financial interpenetration of the developed and emerging regions. To assess this, it is necessary to examine the solidity of their individual links and this will depend on the capacity of each risk-taker to assess, monitor and manage the risks he takes on. Even if he is extremely lucid and vigilant – a highly theoretical assumption – he will still suffer losses from time to time. The solidity of the link will depend on his capacity to face up to these losses without defaulting. For each risk-taker, this capacity is a function of the ratio between the quantity of risk taken on and the volume of equity capital, in other words, the solidity of the various links in the chains will depend on this 'leverage ratio'. Inasmuch as Western risk-takers took on a large part of the risks involved in the

investment of emerging-country savings without necessarily increasing their equity capital in the same proportion, this led to a significant rise in the 'leverage' of the system, a rise that could only increase the latter's fragility.

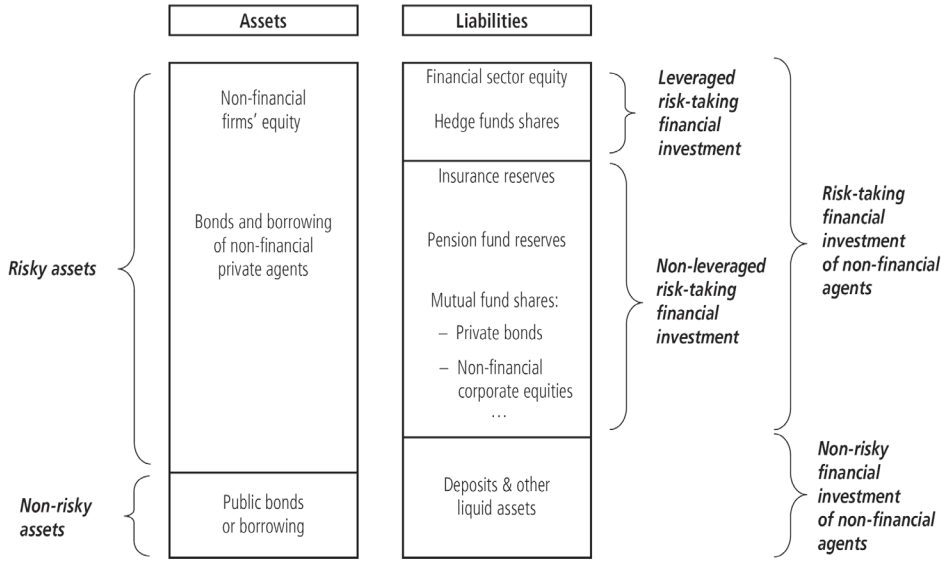
2. A rise in the 'leverage' of the risk-takers

The preceding analysis was aimed at explaining how the globalised financial system was able to relieve the emerging regions of the risks associated with the loans financed by their surpluses. This taking on of risk is not a new function: the system already performed it for the savings of its residents that were invested 'risk-free'. With the advent of globalisation, it also did so for part of the savings of the rest of the world. It is the forces prompting it to do so that we wish to identify here.

For this purpose, let us take as our starting point the balance sheet of a closed economy's financial system. Let us assume that non-financial agents make all their financial investments through this system (if, for instance, they buy securities issued by a firm, they will do so by subscribing to a mutual fund). *The entirety of their investments hence constitutes the liabilities of the financial system and its assets consist of the liabilities of all the non-financial agents* (Diagram 6). These assets are made up of highly diverse and more or less risky elements: shares in non-financial companies (listed or not), claims on public or private agents (tradable or not), with more or less distant maturity dates. In the following analysis, only the credit risk is taken into account and, for the sake of simplicity, the existence of assets bearing no credit risk issued by non-financial agents[2] (government securities) is ignored. The risky assets here consist solely of private debt of the same kind and carrying the same risk. The average expected return on these assets is given and their total amount is equal to that of the liabilities of the financial system.

[2] The existence of risk-free assets complicates the analysis without modifying the conclusions. What matters here is that the financial system has to satisfy a *net* demand for (credit-)risk-free liabilities starting from a supply of (credit-)risk-loaded assets (see also the footnote in Box 9).

Diagram 6. Balance sheet of the developed world's financial system



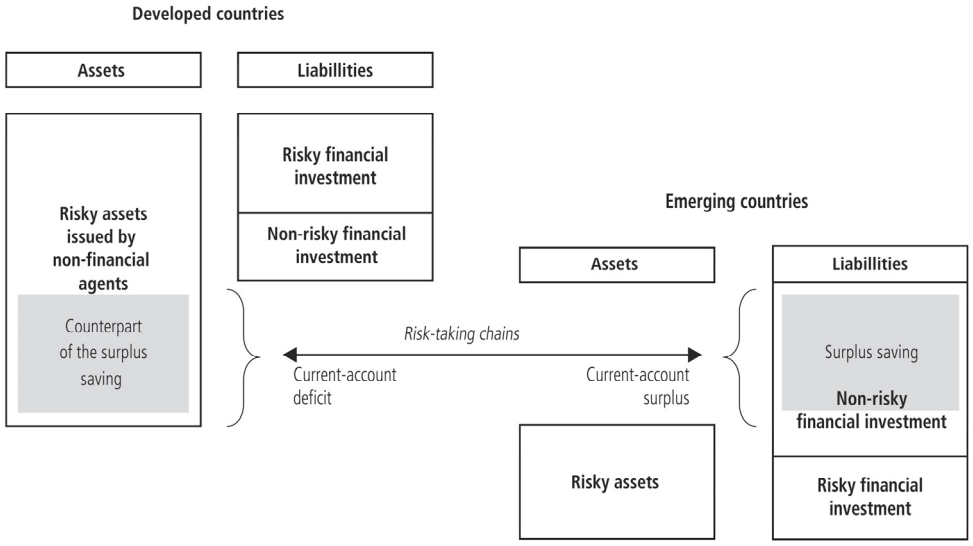
The liabilities of the financial system consist of 'risk-free' investments – banknotes, deposits with banks or money market funds – and risky investments. Among the latter, it is possible to distinguish between those that carry *unleveraged* risks and those that carry *leveraged* risks. The former are 'ordinary' risky investments: for example, a corporate bond is a risky, but unleveraged, financial investment. The latter are investments that provide equity capital to the risk-takers in the financial system: a holding of shares in hedge funds, for example, is a risky investment, but this time leveraged. Thanks to this equity capital, the risk-takers in the system – operators in the banks or in the alternative system – can indeed take on leveraged risk while at the same time exposing the holders of the equity to the risks taken.[3]

Let us now assume, still for the sake of simplicity, that the risky financial investments are also homogeneous and that they all involve leveraged risk. *Since all the existing risks have to be borne somewhere and since the economy is assumed to be closed, these investments necessarily carry the risks of which the 'risk-free' investments are relieved*. The leverage of the system is

[3] A similar distinction between active (leveraged) and passive (unleveraged) investors is made by Adrian et al. [2009].

the ratio between the 'risk-free' and risky investments. Ex post, it is as if all the holders of risky investments had borrowed capital invested risk-free to purchase risky assets. If we now move to a financially open economy, the consequences of the current-account surpluses of the emerging countries can be made clear. *If these surpluses are invested without taking on any other risk than the exchange risk, the risk-free investments with the developed-world financial system are increased by the amount of these surpluses*: the mass of risk to be 'absorbed' by this system is increased correspondingly (Diagram 7).[4] If the size of the financial 'risk-taking' wealth of the developed economies – the share of risky investments – remains unchanged, the leverage of the system is increased in the same proportion. This leverage is not just an accounting magnitude, however, observed *ex post*, but also the variable that summarises the behaviour of the risk-takers. The forces needing to now be identified are therefore those which, in the early 2000s, may have prompted these agents to increase their leverage.

Diagram 7. Interpenetration of the balance sheets of the financial systems



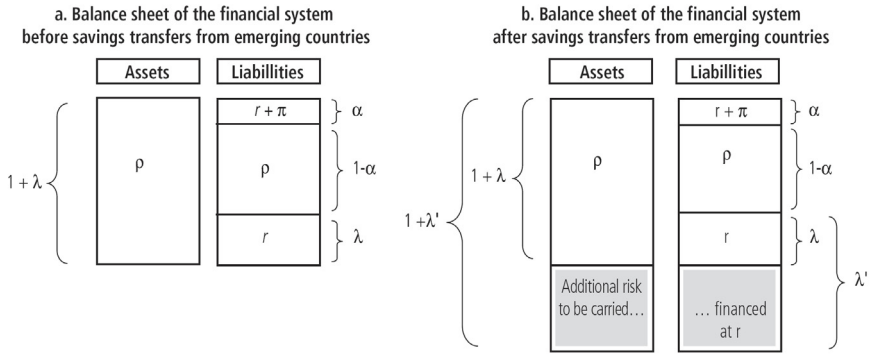
One such force may have stemmed from the rise in the return on risky investments. The premium they receive – over and above the risk-free interest rate – is a function, on the one hand, of the gap between the returns

[4] We assume here that all the debt issued as a counterpart of the savings accumulated in the emerging world is private and hence risky.

on risky and risk-free assets and, on the other, of the leverage. Because no risk is involved, risk-free investments are remunerated at a lower rate although they are the counterpart of risky assets carrying a larger return. The income forgone by the holders of the capital taking no risk makes it possible to pay an increased return to those who take the risk in their place. The higher the ratio of the former to the latter – the leverage – the higher the additional remuneration. Everything else remaining equal, the rise in leverage involved in the formation of the surpluses of the emerging regions has therefore gone hand in hand with a rise in the premium paid to the risk-taking capital. On its own, however, this *induced* rise in the premium could not have sufficed to justify the rise in the leverage. The latter admittedly increases the return on risky investments but also, and in the same proportion, the risk taken on (see Box 9). If the attitude to risk of the risk-taking wealth-holders remains unchanged, the rise in their remuneration merely compensates for this additional risk. This means that the explanation for the rise in leverage that took place in the early 2000s has to be sought elsewhere.

Box 9. Determination of the risk-taking leverage of the globalised financial system

The framework is that defined in the text. Let us denote by λ the quantity of 'risk-free' financial investments, by $(1 - \alpha)$ the quantity of financial investments taking unleveraged risk and by α the quantity taking leveraged risk. All the amounts are expressed taking as the norm the amount of risky financial investment and the size of the balance sheet of the financial system is $(1 + \lambda)$. The ratio λ of the wealth invested 'risk-free' to the risk-taking wealth measures the leverage of the system. Now let us denote by r the average return on the 'risk-free' assets, by ρ the average return on the risky assets held without leverage and by $(r + \pi)$ the return on the financial investments taking risk with leverage. The existence of risk-free assets (i.e. government bonds*) is again ignored and it is recalled that the only risk taken into account is the credit risk. The left-hand part of the diagram below depicts this balance sheet of the financial system before the transfers of savings from the emerging regions, the right-hand part the balance sheet after these transfers of savings. The emerging areas having taken the exchange risk associated with their surpluses, everything proceeds as if, in return for an additional issue of risky assets, the Western financial system had received an addition of deposits. The leverage of the system thus rose from λ to λ'. To understand why this rise could take place, it is necessary to analyse the behaviour of the 'risk-takers' in the system.



For this purpose, let us take as the starting point the left-hand diagram. The additional return π obtained by the leveraged risk-takers is derived from the statement that all the incomes from the risky assets held by the financial system are used to remunerate the capital invested with it. One then has:

$$(1+\lambda)\rho = \alpha(r+\pi) + (1-\alpha)\rho + \lambda r$$

from which can be deduced that:

$$\pi = (\rho - r)\left(1 + \frac{\lambda}{\alpha}\right) \qquad (1)$$

It can be seen that the return π on the leveraged risk-taking increases with the value λ of this leverage (and decreases when, everything remaining equal, the share α of the wealth invested with leverage increases).

Let σ_ρ be the standard deviation of the return on the risky assets. The standard deviation of the return on the investments taking leveraged risk σ_π can then easily be calculated from (1). We have:

$$\sigma_\pi = \left(1 + \frac{\lambda}{\alpha}\right)\sigma_\rho \qquad (2)$$

It can be seen that the return/risk ratio of the investments taking leveraged risk is independent of the leverage. We in fact have:

$$\frac{\pi}{\sigma_\pi} = \frac{\rho - r}{\sigma_\rho}$$

An increase in the leverage thus generates an additional return, but the risk – measured here by the standard deviation of this return – increases in the same proportion.

How then, in these circumstances, will the holders of these leveraged investments decide their risk-taking behaviour? It is assumed that the share α of wealth taking risk with leverage is given and that the holders have a 'standard' utility function that increases with π, but decreases with σ_π. This function can be written:

$$\cup(\lambda) = \pi(\lambda) - a\sigma_{\pi}^{2}(\lambda)$$

The parameter *a* measures these agents' aversion to risk.

The desired leverage is then obtained by maximising this utility function. Replacing π and σ_{π} by (1) and (2) and differentiating with respect to λ, one obtains:

$$\lambda^{*} = \alpha\left(\frac{\rho - r}{2a\sigma_{\rho}^{2}} - 1\right) \qquad (3)$$

The leverage taken by our agents will thus depend on their aversion to risk (parameter *a)*. The lower it is, the higher will be the desired leverage. The same will apply if the agents underestimate the risk σ_{ρ}. An increase in the difference in return ($\rho - r$) between risky assets and risk-free investments will also encourage the agents to take more risk and the desired leverage will rise. Note, finally, that, all the other parameters being fixed, the leverage of the system could be higher, the larger the share α of wealth held with leverage: when this share increases, the risk taken is 'spread' over a larger amount of risky investment. *Each one of these factors, at one time or another in the 2000s, seems to have contributed to the rise in leverage of the system from λ to λ'*.

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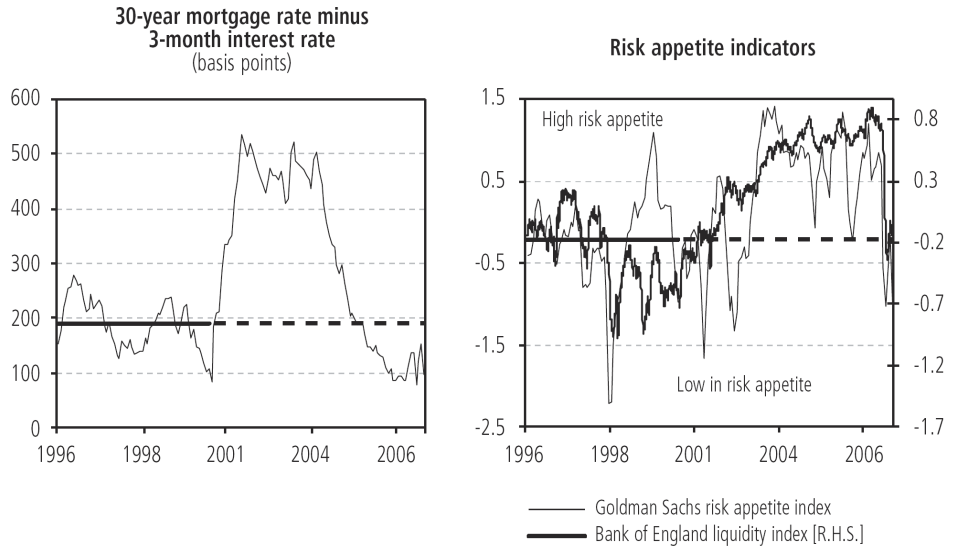
* Government bonds make it possible to satisfy a demand for risk-free financial investments without the intervention of risk-takers. Taking them into account does not, however, modify the leverage on which the reasoning here is based. This leverage is in fact defined by the risk that the risk-takers must take to enable the demand for risk-free investment to be satisfied. It is thus a function of the demand for risk-free investments *net* of the supply of risk-free assets. If the emerging regions, instead of placing their reserves in deposits, buy risk-free assets – Treasury bills – this net demand is not modified.

If the risk-takers' attitude remains unchanged, only an increase in the return on risky investments *greater* than that implied simply by the increase in the risk taken can induce them to increase their leverage. The cuts in policy rates made by the major central banks, and especially the Federal Reserve, in the early 2000s operated in this direction, by reducing the cost to the risk-takers of the borrowing to finance their holding of risky assets – their 'carry cost'. Indeed, insofar as the return on risky assets falls by much less than this carry cost, the taking of a given 'quantity' of risk becomes better remunerated. Throughout the first half of the 2000s, carrying a 30-year mortgage using financing at three months left the holder each year a margin of close to 500 basis points (see Graph 22). The easing of key rates could therefore explain, in part at least, the increase in leverage that was then seen. However, it cannot explain the high levels of risk-taking seen until 2007. From 2004 on, central banks launched a tightening of lending

conditions that reduced the remuneration of risk-taking, with the returns on risky assets rising substantially less than the key rates. Despite this, the risk-taking leverage remained sufficiently high to enable the system to absorb the risks related to the investment of the surpluses of the oil-exporting countries, which then arrived on top of those of the Asian countries (see Box 10). This being so, there is every likelihood that another evolution – one that was less easily observable – gradually took up the running. This was the evolution in the attitude to risk. Indeed, only such an evolution can explain how leverage could remain unchanged – or, *a fortiori*, increase – at a time when the spread between the returns on risky and riskless assets was narrowing. Graph 22 confirms this hypothesis, with the Goldman Sachs 'risk appetite' indicator rising from the end of 2003 on and remaining until 2006 at a level much higher than that seen in the ten previous years (the Bank of England's liquidity indicator, which provides another measure of aversion to risk, leads to a similar conclusion).

