MONEY, FINANCE AND THE REAL ECONOMY

WHAT WENT WRONG?

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TABLE OF CONTENTS

Foreword i

Introduction 1

1. The monetary constraint 5
   1.1 The mechanics of the monetary constraint 6
   1.2 A relaxation of the monetary constraint 9
   1.3 From one rule to another 14
2. Monetary impulses and the response of the economy 25
   2.1 The transmission of movements in policy rates 26
   2.2 The incidence of interest rates on corporate spending 30
   2.3 The incidence of interest rates on household spending 38
3. Information and the supply of lending 47
   3.1 The inter-temporal dimension of macroeconomic regulation 48
   3.2 The information tools of the savings-collectors 55
   3.3 The role of the bond market 59
   3.4 The analysis of debtors' solvency 63
4. Finance and the circulation of risks 69
   4.1 The role of the 'traditional' markets 70
   4.2 The role of securitisation 76
   4.3 A new form of financial intermediation 82
5. The monetary constraint, financial globalisation and world growth 93
   5.1 Monetary policies and financial globalisation 94
   5.2 Potentially exploitable saving reserves 99
   5.3 Constructing new financing channels 105

Conclusion 115

References 117

List of Boxes

Box 1. 'Money base' or central bank money 18
Box 2. Taylor and related rules 22
Box 3. The structures of financial systems in the eurozone and in the United States 27
Box 4. Estimation of an investment equation for France, Germany and the US 32
Box 5. Households' financial investment, borrowing and financial saving 39
Box 6. State of information, attitude to risk and growth 53
Box 7. The new intermediation and the circulation of monetary resources 87
Box 8. The securities-lending market 91
Box 9. Financial wealth and development 102
Box 10. The growth frontier 111

List of Figures

Figure 1. Compulsory reserves and banknotes in the United States and in the eurozone, 1999-2014 20
Figure 2. Fed funds rate and the Taylor and related rules in the United States 24
Figure 3. Financial assets and liabilities of domestic agents in the eurozone and in the United States in 2013 28
Figure 4. Investment in equipment and activity, 1980-2014 32
Figure 5. Borrowing ratio, financial investment ratio and variations in the spending propensity of non-financial firms, 1993-2006 34
Figure 6. Financial investment ratios, borrowing ratios and financial saving ratios of non-financial firms in the US and France, 1991-2013 35
Figure 7. Trade credit and variations in inventories in the United States, 1955-2013 36
Figure 8. Variations in non-financial firms' borrowing flows and acceleration in activity 37
Figure 9. Non-financial firms' borrowing flows and activity in the United States 37
Figure 10. Financial investment flows, borrowing flows and financial saving ratios for 8 developed countries 40
Figure 11. Variations in American households' financial investment ratios, borrowing ratios and financial saving ratios, 1954-2006 41
Figure 12. Credit cost and household borrowing behaviour in the eurozone, 1995-2005 43

Figure 13. Monetary impulse, household borrowing and variations in the spending propensities of American non-financial agents 44
Figure 14. Household borrowing and real-estate prices in the United States, 1966-2013 45
Figure 15. Non-financial firms and household borrowing, 1981-2014 46
Figure 16. Inflows of financial investment into the financial system from households and non-financial firms, 2000-14 49
Figure 17. Level of activity as a function of inflation-tolerance and the volatility of saving behaviour 55
Figure 18. Long rates, nominal evolutions and expectations of short rates in the United States 62
Figure 19. The growing importance of the traditional markets 71
Figure 20. Share issues and share buybacks, 1999-2013 73
Figure 21. The economic situation and analysts' forecasting errors 74
Figure 22. The cyclical dynamics of the risk premium in the American markets 75
Figure 23. Securitisation and the retention of risk 78
Figure 24. The sizes of the 'traditional' ABS and CDO markets in the United States and Europe, 1995-2013 79
Figure 25. The global securitisation market 81
Figure 26. Household debt in the 'spendthrift' countries, current-account balances and growth in the 'thrifty' countries 96
Figure 27. Net purchases of bonds in the United States, 2004-14 99
Figure 28. Saving ratios of the major regions, 1980-2014 100
Figure 29. Emerging countries' shares of the world economy and world saving, 1980-2014 100
Figure 30. Household financial wealth and level of development 102
Figure 31. Growth, the saving ratio and household wealth 105
Figure 32. Revisions to the IMF forecasts of saving propensities and current-account balances, 2000-16 106
Figure 33. Revisions to the IMF's current-account and growth forecasts for the emerging regions, 2000-19 108
Figure 34. China's growth in relation to the frontier 109
Figure 35. The GDP per head growth frontier, 1980-2009 112

FOREWORD

This is a very timely, but also a timeless book.

It is timely because the subject matter goes to the heart of the problem facing policy-makers in advanced countries today as they struggle to revive growth with unconventional monetary policy measures while fiscal policy is still a constraint in many places as a result of very high debt levels.

The book is also timeless because of the way in which it portrays the interaction of money and finance with the real economy and how international capital flows always bring with them chains of risk-taking, which are often not recognised until the risk actually materialises. The global financial crisis of 2007-08 erupted when the risk of lending to subprime American households materialised. And the euro crisis erupted when the risks of lending to the Greek government and to Spanish and Irish home-builders materialised.

At present, the policy discussions in the euro area are focused on two very different issues: the very specific issue of how to deal with the case of Greece, whose newly elected government at first threatened to default on its debt towards its euro-area partners. The second issue is the very general one raised by the intersection between monetary and fiscal policy when the European Central Bank buys large amounts of government debt.

The book provides useful insights on both issues.

The very specific issue of Greece shows how risks are being distributed after a financial crisis and what happens when the risk chain from the ultimate saver (typically a German household, as illustrated in the book) to the ultimate borrower (the Greek government) breaks down. The very general issues raised by the ECB's Expanded Asset Purchase Programme (usually called in economic jargon 'quantitative easing' or QE for short) are analysed in this book in its examination of what the authors call the 'monetary constraint'.

The book describes the mechanisms by which this 'monetary constraint' might keep the economy below its potential, thus providing support for unconventional policies of the ECB. The authors suggest at the end that, in extremis, the need might arise for the ECB to put money directly into the pockets of households. It remains to be seen whether such a dramatic step will be needed and whether the policy of 'alleviating the monetary constraint' will work.

Daniel Gros
Director of CEPS
Brussels, March 2015

INTRODUCTION

For several decades now, the lapses of the financial system have been clear for everyone to see and its excesses regularly denounced [Aglietta & Rebérioux, 2004]. And yet neither the frequency of the crises nor the scale of the wrongdoings has really diminished. This being so, why should it come as a surprise if many people see in the present bloated financial system the signs of worrying degeneration? The problem is that even an unhealthy organ has functions to fulfil and the functions of the financial system are often badly understood both by those who justly criticise its excesses and by those who try more or less astutely to contain them. For this, it is largely free-market ideology that is responsible, having spread the belief that by leaving finance and the markets to their own devices our economies would have at their disposal the mechanism best capable of allocating their savings. And yet the dangerous nature of what circulates in the financial system, namely money and risks, is unmistakable. In order to control its corrosive – even explosive – effects, there is a need for prudential rules combined with constant surveillance. The latest financial crisis sparked off the beginnings of awareness on this point, but it is far from having led to an improved understanding of the role of the financial institutions. For many people, finance remains more in the nature of an enemy to be resisted than an instrument to be intelligently exploited. It nevertheless plays a role in the functioning of the economy that it would be dangerous to neglect. The allocation of savings, the level of activity and the rate of growth all depend on it, both for individual economies in isolation and for the world economy as a whole.

There is sometimes a tendency to forget that our economies are *monetary*. Given that our purchases have to be paid for in money, the quantity of money in circulation, by restricting the value of possible transactions, also restricts the level of production. The transition from a metallic currency to scriptural currency has signified considerable progress from this point of view. The monetary constraint obviously continues to

operate, but the quantity of money available for the carrying out of transactions can be permanently adjusted in order to enable output to attain its full-employment level. With bank lending now the source of money issue, all that is needed is for the banks to grant the necessary volume of loans. The need for a public authority with the task of regulating the activity of these institutions is immediately apparent. Left to themselves, banks have no means of knowing what volume of lending is needed or any reason why they should not exceed this volume. The role of a central bank is precisely to use its power to set interest rates in such a way as to ensure that the volume of lending that will be granted is limited to what is necessary for full employment of capacity (chapter 1).

Because they affect the remuneration of all the financial investments and loans offered by the financial system, movements in the central bank's policy rates influence the real economy. Their impact, however, is far from matching the one that is often described. Contrary to a widely-held view, the response of firms is fairly weak, with a cut in interest rates not prompting them to increase either their borrowing or their investment. An upturn in activity will however lead them to do so, borrowing both to install new productive capacity and to purchase other firms. The resulting financial effervescence will only come to an end when activity starts to slow down. Households' demand for credit, by contrast, is sensitive to changes in interest rates and it is essentially the pace of their borrowing that influences growth in activity. This mode of transmission of monetary policy, common to many developed countries, is not without its consequences. To a large extent, households borrow in order to buy houses *that already exist*. To have an impact on production, this borrowing and these purchases have to multiply in number, at the risk of triggering a boom in house prices. The formation of such 'bubbles' is then an almost 'normal' consequence of the conduct of monetary policy (chapter 2).

The financial system does not merely passively transmit changes in policy rates and respond in a mechanical fashion to the demand for credit from those who are sensitive to these rates. Granting a credit means taking risks and the task of the financial institutions consists of assessing these risks. In so doing, the banks cannot be said to *produce* anything, unless it be the information that will help them to decide on the supply of credit. This mobilisation of information plays a decisive role in maintaining macroeconomic equilibrium *over time*. When a bank undertakes to finance the construction of a factory or a building, it is counting on the availability in the future of the saving needed for the completion of the project. Moreover, given that a substantial portion of household borrowing – and of

corporate borrowing – is long-term, those who grant the loans try not only to make sure they have a good chance of being repaid, but also that they will indeed have the resources needed to fund those loans in the meantime. Savers who invest their money with financial institutions rarely take the risk of committing their funds for as long a period. Without this day-to-day activity of information-gathering and decision-making on the part of financial institutions, the central bank would find it difficult, using only movements in its policy rates, to maintain macroeconomic equilibrium in a growing economy (chapter 3).

Nor is the financial system's activity limited simply to the distribution of loans. Once these loans are in place, it also enables the associated risks to circulate. This possibility reduces the obstacle posed by aversion to risk to the supply of finance and it enables the different types of risk to be directed towards those who are prepared to bear them, at least for a time. The equity and bond markets have long been places where such circulation of risk occurs, while securitisation and the creation of derivatives markets have enlarged the scope of this circulation still further. As a result, the risk-taking capacity of the financial system has been increased. A substantial portion of the risks associated with the accumulation of savings can now be removed from the balance sheets of the traditional financial institutions and be borne by the risk-takers in the shadow banking system. Unlike the banks, however, the latter cannot issue money. In order to take risks, its participants are obliged to borrow and as a result are also a fresh source of vulnerability for the financial system. If at some time in the future the loans they receive dry up, the system's stability will be threatened. In the absence of a public authority capable of acting as a substitute for these risk-takers, this stability will then become very difficult to re-establish, as was seen in 2008 (chapter 4).

Decade by decade, financing 'channels' have taken shape within each economy, running from those who make the loans to those providing the finance, via those who take on the risks. The nature of these channels, their practices and their capacity differ from country to country. While still primitive in many economies, notably in the emerging regions, these channels, especially those directed to the financing of households, have powerful throughput in certain developed economies. Starting in the early 2000s, the opening up of trade and finance made it possible, for a time at least, to ease the monetary constraint holding back growth in several of the countries that were 'large savers': mortgages granted in the United States or Spain fuelled the formation of deposits in China or Germany. This unbridled monetary globalisation, by relying on financing channels – and borrowers – located in a handful of countries, led to an enormous wastage of savings. The

lessons to be learned from this episode are clear. The economies that today tend to generate more saving than they can absorb are threatening the world economy with 'secular stagnation' [Summers, 2014]. To counter this threat, it will be necessary to construct new financing channels that can take some of the burden off those that have been overstrained and make it possible for the available savings to flow into fields of investment that have been underfunded. It is up to governments to lay the foundations for these channels (chapter 5).

1. THE MONETARY CONSTRAINT

In a modern economy, there is an intimate link between money and activity. For a long time, however, this link seems to have been ignored in economic analysis. The so-called 'dichotomous' approach, still sometimes applied, separates the determination of the system of relative prices associated with full employment of resources from that of the general price level considered as being a function of the quantity of money available. This separation of the real from the monetary makes money merely a 'veil' behind which 'products are exchanged for products'. To this extent, money has no influence on the real economy, only on the general price level. This approach nevertheless overlooks an essential aspect of the functioning of a real economy, namely the fact that for the past several centuries money has been an inescapable intermediary in the functioning of trade, being held not only for its own sake but also because transactions have to be settled in money. As a result, the quantity of money in circulation may be insufficient for the settlement of the totality of transactions implied by the full employment of resources. For money to be indeed only a veil, the general price level has to be flexible and capable of adjusting to the quantity of money available. If this is not the case, there will be a constraint on the level of activity. This constraint will be all the greater given that many prices, especially of labour, show downside rigidities. By preventing the level of all prices from adjusting to the quantity of money that is actually available, these rigidities, even if only temporary, will maintain the level of activity below that of full employment.

Recourse to 'scriptural money' (issued by the banks), by first easing and then breaking the link between the quantity of money available and a mass of metal taken out of the ground, marked an essential stage in economic development. Even so, it did not remove the monetary constraint. It merely meant that transactions, whatever their nature, involved transfers from one bank account to another rather than the passing of coins from hand to hand. The major difference, of course, is that the quantity of money available now

depends on the *volume of bank lending* and has thus become adjustable. This major shift has been accompanied by the emergence of a new risk, namely that excessive creation of money leads to a general rise in prices. In recent decades, monetary authorities seem to have gradually learned to master this risk.

1.1 The mechanics of the monetary constraint

For the purposes of argument, let us start by taking an imaginary economy, say an isolated village where the only money is gold – extracted from a now exhausted mine – which circulates in the form of coins of different weights. The prices of all goods and services produced and exchanged are measured in weights of gold. Following a period of trial and error, equilibrium has been reached for the prices at which services or products are exchanged for those of others. Since then, prices have remained unchanged, full employment reigns and, month by month, output and trade are identically repeated. The transactions concern only goods and services. Each month, each villager spends his entire income and no financial transaction takes place. The quantity of gold in circulation, M, makes it possible to perform the totality of transactions, with a value of T (expressed in gold), as the result of which the villagers derive, each month, income with a total value of Y (expressed in gold). Despite its simplicity, this economy is indeed a monetary economy: barter does not exist and, for a transaction to take place, the buyer must have the quantity of gold needed to settle it. Month after month, each villager spends all the money just received but at any given time the gold in circulation is nevertheless to be found in the pocket of someone who has recently received it in payment and has not yet used it in settlement of a transaction.

Let us now suppose that one dark winter's night a marauding band of brigands empties the pockets of all the villagers. What happens the next morning? If the economy continues, despite the upheaval created by the looting, to function as a monetary economy, no transaction can take place, for lack of money. Those people who have in stock the materials they need will be able to continue their usual production for a few days, but the products will be impossible to sell, so that *market* production in the economy comes to a halt. Without money, a monetary economy cannot function.

Taking as a starting point this obvious fact, let us now define a magnitude that plays a central role, namely the velocity of circulation of money. Let us suppose that certain villagers who set off in pursuit of the bandits discovered sacks of gold that the latter had abandoned in their haste

to get away. These stolen coins they decided to give back to their closest neighbours. Let the amount involved be m. Transactions can now be resumed – let us assume at the usual prices prevailing before the raid. The privileged few who have just recovered all their coins proceed to make their usual purchases. In turn, their suppliers now have money and are able to carry out at least part of their usual transactions, and so on. As the days pass, the retrieved coins circulate in this manner. By the end of the month, this circulation will have made it possible to carry out transactions with a value of t, still measured in terms of gold weight. The ratio t/m gives the velocity of circulation of money v in this economy: in a given month the mass of gold m permits the carrying out of transactions for an amount totalling vm. This velocity indicates how many times each gram of gold changes hands on average each month. It has been defined here in quasi-experimental fashion, in order to show that it is a purely 'technical' magnitude.[1] In practice, it depends on the geography of the village, the ease of movement within it, the frequency of transactions, the structure of the transactions network, etc.

As this velocity is given, the transactions that can take place thanks to the retrieved sacks do not allow the village to reach its full-employment activity level. For all the transactions associated with full employment to be carried through with a quantity of money smaller than M, the prices at which they are carried out must be adjusted downwards. Let p be the price index of the transactions. While before the raid this index was equal to unity, it will now have to fall so that m is such as to permit the carrying out of the totality of the habitual transactions. This means that $p = m/M$. If prices do adjust downwards and if in addition the villagers have the good sense to distribute the retrieved coins to all the inhabitants *pro rata* to their individual losses, they will then return to a situation in which all their cash balances have a purchasing power identical to what they had before the raid and the village's activity will resume its normal course despite the disappearance of part of the stock of gold. If, however, prices do not all fall in the required proportion, the insufficiency of cash balances will keep activity below its full-employment level.

Pillage is not the only factor capable of generating such a situation, however. Let us now restore all the villagers' coins and proceed to examine a new scenario. Let us suppose that a technical advance makes possible a uniform across-the-board increase in output at a rate $\dot{y}$ and that all the

[1] In reality, since not all our villagers carry out the same transactions, this scenario would have to be repeated a large number of times, taking an average of the observed velocities in order to obtain the desired result.

villagers are prepared to respond to this increase in income by increasing, at this same rate, the entirety of their purchases of goods and services: the equilibrium of trade in this now expanding economy can be maintained without any need for a change in the *relative* price of any of the goods and services. But what if the *level* of all prices remains unchanged? Once again, the monetary constraint will come into play. It is assumed that the technical advance has not modified the velocity of the circulation of money. The quantity of gold available M makes it possible to carry out transactions that cannot in any one month exceed Mv: the income Y associated with these transactions can then not exceed the previous income. For our villagers to derive full benefit from the progress made, the quantity of gold at their disposal will also have to increase at the same rate. If this is not the case, growth in activity will be curbed by the quantity of money available. This can only be avoided by a general fall in the price level at the rate of $\dot{y}$.

Let us consider one final scenario: the villagers have retrieved all their gold coins and activity in the village again repeats itself in identical fashion month after month. They now suddenly decide, for reasons of prudence, to set aside each month a few coins amounting to a proportion s of their income. In gold terms, everyone's expenditure and income is reduced in this same proportion. In real terms, the full-employment equilibrium of this economy is in no way modified, with each villager remaining capable of producing the same thing and ready to purchase from others the same thing as before, the sole difference being that he decides to devote slightly less gold for the purpose. Each month coins amounting to a total of sY are hoarded and withdrawn from circulation. The monetary constraint is then liable to re-surface. If, month after month, the level of prices as a whole falls continuously in such a way that the purchasing power of the money *in circulation* is maintained, all the transactions associated with full-employment equilibrium prevailing up to that point can be maintained. However, in the absence of a continuous decline in the general price level, with the quantity of money in circulation declining month after month, the level of activity will be obliged to fall: each month, for lack of settlement possibilities, part of the transactions that had taken place in the previous month will no longer be possible and the economy will increasingly diverge from full employment. For this not to be true, there will have to be a miracle which each month puts coins into the pockets of those no longer receiving them exactly compensating for the coins that the villagers are now hoarding.

The lessons to be learned from these 'experiments' are simple and, at first sight, robust. Barely 15 years ago, they were still guiding monetary policy in a certain number of major economies. If prices are downwardly

rigid, *the quantity of money issued must increase in line with the growth in transactions but also, as necessary, in order to compensate for the fact that part of the money available has been frozen in a store of value and is no longer in circulation*. In the absence of this increase in the money supply, full employment in the economy and *a fortiori* its expansion will be held back. This constraint was especially operative when the money in use was metallic in nature. The mercantilist policies implemented following the discovery of gold in the New World were based on this intuitive reasoning. Trade surpluses – and piracy – were the best means for countries without access to these mines of obtaining the gold needed for their economic development. The same intuitive reasoning explains why, at an even earlier period, Islam forbade the hoarding of the precious metals whose circulation was vital for trade, at the time the Arab tribes' principal resource.

1.2 A relaxation of the monetary constraint

For a long time now, the money circulating in our economies has no longer been metallic but 'scriptural', consisting of book entries, mainly the deposits that everyone holds in a bank and uses for the settlement of transactions. The fact that these book entries have replaced metal makes no difference to the operation of the monetary constraint: no more today than yesterday is it possible for a transaction to take place if the buyer does not have at his disposal the funds needed for its settlement. Moreover, the role of this constraint in determining the level of activity has not diminished. All that has changed is that it is no longer the abundance or scarcity of the metal that decides the value of the transactions that can be carried out but rather *the amount of lending extended by the banks*. This also decides the amount of available deposits. However, the change does open up a possibility that had not previously existed, namely that of adjusting the pace of creation of money to the needs of the economy.

Let us now imagine that one fine day our villagers decide that from now on it is a bank that will hold their accounts. Each of them hands over his coins to the bank and his account is credited with an equivalent entry of 'gold euros'. From now on a gram of gold will have the value of a gold euro and all prices will be measured at this rate of equivalence. For the sake of simplicity, it is assumed that the velocity of circulation of this book money remains unchanged (transactions are carried out as previously, but there is now a system allowing the seller's current account to be credited – and the buyer's account debited – at the time when previously coins changed hands). Transactions can then continue to be repeated identically without anything

else changing. This replacement of a metallic currency by a credit-based currency nevertheless introduces a new degree of flexibility in the determination of the level of activity. If required, the restraining impact on activity due to the downward rigidity of prices can now be compensated by a distribution of credit that will inject an additional quantity of money into circulation. This will be possible if, once the initial conversion has been carried out, the bank decides *not to link, in one way or another, the amount of lending it makes with the amount of its gold reserves*. This uncoupling has an important consequence, in that, to prevent the rate of distribution of credit from becoming excessive, the villagers will now have to be wise enough to create an authority having a constraining power over the commercial bank.

Let us return to the cases postulated earlier in which the village's economic expansion was hampered by the lack of metal or by the hoarding of gold. By making loans, the bank will have no difficulty, provided that the villagers are prepared to borrow, in increasing the amount of the available deposits. When it makes a loan, it credits the beneficiary's account in its books. The latter then has available a deposit that can be used to settle transactions. Cash balances can now increase at the pace of potential output. All that is necessary for this is that the bank should lend each villager the cash needed for his expenditure to increase at this same pace. Similarly, if part of the existing deposits are no longer used for the settlement of transactions but set aside in 'scriptural' nest-eggs (savings accounts), the bank, by granting additional credit, will be able to create additional current-account deposits that will make it possible to carry through expenditure that otherwise would not have been possible. Its balance sheet then looks as follows:

The bank's balance sheet

Assets	Liabilities
Gold	Current-account deposits
Loans	Savings accounts

If the potential output of our economy grows at a rate of $\dot{y}$ and if the villagers in each period place in savings accounts the proportion s of their income that they wish to set aside, the bank, if it wishes to ensure full employment (without a decline in the general level of prices) will have to grant loans in each period in such an amount that the totality of deposits on

current account – the *money supply* – is sufficient to settle the transactions associated with full employment. The amount of these loans will have to be equal to $\dot{y}M_{t-1} + s\bar{Y}_t$ where M_{t-1} is the money supply available at the end of the preceding period and $\bar{Y}_t$ is the full-employment income for the period itself (as shown below). The quantity of money has now become 'elastic' [Schlichter, 2011], capable of accommodating the growth in the need for transaction balances.

This flexibility nevertheless raises a question that has so far not been addressed. What happens if our village bank grants loans in an amount greater than just defined? Our villagers' expenditure is then able to exceed what the economy is capable of producing at unchanged prices, there will be upward pressure on the prices at which transactions take place and the price index p defined above will rise. If they do not wish to see the emergence of inflation, our villagers will therefore have to oblige their bank to observe a simple rule, namely that the money supply – now defined as the total outstanding amount of current-account deposits – *must not increase more rapidly than the volume of transactions associated with full employment (possibly increased by an accepted upward drift in prices)*.

Change in the bank's balance sheet from one period to another

Change in assets	Change in liabilities
Loans $(\dot{y}M_{t-1} + sY_t)$	Current-account deposits $(\dot{y}M_{t-1})$ Savings accounts (sY_t)

This rule is clearly 'monetarist'. Its microeconomic foundations are nevertheless those of Keynesian analysis [Clower, 1967]. What distinguishes the two approaches is the choice of variable on which attention is focused. For Keynes, what is crucial is not the evolution of the quantity of money but that of *effective* demand. Allocation to savings – in other words, the non-expenditure of part of the income received – by reducing the quantity of money in circulation, depresses effective demand and hence activity. Inasmuch as borrowing makes it possible to settle an item of expenditure before the necessary income has been received, expenditure financed by a loan is necessary in order to compensate for this depressive force. This expenditure, then described as 'autonomous', by injecting means of payment

into circulation, eases the constraint that would otherwise have curbed effective demand.

Let us return to the situation just described in which our villagers decide not to expend a proportion s of their income (placing it instead on their savings accounts) and in which technical progress enables the village's output to grow at a rate of $\dot{y}$. Let us now suppose that no one borrows from the bank. Activity, instead of growing at a rate of $\dot{y}$, will in fact contract. As the days pass, part of the current-account deposits will move into savings accounts and the quantity of money available for transactions will be reduced. Everything will then proceed as described earlier in the case when the gold coins were regularly being withdrawn from circulation: the level of activity will be depressed and growth held back. The difference lies in the fact that with gold as currency the only thing that could extricate the economy from this unfavourable situation was a fall in prices; with a credit-based currency, this can be achieved through additional 'autonomous' expenditure.

For the economy to be able to grow at a rate of $\dot{y}$ at a time when the villagers are in each period placing a sum of sY_t in savings accounts, other villagers – perhaps the village taken collectively – must, period after period, borrow from the bank *for the purpose of expenditure* the sum of $\dot{y}M_{t-1} + sY_t$. Let σ be the proportion of income that villagers are not going to spend[2] and $\bar{Y}_t$ be the village's full-employment output for the period. The economy will be in a state of full employment if the 'autonomous' expenditure I_t financed by bank lending is such that $I_t = \sigma\bar{Y}_t$. This relationship is precisely the one that traditionally defines the Keynesian 'multiplier'.

To understand this, let us suppose that our villagers are now able to invest by purchasing capital goods. Let us further suppose that all their investments – and only these investments – are financed on credit obtained from the banks. The above equality states that in order to keep the economy in a state of full employment, investment expenditure must be equal to the amount of saving that the villagers will make at full employment. If investment expenditure is less than this amount, full employment cannot be attained. Because of the decline in their income, the villagers will save less and saving will thereby adjust to the level of investment expenditure. If σ is assumed to be fixed, the operation of the monetary constraint establishes the following relationship between investment expenditure and the level of income: $Y_t = (1/\sigma)I_t$.

[2] We have $\sigma = (\dot{y}M_{t-1} + sY_t)/Y_t$.

However, in order to arrive at this traditional expression of the 'multiplier', a certain number of restrictive assumptions have been made. In particular, savings were identified with deposits (in one form or another) and capital investment with bank borrowing. In reality, the multiplier that derives from the monetary constraint should not be calculated on the basis of a propensity to save, but on a propensity to "accumulate claims on the banking system" [Denizet, 1969]. It is this accumulation – and not the saving *per se* – that depresses effective demand inasmuch as it 'freezes' the means of payment needed for the carrying out of the transactions associated with full employment. If the saver uses his savings to finance the construction of a building or the purchase of a machine, the same will not be true: the non-consumed portion of income used to 'self-finance' this investment will not be frozen in a savings account, but spent. Whether the spending is for consumption or for capital investment is irrelevant from the point of view of monetary circulation! Similarly, if our village now has at its disposal a more complex financial system, monetary circulation will not be interrupted if the unconsumed portion of the villagers' income, instead of being deposited with the bank, is used for the purchase of securities or placed with another type of financial intermediary (an insurance company, for example) or even directly lent to another villager. All that is necessary is that the seller of the security, the financial intermediary or the villager in question, not use the proceeds to accumulate claims on the banking system but spends them (or lends them to someone who will spend them). Like other transactions, however, these financial transactions do not take place instantaneously and involve a need for additional transaction balances… which will have to be met by additional bank lending.

The microeconomic foundations of the Keynesian and monetarist analyses may be identical, but the same cannot be said of their philosophical foundations. The exponents of monetarism usually have a liberal attitude to the functioning of the economy, believing that the expansion of transactions and of output is the result of the normal interplay of market forces, which can safely be left to themselves, provided only that care is taken to regulate the rate of growth of money supply. Observance over the medium term of the rule set out above will serve to anchor nominal evolutions: the value of transactions will not lastingly be able to grow faster than the cash balances available to settle them and this anchorage will protect the economy from the inflationary risk inherent in the use of 'elastic' money. Keynes does not share this optimistic vision of the functioning of the market economy. In his view, in certain circumstances, 'market failures' are possible. This will be the case if spending by private agents is insufficient to keep the economy at full

employment: to remedy this situation, an increase in the government's propensity to spend (through a widening of the budget deficit or a reduction in the surplus) will then be necessary. Many people in fact continue to label as 'Keynesian' only those policies aimed at 'boosting' activity through a positive 'fiscal stimulus' (i.e., a deliberate deterioration in the public balance). This is understandable. For Keynes [1937] monetary policy was not to be used for purposes of economic cyclical regulation. On closer inspection, however, monetary policies attempting to regulate the pace of activity in order that the economy should stick as closely as possible to the expansion of its potential are fully in keeping with Keynesian logic. By cutting interest rates, the central bank will attempt, when the level of effective demand threatens to fall below that of potential output, to discourage financial investment and to stimulate recourse to borrowing in order to trigger additional private spending. Conversely, if effective demand threatens to exceed the economy's productive capacity, it will try to curb the rise in this expenditure by raising its policy rates.

