ECONSTOR
Make Your Publications Visible.

A Service of
ZBW
Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Allen, Franklin

Working Paper

The Efficiency and Stability of Banks and Markets

NBB Working Paper, No. 52

Provided in Cooperation with:
National Bank of Belgium, Brussels

Suggested Citation: Allen, Franklin (2004) : The Efficiency and Stability of Banks and Markets, NBB Working Paper, No. 52, National Bank of Belgium, Brussels

This Version is available at:
https://hdl.handle.net/10419/144266

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

NATIONAL BANK OF BELGIUM

WORKING PAPERS - RESEARCH SERIES

The Efficiency and Stability of Banks and Markets

Franklin Allen (*)

The views expressed in this paper are those of the authors and do not necessarily reflect the views of the National Bank of Belgium.

Paper presented at the conference on "Efficiency and Stability in an Evolving Financial System" organized by the National Bank of Belgium, to be held on May 17-18, 2004.

(*) University of Pennsylvania. e-mail: allenf@wharton.upenn.edu

Editorial Director

Jan Smets, Member of the Board of Directors of the National Bank of Belgium

Statement of purpose:

The purpose of these working papers is to promote the circulation of research results (Research Series) and analytical studies (Documents Series) made within the National Bank of Belgium or presented by external economists in seminars, conferences and conventions organised by the Bank. The aim is therefore to provide a platform for discussion. The opinions expressed are strictly those of the authors and do not necessarily reflect the views of the National Bank of Belgium.

The Working Papers are available on the website of the Bank:
http://www.nbb.be

Individual copies are also available on request to:
NATIONAL BANK OF BELGIUM
Documentation Service
boulevard de Berlaimont 14
BE - 1000 Brussels

Imprint: Responsibility according to the Belgian law: Jean Hilgers, Member of the Board of Directors, National Bank of Belgium.
Copyright © fotostockdirect - goodshoot
gettyimages - digitalvision
gettyimages - photodisc
National Bank of Belgium
Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.
ISSN: 1375-680X

Editorial

On May 17-18, 2004 the National Bank of Belgium hosted a Conference on *"Efficiency and stability in an evolving financial system"*. Papers presented at this conference are made available to a broader audience in the NBB Working Paper Series (www.nbb.be).

Abstract

Traditionally, financial systems have been bank-based or market-based. The efficiency properties of these systems are compared in various dimensions. These include risk sharing, information provision, funding new industries, corporate governance, and law, finance and politics. Both systems have advantages and disadvantages. With regard to stability, both bank-based and market-based systems are subject to crises. Going forward a financial system with financial intermediaries and markets would have many advantages and few disadvantages.

TABLE OF CONTENTS

1. Introduction.....1

2. Efficiency Properties.....2
2.1 Risk sharing.....2
2.2 Information provision.....4
2.3 Corporate governance.....6
2.4 Funding new industries.....8
2.5 Law, politics and finance.....10
2.6 Discussion.....12

3. Stability Properties.....13
3.1 A brief history.....13
3.2 Banking crises.....14
3.3 Theories of currency crises and twin crises.....15
3.4 Bubbles and crises.....17
3.5 Contagion and financial fragility.....17
3.6 Banks versus markets: financial stability.....18

4. Conclusions.....18

References.....20

1. Introduction

What kind of financial system is best for Europe? This is a pressing issue as the European Union continues to expand and the program for the creation of a single market for financial services proceeds. Some countries in Europe, like the UK, have market-based systems. Financial markets are broad and deep and play a primary role in the allocation of resources. In other countries like Germany, banks play a much more important role in the allocation of resources. Markets do not have many firms listed relatively speaking and market capitalization relative to GDP is low. Which type of system should Europe adopt for its single market?

This paper reviews the efficiency and stability properties of market-based and bank-based systems. The conventional academic wisdom is that US style market-based systems are better in terms of efficiency. The allocation of resources through market-based systems has been extensively analyzed. If markets are complete, there is symmetric information and no transaction costs, then markets will allocate resources efficiently. However, in practice these assumptions do not hold. In such situations, bank-based systems may have many advantages.

As far as stability is concerned, both bank-based systems and market-based systems are susceptible to crises. With bank-based systems this is clear. Much of the literature on financial crises is concerned with banking crises since these were so important in many periods of history. The occurrence of crises in market-based systems is less well understood. However, it appears that lack of liquidity can indeed lead to stability problems in markets. The actions of the Federal Reserve Bank of New York in ensuring a private sector bail-out of the hedge fund Long Term Capital Managment (LTCM) in 1998 appear to have been motivated by a fear of this kind of crisis. LTCM had large positions in many thinly traded markets. If the firm had failed then these positions may have had to be liquidated in a short time period. This could have caused a sharp drop in prices due to a lack of liquidity held by potential buyers. The subsequent drop in prices could have led to a snowball effect where other firms were forced to sell and this could have caused a systemic problem.