Graph 22. Carry margins and risk appetite, 1996-2007



Note: The two horizontal straight lines correspond to the average values for the period 1996-2000.

Sources: Thomson Datastream, Bank of England and Goldman Sachs.

This attitude to risk is the result of two variables that are easier to distinguish in theory than in practice, but which evolve in the same direction and have the same effect on the behaviour of the risk-takers. These are the aversion to risk and the perception of risk. The fact that a

reduction in aversion to risk took place starting in the mid-2000s is hardly surprising given the pro-cyclical nature of this variable, which has in fact a tendency to fluctuate with the economic cycle: high at the bottom of the cycle, when things are going badly, much less so when activity returns to firm growth and things go better. The return to strong growth starting in 2004 therefore contributed to a reduction in aversion to risk. This reduction was all the more lasting in that the episode seemed to confirm the reality of 'The Great Moderation'. The reduced volatility of growth and the fact that inflation remained well in hand from the mid-1990s on gradually helped to give credence to the idea that a series of structural changes had made macroeconomic evolutions more regular and less uncertain. By the middle of the decade, the economic environment had turned favourable again and, in appearance, become less volatile, so that financial agents gradually adopted a less cautious attitude. This evolution helped to keep risk-taking leverage high despite the rise in short rates.

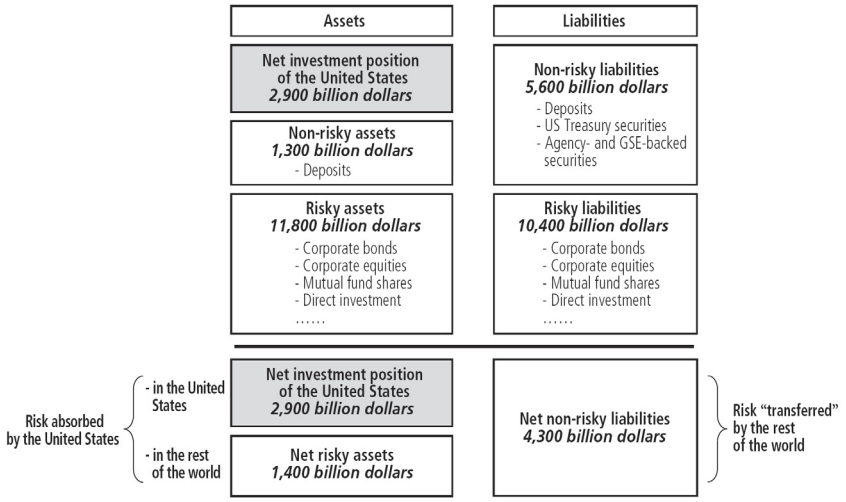
Box 10. A measure of the rise in the leverage of the globalised financial system: The American case

Both macroeconomic analysis and microeconomic observation suggest that in recent years the 'leverage' of the Western financial system has risen significantly. As national accounts data have not been designed to capture masses of risk, measuring this rise is far from easy. It has nevertheless been attempted here, taking only the United States economy, in order to provide some indication, using the flow-of-funds data from the Federal Reserve. This means that entire groups of risk-taking instruments – those based on derivatives – thus fall outside our evaluation.

Let us first estimate the quantity of risk that American agents have taken on behalf of the rest of the world since the mid-1980s. The diagram below gives the summary financial 'balance sheet' of the United States vis-à-vis the rest of the world, distinguishing the risky positions from the rest. The focus here, as in Chapter I, is on the credit-risk dimension, with deposits, Treasury securities and GSE securities regarded as 'risk-free'. In reality, these investments are of course far from being free from all risk: for example, the foreign investors who buy Treasury securities normally take no credit risk, but nevertheless bear, in addition to the exchange risk, an interest-rate risk. Note that the statistics available do not make it possible, over the long period, to isolate symmetrically the purchases, by Americans, of foreign government bonds (some of which could, on the lines of those of the US Treasury, be regarded as 'risk-free').

By default, it has been considered here that deposits are the only form of risk-free asset held by the United States on the rest of the world. This calculation *underestimates the recent increase* in risk-taking by the United States: at the end of 2007, three-quarters of the stock of foreign debt securities held by the United States consisted of private-sector bonds, compared with only a quarter in 1994 [US Treasury, 2008].

'Balance sheet' of the United States vis-à-vis the rest of the world



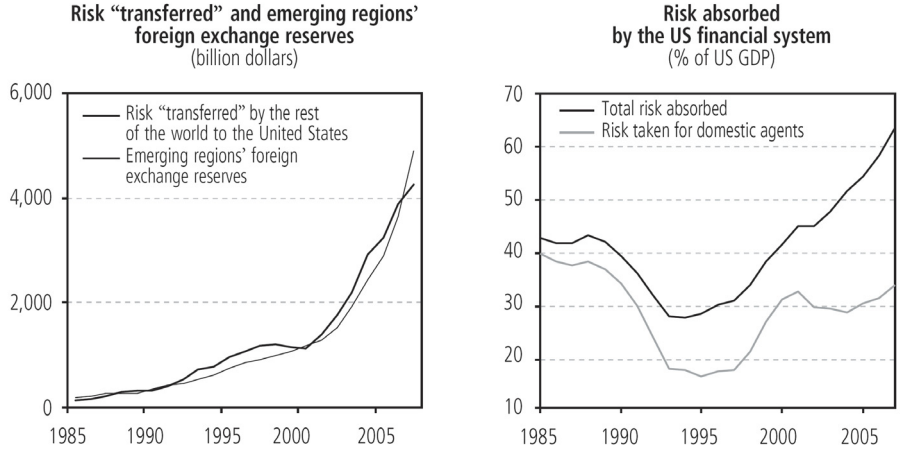
Note: In this diagram, the figures in bold type represent the amounts at the end of 2007.
Sources: Federal Reserve and authors' own calculations.

The 'risk-free' assets and liabilities being thus defined, the risky assets and liabilities are obtained by difference. The amount of risk 'transferred' by the rest of the world to the United States is equal to the net 'risk-free' liabilities of the US economy. It is also equal to the sum of the net external investment position of the United States increased by the net risky assets held on the rest of the world, making a total of $4,300 billion at the end of 2007. This figure gives a rough idea of the risk that the United States has taken on for the rest of the world.

How has this amount evolved during recent years? The graph on the next page shows that it increased appreciably after the middle of the 1980s and especially from the beginning of the 2000s. Its progress is not unrelated to the accumulation of exchange reserves in the emerging regions. These reserves are in fact the counterpart of the accumulated current-account surpluses of these regions, plus their cumulative net capital inflows (in the form of direct investment, purchases of shares or bonds, or bank loans). The two curves in the graph would merge into one if the world consisted only of the United States and the emerging regions. In reality, there was no reason why the risks 'transferred' by the rest of the world should have been borne by the United States alone; in net terms, however, this seems to have been largely the case.

One can now calculate the total demand for risk-free financial investments satisfied by the US system by adding the demand of domestic origin to that coming from the rest of the world. American non-financial agents' demand for what they regard as 'risk-free' investments is assumed here to be equal to their deposits plus their holdings of securities issued by the Treasury, the GSEs or local authorities. The total demand for risk-free investments calculated in this way overestimates the risks *actually absorbed* by the American financial system. This is because of the existence of a domestic supply of risk-free assets consisting of securities issued by the Treasury, the States and local authorities. In order to measure the risk actually absorbed by the system, it is therefore necessary to deduct from the total mass of risk-free investments made available to American and foreign agents this domestic supply of risk-free assets.*

Foreign exchange reserves and risk to be 'absorbed' by the US financial system, 1985-2007



Sources: IMF, Federal Reserve and authors' own calculations.

The above graph retraces the evolution in the amount obtained as a proportion of GDP. If, applying an assumption which can validly be made at the stage of first approximation, the mass of risk-taking investments moves in line with GDP, this ratio shows the required *evolution* in 'leverage' (defined as the ratio between the mass of risk having to be absorbed and the risk-taking investments). This leverage has clearly risen since the end of the 1990s, at the time when the emerging regions started to rapidly accumulate saving surpluses. If one now reduces this total mass of absorbed risk by the part that is absorbed for the rest of the world, it can be seen that, since 2000, the domestic demand for risk-free investments on its own would not have led to a rise in leverage: *this rise is explained primarily by the build-up of surpluses by the emerging regions*.

* On this point, see the footnote in Box 9.

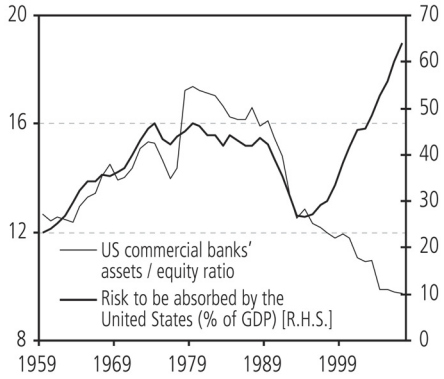
In reality, this risk-taking was much more concentrated than had hitherto been supposed. The reasoning applied earlier was on the assumption that all financial investments involving the taking of risk do so with leverage. This is clearly far from being the case. First of all, the majority of risky financial investments, if they are indeed risk-bearing, do so without taking leverage. The portion taking leverage consists solely of the equity of banks, insurers, hedge funds and the various off-balance-sheet vehicles mentioned earlier. And, within these investments used to take risk with leverage, the risk-taking itself was far from homogeneous. Since the introduction of the Basel I regulation, commercial banks have been subject to explicit prudential constraints that set a minimum ratio between equity capital and the risks held on the balance sheets. Moreover, going further than was required by the regulations was regarded as a sign of seriousness and solidity. The balance sheet leverage of many commercial banks had in fact been appreciably *reduced* in the years preceding the financial crisis, as indicated in the case of American banks by the evolution in the ratio between their assets and their equity. The evolution in the attitude to risk of investment banks, hedge funds, insurers and other takers of risk with leverage must therefore have been even more marked than the rise in the average leverage would imply.

Adrian & Shin [2008] have confirmed, in particular, the highly pro-cyclical nature of the evolution in the leverage of American investment banks: when their assets appreciate, they increase their risk-taking through borrowing. It is here that the principal difference compared with past evolutions lies. Between the beginning of the 1960s and the middle of the 1980s, the American financial system had already absorbed a rapidly-growing mass of risk (see Box 10). This it had done mainly through a rise in the leverage of its deposit institutions and the episode ended with the failure of a substantial number of these, in particular the savings and loans. Since the end of the 1990s it has again absorbed a rapidly-growing mass of risk,[5] but this time much of the absorption took place off the commercial

[5] The American system has however been far from the only one to absorb more risks during this period: non-US institutions – European banks in particular – played the role of risk-takers in dollar-denominated risk-taking chains, borrowing short-term on the US money market to finance their buying of American private securities. Hence an increasing structural need for dollar funding that led to additional tensions during the financial crisis [Coffey et al., 2009 and Baba et al., 2009].

banks' balance sheets (Graph 23). *The rise in leverage was mainly concentrated in the alternative banking system.*

Graph 23. Evolution of the risk to be 'absorbed' by the US financial system and commercial banks' leverage, 1959-2007



Sources: Federal Reserve, FDIC and authors' own calculations.

This observation highlights a final point. The financial system's attitude to risk since the beginning of the 2000s cannot be explained solely by an aggregation of individual attitudes. The behaviour of the institutions around which the system is organised, as well as the beliefs they tend to share at a given moment [Orléan, 2009], are also important. For example, the behaviour of the banks subjected to prudential regulation depends on the vigilance with which the authorities ensure that this is respected, in letter and in spirit. At the beginning of the 2000s, for example, commercial banks set up 'off-balance-sheet' risk-taking vehicles without any reaction from the authorities responsible for their surveillance. This passivity helps to explain the apparent reduction in the risk perceived by the system and the rise in its leverage. Similarly, the perception of the risk involved in structured products was based not so much on the diligence of individual risk-takers as on the assessment made by a small number of specialised rating agencies. From 2007 on, the extent to which many of their assessments had been affected by a systematic favourable bias, under the influence of a mixture of deal-making and laxity, became apparent. By leading the system to underestimate the risk to which it was exposing itself, this bias, too, contributed to an increase in leverage.

Throughout the 2000s, the leverage of the developed economies' financial system rose continually.[6] This rise permitted the 'transformation' of some $4,000 billion of emerging-countries' savings, invested largely risk-free, into loans to Western households and firms, risky by nature. This laid the ground for an unprecedented financial crisis, in that if the leverage of the system were to fall abruptly and substantially, a considerable mass of risk would have to be expelled…

[6] Using an approach quite different from that of Box 10, McGuire & von Peter [2009] give an evaluation of the increase in risk-taking during the 2000s by the non-US banking system.

VII. GLOBALISED FINANCE IN CRISIS

Since the end of the 1990s, the alternative banking system has taken in charge a substantial part of the risks involved in the accumulation of debt in the Western countries, and in particular in the United States. As these debts were mainly owed by private agents, an ever-greater mass of credit risk had to be borne. Since the savings that were the counterpart of this borrowing were mainly placed short term, the liquidity risk rose in parallel. This high level of risk-taking required the aversion to risk to remain low and from the spring of 2007, this was no longer the case. The re-evaluation of the risk of a particular category of loans to American households – the subprime loans – led to a general and continuous rise in mistrust of financial agents and products. Under the impact of this shock, the interweaving of positions became unravelled, resulting in a crisis of the credit system, which, after smouldering for a long time, flared up in September 2008, with the paralysis of the interbank markets. This chapter, after examining the immediate causes of this crisis, will analyse the mechanisms by which it was propagated and the efforts made – in vain – by the authorities to stem it.

1. The subprime shock and the reversal of attitude to risk

The revelation at the end of 2006 of a spectacular rise in payment incidents on American subprime mortgage loans marked the beginning of a crisis that was to shake the Western financial system to its very foundations. For several months, all the talk was in fact of the 'subprime crisis'. These loans are known as 'subprime' because they fail to meet the standards set by Fannie Mae and Freddie Mac for the 'prime' loans guaranteed by these institutions. The distribution of subprime loans grew rapidly from the mid-2000s on. Many households had then taken advantage of the low mortgage rates prevailing at the beginning of the decade to borrow, in most cases at fixed rates, for the purpose of buying a house. At the beginning of 2005, American households' capacity for mortgage borrowing was virtually

saturated. The ratio between their debt service and their income, at around 13.5%, far exceeded the peak figures for the 1980s and only the fact that the unemployment rate was much lower than 20 years previously explains why payment incidents remained as low as they did [Brender & Pisani, 2005]. Households would nevertheless continue to go into debt – and spend – at a steady rate. To the surprise of many, this would enable American growth and, with it, world growth, to withstand the steep rise in commodity prices, of oil in particular. Instead of reducing their non-energy spending to pay for the extra oil bill, American households, taken as a whole, resorted to borrowing.

The expansion of subprime loans – the stock of which reached $1,300 billion in 2006, compared with only around $100 billion in 1998 – meant that access to mortgage lending was extended to a new stratum of borrowers whose creditworthiness was shakier. This development was facilitated, from the mid-2000s, by a continuous relaxation of the prudential standards applied by those distributing these loans. Month by month, the requirements in terms of personal down-payments were reduced and the proportion of loans made without any proof of income increased, as did lending at artificially attractive initial interest rates that were programmed to be revised upwards by several hundred basis points after two or three years. This steady deterioration in the quality of the subprime loans would soon be reflected in the performances of loans of different vintages. The frequency of payment incidents after one year on loans granted in 2006 was roughly four times as high as on those made in 2003 and even twice as high as on those made in 2001, when the economy was in recession. The announcement by HSBC at the beginning of March 2007 of substantial losses on claims backed by subprime loans held by investment funds managed by the bank was the trigger for the initial bout of fever on the financial markets.

Nearly two-thirds of these loans had in fact been securitised. Unlike the bonds backed by prime loans, guaranteed by Fannie Mae or Freddie Mac, those backed by subprime loans were issued by private securitisers and carried no particular guarantee, leaving their purchasers to carry all the risks. In the mid-2000s, however, demand for high-yield investments was so great that these securities were placed without difficulty. On average, the interest rates on subprime loans were two to three hundred basis points higher than those on prime loans. In addition, structuration made it possible to transform almost 60% of the value of a pool of subprime loans into bonds awarded an AAA grade by the rating agencies. No alchemy was required. The risk on the loans in the pool backing the bonds

is carried first by the 'junior' tranches, which are less well rated. As long as losses do not exceed, on average, 40% of the amount of the loans granted, the AAA tranches will not be affected. The junior tranches thus relieve the AAA tranches of part of their credit risk. Those who subscribe to these tranches, because they are taking more risk, are remunerated by an additional return. However, the ratings attributed to the various tranches and the allocation of returns between them were based on calculations with fragile underpinnings. Given the deterioration in lending standards, the probabilities of default and the recovery rates on these subprime loans were much more difficult to predict than those on prime loans. For example, the frequent absence of a down-payment meant that the beneficiary of a subprime loan had nothing to lose, from a purely financial point of view, by failing to meet his repayment commitments if house prices declined shortly after purchase.[1] The default and recovery rates on these loans were heavily dependent on the evolution of house prices. The fact that no checks had been made on the reality of the incomes declared by a substantial portion of borrowers did nothing to improve the situation.