The move from a metallic to a scriptural currency does not alter the mechanics of the monetary constraint. However, by making bank credit the source of the money issue, it gives it a central role in the regulation of real activity. This move has another noteworthy consequence. Because gold is owed by nobody to anybody, the holding of gold finances nobody. The same cannot be said of deposits held in a bank, which finance the borrowing by which they have been created and of which they are the counterpart. Inasmuch as the expansion of activity requires a parallel expansion in the quantity of money available for transactions and normally generates a setting-aside of means of payment, the bank is a particularly powerful social invention. By anticipating this need for money, which normally tends to increase, it can supply financing. Whereas the need for gold was a hindrance to growth, the need for bank deposits can, on the contrary, be used to fuel it. This possibility of anticipating coming saving, however, gives the bank power that it can easily misuse. The intervention of a public authority given the task of regulating the issue of money is the only means of avoiding this.

1.3 From one rule to another

The monetarist rule – requiring money supply to rise in line with potential output – is attractive. By making explicit reference to the quantity of money available for transactions, it seems to make scriptural money the extension of metallic money. If a public authority applies this rule, the quantity of money can indeed grow but at a rate that still places a constraint on the

evolution of the *value* of transactions. The rise in the money supply will permit the full employment of an expanding potential output while at the same time preventing an excessive upward drift in the level of prices. This will not be without its difficulties. The German experience with monetary 'targeting', conducted over a few decades, illustrates the point.

Given that aversion to the inflationary risk is particularly strong in Germany, the Bundesbank decided fairly rapidly at the beginning of the 1970s, following the break-up of the system of fixed exchange rates, to adopt a monetary rule directly inspired by the one defined in the previous paragraph. For the Bank, the balance sheet of the German banking system then looks exactly like the particularly simple one of our village bank. The liabilities measure the totality of money *issued* by the German banks and are the counterpart of the loans shown in their assets (with the passage of time, the role of gold has become minimal). In part (corresponding to the variable s defined above), the money issued then becomes frozen in savings accounts and no longer circulates. Using the Bank's terminology, this 'long-term' saving is grouped under the abstruse but, all things considered, fairly explicit label of 'monetary capital formation' (*Geldkapitalbildung*). It is the remaining portion of the money issue that constitutes the money supply, in other words the totality of the deposits used for the purpose of settling transactions (corresponding to the current-account deposits in our village bank). If potential output grows at a rate of $\dot{y}$ and if the totality of the transactions associated with this level of output grows at the same rate, then the money supply will also have to grow at the rate of $\dot{y}$. If, at the same time, an upward drift in prices $\dot{p}$ is, if not desired, at least accepted, it will also be necessary to take this into account, so that the target for the growth in the money supply becomes $\dot{y} + \dot{p}$, the same rate as that of nominal full-employment output. It is precisely this rule that guided Bundesbank policy between the end of the 1980s and the creation of the euro: it set itself each year a target for growth in the money supply as an 'intermediate' objective towards achieving its ultimate objective of price stability (in practice, a contained upward drift).

Setting the values of the different variables that enter into the calculation of this target is nevertheless less simple than would appear [Baltensperger, 1998 and Richter, 1998]. In the case of the acceptable (also described as 'inevitable') price rise, this is of course not difficult. The Bundesbank's prime mission is to ensure price stability and it is up to the Bank to say what rate of inflation is compatible with this stability. From the mid-1980s on, this rate was set at 2%. Evaluating the growth in potential output is already more complicated: most often the forecast used merely

extrapolates a past trend. The first real difficulty is the calculation of the need for transaction balances. This need, as we have seen, is not linked solely to the added value – GDP – of the economy but to the totality of transactions making the production and utilisation of this added value possible. This heading obviously covers payment for inputs but also for all the production 'factors' (wages and salaries, rents, dividends, taxes, etc.) among which the added value produced is to be shared and redistributed before being finally spent. On top of these transactions directly linked to the formation and utilisation of 'national income', there are others that are less directly linked, namely transactions in real estate and financial assets. In order to pay for the acquisition of a building or securities, money is also needed. This additional need for monetary balances increases with the value of these transactions.

The implicit assumption made in linking the monetary target to growth in the nominal value of GDP taken on its own is that the value of all the transactions mentioned moves at the same rate on average. From a starting point at which the total money supply is initially satisfactory, its growth at the same rate as the value of GDP will then enable the economy to have permanently at its disposal the transaction balances required. This hypothesis may turn out to be overbold. If, for example, the value of real-estate or financial transactions grows faster than that of GDP, the need for transaction balances will also increase more rapidly. If the monetary target is in fact reached, the monetary policy implemented may later turn out to be more restrictive than desired, with the increase in the money supply intended to accompany that of the expected value of GDP partly absorbed by the increased value of the real-estate or financial transactions.

In addition to these difficulties there is another more deep-seated one. Once the growth target has been set, how does one define the 'money supply' to which it is applied? By drawing a line across the liability side of the balance sheet of our village bank, we separated the current-account deposits from the savings accounts and it was assumed that, by choosing between these two types of financial investment, our villagers *were explicitly signalling the use they intended to make of their money*. The banking system of a developed economy offers depositors a vast range of deposits, savings books and accounts or securities with varying maturities and varying degrees of liquidity. In Germany, where savers are partial to fixed-rate and relatively risk-free investments, this range is particularly wide. Knowing where to draw the line separating 'monetary capital formation' – the money put under the mattress – from the rest – the money kept available to deal with forthcoming expenses – becomes a matter of judgement. The boundary between savings accounts and transaction balances is imprecise and it is

possible to define several money supply aggregates. These differ in terms of the facility and speed with which the assets grouped under them can become means of payment. The M3 aggregate used from the end-1980s on by the Bundesbank[3] included, in addition to banknotes, term deposits with a maturity of less than four years as well as savings deposits at three months' notice and short-term bank debt securities. This form of 'money supply' clearly does not consist uniquely of transaction balances – some of the investments included are necessarily savings deposits – but, taking a medium-term standpoint, this aggregate could be viewed as giving an idea of the transaction settlements that German agents intended to make in coming years.

Relating growth in the value of transactions to that of nominal GDP only and defining the quantity of money in terms of such a broad aggregate as M3 has a particular consequence: the 'velocity of circulation' obtained by dividing nominal GDP by M3 stops being a 'technical' characteristic and becomes an *apparent* velocity defined by the ratio between two macroeconomic magnitudes. Changes in this velocity will no longer be the result merely of the evolution of the transactions network and of the payment system but also of the approximate nature of the numerator and denominator chosen to define it. If the value of financial transactions rises appreciably faster than that of GDP – because stock market prices rise faster than GDP prices or because the volume of financial transactions grows by more than output – this *apparent* velocity of circulation of money will decline. The same will be true if investments for savings purposes tend to rise as a share of M3. In order to take account of these evolutions as well as that of settlement techniques, the Bundesbank decided to include in the calculation of its target an expected change in the velocity of circulation. As in the case of potential output, here again the Bank extrapolated a past tendency and took into account a regular *decline* in this velocity, amounting initially to 0.5% a year and later to 1%.

While the Bundesbank's success in terms of price stability has been remarkable, the contribution of this monetary 'rule' to its success is more ambiguous. A central bank, no more in Germany than elsewhere, cannot decide the growth in the money supply, which can only be an intermediate objective, depending as it does on the reaction of the banks and of the

[3] The monetary aggregate used by the Bundesbank prior to 1987 was not M3, but rather the stock of central bank money. This contained, in addition to notes in circulation, the compulsory reserves deposits, calculated maintaining the January 1974 reserve coefficients.

economy in general to the decisions that are the only ones the central bank can implement: the setting of the constraints it imposes on the banking system and in particular the level of its policy rates. Until the end of the 1990s, the Bank required banks to deposit with it reserves proportionate to the deposits or savings accounts included in M3 and appearing among their liabilities. In order to obtain these reserves, the banks 'discounted'[4] with the central bank part of the loans they made (Box 1). The interest rate for this discounting, set by the Bundesbank, played a crucial role: when it rose, so did the cost of bank resources and that of the loans they made normally followed suit (similarly, a decline in the discount rate led to a decline in the cost of bank lending).

Box 1. 'Money base' or central bank money

Banks have the power to create money. This power is limited, however, by the existence of an authority – the central bank – which alone can issue a type of money that the banks have to acquire. This money – the money base – consists of the banknotes used by private agents for their day-to-day transactions and the deposits of the banks with the central bank (see the simplified balance sheet below). The banks use these deposits – their reserves – to settle the transactions they carry out among themselves and with the central bank. The latter 'keeps their accounts' (which can never be in deficit), and the sums to their credit are used by them as transaction balances.

Insofar as the demand for banknotes normally increases in line with activity and interbank settlements do the same, the demand for 'central bank money' increases in line with activity and the banks have a permanent need to hold somewhat more. In addition to this 'technical' requirement, there is in some cases a legal obligation, with some central banks requiring each bank to hold with themselves 'compulsory reserves' of an amount defined as a percentage of the deposits each bank has taken in. If a bank is short of reserves, it can borrow on the *interbank market* from those banks which have excess reserves or directly from the central bank.

[4] 'Discounting' consists of selling a loan that has not yet matured at a price below its face value. In so doing, the purchaser 'advances' to the seller the amount that will be paid at maturity. The interest rate at which this advance is made is the discount rate.

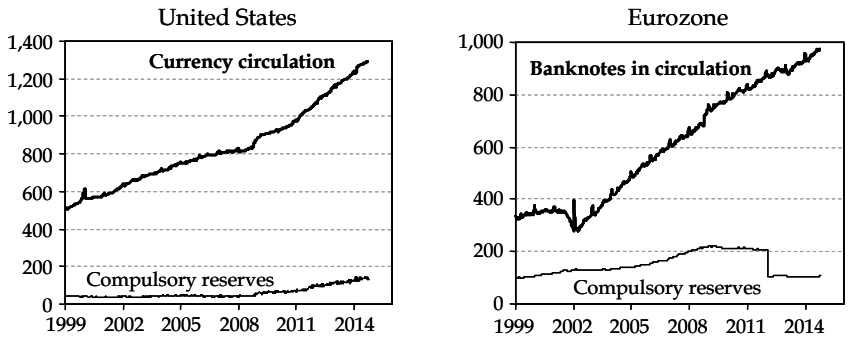
A central bank simplified balance sheet

Assets	Liabilities	
Foreign exchange reserves	Notes in circulation	Money base
Lending to credit institutions	Bank reserves - Compulsory - Surplus	
Securities	Treasury deposits	

In order to regulate the distribution of credit, the central bank can operate both on the quantity of money it issues and on its price. At the end of the 1970s, the Chairman of the Federal Reserve, Paul Volcker, adopted a policy of controlling the money base and this provoked a sharp increase in the volatility and level of interbank rates. The distribution of credit came to an abrupt halt and economic activity contracted. The scale of the 1982 recession forced the Fed to abandon this policy. Most central banks today tend to prefer to use the 'price' of their money, in other words their policy rates. To keep interbank rates close to its policy rate, the monetary authority adjusts the supply of central bank money. It has various instruments at its disposal for this purpose. It can purchase securities on the bond market (in so-called 'open market operations') or buy bank claims that are close to maturity ('discount operations'). But it can also lend money by accepting extremely secure claims as collateral; these refinancing operations (known as 'repos') are today the type used by the European Central Bank (ECB) and it is their rate that serves as the Bank's policy rate.

The central bank adjusts the volume of its interventions in accordance with the amount it deems necessary to enable the banks to satisfy the demand for banknotes and to cover their needs for reserves. If this amount turns out to be insufficient, interbank market rates will tend to rise. The central bank may then possibly increase its supply. Alternatively, it can allow the banks with the greatest shortage of 'liquidity' to come to it in order to borrow at a rate that will this time be substantially higher and will set a cap on the interbank market rates. Note that these rates can be managed without the banks needing to hold a massive quantity of central bank money [Pollin, 2005]. This is the case, for example, in the United States (Figure 1): before the 2007 crisis, the volume of compulsory reserves (excluding banknotes*) amounted to barely around $10 billion and surplus reserves were very small (in the range between $1 and $2 billion).

Figure 1. Compulsory reserves and banknotes in the United States and in the eurozone, 1999-2014 (billions, in the respective currencies)



Sources: European Central Bank and Federal Reserve.

The size of the compulsory reserves is an additional instrument at the disposal of the central bank, enabling it to modulate the banks' demand for its money. In practice, however, in many countries the calculation base and the percentage of compulsory reserves are rarely modified. These reserves are today above all a means of stabilising the overnight rate on the interbank market,** with the banks often being obliged to constitute their reserves 'on average' over a given period. During this period, the amount of the banks' reserves can vary from day to day provided that they meet the obligations on average over the period. Furthermore, a 'high' level of reserves required on an average basis – i.e. significantly exceeding the banks' need for transaction balances – constitutes an additional 'cushion' making it possible to absorb temporary strains. It should be noted that certain central banks do not impose compulsory reserves. This is the case, in particular, of the central banks of Australia and New Zealand and of the Bank of England. If these central banks wish to prevent excessive fluctuations in interbank rates they are obliged to be continually active on the money market.

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* Unlike the situation in the eurozone, in the United States banknotes held by commercial banks are included in the compulsory reserves and accounted for roughly 80% of the total before the 2007 crisis.

** The compulsory reserve requirement was long considered as a means of protecting depositors by limiting the consequences for them of a possible failure of the banks (i.e. these reserves were intended to cope with a run on the banks). It was not until 1931 in the United States and the attendant regular occurrence of bank panics that it was understood how limited a guarantee of bank liquidity this requirement represented in practice [Feinman, 1993].

However, the evolution of the total money supply depends not only on the way in which the distribution of bank loans is influenced by the cost of borrowing. It also depends on the change in 'monetary capital formation' – the variable *s* referred to earlier – which deprives M3 of part of the money issued at the time of the granting of these loans. *The evolution of the money supply*, regardless of how it is defined, *is therefore not automatically linked to that of policy rates*. Assessing the role of monetary targeting in the Bundesbank's policy implementation is therefore tantamount to inquiring into the way in which the gap between the observed evolutions in the money supply and the target set for it have in return influenced the decisions of the central bank and in particular movements in its interest rates. Several studies have shown that this influence was weak, at best [Clausen & Meier, 2005]. This is easily confirmed by noting that, starting at the end of the 1980s, its target was more often exceeded than attained (despite the relatively wide band used in its definition) without the Bank ever attempting to correct its past excesses!

The lack of precision affecting both 'the quantity of money' and its velocity of circulation explains the extremely 'discretionary' manner in which the German central bank applied the monetarist rule.[5] It found this all the easier in that it had always stated it wished to judge the evolution of the money supply taking a medium-term view – despite the fact that the target was set for a year at a time. In the shorter term, the analysis of the determinants of M3 helped it mainly to understand – and to explain to the public – the reasons for deviations between the observed evolution of the aggregate and the one desired. The monetary targeting was more a factor for discipline and an instrument for communication than a decision-making rule. In fact, month after month, the setting of the level of the Bundesbank's policy rates seems to have reflected a more 'Keynesian' logic: in good years and bad, the Bank attempted to prevent the emergence of too wide a gap between potential output and the level of effective demand. In this way it behaved in a somewhat similar manner to other central banks whose objectives were more explicitly 'symmetrical' (and whose approaches were less explicitly monetarist) – the Fed in particular.

Following a settling-in period, the central banks whose currencies were no longer pegged to gold (or to some reserve currency) adopted relatively similar behaviour, which can be fairly well summarised by a

[5] Otmar Issing [1997] described Bundesbank policy as "pragmatic monetarism" or "disciplined discretion".

'Taylor's rule'. This rule no longer makes reference to the evolution of a monetary aggregate.[6] It simply describes how a central bank must adjust the 'real' level of its policy rate as a function of the difference between observed and target inflation, but also the difference between the level of activity and the level corresponding to full employment of resources. By adjusting policy rates in response to these two gaps, a central bank can hope to keep the level of activity as close as possible to full employment while at the same time avoiding a lasting gap between inflation and its objective (Box 2). This time, the rule directly refers to decisions taken by the central bank – telling it how to handle its policy rates – without involving an intermediate objective. Even so, it does not resolve some of the information problems raised earlier: in particular, ascertaining the level of potential output (or indeed the level of observed output!) is a constant problem for monetary policy-makers. The 'Great Moderation' – in other words, the period of steady growth with contained inflation – seen between the beginning of the 1990s and 2007 in the United States but also in many other developed countries – nevertheless illustrated, for a time at least, the apparent effectiveness of such a rule for managing the business cycle.

Box 2. Taylor and related rules

'Taylor's rule' can be viewed as a guide for the conduct of monetary policy. It describes how a central bank must adjust its policy rate when inflation diverges from its target or output from its potential. Taylor [1993] proposes the following rule:

$$i = \bar{r} + \pi + 0.5y + 0.5(\pi - \bar{\pi})$$

where i, is the key interest rate; $\bar{r}$, the equilibrium real short rate; π, the rate of inflation; $\bar{\pi}$, the central bank's target rate of inflation and y, the gap between observed and potential GDP.

The rule states that the central bank's *real* interest rate $i - \pi$ must be greater than the real equilibrium rate $\bar{r}$ if GDP exceeds its potential ($y > 0$) and/or if the inflation rate is above the central bank's target ($\pi > \bar{\pi}$). In the original version of the rule, Taylor set both $\bar{r}$ and $\bar{\pi}$ at 2% for the United States. Because central banks' targets may differ according to relative aversions to inflation and underemployment, the weights attributed to these two variables may vary. Yellen [2012] proposes a rule – the *balanced approach rule* – according to which the Fed funds rate is twice as sensitive to the deviation from potential as in Taylor's original rule.

[6] Taylor [1998] shows the assumptions under which his rule can be derived from the quantitative approach described above.

While these rules have the advantage of simplicity, the estimation of the output gap is a tricky matter. The revisions made by the European Commission are an illustration of this difficulty: whereas it estimated that the eurozone economy was close to its potential in 2007, its latest estimates show that it was in fact substantially above. This point then leads on to another, namely that the use of *revised* macroeconomic data, sometimes after a lag of several years, can lead to an erroneous interpretation of the decisions taken at a given date by the central bank [Orphanides, 2007]. This problem is not as great, however, if the variable used is not the output gap but either its variation (i.e. the gap between observed growth and potential growth) [Orphanides, 2003] or the unemployment rate, a statistic that is rarely revised. Mankiw [2001] therefore proposes the following rule:

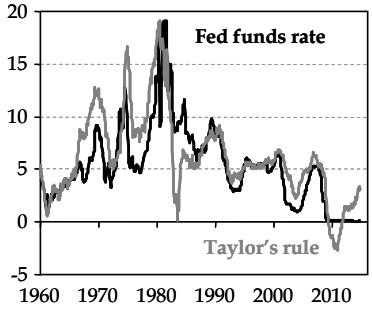
$$i = 8.5 + 1.4\,(\pi' - u)$$

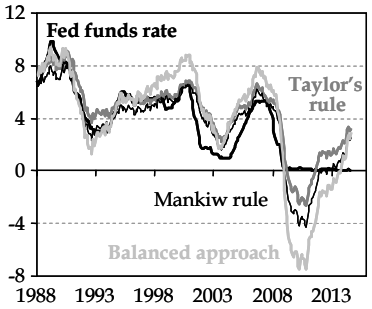
where π' is the underlying inflation and u is the unemployment rate.

These rules, it should be noted, involve no element of 'expectation' (even though Mankiw underlines the fact that the unemployment rate is a good leading indicator of inflation). Since monetary policy is transmitted with a certain time lag to the economy, the central bank should normally act pre-emptively. So-called 'modified' rules in this case attempt to add certain more forward-looking elements. For example, stock-market evolutions or evolutions in real estate prices are introduced in order to take into account a modification of financial conditions (higher asset prices tending to force up policy rates), and past inflation is replaced by the inflation rate expected over the coming year. The indication provided by these 'modified' rules nevertheless depends on the quality of the forecasts introduced!

Despite these problems, the estimation of such rules constitutes a simple instrument for the analysis of monetary policy. US data show that between 1988 and 2007, the Fed tended to follow a Taylor's rule (Figure 2). Its implementation in the preceding decades would have implied a more accommodating monetary stance at the beginning of the 1980s than that actually adopted by Paul Volcker, but a substantially less accommodating one than that followed by Arthur Burns during the 1970s [Mankiw, 2001]. The behaviour of the Bundesbank from the 1970s to the introduction of the euro can also be described by a Taylor's rule, at least if one takes *non-revised* economic data, i.e. those that were in fact available when the decisions were taken [Clausen & Meier, 2005]. This means that the role of the change in the monetary aggregates in the conduct of the Bank's policy seems to have been relatively modest, as would seem to be confirmed, for the 1970s, by analysis of the minutes of its Monetary Policy Committee [von Hagen, 1999].

Figure 2. Fed funds rate and the Taylor and related rules in the United States (%)*





* In order to avoid the problems associated with the estimation and revisions of potential GDP, the method adopted here is that of Janet Yellen [2012], replacing in the three rules the deviation from potential y by 2.3 ($\bar{u} - u$) where u is the unemployment rate and $\bar{u}$ is the NAIRU – here equal to 5.6%. The inflation rate used in all these simulations is underlying inflation.

Sources: Thomson Datastream, authors' calculations.

2. MONETARY IMPULSES AND THE RESPONSE OF THE ECONOMY

After less than half a century, central banks in the developed countries have succeeded in controlling the inflationary risk involved in the issue of money detached from any 'exogenous' scarcity. At the same time, there has been a considerable evolution in their financial systems, without the same attention being paid to these. While the central banks may attempt, through management of their policy rates, to regulate the rate of growth of activity, they do not decide the nature of the expenditure responding to such interest-rate movements, which depends on the financial systems through which these movements are transmitted. Inasmuch as financial structures and practices differ appreciably from one economy to another, the way in which domestic agents' expenditure responds is far from being the same everywhere.

In theory, a fall in interest rates should give firms an incentive to pass orders for new capital goods or even start building new factories. It could just as well help some of them to finance an increase in inventories. But it could also incite households to bring forward major purchases, borrowing in order to buy the car or the house that they had been thinking of acquiring at a later date and in so doing help to bring the economy closer to its full-employment level. For this to take place, however, it will be necessary that the organisation of the financial system be such as to make this type of borrowing possible.

Before examining how private spending in developed economies responds to movements in policy rates, it is necessary to recall how such movements are transmitted within the various compartments of the relatively complex financial systems with which these economies are endowed.

2.1 The transmission of movements in policy rates

The banks, as has just been seen, are at the heart of *monetary* circulation, but they are far from being the sole support for *financial* circulation, which can in fact take a number of diverse channels. Obviously, 'direct' financial transactions are possible, with those desiring to spend less than they earn lending directly to those who want to spend more. For this to be possible a certain number of conditions have to be met. First, as in the case of a simple barter transaction, the needs of the participants have to coincide: if one party is looking for a multi-year loan and the other for an investment with a maturity of only a few months, no deal is possible. The same is true if one party wants to borrow millions of euros and the other to invest only a few hundreds. Let us suppose, however, that wants in fact coincide. Even then, for a transaction to take place, the lender has to be prepared to take certain risks: in the first place, a *liquidity risk*, in other words, supposing that the loan is for one year, the lender takes the risk that he may require the money in the meantime; secondly, there is a *credit risk*, in that failure to repay on the part of the borrower means that the lender will lose all or part of his investment. A high level of aversion to risk can therefore severely hamper the development of direct transactions. *The role of the markets and of the financial system more generally is to ease, in part at least, these obstacles to financial circulation.*

To take the example of the bond market, a firm may launch an issue totalling several hundred million euros, subscribed to by a large number of lenders, each for different amounts. Furthermore, the securities acquired can be sold at any time on the same market and this means that the taking of both the liquidity risk and the credit risk is facilitated. From this point of view, the stock market plays an identical role, enabling firms to find more easily the equity capital they need. In the absence of a stock market, this capital has to be provided either by the entrepreneur himself or by the investors that he persuades to share with him the risks (and any possible profits) of his enterprise. The existence of a stock market on which shares can be issued and traded here again reduces the liquidity risk for the purchasers and makes it possible to share the risks of the firm's own activity among a large number of shareholders whom it may not know and who are liable to change.

The intervention of an intermediary is an even more powerful means of removing the obstacles related to non-financial agents' aversion to risk and to the lack of coincidence of their requirements. Our village bank provides a good example of this. If our villagers were able to find finance

with a relatively long maturity, some of them would be prepared to borrow in order to invest in their enterprise and others, if they were spared the risks involved, would be prepared to release the savings needed for this financing. By taking over all or part of these risks, the bank, and financial intermediaries more generally, can enable them to access the financial investments and the capital each of them is looking for.

In recent decades, the 'menu' of financial investments and the modalities of financing have been considerably enlarged. For example, firms can invest their treasury holdings in short-term deposits or securities; they can turn to the banks or the markets, on a short-term basis to finance increases in inventories and on a longer-term basis to finance their investments in fixed capital or their acquisitions. They can find, not only on the stock markets but also from a steadily growing number of specialised operators, the equity capital they need for their expansion. For their part, households can leave their transaction balances on their current accounts and place their 'long-term' savings on an increasingly varied range of accounts but also with insurance companies or pension funds or, of course, directly in the markets. They can borrow short-term to finance purchases of durable goods or even cash deficits, and longer-term to finance education or to buy a dwelling. Despite certain common developments, the financial systems of the different developed economies are nevertheless far from being uniform (Box 3). The size of the markets, the nature of the intermediaries, the types of credit granted and the financial investments on offer are often different. There is therefore every chance that the paths followed by the transmission of monetary policy in each of them will also be different. *By managing its policy rates, a central bank will nevertheless always be able to influence, more or less rapidly and more or less automatically, the various interest rates posted within its financial system*.

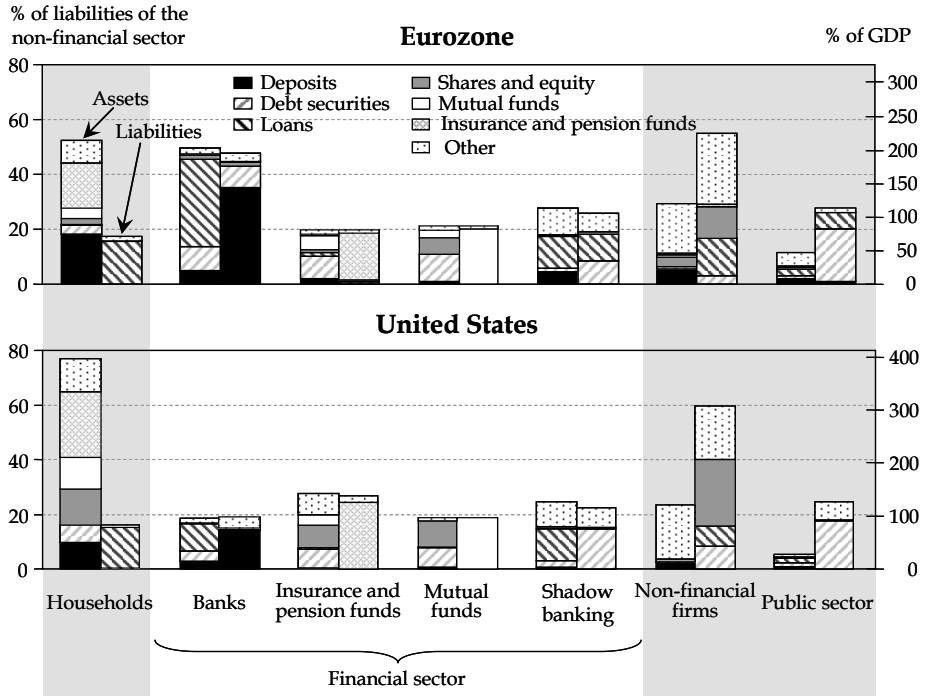
Box 3. The structures of financial systems in the eurozone and in the United States

The banks are not the financial system's only operators. Alongside them are to be found other savings-collectors (pension funds or insurance companies) or mutual funds, which invest in the market on behalf of those acquiring the shares they issue. Others, which will form part of the subject of chapter 4, include intermediaries that collect no savings themselves and find their finance very largely through borrowing. These belong to what is now known as the 'shadow banking' system. It will be seen that this expression covers a wide variety of actors: securitisation vehicles (in the United States, the Fannie Mae and Freddie Mac agencies but also the issuers of asset-backed securities or ABS), investment banks, brokers and dealers, among others.

This box aims simply to provide an idea of the size and nature of the assets and liabilities of these various operators and to highlight certain important features of the European and US financial systems.

In both regions, the non-financial enterprises and the governments are, *on a net basis*, borrowers, while households are, still on a net basis, creditors (the financial intermediaries being by nature 'in balance'). In both the eurozone and the United States, households are thus by far the largest holders of financial assets. However, American households own financial assets equivalent to almost twice as great a proportion (400%) of GDP as their eurozone counterparts (215%). They also hold a greater proportion (around 80% as against barely 50%) of the financial liabilities issued by non-financial domestic agents.

Figure 3. Financial assets and liabilities of domestic agents in the eurozone and in the United States in 2013



Note: The 'Other' item includes trade credits (net), taxes due or receivable, repos, unquoted shares and the sub-heading "other miscellaneous transactions". In the eurozone, the 'Other' assets of non-financial firms consist essentially of unquoted shares. For the eurozone, money market funds have been taken out of 'monetary and financial institutions' (MFI) and added to the mutual funds, the rest of the MFI forming the banking sector.

Sources: European Central Bank and Federal Reserve.