The ratings awarded by the agencies have played an important part in the way in which the credit risk on the subprime loans was taken on. Prudential regulations in fact refer to these ratings in order to define the investments to which certain types of institutional investor can have access. American money market funds – like pension funds, incidentally – can only hold highly-rated securities. Furthermore, the capital requirements imposed on banks by the Basel II agreement, which was then coming into force, were differentiated according to the rating of claims: the higher the rating, the less the equity required to hold it. Working in collaboration with the rating agencies to which it pays fees, the securitisation industry then produced large quantities of securities carrying attractive yields. Even the 'residues' of a first round of securitisation could be brought into the system. Using junior tranches backed by various pools of subprime loans, CDO tranches with an AAA rating have been manufactured – involving, if required, insurance bought from a credit-enhancer – with an initial yield higher than that of a corporate bond carrying the same rating. The placing of securities backed by subprime loans then posed no problem. Being inattentive to risk, investors were attracted by the additional return payable

[1] In most states in the United States, repossession of the property used as collateral is the only possible recourse for a mortgage lender faced with default on the part of his debtor.

on securities of a given rating. The demand from these investors explains much of the relaxation of lending standards. Since the supply of the underlying 'raw material' failed to keep pace, there has even been creation of synthetic CDOs based on CDS, taking as reference the subprime bond indices [Crouhy et al., 2008].

This demand for relatively remunerative securities also stimulated the production, using the same techniques, of bonds backed by other relatively dubious claims. At the beginning of 2007, almost $800 billion of 'Alt A' loans – not as well documented as the prime loans, but less risky, in principle, than the subprime loans – had been distributed and in large part securitised. At the same date securitisation had been applied to almost half the $550 billion of American firms' leveraged loans, used notably to finance M&A operations. For these too, however, given the strong demand, the quality of the claims, measured by the debt burden of the borrowing firms or by the number of contractual constraints imposed to protect the lenders – by means of covenants –, declined steadily from the mid-2000s onward.

Permitting the securitisation of loans whose quality was continually deteriorating fed risk-taking chains with securities that would turn out to be all the more 'toxic' in that the purchasers were in many cases also takers of a liquidity risk. Institutional investors, collectors of savings, were in fact not alone in being attracted by the higher returns on such securities. The risk-takers in the alternative banking system – investment banks, hedge funds, banks' proprietary accounts – were even more so. These latter institutions borrowed by one means or another in order to purchase securities on which they wanted to carry the credit risk. Until 2007 they were able to do so without great difficulty: the financial system was awash with what for a long time was described as an 'abundance of liquidity'. This abundance was nothing other than the consequence of the way in which the savings emanating from the emerging regions were 'delivered' to the Western financial system to be 'transformed'. By borrowing short term to finance the acquisition of securitised mortgage loans or tranches of CDOs, the risk-takers participated in this 'transformation' of liquid investments into long-term investments. In so doing, they took on one of the risks having to be taken for an accumulation of savings by the emerging countries to take place, namely the liquidity risk (and along with it, in many cases, the interest-rate risk linked to the fact that variable-rate borrowing was being used to fund long-term lending).

The risk attached to the subprime loans was therefore, as in the case of other securitised claims, to a great extent borne by risk-takers that were

links in the chains described earlier. The SIVs accordingly financed their holding of subprime securities (or of CDOs created using these securities), notably by issuing commercial paper. While taking the credit risk and the interest-rate risk, they nevertheless left the liquidity risk to the bank that had guaranteed them a line of credit. The investment banks, the banks' proprietary accounts and the hedge funds, for their part, generally also took on this latter risk, often with relatively small amounts of equity. The American investment banks in particular, taking advantage of what had become extremely permissive regulation (in 2004, the Securities and Exchange Commission, at their request, had eased their capital adequacy constraints) raised their leverage to very high levels (see Chapter I). The stability of the system therefore depended on an extremely lenient attitude to risk that was to be radically changed in the space of a few weeks by the subprime shock. *The perceived risk on the securities held, like the aversion to risk on the part of all the links in the risk-taking chains, rose steeply and abruptly, forcing down the leverage of the system.* By this route, the subprime shock spread rapidly to the whole of the Western financial system.

2. Reduction in risk-taking leverage and propagation of the shock

With the general attitude to risk suddenly becoming more prudent, the risk-takers that were links in the chains described above immediately reduced their positions. They did so either on their own initiative or because those who had lent to them forced them to do so by reducing the finance made available. A shock wave then spread through the globalised financial system. In order to understand the mechanism of this propagation, let us take the extreme case in which the system has only two components, the risk-takers, the only ones to take the risk of holding securities by borrowing short term for the purpose, and the deposit banks, which take only the risk of lending to them, with the securities purchased as collateral. Let us assume that, at the time of the shock – say, early 2007, when the consequences of the poor quality of the loans made became evident – the leverage of the system was at the maximum level compatible with the equity of the various operators and a complaisant attitude to risk. A sudden change in this attitude meant that leverage had to decline. This initial shock was sufficient to engage a vicious circle that would be difficult to break without external intervention. The risk-takers would in fact try to reduce their positions by selling some of the securities acquired. Everything else remaining equal, given that the system was already at the limit of its risk-taking capacity, no one was able to find buyers for these securities at

their original prices, but only at much lower ones. If the desired decline in leverage involved a reduction in the value of securities held amounting to, say, $100 billion, the value of the stock of securities held had, in one way or another, to fall by this same amount. Such a fall would, however, lead to loss for the holders of these securities, with their equity also being reduced by $100 billion. The total value of the assets held would therefore have to fall again and this time, the leverage ratio being higher than one, the size of the fall would be more than $100 billion. This triggered a fresh cycle of losses, a further amputation of equity and the need to reduce yet again the value of the stock of assets held, by an amount that was again greater than in the previous round. If nothing occurred to stem this process, the downward price spiral and the destruction of equity would only come to a halt when the risk-takers were wiped out.

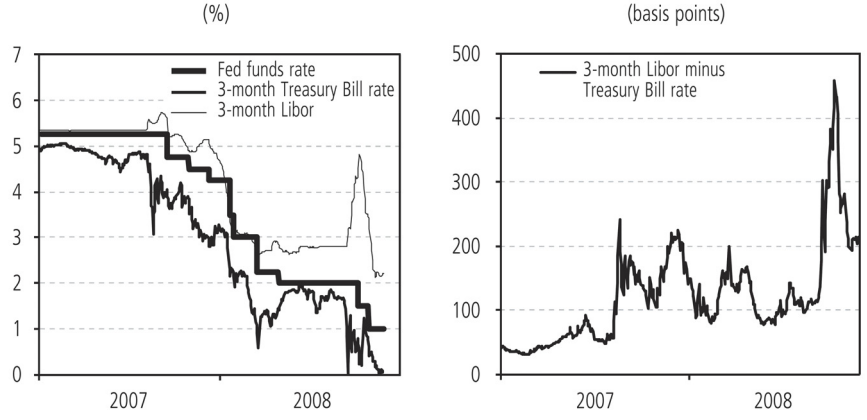
In reality, of course, things were not so simple. The commercial banks, in particular, had not only lent to the risk-takers against collateral, they had also and in different ways themselves been risk-takers. However, the fundamental logic of the mechanism at work at the level of each of the links in the risk-taking chains was indeed that of the downward spiral just described,[2] with the operation of the liquidity risk even taking on an unexpected amplitude. The subprime shock in fact began to mutate into a financial crisis when, at the beginning of August 2007, a particular category of risk-takers, namely the SIVs and more generally the 'conduits' that had issued commercial paper to finance their holding of securities, found their issues the target of mistrust. It became apparent that some of the securities in their balance sheets were in fact backed by subprime loans and some days earlier BNP Paribas had suspended withdrawals from three investment funds holding these claims because they were unable to put a value on them. Finding it difficult to roll over their debts, these vehicles activated the existing credit lines. In order to meet their commitments, many banks were then forced to mobilise liquidity in order to lend to vehicles whose equity was starting to be eroded. Some of them, however, like the German bank IKB, guaranteed credit lines that were out of all proportion to their own size and very soon found themselves incapable of meeting their commitments. Fears regarding the value of subprime securities were then compounded by fears regarding the solidity of the banks and the functioning of the interbank market crucial to the circulation

[2] This same mechanism is described, but in its winding-up phase, in Adrian et al. [2009].

of liquidity. The crisis then took on the awesome shape described by Rajan [2005] in a premonitory article.

Normally, when banks have excess liquidity – assets held with the central bank that will exceed the amount of reserves they are obliged to maintain there – they lend it to those that are short of liquidity. In this way, the interbank market plays a key role in the management of liquidity risk. A bank will not hesitate to lend to others if it knows that at some future date, if its own deposit base becomes insufficient, it can borrow the reserves it lacks without any particular difficulty because other banks will be in surplus. Starting in August 2007, however, this fluidity of the interbank market was called into question, with each bank not only worried about the others' exposure to the subprime crisis but also wondering how easily it would be able to borrow in the future in case of need. While at macroeconomic level the situation of 'abundance of liquidity' was unchanged, at microeconomic level the circulation of liquidity was hobbled by the rise in aversion to risk. For each individual financial institution, having the liquidity needed for its day-to-day settlements became a major concern. When a bank had too large a volume of deposits in relation to its needs, it then preferred to invest the surplus in Treasury bills or leave it with the central bank rather than lend it, even for a few weeks, on the money market. The spread between the LIBOR interbank rate and the return on Treasury bills became one of the thermometers of a fever set to remain present, albeit dormant, during long months, punctuated by particularly violent bouts (Graph 24).

Graph 24. Tensions on the US money market, 2007-08

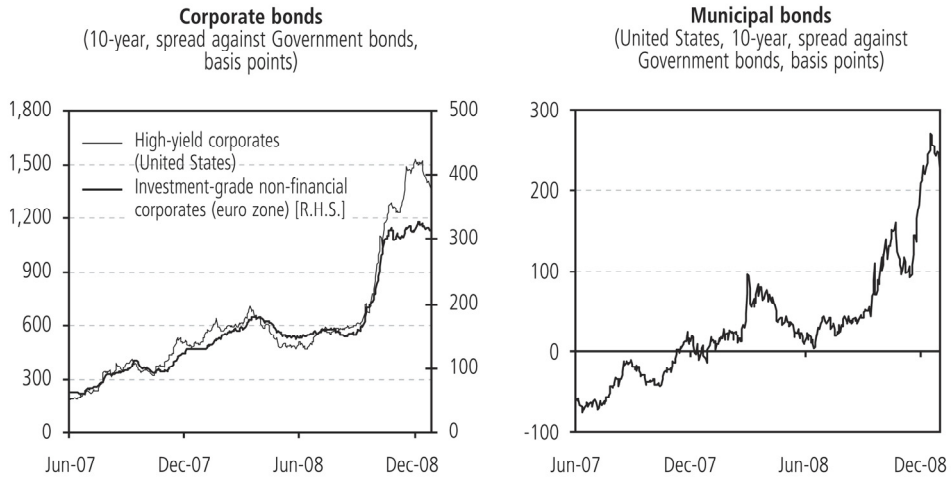


Sources: Bloomberg and Federal Reserve.

In response to these developments, aversion to risk continued to rise, inducing an even greater reduction in the leverage of the system. SIVs were in fact 'programmed' to be liquidated when their equity fell beneath the threshold judged to be necessary for the protection of their creditors. The downward pressure on prices of debt securities was accordingly intensified as a result and the risk-takers' losses were amplified. Very soon the decline in the prices of securities backed by subprime loans substantially exceeded any reasonable estimate of the losses that would actually be suffered by those holding them to maturity [Bank of England, 2008]. As for the CDOs manufactured from these securities, their value collapsed, causing considerable damage to the investment banks that, like Merrill Lynch, did not have time to unload their stocks. Contrary to what the rating agencies had postulated, the prices of the various securities on the balance sheets of these structured products turned out to be closely correlated, so that the aversion to them became total – especially as the capacity of the credit-enhancers (the 'monolines') to guarantee the risk on the best tranches of these CDOs soon came to be called into question. As a result, the prices of the municipal bonds that these monolines traditionally guarantee fell as well.

The subprime shock thus led in the space of a few months to a crisis affecting all credit markets. By depriving the risk-takers of their sources of finance, the rise in aversion to risk forced them, in order to meet their commitments, to sell 'good' debt securities, since the 'bad' securities – those linked to the subprime loans or suspected of being so – rapidly became unsaleable. The phenomenon was accentuated by investors' withdrawals from the hedge funds – another demonstration of the increase in aversion to risk – thus reducing the equity of these risk-takers. One after another, the prices of all debt securities were affected (Graph 25). Their continuous decline reflected not so much an upward revision in the losses expected at maturity as the effect of forced sales in a market where, for lack of operators with the necessary liquidity (or prepared to use the liquidity they had), buyers were scarce. In March 2008, for example, the threat of failure of one major risk-taker – the Bear Stearns investment bank – brought about a sharp rise in all risk premiums, to such an extent that the premium for a private European investment-grade borrower exceeded by more than 80 basis points its November 2007 level.

Graph 25. Credit market risk premiums, June 2007-December 2008

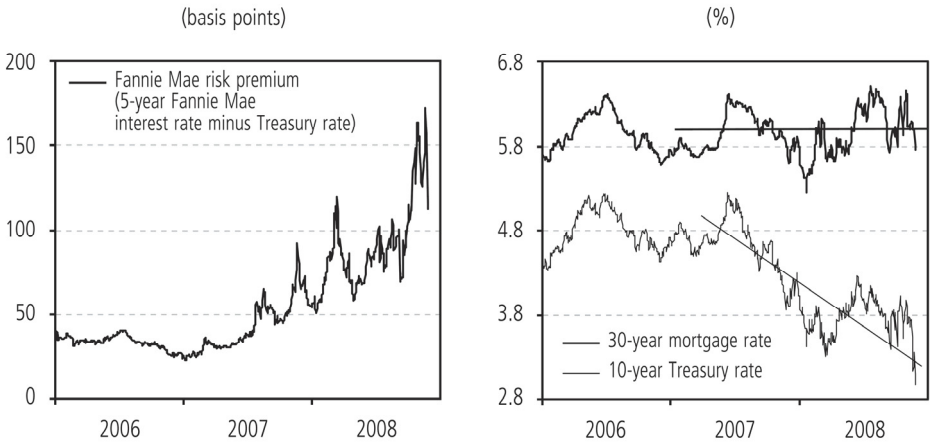


Source: Thomson Datastream.

Until the summer of 2008, the downward pressure on prices of debt securities – and the rise in losses measured at market prices – resulted above all from the dynamics of the financial system itself. The American economy continued to grow and the contraction in activity expected for the first part of the year failed to materialise, despite a very steep rise in energy prices. During the summer, however, when the effects of the tax stimulus package introduced in April began to fade, signs reappeared that activity was running out of steam. The same was true in Europe, where the rise in inflation and the strength of the euro finally snuffed out growth. The rise in credit risk premiums was then intensified still further by the cyclical behaviour described in the previous chapter, with the deterioration in the economic situation increasing aversion to risk while at the same time prompting an increase in the perception of risk – all the more so as the American housing market, on which the fate of a large proportion of the issued debt depends, showed no signs of stabilising. The continuous rise in the risk premiums of Fannie Mae and Freddie Mac was such that mortgage rates failed to track the decline in rates on government bonds. On the contrary, between January and June 2008, they rose without interruption (Graph 26). This tendency had a certain logic. Out of a concern to reduce the cost of mortgages and to make them more easily available, the authorities had pressured these two institutions into taking more risk while

at the same time reducing the capital adequacy requirements that they had themselves, through prudence, imposed on them a few years earlier.[3] As their leverage was already particularly high and with their status as private firms 'sponsored' by the government ensuring them only an implicit guarantee, market worries regarding their capacity to meet their commitments were bound to increase. The stabilisation of the residential property sector was jeopardised as a result. Since the end of 2007, in fact, the financing of mortgage loans was based on securitisation provided solely by the GSEs. When the borrower quality of these institutions deteriorated, their financing cost rose, and with it the cost of mortgage lending.

Graph 26. Fannie Mae risk premium and US mortgage rates, January 2006-November 2008



Sources: JP Morgan and Bloomberg.

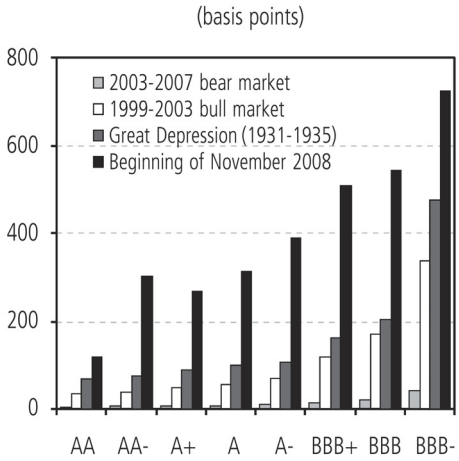
The authorities, aware of the danger, obtained from Congress in July 2008 the right to intervene, if necessary, in support of Fannie Mae and Freddie Mac. Their risk premiums nevertheless continued to rise and mortgage rates followed suit. By the end of August, the interest rate on a 30-year loan exceeded 6.5%. The impact of the decision by Congress on the share prices of the two institutions was unfortunate. Since the takeover,

[3] Fannie Mae and Freddie Mac are obliged by the regulations to maintain a minimum amount of equity capital equal to 2.5% of the assets in their balance sheets and another 0.45% of their off-balance-sheet commitments. In 2004, the OFHEO had demanded 30% surplus capital, before reducing the figure to 20% at the beginning of 2008.

with the assistance of the Federal Reserve, of Bear Stearns by JP Morgan, the markets had come to understand that the shareholders were the first to pay the price of a government bailout. The prospect of a rescue operation for the two GSEs therefore tended to push the price of their shares rapidly down to zero. Any hope of a private re-capitalisation having vanished, the risk premiums of these two firms, already high, climbed further still. In order to avoid the collapse of the most important segment of the American bond market, the authorities soon found they no longer had any option and at the beginning of September placed the two GSEs under conservatorship. Using the 'bazooka' that Henry Paulson, Secretary to the Treasury, had asked for some weeks previously "so as not to have to use it", the government announced that it might enter the share capital of each institution for a sum of $100 billion. In the space of a few days, the cost of mortgage lending fell by more than 40 basis points.

The relief was short-lived, however. As the months went by, the downward spiral involving asset prices and the erosion of equity continuously gathered pace and pressure on the risk-takers was strengthened. Being exposed to the credit and liquidity risks, the investment banks were particularly vulnerable, in that the erosion of their capital base led to doubts regarding their solvency while at the same time the loans they needed to hold onto their positions were not renewed. For lack of liquidity, they were threatened with being forced to file for bankruptcy. Following Bear Stearns in March, Lehman Brothers found itself precisely in this situation in mid-September. This time, the authorities allowed the institution to go bankrupt. Having a central place in the interwoven positions of the alternative banking system, it had very numerous counterparts: banks or money market funds that had lent money, hedge funds to which it had lent or for which it acted as depositary, traders involved in transactions on derivatives... All these counterparties were immediately affected. Aversion to risk soared. The money markets became totally paralysed. The prospect of a prolonged credit shortage sent stock markets and commodity prices plunging. What had previously been a smouldering crisis suddenly became a conflagration. With liquidity no longer circulating, the positions of many risk-takers suddenly fell apart, forcing up risk premiums on all segments of the credit market still further. At the beginning of November, those of the best-rated firms far exceeded the levels that would have been justified by losses corresponding to those actually observed even in the time of the Great Depression (Graph 27). The dislocation of the alternative financial system continued, exposing the ineffectiveness of the efforts made until then to stem the crisis.

Graph 27. Risk premiums on US investment-grade corporate bonds



Note: The premiums for November 2008 are observed data. The others, calculated by Citigroup, are those that should theoretically have remunerated bondholders on the eve of the three episodes mentioned, taking into account the effective default rates seen during these episodes.

Source: Citigroup.

3. The policies applied by the authorities

In the period up to the stock-market collapse of October 2008, the authorities' strategy had consisted mainly of dealing with the symptoms of the crisis – the pressures on liquidity – without ever tackling its cause, namely, *the incapacity of the system to bear the totality of the risks accumulated during the period when its attitude to risk had been complaisant*. Between the middle of 2007 and the last quarter of 2008, the spiral triggered by the expulsion of this excess of risk operated virtually unimpeded, pushing down the prices of all debts. The losses of the financial system steadily increased. At the end of October 2008, the Bank of England estimated that the deterioration since April in the prices of bonds issued by investment-grade firms in both Europe and the United States amounted on its own to an additional loss of $1,000 billion, or at least twice the market value of the losses related to the subprimes [Bank of England, 2008]. However, this deterioration was by then no longer due solely to the spiral engaged through the reduction in leverage: like the stock-market collapse, it was linked also to the prospect of the recession which the sudden breakdown of the credit system and the accompanying confidence shock had made inevitable. By their sheer size, these new losses had further weakened the

system and, by postponing the moment when it could once again function normally, had darkened the economic outlook still further. In order to try to break this vicious circle, the authorities finally revised their strategy. Instead of intervening only to preserve the liquidity of the system, they started to help it bear the risks with which it was burdened.

Since August 2007, the dysfunctioning of the money markets had placed Western central banks on high alert. Their interventions at first followed a simple logic: since the banks preferred to place their excess liquidity in Treasury paper or with the monetary authorities rather than lend it to other banks, the authorities were constantly obliged to inject into the system the reserves that would otherwise be lacking. The particular organisation of each of the individual money markets led them to take different types of measure, but in all cases the role of the central banks was the same, namely *to act as intermediaries between private institutions that were hesitant about lending directly to each other*.

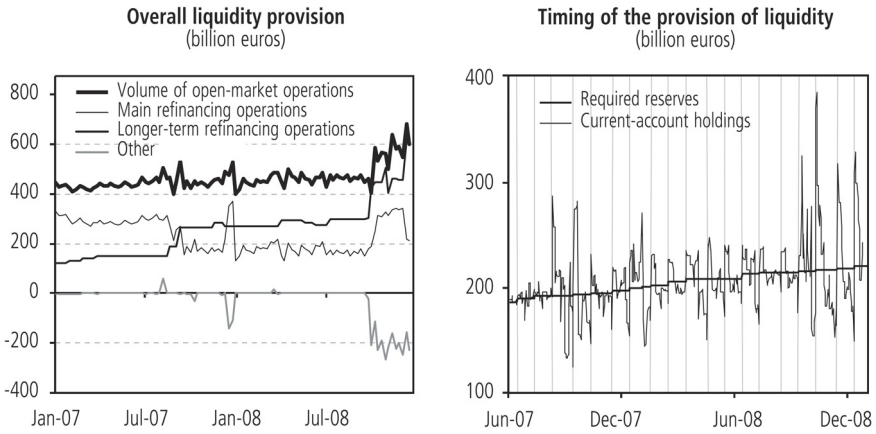
Very soon, the Federal Reserve became aware of the limitations of its intervention arrangements, with those of the ECB turning out to be more suitable (Box 11). In the United States, only some 20 institutions had access to central bank borrowing. This meant that, with liquidity not circulating freely, the reserves injected through these entry points could not reach the whole of the money market participants as they usually do. Over the months, the Fed opened new 'windows' to respond as directly as possible to the needs of the various operators. For example, the PDCF (Primary Dealer Credit Facility) enabled investment banks to obtain loans from the central bank, while swaps with foreign central banks – operations through which the Fed provides other central banks with dollars in exchange for their currencies – made it possible to delegate to these other banks the task of lending in dollars to the institutions under their remit. To help the risk-takers finance their positions, a specific programme for lending Treasury bills was also put in place. With many private lenders no longer prepared to accept as collateral securities backed by mortgage debt, the risk-takers were in fact having increasing difficulty in renewing the finance they needed in order to hold onto these securities. The Fed opened a new window – the Term Securities Lending Facility (TSLF) – in order to lend, in exchange for these securities and for a period of one month, Treasury securities, which are universally accepted as collateral. In this way it was facilitating the borrowing of the liquidity needed to finance existing positions. Unlike the other programmes, this one did not inject liquidity into the system but improved the possibilities for the circulation of existing liquidity.

Box 11. Interventions of the European Central Bank on the money market

From August 2007 to September 2008, the ECB, like the Federal Reserve, tried to reduce strains on the money market without modifying the overall liquidity of the system. Better equipped originally than its peers – its regular monetary policy framework being much broader* – the ECB did not have to open new 'windows' as a matter of urgency. It simply modified the calendar for its supply of liquidity during the minimum reserves maintenance period and lengthened the average maturity of its refinancing operations (see graph below).

Since the summer of 2007, the share of the longer-term refinancing operations (for three or even six months) in total refinancing thus rose from approximately 25% between January 1999 and June 2007 to more than 60% between September 2007 and August 2008. In parallel, the calendar for the supply of liquidity was modified, the injections being stepped up at the beginning of each minimum reserves maintenance period and later reduced or even withdrawn. Between August 2007 and January 2008 the *daily* surplus of reserves observed, compared with the monthly average, exceeded €20 billion at the beginning of each minimum reserves maintenance period (28 to 24 days before the end of the period) and was transformed into a deficit of €40 billion a few days before the end of the period (between December 2004 and August 2007, this daily balance was almost systematically nil).

Lengthening of refinancing operations' maturity and frontloading of the provision of liquidity



Note: On the left-hand graph, the 'other' item consists of net fine-tuning operations, term deposits and the net lending facility (the lending facility minus the deposit facility). As from October 2008, the surplus liquidity observed was reabsorbed especially by means of the marginal deposit facility. The vertical shaded lines on the right-hand graph indicate the initial and final dates of the reserve maintenance periods.

Sources: Thomson Datastream and ECB.

In order to understand the logic behind this frontloading of liquidity, it should be recalled that the minimum reserves requirement of the Eurosystem allows the monetary financial institutions subject to it to constitute their reserves *taking an average*: over a reserves maintenance period, the minimum reserves requirement must be met by the average of the end-of-day balances. Let us now reason on the assumption that there are two banks (A and B) and a reserves period consisting of two days (1 and 2). Each bank must have on average €100 million of reserves deposited with the central bank. To meet their need for refinancing, the central bank provides, in normal circumstances, €200 million each day. Let us suppose that by the end of day 1, bank A has on its account with the central bank the totality of these €200 million. Half this sum then provides €100 million of its need for minimum reserves requirement and it lends the remaining €100 million to bank B, which can in its turn satisfy its own need for reserves (case 1 in the table below).

Mechanics of the liquidity frontloading

(million euros)		Case 1			Case 2		
		Day 1	Day 2	Average current accounts	Day 1	Day 2	Average current accounts
Credit institutions' current accounts							
- Bank A	(1)	100	100	100	200	0	100
- Bank B	(2)	100	100	100	100	100	100
- Total	(3) = (1) + (2)	**200**	**200**	200	**300**	**100**	200
Required reserves	(4)	200	200	200	200	200	200
Excess reserves	(3) - (4)	**0**	**0**	0	**100**	**-100**	0

Let us now suppose (case 2) that the rise in aversion to risk leads the banks to hesitate before releasing their liquidity. If the situation at the end of day 1 is the same as previously, bank A no longer lends liquidity to bank B, but satisfies, as of the first day, the totality of its reserve obligations. If the central bank wants to enable bank B to build up its reserves, it must inject more liquidity than usual on the first day. If it injects an additional €100 million, this will enable bank B to satisfy its reserves obligation. On day 2, however, it will inject only €100 million: as bank A has already fulfilled its reserve requirement for the holding period, this 100 million will suffice to make it possible for bank B to build its minimum reserves. On average over the two days, the quantity of liquidity injected by the central bank is unchanged, but the calendar of the injections has been modified, leading to a surplus of reserves compared with the daily average on day 1 (amounting to €100 million) and to a deficit on day 2 (also amounting to €100 million).

Between the summer of 2007 and the summer of 2008, thanks to this frontloading, combined with the modification of the maturity structure of the refinancing operations, the ECB managed to soothe liquidity strains and bring the overnight rate close to its target, although conditions remained far from normal on the interbank market. Following the Lehman Brothers bankruptcy,

however, the disturbances were such that the ECB had to take a series of additional measures, further adding to the frontloading of the market and extending the list of securities accepted as collateral for its refinancing operations. It also decided that as from October 2008, the refinancing operations would be carried out by a fixed-rate tender procedure, with full allotment.**

The size of the refinancing operations thus rose appreciably, from €450 billion in September 2008 to more than €600 billion in December. Over this period, surplus liquidity was for the most part put into the deposit facility. The surplus reserves which are placed in this facility are remunerated, but at a rate lower than the policy rate. In January 2009, the Eurosystem cut this remuneration by 1 percentage point to 1%, while the main refinancing rate was lowered by 50 basis points to 2%.

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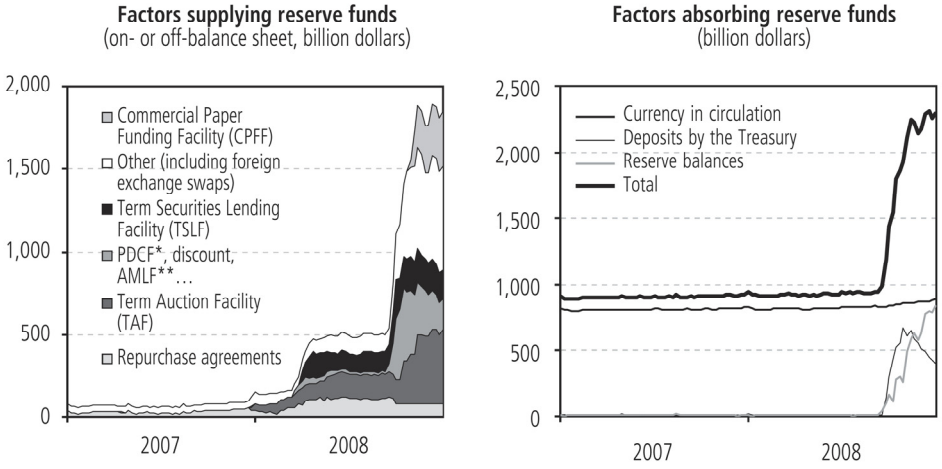
* Prior to the crisis and unlike the United States banks, a broad range of credit institutions in the eurozone had direct access to the central bank. Moreover, the range of paper accepted as collateral by the ECB being already very broad, there was no need to widen it immediately.

** The ECB also widened its swap arrangement with the Federal Reserve in order to increase the US dollar provision to European institutions. As of December 2007, the ECB and the Federal Reserve had set up such swap agreements, but for limited amounts; as from October 2008, these amounts became unlimited.

Graph 28 shows how, over the months, the size of the loans made by the Fed steadily increased before soaring in mid-September 2008 following the failure of Lehman Brothers. Not only did strains on liquidity then become more intense, as at the time of the Bear Stearns episode, but this time they extended to segments of the market that had not previously been affected. Like many financial institutions, Lehman Brothers had been issuing short-term debt that was held by the money market funds. When it went under, this meant losses for a certain number of these funds and led to a sudden rise in aversion vis-à-vis all those investing in private securities. Substantial sums then flowed out of these funds to be placed as bank deposits or in funds investing only in Treasury paper. In order to help the funds affected cope with these withdrawals without having to sell at a loss the paper held, the Fed was obliged immediately to put in place a new intervention window, named the Asset Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), which enabled banks to obtain from the central bank the resources needed to buy the paper sold by the mutual funds. These increasingly massive interventions by the Fed merely put back into circulation the liquidity which, in a concern for security, institutions wanted only to place with it or in Treasury paper.

Until the failure of Lehman Brothers, however, the size of the Fed's balance sheet remained unchanged, since it sold Treasury bills on the asset side of its balance sheet for an amount corresponding exactly to the injection of reserves over and above what was needed to cover the minimum reserve requirements. By September 2008, the stock of lending by the various facilities that had been opened had therefore risen substantially, while that of the Treasury securities on its balance sheet had been halved, falling below $500 billion (and even part of this amount, being lent in the framework of the TSLF, was in fact unavailable). Faced with the explosion of strains on liquidity, the Fed had to accept a rise in the size of its balance sheet. In order to keep control over the amount of available reserves and to prevent a collapse in the Fed funds rate, it asked the Treasury to issue and deposit with it the proceeds from these issues, for an amount equivalent to the excess reserves injected. Very soon, this temporary expedient was supplemented by a more durable arrangement. The central bank obtained from Congress the right to remunerate the excess reserves, and the rate of this remuneration would in normal circumstances put a floor on the Fed funds rate.

Graph 28. Federal Reserve on- or off-balance-sheet items, 2007-08



* Primary Discount Lending Facility.

** Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility.

Sources: Thomson Datastream and Federal Reserve.

Among the various 'facilities' opened following the collapse of Lehman Brothers, the CPFF (Commercial Paper Funding Facility) introduced a major innovation. Withdrawals from money market funds investing in private paper had placed in jeopardy numerous firms that had been regularly issuing commercial paper, for example to finance their inventories. As a result, the financial turmoil threatened to directly affect the functioning of the real economy. In order to limit this risk, an ad hoc vehicle financed by the Fed was introduced to buy newly-issued commercial paper. In so doing, the Fed was no longer content to supply liquidity but also took on the credit risk, admittedly at short term and on the best borrowers. It therefore began to advance along a path that the American authorities, loath to risk 'taxpayers' money', had previously refused to go down.