The way in which financial intermediation is organised is far from identical on both sides of the Atlantic, with banks having much more importance in the eurozone. This is explained by the less-frequent recourse to securitisation than in the United States – especially regarding mortgages – but also by the greater dependence of firms on bank finance. Debt securities of non-financial enterprises in the eurozone amounted to barely €1.1 trillion at the end of 2013, little more than one-fifth of the figure for American firms. Insurance companies and pension funds play a slightly more important role in the United States. This is largely explained by the greater role played by capitalisation retirement schemes but also by the accounting treatment of acquired pension rights. Some of the financial assets of American pension funds (appearing as 'Other' assets in Figure 3) in fact constitute pure commitments by the sponsors of these funds. At the end of 2013, unfunded pension commitments amounted to more than $3 trillion and were largely imputable to the public pension funds ($1.8 trillion for the federal government and $1.1 trillion for state and local governments). The sizes of the mutual funds (including the money market funds) and the shadow banking sector are similar, being equivalent to 100% and 120% of the GDP of the respective regions. However, the compositions of the shadow banking systems are very different, with the securitisation agencies and private-label issuers accounting for almost half the sector in the United States while in the eurozone securitisation vehicles account for less than one-fifth.

In order to understand the mechanics of this adjustment, let us take as our starting point the balance sheet of a bank similar to that of our village. If the central bank raises its interest rates, the cost of refinancing our bank's needs in order to meet its reserve requirements (and the demand for banknotes) will rise (Box 1). In order to contain this rise, it will try to persuade those of its customers who have left savings of a fairly long-term nature on their current accounts to shift these funds to savings accounts (concerning which, it is assumed, the bank has no reserve obligations). As an incentive, it will increase the remuneration of these latter accounts (all the more readily in that its competitors will be doing the same thing and for the same reason). Because this will increase the charges on the liability side of its balance sheet, it will pass on at least part of the cost into the interest rates on the loans it makes, so that the cost of bank lending will rise. The adjustment does not stop there, however. If the remuneration of the savings accounts – which are free of interest-rate risk – increases, those who have taken this risk by investing in the bond market may cease to do so, meaning that bond yields will increase as well. In this way the rise in the central bank's policy rates will trigger a chain reaction liable to force up interest rates on all the

financial investments and loans proposed by the financial system. Share prices will also be affected, given that bond yields are used to calculate the present value of firms' future dividend payments. Everything else remaining equal, if bond yields increase, prices of equities will fall. All in all, therefore, a movement in policy rates will have repercussions throughout the financial system. However, these repercussions will never be purely automatic and will be a function of the system's structure and of the behaviour of the units of which it is composed. The way in which monetary policy affects the real economy will largely depend on this.

A widely-held notion is that a rise in interest rates prompts firms to invest less and households to save more and that a fall in rates has the converse effects. In many macroeconomic models, including those used by the central banks of the major developed economies, corporate investment is a major link, sometimes even the principal link, in the transmission of monetary policy. Empirical observation, as will now be shown, leads to more qualified conclusions, however. The *immediate* response of firms to monetary policy impulses is generally weak, while that of households, on the other hand, in certain countries at least, is distinctly more marked. The latter response nevertheless operates more through their borrowing behaviour than through their financial investments. *To a large extent, monetary policy has for several decades regulated economic activity in the advanced economies by influencing the household borrowing rate in certain countries*.

2.2 The incidence of interest rates on corporate spending

For a long time, economic analysis attributed a central role in macroeconomic regulation to *corporate investment* expenditure. In a neo-classical framework, the transmission of monetary policy was said to operate through the *user cost of capital* [Jorgenson 1963]. This is a function of the interest charges paid (or forgone) on the funds immobilised for the purpose of installing 'fixed capital' (equipment, buildings, etc.), of the evolution of the prices of these investments and their depreciation rates. The firm will invest if the expected return on a project is higher than its user cost. Monetary policy then influences investment by modifying one of the components of this cost, namely the opportunity cost of the funds immobilised.[7] In the middle of the 1970s, Robert Hall [1977] underlined the fact that "the stimulus of lower interest rates on investment is one of the principal channels of monetary influence in virtually all macroeconomic

[7] Taxation policy can also modify the user cost of capital by changing the rules regarding depreciation or the taxation of profits.

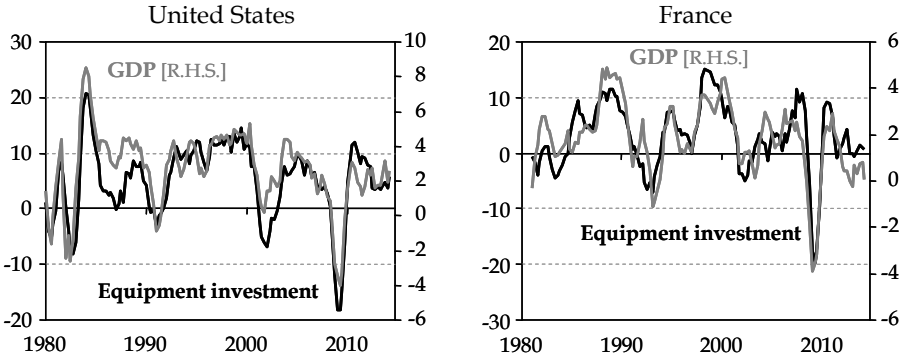
theories". A rise in interest rates, by increasing the user cost of capital, also has a negative effect on investment in the Federal Reserve model (the so-called FRB/US) and in that of the European Central Bank (known as the Area Wide Model (AWM)). Concerning the investment equation in this model, Fagan et al. [2001] even note that it is "the main channel through which interest rates affect aggregate demand".

The conclusions derived from empirical observation are more ambiguous, however. The underlying assumptions of neo-classical analysis (perfect competition, absence of financial constraints, etc.) are far from obtaining in practice and numerous studies concerning corporate investment behaviour have great difficulty in showing a clear-cut influence of interest rates. It should be noted that most of the studies examine this influence only indirectly, via the effects on the user cost of capital. However, the long-term elasticities of investment to this user cost differ widely not only among countries – being generally weak in France [Bardaji et al., 2006], uncertain in the United States [Chirinko, 1993] and more marked in Germany [Breitung et al., 2003] – but also between estimates depending on the estimation method used. Moreover, even in those studies that show a significant impact of user cost, demand for firms' products is very often the dominant explanatory factor: "The response of investment to price variables [i.e., the user cost of capital] tends to be small and unimportant relative to quantity variables" [Chirinko, 1993].

The econometric analysis of the evolution of corporate investment in equipment shown in Box 4 leads to similar conclusions. In this case the interest-rate effect operates through a user cost. Its role seems modest, however, with investment fluctuating above all as a function of demand, measured by the contemporaneous evolution of GDP: when activity picks up, investment does as well and conversely (Figure 4). Over the short term, the impact of the user cost is often not significant, whereas that of demand is always significant and powerful. Like many others, these estimates are fragile. Carried out on the basis of macroeconomic data, they can easily underestimate the long-term elasticities to the user cost of capital (the simultaneity between the rise in investment and interest rates means that the apparent elasticity to the user cost tends towards zero). Estimates using individual company data show hardly any greater sensitivity of investment to interest rates, however. Moreover, being heavily dependent on the methods used [Chatelain et al., 2001], the sensitivities found are distinctly smaller than neo-classical theory would lead one to expect. The conclusion remains the same: "a modest effect of interest rates on investment,

weakening the traditional monetary transmission mechanism" [Chirinko et al., 1999].

Figure 4. Investment in equipment and activity, 1980-2014 (year on year % change)



Source: Thomson Datastream.

Box 4. Estimation of an investment equation for France, Germany and the US

The econometric analysis of the principal determinants of corporate investment presented here follows Bardaji et al. [2006]. With some firms restricted in their outlets, their investment responds to the evolution in demand and the relative costs of factors of production. Others are mainly sensitive to the return on capital (measured here by Tobin's Q). The explained variable is investment in equipment, whose cycle may differ from that of investment in structures, for which the interest-rate effect is probably stronger [Chirinko et al., 1999]. The estimated equation is of the error-correction type. The long-term equation is written as follows:

$$\ln(I_t) = \ln(Y_t) + \alpha \ln(TobinQ_t) + \beta \ln(UCK_t/ULC_t) + \gamma$$

where I is corporate investment in equipment, Y is volume GDP, *TobinQ* (Tobin's Q) is calculated by relating the stock-market capitalisation of non-financial firms to their net worth measured at historical cost, UCL is the real unit labour cost and UCK is the user cost of capital. UCK is defined as follows:

$$UCK_t = p_t^i/p_t^y(r_t + \delta_t)$$

where p_t^i and p_t^y are the deflators for investment in equipment and GDP respectively, r_t is a real 10-year public interest rate* and δ_t the depreciation rate on the stock of corporate capital.

The short-term equation is written as follows:

$$\Delta\, ln(I_t) = -\delta\, ECM_{t-1} + a\Delta\, ln(Y_t) + b\Delta\, ln(UCK_t) + c\Delta \ln(ULC_t) + d$$

where ΔX is the change over one quarter in X and ECM_{t-1} *is* the residual of the long-term equation for the previous period.

The data are quarterly and the estimation period is 1985-2006 for France and the United States. A shortage of available series means that the estimation period is reduced in the case of Germany (1991-2006) and this makes the results more fragile. For all three countries, the estimation was deliberately taken no further than the end of 2006 in order to avoid having the short-term coefficients biased as a result of the scale of the 2007-09 shock. Estimating the model for the whole of the period in fact reinforces the role of the GDP variable in the short-term equation. The results obtained are summarised in the table.

Estimated coefficients, by country

	France	Germany	United States
		Long-term coefficients	
Y	1.00	1.00	1.00
TobinQ	0.12	0.16	0.18
UCK/ULC	-0.17	-0.29	-0.62
		Short-term coefficients	
ECM	-0.11	-0.23	-0.04
Y	2.94	1.47	2.55
TobinQ	---	0.15	---
UCK	---	---	---
ULC	---	---	---

The response of investment to a demand shock is strong and rapid, while the responses to a user-cost shock are slower and the long-term elasticities obtained are all below unity. One final point deserves to be underlined: the specification adopted (involving user cost of capital) is not the best. For both the United States and Germany, the investment dynamic is better captured if the variable UCK_t/ULC_t is replaced by taking only relative prices (p_t^i/p_t^y). In the case of France, it remains identical. This means that the role of the interest rate is far from being as clear-cut as is postulated in the neo-classical models.

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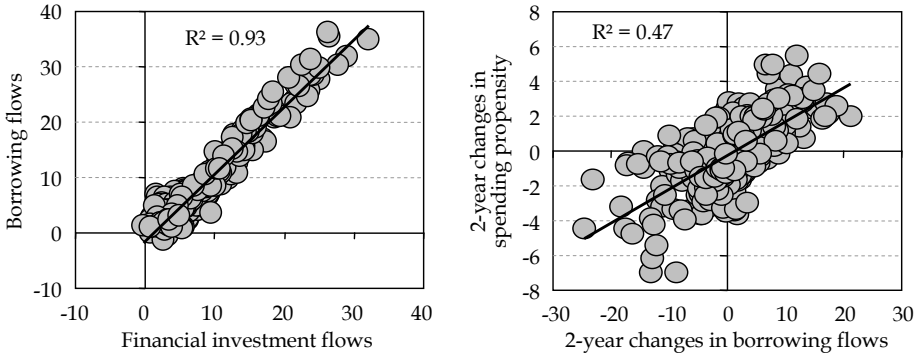
* This real interest rate is calculated by subtracting the average inflation rate over the past 10 years from the nominal 10-year public interest rate.

What is important in order to appreciate the contribution of firms to cyclical regulation, however, is not their behaviour in terms of investment alone but that of their propensity to spend their income (corresponding to the $(1-\sigma)$ variable in the previous chapter). In order to ease the monetary constraint, in response to a cut in interest rates, firms must in fact increase their investment more than their saving (their undistributed profits). Their

contribution to supporting activity can then be assessed by observing the evolution of their net financing requirement. If, in relation to their income, their borrowing increases by more than their financial investment, their financing requirement and hence their spending propensity will also rise. This leaves the question of what does in fact influence this propensity. *Observation of firms' financial investment and borrowing confirms the determining role of the dynamism of activity – and the weak role played by interest rates – in the behaviour of their spending propensity*.

There is a striking initial observation to be made. In all the countries examined (Germany, France, Spain, Italy, the United Kingdom, Canada and the United States), the flows of financial investment and of corporate borrowing are closely and positively correlated. The more firms borrow, the larger their financial investment – their acquisition of financial assets (Figure 5, left-hand side). At the same time, their borrowing rising more than their financial investment, the more they borrow, the larger their spending propensity (Figure 5, right-hand side).

*Figure 5. Borrowing ratio, financial investment ratio and variations in the spending propensity of non-financial firms, 1993-2006 (% of GDP)**



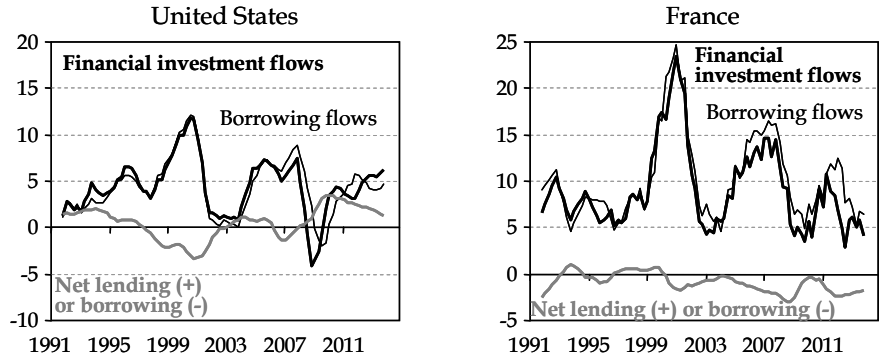
* In the above illustrations, the data are quarterly and cover six countries (Germany, Spain, France, Canada, the United Kingdom and the United States). The spending propensity is derived from the national non-financial accounts.

Sources: National central banks and national statistical institutes.

A second feature of the financial behaviour of firms needs to be underlined (Figure 6), namely that their borrowing flows far exceed their financing requirements: firms borrow as much – and sometimes even more – for the purpose of financial investment as they do for investment in physical capital. Moreover, in all the countries examined, at certain times at least, these flows become synchronised and seem to reflect a runaway build-

up of borrowing. For example, there was a surge in borrowing in all countries in 1998-2000, at the time of the formation of the stock-market bubble, as well as between 2003 and 2006, the years immediately preceding the 2007 financial crisis.

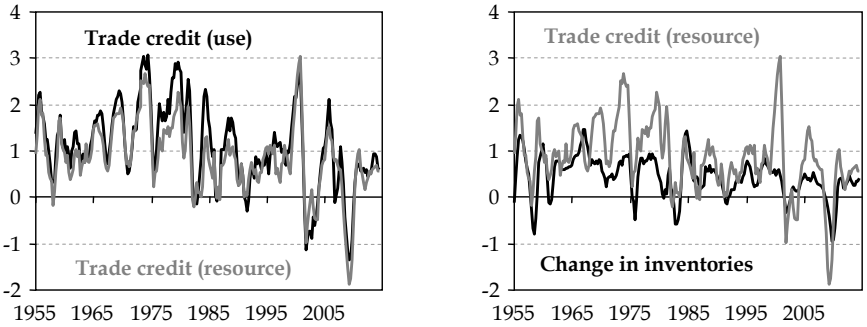
Figure 6. Financial investment ratios, borrowing ratios and financial saving ratios of non-financial firms in the US and France, 1991-2013 (% of GDP)



Sources: National central banks and national statistical institutes.

Firms' financial investments can take many different forms. For one thing, they grant and receive trade credits, which simultaneously boost both the sector's assets and its liabilities. These flows, which are directly linked to movements in the real economy, in large measure track the evolution of inventories during the business cycle (Figure 7). The same is true of their transaction balances. In part also, firms' financial investments are indeed purely financial, permitting them, in particular, to take control of other firms. While for the purchasers these takeovers represent an investment, the impact on real activity is less certain, depending on what the sellers do with the proceeds of the share sale. This 'financialisation' of the behaviour of non-financial enterprises can therefore distend the link between the evolutions in their borrowing and in real activity.

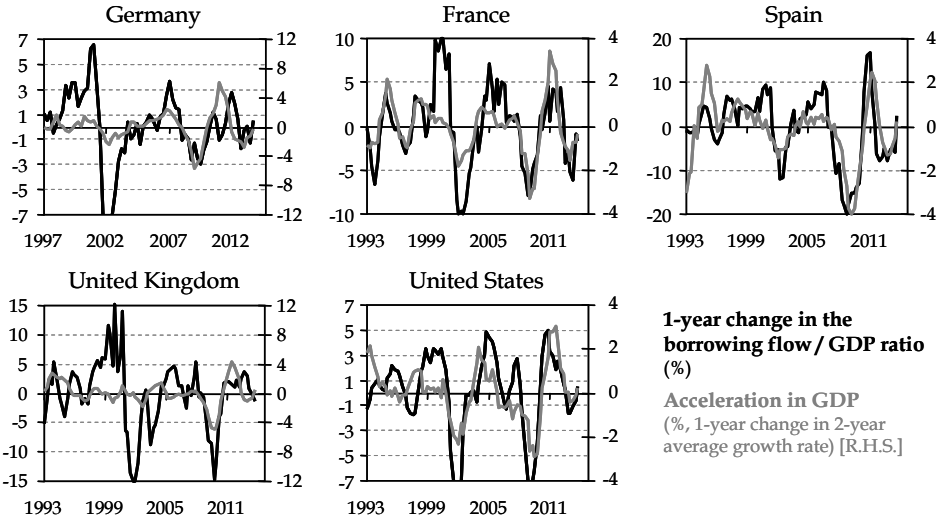
Figure 7. Trade credit and variations in inventories in the United States, 1955-2013 (non-financial firms, % of GDP)



Sources: Federal Reserve and Thomson Datastream.

If one now seeks the explanation for variations in firms' borrowing flows, the cyclical situation again turns out to be the determining factor. For the group of countries examined here, the link between borrowing and real activity is, except in the case of the United Kingdom, relatively clear-cut (Figure 8). When activity picks up, the flow of corporate borrowing increases and with it firms' spending propensity. The converse is true when activity slows down. US data, which are available over a longer period, confirm this link while at the same time illustrating another essential point (Figure 9), namely that while the borrowing flow seems to evolve in line with the business cycle, it is largely insensitive to either the levels or the variations of interest rates. In the American case, there is even a distinctly positive correlation between borrowing and real interest rates! The paradox is only apparent, however. When activity picks up, firms invest more, borrowing to do so, while generally at the same time the central bank tends to raise its interest rates. This observation has in fact led to highlighting the pro-cyclical role of the financial system in the transmission of monetary policy. While during slowdown phases the deterioration in corporate balance sheets leads to a tightening of lending conditions that weakens the impact of the monetary stimulus, the reverse is true in upswing phases, when the impact of monetary tightening is cushioned by an easing of borrowing conditions [Bernanke & Gertler, 1995].

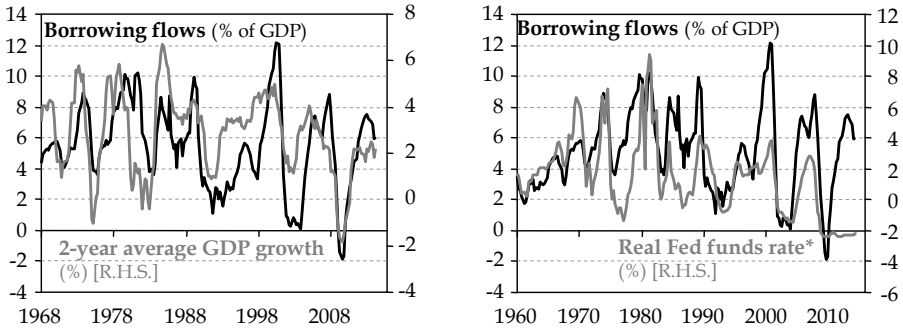
Figure 8. Variations in non-financial firms' borrowing flows and acceleration in activity



Note: For the United Kingdom and the United States, the acceleration in GDP is lagged by 2 quarters and 1 quarter, respectively.

Sources: National central banks and Thomson Datastream.

Figure 9. Non-financial firms' borrowing flows and activity in the United States



* Fed funds rate deflated by average inflation over the past 10 years.

Sources: Federal Reserve and Thomson Datastream.

These observations take some of the mystery out of the haziness of the estimations of the effects of monetary policy on investment. If the behaviour of corporate investment, real or financial, is first and foremost a function of the business cycle, there is every chance that the correlation between investment and the key interest rate will be positive. This is what is brought out, at best, by the rare studies that have tried to assess the direct effect of

interest rates on investment. Kothari et al. [2013] note, for example: "The positive relation between 1-year interest rates and investment is hard to reconcile with the idea that Federal Reserve-driven movements in interest rates have a first-order impact on investment."

A recent Federal Reserve study [Sharpe & Suarez, 2014] confirms this. Confronted with the heterogeneity of the econometric estimations, the authors preferred to use survey data. Chief financial officers of American non-financial corporations were directly questioned regarding the sensitivity of their investment decisions to interest rates. The results are enlightening. For a very large majority, a fall in borrowing costs has no effect, with almost 70% of respondents saying that a cut in interest rates would lead them neither to bring forward projects nor to launch new ones. Nor do the financial officers seem much more sensitive to a rise in the policy rate: in almost 60% of cases, a rise of less than 300 basis points would have no effect on their projects. This study, carried out in September 2012, is admittedly one-off and there is no guarantee that the replies would have been similar elsewhere or at another time. It nevertheless shows that *the movements in interest rates needed to influence corporate investment are of much greater amplitude than those normally practised by central banks in the developed countries*.

Given that corporate investment behaviour is much more sensitive to the business cycle than to movements in interest rates, the transmission of monetary policy must pass through other channels. Leaving aside, for the moment, the possible impact on the exchange rate, the impulses given by the central bank for the purpose of regulating activity can be transmitted to the real economy only via spending by households.

2.3 The incidence of interest rates on household spending

In the economic literature, the effect of movements in interest rates on household saving is ambiguous. A fall, by reducing the income of certain agents, may lead them to consume less, but it can also prompt others to borrow in order to bring forward purchases of durable goods and hence save less. Wealth effects can also enter the picture. With a decline in interest rates normally being accompanied by a rise in asset prices, households may come to consider the increase in their wealth to be permanent and as a result consume a larger proportion of their current income. The direction in which interest rates affect the propensity to consume is therefore far from certain.

What interests us here, however, is not households' propensity to consume but, as in the case of firms, their propensity to spend or, if one prefers, its complement, their *financial* saving ratio. The latter – when

positive – measures the proportion of current income not used to meet spending on either consumption *or* residential investment. This 'financial' saving (or net lending) is also the difference between agents' flows of financial investment and borrowing. It is positive if households invest more in financial assets than they borrow (meaning that, in net terms, they place saving at the disposal of the rest of the economy) and negative in the opposite case (meaning that on a net basis they absorb saving released by the rest of the economy). To what extent does monetary policy influence households' spending propensity?

To answer this question, we first examined movements in the flow of households' financial saving in some 10 developed countries over the past 20 years. A first observation stands out: for the most part, since the beginning of the 1990s at least, these movements have been much more the reflection of variations in their borrowing ratios than their financial investment ratios (Box 5). The only exception is Japan, where the evolution of household borrowing explains relatively little of the movements in their flows of financial saving.

Box 5. Households' financial investment, borrowing and financial saving

In order to make a more precise analysis of the link between the financial investment ratio, the borrowing ratio and the financial saving ratio, we carried out successive estimates on panel data for the following two equations between 1991 and 2013 :

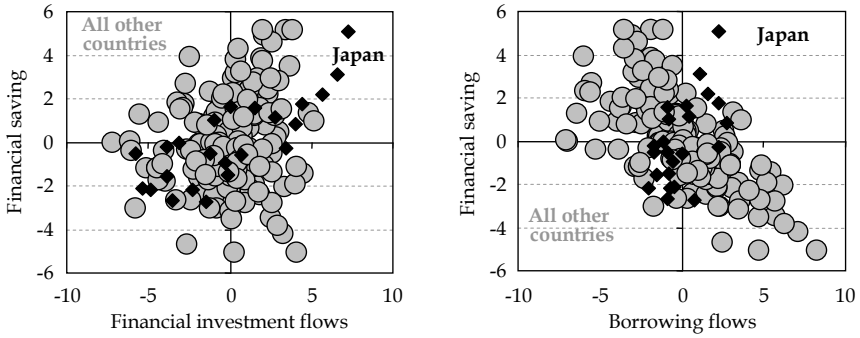
$$FS_t^i = aFI_t^i + b^i + c \qquad (1)$$

$$FS_t^i = \alpha BOR_t^i + \beta^i + \gamma \quad (2)$$

where FS_t^i is the household financial saving ratio of country i at date t, FI_t^i their financial investment ratio and BOR_t^i *t*heir borrowing ratio.

The specification chosen permits fixed effects by country b^i and β^i. The financial saving ratio is taken from the non-financial national accounts. The financial investment and borrowing ratios are taken from the financial accounts. Using the saving ratio in the financial accounts makes no difference to the results but increases somewhat speciously the correlation between the financial saving ratio and the financial investment ratio. The panel comprises eight developed countries (United States, Canada, United Kingdom, Germany, France, Spain, Belgium and the Netherlands). The data are quarterly. Italy was excluded from the sample as the data for financial investment and borrowing derived from the quarterly household financial accounts are extremely volatile and the household financing capacity is very different from that shown in the national accounts.

Figure 10. Financial investment flows, borrowing flows and financial saving ratios for 8 developed countries (% of GDP)



Note: In these drawings, the points are annual and cover the period 1991-2013, except for Belgium, where the financial accounts start only in 1999. The variables are centred for each country.

Sources: National central banks, national statistical institutes.

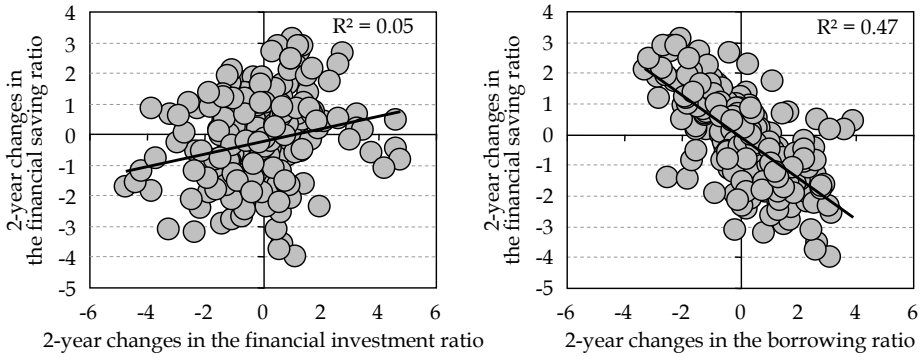
Japan is a special case, in that the financial investment ratio here explains a significant part of the evolutions in the financial saving ratio. For all the other countries, the financial investment ratio does not appear to be a major determinant of household spending behaviour. Although over the whole period coefficient a is significant, it remains small ($\hat{a} = 0.11$) and its explanatory power is limited. Above all, it is particularly unstable over the period. For certain countries taken individually, this coefficient was not significant or only slightly significant (United States, United Kingdom) and in some cases even carried the wrong sign (Germany, France and Spain).

On the other hand, the impact of the borrowing ratio on household spending behaviour is clear. Coefficient α is significant over the whole of the period ($\hat{\alpha} = -0.51$) and has an explanatory power much greater than that of coefficient a (R^2=0.73). The constraint imposed by having a coefficient that is common to all the countries therefore seems reasonable – especially as the estimation is robust to a modification of the period considered, with the coefficient stable and in all cases significant. If one eliminates data for the time after the 2007 financial crisis, it increases and becomes even more significant ($\hat{\alpha} = -0.75$ and $R^2 = 0.82$).

When data are available, study of these behaviours over a longer period confirms and refines this observation. In most countries, the *variations* in spending propensities continue to be largely explained by those in the borrowing ratios. Certainly, the behaviour of household financial investment is by no means without its effect on the *trend*

evolution in their financial saving ratios, with lasting rises or falls in the flow of financial investment prompting corresponding rises or falls in spending propensities. For example, between the mid-1950s and the mid-1970s, the financial saving ratio of American households rose along with their flows of financial investment. Conversely, its decline over the following two decades pushed their financial saving ratio down. Even so, short-term fluctuations in this ratio still remain largely determined by those of the borrowing flows (Figure 11). *For monetary policy to exert an immediate influence on household spending, this influence has to be channelled much more through their borrowing behaviour than through their financial investment behaviour*.

Figure 11. Variations in American households' financial investment ratios, borrowing ratios and financial saving ratios, 1954-2006 (% of GDP)



Sources: Federal Reserve and Thomson Datastream.

To verify this, an examination was made of the link between the evolution in interest rates and in household borrowing flows. However, this examination excluded data for periods after end-2006, as the 2007-09 financial crisis clearly modified behaviours, especially where householders were highly indebted. The effect of interest rates on household borrowing behaviour is relatively clear-cut, even though there is every reason why these effects should not be identical everywhere. The financial system, the loan modalities and the 'appetite' for debt all play an important role in this respect and national specificities have to be taken into account in attempting to make a correct assessment of the effects of the policies implemented by central banks, the case of the eurozone countries being a good illustration. Because retail banks' practices in the eurozone have remained national, the same monetary policy is reflected in evolutions in individual countries' household borrowing conditions that are very different.