The size of the financial conflagration was such that the American authorities, like those of the other countries affected, were obliged to go further. The FDIC became guarantor not only, as previously, for deposits but also for the new debts of the banks it insured. The Treasury, for its part, using $50 billion from the Exchange Stabilisation Fund, also temporarily insured investments by money market funds that so wished, on payment of a premium. These measures did not really relieve the system of the excess risk it was carrying. They simply aimed to re-establish the 'risk-free' nature of investments that were habitually regarded as such. In the following weeks, having great trouble in keeping up with events, the Treasury used up three-quarters of the $350 billion first tranche of the Troubled Assets Relief Program (TARP) in re-capitalising American banks and preventing AIG, the world's largest insurer and counterparty to numerous risk-transfer operations, from going under. This programme, voted by Congress on 3 October 2008 and known as the 'Paulson plan', was intended to purchase illiquid securities. By diverting it from its initial aim, the US Treasury followed the path taken at the time by most Western governments, namely providing equity to the banks. It was not until the end of November that the Fed decided to make use of "non-conventional" instruments of monetary policy and announced a massive programme – $600 billion (extended a few weeks later to $1,450 billion) – for the purchase of securities issued or guaranteed by GSEs. The aim was to ensure the availability of mortgage credit and reduce its cost. At the same time, the Fed put in place an additional facility known as the Term Asset-Backed

Securities Loan Facility (TALF) in order to bolster, to the tune of $200 billion (later extended to $1,000 billion), the market for securities backed by consumer credit or by loans to small businesses.[4] This time, the American authorities were taking on part of the risks that the financial operators – in particular, the risk-takers in the alternative banking system – were no longer in a position to bear. By so doing, the authorities bypassed the damaged private financial system. Everything went indeed as if the Fed was borrowing excess reserves from banks in order to buy the assets the risk-takers could no longer carry. By financing out of borrowing the acquisition of a portfolio of (high-quality) securities, the Fed took on precisely the position previously borne by the latter.

These measures, like the repeated cuts in policy rates made by the major Western central banks, came too late, however. Having been content for several months to inject liquidity into a financial system caught up in the destructive spiral triggered by the brutal reversal of attitude to risk, the Western monetary and financial authorities had allowed the first crisis in the history of globalised finance to take on huge proportions and in the end plunge the Western economies into a deep recession.

[4] At the end of 2009, less than one-tenth of this amount had in fact been used.

VIII. THE ASTONISHING RESILIENCE OF THE DOLLAR

While the real economy – as was unfortunately only to be expected – was being devastated by the financial turmoil, the events on the foreign exchange markets came as a surprise to many. Not only did the long-announced collapse of the dollar not materialise, during the autumn of 2008 the US currency even appreciated sharply against many others, the euro in particular, despite the huge current-account deficits that had built up over the preceding years. This highlighted the importance of the often-forgotten distinction between two different risks generated by the accumulation of US indebtedness. On the one hand, when US residents borrow, somebody has to bear the risk of lending to them: this is the credit risk; on the other, when part of this borrowing is financed by the rest of the world through a transfer of savings, it implies, as was seen in Chapter I, that somebody has to bear an exchange risk. The credit risk generated by American residents' borrowing can turn sour without the US currency necessarily faltering.

Financial globalisation has also transformed the way in which exchange risk is generated and absorbed: American agents are neither the only ones borrowing in dollars nor the only ones routinely accumulating dollar-denominated assets. This transformation has loosened further the link between exchange and credit risks. For several decades much of the borrowing by the emerging regions has been in the American currency and for anyone outside the US holding a dollar-denominated claim the exchange risk is the same whether the claim is on Brazil or on the United States, but of course the credit risk is different. This makes it all the more important to distinguish the credit risk related to American borrowing from the exchange risk related to the holding of dollar-denominated assets: when the Asian economies, in the immediate aftermath of the 1998 crisis, repaid their dollar-denominated debts by building up trade surpluses

whose counterpart was a widening of the American deficit, US indebtedness increased without any direct effect on the dollar exchange rate. Similarly, if a certain number of oil-exporting countries have a sufficiently privileged relationship with the United States to hold the bulk of their financial assets in dollars, a rise in the oil price that widens the American deficit at the same time as it increases the oil-generated surpluses will have little impact on the dollar exchange rate, but it will nonetheless increase American indebtedness.

This distinction between exchange risk and credit risk clearly has its limitations. If at some time there were fears that the United States could no longer go on borrowing, there would be every likelihood that the dollar exchange rate would collapse. Overnight, American residents would be obliged to spend no more than they earn (and even spend less if they were required to repay part of their earlier borrowing). Such a return to equilibrium, or even surplus, on current account would be impossible in the absence of a steep fall in the dollar. Moreover, the mere expectation of such a situation – doubts regarding the creditworthiness of American borrowers – would be sufficient to trigger a currency crisis. In the autumn of 2009, the likelihood of this happening still seemed fairly remote, at least for market operators: despite the size of the deficits accumulated since the end of the 1990s, the real effective exchange rate for the dollar was, at the end of 2006, the same as it had been in 1997. And even after the brutal reassessment of the credit risk associated with US households' borrowing, markets were not convinced that a brutal rebalancing of the US current account was unavoidable: the financial turmoil did not send the dollar into the abyss. This chapter analyses the factors explaining this amazing resistance. Part of the explanation lies in the dollar's role in the – more or less tight – pegging of many countries' currencies: this has led their monetary authorities to absorb the bulk of the exchange risk generated by the savings they exported. A significant part of the explanation is, however, to be found in globalisation itself: by allowing for an increase in the size of international portfolios, it has cushioned the impact of current-account imbalances on foreign exchange markets.

1. The role played by monetary authorities

In the early part of the 2000s, when the deterioration in the US current-account balance began to accelerate, the collapse of the dollar seemed only a matter of time. Worries were based on the observation that a large part of the net borrowing by the United States found its counterpart in Asian

central banks' reserve accumulation. If these banks were the only agents prepared to finance the United States, this obviously pointed to the imminent failure of the economy, accompanied by the collapse of the dollar. This apparently common-sense reasoning was nevertheless somewhat flawed.

In 2004, for example, the current-account deficit in the US balance of payments was around $630 billion (Table 3). This was financed by a surplus of the same amount on the financial account.[1] In the latter account, the item showing the capital inflows corresponding to the increase in official reserves in the rest of the world amounted to slightly less than $400 billion, i.e. three-fifths of the current-account deficit.

Table 3. US balance of payments, 2003-05 ($ billion)

	2003	2004	2005
Current-account balance	**–522**	**–631**	**–749**
Financial account*	**522**	**631**	**749**
US purchases of foreign assets	–325	–1001	–547
of which			
– Official reserve assets	2	3	14
– Direct investment	–150	–316	–36
– Portfolio investment	–147	–171	–251
– Bank loans	–13	–366	–208
– Other	–18	–151	–66
Foreign purchases of US assets	858	1,533	1,247
of which			
– Foreign official assets	278	398	259
– Direct investment	64	146	113
– Portfolio investment	312	475	583
– Bank loans	97	335	215
– Other	107	179	78
Capital account and statistical discrepancy	–11	99	48

* Including the capital account and the statistical discrepancy.

Source: Bureau of Economic Analysis of the US Department of Commerce.

[1] For the purposes of this analysis, items in the capital account containing minute amounts were ignored – as was the statistical discrepancy, which, on the contrary, can be enormous!

A quick reasoning might lead to the conclusion that without this support from foreign central banks, the United States would have been obliged to reduce its spending by $400 billion in order to cut its deficit by the same amount. However, this reasoning ignores movements in the other items in the financial account. In fact, in that year the total capital inflows recorded in the balance of payments exceeded $1,500 billion! In addition to the $400 billion of reserves invested in dollars, the United States therefore received more than $1,000 billion in private investment in one form or another, showing that central banks were far from being alone in agreeing to lend to United States residents. Furthermore there is nothing to say that, without such financing, the current-account deficit would have had to fall by $400 billion. In 2004 there was a capital outflow of more than $1,000 billion from the United States. If the inflows had been $400 billion less, outflows could simply have declined by the same amount.

There is a more essential reason making it difficult to believe that in the absence of official interventions the United States would have had a financing problem. This is to be found in the very logic of these interventions: they are meant to prevent a currency from appreciating (by relieving the system of some exchange risk) and not to finance the United States (by taking on some credit and liquidity risks). To understand the consequences of this distinction, it is easier to reason here – the mechanics being the same – by taking the case of Japan, whose currency is supposed to float freely, rather than that of a country like China, where the central bank intervenes to clear a largely unliberalised foreign exchange market at a pegged rate.

A Japanese surplus leads, everything else remaining equal, to a net sale of dollars against yen that forces up the latter. By selling yen against dollars – as it did heavily at the beginning of the 2000s – the Bank of Japan has often counteracted this upward pressure. By the time it intervened, the American deficit had already been financed (if not, there could be no Japanese surplus) and Japanese savings had been constituted as a counterpart. However, no Japanese private agents were willing to take the exchange risk generated by this transfer of savings in the absence of a change in the exchange rate. They therefore offloaded the exchange risk by selling their dollars to the Bank of Japan, whose intervention in this way financed nothing but simply took on an exchange risk in place of the private sector. What would have happened had it not done so? The financing of the American economy would in no way have been called into question, but the dollar would have fallen versus the yen to the point at which private agents were prepared to take on the exchange risk they had

refused at the initial level. The financial account of the American balance of payments would then have recorded inflows in the item for private capital movements and not in the item for changes in official reserves. Since the required rise in the yen would have adversely affected the Japanese economic situation, the intervention by the Bank of Japan in the early 2000s was precisely to prevent this from happening.[2] The fact that the Bank of Japan was obliged to intervene merely shows that, *given the then prevailing margin between the two interest rates*, private agents were prepared to hold more dollars only at a higher exchange rate for the yen. Actually, as soon as this interest rate margin significantly widened – the Federal Reserve progressively pushing its policy rate above 5% – the Japanese central bank could stop intervening. Private agents, moving again into carry-trades, took on the exchange risk in its place and by so doing pushed the yen down against the dollar.

When they took place, interventions of foreign central banks therefore mainly permitted private agents to offload onto public entities part of the exchange risk implied by American external indebtedness. In fact, if one looks at the amounts involved, it appears that a large part – roughly one-half – of the exchange risk generated by the transfers of savings between the US economy and the surplus countries was taken on by the latter's official authorities and hence did not weigh on the foreign exchange markets. Thus, these interventions are one reason why the dollar has not collapsed.

It is not the only one though; financial globalisation too has exerted its influence here. One simple fact will suffice to give a measure of the depth of the changes that took place. Despite the magnitude of the public interventions, the share of official reserves in America's liabilities to the rest of the world during the 2000s rose only slightly above what it had been in the 1980s or the 1990s. This should come as no surprise. It is merely a reminder of the rapidity with which financial globalisation has become a

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[2] The institutional arrangements in this case are instructive. The Bank of Japan merely intervenes on behalf of the Finance Ministry, the Diet each year setting a ceiling on the amount of reserves that the Ministry can hold. The Bank of Japan sells the dollars it buys to the Finance Ministry's Exchange Stabilization Fund. The fund pays the sum due to the central bank – borrowing in yen on the Japanese market for the purpose – and invests the dollars it has acquired in US Treasury securities. In this way, the Japanese authorities replace private agents as takers solely of the currency risk, holding in their place 'risk-free' dollar-denominated debts and allowing them in exchange to purchase 'risk-free' yen-denominated claims.

reality. If the *share* of these now huge official reserves in America's liabilities has not risen sharply, this is simply because these total liabilities have also risen substantially in recent decades. This evolution has slowly but profoundly modified the relative weight of the different factors influencing exchange rates.

2. The role played by financial globalisation

Financial globalisation has enabled residents of the financially more advanced countries to diversify the composition of their assets. In the space of a few decades, these countries' holdings of foreign assets have risen sharply as a proportion of GDP, at a time when their liabilities vis-à-vis the rest of the world were also rising substantially. This diversification, made possible by financial globalisation, has increased the total size of these economies' 'external balance sheets' [Lane & Milesi-Ferretti, 2003]. Whether they had been running surpluses or deficits, they now have balance sheets that are much larger in relation to each country's GDP than had been the case a few decades ago.

In the mid-2000s, the liabilities of the eurozone were identical to those of the United States (see Table 1 in Chapter I), although the US GDP was larger. If one takes into account the existence of certain financial centres – Ireland and Luxembourg – that inflate the European balance sheet, it can be considered that the world's two largest economic regions have balance sheets vis-à-vis the rest of the world roughly equivalent to their GDPs. Twenty-five years ago, these ratios were only one-third as great. *This increase in the size of the 'portfolios' of international assets* has implications for the formation of exchange rates, in that, even without the central banks' interventions, *it substantially diminishes the impact of the accumulated current-account imbalances*. The explanation is relatively intuitive. When these countries are running deficits, they finance them by issuing debt denominated in their own currencies, which then finds its place in the portfolios of the residents of the rest of the developed world. For the latter, holding more assets denominated in foreign currencies means taking on an additional exchange risk. This they will do if, everything else remaining equal, the prices of these assets have been sufficiently reduced by a depreciation of the currency of the deficit country. However, the greater the increase in the size of the portfolios liable to absorb the debt issued, the smaller the downward adjustment required in the exchange rate.

For a simple demonstration, let us assume, following Blanchard et al. [2005], that the world is divided into two regions – the United States and

the eurozone – having, in national currencies, the same GDP Y. It is assumed first that one dollar is worth one euro. The total of the financial assets issued by the residents of the two regions – X – is the same and these assets are entirely denominated in the national currencies. Trade between the two regions has been balanced and their external positions are also in balance. In each case total assets issued are equal to the total accumulated wealth. This means that in both regions residents' wealth W is equal to X. However, the two economies are financially integrated and their residents are free to diversify the composition of their assets both geographically and by currency. Here again, their behaviour is identical. They take advantage of financial liberalisation by holding only a proportion α of their wealth in their domestic currencies. The remaining proportion, $(1-\alpha)$, of their wealth is invested in foreign assets. This asset-holding structure is due purely to a desire for diversification: yields are the same in both regions and no change in the exchange rate is expected. It is then an easy matter to write down the external balance sheets of the two economies, in national currencies, as follows:

United States

A	L
$(1-\alpha)W$	$(1-\alpha)W$

Eurozone

A	L
$(1-\alpha)W$	$(1-\alpha)W$

The liabilities of each region are themselves also in fact the result of this diversification behaviour. In order to acquire foreign assets, residents sell $(1-\alpha)X$ in national assets, which then have to be held by none other than the rest of the world. Given the perfect symmetry of behaviour and the identical size of the two regions, the totality of the assets issued can be held at an exchange rate of unity between the euro and the dollar.

Taking this reference framework, let us define γ, measuring the 'intensity' of globalisation, as the share of each country's GDP represented by the amount of domestic assets sold by residents in order to acquire foreign assets. This can be written:

$$\gamma = \frac{(1-\alpha)X}{Y}$$

The assets 'made available' by diversification will necessarily have to be held by the outside world. In this reference situation, the intensity γ is equal to the size of the international balance sheets of the two economies in

relation to GDP. It obviously increases with the proportion of wealth that residents want to hold in foreign assets but also with the proportion of GDP represented by the stock X of financial assets. Having defined this measure, let us see how globalisation affects the way in which an external imbalance influences the exchange rate.

Let us suppose, everything else remaining equal, that the United States' external position is in net deficit by an amount F in dollars, the counterpart being a surplus position for Europe. American residents spent more than their income while European ones did the opposite. The amount X of assets issued is still the same, but the wealth figures are now different. As savings were transferred from Europe to the US, wealth moved in the opposite direction. The wealth of American agents, who are in deficit, is thus now smaller than that of European agents, who are in surplus. We now have, denoting American residents' wealth by W and European residents' wealth by W^*,

$$W = X - F \text{ and } W^* = X + \frac{F}{e}$$

The exchange rate e (one euro = e dollars) is now the rate that will arise from this new situation. As the United States is in a deficit position, European residents will have to hold an additional amount F of dollar-denominated American assets. If, by assumption, the assets of the two regions continue to have the same returns in national currency and if no change in the exchange rate is expected, the only way to induce Europeans to hold additional American assets is to lower their prices, meaning in this case increasing the exchange rate e of the euro against the dollar. How far will the dollar have to fall – how far will e have to rise – in order to find holders for all the assets?

The balance sheets of the two economies can be written (still in national currencies) as follows:

United States

A	L
$(1-\alpha)W$	$F+(1-\alpha)W$

Eurozone

A	L
$(1-\alpha)W^*$	$-\frac{F}{e}+(1-\alpha)W^*$

Let us now write the condition for all American assets to be held. European demand for foreign assets – unchanged in national currency –

must be equal, when converted into dollars at the exchange rate *e*, to the amount of assets sold by the Americans. This amount is the one implied by their diversification, *i.e.* $(1-\alpha)W$, but this time increased by their external debtor position *F*. We therefore have:

$$F + (1-\alpha)W = e\,(1-\alpha)W^*$$

It can be deduced from this, given the definition of the wealth of residents in the two regions, that

$$e = \frac{(1-\alpha)\,(X-F) + \alpha F}{(1-\alpha)X} \qquad (1)$$

Let $\sigma = \frac{F}{Y}$ be the intensity of the accumulated American current-account imbalances (in other words, the ratio of the United States' net debt to United States GDP). The exchange rate that brings the foreign exchange market into equilibrium can easily be shown to be a function of this intensity but also of the intensity of globalisation. Starting from (1), we obtain:

$$e = 1 + \frac{\sigma}{\gamma} - 2\sigma\frac{Y}{X}$$

which can also be written as follows:

$$e = 1 + \frac{\sigma}{\gamma}(2\alpha - 1)$$

If, in the two regions, residents have maintained a 'bias' in favour of domestic assets – wanting to hold more of them than of foreign assets – one has $\alpha > \frac{1}{2}$. The exchange rate *e* will then be an increasing function of the American net external position:[3] the greater the net debt as a proportion of GDP, the more the euro will have to appreciate (the more the dollar will have to depreciate) in order to adjust to European demand the value of American assets needing to be held. In addition to this foreseeable conclusion, however, there is another that is essential in order to understand the modest consequences of the financial disequilibria of the 2000s for exchange rates*: the more globalisation progresses (i.e. the greater the value of* γ*), the smaller the impact on the exchange rate of an imbalance of a given*

[3] The more this diversification increases – the more α falls towards 1/2 – the smaller the impact of the external position on the exchange rate.

intensity σ. A simple conclusion can be drawn from this: despite the fact that American deficits in the middle of the 2000s were higher than ever, they weighed less on the dollar exchange rate than the more modest imbalances seen 20 years earlier.

The amount of foreign assets that residents of the two economies want to hold simply for the purpose of diversification – $(1-\alpha)W$ – is not, however, necessarily equal to the amount they will effectively demand: the prospect of a yield differential may lead residents of the two regions to depart from their reference holding structures. They will deviate from them all the more, the greater the *expected* differential and the lower their aversion to risk. For this reason, other factors than those discussed above will also shape the evolution of the exchange rate. The *actual* yield differential between an investment in euros and an investment in dollars is in fact an unknown quantity, depending on the interest-rate differential between the two currencies and the evolution in the exchange rate. If, for simplicity's sake, one can regard the first of these terms as certain,[4] this is not true of the second, leading to the existence of an exchange risk for agents holding assets in foreign currency. Let us denote by ρ the expected yield differential between an investment in euros and an investment in dollars[5] and by β the risk aversion parameter for the residents of the two regions. The greater the value of β, the lower the aversion to risk and the more the share of foreign assets will deviate from the reference share in response to a given expected yield differential ρ. When this differential is greater than unity, investments in euros are more attractive than investments in dollars and the desired share of euro assets increases for residents of both countries.

Let us now rewrite the balance sheets of the two regions, again in national currencies and again assuming perfect symmetry of behaviour.

United States

A	L
$\rho^{\beta}(1-\alpha)W$	$\sigma Y+\rho^{\beta}(1-\alpha)W$

Eurozone

A	L
$\frac{1}{\rho^{\beta}}(1-\alpha)W^*$	$-\frac{\sigma Y}{e}+\frac{1}{\rho^{\beta}}(1-\alpha)W^*$

[4] It is assumed that each country's liabilities consist entirely of short-term debts.

[5] Writing $\rho=\frac{(1+i)}{(1+i^*)}.\frac{e^a}{e}$ where i^* and i are the posted interest rates on investments in euros and dollars respectively and e^a is the expected exchange rate.

The equilibrium exchange rate e is determined, as previously, by writing the condition that the totality of assets is held. This time, however, American residents 'make available', in addition to their net external position σY, an amount $\rho^{\beta}(1-\alpha)W$ of dollar assets for which room has to be found in European portfolios. Expressed in euros, European demand for foreign assets is this time $\frac{1}{\rho^{\beta}}(1-\alpha)W^*$. The relationship determining the equilibrium exchange rate now becomes:

$$\sigma Y + \rho^{\beta}(1-\alpha)W = \frac{1}{\rho^{\beta}}(1-\alpha)W^*$$

From this can be deduced:

$$e = \rho^{2\beta} + \frac{\sigma}{\gamma}\left(\rho^{\beta} - (1-\alpha)\,(1+\rho^{2\beta})\right) \qquad (2)$$

It can be seen that globalisation leaves intact the (positive) influence of the yield differential on the exchange rate while it erodes the (negative) impact of the accumulated net debt to GDP ratio: *the greater the intensity of globalisation (the higher* γ*), the more the impact of expected yield differentials will outweigh the impact – sometimes called fundamental – due to the accumulation of external imbalances*. Note that this conclusion would also be valid if the two-country, two-currency framework was broadened to allow for other countries using the euro and the dollar as their 'home' currency, both to issue debt and accumulate assets. The fundamental imbalances between the dollar and euro 'zones' – their net investment positions – would weigh less and less on the foreign exchange markets in comparison to the expected returns on the two currencies. This dominant role of yield differentials will be all the more marked the lower the degree of aversion to risk on the part of the portfolio-holders.

This analysis puts in perspective the consequences for the dollar of a widening of the American current-account deficit. It does not mean that this widening has no consequence. Everything else remaining equal, a continuous deterioration of the US external position will force the dollar down. However, the forces capable of limiting this fall should not be underestimated.

3. The role played by expected return differentials

To sum up, two sets of factors determine the value of the dollar vis-à-vis freely floating currencies (represented here by the euro). One of these factors, as we have just seen, relates to the accumulation of external

payment imbalances (possibly extended to include capital movements that are not financially motivated). The progress of globalisation has eroded its strength relative to the other force at work, namely the yield differential. *Thanks to globalisation, a modest change in interest-rate differential can now help to counter downward pressure on the exchange rate stemming from the accumulation of substantial current-account deficits and even enable the rate to appreciate, despite these deficits.* If we add to this the fact that, as noted earlier, the monetary authorities of surplus emerging countries absorbed a large part of the exchange risk generated by those deficits, the strength of the dollar in the mid-2000s is easier to understand: the remaining downward pressure resulting from the accumulated current-account deficits was opposed by the upward pressure generated by the relatively high level of American interest rates – hence the stability of the dollar versus the euro and its rise versus the yen (despite the quasi-absence of the Bank of Japan from the foreign exchange market after 2004).

But interest-rate differentials are not the only factor whose influence has been increased by comparison with the current-account imbalances. The yield differential ρ just referred to is defined by the combination of two terms: an interest-rate differential and an expectation regarding the evolution in the exchange rate, meaning that expectations – and hence speculation – can also play an increased role in the determination of the exchange rate alongside interest-rate differentials. *The potential for destabilisation of foreign exchange markets by speculation has been fully preserved by globalisation*. If, at some time in the future, the whole world is convinced that the dollar is about to fall, it will indeed fall – and rapidly. However, it would be a mistake to regard the speculators' expectations merely as a potential threat. The way they are formed can in fact be described in terms of various 'regimes' (see Box 12), each of which has different consequences for currency stability (or instability). During the second half of the 2000s, contrary to what many had feared, it is not changes in exchange-rate expectations but in interest-rate differentials that seem to have been the main force driving the moves of the dollar against the euro (as well as against the yen).

Box 12. The role of expectations in exchange-rate dynamics

Let us suppose, first of all, that market operators have *strong convictions* regarding the level of exchange rates in coming months. For example, seeing that the United States is running a substantial deficit, they may be convinced that the rate for the dollar against the euro will steadily depreciate, say by 20% from its present level in two years. If this expected tendency is firmly entrenched in the mind of the market, the actual evolution in the exchange rate will not deviate substantially from this expected tendency, regardless of the evolution in the American current-account deficit and in the interest-rate differentials. In order to demonstrate this, let us denote by $\bar{e}^a$ the expected level of the exchange rate for the following period. The equation for the equilibrium rate on the foreign exchange market defined above can be written, for the sake of simplified handling, as the *product* of a fundamental force k – a function of the accumulated imbalances – and the yield differential ρ. Equation (2) can therefore be written in approximated form* as $e = k\rho^{\beta b}$.

If the interest-rate differential is assumed, still for the sake of simplicity, to be zero, we have:

$$e = \left(1 + \lambda \frac{\sigma}{\gamma}\right) \cdot \left(\frac{\bar{e}^a}{e}\right)^{\beta b}$$

The equilibrium exchange rate can then be written:

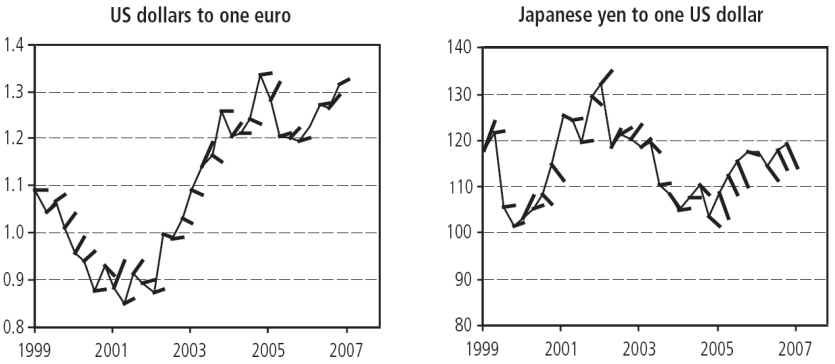
$$e = \left(\bar{e}^a\right)^{\frac{\beta b}{\beta b+1}} \cdot \left(1 + \lambda \frac{\sigma}{\gamma}\right)^{\frac{1}{\beta b+1}}$$

The gap between the expected exchange rate $\bar{e}^a$ and the rate e that will in fact apply represents a restraining force that will be all the more powerful, the lower the aversion to risk. This force, related to the conviction on the part of the markets regarding the future evolution in the exchange rate, plays a stabilising role, preventing too great a widening of the gap between the observed rate and its expected trajectory. Let us imagine, however, that things turn out differently and that the dollar drops well below this trajectory. The gap between the expected and the actual exchange rate will widen and the restraining force will be correspondingly greater. This force will therefore tend to bring the exchange rate back towards its expected trajectory. The lower the aversion to risk, the less the dollar will deviate from this trajectory – on condition, of course, that the convictions remain strong.

The operation of this restraining force is based entirely on the strength of the markets' convictions. However, these convictions often seem more frail than robust. Surveys in fact show an absence of firm views regarding future *levels* of exchange rates. If a sharp fall in the dollar takes place tomorrow, expectations concerning the following weeks will be for a correction of this movement.

If a few days later the dollar is still falling, a correction will still be expected, but one that brings the rate back to a lower level than previously expected. Markets in this way simply expect a reversal of the latest movement, so that expected levels are continually being revised [Brender & Pisani, 2001]. Between 1999 and 2006, in three-quarters of the cases relating to the euro and the yen, the expected movement vis-à-vis the dollar was for a reversal of the most recent observed movement, in the most frequent case correcting a substantial portion of that movement (see graph below).

Exchange-rate expectations, 1999-2006



Note: The thick line represents, quarter by quarter, the expected variation and the thin line the actual evolution. The survey used here is the one carried out by Bloomberg around the start of the quarter, in which respondents are asked to report their expectations for the end of the quarter (giving a time-horizon of roughly three months).

Under this 'frail convictions' regime, expectations, instead of providing an anchor for the actual evolutions, are influenced by them. These expectations nevertheless still act as a damping force, thereby making it possible to avoid too steep a fall in the exchange rate. In order to demonstrate this, let us take the extreme case in which the expected movement is the one that would correct the totality of the evolution just seen (in this case, therefore, we can write $e^a = 1$). Again assuming no interest-rate differential, it can easily be verified that the equilibrium rate for the foreign exchange market is given by:

$$e = \left(1 + \lambda \frac{\sigma}{\gamma}\right)^{\frac{1}{1+\beta b}}$$

The lower the aversion to risk, the greater the extent to which the fall in the dollar (rise in the euro) provoked by the fundamental disequilibrium (the American current-account deficit) will be cushioned. Obviously, the dollar will fall by more, the greater this disequilibrium, but the fall will be slowed down in the manner of a parachutist falling under the influence of gravity but with his fall curbed by his parachute.

The increased role played by expectations in the determination of the evolutions in the exchange rates of the leading currencies does not therefore necessarily imply greater instability of rates. The emergence of a different and much more devastating expectation regime cannot be ruled out, however. Under this regime, which is seen episodically on the markets for the leading currencies, it is no longer the levels reached that count: expectations will no longer be focused on a level but on a rate of change in the exchange rate.** If such a regime becomes entrenched, the collapse of a major currency becomes a possibility. This was seen, in particular, during the Asian crisis in the early summer of 1998 when the yen very nearly collapsed. The threat exists that at some time in the future the dollar might in its turn fall victim to a crisis of this type. However, it can be prevented from materialising if the monetary authorities of the participants in financial globalisation strive collectively to avoid it. Experience in fact shows that when the authorities of countries one of whose currencies is being forced down and the other up agree to put an end to this situation, they manage to do so without much difficulty. The tactic they have to adopt is to signal jointly to the markets their determination not to allow the exchange rate to go beyond a certain level. This is what Japan and the United States did in 1998 to support the yen and what the ECB, the Fed and the Bank of Japan did in September 2000 to stem a worrying decline in the euro. In both cases, by showing their joint determination the authorities embedded in the markets' mind a firm conviction that an exchange rate beyond the indicated level was unacceptable to the central banks. In this way they re-established a stabilising expectations regime.

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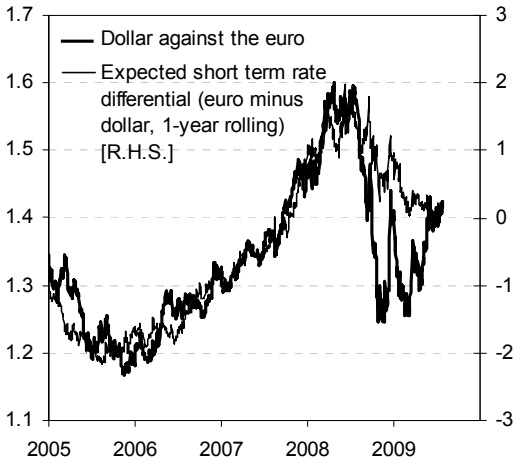
* When ρ is close to 1, equation (2) can in fact be written in the form $e = k\rho^{\beta b}$ where $k = 1 + \lambda\frac{\sigma}{\gamma}$ with $\lambda = (2\alpha - 1)$ and $b = \frac{2 + \lambda\frac{\sigma}{\gamma}}{1 + \lambda\frac{\sigma}{\gamma}}$. Since $\alpha > \frac{1}{2}$ and $\sigma > 0$, k and b are positive.

** We shall therefore this time have $e = \left(1 + \lambda\frac{\sigma}{\gamma}\right)\left(1 + \dot{e}^{a}\right)^{\beta b}$.

In this respect, trying to understand what explains the bumpy road followed by the dollar against the euro from 2005 to mid-2009 is particularly revealing. A look at Graph 29 gives some interesting clues. It compares the rate of the euro in dollars and the difference in 3-month rates on the two currencies *expected at a one-year rolling time-horizon*. Until the end of 2007, the two variables appear to have been strongly correlated. This confirms that in a financially globalised world, interest-rate differentials

exert a dominant influence on foreign exchange markets.[6] Note that in such a world this influence of interest rates is magnified by the activity of exchange-risk-takers who borrow in a low-rate currency and lend in a higher-rate one. By so doing, they push the value of the former down against the latter exactly as do the portfolio holders in our framework. The conclusion derived from Graph 29 is straightforward: from 2005 to the beginning of the financial turmoil, changes in expected monetary policies have been the driving force behind the observed exchange-rate movements. This implies that, during these years at least, there was hardly any change in the influence exerted by 'fundamental' factors – the exchange risk generated by the US current-account deficit being largely absorbed by emerging countries' central banks – and that expected changes in the euro-dollar exchange rate remained fairly stable.

Graph 29. Expected interest-rate differential and the euro-dollar exchange rate, 2005-09



Sources: Thomson Datastream and authors' own calculations.

Beyond this first conclusion, however, the behaviour of the euro-dollar rate at the height of the financial crisis looks puzzling. In 2008, the correlation that prevailed clearly no longer held and the euro depreciated against the dollar in a way that seems totally unjustified by the change in

[6] We assume that the euro and dollar forward interest rates used here capture the average levels of the relevant part of the two yield curves.

the interest-rate differential. But this should not come as a total surprise. In the above simplified framework, the influence of yield differentials on the exchange rate is a function of risk aversion. And, as we have seen in the previous chapter, a sharp increase in risk aversion has been both the trigger and the consequence of the financial crisis. What happens, in our framework, if risk aversion suddenly increases? The influence of return differentials will suddenly be diminished. Such a break in risk-taking behaviour took place during the financial crisis and there is no reason to believe it did not affect exchange markets.

To see how changes in risk aversion may have affected the euro-dollar exchange rate, one can use a simple equation derived from relation (2) above to simulate the behaviour of the euro exchange rate over the period from 2005 to mid-2009. Let us assume that, over this period, the exchange rate has responded only to changes in the expected return differential, the elasticity of this response being given by a parameter inversely related to risk aversion.[7] The return differential is taken as the difference in interest rates in Graph 29 plus an expected rate of change in the exchange rate (assumed to be constant over the whole period). Calibrated on 2005-07, this equation provides a good account of the observed euro-dollar exchange rate moves over those three years (Graph 30, left-hand side), but, exactly like the relationship depicted in Graph 29, this one also breaks down by mid-2008. Could fluctuations in risk aversion be the explanation?

To answer this last question, we use our calibrated equation to calculate the path the elasticity to the return differential parameter *should have followed* in order to correctly simulate the observed exchange-rate trajectory from January 2008 to June 2009 (Graph 30 left hand side). Not surprisingly, this implicit elasticity started to fall significantly – it moves in the opposite direction to risk aversion – at the beginning of 2008, before collapsing when Lehman went under. It then slowly and hesitantly moved back to more normal levels and by June 2009 it was roughly back to its end-2007 level.