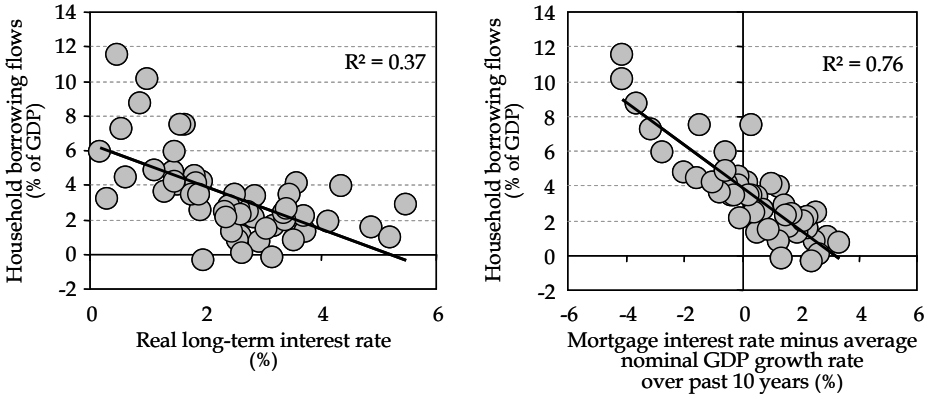
Let us take the example of Spain, where mortgages are at variable rates indexed on short rates. A fall in policy rates will rapidly lead to a fall not only in the rates for new loans but also in the rates charged on the stock of existing loans. The impact on household spending will be all the more powerful in that people already in debt will find that their interest charges decline. If, on the other hand, as in Germany in the early part of the 2000s, households have been borrowing long-term at fixed rates and have difficulty in renegotiating their loans, the effects of monetary policy will be less clear-cut and less powerful and take longer to manifest themselves. The evolutions in these two countries of the average cost of the *stock* of mortgage borrowing were necessarily different. Between the beginning of 2003 and the end of 2004, this cost fell by 100 basis points more for households in Spain than in Germany. Conversely, between the beginning of 2006 and 2008, it rose by 170 basis points in Spain whereas it fell by 20 basis points in Germany. There was therefore very little chance that the same monetary policy would produce the same effects in both countries. Whereas between the end of 1990 and 2007, Spanish households' borrowing flows steadily rose, those of German households steadily diminished.

Differences in financial practices are not the only factor capable of producing differences in the effects of one and the same monetary policy in different countries. Lasting gaps in growth and inflation can produce diverging expectations regarding the growth in nominal incomes and hence in the real interest rates *perceived* by the borrowers [Brender & Pisani, 2010]. Taking these into account, one arrives at a fairly good explanation of the diversity of borrowing behaviours seen in the eurozone in response to the evolution in the ECB's policy rates up to the time of the financial crisis (Figure 12). The financial accounts that are available for a longer period (1965-2006) for American households confirm the influence of interest rates on household borrowing (Figure 13). A fall in interest rates is accompanied by an increase in borrowing flows and conversely. This brings out one conclusion, namely that *the immediate effects of monetary policy on the real economy operate not so much via corporate behaviour as via households' behaviour, especially with regard to their borrowing*.

The Federal Reserve's FRB/US model – whose foundations are nonetheless 'neo-classical' – confirms this. More than half the impact on activity of a 100-basis-point cut in policy rates, after a lag of four quarters, is due to upturns in residential investment and in the consumption of durable goods, in equal shares. As the ratio of residential investment to GDP is only half that of durable goods consumption (4%, compared with 8%) its

evolution is the one most heavily affected by the change in the interest rate.[8] The rise in productive investment explains 13% of the upturn in activity, a contribution barely greater than its proportion of GDP (close to 11%). Two years after a cut in policy rates, the (cumulative) contribution of residential investment remains the same (24%), that of consumption of durable goods falls slightly (19%) and that of corporate investment rises slightly (18%). All in all, the response of corporate expenditure is much weaker and more delayed than that of household spending. Leamer [2007] also stresses the forerunner role of residential investment in American cycles, with corporate investment subsequently responding to the evolution in economic activity. The evolution in US private agents' spending propensities operates in the same direction, with *fluctuations in household spending propensity systematically preceding those of firms* (Figure 13, right-hand side).

Figure 12. Credit cost and household borrowing behaviour in the eurozone, 1995-2005

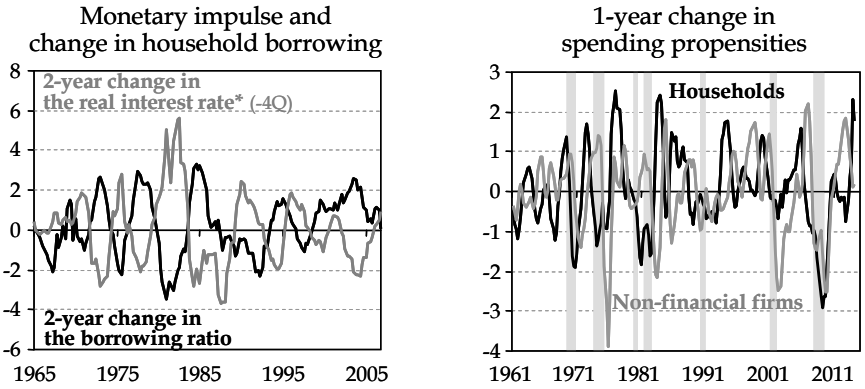


Note: The points correspond to annual data for the following countries: Germany, France, Italy, Spain and Belgium. In the case of Italy and Belgium, the data are available from 1999 on. In order to explain the flow of household borrowing, in the left-hand figure, the 10-year government bond rate has been used for each country and deflated by its average inflation over the past 10 years; in the right-hand figure, this rate is replaced, for each country, by the difference between its mortgage rates and its average annual nominal growth rate over the past 10 years.

Sources: National central banks, authors' calculations.

[8] The response of residential investment to a movement in the policy rate is in this case channelled through that of long rates and it is through its influence on long rates that monetary policy influences residential investment.

Figure 13. Monetary impulse, household borrowing and variations in the spending propensities of American non-financial agents (% of GDP)



* The real interest rate is here the difference between a nominal interest rate and the average growth in household income over the past 10 years. The nominal interest rate is itself a weighted average of the 10-year public bond yield (70%) and the Fed funds rate (30%), lagged by four quarters. The shaded zones in the right-hand figure correspond to American recessions (NBER definition).

Sources: Bureau of Economic Analysis, Federal Reserve and Thomson Datastream.

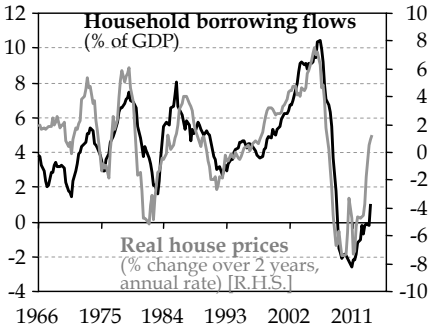
This central role of household borrowing in the transmission of monetary policy calls for one final remark. The demand component that is first to accelerate in response to a cut in interest rates is, as we have just seen in the American case, household spending. The link between this additional expenditure by households and their additional borrowing is nevertheless less direct than might appear. To a large extent (almost 80%, before the financial crisis, in the American case), household borrowing takes the form of mortgages and hence is intended to finance the acquisition of dwellings. Many of these dwellings *already exist*, however – less than one quarter of transactions involve new housing. Admittedly, in the national accounts, purchases of existing housing are also a source of residential investment as the various commissions paid and any renovation work carried out are considered as an investment. Even so, the investment spending related to the purchase of an existing dwelling is much smaller than the value of the purchased asset and also, most often, than that of the loan that financed it. If residential investment nevertheless rises significantly in response to a cut in interest rates, this is because a cut triggers transactions – and borrowings – that are *a multiple of the observed investment*.

In the United States the volume of mortgage lending intended to *finance a real-estate acquisition* (meaning that loans intended to refinance an

earlier purchase are excluded) accordingly represent on average more than *twice* the volume of residential investment carried out during the same period. The loan taken out by a household purchasing an existing dwelling will in fact in most cases be followed by another loan, this time taken out by the seller, who will use the proceeds of the sale partly to pay off the balance on his past loan, with the rest, unless it finances consumer expenditure, serving as the down payment on a new purchase, and so on, until a rise in interest rates comes along to curb the process.

This remark has its consequences for the conduct of monetary policy: while household borrowing for real-estate purposes provides support for activity by stimulating household spending, there is also a risk, given the importance of transactions involving existing dwellings and also in many cases of constraints on new building, that it will prompt a rise in real-estate prices. A sequential movement involving an increase in mortgage borrowing, a rise in real-estate prices, a decline in aversion to risk and expectation of future price rises can then rapidly become self-sustaining and lead to a real-estate cycle whose dynamics would be uncoupled from those of the business cycle (Figure 14).

Figure 14. Household borrowing and real-estate prices in the United States, 1966-2013



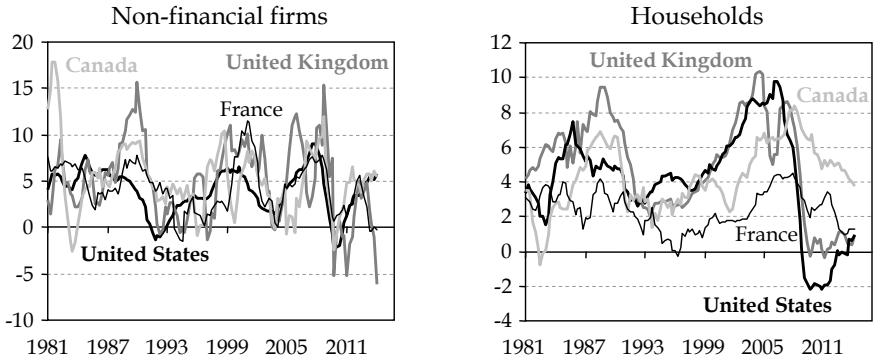
Note: The real-estate prices are deflated by consumer prices.

Source: Thomson Datastream.

The result of all this – since financial liberalisation, at least – has been the emergence in several countries of a household debt cycle that differs in its periodicity and its amplitude from the corporate debt cycle (Figure 15). This conclusion takes a stage further the analysis made by Borio [2012], which places the emphasis on the existence of a 'financial cycle' that is more persistent than the 'business cycle' but without underlining the particular role played by household borrowing. This point is nevertheless essential: if

the effects of the impulses given by the central bank in order to keep the economy in the vicinity of full employment are channelled first through household borrowing and trigger a real-estate cycle that is more persistent than the business cycle, then policy makers cannot ignore the fact, the formation of real-estate bubbles being a frequent side-effect of low interest rates.

Figure 15. Non-financial firms and household borrowing, 1981-2014



Sources: BIS and Thomson Datastream.

The conclusion of this study of the factors determining household and corporate financial behaviour shows why monetary policy on its own cannot take charge of the day-to-day management of the monetary constraint. Given that the flows of financial investments by both households and firms are largely insensitive to movements in interest rates, this management operates above all through modulation of borrowing flows. These flows, as shown in the previous chapter, will have to be adjusted *to those of the financial investments that agents would wish to make if the economy is in a state of full employment*. Formulated in this way, the problem posed by keeping the economy on a full-employment trajectory becomes evident: the adjustment needed implies *anticipation* of the desired amount of financial investments in the future. On its own, the transmission by the financial system of the interest-rate movements decided by the central bank cannot suffice to ensure this adjustment. The information-gathering and the decision-making mechanisms applied within the financial system in order to determine, day by day, the supply of lending, will play an essential role in this respect.

3. INFORMATION AND THE SUPPLY OF LENDING

The fact that the financial system plays a major role in keeping the economy on a growth path should come as no surprise. Unlike the central bank, it is in direct contact with the borrowers as well as the savers: it provides the financing, collects the incoming funds and relieves those providing the funds of part of the risks they do not wish to take. It does not do this blindly. Its units, like all other private enterprises, aim to make profits rather than losses, so that before granting a loan (or acquiring a security) they will try to calculate, to a certain extent at least, the risks they are taking. For this purpose, they will mobilise information resources to help them make detailed decisions regarding the loans they are prepared to grant: for how much, to whom, for what purpose, at what rate of interest, etc. Within the financial system, information-gathering tools and decision-making routines are used to provide answers to these questions on a daily basis. These mechanisms, often largely ignored, nevertheless have a direct impact on the real economy. On their effectiveness will depend the quality, not only of the macroeconomic equilibrium but also that of the allocation of the savings generated in the economy and hence the growth of its potential output. However, to grasp their full importance it is necessary to introduce a hitherto neglected dimension of the problem posed by keeping an economy in macroeconomic balance, namely its inter-temporal dimension.

In order to benefit from the saving available *today* in an economy and to expand its potential output without running the risk of creating inflationary pressures, some idea of the saving that will be generated *tomorrow* is needed. The information-producing activity of the institutions that receive the financial investments of non-financial agents – to be known from now on as the savings-collectors – plays a key role here. By choosing between the various types of financial investments offered, the savers provide the financial system with information on the future of their financial

investments. This information helps to determine the 'length' of the loans granted and hence also that of the projects financed. In this respect, the bond market makes an appreciable contribution by enabling the information available to savers and to savings-collectors to be passed on to those implementing the investment projects or to the banks financing them. For the complete determination of the supply of credit, information of a different nature is also needed, this time involving not the resources that will be available to the financial system, but the capacity of the borrowers to meet their commitments. Financial units also have the role of assessing borrowers' creditworthiness and ensuring that the loans granted stand a good chance of being repaid.

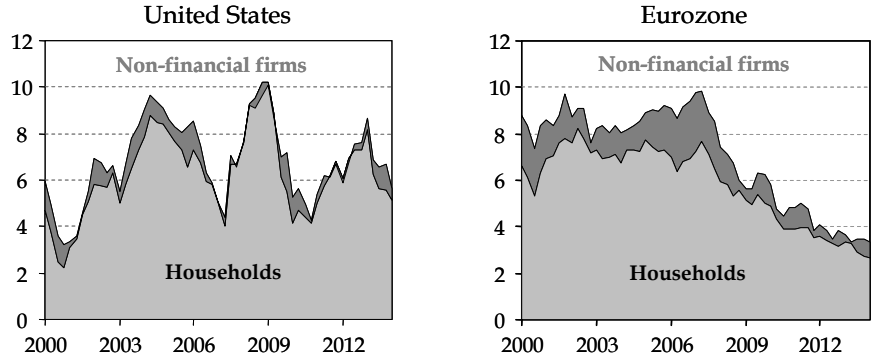
3.1 The inter-temporal dimension of macroeconomic regulation

A country's saving is a macroeconomic magnitude; its financial system only takes account of the inflows of financial investment it receives and the outflows of the financing it grants. These financial investment inflows emanate essentially from households (Figure 16) and their total amount is, as we have seen, relatively unresponsive to the level of interest rates. This has one important consequence, stressed in the previous chapter, namely, that to maintain an economy in the vicinity of full employment, monetary policy, failing the ability to have a significant effect on the amount of financial investment, will *operate mainly by influencing the amount of the expenditure financed via borrowing*. This amount will have to be permanently as close as possible to that of the financial investments that agents wish to make if the economy is at full employment. The problem posed by this adjustment is all the more delicate in that, to some extent at least, this expenditure is relatively inert or, to be more precise, downwardly rigid.

Part of the loans granted do in fact finance investments that will sooner or later increase the economy's potential output. By their very nature – it takes time to expand a workshop, to construct a factory or a shopping centre (or, indeed, a hospital or a residential building) – expenditures of this type are marked by severe rigidities. They are often for projects whose realisation is spread over a certain period of time, which lengthens what Hayek [1931] calls the 'production structure'. A firm will not normally launch an investment project if its financing is not, in large part at least, ensured. It would otherwise run the risk of having to interrupt the project before completion, meaning that much of the expenditure already carried out would have to be written off. Similarly, no one is going to start to build a house without being certain of completing it. By deciding the size of the

credit lines it opens up, the financial system makes daily decisions concerning the amount of the projects that can be launched. The credits granted will finance expenditures spread over the whole duration of project implementation. This means that today's investment spending results from decisions taken months, or even years, ago and that the total amount cannot fall other than slowly, as projects arrive at completion [Hayek, 1931].

Figure 16. Inflows of financial investment into the financial system from households and non-financial firms, 2000-14 (% of GDP of the country or zone)*



* In the case of non-financial firms, the financial investments exclude direct transactions between firms. Only deposits, investments in money-market funds and mutual funds and purchases of debt securities are included. Given that investment in equities is not available for the United States, this has also been excluded in the case of the eurozone.

Sources: European Central Bank and Federal Reserve.

Other types of credit can nevertheless make it possible to absorb the available saving without having to take a gamble on the existence of fresh saving in the future. This is true of all the loans – short-term, this time – granted to firms to finance an increase in their inventories as well as of the loans that may be made to the government to finance a surplus of current spending or to households to finance their consumption. But it is also true for most of the loans, albeit long-term, made to households, in particular for the purchase of an existing dwelling, or to firms to finance a takeover. Despite their longer maturity, these loans do not lead to a lengthening of the production structure. When a household borrows over 15 or 20 years to finance the acquisition of an existing dwelling, no new project is really involved and any possible renovation work generally lasts no more than a few weeks.

Even so, these mortgage loans, through their multiplication, are capable, as we saw in the previous chapter, of inducing, more or less directly, a significant addition to expenditure. Hence, they too can make it possible to prevent deflationary pressures from forcing the economy to deviate from full employment. While they do not contribute to the rigidity of the *flows* of credit-financed expenditure – unlike the latter, they do not 'pre-empt' a flow of future saving – they nevertheless, to the extent that the reimbursement cannot be required before maturity, mean that the *stock* of outstanding loans is downwardly rigid. The irreversible aspects of investment projects – needed for growth in potential output – or of other long-term loans – often needed to ensure the full employment of this potential – thus provide a temporal dimension to macroeconomic equilibrium, making it impossible for it to be maintained simply by adjusting the central bank's policy rates.

Full employment, 'growth forgone' and inflationary pressures

These rigidities in fact imply a need for permanent intertemporal trade-offs. Deciding today to finance new projects involves the risk of not being able at some stage in the future to reduce the flow of credit-financed investment expenditure to an extent sufficient to adjust it to that of the saving that will be generated at full employment. Admittedly, the central bank can then take note that investment is excessive, but it will not be able to prevent inflationary pressures from surfacing (unless it wishes to implement a policy that is so restrictive as to lead to the abandonment of part of the projects already launched). A rise in prices, by eroding the purchasing power of the income being spent, will then enforce the saving of the resources necessary for the completion of ongoing projects. However, not to launch investment projects in sufficient number to absorb all the saving available today, in order to avoid generating inflationary pressures in the future, would imply giving up increasing the potential output by as much as possible. A trade-off has therefore permanently to be made between 'growth forgone' and inflation. It is not the only one, however. Recourse to long-term lending to finance investment projects as well as current expenditure[9] creates a different dilemma. The rigidity conferred by these loans on the outstanding amount of existing lending can in fact, for its part, also become a source of inflationary pressures. This will be the case if, at some time in the future, with the economy in a state of full employment, economic agents, in a desire

[9] The boundary between investment and current expenditure is not always clear-cut. In the American national accounts, for example, the expenses relating to a real-estate purchase or the renovation of an existing dwelling are considered as investment.

to spend more, draw down on their financial investments at a more rapid pace than the diminution in outstanding lending. Here again, a trade-off has to be made, this time between maintaining full employment today and risking a rise in inflation sometime in the future.

These trade-offs are not something that can be dealt with by the Taylor's rule discussed earlier. This rule merely states how the central bank, by adjusting its policy rate, can accelerate or curb expenditure in such a way as to keep the economy at more or less full employment without inflation being allowed to exceed a certain level. It is not concerned with determining whether or not the expenditure that is sensitive to these changes in interest rates is linked to investment projects or whether the financing granted is short- or long-term, nor does it 'prescribe' the level of inflation that must not be exceeded. Ensuring full utilisation of the potential output and producing the highest possible economic growth, but without excessively forcing up prices, cannot be achieved by the application of what is a purely tactical rule.

Given this intertemporal dimension, maintaining macroeconomic equilibrium through time implies *memory* of the maturity of the existing loans and of the amount of the ongoing investment projects. It also implies *information* on the financial investments that will be potentially available in the future. This memory and this information are possessed, in part at least, by the units making up the financial system, in particular those that collect the financial investments and distribute the loans. Management of macroeconomic equilibrium therefore necessarily implies continual interaction between the central bank and these units. The adjustment of policy rates is the most visible element of this process, but there are others much more deep-seated: the level of inflation that the monetary authority does not wish to see exceeded and the rigour with which it tries to attain this objective, as well as the prudential rules it imposes, will have a decisive influence on the composition and volume of the supply of credit.

Looking beyond Taylor's rule

In order to regulate activity, the monetary authority must take into account the community's relative aversions to inflation, underemployment and growth forgone. In fact, *by setting more or less explicitly the level of inflation that it will tolerate, the central bank resolves the dilemmas that have just been described*. To understand this, let us return to the objective of its policy, namely to ensure that the total expenditure, both current and for investment purposes, that is financed by either short- or long-term loans permanently matches as closely as possible the financial investments that agents wish to make at full

employment. While these financial investments are relatively insensitive to the rate of interest, they are nevertheless continually evolving. The flows of financial investments by households, which constitute the bulk of the total, respond to a variety of needs, including in particular precautionary purposes, and are affected by a multiplicity of forces (demography, income distribution, evolution of wealth, etc.).

Let us suppose that the financial investments that households wish to make today if the economy is in a state of full employment are given. In order to avoid any growth forgone, *all the available* savings would have to be invested in fixed capital, with the risk of seeing at some stage in the future a decline in the flow of financial investment and the emergence of inflationary pressures.[10] The rigour with which the central bank pursues its objective of containing inflation will progressively set limits on the taking of this risk. If the projects launched do not absorb the totality of full-employment savings, other loans will have to be granted for the economy nonetheless to be in a state of full employment. If this lending is long-term, it can also represent an inflationary risk. This will be the case if it is financed by financial investments with relatively short maturities. The level of inflation tolerated by the monetary authority will therefore also put a limit on this 'maturity-transformation' risk (if this has not already been done more harshly by regulatory means).

However, the central bank is far from alone in being responsible for deciding the growth of potential output and its degree of utilisation. For a given saving stance on the part of private agents, this growth and this degree of utilisation will also depend on the *state of information* within the financial system regarding the financial investments that it will be receiving in the future and on its attitude towards risk. Improving this state of information or changing this attitude will make it possible to increase, all things remaining equal, the growth in the potential output. *The quality of the information mobilised by the savings-collectors plays a crucial role in determining the way in which the available savings can be placed at the service of growth* (Box 6).

[10] Stock formation is obviously one way of absorbing these pressures, but its financing has to take place at the expense of productive investment: deciding which part of the available saving goes to which of these alternatives is part of the trade-off between growth forgone and inflation [Brender, 1980].

Box 6. State of information, attitude to risk and growth

For the sake of argument, let us take a financial system comprising only a commercial bank that distributes the totality of lending and receives the totality of deposits and a central bank charged with seeing that the economy does not deviate 'too far' from full employment. In order to demonstrate the link that exists between the state of information within the financial system regarding future saving and growth in potential output, let us suppose that only two types of loans can be granted. Loans of the first type are used to finance *investment projects* that will increase potential output; these are carried out in equal shares over two periods. Let X_t be the value of projects whose financing was *decided* in t; I_t, the amount of investment *carried out* in t; K_t, the stock of productive capital at this same date. This gives:

$$I_t = \frac{1}{2}(X_{t-1} + X_t) \text{ and } K_t = K_{t-1} + X_{t-2}.$$

Loans of the second type are of a different nature, in that they do not finance an expansion of productive capacity – instead, they enable households to purchase consumer goods, for example – and do not involve a commitment by the commercial bank for the following period. The bank, it is assumed, knows the financial investments that it will take in, for the present period, *if the economy is in a state of full employment* (as these investments correspond to the saving for the period). It also knows that the central bank, in each period, is possibly going to cut its interest rates to ensure that the economy will indeed be in a state of full employment and that households will therefore borrow all the full-employment saving not devoted to financing investment in fixed capital. The only real decision to be taken by the commercial bank then involves *the amount X_t of the new investment projects it undertakes to finance*. As loans of the first type carry higher remuneration than the others, it will, of course, want to grant as many of these as possible. There is, however, an associated risk: if, for the following period, it has undertaken to finance investment to an amount greater than the saving desired by private agents with the economy in a state of full employment, inflationary strains will inevitably appear. A price rise will then force households to generate the saving needed to finance the projects already launched. The central bank will tighten its refinancing conditions and the commercial bank will suffer a greater loss, it will be assumed here, than the gain procured by the investment projects it has agreed to finance.

Let us suppose, in the first place, that the saving ratio s_t of private agents is known, stable and equal to s. Let k be a capital coefficient assumed, for the sake of simplicity, to be constant and let Y_t be the GDP of this economy for period t. We then have $S_t = s_t Y_t$ and $Y_t = kK_t$. The potential output for period t is known with certainty, being a function of the installed capacity and hence

of the projects decided in the period up to $t-2$ (the capital has an infinite lifetime). It can be easily verified that, on these assumptions, the economy can be maintained without tension on a full-employment growth trajectory. For this to happen, the commercial bank will only have to increase, period after period, its supply of project financing at the pace $\dot{X} = \sqrt{(1+2sk)} - 1$. This rate will also be equal to the rate of growth of the economy and one will have $\dot{X} = \dot{K} = \dot{Y}$. The higher the private agents' saving ratio, the greater the growth in potential output.

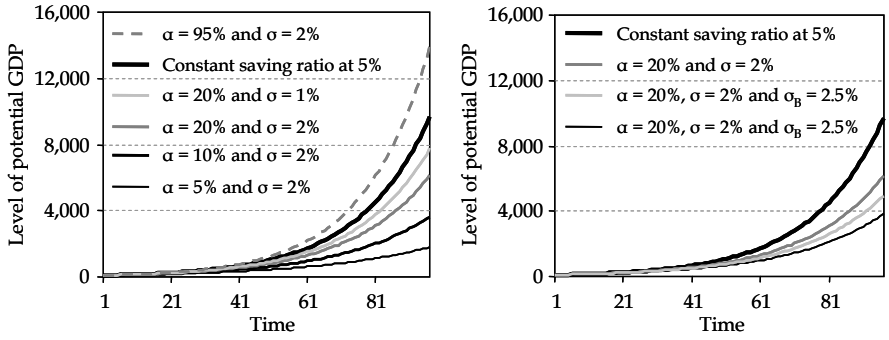
Let us now suppose *this saving ratio fluctuates randomly around a certain average*. The saving ratio s_t now follows a normal distribution with mean s and standard deviation σ. If the commercial bank knows the parameters of this probability distribution function, what amount of investment projects will it agree to finance? In order to answer this question as simply as possible, it is supposed that it will *want to limit the probability of the emergence of a situation of forced saving*. If α is the probability threshold below which it wants to remain, it will decide to finance new investment projects for an amount X_t such that:

$$P[s_{t+1} < \tfrac{1}{2} X_t / Y_{t+1}] < \alpha\ \%$$

This value α can be seen either as the threshold of 'inflation-tolerance' for a central bank or as a measure of the aversion to risk on the part of the commercial bank. The higher this threshold or the weaker this aversion (i.e. the greater the value of α), then, *for a given average level of the saving ratio*, the faster the growth in our economy's potential output.

To illustrate this, a simulation was carried out, taking each time over 1,000 independent draws, of the trajectories associated with different values of α (Figure 17). For a low value (meaning, for example, that the bank does not want the probability of inflationary pressures to exceed 5%) and for a saving ratio following a normal distribution $N(5\%, 2\%)$, GDP grows relatively little (in the left-hand figure, fine black curve towards the bottom); if the tolerance threshold is 20%, potential output rises much more rapidly. Note that the same will be true if, all things remaining equal, the standard deviation of the saving ratio being smaller (1% on Figure 17) – meaning that private agents' saving behaviour is more stable – the 'transformation' of the saving by the bank becomes less risky. Note, finally, that if the emergence of inflationary pressures is not a problem (α=95%), the commercial bank will systematically launch investment projects absorbing all the saving in period t and potential output will grow even faster than in the case in which the saving ratio is stable and certain. The economy will, however, often be in a situation of forced saving.

Figure 17. Level of activity as a function of inflation-tolerance and the volatility of saving behaviour



Source: Authors' own calculations.

So far, it has been assumed that the commercial bank has perfect knowledge of households' saving behaviour or, to be more precise, of the distribution describing it. In fact, the information tools used by the bank enable it to have no more than an approximate knowledge. Suppose that, for the bank, s_t follows a normal distribution with mean s, but with standard deviation σ_B where $\sigma_B > \sigma$. The difference between these two standard deviations gives an idea of the imperfection of the information tools used by the bank. It can then easily be shown, taking the previous framework, that, everything else remaining equal, *growth in potential output will be the weaker, the greater this imperfection* (Figure 17, right hand side). Despite its summary nature, the exercise illustrates the importance, for an allocation of savings that is favourable to growth, of the state of information of the financial system and hence of the quality of the information tools it brings to bear. It also shows the role played by aversion to the risk of inflation.

3.2 The information tools of the savings-collectors

The financial system offers financial investments of different types to those wishing to 'put money aside'. By choosing among these, the agents are communicating information regarding the flow of their future financial investments. On this basis, the financial system will be able to decide the amount, the nature and the maturity of the loans it is prepared to grant. The intermediaries with which households and firms invest their money – the 'savings-collectors' – clearly play a special role in this gathering of information regarding future financial investments. The way in which they do so differs widely, depending on whether or not they have the capacity to create money.

Continuous interaction between the central bank and commercial banks

The banks, being at the heart of the circulation of money, are in a special situation. Having the power to lend money they create, the amount of lending they grant is not constrained by that of the financial investments they receive, but *anticipates this amount*. Left to themselves, they could grant an unlimited amount of lending. However, the central bank has the power to exert a particular constraint over them. When its policy is well-managed, these units have an incentive to mobilise any information they may have regarding the financial investments which in normal circumstances they should have at their disposal in the future.

To understand this, let us suppose, in the first place, that there is only one commercial bank, which is obliged to hold reserves with the central bank in proportion to the outstanding volume of its deposits and that it must also be permanently able to meet the demand for banknotes from its customers. These banknotes and these reserves are a form of money that the commercial bank cannot create; only the central bank has the power to do so. To procure this money for itself, the commercial bank must borrow at rates that are set by the central bank's Monetary Policy Committee (Box 1). This permanent need for borrowing in order to meet its reserve obligations and the demand for banknotes makes the commercial bank vulnerable. If it lends 'too much', it takes the risk of seeing the central bank raise its policy rates and hence increase the cost of what it borrows on the money market. If it has failed to anticipate this rise, its profits will be reduced, all the more so in that the central bank can also increase the level of the reserves it obliges the commercial bank to hold with it. Note that if there is only a single commercial bank, lending 'too much' corresponds to a very precise macroeconomic situation, in that the loans granted will bring the economy beyond full employment and lead to inflation greater than the central bank is prepared to tolerate.

Faced with the threat of a 'punitive' monetary stance, our commercial bank will find it in its interest, when it decides the amount of its new commitments, to take into account any information it may have on the financial investments that should normally be available to it in the future, with the economy remaining around the full-employment level. If it agrees to finance a new project for investment in fixed capital, will it be able in the future, without having to borrow at 'punitive' interest rates, to cope with the draw-downs that will be made on the loans financing all the ongoing projects? Will the financial investments that should normally become

available to it be sufficient to enable it to hold out, again without undue strain, until the loans granted reach maturity? The information provided by the financial investments appearing on the liability side of its balance sheet will help the bank to reply to these questions by enabling it to have a better idea of the risk related to the maturity of the loans granted and to the commitments this implies for its treasury.

The banks' information and decision-making activities

The liabilities of our bank are comprised partly of bonds with varying maturities. The information these provide is unambiguous. By issuing these bonds, the bank has locked in the cost and maturity of part of its resources. Deposits have been converted into securities and money has been frozen until the time of maturity. The corresponding amounts can be lent, over the same time horizon, without the bank having to take the slightest 'transformation risk'. Moreover, its continuous contact with the operators on the bond market gives it some idea of the resources that it will be able to find on that market in the near future.

Another part of its liabilities consists of accounts and deposits of varying terms. Those who have chosen this type of financial investment are not totally committed to keeping these sums on deposit until the set term but have nevertheless provided one item of information, namely, that they do not *expect* to be using these sums within a certain time period. The bank's past experience enables it to know the likelihood that these deposits, in normal circumstances at least, will be withdrawn prematurely. It also enables it to predict more or less precisely the future inflows of investments of this type.

The final part of its liabilities consists of current deposits, which the holders can use whenever they like and without prior notice for any transaction they wish. This is precisely their reason for choosing to place part of their assets in this form. Here again, however, the bank is capable on the basis of its past experience to forecast more or less precisely its future evolution. Finally, in order to decide the amount of its new commitments, the bank has one last source of information, namely, the repayment schedule of the loans already granted. Those who have borrowed from it will constantly be saving part of their income in order to pay off their debt, creating a flow of resources that is particularly easy for the bank to predict.

On the basis of this body of information, collected and analysed on a daily basis by its treasury department, the commercial bank will decide the amount and maturity of the new commitments it is prepared to grant and

hence the liquidity risk it is taking. Inasmuch as the central bank will 'punish' it if it lends 'too much' and inflation rises – remember that the banking sector still consists of only one bank – it has an interest in using the information available to it in such a way as to keep the likelihood of such punishment below a certain level that will be lower, the greater its aversion to risk and the greater the central bank's reputation for severity (Box 6). This incentive will still operate if there are several banks instead of the single bank assumed here. The total of the loans distributed will indeed still decide the total of the deposits but this equality will not hold good for each individual bank. The interbank market will then make it possible for intercommunication between the respective treasuries.

On this market, banks are on a daily basis lending money that is not theirs to create, namely that issued by the central bank. Those banks which at any given moment have an excess of deposits with the central bank will lend to those that do not have enough. If policy rates rise, borrower banks will be penalised and, conversely, the more cautious banks will benefit. This part of their liabilities will not, however, provide the borrower banks with information regarding resources that will be available to them in the future except to the extent that regularities appear, some banks being permanent lenders and others permanent borrowers. The interest rate on these interbank loans is directly linked to that of the policy rates. Banks needing to borrow can in fact, in normal times, always choose between borrowing from another bank or from the central bank. If it is assumed that the banks are perfectly sound, this interbank rate defines *the riskless overnight rate* and it is this rate, as we shall shortly see, that plays a key role in the determination of all the interest rates applied within the financial system.

The information activity of the non-bank intermediaries

Unlike the banks, the other savings-collectors can lend only such money as they actually have at their disposal. Incapable of creating money, they can only circulate it. They nevertheless play a crucial role in the mobilisation of information regarding the flow of future financial investments. This is obviously true of the pension funds (or of the reserve funds of the pay-as-you-go pension systems). These funds have at their disposal particularly refined information on the financial investment behaviour of their members. Their knowledge of the latter's age structure enables them to estimate fairly precisely the evolution in the contributions that they are going to receive as well as of the payments they will have to make over a time horizon that may be relatively distant. They hence constantly have a fairly precise idea of the sums they will be able to place at the disposal of the rest of the economy (or,

conversely, the sums that they will have to recover from it). The same will be true of the insurance companies, which, in exchange for the premiums regularly paid in by their subscribers, undertake to pay a capital sum or an annuity in certain precise circumstances (retirement, death, invalidity, etc.). Here again, they are capable, in the light of their past experience and knowledge of the population covered, to have a fairly precise notion, looking several years ahead, of the resources that they will have at their disposal.

This long-term vision would seem to make these savings-collectors the archetypal 'long-term investor'. While they do indeed have particularly precise information regarding the future flow of financial investments which enables them to play this role, prudence, the lack of the necessary information resources and often the regulatory framework usually lead them not to finance projects directly but rather to acquire *securities that are tradable on markets*, namely shares and bonds. By permanently adjusting the maturity of these securities so as to derive the maximum benefit from the resources that they are likely to have at their disposal, they are communicating to other financial institutions (or directly to non-financial firms) part at least of the information they have available. The role of the bond market in this communication is crucial.

3.3 The role of the bond market

The bond market occupies a special place in the financial system in that it enables the savings-collectors – or the savers themselves – to pass on, *without ambiguity*, part of the information at their disposal. When an insurance company buys a bond, it provides the issuer with a precise item of information, namely that the sum it has just borrowed cannot be reclaimed before maturity. If this borrower is a firm, it can launch an investment project without having to worry any further about its financing. Note that the amount of the issue says nothing about the *immediate* investment expenditure. Regardless of the way they are financed, projects are in fact spread over time. If a firm borrows €1 billion on the bond market to finance the development, spread over four years, of a new product line, the expenditure implied by the project will each year account for only part of this sum. Having ensured the financing of the project through the issue, the firm will invest the bulk of the sum collected at shorter term, leaving the company treasurer to decide the structure of these investments. In so doing, the treasurer will in turn be communicating to the financial system, more or less explicitly, the schedule of the drawings that the firm expects to make in the future in order to implement its investment.

The influence of the central bank on the formation of long rates

The bond markets are places where savings-collectors and agents with funds to spare can purchase debt securities with different maturities. The prices formed in the market determine an essential element of the supply of credit, namely the yield curve. This curve, which relates yields to maturities, acts as the reference for all the loans granted within the financial system, regardless of their nature or of the beneficiary. Let us take the imaginary case of an insurance company which believes that it will be able to have one billion euros at its disposal for a period of seven years and which buys a seven-year bond issued by a bank. The latter then knows that it will have this sum at its disposal for seven years at the interest rate the bond market has now set and this will influence the interest rate of the loans that it will make for this period. Inasmuch as the demand for interest-rate-sensitive loans, especially from households, is demand for long-term loans, *the way in which interest rates are formed in the bond market plays a central role in the transmission of monetary policy*.

The link between the policy rates set by the central bank and the bond-market yield curve is close, as long-term rates depend on the expectations of operators in the bond market regarding *future policy rates*. This can be simply explained. Let us take a perfectly sound bank (the likelihood of default in the coming years being zero). It can equally well borrow from our insurance company by issuing a seven-year bond as by issuing every three months over a period of seven years short-term securities – certificates of deposit, say – whose remuneration will be close to that of the interbank market rate (and hence also to the central bank's policy rate). Our insurance company therefore has a choice between lending one billion euros for seven years at the bond-market borrowing rate or investing this sum in certificates of deposit whose remuneration will be re-set every three months and renewing this investment at regular intervals over a period of seven years. It will choose between the two by comparing today's seven-year rate with the money-market rate it expects to see during the coming seven years. The bank applies the same reasoning, having a choice between borrowing for the period of seven years or issuing certificates of deposit during the same period. Its decisions will be taken in the light of its expectations regarding market rates during this period. As a consequence, *the bond-market rate will depend on operators' expectations regarding the future level of policy rates*.

To understand how the central bank exerts a grip on the yield curve covering a range of maturities, it is necessary first to understand how expectations regarding future policy rates are formed. The market data

available over a long period in the American case make it possible to know what these expectations were and hence shed light on the logic underlying their formation. There is one initial striking observation: for a time horizon of one to two years, the expectation 'errors' are relatively modest – at least since the Federal Reserve, at the beginning of the 1990s, made special efforts to improve transparency regarding its policies. By bringing greater clarity to the principles underlying its action, even to the point of committing itself regarding the forthcoming trajectory of its policy rates, the American central bank has managed to guide market expectations with a fair degree of precision over a short time horizon [Kool & Thornton, 2012].

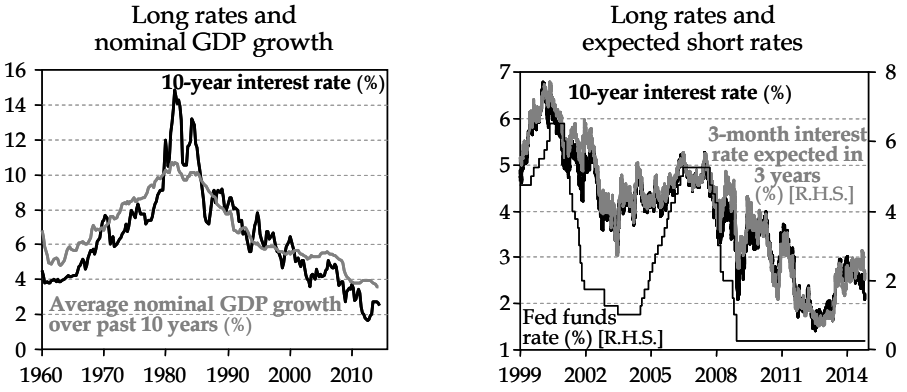
The Fed is not the only central bank to have opted for such 'forward guidance'. By announcing in the summer of 2013 that it would be holding its rates low "for a considerable period", the ECB finally abandoned a rule that it had reaffirmed on several occasions, namely, that it would never 'pre-commit' its future policy. This more or less explicit guidance of expectations has thus become a genuine instrument of monetary policy, with effects that can be just as powerful as those of variations in the policy rates themselves. When the central bank hints that it is going to raise its rates – or when the markets, on their understanding of the logic underlying the bank's policy, become convinced of the fact – longer-term rates will harden and the movement will affect the demand for loans that are sensitive to these rates; conversely, a downward revision in expectations of policy rates, by tending to lower long rates, will stimulate the demand.

Long memories of nominal evolutions

However, the long-term bond yield does not depend solely on expectations regarding the next few years. The policy rates expected over a more distant time horizon are even more important in determining their level. For this longer period, the vision is necessarily less precise, but certain elements of information are nevertheless available. The value around which real policy rates, i.e. adjusted for inflation, have fluctuated during past cycles is known and there is no reason, *a priori*, why the average value in the next cycle should be very different. On top of this expected average real short rate, there must be added an expectation of future inflation, still over the long term. The surveys available (the Survey of Professional Forecasters for the United States, for example) indicate that these expectations of long-term inflation are relatively inert, with economic agents tending to expect inflation in the coming years to be similar to that observed in past years. For the past several decades, the US Treasury 10-year bond yield has fluctuated around a value set by nominal growth in the 10 or so preceding years (Figure 18). It can be

interpreted as the sum of an average real short rate (the growth rate of real GDP over the past 10 years) and an inflation expectation that is also a reflection of inflation observed over these same 10 years. This long-term memory suggests that market expectations are more 'adaptive' than 'rational'. How else can one explain that, with American central bankers clearly declaring at the beginning of the 1980s that their aim was to defeat inflation, it took so many long years for the bond market to take on board the fact that this goal had been attained?

Figure 18. Long rates, nominal evolutions and expectations of short rates in the United States



Source: Thomson Datastream.

The 'riskless' long rates that are formed on a daily basis in the bond market will obviously be capable of diverging substantially from this expectation of the 'normal' average level of policy rates at a relatively distant time horizon. In the first place, as we have just seen, they will fluctuate in accordance with the movements in policy rates decided by the central bank and the indications given in the accompanying announcements (Figure 18). Second, they will fluctuate in accordance with variations in a particular type of risk premium – the term premium. The long rates in the reasoning are said to be 'riskless' because they involve no *credit risk* (the borrower being regarded as perfectly sound). But this does not mean that they do not carry an *interest-rate risk*. If tomorrow the policy rates are higher than expected, our insurance company will regret having immobilised its money for a period of seven years in exchange for a remuneration smaller than the one it could have received by repeated purchases of certificates of deposit (the bank, on the contrary, will be congratulating itself!). The lender is compensated for this risk by means of a *term premium*. In normal circumstances this premium

will be higher, the more distant the maturity of the bond but also the more the issues with this maturity tend to exceed demand. If the savings-collectors have at their disposal abundant long-term savings, their demand for bonds will tend, on the contrary, to squeeze this premium or even turn it negative. By making massive purchases of long-term securities – and therefore lending funds with this time horizon – the central bank can operate in the same direction. When the market is already expecting policy rates to be very low for a very long time, it can in a process known as quantitative easing (QE) bring down still further the level of long-term interest rates.

Day after day, analyses of the detailed structure of the financial investments received, combined with memory of the financings granted, provide operators in the financial system with a massive amount of information. On this basis, they can, in the light of the constraints imposed upon them by the central bank but also of the indications it provides and the interventions it makes, decide on the time horizon and interest rate of the commitments they are prepared to undertake. In this way, they contribute to the management of macroeconomic equilibrium. This contribution is all the greater in that other sources of information enable them to assess yet another risk, this time regarding the capacity of the borrowers to meet their future commitments.

3.4 The analysis of debtors' solvency

In order to keep some control over the credit risk he is taking, the lender has little choice: he must attempt to assess the capacity of those to whom he is about to lend to repay what they borrow. The quality of this assessment clearly plays a key role in the allocation of savings and the growth in potential output. Lending to insolvent debtors or financing projects that will lead to nothing is simply a recipe for wasting savings. This waste will also involve losses for those bearing the risk of these loans. To avoid this, lenders will decide the interest rate at which they lend to such a debtor in the light of their judgement regarding his solvency. The greater the perceived risk of default, the higher the *credit risk* premium that will be added to the riskless rate. The information tools used to appreciate this credit risk will, in part at least, differ depending on whether the borrowers turn to the markets or to the banks. Inasmuch as the development and use of these tools are in all cases costly and time-consuming, their *specialisation will in itself influence the allocation of savings*. If in a given financial system more investment has been placed in methods facilitating the assessment of certain types of loans or

certain types of borrowers, there is a good chance that the available savings will go to the financing of these types rather than the others.

The banks' 'inside information' and its limitations

The banks have a natural interest in protecting themselves against the credit risk, as the non-repayment of a loan appearing on their balance sheet will reduce their profits. In order to reduce this risk as far as possible, before taking a loan decision they will make use of the arrangements intended to reduce the uncertainty regarding the soundness of borrowers and of the projects they are financing. They have a considerable advantage in this respect, namely that their borrowers are also their customers. There is often a personal relationship involved and the transactions their customers carry out on a daily basis often pass largely through their books. This gives them at the outset 'inside' information regarding the quality of the projects to be financed today or, failing that, the quality of previous projects implemented by their customers, their capacity to carry them through and, more generally, their financial soundness.

When a bank has for a long time held the accounts of a certain customer, be it a firm or a household, analysis of these accounts gives particularly useful information regarding any loan it might make. This will be less true in the case of customers having accounts with several different banks, typically high-income households and firms of appreciable size. But in this case other sources of information exist: exchange of information between banks is possible and, in particular, certain data bases exist that centralise information relating to past repayment incidents involving the borrowers or to their present indebtedness situations. In the case of small firms and of many households, the interpersonal relationships often tend nowadays to be replaced by a 'statistical' relationship. Processing of the data that may be available to the bank concerning each of the borrowers then leads to the attribution of a credit rating, more or less explicit in nature, that makes it possible in the case of small loans, especially to households, to accelerate the decision-making procedure, reducing it simply to checking that the loan being asked for is consistent with what the lender considers to be the borrower's repayment capacity.

Before agreeing to finance a project of any significant size planned by a firm, the banks will obviously scrutinise the project's proposal documents in order to assess its viability. This scrutiny will take into account, along with the project's specific characteristics, the prospects for the economy in general but also for the sector of activity concerned. If all the information assembled

is insufficient to dissipate doubts regarding the capacity – and even the intention – of the borrower to repay the loan, the bank may modify the information problem posed by asking a third party having close relations with the borrower – and with recognised credit – to act as guarantor. In most cases, if the loan is of substantial size, the bank will ask for a specific guarantee. The asset purchased on credit (a car, a building, a machine, a business, etc.) or other property belonging to the borrower will be used as security. For a complete appreciation of the risk actually being taken, the lender will then have to consider the resale value of the security in the event of default by the borrower. In the case of real estate, a mortgage guarantee is the norm, obliging the lender to examine, in addition, the outlook for the housing market in general.

In most cases, the loan decision will therefore be based on information relating to the borrower himself but also on other information regarding the prospects for the economy. In fact, everything else remaining equal, the risk of default fluctuates in line with the economic situation. When conditions worsen, an upturn in business failures and a rise in unemployment increase the number of repayment incidents; when conditions improve, the number declines. In taking its decision, the bank will have to rely on a range of information sources providing analysis, not only of the borrower's creditworthiness and the quality of the project, but also of the outlook for the sector in which he operates and for the economy more generally. Inasmuch as recourse to information sources is a costly business, some financial institutions tend to specialise in this activity, permitting a pooling of costs. This applies, for example, to the agencies that produce 'credit scores' for individuals, these scores then being used by the potential lender. Other units, like the American mortgage securitisation agencies, go a stage further by offering in return for a premium their guarantee on loans that meet a fixed set of criteria. *In this way they take over the credit risk on the loans granted*.

The role of the rating agencies

If we now take a situation in which the borrower turns to the bond market rather than to a bank, the lenders' information sources will be different. As we have seen, borrowings on this market are for large sums, meaning that households and the majority of firms are unable to borrow directly from it, with only governments and a relatively small number of firms having access to it. At the same time, given that a large number of lenders are subscribers to one and the same issue from a single borrower, the information source constituted by the direct relationship between lender and borrower can no longer come into play. Assessment of the credit of each of the issuers on the

bond market will be based essentially on information published by the borrowers themselves. On this basis, possibly supplemented by further information supplied by answers to their questions, certain specialised financial institutions – the rating agencies – award each potential borrower ratings, possibly accompanied by detailed comments, indicating the creditworthiness of the borrower but also the prospects for the sectors in which the borrower operates. While the borrower pays the agency for this rating, this does not normally mean that it also buys its indulgence. In order for its ratings to have value in themselves, the agency must acquire and then maintain a reputation for honesty. When non-financial agents – households, in particular – subscribe to a bond issue, this rating will often constitute the principal information regarding the risk of default by the borrower. When the subscriber is a financial institution – an insurance company or a fund manager, for example – this rating will normally be only one among several elements for the appreciation of this risk. Other elements, similar in part to those mentioned in the case of the banks, will also be applied.

The financial institutions, inasmuch as their aim is to make profits, will only lend if they are capable, to a certain extent at least, of evaluating the risks incurred. For this to be possible, the risks have to be relatively predictable. For the most part, as we have just seen, these units derive from *observation of the past* the information – both micro- and macroeconomic – on which they base their current decisions. Their information sources therefore only operate satisfactorily in economies where relative stability prevails. Both inflation and growth, in particular, must evolve in relatively steady fashion. This is normally true of the advanced economies, but more rarely in the case of economies that are less so. When this stability is assured, the development of information tools specialising in the assessment of risks associated with various types of loans and borrowers becomes viable. Where these tools are in place, the distribution of lending can respond rapidly and with precision to monetary policy impulses. This response will be less clear-cut, on the other hand, in countries where this is not the case and especially those whose financial systems are less developed. This has one important consequence which we shall return to later: in a world economy where 'financial globalisation' makes it possible for savings generated in one place on the planet to finance expenditure in another, the absorption of available savings will take place preferentially where there exist powerful *financing channels*.

These channels are characterised, not only by the nature and quality of the information tools in place, but also by the 'quantity' of risk they are able to take on. Like any private firm, each financial institution has a given

amount of equity capital. If at some time in the future its accumulated losses exceed this amount, it will go bankrupt. In order to avoid this, and taking into account the particular nature of their activity, the financial enterprises are subjected – when they do not subject themselves – to particular 'prudential' rules, such as the need to maintain a minimum ratio between their equity capital and the risks they take on. This means that the amount of equity capital at the disposal of each unit – or the amount allocated to its department specialising in one or other type of loan – sets a limit, temporarily at least, on the lending that can be distributed via this channel.

Here again, the financial system will be able to *respond to the monetary policy impulses aimed at stimulating lending only if the risk-taking capacity of the channels for the distribution of lending is not saturated*. In an economy where there is substantial accumulation of savings and capital and where much of the financial commitment is at long term, *enabling the associated risks to circulate* within the financial system is essential if growth in the real economy is not to be hampered by insufficient capacity on the part of the banks to take on the risks implied by new lending. If care is not taken, however, there is then an obvious danger that the supply of lending will end up by being governed more by the ease with which lenders can download the risks taken than by the mobilisation of the information resources just discussed!

4. FINANCE AND THE CIRCULATION OF RISKS

The financial system plays a key role in the day-to-day management of the monetary constraint. Money is issued and circulated within this system at the same time as risks are being taken there. Once taken, these risks will have to be carried until maturity. The financial system facilitates this 'carrying' by enabling risks to circulate in their turn. An increasing number of markets give those who wish the possibility of taking on or unloading a financial risk. The 'speculation' taking place in these markets often leads to their being regarded as 'divorced from reality'. And yet, enabling those taking the risks to unload them, possibly taking a loss in so doing, reduces the obstacle that risk aversion imposes to the provision of financing.

No one can be certain of correctly appreciating a risk any more than of being able to carry this risk to maturity. The traditional financial markets, the equity markets in particular, have long been the place where such circulation of risk takes place and the price movements occurring there clearly illustrate the fluctuating nature of the assessments they provide. Securitisation, by which claims are made negotiable, has led to the emergence of new markets, in which savings-collectors (insurance companies, pension funds, etc.) can take on risks and ensure the financing of loans that are not normally their business to grant. The more recent growth in recourse to derivative products and the generalisation of lending against securities mark a further stage in this evolution, with operators that are not savings-collectors – to be known as 'risk-takers' – now able to bear all or part of the risk involved in existing loans.

This expansion of the scope of risk-circulation is an aspect of financial development that the authorities are going to have to learn to control. This is because such 'non-financing finance' performs a useful function. By enabling risks to be steered in the direction of operators that have not

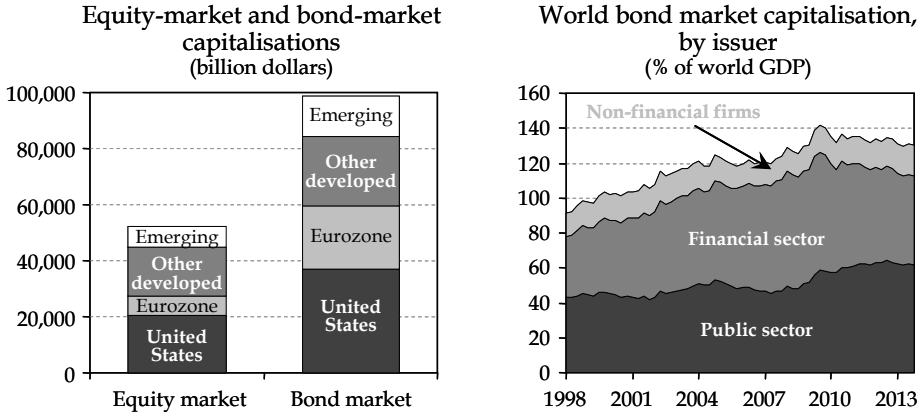
accumulated savings, it is possible to prevent growth in activity from being gradually snuffed out by a build-up of savings in the hands of non-risk-taking agents. The 'new intermediation' created on this basis, through the degrees of freedom it opens up, facilitates macroeconomic adjustment and the conduct of monetary policy. It is also, however, the source of new dangers, being in fact based on risk-taking chains that are both lengthy and intricately interwoven and therefore vulnerable to the failure of any one of the links they comprise. Moreover, those taking part have information-gathering and decision-making behaviours that are similar to those of many market traders in that they take a short-sighted view and that their attitude to risk tends to fluctuate, the result being to make the financial system more unstable.

4.1 The role of the 'traditional' markets

The equity and bond markets occupy a special place within the financial system. They are the place where financing is obtained – in the form of equity capital or loans – and the securities issued on this occasion can then be traded and can circulate. Given the economic and financial development that has taken place, the function of these 'traditional' markets has become somewhat different, notably in the United States. The financing role of the bond markets, described in the previous chapter, has been growing continuously, while that of the equity market has declined. The latter now mainly ensures the redistribution of equity capital between firms and the circulation among investors of the risks associated with the holding of shares.

In the space of some 20 years, the market capitalisation of the equity and bond markets in the advanced economies has doubled to close to 100% and 200% of GDP, respectively. The emerging regions, meanwhile, despite rapid progress since the beginning of the 2000s, still represented at the end of 2013 a relatively small share of world capitalisation (Figure 19). In this respect, the United States continues to dominate. The US market for debt securities issued by non-financial firms is particularly developed, accounting for almost three-fifths of the world total. This recourse by American companies to market financing is not a new phenomenon. At the beginning of the 1950s, these loans already accounted for 50% of their borrowing and this proportion has steadily increased since the beginning of the 1980s – at the expense of bank financing – and now amounts to no less than 85%. However, at world level, non-financial firms account for only a small share of total issues, with governments and the financial sector by far the largest issuers of debt securities.

Figure 19. The growing importance of the traditional markets



Sources: BIS and Thomson Datastream.

In parallel with this growth of the bond markets, there has been a change in the nature of the investors. Households and banks held almost two-thirds of the outstanding Treasury securities at the beginning of the 1950s, but only 10% – directly, at least – in 2013. In part, this trend reflects the increasing importance of institutional investors (investment funds or pension funds), but it is also explained by the accumulation, in the form of debt securities, of the emerging countries' foreign-exchange reserves. The bondholders have also become more diverse. Whereas at the beginning of the 1950s insurance companies held two-thirds of the debt securities issued by American companies (at that time, mainly non-financial firms), at the end of 2013 the proportion was only one-fifth.

The increased size of the markets is, of course, an advantage for the issuers but also for the investors: the deeper the markets, the greater the possibility of selling securities without affecting their prices. The daily volume of transactions gives an idea of this liquidity: between July 2013 and July 2014, the primary dealers in US Treasury bonds – the most active operators on this market – traded a daily average of no less than $500 billion. Similarly, daily trading on the American equity market amounts to almost $130 billion, in other words, the equivalent, in one year, of total stock market capitalisation. Indeed, many people today regard the stock markets more as the place where securities are traded at prices having no relationship with the real economy than as the source of the equity capital needed by firms for their development. They are not entirely wrong. In the advanced economies, for companies *taken as a whole*, the stock market is no longer a source of equity capital and the volatility of prices formed there is sometimes high. The

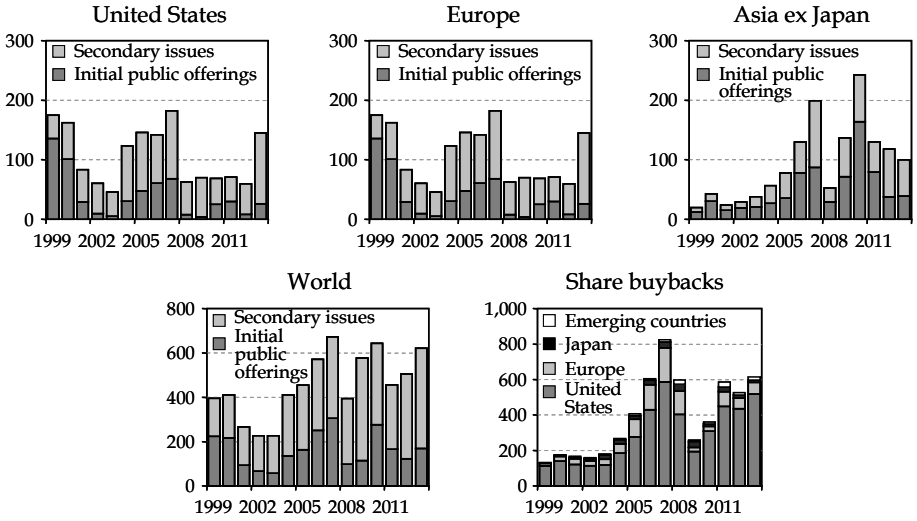
markets – of which the equity market is the prototype – are by their nature the place where bubbles and panics regularly occur. However, to conclude from this that they have no utility would be short-sighted.

Circulation of risks and of equity capital on the stock market

American data would seem to confirm the now relatively small role played by the stock market in the financing of growth. While there has been a steady year-on-year rise in the funds raised on the bond market, *net* equity issues (i.e. after deduction of the shares acquired by firms themselves) have often even been negative in the period since the beginning of the 1990s! Overall, American firms have been 'handing back' capital to their shareholders by buying back their own shares or the shares of firms they have taken over. This fact, however, must not be allowed to conceal another: while the volume of buybacks is substantial, this does not mean that *gross* issues are negligible. The stock markets remain a place where companies, start-ups in particular, can find equity capital. Stock market flotations have amounted to a yearly average of around $50 billion since the 1990s, roughly one-quarter of the funds raised on the American equity market.

This activity, which is particularly intense in the United States and Europe, consisting of the buying (or buying back) of shares by certain companies and of the issuing of shares by others, contributes to a redistribution of equity capital between mature companies and companies just starting up. However, this redistribution is not confined to the developed economies but also takes place at world level. In the emerging regions, share buybacks are small and flotations are substantial. This is especially true in Asia (Figure 20). Far from being simply a place for the circulation of securities, the stock market is therefore also a source of equity capital for numerous companies, especially in fast-growing sectors and economies. It also obviously makes it possible for those who have hitherto taken the risk involved in financing their development to take their profits – sometimes on a spectacular scale – at the time of their initial public offerings, whereas without this prospect their expansion would perhaps have been more difficult.