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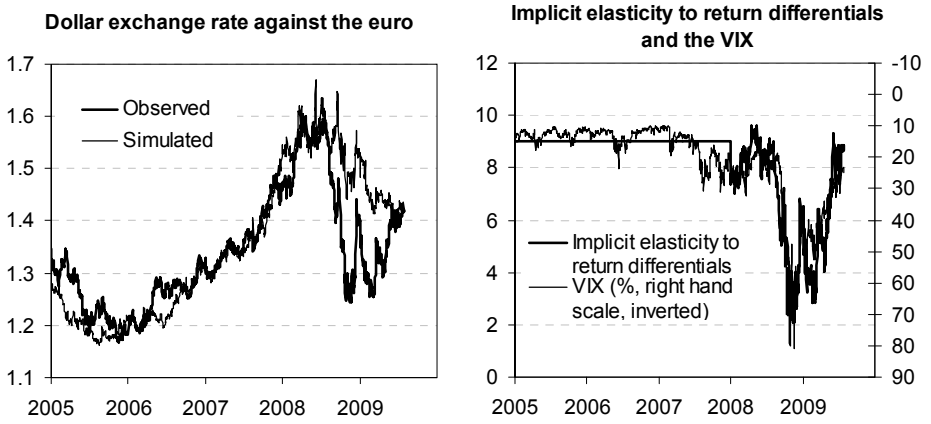
[7] Following Box 12, we wrote $e = k \times (1 + r_{€} - r_{\$} + \varepsilon)^{\beta'}$, where $r_{€}$ is the euro expected 3-month interest rate at a 1-year rolling horizon, $r_{\$}$ is the dollar expected 3-month interest rate at a 1-year rolling horizon (both rates are derived from futures contracts prices); ε is the expected change in the euro/dollar exchange rate (taken as equal to +2 % over the whole period); β' is the apparent exchange rate elasticity to the return differentials – βb in Box 12 – also assumed to be stable over the period; so is k, used here as a scale parameter.

Graph 30. The euro-dollar exchange rate and the role of risk aversion, 2005-09



So*urces:* Thomson Datastream and authors' own calculations.

Is this consistent with what we know about risk-taking attitudes during this period of financial turmoil? By comparing a risk-aversion indicator commonly used for the stock market – its volatility measured by the VIX – with the implicit elasticity calculated here (Graph 30, right-hand side), we can see that the two have broadly followed the same fluctuation patterns. During this whole period, wild fluctuations in risk aversion seem indeed to have played a key role in the euro-dollar exchange rate movements. The exercise does not say much about how the euro-dollar exchange rate will move after this episode, but it does tell us that interest-rate differentials will regain traction in influencing foreign exchange markets as risk aversion moves back to more normal levels. This also implies, however, that the foreign exchange markets' vulnerability to changes in expected exchange rates will then also be back to normal.

Paradoxically, since globalisation has considerably increased the resilience of the foreign exchange markets, it is the public authorities that have now become the main source of their possible destabilisation. If at some time in the future the United States wanted to see a decline in the dollar – and said as much – there would be a substantial risk that the dollar would in fact fall. Much the same would happen if the central bank of an Asian country or of one of the major oil exporters announced that it wanted to bring about a rapid diversification in the composition of its reserves. As we have seen, these authorities have taken on the bulk of the exchange risk generated by the US current-account deficit. They cannot reduce this amount without pushing their currencies upwards, but they can diversify it

by selling the dollars they have bought against, say, euros. By so doing they will exert a force exactly comparable to the one produced by the US deficit σ in the above two-currency, two-country framework. The direct impact of such a diversification may, however, not necessarily be as formidable as is often feared. Of course, the amounts involved look huge in absolute terms but they have to be scaled back to the current size of the world portfolios that would have to take in the dollars being sold and supply the euros being demanded. *In the absence of destabilising expectations*, a comparatively modest rise in the euro would in normal circumstances be sufficient to absorb the shock. The announcement effect is probably more to be feared here than the actual effect.

In this way, globalisation has increased the responsibility of public agents for maintaining market stability. If, in cooperation, these agents take on this responsibility, the imbalances that have accumulated during the 2000s could be dealt with without triggering a currency crisis.

IX. FINANCIAL GLOBALISATION IN QUESTION

Following the conflagration in the autumn of 2008, it is legitimate to raise the question of the contribution made by financial globalisation. If a few years of accelerated development in the emerging regions come at the cost of a dramatic slowdown in the world economy, is the game worth the candle? Simplistic though it may be, this 'cost-benefit' analysis nevertheless sums up fairly well the events of the 2000s. But does this mean reopening the question of the liberalisation of capital movements and trying to confine finance again to the balance sheets of the banks? We hope not. Despite the recent debacle, a globalised financial system can help the world economy make better use of the savings its various parts tend to generate. For this to happen, however, the origins of the present crisis have to be clearly understood. They are to be found less in globalisation itself than in the policies that accompanied it, or, to be more precise, the policies that failed to accompany it. The ideology of the promoters of globalisation has obscured the fact that finance left to its own devices regularly leads to disaster.

This latest catastrophe merely provides further confirmation. To rely on 'market discipline' to ensure financial stability, as the American authorities in particular have done, is illusory. The quality of the prudential regulations imposed and the vigilance with which their observance is scrutinised are essential elements. However, the collapse of the globalised financial system has shown that, contrary to a widely-held view, the need for public consideration and intervention is far from being limited to the definition and maintenance of proper accounting and prudential rules. Given the vital nature of what is channelled by the financial system, preserving its liquidity is key to the very survival of the real economy. But what flows in the system – money and risks – makes it particularly prone to what was recently termed a 'sudden financial arrest' [Caballero, 2009], that

is, a credit freeze due to the brutal unravelling of the risk-taking chains that constitute the very fabric of globalised finance. What followed in the wake of the Lehman Brothers' bankruptcy gave a striking example of such a breakdown. Preventing such a deadly event from ever happening again should be an absolute priority for the authorities. This implies of course that they prepare themselves to take the necessary emergency measures whenever such an accident seems imminent.

But what is needed goes well beyond shock treatment and extends to trying to diminish the odds of such an accident happening by improving the design of the globalised system. This system cannot safely remain merely a juxtaposition of heterogeneous and more or less loosely linked national systems: public authorities should involve themselves in the definition of its frontiers and its architecture. Freedom of capital movements is not sufficient for funds to flow where they can usefully be invested. For this to happen, adequate 'pipework' has to be in place. An adequate level of development of the infrastructure for financing and risk-taking in each economy, as well as proper connections to the global system, are necessary in order to allow savings to circulate smoothly in the world economy. However, the international cooperation required for financial globalisation to work properly goes even further than the installation of more complete and more solid 'plumbing'. It also extends to the policies that, by influencing the formation of savings and investment decisions, regulate the 'pressure' of what circulates in the pipes. Whatever the efforts made to consolidate the infrastructure of globalised finance, its capacity to ensure the circulation of world savings will remain limited and governments will have to accept the constraints that this limitation imposes on their policies. The financial crisis of the late 2000s stems also from the willingness of many of them to ignore these constraints and to act as if globalisation merely extended their margins for manoeuvre, without demanding anything in return on their part.

1. Microeconomic regulation

The crisis of the late 2000s marks the failure of a conception of financial regulation of which Alan Greenspan has been the most notorious advocate [Greenspan, 2007]. For its proponents, the intervention of the public regulator must be as light-handed as possible and practically limited to providing a framework for the behaviour of just the deposit institutions (the money they 'produce' being a public good). Admittedly, light-handed regulation will from time to time lead to accidents, but, little by little, if

allowed to do so, finance will learn how to 'self-regulate'. According to this ultra-liberal conception, financial stability is based essentially on the unhampered interplay of private interests and not on public intervention. There is an underlying postulate, namely that private agents behave rationally and pay constant attention to gathering the information that past experience places at their disposal. The subprime debacle has shown, yet again, how this postulate is contradicted by the facts. Prompted by self-interest, the private counterparties to a financial operator should normally keep a closer eye on him than a public authority would. However, for this to be true, a number of conditions must come together in a way they rarely do. Moreover, the vigilance of these counterparties must not be blinded by greed or euphoria. The ease with which securities were sold – securities that were backed by mortgages that should never have been granted – is a powerful reminder of these realities. The acute embarrassment of the former Chairman of the Federal Reserve when called on to testify to Congress in the autumn of 2008 was edifying on this point.[8]

The authorities have to learn the lessons but without depriving the economy of the benefit of financial innovation. Being able to transfer financing and the attendant risks more easily, for example, is advantageous for growth and it would be unfortunate if the crisis that has arisen were to lead to wholesale condemnation of securitisation. The problem that private surveillance was unable to solve on its own may be dealt with, for instance, through the introduction of norms whose respect is guaranteed by a public authority or a collective body. This is already the case for the German *Pfandbriefe*, for example, or in the United States for the securities backed by prime mortgage loans. Fannie Mae and Freddie Mac have long 'normalised' the quality of the loans they buy in for securitisation. A prime loan, by definition, meets certain precise requirements: its amount must not exceed a given proportion of the value of the house purchased and the borrower must demonstrate income that is compatible with his debt service burden. Only loans that meet precise norms should be allowed to be sold by a bank. This does not mean banning 'non-conforming' loans, merely

[8] To the question of Representative Henry A. Waxman "You had the authority to prevent irresponsible lending practices that led to the subprime mortgage crisis. You were advised to do so by many others. Do you feel that your ideology pushed you to make decisions that you wish you had not made?", Alan Greenspan answered "Yes, I've found a flaw. I don't know how significant or permanent it is. But I've been very distressed by that fact." See "Greenspan Concedes Error on Regulation", *New York Times*, 24 October 2008.

obliging those making such loans to keep them on their balance sheets. Clearly, respect for norms cannot guarantee the repayment of the loans granted, but it makes the risks involved easier to assess.

However, the mass of information to be processed in order to arrive at a correct assessment of the risk involved in claims that are securitised in this way, and possibly structured, is liable to exceed the capacities of many investors, who will continue mainly to base their decisions on the ratings awarded by the specialised agencies. This means that surveillance of the quality of the information used, and of the calculations carried out, by the rating agencies is the responsibility of the authorities. It may lead them to suspend the rating of securities created from loans for which the past does not provide adequate information. In the mid-2000s there was not sufficient recorded experience of defaults in the case of subprime loans, so that no agency should have agreed to rate them. Public surveillance of rating agencies is all the more necessary in that prudential regulation will continue, as now, to refer to the grades they issue [Rochet, 2008]. It would be paradoxical if these accessories to prudential regulation were not subjected to any surveillance.

Normalising the way in which risk is generated and perceived is not sufficient by itself, however. It is necessary also to compensate for the pro-cyclical character of financial agents' attitudes towards risk. There is now virtual consensus on this point. The aim must be to curb risk-taking when things are going well and, conversely, to facilitate it when things get worse: regulation should become "cycle-proof" [Rajan, 2009]. Recourse to the accounting rules known as 'dynamic provisioning' is one way of moving in this direction, but various others have been discussed in the aftermath of the crisis. Whatever the regulatory framework, the problem is to ensure that the rules apply to all the risks taken, whether on or off the balance sheet, so as not to leave open the possibility of what has been euphemistically described as 'regulatory arbitrage' [Aglietta, 2008]. The challenge, however, will be to calibrate these rules so as not to unduly constrain the risk-taking capacity of the financial system while at the same time ensuring its stability.

This directly raises the question of the prices used in the regulatory framework to evaluate the assets held by the financial institutions. Fluctuations in their market prices are themselves pro-cyclical and merely further reinforce the tendency of the system to engage an upward (or downward) spiral. At the peak of the cycle, asset prices tend to be excessively high, producing capital gains that increase the equity of the

financial institutions and hence their capacity for risk-taking, just when their attitude to risk is tending to make them less prudent – and vice versa when the turnaround takes place. This does not mean, however, that the use of market values should not remain central for accounting purposes. The introduction of anti-cyclical prudential regulation insofar as it would affect the loans made by financial institutions to the risk-takers, should already moderate the cyclical nature of the evolution in asset prices. In addition, 'real-time' application of market values could be made less harsh by introducing an average of past and observed prices [Plantin et al., 2008]. Whatever rules are applied, however, the prices that are formed on the markets cannot be ignored by operators and will inevitably continue to influence the behaviour of many of them, notably the risk-takers. It is then up to the authorities, when the evolution of the markets becomes extreme – and the past decades have shown that this can be a regular occurrence – to assume their responsibilities and prevent the system from moving into dangerous territory. If market prices become excessive for one major asset class or another, the authorities can intervene by reasoned warnings and then by measures – of a tax nature, for example – that make the acquisition of the assets in question more expensive. If, on the contrary, it becomes evident that prices are becoming dangerously depressed, the authorities may have no choice but to support them in one way or another: experience has shown that unduly low asset prices may reflect an increase in risk aversion to abnormal levels and signal that the system is moving dangerously close to a crisis.

2. Dynamic interaction

When such a threat emerges, containing it should become the sole priority of the authorities and in particular of the central bank. From this point of view, just as Alan Greenspan's ideology was harmful for the solidity of the financial system, his highly pragmatic reaction to the threat of financial crisis was salutary. By cutting rates rapidly each time, the Fed under his chairmanship implemented a policy of insuring against potentially catastrophic events [Greenspan, 2004]. The prompt lowering of rates reassured the financial operators and stopped their risk-aversion from increasing further – at the cost, some will say, of persuading them that the central bank would always come to the rescue. That may be so, but putting financial stability in jeopardy in order to teach those who have been imprudent a lesson is a dangerous and somewhat sterile game. Financial history has amply shown that punishment inflicted on today's

mismanagers rarely serves as a lesson for those who come after them. Reinforcing financial stability is not so much a matter of this illusory education of operators, dear to the theoreticians of moral hazard, as of establishing a solid prudential framework combined with attentive surveillance. If this has not been done and the system has come close to the danger zone, the time for education has passed and preventing collapse should become the only priority [Calvo, 2009].

One of the main lessons of the 2008 crisis is in fact that the stability properties of globalised finance are similar to those of many other complex systems [Leijonhufvud, 2009]. As long as the shocks to which such systems are subjected do not exceed a given amplitude, they rapidly return to equilibrium. If the amplitude is excessive, however, such a return becomes impossible and only a prompt external intervention can help avoid a complete collapse of the system. The way the US authorities acted once money markets started to dysfunction during the summer of 2007 and up to the collapse of Lehman Brothers gives an illustration of the cost of their not being ready to face this reality. With hindsight, not cutting rates fast enough in the summer of 2007 because of worries over a slippage in inflation and possible moral hazard implications – at a time when the dangers of the subprime crisis to financial stability were becoming evident – and intimating, as was the case after the failure of Bear Stearns, that the next movement in rates would probably be a rise, were errors on the part of the Federal Reserve (see Box 13).

Month after month, indeed, the strains on the risk-taking chains that allowed liquid emerging savings to finance US mortgage loans continued to intensify and their links started to break. Letting Lehman Brothers go under could only make things worse. As was seen earlier, it led to nothing less than a breakdown of the financial system. The US authorities found themselves confronted with a 'sudden financial arrest' that they lacked adequate tools to handle. The sharp rise in risk aversion forced private risk-takers to unload their risk and called for a massive and rapid transfer of (credit-)risk from private to public hands. The authorities could have achieved this by auctioning significant amounts of protection on the main CDS indices, but neither the Treasury nor the Federal Reserve was ready or empowered for such action. For lack of being able to provide a rapid remedy, as they had hoped, by recapitalising the banks, the American authorities ended up having hardly any choice. In order to avoid progressive suffocation of the real economy, they were obliged to progressively replace part of the damaged risk-taking chains. They had themselves to provide the indispensable financing and take on the risks the

private system was no longer able or willing to take. By that time, however, the damage done to the real economy was huge. In retrospect, public intervention would have been lighter, less dramatic and probably less costly if it had been aimed at preventing this breakdown rather than at cushioning its consequences.

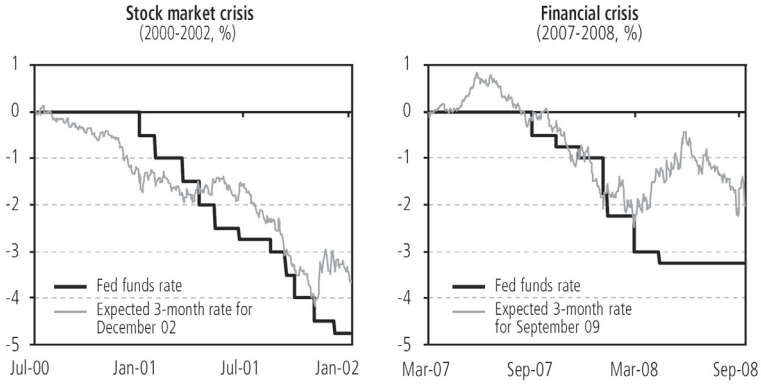
One lesson of this episode is clear: the authorities have to accept an increased role in the functioning of financial systems in a way that runs counter to the hitherto dominant ideology. For instance, building a contingent insurance scheme of the type proposed by Caballero & Kurlat [2009] could in the future help prevent the development of a 'loss spiral' similar to the one described in Chapter VII. By selling, in normal times (at a relatively low price) tradable insurance credits (TICs), the central bank would provide financial institutions with an inflatable lifebelt that would help keep them afloat in times of crisis: the rising value of the TICs during financial turbulences would prevent too sharp a fall in the value of their assets and thus protect their equity capital. Putting in place and managing such a mechanism is just one example of the new responsibilities authorities have to assume. Almost continuous 'dynamic interaction' between them and the financial system is needed to preserve the latter's stability at a reasonable cost in terms of growth. It would be illusory to think that this can be avoided, while at the same time hoping that globalisation can serve the cause of growth.