Figure 20. Share issues and share buybacks, 1999-2013 (billion dollars)



Note: The Worldscope data for share buybacks have been aggregated for the companies included in the Thomson Datastream indices, which cover a very wide range of companies (1,255 in the eurozone, 1,000 in the United States and Japan and 550 in the United Kingdom). However, these data include transactions other than share buybacks (in particular, conversions of preferred stock into common stock). In the case of the developed countries, we therefore excluded banks, more likely to engage in such operations.

Sources: Bloomberg, Thomson Datastream and authors' calculations.

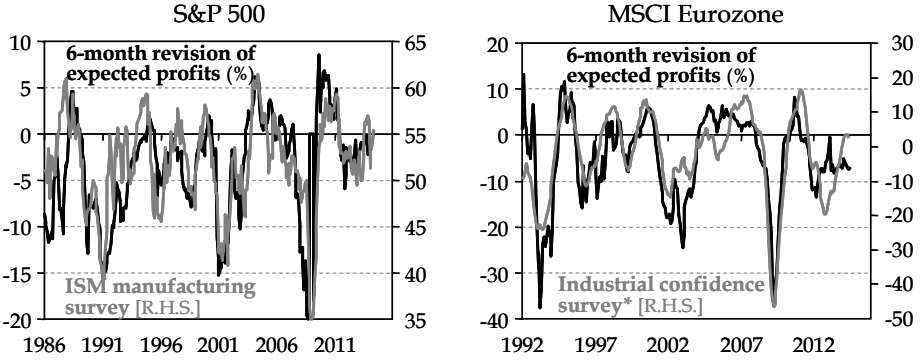
While in the developed economies the role of the stock market as a net source of equity capital has become relatively marginal, its role in the circulation of the risks associated with the holding of shares nevertheless remains essential. Who would want to immobilise his savings in a company's shares if he did not have the assurance that he would be able to sell them, even at a loss, if the outlook were to deteriorate? Assessing the value of a company is in fact never easy: the evolution of its share price reflects the continually-changing views of the market participants. If the value of a share is defined as the *present value* of the dividends that the company will pay out *in the future*, it is immediately clear that the calculation is a delicate operation. In the first place, it assumes that the profit outlook for the company can be estimated over a fairly long time period, and this cannot be done without taking a more general view of the outlook for the economy as a whole. Next, the present value of the expected dividends has to be calculated using as discount rate the yield on a 'riskless' investment over the

same period, increased by a premium in order to take into account the uncertainty surrounding these expected dividends. Examination of the logic underlying the formation of stock-market prices clearly reveals the limitations of the evaluations made by the market and of the mechanisms underlying them.

The fluctuating nature of stock-market evaluations

In order to maintain a *macroeconomic viewpoint*, it is necessary to look at indices representative of a basket of securities rather than individual shares. The expected profits of companies in the index are then the starting point for the valuation calculations. The forecasts made by the analysts contributing to the 'IBES consensus'[11] for the companies entering the main indices – the S&P 500, the CAC 40… – are available for two different time-horizons: the next two or three years and the longer term. The first observation is perhaps surprising: the short-term forecast of the total profits of these companies constantly fluctuates in accordance with the economic situation, and changes in this situation are rarely foreseen. When the monthly surveys show the situation to be improving, the expected profits are revised upwards; when they show a deterioration, the expectations are revised downwards (Figure 21). The mechanism is therefore more a reflex reaction than a forecast. This does not mean that it has no utility: without it, the profit forecasts would be revised, not simultaneously with the economic prospects, but later!

Figure 21. The economic situation and analysts' forecasting errors

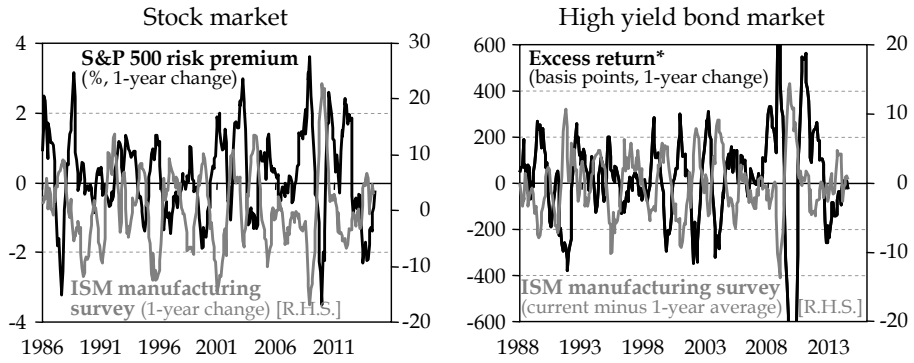


* European Commission survey.
Source: Thomson Datastream.

[11] Institutional Brokers' Estimate System. This database covers 40,000 firms and 70 markets.

Forecasts of profits growth over the longer term, for their part, are based largely on past trends. If profits are seen to have grown rapidly in recent years, analysts tend to expect rapid growth in coming years, and vice versa. "The longer an economy expands at a solid rate, the more people are likely to project that rate forward" [Greenspan, 2001]. This behaviour tends to amplify price fluctuations still more. The influence of the risk premium described earlier operates in the same direction. To illustrate this, it is possible, knowing the observed prices on the European and American stock markets, to calculate the respective underlying risk premiums [Brender & Pisani, 2001]. From this calculation it can be seen that the premiums also vary in close correlation with the business cycle: when the situation improves, the premiums narrow and vice versa (Figure 22).

Figure 22. The cyclical dynamics of the risk premium in the American markets



* A corporate bond risk premium is first calculated as the spread between the respective yields on corporate and Treasury bonds with the same maturity. The 'excess return' is then calculated by deducting from this premium the default ratio observed by Moody's over the past 12 months multiplied by a loss ratio set at 60%.

Sources: Thomson Datastream and authors' calculations.

The articulation of these various types of behaviour means that stock market prices are liable to vary considerably and to deviate constantly from any values that might be regarded as 'fundamental'. If the economic situation improves, analysts will expect rapid growth in current profits while at the same time the risk premium will fall. If the situation remains favourable, the longer-term profit expectations will be revised upwards in their turn, thus contributing to a general rise in stock-market indices. The levels attained at the end of this sequence will be extremely vulnerable, however, easily reversed by signs of a slowdown. Accordingly, stock-market indices give a fluctuating measure of company values. Moreover, in the

event of a shock – economic or geopolitical – the premium required for holding equities will rise sharply, triggering a fall in prices.

One final observation can be added, namely that the credit-risk premium on corporate bonds shows that the markets' assessment of the associated default risk is itself largely pro-cyclical, falling when the economic situation improves and rising during slowdown phases (Figure 22). This makes it easier to understand some of the observations made in chapter 2. When activity accelerates, the financing conditions of firms – especially those that find their financing in the markets – improve, their real investment increases and their financial activity expands. They borrow or use their shares to acquire partial or total holdings in other firms and this in turn boosts stock-market prices. If the central bank is slow to raise interest rates, it will have difficulty in putting a halt to this financial euphoria.

4.2 The role of securitisation

Alongside traditional markets, securitisation has led to the development of new markets: by creating tradable securities backed by loans that were not tradable, it has enlarged the scope of bond circulation. This practice – which has acquired a bad reputation, to say the least, as a result of the sub-prime crisis – is not really new. The German market in *Pfandbriefe* opened in the middle of the 18th century, in the wake of the Seven Years' War, in order to help regional unions of landowners (*Landschaften*) to find finance [Wandschneider, 2013]; the Danish covered bonds market facilitated the financing of the reconstruction of Copenhagen following the 1795 fire.

Two principal methods of securitisation are currently practised. The first consists of the issuing by a bank of securities backed by a group of loans ring-fenced in its balance sheet. This is exemplified by the *Pfandbriefe* in Germany or the covered bonds in France. These bonds offer their holders dual protection: in addition to the backing provided by the loans, the issuer bank acts as guarantor for their repayment. The second method consists of passing on the loans to a vehicle which will then finance their purchase by issuing securities backed by these claims. Financial institutions in Europe tend to use the first type of securitisation, i.e. the issue of covered bonds, while American institutions favour the second, issuing mortgage-backed securities (MBS) when the loans acquired are mortgages, or asset-backed securities (ABS) in the other cases.

Both methods have a feature in common, namely that the bank no longer has to worry about financing the loans granted, since this is taken care of by the purchaser of the issued securities. Depending on the method used,

however, the bank will also unload part or all of the other risks associated with these loans. *In the cases of the ABS and MBS, it will no longer bear any risk at all, while in the case of the covered bonds it will retain their default risk*. The risks that the banks no longer have to worry about have not disappeared, of course, but are now being borne instead by the purchasers of the securitised claims. Whether the latter have correctly assessed these risks is a question that we shall return to. What is certain is that these acquisitions enable financial institutions to diversify the composition of their assets or to bring it more into line with the composition of their liabilities.

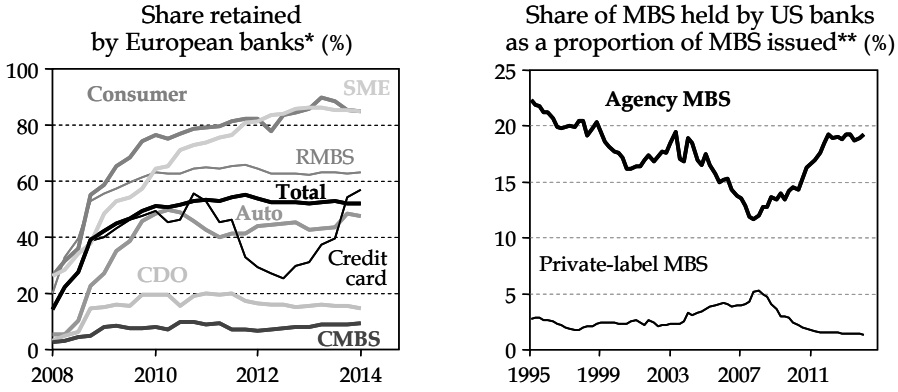
The market in securitised mortgages

While securitisation, in all its forms, has steadily grown since the beginning of the 1990s, certain types of loans are more systematically concerned than others. Mortgage loans taken out by households account for almost 80% of all securitised claims in both the United States and Europe. While the proportions are similar in the two cases, the total volumes are different. The *outstanding amount* of securitised mortgage loans in the United States is more than twice what it is in Europe – more than $8,700 billion compared with $4,100 billion at the end of 2013 – this latter figure being made up of $2,800 billion in the form of covered bonds and $1,300 in MBS. Having risen continuously since the beginning of the 1970s, the percentage of mortgages that were securitised in the United States exceeded 50% at the beginning of the 1990s and was close to 75% at the end of 2013. The securitisation agencies (Fannie Mae and Freddie Mac) played a major role in this evolution. By granting their guarantee to mortgages *meeting certain defined norms*, they facilitated the acquisition of the securities backed by those mortgages.

As has often been emphasised, the possibility of securitisation facilitates the granting of mortgages. Once the loan has been sold, the bank is relieved of the burden both of bearing the risks and of providing the financing. This possibility also influences the nature of the loans granted and, in so doing, the transmission of monetary policy. Banks are for instance disinclined to take the risks associated with long-term fixed-rate loans with an option of early repayment. When securitisation enables them to pass on these loans, as is the case in the United States, they no longer hesitate to grant them. When interest rates fall, households can then pay off an existing loan by taking out a new loan at lower interest, thus correspondingly increasing their capacity to spend. In the United States, the role played by securitisation in creating the preponderance of loans of this type is fully evident: their share of total mortgages is reduced when the possibilities of passing them on are restricted. For instance, this share is systematically smaller for the savings

banks – which are subjected to regulations requiring them to hold on the asset side of their balance sheets a substantial proportion of mortgage loans or MBS – than for the commercial banks [Fuster & Vickery, 2014]. Another point to note is that, while the option of early repayment is commonplace in the United States, this is far less true of other countries and almost impossible in Germany. Here again, there is a reason for this. In order to cover their interest-rate and liquidity risks, German banks issue fixed-rate *Pfandbriefe* with maturities close to those of the loans granted. The possibility of early repayment without dissuasive penalties for the borrower would expose them to the risk of losses when interest rates fall (the remuneration on their loans declining but the cost of their resources remaining fixed).[12] The response of German households to a decline in long rates is correspondingly weakened.

Figure 23. Securitisation and the retention of risk



* The data used are supplied by the SIFMA (Securities Industry and Financial Markets Association). They relate to the countries of origin of the loans securitised and not, like those published by the ECB, to the location of the securitisation vehicles. The figures for the Irish loans securitised are for instance much lower than the outstanding assets on the balance sheets of Irish vehicles.

** Only MBS backed by residential mortgages are included.

Sources: Federal Reserve and SIFMA.

There is one final difference to be noted between the European and American markets in mortgage-backed loans. As shown in Figure 23 above,

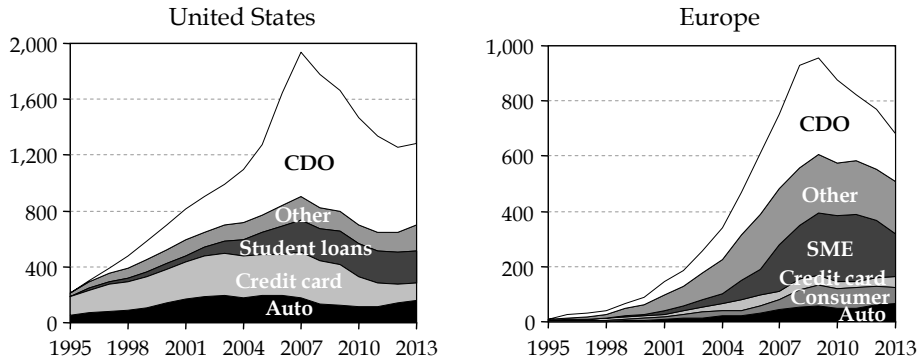
[12] The Danish covered bond market is an exception in this respect. Since the securities issued transfer the risk of early repayment to their holders, financial institutions in that country, as in the United States, grant long-term fixed-rate loans with the option of early repayment.

European banks still *retain a substantial proportion of the securities issued on their own balance sheets*. At the end of 2013, this was the case for almost 60% of the MBS but also, since 2011, for the covered bonds issued by Italian and Spanish banks. The role played by securitisation is therefore somewhat special in this case, with the banks having less recourse to it for disposing of their loans than for increasing their portfolios of securities eligible for ECB refinancing and hence protecting themselves against the liquidity risk.

The ABS market

Mortgages are obviously not the only type of loan to be securitised. The creation of ABS has also expanded with the passage of time. In the United States and elsewhere, a broadening range of assets has been the subject of securitisation by an increasing number of operators (Figure 24). While the sums involved are less impressive than in the case of mortgages, the securitisation of car-purchase loans, credit-card debt and student loans expanded considerably during the 1990s. At the end of 2013, the outstanding amount of securitised loans of these types came to $500 billion in the United States and $160 billion in Europe (Figure 24).

Figure 24. The sizes of the 'traditional' ABS and CDO markets in the United States and Europe, 1995-2013 (billion dollars)



Source: SIFMA.

Other types of loans, being less homogeneous, lend themselves less easily to securitisation. A particular case in point is lending to small firms. In Europe, the outstanding amount of these loans at the end of 2013 was slightly over $150 billion ($135 billion for the eurozone countries on their own). The proportion of the securities issued that are retained by European banks is particularly substantial: in 2013, 85% were still on their balance sheets. In the United States, the outstanding amount of loans securitised with the

guarantee of the Small Business Administration amounted to barely $33 billion. Even so, the participation of the markets in the financing of small US firms has risen substantially, from virtually nil at the beginning of the 1980s to almost one-quarter of their debt in 2010 [Wilcox, 2011]. This form of access to the market is nevertheless largely indirect, being via the securitisation of personal loans and more often of non-residential mortgages – Commercial Mortgage-Backed Securities or CMBS.

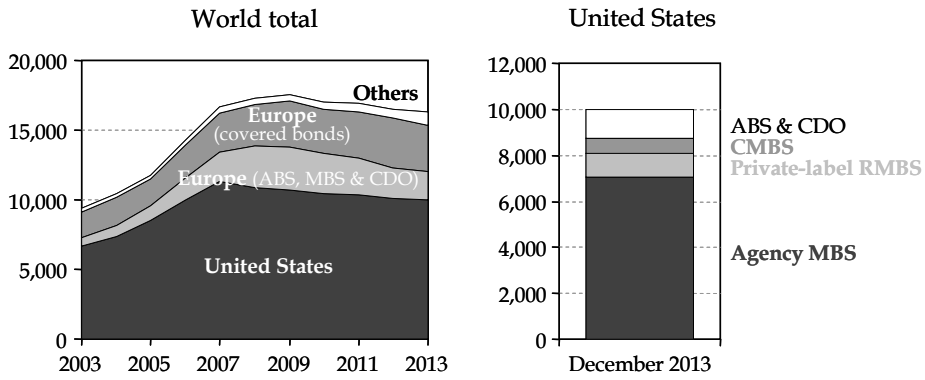
The securitisation of loans – other than mortgages – made to larger firms is more recent. Given their size, these loans are, initially, granted by several banks, one of them acting as lead bank. This 'syndication' is nothing new, having enabled the recycling of petrodollars towards sovereign borrowers in the developing countries until the Mexican crisis in 1982, before going on to experience a new expansion phase during the 1980s with the surge in mergers and acquisitions. In the mid-1990s, banks started to use a new instrument to unload part of the fairly high risk involved in these loans. Issuance of collateralised loan obligations (CLO) is the modern method for the sale of corporate loans. The banks granting the syndicated loans issue as counterpart – often through the intermediation of a collateral manager – securities that are backed by the loans.

According to SIFMA, the outstanding amount of CLO at global level exceeded $400 billion at the end of 2013. As in the case of other securitisation transactions, the disposal of these loans frees up capacity in the banks' balance sheets for the taking of risk. The activity of fund managers, taking a slightly different form, leads to the same result, by creating funds that acquire syndicated loans – also known as leveraged loans – and then managing them on behalf of their clients. In this way, non-bank investors have been able to purchase an increasing proportion of the newly-made loans [Bord & Santos, 2012]. It should be noted that this CLO market forms part of the larger market in collateralised debt obligations (CDOs). Unlike ABS, which deal with portfolios of claims of the same nature, the CDOs are representative of a diverse range of bank claims or financial instruments. They are 'structured' into tranches, permitting the redistribution to investors, according to their appetite for risk, of the income – and the risks – of the underlying portfolios [Cousseran & Rahmouni, 2005].

Evaluating the total outstanding amount of securitised claims is a tricky business, because the definitions used vary considerably, as do the statistical sources. Defined narrowly, securitisation covers only MBS and ABS (therefore excluding covered bonds). The bulk of the market is located in the United States, where at the end of 2013 the total stock of these securities

exceeded $10 trillion, i.e. four-fifths of the world total of $13 trillion. If one adds in the covered bonds, the total rises to close to $17 trillion (Figure 25), the US share falls to 60% and that of Europe (where the quasi-totality of these bonds are issued) rises to 35%.

Figure 25. The global securitisation market (billion dollars)



Sources: European Covered Bond Council (ECBC) and SIFMA.

Benefits and dangers of securitisation

By enabling non-bank agents to bear the risks of part of the loans granted by the banks, *securitisation considerably enlarges the capacity of the existing financing channels*. It enables the banks to continue lending without having constantly to mobilise additional equity capital and it enables the accumulated debts to be placed in the hands of those willing to hold them. Both the burden of their financing and the taking of the associated risks are in this way redistributed towards a much wider group of savings-collectors who are often looking for long-term investments.

While this benefit from securitisation is undeniable, it is nevertheless dangerous to ignore the surveillance problems it poses. Far from always transferring risks to other agents, securitisation can, on the contrary, lead banks to concentrate them, retaining in their balance sheets the more risky tranches of the structured products that have been created – as they in fact did during the 2000s [Rajan, 2005]. During this same period they also made use of securitisation, not so much in order to remove risks from their balance sheets as to reduce, in an artificial manner, their equity capital requirements by creating 'off-balance-sheet' vehicles whose risk they were in fact carrying [Acharya et al., 2010]. Recent experience also raises the question of the capacity of non-bank players to assess the risks they are taking and in particular the risk of default. Being able to distribute loans without having

to bear the corresponding risks *naturally* leads banks to be less vigilant regarding the creditworthiness of the borrowers. If this relaxation of vigilance is not compensated by increased vigilance on the part of those who will finally be bearing the risks of these loans, there is bound to be a deterioration in the quality of the loans granted.

For many decades, mortgage securitisation functioned without any problems in the United States because it remained regulated by the precise prudential norms laid down. The agencies bought in for securitisation only loans that were at fixed rate, did not exceed a predetermined percentage of the value of the real-estate asset purchased, whose repayment burden did not exceed a predetermined proportion of the borrower's income, and so on. Statistical analysis permits the evaluation of the credit risk of a portfolio comprising a large number of loans of this kind. By contrast, so-called 'private label' securitisation, which expanded during the 2000s, has been subjected to no such rules. This form of securitisation was gambling on the ability of investors to assess these lower-quality (sub-prime) loans, even though they lacked the slightest information of a serious nature to enable them to do so. For some of these securitised loans, nobody even checked that the borrower had any income at all! The result was that prices of these securities, offering high yields but highly uncertain repayment prospects, depended entirely on the volatile attitude to risk of market operators.

To believe that today's operators have now learnt the lessons of the past misfortunes of others would be a mistake, as all financial history shows. This is confirmed by the increase since 2012 in the securitisation of sub-prime car loans. Admittedly, the outstanding amount of these at the beginning of 2014 – around $40 billion – remained modest, but the rapid deterioration in their quality has been substantial, with almost one-third of new loans classified as sub-prime, compared with 10% five years earlier, and with almost one-quarter backed by used cars with a value well below that of the loan taken out, carrying a maturity of 6 to 7 years! In the same vein, at the beginning of 2014, banks again began to grant increasingly high-risk leveraged loans, despite the 'recommendations' of the US regulatory authorities. In this field, however, experience shows that recommendations have little effect; only *norms* that are properly *enforced* are effective.

4.3 A new form of financial intermediation

Securitisation enables savings-collectors having at their disposal 'long-term' savings to invest in *tradable securities*. Financial operators *who are not savings-collectors* are also able to do so, carrying the risks of the securitised claims –

or of traditional securities – but having to bear an additional liquidity risk. Not being collectors of savings, they will in fact finance their acquisition of these securities through short-term borrowing. Other operators – or perhaps the same ones – will be able to take on all or part of the risks of certain securities without having to purchase them. This they will do through recourse to the derivatives markets. In this way an increasingly refined fragmentation of the taking of financial risks becomes possible, enabling financial institutions to specialise their activities (just as the 'division of labour' made it possible for the non-financial firms). In parallel with traditional bank intermediation, a new form of intermediation – now called 'shadow banking' – has accordingly in the space of a few decades seen considerable expansion. Contrary to a sometimes accepted belief, this circulation of securities and of financial risks remains subject to a monetary constraint. Unlike the banks, the shadow banking sector cannot create money and its development depends on its capacity to mobilise existing monetary resources. Herein also lies its utility, as we shall see. In order for these resources to be held in this form by those who wish to do so, it is necessary that the risks of the lending forming their counterpart be taken on by others! This new form of intermediation is nevertheless, by its very nature, particularly vulnerable to any change in operators' attitudes to risk.

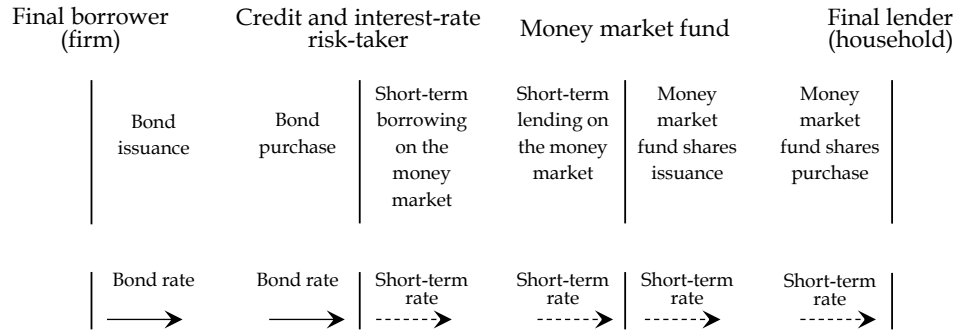
The risk-taking mechanisms

Financial operators in the shadow banking sector are highly diverse, but have one thing in common, namely that, like the banks, they will take on, for a certain period of time, financial risks using a much smaller amount of capital than would be needed to acquire the securities with which these risks are associated. It is these 'leveraged' risk-taking mechanisms that we now wish to recall briefly [Brender & Pisani, 2007].

Let us start from a simple example. A trader decides – obviously in the hope of making a profit – to take on the risks of 1,000 fixed-rate 5-year corporate bonds valued at €10,000 each. There are two risks associated with these securities: an interest-rate risk (if at some time in the future the interest rates on 'riskless' securities rise by more than is currently expected, the value of these bonds will fall) and a credit risk (if at some time in the future the likelihood of failure of the issuer firm increases, the risk premium that is added to the riskless rate will increase and, again, the value of the bonds will fall). In order to carry these risks, our trader can borrow €10 million short-term on the money market and buy 1,000 securities, as shown in the diagram below. In so doing, he will find himself in the situation of a bank that has

lent €10 million to the same firm. Like the bank, he is now carrying a *credit risk* and an *interest-rate risk*. However, for lack of being able, like a bank, to create money, our risk-taker will have had to borrow €10 million on the money market in order to make the purchase. This means that he is taking on, in addition, a *liquidity risk* and, unlike a bank, he will not have the possibility of calling, if necessary, on refinancing from the central bank. If tomorrow the lender of these €10 million no longer wishes to renew the loan and if no one else agrees to take it over, our risk-taker will have no choice but to sell the securities he has purchased, possibly at a loss. In return for this risk-taking, he will receive the difference between the fixed interest rate paid by the corporate bond-issuer and the variable interest rates obtaining, day-by-day, on the money market. If he takes this position, it is obviously because he is convinced that this spread will be large enough to remunerate the totality of the risks he has agreed to take on.

A risk-taking chain: A risk-taker borrows in order to purchase a corporate bond



Our risk-taker can nevertheless take on these credit and interest-rate risks without having to borrow in order to purchase the $10 million of bonds. For this, all he has to do is to take a position on the derivatives markets by taking out two contracts. The first will be an interest-rate swap that will enable him to receive, during a period of five years, interest calculated on this notional amount at a rate that is set on the day the contract is concluded (the 5-year 'riskless' rate recorded that day). In return, he undertakes to pay interest, still on the same amount, but calculated using the overnight rate on the money market. The second contract is a credit default swap (or CDS), by which, in exchange for a premium – at a rate set at the time of the contract and applied to a notional amount of €10 million – that he will receive during a period of five years, he undertakes to reimburse any loss incurred by the contractor of this 'insurance' should the firm default during the period.

In principle, if the various markets are sufficiently liquid and efficient, the remuneration derived by our risk-taker will be roughly the same in the two cases described: 'roughly', because in the first case he is taking on an additional risk (the liquidity risk for which it is normal he should be remunerated), whereas in the other he has an additional cost[13] (having to immobilise monetary resources in the form of guarantee deposits). By relying on such mechanisms, this new form of financial intermediation has taken charge of considerable volumes of risk in addition to, or instead of, the traditional forms.

The derivatives markets

The derivatives markets play an important role in this respect, inasmuch as they enable each participant to unload unwanted risks and to have better control of the risks retained. Players increasingly specialised in the evaluation and taking of particular forms of risk – default risk on the CDS market, interest-rate risk on the swaps market – have therefore emerged, often within the investment banks. Those whose job it is, as we have seen, to assess these risks – the commercial banks – even sometimes rely on the 'market's evaluation' rather than on their own internal analysis. They have increasingly frequent recourse to the CDS market even for the evaluation of the credit risk of the firms they are lending to [Ivanov et al., 2014]. Meanwhile, the interest-rate swaps increasingly serve as the benchmark for defining the riskless yield curve.

Evaluating the scale of operations on the derivatives markets is a tricky matter. The *notional* amounts of the contracts in place are considerable. At the beginning of 2014, the notional underlying amounts of operations on the exchange-traded markets amounted to $72 trillion, while on the over-the-counter markets they exceeded $700 trillion. This latter enormous figure is deceptive, however. Participants wanting to unwind their positions prior to maturity can only do so by taking the opposite positions, giving rise to a falsely impressive build-up of contracts. The gross market value of open positions was in fact less than $20 trillion, while *after taking into account clearing agreements between participants* the figure falls to a mere $3 trillion. These figures illustrate the difficulty of measuring the quantity of risk circulating within a complex financial system. They also give an idea of the multitude of transactions to which this circulation gives rise.

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[13] For the time being, the counterparty risk linked to swap operations is being ignored, but will be returned to at the end of this chapter.

On the over-the-counter markets, as on the organised markets, most of the risk transferred concerns interest rates. For the past 10 or so years, the notional amount of Credit Default Swap contracts has risen rapidly, from $6 trillion to $60 trillion between 2004 and 2007, before falling back to $20 trillion in 2013. On a gross market value basis, they still amount to only one-twentieth of the value of the interest-rate contracts.

The mobilisation of monetary resources by the risk-takers

The new financial intermediation is not based solely on the derivatives markets but also on the intervention of risk-takers whose activity replicates that of a bank, via mechanisms of the type set out on page 84. These involve borrowing short-term to purchase the securities whose risks they will now bear. They can take this position either deliberately or for more 'technical' reasons. Hedge funds are the most visible risk-takers in the first category. Admittedly, they are collectors of savings (the funds entrusted to them by their investors), but these will play the same role as equity capital does in the case of a bank, meaning that they can borrow a multiple (sometimes substantial) of the entrusted sums for the purpose of purchasing securities and, with the help of leverage, derive an attractive yield for their clients – but of course at the cost of substantial risk-taking. Alongside the hedge funds are the off-balance-sheet vehicles created by the banks – often for the purpose of obviating prudential constraints – which operate on the same principle.

The second category of participant in the risk-taking consists of the intermediaries that are active in one or another securities market or the 'market-makers' specialising in a particular security. These traders permanently hold a substantial stock of securities (those they trade in). Holding this stock is financed by borrowing. The 'conduits' used to 'warehouse' loans purchased but awaiting securitisation are in the same position: these stocks, like stocks of goods, are financed by the issue of 'commercial paper', in this case asset-backed commercial paper.

In order to purchase securities, all the risk-takers have to be able to pay for them. For this, they procure the necessary monetary resources through borrowing which often takes a particular form, namely repurchase agreements. The so-called 'repo market' ('repo' being short for 'repurchase agreement') goes back a long way. As early as 1918, the Federal Reserve was using it for the purpose of injecting or withdrawing liquidity. These repos have become the most common method of financing between financial units. The operation consists of selling a security accompanied by a commitment

to buy it back at a later date and at a pre-set price (in the other direction, it is known as a 'reverse repo'). This enables a bank, on payment of remuneration at the 'repo rate', to cope with a temporary need for liquidity or a risk-taker to finance the holding of a portfolio of securities (Box 7). A reduction ('haircut') is applied to the market value of the securities serving as collateral in order to protect the lender against a possible fall in their prices. The operation enables him to invest his surplus cash short-term and in a very secure fashion: the securities serving as collateral are in fact 'delivered' even if the borrower continues to bear the risks.

Data concerning this market are fragmentary and often unusable for inter-country comparisons. In particular, data from the International Capital Market Association – or ICMA – involve double counting in that one bank's repo can be another bank's reverse repo. According to the most frequently used estimates, the repo market is thought to have more than doubled since the beginning of the 2000s, reaching by the end of 2007 $10 trillion in the United States and $7.5 trillion in Europe [Hördahl & King, 2008]. Since June 2014, the Fed has provided a more refined estimate – adjusted for double counting – for the US market. The result is more modest, but still not far off an outstanding amount of $4 trillion at the end of 2014. Public or quasi-public securities (Treasury or agency securities in the case of the United States) are used as collateral for much of the trading taking place on this market.

Box 7. The new intermediation and the circulation of monetary resources

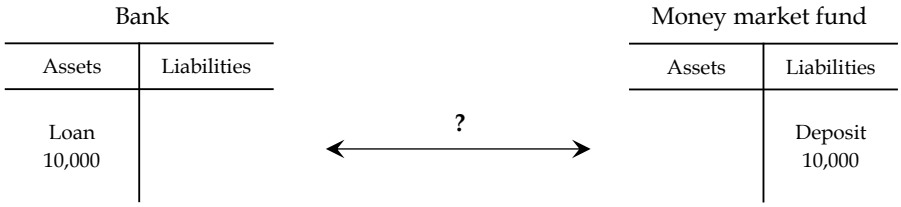
The shadow banking sector differs from traditional bank intermediation in one essential respect, namely, the fact that it cannot create money. Those who are prepared to take risks must permanently finance their position through borrowing. In most cases, this borrowing will be backed by a security. Within the financial system, borrowing against collateral has become the most frequent method of circulation of liquidity. The following example shows various circuits by which monetary resources available in one part of the system can be mobilised to finance the position of a risk-taker.

Let us suppose that a bank grants a car loan for the sum of €10,000. Its balance sheet therefore looks as shown in the following diagram:

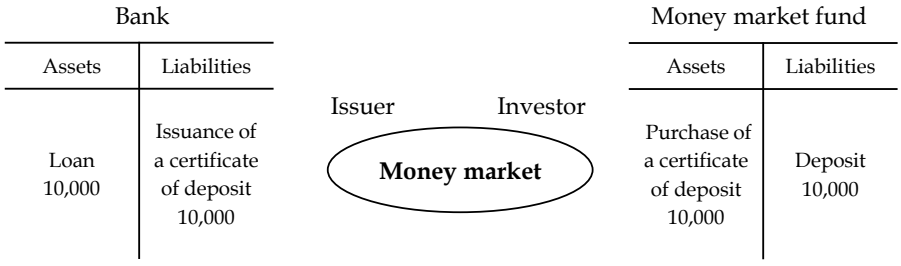
Bank

Assets	Liabilities
Loan 10,000	Deposit 10,000

The borrower uses this loan to buy a car and the car firm invests the proceeds of this sale in a money market fund (see next diagram). If the bank does not want to see a reduction in the credit balance on its account with the central bank, it will have to find a sum equivalent to the deposit that has just been withdrawn.



The bank can do this in a variety of ways: by issuing a certificate of deposit that the money market fund can acquire (as shown below), through a repo with the same fund and so on.



It can also securitise its loan, before going on to sell it to a risk-taker (as diagrammed below). The problem faced by the latter is obviously the need to borrow the sum necessary for the purchase. For this, he will have to mobilise the sum available in the money market fund. However, he has no reason to be in contact with this fund. The repo market will enable available liquidity in one part of the system to move in his direction, at the end of a chain of transactions that may well all possibly be backed by the same collateral*: collateral and liquidity will then be circulating in opposite directions within the financial system.

Bank		Risk-taker		Money market fund	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
~~Loan 10,000~~	~~Deposit 10,000~~	Securitised loan 10,000	Borrowing against collateral 10,000	Lending against collateral 10,000	Deposit 10,000

The re-use of the collateral has sometimes been regarded – wrongly – as "the modern form of monetary creation"**. At no time have these transactions created any money. The sole source of money creation was the loan granted by the bank. In reality, these transactions only permit the initial deposit to continue to 'finance' the loan granted *regardless of the location of this deposit and regardless of the identity of the operator who at any given time is bearing the risk associated with the loan*. The velocity of circulation of financial transaction balances will thereby rise. However, these operations do indeed increase the counterparty risks and hence add to the risk in the system. Finally, it should be noted that their development is constrained by the acceptability of the securities used as collateral and the discounts applied to them. A lack of collateral, by hampering the circulation of liquidity, reduces the positions that the risk-takers can finance.

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* It is assumed here, for the sake of simplicity, that no haircut is applied to the collateral.

** Singh & Stella [2012] state, in this connection: "This re-use of pledged collateral creates credit in a way that is analogous to the traditional money-creation process", before later recognising that "collateral-backed credit does not increase the money supply" [Singh, 2013].

The providers of monetary resources

The providers of the resources needed by the risk-takers can be grouped into two main categories. The first group consists of those on the lookout for safe investments. Their main aim is to safeguard the value of their capital and, in the United States at least, they look for alternatives to bank deposits (the sums guaranteed by the FDIC being small by comparison with those they wish to invest) or to the holding of Treasury bills (whose amount is relatively small). The second group of operators are more opportunistic and are trying to improve the yields on the security portfolios they are managing.

The large non-financial firms belong to the first category. The rise in the share of profits in GDP, combined with the fall in prices of investment goods, has enabled firms to build up substantial cash balances. These cash balances were estimated at the end of 2013 to amount to $5 trillion for non-financial firms in the United States and the eurozone. The way in which these sums are allocated between different types of liquid investment naturally varies. A survey by the Association for Financial Professionals nevertheless shows that the choices made by American corporate treasurers were aimed more often at achieving security than at improving returns.

The large firms are not alone in searching for investments that are both liquid and safe. This is also the case for monetary authorities having foreign exchange reserves to invest, commercial banks required by regulation to have liquid resources available, the clearinghouses for the derivatives markets that collect margin deposits, and the asset management firms, which also hold substantial amounts of assets in liquid form: at the beginning of 2014, such firms (excluding money market funds) in the United States and the eurozone together held almost $1.5 trillion of liquid assets. This amount, while considerable, does not signify any increased preference for liquidity on the part of these firms. In the United States, since the beginning of the 2000s, the share of liquid assets in their total assets under management has remained stable, but the absolute amount has risen substantially. In part, these liquidities constitute transaction balances and in part result from securities-lending operations (Box 8), through which in exchange for the securities they lend, these investment firms receive cash. They then invest this cash – at very short term and often in repos – in order to improve the yield on their funds. Pension funds and insurance companies – which, like them, hold substantial volumes of securities (especially equities) – do the same.

With the passage of time, increasingly substantial amounts of liquid assets have therefore been accumulated. Pozsar [2014] estimates these cash pools at almost $6 trillion for the United States alone. This accumulation makes it possible to understand the origins of the monetary resources mobilised by the shadow banking sector, whose development, especially in the United States, has been made possible by an increasing demand for safe and liquid assets that the banks are unable to satisfy. The shadow banking sector responds by borrowing in order to acquire the securities which those with monetary resources do not wish to hold. It thus provides an additional degree of freedom to the financial sector enabling it to dissociate the risk profile of the investments being sought from that of the financing granted.

This dissociation is, of course, the prime function of the traditional financial system, but its capacity to perform is constrained by the equity capital at its disposal and by its own particular behaviour and prudential rules. When this capacity is saturated and when the attitude to risk is favourable, the shadow banking sector takes up the running, at least for a time. However, its contribution is based on mechanisms that are particularly fragile. The transformation activity it undertakes (by borrowing short-term in order to purchase securities) is in fact not based on any of the information resources used by the traditional financial system, and its operators do not normally enjoy access to central bank refinancing. A change in attitude to risk can at any moment lead risk-takers to wind down their positions.

If at the same time no one is prepared to replace them, a chain reaction is set off. In order to pay back the sums they have borrowed, the holders of the securities will proceed to distress selling, with the prices of the risky securities used as collateral falling at a time when lenders are becoming more cautious, meaning that other risk-takers will be placed in difficulty. A systemic crisis can then be triggered off without having its origin in any major macroeconomic disturbance. However, to attribute this solely to the cupidity of the financial operators, and especially of the speculators in the shadow banking sector, is to ignore that it is their activity that will have made it possible, in an economy where the risk-taking capacity of the traditional financial system was saturated, to deal with a substantial accumulation of savings, concentrated in the hands of agents disinclined to take risks.

Box 8. The securities-lending market

Securities lending has expanded considerably since the beginning of the 1990s. According to the Risk Management Association, the outstanding amount totalled $1.8 trillion in 2011, with US securities accounting for more than two-thirds of the stocks loaned.

Securities lending and borrowing, like repos, are a form of financing backed by collateral that can be either another security or cash. In the latter case, the transaction closely resembles a repo, differing partly in the nature of the collateral pledged, with the more frequently lent securities taking the form of equities, whereas repos mainly involve debt securities. Above all, however, the motives differ. Repos respond to a need for finance (the collateral restored at the term of the operation is in fact often an equivalent security and not the one originally loaned), whereas securities lending is a response to a search for a particular security. This in turn may have several explanations: a need to cover a position in the derivatives markets; to avoid a delivery failure (linked,

for example, to a delay in the reception of a security it had been agreed to deliver); or to sell a security short.

In the equity markets, short selling is the principal reason for securities lending.* The proceeds of the sale of the borrowed stock will be immediately passed on to the lender – a pension fund or an insurance company – which will often reinvest the cash received as collateral on the repo market. This means that the repo market and the securities lending market are more closely linked than would appear at first sight.

The role of short sales in the process of price discovery is controversial. Several studies have stressed that when short sales are restricted, security prices adjust less rapidly to negative news. By examining the markets on which short sales have been subject to limitations or even to a total ban, Beber & Pagano [2011] also note, in addition to a reduction in liquidity, a slowdown in the process of price discovery, especially during phases of falling prices. Moreover, a ban on short sales does not seem to slow down the fall in prices when there is a downturn on the market [Battalio et al., 2012] and appears to have substantial side-effects (increased transaction costs, reduced liquidity and, in particular, reduced detection of fraud and profit manipulation on the part of certain firms). While some effects of short sales may be positive, others are more ambiguous. Short sales can accelerate and even trigger unwanted price falls; by intensifying the circulation of monetary resources among financial operators, these operations also tend to aggravate systemic risk.

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* These operations have in fact multiplied since the banning of 'naked short sales' in 2008 in the United States and at the end of 2012 in Europe. These sales enabled a trader to sell shares without having borrowed them. In theory at least, he could do this for unlimited quantities and thereby push down significantly the share prices. If three days at the latest after this sale the trader could not in fact deliver the securities, he was obliged to default on the delivery and the operation remained in suspense until the actual delivery of the securities or the closure of the position through a monetary payment.

5. THE MONETARY CONSTRAINT, FINANCIAL GLOBALISATION AND WORLD GROWTH

The structures of financial systems are far from being the same everywhere. The information and decision-making mechanisms that determine both the distribution of loans and the redistribution of the corresponding risks or funding needs provide each economy with its own particular financing channels. Moreover, they rely on practices and routines that often differ from one country to another. In one case banks lend mainly at variable interest rates and in another at fixed rates; in one case they issue covered bonds in order to unload the interest-rate risk on a long-term loan and in another the guarantee provided by a public entity will relieve them of credit risk; in one case firms will tend to borrow on the markets and in another from the banks, and so on. This diversity, in combination with differences in the behaviour of non-financial agents, can lead to profound differences in the way in which monetary policy influences the real economy. Admittedly, in all cases the central bank will try to ensure that the expenditure financed by borrowing increases with the financial investment which agents wish to make when the economy is on a full-employment trajectory. Even so, the response to movements in policy rates will depend largely on the nature of the financing channels in place.

In a globalised world, this may produce unexpected consequences. Let us assume, as was the case at the beginning of the 2000s, that the regions which tend to accumulate substantial savings when their income grows rapidly have primitive financing channels or agents averse to borrowing. For those regions to mobilise their full growth potential, they will have to succeed in 'exporting' part of their savings to regions where the financial channels can handle more substantial flows of lending or where the agents are more inclined to borrow. If, in addition, the financial investments that

are built up in the saving regions are in relatively riskless forms, these transfers of savings will only take place if at least part of the associated risks are taken by risk-takers in the rest of the world. The financial crisis that occurred towards the end of the 2000s clearly showed the dangers inherent in this financial globalisation [Brender & Pisani, 2010]: a large part of the transferred savings was wasted and, in countries where the distribution of loans was on a massive scale, the channels used suffered serious damage.

The fact is that for several years to come numerous regions will have a tendency, if they grow at their potential rate, to generate more savings than they can themselves absorb. In order that the monetary constraint should not curb world growth (as it curbed the growth of our village in chapter 1) loans will have to be made elsewhere in the world in an amount corresponding to this potentially available savings. For this to happen, however, if another financial crisis is to be avoided, it will be necessary to construct new financing channels and to ensure that the savings generated do not go only where they are attracted by well-established routines.

5.1 Monetary policies and financial globalisation

Greater freedom of trade combined with greater freedom of capital movements provides central banks with an additional lever. If one bank reduces its rates in order to stimulate domestic activity but others do not follow suit, the former's currency will be offering less attractive yields and will tend to depreciate. This depreciation will help to sustain activity in the first economy but obviously at the expense of activity in the rest of the world. *The transmission of monetary policy also takes place via this impact on exchange rates*. Its effects will depend on the size of the economy and its degree of openness but also on the reaction of the rest of the world. If activity elsewhere was tending to grow too rapidly, the currency appreciation induced by the rate cuts in the first country will be welcome. Otherwise, the monetary authorities, if they wish to avoid a slowdown in activity, will be prompted to reduce their own policy rates. In so doing they will attenuate – or even eliminate – the upward pressure on their currencies.[14] The weak final outcome in terms of exchange-rate movements does not mean, however, that the initial monetary easing was to no avail. At a time when world activity was below its potential level, the move by the first central bank will have

[14] This interplay of forces complicates any empirical assessment of the effects of monetary policy and explains why the estimated sensitivities of exchange rates to interest rates are often small [Boivin et al., 2010].

prompted the others to stimulate their own domestic demand.[15] Acting at the same time, but not necessarily in a concerted manner, they will have helped to bring the world economy closer to full employment.

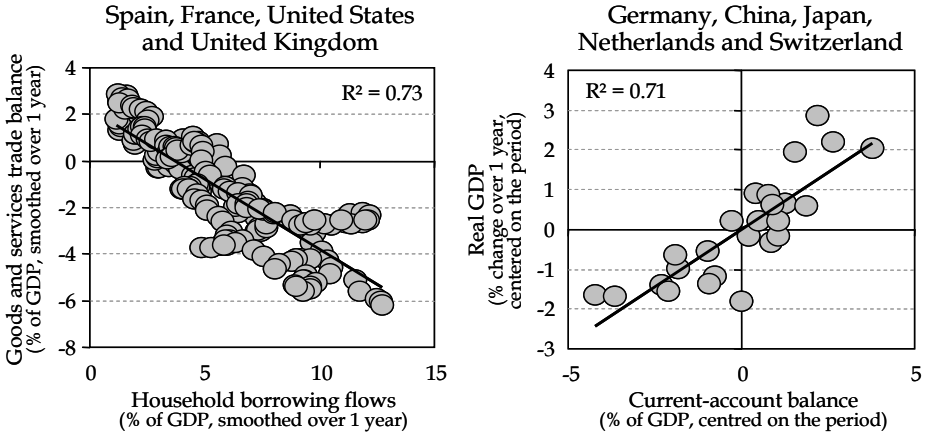
The commercial and financial intermingling of the different economies can give the various monetary policies and the financial systems through which they are transmitted an even more profound international influence. By making *international transfers of savings* possible, central banks wishing to regulate activity just in their own economy can help the world economy as a whole, not necessarily intentionally, to come closer to its growth potential. This was the case in the early part of the 2000s, when countries having a tendency not to spend all their income – the oil-producers, China, Germany, etc. – found themselves, each for different reasons, *achieving an increased share of world income*. This evolution prompted central banks elsewhere to keep policy rates low in order to prevent their economies, held back by a loss of share in world income, from deviating too far from full employment [Brender & Pisani, 2010]. Responding to these lower interest rates, agents increased their indebtedness and this in the end meant borrowing from less spendthrift economies the savings that would not otherwise have been generated. In this way, the countries with savings to spare were able to export the surplus that would otherwise have threatened to stifle their growth. In this respect, in fact, the world economy resembles our village, in that one of its members can only save if others are prepared to borrow. Loans always create deposits – albeit in other corners of the globe – and one group of countries' deficits are always another group's surpluses!

The real world is nevertheless nothing like our village in terms of its monetary and financial organisation. Instead of one currency, one central bank and one commercial bank, it consists of a juxtaposition of monetary areas each with its own central bank and financial system (several in the case of the eurozone!). If care is not taken, the saving that is in virtual surplus in one part of the world may well go to finance the borrowing of countries whose financial channels transmit monetary impulses most rapidly and forcefully to those agents that are most sensitive to them, namely households. This is clearly illustrated by the build-up of international transfers of savings that began in the mid-1990s, made possible by a spectacular rise in borrowing by households in countries where access to lending was particularly easy. Between 1997 and 2006, the current-account balance of just four countries (the United States, the United Kingdom, France

[15] Matters become more complicated, of course, if policy rates in the rest of the world are already at rock bottom!

and Spain), representing around 40% of world GDP, worsened by almost $900 billion or three-quarters of the total observed deterioration in current accounts seen during the period. *Most of this was explained by the rise in household indebtedness* (Figure 26). The phenomenon was not restricted to these years. For more than three decades, the fluctuations in the United States current-account balance mainly reflected those of borrowing by American households alone.

Figure 26. Household debt in the 'spendthrift' countries, current-account balances and growth in the 'thrifty' countries



Note: The left-hand figure relates to the period 1995-2006. The right-hand figure relates to the period 2002-06 for the five non-oil-exporting countries with the largest current-account surpluses (in dollars).

Sources: National central banks and Thomson Datastream.

In the years that preceded the financial crisis, the acceleration in the household borrowing of a handful of economies therefore enabled the income of the thrifty countries to increase more rapidly. The oil-exporting countries were able to build up current-account surpluses as a result of the sharp price rises that preceded the 2008 crisis, while the manufactures-exporting countries whose agents tended not to spend the entirety of their income – China, Japan and Germany, for example – saw their growth accelerating while at the same time their current-account surpluses were improving (Figure 26). The loans granted to households in the spendthrift countries made it possible, during these few years, for the thrifty countries to grow more rapidly, with the deposits they were able to build up exceeding the loans that their financing channels were capable of distributing (and that their domestic agents were capable of absorbing). The deterioration in the

current accounts of the spendthrifts thus made possible the improvement in those of the thrifty countries and the acceleration in their growth.

During the years in which these global imbalances were continually increasing, the growth in total lending was far from excessive, at least if one is to judge only by the respect for macroeconomic equilibria: each central bank was more or less successful in keeping its economy close to its growth potential. Admittedly, the high level of world economic growth prevailing at the time caught the commodity markets off-guard and prices soared, but there was no disquieting acceleration in underlying inflation in the developed economies. These years were the period of the Great Moderation. While expenditure in almost all countries grew in line with potential output, the bulk of the borrowing that underpinned this progress was concentrated in a limited number of countries, with the response of their households to the monetary policies being implemented contributing to the support of activity in the rest of the world (Figure 26). A one-GDP-point increase in household borrowing in the spendthrift countries was associated with an improvement in the current-account balances of other countries – and hence in the demand for the products of their firms – equivalent to 0.4 points of their GDP!

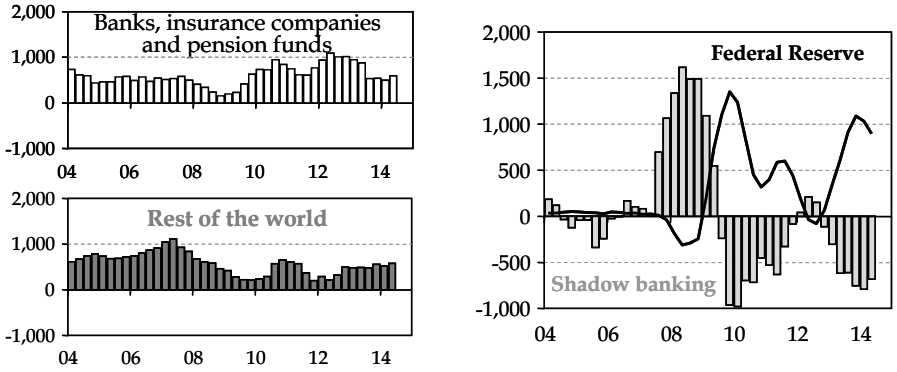
To a large extent, the specific response of households in each of these countries is explained by the particular features of its financial system. The contrast already mentioned between the evolutions of household borrowing in Germany and in Spain clearly demonstrates this. In turn, partly at least, as was shown in chapter 2, this was due to a difference in the financial practices by which one and the same monetary policy – that of the ECB – was transmitted. The US case is even more enlightening, in that it illustrates the role played by the different segments of the financing channels available to each economy. Left to themselves, the mechanisms for the distribution of lending and for ensuring the circulation of the risks implied by this lending interacted perversely from the mid-2000s in such a way as to fuel a steady rise in borrowing by US households. While the latter's behaviour in this respect is sensitive to the level of interest rates, their capacity for taking on debt is nevertheless not infinite. The growth in borrowing that took place in the period up to 2007 could be continuous only because, with the borrowing requirements of solvent households fully saturated, loans to insolvent households took up the running. This in turn was made possible by the fact that, once granted, these sub-prime loans were securitised, meaning that their risks were borne – profiting from a wave of financial euphoria – by operators having no access to the information needed for their proper assessment.

The consequences of this *laisser-aller* were all the more catastrophic in that these securitised loans had been acquired by risk-takers. Their intervention was needed in order to complete the chain enabling savings generated in China or Germany to finance loans made in the United States or Spain. In the thrifty countries, savings tend in fact to be invested in relatively riskless forms, in this case bank deposits, with differing maturities. Investments of this type were thus built up in increasingly large amounts because investment banks, hedge funds and market operators located elsewhere were taking the risks that the savers themselves were unwilling to take. To purchase the securities issued in this way, the risk-takers borrowed short-term, notably on the repo markets. A succession of operations of this type, constantly renewed, therefore made it possible to ensure that savings deposits were able to accumulate in the thrifty countries as counterpart to the loans granted elsewhere. The increasing number of operations needed for the taking of the totality of the risks implied by these international transfers of savings also explains, in part at least, the observed intensification of international capital flows *on a gross basis*. This formed part of the "international division of financial risk-taking" that has steadily developed since the beginning of the 1990s [Brender & Pisani, 2001].

How this episode ended does not need re-telling. The revelation of the poor quality of the sub-prime loans and the subsequent rise in aversion to risk led to the non-renewal of the loans that were financing the operations of the risk-takers, who had no option, if they were to repay their loans, but to engage in distress selling of the securities they held. The myriad chains of intermediation needed to make more or less short-term deposits the counterpart of long-term loans began to disintegrate. The gradual paralysis of monetary and financial circulation, the collapse in activity, especially in the thrifty countries, then resurrected fears of a Great Depression. This was only prevented by the intervention on a massive scale, albeit belated, of the central banks. Starting at the end of 2008, in the United States as well as in the United Kingdom, the central bank purely and simply took the place of the now absent risk-takers by borrowing, also short-term, the liquidities that had hitherto been lent to these risk-takers[16] and by buying the securities that the latter had been obliged to sell (Figure 27)!

[16] These purchases of securities had in fact as counterpart an increase in the reserves of the commercial banks held with the central bank. Similarly in Europe, when the sovereign debt crisis broke out, the ECB 'borrowed' from the German banks the sums that the latter had until then been lending to the Spanish banks and lent them directly to the Spanish banks instead.

Figure 27. Net purchases of bonds in the United States, by sector, 2004-14 (billion dollars, smoothed over 4 quarters, annual rate)



Note: Bonds as defined here comprise Treasury securities (including Treasury bills), agency securities, tax-exempt and corporate securities. The shadow banking system as defined here comprises the securitisation agencies, issuers of ABS, investment banks, money-market funds and various other institutions (finance companies, REITs, etc.) that obtain financing on the markets. Purchases by households of corporate, agency or Treasury securities have also been included as hedge funds are part of the household sector in the US flow of funds accounts.

Source: Federal Reserve.

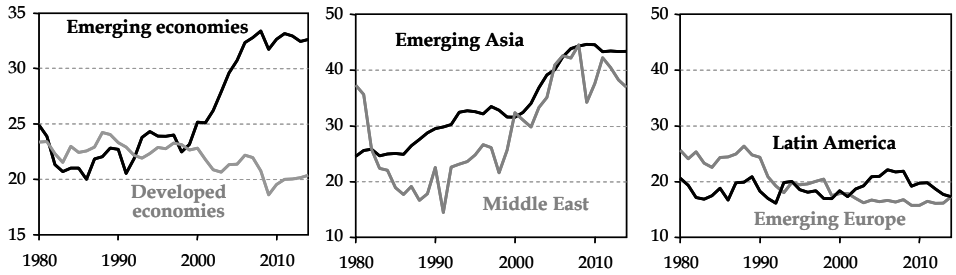
The innovations introduced in the past decades have not made it possible to avoid repetition of certain phenomena which the world economy had already experienced on several occasions. Left to itself, globalised finance has again turned out to be incapable of transferring substantial masses of savings from one economic area to another without a substantial degree of wastage. From this point of view, recent experience has been no different from that of the 1970s, when the recycling of petrodollars ended in a dramatic crisis, namely that of Latin American debt.

5.2 Potentially exploitable saving reserves

It is important to learn from this latest episode, above all if the abundance of savings that has marked the past decade still has some way to go. The fact is that for at least some years to come, several countries, mainly in the emerging group, are capable, given firm growth, of generating substantial savings that often exceed their investment capacity. Whether these *potential* surpluses of saving will be a hindrance or, on the contrary, act as a fuel for world growth will depend on the capacity of the globalised financial system to transfer and allocate them efficiently.

It is useful at this point to put things into perspective. Since the mid-1990s, savings behaviour has evolved very differently in the developed and the emerging economies. Whereas saving ratios in the former group, taken as a whole, have tended to decline slightly, those of the latter group have risen in spectacular fashion. This rise has not been universal, however (Figure 28): between 1985 and 2014, *the saving ratio rose by some 20 GDP points in both Asia and the Middle East*, but remained relatively stable in Latin America and declined in emerging Europe.

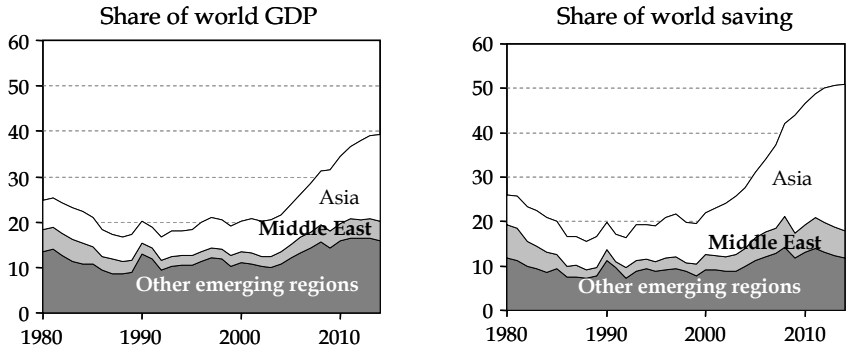
Figure 28. Saving ratios of the major regions, 1980-2014 (% of the respective regional GDPs)



Source: IMF.

On top of this rise in the saving ratios of certain emerging regions, there has been an increase in their share of world income. With the passage of time, an increasing proportion of world saving has accordingly been built up in emerging Asia and in the Middle East: the saving of these regions, which amounted to only 10% of the world total in 1995, reached almost 40% in 2014 (Figure 29).

Figure 29. Emerging countries' shares of the world economy and world saving, 1980-2014 (%)



Note: The shares were calculated using current prices and exchange rates.
Source: IMF.