Box 13. The ambiguities of the Federal Reserve's policy from mid-2007 to end-2008

Following the arrival in 2006 of Ben Bernanke to head the Federal Reserve, several operational changes were made: the duration of FOMC meetings was lengthened, the frequency of the published economic forecasts was increased and the power of the President was reduced in favour of that of the Committee.* The crisis that began in the summer of 2007 will show that, behind these rearrangements, the way in which monetary policy is conducted had also changed.

The graph below re-traces the evolution of policy rates at the time of two crisis episodes: the bursting of the stock-market bubble in 2000 and the financial crisis of 2007. If one takes the NBER's dates for entry in recession, the Fed can be seen to have begun to lower its rates approximately three months before the beginning of the recession in both 2000 and 2007. However, the change observed between September and December 2007 was distinctly slower than in the early part of 2001: between mid-September 2007 and mid-January 2008, the policy rate was cut by 100 basis points, compared with a fall of 200 points between the beginning of January and the end of April 2001.

Fed funds rate and expected short-term rates during two episodes



Note: The graphs show, for each crisis, the change in rates from their level six months before the date of the first monetary easing.

Source: Thomson Datastream.

As early as the summer of 2007, however, Frederic S. Mishkin, then a member of the FOMC, had stressed that, faced with the bursting of a real estate bubble, monetary policy is all the more effective in that it acts quickly and powerfully.** However, not only was the monetary easing slower until January 2008 than in 2000, but the message sent out by the Fed remained confused: at no time did the central bank adopt a downward bias (signalling a probable continuation of the rate cuts) and the official statements published at the conclusion of the Committee meetings of September and December 2007 even referred to the persistence of a "certain inflationary risk". By comparison, the Fed under Alan Greenspan had opted, as of January 2001, for a downward bias and had maintained this throughout the year.

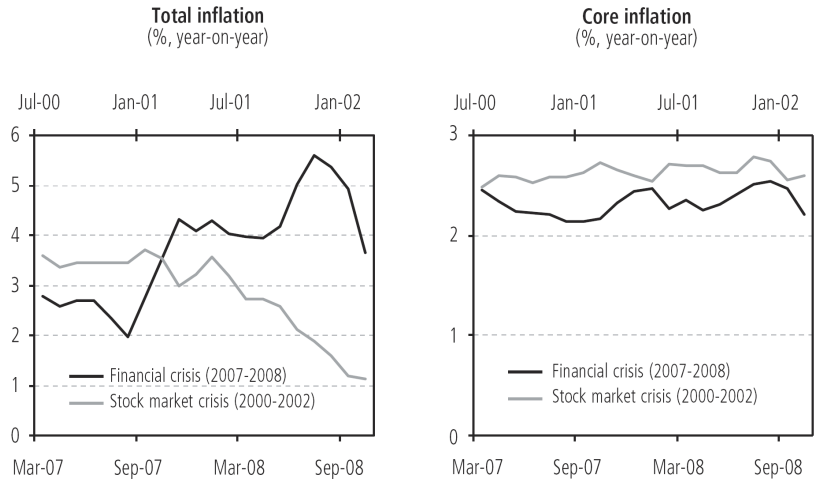
This woolly communication on the part of the Fed had visible effects on the financial markets' short-rate expectations: in 2000 (as in 1998, in fact), expectations concerning short rates had started to decline approximately a month and half *before* the first actual fall in the Fed funds rate (at the end of September 1998 and at the beginning of January 2001, respectively). In 2007, they did not start to decrease until one month *after* the first fall in the policy rate. At the beginning of January 2001, even before the Fed cut its rates, the change in short-rate expectations had pushed long rates down by 100 basis points; in September 2007, on the other hand, 10-year rates were at the same level as six months before. A decline in these rates, bringing with it a decline in mortgage rates, was all the more important, however, in that the largest part of the domestic transmission of American monetary policy is through residential investment (and, accessorily, household spending on durable goods). Until the end of 2007, the Fed deprived itself of this lever.

January 2008 was to mark a turning point: in just two weeks, the central bank cut its rates by 125 basis points. By mid-April, the monetary easing had become comparable to that seen in 2001, as had the change in short-rate expectations. By adopting a downward bias between January 2008 and the beginning of April, the Fed sent out a clear message and exploited expectations: in mid-year, 10-year interest rates were more than 150 basis points lower than in June 2007 and the 30-year mortgage rate had fallen below the symbolic 6% level (70 basis points less than in the summer of 2007).

In Q2, despite a first dramatic financial episode – the last-minute rescue of Bear Stearns – ambiguity returned: at the end of April, the Fed lowered its rates to 2%, but its downward bias disappeared and two members – Richard Fisher and Charles Plosser – marked their dissent, preferring rates to be left on hold. In the following weeks, the Fed even pushed interest-rate expectations up. At the beginning of June, Ben Bernanke highlighted the resistance shown by the economy and stressed the inflationary risk.*** In mid- June 2008, 10-year rates were 100 basis points higher than three months earlier and, while the fall in real estate prices continued to accelerate, 30-year mortgage interest rates were *higher than at the beginning of the crisis*. At the end of June, the Fed decided to mark a pause, keeping its policy rate at 2% and adopting an upward bias!

How can this change of course be explained? Inflation was showing signs of getting out of control and the central bank was afraid that interest-rate expectations would follow suit. The change of orientation of its policy was nevertheless surprising. The rise in inflation stemmed primarily from the surge in energy prices and, as in 2001, there was no upward drift in core inflation. Above all, the financial and real estate crises had not been stemmed, far from it.

Total and core inflation during two episodes



Source: Thomson Datastream.

In the months that followed, the Fed's message remained confusing. Having opted for neutrality in August, it cut its rates at the beginning of October following the turmoil caused by the failure of Lehman Brothers. However, it restored its downward bias only at the end of October. Finally, in mid-December, it made a statement concerning the orientation of its monetary policy going beyond the next few weeks. By indicating that the Fed funds rate would remain low "for some time",**** it again made use of the lever of market expectations, but only after much hesitation.

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* V. Reinhart, "The Governance, Communication, and Conduct of the Federal Reserve's Monetary Policy", remarks at the Second US Monetary Policy Forum, New York, 29 February 2008.

** Frederic S. Mishkin, "Housing and the Monetary Transmission Mechanism", Jackson Hole Symposium, Federal Reserve Bank of Kansas City, 2007.

*** Chairman Ben S. Bernanke, "Outstanding Issues in the Analysis of Inflation", Federal Reserve Bank of Boston's 53rd Annual Economic Conference, Chatham, Massachusetts, 9 June 2008.

**** From its March 2009 meeting on, the FOMC will go one step further, replacing this expression by "for an extended period".

3. The frontiers and architecture of the globalised system

Making financial globalisation work calls not only for more public action but also for more internationally coordinated public action. Globalisation has created a financial space in which capital and risks can circulate freely. Its promoters nevertheless tried to avert their gaze from the consequences of the interdependence established in this way. As the locus for contagion and contamination, the globalised financial space should be subjected to prudential regulations and norms that are homogeneous and internationally approved and controlled. The subprime crisis has now dramatically illustrated the dangers related to the development of a 'low-prudence' zone at the very heart of this space. The fact that nothing has hampered its development has shown that the increase in the number of forums, sometimes at the highest level, where financial stability is routinely discussed should not conceal the reality, namely that there is no authority effectively responsible for the stability of the globalised financial system.

This vacuum is flagrant when it comes to setting the limits of the system. The concern for homogeneity of regulations should lead to the exclusion of financial operators or products coming from zones not complying with – or not subjected to – the common norms. Remember that the Asian crisis stemmed from the incorporation in the globalised system of

banks – those of developing Asian countries – that were subject to extremely lax prudential regulation. After serving as bridgeheads for a massive flow of short-term capital, these banks were caught up in a monetary and financial whirlwind. Their collapse triggered a hurricane that – as the LTCM affair showed – almost pushed the system to the brink. Setting the limits of the globalised financial system with the aim of preserving its stability has to be the responsibility of an international authority able to impose a common set of rules and norms on those operating in the system and on the products circulating in it. It also must be able to monitor their effective application. This authority will, in particular, have to assess the extent to which the practices of the various offshore centres are in conformity with the general level of prudence required.

It should also verify the solidity of the system's infrastructures, both public and private. The 2008 crisis, for example, has shown that the existence of OTC markets is a source of fragility. The counterparty risk on these markets is much greater than on organised exchanges. The turmoil seen in the autumn of 2008 has confirmed the reality of the dangers resulting from the absence of a clearing institution, for the CDS market in particular. The major role played on this market by the AIG insurance company explains in large part the 'crash' support – amounting to some hundred billion dollars – that the American government was obliged to provide. Given AIG's role as counterparty in a huge number of contracts, its failure would otherwise have placed its co-contractors in serious difficulty. The vulnerability resulting from the mode of organisation of the CDS market had been widely denounced, but as the responsibility for this pillar of the system continued to lie only with private interests, these warnings went unheeded.

The stability of the globalised financial space is not simply a matter of adequate prudence and solidity. It depends also on the architecture of the system. In this space, loans, and with them savings, can circulate freely. However, the very special mechanics of bank credit mean that this circulation obeys a logic that may seem surprising. What to a large extent decides the allocation of world savings is the location and capacity of the loan distribution channels, that is of the 'pipework' to enable funding to flow within the globalised system. If a region has numerous distribution channels and a large throughput, it will easily capture a large proportion of world savings and the distribution of credit in that region may easily become excessive, with the loans granted financing agents whose creditworthiness soon becomes dubious. In order to avoid in future a wastage of savings similar to that seen at the end of the 2000s, the

architecture of the globalised financial system must be changed to achieve a more even distribution of the channels through which loans are made.

Unfortunately, to achieve this it is not sufficient merely to open more lending windows. It is also necessary to put in place the risk-taking chains that will make it possible to distribute lending in ways that respect the prudential norms that have been set. If too much risk is left to the borrower – through a loan at a variable rate, for a short term, in a currency other than his own – few loans will be granted, unless borrowers – and lenders! – ignore the need for prudence. If, on the other hand, little risk is left to the borrower – borrowing in his own currency, for a long period, at a fixed rate – the flow through the channel can be greater. But for this in fact to be the case, it will nevertheless be necessary, as long as a substantial portion of world savings continues to be placed 'risk-free', that there should be risk-takers prepared to take on the risks that are taken by neither the borrowers nor the savers. Putting in place channels for the distribution of loans hence also implies putting in place the necessary risk-taking chains. It would be a mistake to draw the conclusion from the 2008 crisis that the infrastructure of globalised finance has to be demolished. On the contrary, it must be consolidated and supplemented. Alongside better-supervised private risk-takers, it may be indispensable to put in place specialised public risk-takers to take, when deemed necessary, the risks that private agents have every reason not to be able to assess correctly and hence, again unless they act imprudently, not to take.

This is true in particular of the risks related to transfers of savings towards the emerging regions. We saw earlier that these transfers carry an exchange risk. Private agents in the rest of the world rarely wish to lend in the currencies of the deficit emerging countries, so that when these transfers take place they do so in the lenders' currencies. This carries an obvious danger, namely that the mere threat of devaluation rapidly leads to a currency and financial crisis. Following the Latin American and Asian countries, in 2008 it was the turn of emerging Europe to undergo this painful experience. Introducing new lending channels allowing emerging countries to borrow from the rest of the world without taking a currency risk is, as Wolf [2008] recently pointed out, a pre-condition for savings to safely flow there. This could be achieved in many ways, since an outside risk-taker can easily diversify its currency risk across emerging countries and benefit from the fact that on average their currencies should be on an appreciating trend. Hence the proposal of having the World Bank initiate a bond market in a basket of emerging currencies [Eichengreen & Hausmann, 2003] or of creating an international agency to take on the

exchange risk of given amounts of interbank lending to the various emerging regions [Brender & Pisani, 2001]. Such initiatives could help emerging economies to tap the pool of available world savings without taking excessive risks as they repeatedly did in the past.

Similarly, the introduction in the emerging countries, whether in deficit or in surplus, of new mechanisms for financing house purchase and of loans to small firms or local authorities can permit a better allocation of world savings. Frequently, the distribution of these loans is held back by the multitude of legal, political and economic uncertainties specific to these countries, making the creditworthiness of the borrowers impossible to assess. The introduction of public credit-risk-takers, along the lines of what took place in the United States several decades ago in the case of mortgage loans, could encourage the granting and securitisation of such credits. The emerging countries could in this way, too, capture a larger proportion of the world savings potential. These channels would make it possible, in particular, to recycle part of the savings of the countries now in surplus within their own economies.

The intervention of public risk-takers in the distribution of lending is not only useful for the development of new financing channels. It can also provide additional instruments for the authorities to regulate the flows through the various channels, out of concern for macroeconomic equilibrium. For example, the above-mentioned mechanism that would transfer to an international authority part of the exchange risks involved in the import of savings by deficit emerging countries could set the amount of protection sold on the currencies of each country as a function of the prospects for its economy, but also of the expected equilibrium between saving and investment at world level. The public risk-taker would thus introduce information into the globalised financial system that is not effectively gathered by any market.

4. Macroeconomic surveillance

Whatever the efforts made to improve the regulation and architecture of the system, its capacity to ensure transfers of savings between nations will remain limited, as will the amount of savings that the borrowing countries can invest usefully and prudently. The savings-exporting countries can no longer ignore these constraints. They have to accept the need, as and when necessary, to attenuate the pressure exerted by their surpluses on world macroeconomic equilibrium.

While savings are virtuous at the microeconomic level, their macroeconomic role is more ambiguous. In an economy where investment opportunities are numerous, savings are the fuel for sustained growth but they act as a brake when these opportunities run out. With financial globalisation, this ambiguity is now expressed at the level of the world economy and no longer that of each economy taken in isolation. It still exists, nevertheless. Behind each of the international financial crises in recent decades there lies a rise in the financing capacities of certain regions that would have been impossible in the absence of imprudence on the part of the global financial system and of those to whom it lent. To illustrate the point, in the mid-2000s the surpluses of the oil-exporters, and indeed of China or Germany, could not have been as large if the borrowing by American, British or Spanish households had not surpassed reasonable levels. Similarly, in the mid-1990s the European countries would not have been able simultaneously to reduce their budget deficits (to meet the criteria for joining the EMU) if the savings freed in this way had not been absorbed by the Asian countries. If financial globalisation enables countries to save a portion of their income by lending it to the rest of the world, it would be logical that these countries, in return, take into account the limits of the rest of the world's capacity to use their surplus savings.

Financial globalisation and stability cannot be made compatible if the surplus countries refuse to adjust their policies when these limits are approached. The fact that it was not until the autumn of 2008, when the financial crisis led to a collapse in world demand, that China and Germany decided to bolster their domestic demand shows how great is the distance still to be covered. The price of oil, inasmuch as it plays a decisive role in the formation of world savings, poses a problem of the same kind, even though strictly speaking it does not form part of the policy of any government. Its steady rise from the summer of 2008 on could only lead to a suffocation of world growth. With the oil price rising from $100 a barrel to $150, growth could only be maintained at the price of an increase in borrowing amounting to several hundred billion dollars in the developed countries. At a time when the distribution of lending was drying up, such an increase was impossible. Cooperation between oil-producers and oil-consumers to avoid excessively rapid rises in the price of oil is all the more necessary in that the market for oil may again be tense in the coming years.

The crisis affecting globalised finance therefore teaches at the macroeconomic level the same lessons as at the microeconomic level: accepted surveillance is necessary for the maintenance of financial stability. By easing the constraints imposed by the current-account balance,

globalisation gives all the world's economies additional margins for growth. But they will not be able to benefit from it unless the largest of them, at least, are prepared to cooperate. It is up to them to adjust their economic policies to prevent the shocks and attenuate the pressures that otherwise will regularly come to plague the globalised financial system.

CONCLUSION

The crisis that pushed the world economy to the brink of a depression forced governments to become aware of the interdependence that financial globalisation has created between their economies. Will they now be prepared to take on the responsibilities this implies? Will they be capable of organising themselves in such a way as to be able to do so? The future of financial globalisation is now their affair. But there should be no ambiguity on the strategy they have to follow. It would be vain to hope that finance and financiers can be transformed in such a way as to be at the service of growth and financial stability – just as it would be vain to think that capitalism can be transformed in order to place it at the service of social progress. For almost two centuries, capitalism has been able to act as a driving force for social progress because governments organised themselves in such a way as to oblige it to take this direction. By setting up, each in its own way, institutions to regulate capitalism and passing laws to provide a framework for it, by carrying out policies to fine-tune the pace of activity, governments have, to some extent at least, succeeded in taming the force it represents. The same necessarily applies to finance, which is at the very core of capitalism.

The deregulation launched during the 1970s, followed by the liberalisation of international capital movements, has opened up the field for financial innovations that have profoundly transformed the ways in which capital and risk circulate. These innovations provide all countries with margins for further growth, but on the condition that governments pay attention to attenuating the excesses of finance and to channelling its development. The series of crises that have occurred highlight the delays in the attempts at supervision and containment, as well as the inadequacy of the cooperative efforts undertaken. Placing financial globalisation at the service of economic development requires not so much a reform of finance or capitalism as a redefinition of the role of government in the functioning of finance – and of capitalism.

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