Can this tendency on the part of certain emerging economies to generate a substantial mass of savings be maintained? It will largely depend on their growth rates. In fact, these countries – the best example being that mentioned earlier of China – *tend to generate higher saving the faster they grow*. The direction of this relationship may seem surprising and incompatible with some of the models used in economic analysis. According to the reasoning underlying neo-classical supply-side models (the 'Solow model' being an example), the direction of causality is from saving towards growth, with higher saving permitting faster accumulation of capital and hence firmer growth. In the models concentrating more on the dynamics of demand, the direction of the causality is the reverse and the sign attached to the relationship is ambiguous. In the case of the 'permanent income' theory, the link between growth and saving is negative: when consumers expect higher growth in their incomes, they raise their consumption immediately, meaning that their saving declines. In the life-cycle models, the effect of growth is unclear, depending on which cohorts find their incomes increasing most rapidly.

While the theoretical links between growth and saving are prone to ambiguity, this is less true of the corresponding empirical studies. An increasing body of work [Bosworth, 1993 or Loayza et al., 2000] shows a positive link between growth and saving, with causality starting from growth. For example, a recent IMF study covering more than 150 countries has shown that "the increased growth acceleration in emerging market economies during the early years of the 2000s contributed to the increase in their saving rates" [Furceri & Pescatori, 2014]. In order to explain the mechanism at work here, the authors put forward the role of "habit persistence": when growth picks up, households find their income growth accelerating, but do not adjust their consumer spending at a corresponding rate. This means that the acceleration in growth is accompanied by a rise in their saving ratio. Note that this inertia affecting spending is not confined to households. The steep and rapid rise in oil prices during the 2000s led to accelerated government income growth in the producer countries and increased their public saving ratios. By bringing their revenues to a level far exceeding their absorptive capacities, the higher prices led them to become massive exporters of savings [Brender & Pisani, 2010].

The link between growth and saving

In order to shed more light on this behaviour regarding the saving ratio – not confined to the emerging economies, in fact – a different approach was adopted. Its starting point is the relatively clear-cut link that seems to exist

between an economy's level of development – measured by its GDP per head – and its households' financial wealth. Using data that are available for some 30 countries with different levels of development, a relatively robust relationship can be estimated between these two variables (Box 9). This shows that the greater the progress in a country's level of development, the greater the rise in the average financial wealth of its households (Figure 30).

Box 9. Financial wealth and development

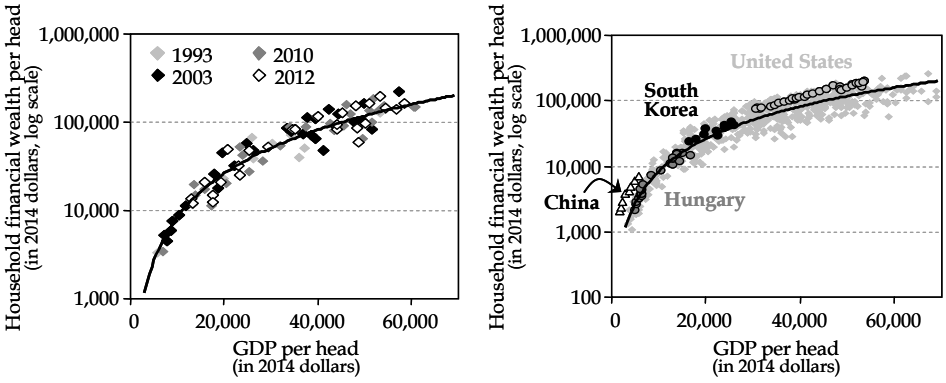
This box aims to demonstrate the link that exists at macroeconomic level between households' gross financial wealth (their accumulated stock of financial assets) and a country's level of development (measured by its GDP per head). For this purpose, the following relationship was estimated (using panel data):

$$\ln(W_t^i/N_t^i) = a\ln(Y_t^i/N_t^i) + b_t + c \qquad (1)$$

where W_t^i is the amount of financial assets held by households in country i at time t; N_t^i, the number of inhabitants; Y_t^i, its GDP.

For the purposes of international and intertemporal comparison, all the variables were converted into dollars and then expressed at 2014 prices. The data are annual and are taken from OECD financial accounts in the case of gross financial wealth and from the IMF's WEO database in the case of GDP and population. The period used runs from 1982 to 2012 and the countries covered are those for which the OECD provides data on financial wealth (giving a sample of 21 developed countries and 10 emerging countries).

Figure 30. Household financial wealth and level of development



Note: In the figure on the left, there are 33 countries for the years 2010 and 2012, 31 for 2003 and 13 for 1993. These years were chosen to avoid valuation effects related to excessively pronounced rises or falls in asset prices – in this case, stock-market indices. The figure on the right shows all the points used in the regression.

Sources: IMF, OECD and authors' calculations.

The estimation of equation (1) in the absence of fixed time effects or additional variables and taking only GDP per head as a variable explains more than 90% of the dispersion – over time and between countries – of financial wealth per head. The estimated coefficients â and ĉ are very significant ($\hat{a}$=1.66 and $\hat{c}$=-6.26) and stable between different estimation periods (1980-2012, 1995-2012) and between different country groupings (emerging and developed). Moreover, the estimations are robust to differences in specification. Introducing fixed time effects does little to improve the quality of the regression and the estimated coefficients remain very close to those of the simplified form ($\hat{a}$=1.68 et $\hat{c}$=-6.52).

Other variables that might explain differences between countries as regards wealth (age structure of the population, funded or pay-as-you-go pension schemes, etc.) were also tested. Replacing the number of inhabitants by the number of adults makes no significant change to the results; nor does the introduction of public spending on pensions as a share of GDP. The ratio of equity-market capitalisation to GDP is significant, but the introduction of this variable makes little difference to the overall results (above all, it makes it possible to correct for the underestimation of the amount of financial assets in times when, as in 1999-2000, for example, the stock market rose sharply).

It is possible to use equation (1) in its most simplified form (without fixed time effects or additional variables) in order to trace the evolution since 1980 in the household financial wealth of 189 countries in the IMF database. For each country, the assets per head were estimated and the result then multiplied by the population. The total amount of assets obtained by aggregating all 189 countries was close to $128 trillion at the end of 2013, much the same order of magnitude, albeit slightly smaller, as that obtained by Davies et al. [2013] ($147 trillion).

How has this figure evolved since the beginning of the 1980s? In relation to world GDP it has risen substantially, from around 130% at the beginning of the 1980s to 170% in 2013. Unsurprisingly, most of this total amount (roughly four-fifths) is concentrated in the developed countries, but the share accounted for by the emerging regions has risen rapidly since the mid-2000s. More refined observation of individual countries shows that, while the estimated amounts are far from always being identical to those actually observed, they nevertheless – with the exception of China – give a rough idea of the relative wealth levels as well as of their accumulative tendencies. In the case of China the estimate reached for households' financial wealth is substantially below that given by Davies et al. [2013] or by the central bank [People's Bank of China, 2011]. But it is relatively close to the results of the "China Household Finance Survey" published in May 2012 by China Southwestern University of Finance and Economics, in which total wealth is

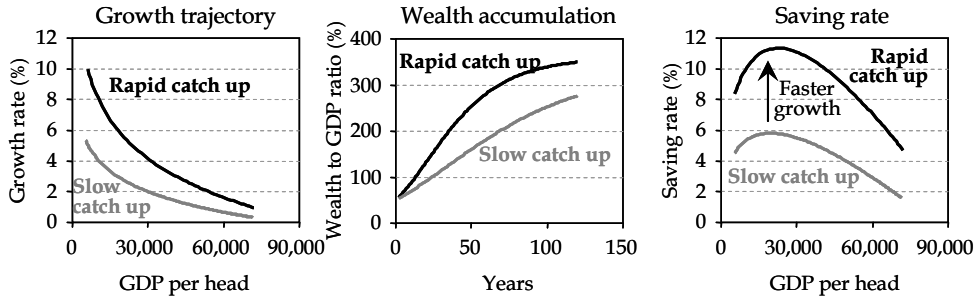
put at $4.5 trillion in 2011, which is close to the estimated amount ($4.2 trillion) but well below the figure announced by the Chinese central bank ($9 trillion in 2011).

The fact that the saving ratio does not explicitly appear in this relationship does not signify its total absence. The private saving generated in each period is normally the principal source of the variation between periods in households' financial wealth. To understand this, let us assume that neither the government nor the rest of the world owns the country's firms, whose only owners are its households. Let us also suppose that the firms are valued by the amount of capital subscribed by shareholders together with retained earnings. Household financial wealth will then be equal to the financial savings they have accumulated plus the earnings retained by the firms (which indirectly increase the wealth of the householders/owners). This wealth will therefore change each year by the amount of their financial saving and the saving made by the firms. If it is further assumed that there is no residential investment – meaning that households' financial saving is equal to their current saving – this wealth will increase by an amount equal to the private saving in the economy. On these simplifying assumptions, the direction in which growth influences the behaviour of the private saving ratio, if household wealth moves in line with the observed relationship, becomes obvious: wealth will increase more rapidly, the faster the growth in GDP per head. For this to be true, *the private saving ratio will have to be higher, the faster the growth of the economy*.

This property explains the evolution in the saving ratio of the emerging countries with the fastest growth. Let us in fact take an underdeveloped economy whose productivity level – defined here by its level of development – is a long way from that of the advanced economies. Its growth possibilities are therefore *a priori* substantial: if the country manages to initiate growth and thereafter keep it under control, its GDP per head will be able to grow very rapidly for several years until it reaches the stage when, having caught up with the more developed economies, its growth rate will tend to converge with those of the latter. The relationship mentioned between wealth and GDP per head then makes it possible to say what its saving ratio will be, *depending on the rate at which this catching-up takes place*: the faster this rate, the higher the saving ratio. To demonstrate this, a simulation was made, taking the above simplifying assumptions, of the trajectories of a country's saving ratio depending on whether this catching-up period is long or short (still obviously assuming that the evolution in its wealth conforms to the observed relationship). In both cases, when it reaches a given level of GDP per head,

its wealth will be the same but, inasmuch as it reaches this level more rapidly in the first case than in the second, its saving ratio will be higher if the catching-up is fast rather than slow (Figure 31).

Figure 31. Growth, the saving ratio and household wealth



Note: On the 'slow catch-up' trajectory, the country constantly grows at half the rate of the 'rapid catch-up'.

Source: Authors' calculations.

The problem that faced fast-growing emerging economies, those of Asia in particular, in the aftermath of the financial crisis then becomes easy to understand: with the saving they generate substantially exceeding their investment requirements, given the exceptional speed of their catch-up process, they can only maintain firm growth if the rest of the world is prepared to absorb this surplus – as it did during the first half of the 2000s [Brender & Pisani, 2010]. It is precisely this absorptive capacity that was called into question as a result of the financial crisis and which, seven years later, is still far from having been restored.

5.3 Constructing new financing channels

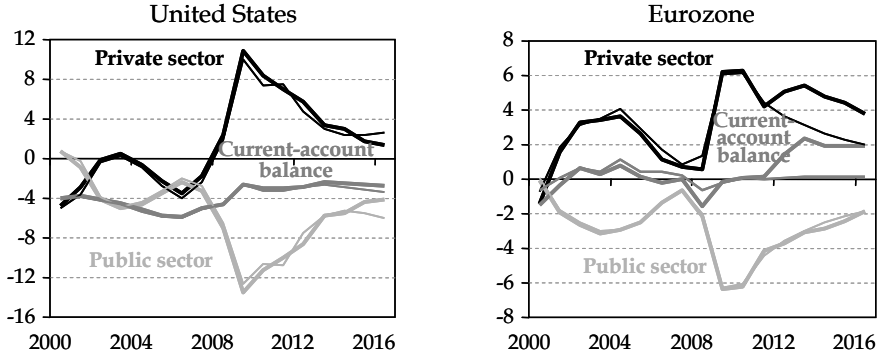
The 2008 crisis put the brakes on borrowing by households in the developed countries, whose unsustainable character was brutally exposed, with the sudden reduction in their propensity to spend leading to a steep rise in the private saving ratio and a sharp reduction in current-account deficits. Faced with the resulting risk of economic depression, governments accepted a deterioration in their budget balances in order to prop up activity. However, they had later to put their borrowing back on a sustainable trajectory [Brender et al., 2012]. The United States, by adjusting the rate of this rebalancing of the budget to that of the return to normal on the part of private saving behaviour, facilitated the country's return to growth: the government

gradually reduced its deficit and continued to absorb the excess savings of private agents to prevent it from stifling activity.

The eurozone countries, unlike the United States, aimed to reduce budget deficits more rapidly, without worrying about the rate at which private agents' propensity to spend would return to normal, and even decided in 2011 to accelerate the rebalancing process. The disastrous results of this cyclical management soon became apparent. The incipient recovery broke down and the current-account balance moved into substantial surplus, whereas that of the United States stabilised at its post-crisis level.

The revisions made to the IMF forecasts for the eurozone current-account balance between April 2011 and October 2014 are enlightening in this respect. These revisions reflect the eminently 'non-Ricardian' behaviour of private agents during these years: the hasty reduction in public deficits failed to incite them to save less – on the contrary! As regards the savings-exporting emerging regions, the consequences of the financial shock of the end-2000s are easy to characterise. The rate at which the US economy absorbed the savings of the rest of the world fell sharply, and the eurozone countries, whose current accounts had previously been in balance, far from contributing to the absorption of the emerging regions' surplus, became in their turn exporters of savings (Figure 32).

Figure 32. Revisions to the IMF forecasts of saving propensities and current-account balances, 2000-16 (% of GDP)



Note: Faint lines show the IMF's April 2011 forecasts; bold lines the October 2014 forecasts.

Source: IMF.

Faced with this abrupt change, the emerging regions had little choice: in order to avoid too great a weakening of their growth under the impact of

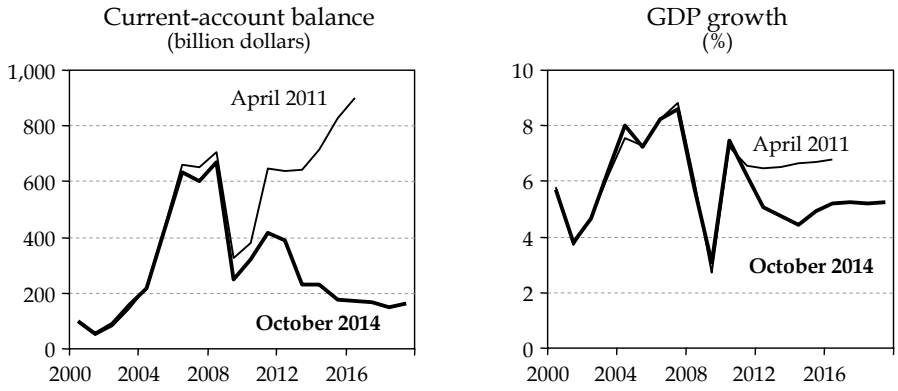
the interruption of borrowing in the rest of the world, they took emergency steps to boost demand by stimulating domestic borrowing. The governments initially widened their deficits before borrowing by private agents rose at a rapid rate, taking up the running from that of the rest of the world. Whereas between 2008 and 2013, US private debt fell by 14 GDP points, China's rose by almost 70 points!

This rise in domestic borrowing in several emerging economies nevertheless rapidly exposed the underdeveloped state of their financial systems. Those of savings-exporting countries, China in particular, were primitive and essentially directed towards financing firms. Maintaining control over a very rapid growth of lending was therefore particularly delicate, especially in cases where this growth took place to a substantial extent through loans to households. This had already been demonstrated in Korea ten years earlier by the sudden introduction of lending through card-based consumer credit. The repeated efforts by the Chinese monetary authorities, starting at the beginning of the 2010s, to use administrative measures to regulate the distribution of lending and to improve its allocation were a further illustration of this – especially as, alongside the traditional banking system, which was subjected to official surveillance, a shadow banking system under little or no surveillance rapidly developed, partly with the aim of circumventing the rules governing the distribution of bank lending.

Its role in the circulation of monetary resources resembles in certain respects that of the risk-takers discussed in the previous chapter. The trusts (which are often in fact emanations of the commercial banks) in this way contributed to the financing of risky real-estate projects or to the provision of loans to firms that were manifestly in a situation of overcapacity (steel, shipbuilding, etc.). In order to be able to lend money that they were unable to create, they were obliged to attract deposits from well-off savers by promising them high returns. There was also rapid growth in loans on behalf of third parties (entrusted loans) put together off-balance-sheet by the banks. These made it possible to mobilise the cash pools accumulated by firms in China as elsewhere. In this way, firms were able to lend their cash surpluses to others which did not have – or no longer had – access to traditional bank lending. China's experience since the beginning of the 2010s shows how difficult it is for a country at this stage of development to achieve rapid construction of the financing channels capable of passing on the abundance of savings created. There is therefore a substantial chance that much of this savings will go to waste.

Unable to recycle domestically in sustainable conditions all the savings they tend to generate, the emerging regions have experienced less dynamic growth since the beginning of the decade. Here again, the yearly revisions made to the IMF forecasts illustrate the interplay of the forces at work. At the beginning of 2011, a marked increase in the saving surplus of these regions was expected by the end of the decade; in the autumn of 2014, the Fund was predicting for this same time horizon the virtual disappearance of this surplus and was making a downward revision of 1.5 points in the medium-term growth outlook (Figure 33). These revisions were particularly substantial in the case of emerging Asia, for which the expected medium-term growth was cut from 8.6% in April 2011 to 6.3%, while the current-account surplus predicted for 2016 was cut from almost $850 billion (1% of world GDP) to only $200 billion. The cumulative saving surplus between 2014 and 2016 was reduced by $1.5 trillion from its 2011 forecast!

Figure 33. Revisions to the IMF's current-account and growth forecasts for the emerging regions, 2000-19



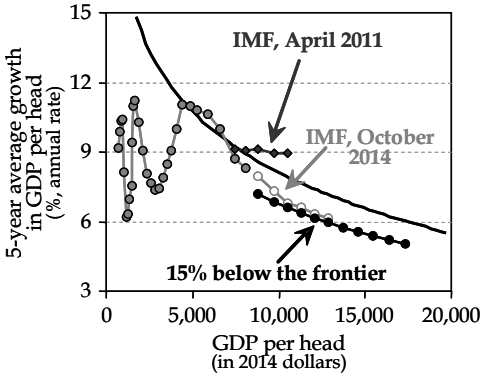
Source: IMF.

These downward revisions in the current-account surplus and growth expected for the emerging Asian countries clearly point to one of the financial challenges for the last part of this decade, namely how to provide the world economy with financing channels that are more robust, more numerous and better distributed, capable of absorbing the saving surplus holding back growth in these countries and in the more thrifty economies in general. The Chinese case is sufficient to give an idea of the scale of this challenge. Between 2000 and 2008, China's exceptionally rapid rate of growth led the country practically to the edge of the frontier defined by the maximum growth rate attainable at a given stage of development (Box 10).

More recently, China has drawn back from this frontier and the IMF's October 2014 projections suggest that the extent of this deviation could increase still further (Figure 34). The fact is that, depending on whether Chinese growth is practically on this frontier, as it has been until now, or well below it in a prolongation of the tendency now expected by the IMF, the volume of saving generated will be substantially different: in the latter case, it would be $1 trillion smaller over the period 2014-19 and more than $3 trillion smaller for the decade 2014-24.

This calculation is obviously crude. Even so, it gives an idea of the investments that this saving would make it possible to finance and of the forgone growth that their non-realisation would imply for the world economy. This forgone growth will be all the greater in that China is not the only economy whose growth is currently being held back by an excess of saving: Germany, with a current-account surplus larger than that of China, was in 2014 in the same situation!

Figure 34. China's growth in relation to the frontier



Sources: IMF, authors' calculations.

The financing channels needing consolidation or creation in order to mobilise these potential sources of saving are clearly to be found partly within the thrifty economies themselves. This is true of loans to households, especially mortgages, which play a central role in the transmission of monetary policy. Efficient transmission requires a favourable legal and financial environment and the existence of operators, public or private, prepared to bear the associated risks. In this respect, the law relating to mortgages, the existence and nature of securitisation mechanisms, as well as the state of the banking system, are determining factors, as is the authorities'

capacity for surveillance. This consolidation of domestic financing channels may in fact not be aimed solely at improved transmission of monetary policy impulses but also at an improvement in the quality of growth. This will be the case, for example, if criteria relating to environmental sustainability are added to the financial creditworthiness criteria normally applied in making loan decisions.

Alongside the channels intended, within these economies themselves, to permit increased and better exploitation of the saving they are capable of generating, other channels must also be available in the rest of the world to attract the surplus and prevent over-straining the domestic channels. To a large extent, the channels that had ensured the international transfers of savings in the 2000s are at least temporarily no longer functioning. This means that new ones have to be constructed, involving the participation of different operators capable of taking the various associated risks and of ensuring that the potentially available savings is in fact mobilised.

In a world having to cope with climate warming, in which many emerging economies are unable to finance the investment needed to launch a process of rapid and sustainable catch-up and in which a number of developed countries have neglected their physical – and sometimes even social – infrastructure, finding potential fields for financing through these channels should be an easy matter. The difficulty lies in finding those willing to bear the risks associated with the hundreds of billions of dollars' worth of additional investment which the saving of the thrifty countries could finance each year. The signals sent out in the mid-2010s by the bond markets were disquieting in this regard. The lowest long rates in decades were only just capable of stimulating the borrowing needed to absorb the saving generated by a world economy operating well below its potential!

Herein lies part of the origin of the menace of 'secular stagnation' [Summers, 2014]. Emphasis needs to be placed on its paradoxical nature, involving, on the one hand, the existence of substantial potential sources of saving and, on the other, obvious investment needs. For the former to finance the latter, however, someone must be prepared to take on the risks implied and this is the stumbling block. In a situation of this kind, governments would normally play the role of long-term investor and borrow in order to take charge of at least part of these investments, namely, those which sooner or later will provide additional tax income or permit a reduction in budgetary expenditure. The low level of long-term interest rates is telling us that this is just the right moment for such investments. However, for fear of adding dangerously to the levels of debt – and in some cases aware of having

badly managed their budgets –, governments in the developed countries, those of the eurozone in particular, are hesitant to commit themselves in a direction that could make them even more vulnerable to a change in the mood of the markets.

Only greater international cooperation can extricate the world from this deadlock. If the national governments, which are the natural long-term investors, will not 'step up to the plate', supranational long-term investors can act as a substitute. For this, however, international organisations at regional (or possibly world) level must agree on the priority thrusts for investment and provide at least partial guarantees for the loans needed to finance the projects conforming to the norms laid down. Once guaranteed, these loans could be purchased by securitisation vehicles, which might issue bonds of varying maturities backed by a set of loans of the same type whose default risk would be at least partly guaranteed and could be purchased by savings-collectors anywhere in the world. By channelling savings towards projects that are seen as collectively viable in the long term, these vehicles would act as borrowers of last resort in a world where they are sorely lacking today. Europe attempted at the end of 2014, through the Juncker plan, to set an example. However, this was on a small scale in relation to the savings surplus needing to be absorbed. Even if fully realised in three years – a short time for infrastructure projects – these investments would each year absorb only one-third of the present saving surplus – generated in the eurozone alone!

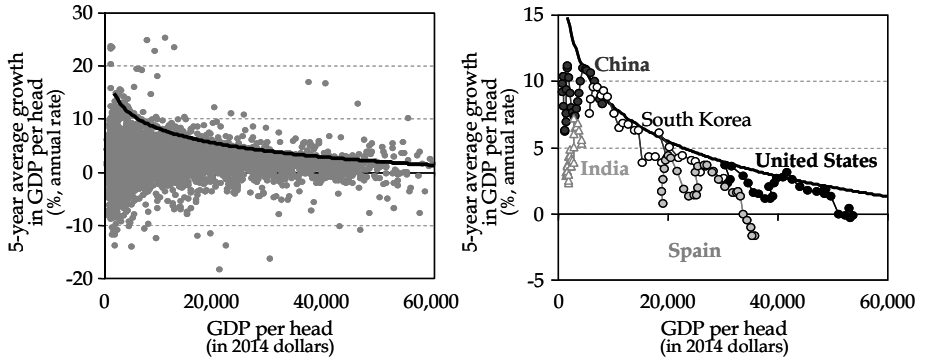
Box 10. The growth frontier

As a follow-up to Brender & Pisani [2010], a re-estimation of the growth frontier was made using the annual observations available for 183 countries in the IMF's World Economic Outlook database. The relationship obtained defines the growth of GDP per head that an economy at a given level of development, optimally managed and having access to all the necessary savings, can hope to maintain over the medium term. More precisely, the relationship for the period 1980-2009 is as follows:

$$(\dot{Y/N})_{[t,t+5]} = -3{,}5 \ln(Y_t/N_t) + 40{,}3$$

where Y_t/N_t is GDP per head in period t measured on a purchasing power parity basis and in constant 2014 dollars for a given country and year; $(\dot{Y/N})_{[t,t+5]}$ is the country's growth in GDP per head, calculated in local currency and in real terms, as an annual average over the five following years.

Figure 35. The GDP per head growth frontier, 1980-2009



Sources: IMF, authors' calculations.

By construction, the quasi-totality of the points are to be found below the frontier – a large number of them well below – and many of them even below the horizontal axis. The latter therefore correspond to periods where, on a five-year average basis, output per head decreased (Figure 35).

This example serves as a reminder that it would be futile – and dangerous – to count on infrastructure investment alone to reinvigorate world growth. Given that delays in the launching and subsequent implementation of these projects are particularly long, it will be necessary to launch a substantial number of them if any significant support is to be provided for activity. It is illusory to think that this could be achieved at all rapidly, especially as these investments are not devoid of undesirable side-effects (in many countries they have often been riddled with corruption [Gros, 2014]) and bottlenecks are capable of cropping up at any place. Here again, caution and detailed surveillance are needed. Alongside the financing channels directed towards the construction of ambitious infrastructure, at a pace that is bound to be moderate, others have to be put in place in parallel, having implementation delays that are, at least in some cases, shorter.

The financing of decarbonated growth offers a range of possible investments [Aglietta, 2014], as does the financing of small firms or local authorities. However, the principle remains the same, namely putting in place at regional or national level public or private bodies specialising in the assessment of the quality of projects and their conformity to the priorities being pursued and possibly taking on part of the risks involved, according to modalities that can be wide-ranging (insurance, guarantees, structuring by tranches, etc.). Bonds would then be issued, backed by sets of loans of

each type. The role of the bond markets in the carrying of the risks of these loans would thus be strengthened, while that of the banks, which would sell the loans after granting them, would be reduced. In the eurozone in particular, financial fragmentation would diminish.

The credit risk is not the only type whose carrying, with public backing, can contribute to opening up new financing channels. By using the macro- and microeconomic information at their disposal, the Bretton Woods institutions – the IMF and the World Bank – could sell, within certain limits, in volumes and over time horizons that would be permanently adjustable, protection for the *foreign-exchange risk* linked to fluctuations in the emerging-country currencies [Brender & Pisani, 2001]. By contributing to the stabilisation of their exchange rates, such a mechanism would enable emerging countries that are in deficit but nevertheless well-managed to call on foreign capital with less apprehension. In time, the stability of the international financial system would also be enhanced and the transmission of monetary policy facilitated. By broadening still further the range of investments capable of absorbing world savings, this financing channel would reduce the flow of lending expected of the others. This is in fact one of the lessons to be learned from the so-called sub-prime crisis, namely that relying on the financing channels of a few countries in order to manage, with the help of financial globalisation, the monetary constraint holding back world growth can only lead to fresh disasters!

CONCLUSION

Finance has one essential function, namely, *to modify the timing of the monetary constraint*. For this reason, the mechanisms it involves are indispensable for maintaining an economy on its growth trajectory. But these mechanisms are neither as powerful nor as autonomous as some would have us believe: left entirely to themselves, they will regularly fail to perform. For the economy to remain on a sustainable growth trajectory there must permanently be a public authority to regulate and supervise their functioning. As recent decades have reminded us, however, public intervention can no longer be limited to these two functions of regulation and surveillance: the liberalisation of international capital movements has created a degree of interdependence among financial systems which, if it is to be kept in hand, requires cooperation between governments. By permitting international division of the taking of financial risks and by making possible transfers of savings between economies, this liberalisation is in fact leading private operators to carry ever-increasing exchange-rate and liquidity risks, so that the stability of this globalised finance is vulnerable to the slightest reversal in their attitude to risk.

Moreover, despite the complexity and density of its mechanisms, private finance often turns out to be incapable of guiding savings in the direction of investments that will enable growth *to be more than just a prolongation of the past*. In fact, the decision-making routines and the information resources on which these mechanisms are based give them only limited capacity to imagine a future that is very different from the present. In order for an economy – and, *a fortiori*, a group of economies – to engage in a new development phase, new financing channels have to be put in place. The saving surplus that has been holding back world growth since the mid-2000s stems, in part at least, from governments' failure to make the effort needed to make up for the lack of imagination on the part of private finance.

The eurozone countries, in particular, have largely ignored this short-sightedness of private finance. They constructed a monetary union without paying the least attention to its financial integration. For lack of mechanisms making it possible for the various financing channels to converge towards a single bond market, the loans granted have mostly remained confined to the balance sheets of the banks – balance sheets for which almost the only unifying element was the money market. The crisis of the early-2010s showed how fragile this essentially monetary integration was. The interposition of the Eurosystem admittedly enabled the monetary union to cope with the blockages affecting interbank relations, but was unable to prevent either the fragmentation of the private banking sector or the clogging of the financing channels in numerous countries. Faced with this situation, the eurozone countries adopted a budgetary strategy that led, not to the absorption of the saving surplus generated, but to its increase!

Eurozone governments have wagered on being able to reinvigorate growth by making their economies more competitive. They hoped that by improving supply-side conditions they would be able to obtain an increased share of world demand. Winning this wager will be no easy matter. For one thing, many other countries having difficulty in reviving their domestic demand have the same hope. In addition, the stagnation in demand that European firms have recently had to cope with has considerably curbed their investment. The competitiveness of the eurozone will be all the more affected in that public investment, too, has been cut back. Blind to the manner in which money, finance and the real economy interact, eurozone governments have taken the risk of maintaining their economies on the brink of deflation for several years to come. If tomorrow this risk were to become reality, the European Central Bank would have only one solution left for *easing the monetary constraint, namely to place euros directly into the pockets of the eurozone's households*!

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