Going forward it seems likely that Europe will develop a financial system based on both financial intermediaries and markets. It is important that the efficiency and stability properties of this kind of financial system be better understood.

The paper is organized as follows. Section 2 considers the efficiency properties of bank-based and market-based systems. The two systems are compared in terms of risk sharing, information provision, corporate governance, funding new industries, and law, politics and finance. The stability properties of the two systems are considered in Section 3. The nature of banking crises, currency crises and twin crises, bubbles and crises, and contagion and financial fragility are outlined. Given this background on crises, the properties of the two types of system with regard to stability are compared. Finally, Section 4 contains conclusions.

2. Efficiency Properties

In this section, the efficiency properties of bank-based and market-based systems are considered. More extensive surveys are contained in Allen and Gale (2000a; 2004a).

2.1 Risk sharing

One of the most important functions of a financial system is to share risk and it is often suggested that financial markets are well suited to achieve this aim. The standard argument on risk sharing is that financial markets allow good risk sharing among agents so that more risk tolerant agents end up bearing greater risk than more risk-averse agents. Provided that markets are complete, and there are no transaction costs and information is symmetric, cross-sectional risk sharing can allocate risk among agents efficiently. However, this is only one type of risk sharing, namely, cross-sectional risk sharing, while another type of risk-sharing, inter-temporal risk sharing or risk sharing among different generations of agents, is just as important. In this respect, financial institutions can do better than markets. To see this consider the following simple example to illustrate the idea of intertemporal smoothing introduced in Allen and Gale (1997).

Consider an economy that lasts for an infinite number of periods, t = 0, 1, 2, … There is a storage technology that converts one unit of the single consumption good into exactly one unit one period later. There is also an asset (stock) with fixed supply of one unit and has the following (net) payoff structure: it pays 0.9 in even periods (t = 0, 2, 4, …) and 0.1 in odd periods (t = 1, 3, 5, …). There are consumers in the economy that live for two periods. They only consume in the final period of their lives. In the period they are born, Period t, each of them is endowed with one unit of the consumption good, which they can invest so that they can have something available to consume in Period t+1. We denote their Period t+1 consumption to be c_{t+1}, and their utility is $u = \ln c_{t+1}$. Two institutional arrangements: financial markets (for trading stock) and banks (for deposit service) are compared.

It can be easily shown that in the *stationary* equilibrium with financial markets the equilibrium price of the fixed asset is one unit. In a stationary equilibrium, the price of the stock is the same each period. This means that the stock dominates the storage technology since agents can buy and sell it for the same price and in addition it pays a positive dividend. Since the stock dominates everybody will use all of their endowment to buy it and so the price will be one unit. Nothing will be invested in the storage technology. Equilibrium consumption varies for agents who become old in even or odd periods: for those who become old in even periods they consume $c_{even} = 1 + 0.9 = 1.9$, and $u_{even} = 0.64$, while for those who become old in odd periods they consume $c_{odd} = 1 + 0.1 = 1.1$, and $u_{odd} = 0.10$. Overall agents in the economy earn an average utility of $u_{Market} = 0.37$.

On the other hand, banks, which exist for more than two periods (for simplicity assume that they live for ever), can take the long-run view and maximize average utility across agents from different generations, i.e., they engage in inter-temporal risk smoothing. It is easy to verify that with the help of the storage technology, a “smooth” consumption pattern across periods and generations is the best solution. This can be achieved by the banks taking deposits (endowment) from agents, storing 0.4 units in even periods when the payoff is high, and taking out the 0.4 units in odd periods when payoff on the asset is low, so that consumption is perfectly smoothed and equals $c_{bank} = 1.5$, with $u_{Bank} = 0.41 > u_{Market} = 0.37$.

From the above example we can see that the reason the average utility of agents in the economy with banks is higher than that in the economy with markets is due to banks' intertemporal smoothing. Similar results hold in much more complex situations with uncertain returns for the fixed assets. In fact it can be shown that in this case not only is average utility higher with smoothing but also the banking equilibrium is Pareto superior to the market equilibrium. Therefore, a financial system with an efficient banking system can dominate a system with financial markets because banks can better allocate risk and smooth consumption inter-temporally. This requires markets are not complete otherwise agents will use the markets when returns are high which will prevent smoothing. Thus long-lived financial institutions, such as banks, can achieve intertemporal smoothing, as long as they are not subject to substantial competition from financial markets.

2.2 Information provision

One of the most important functions of a financial system is the acquisition and use of information to facilitate an efficient allocation of resources. In market-based systems such as the US, the fact that a large number of firms are publicly listed and traded, along with extensive disclosure requirements, implies that there is a great deal of information disclosure. In addition to the publicly available information, there are many financial analysts working for financial institutions, who gather information from all sources including private information, and their earnings forecasts and stock recommendations also contribute to the information provision process. Ample empirical evidence on efficient markets suggests that much of the information is quickly reflected in stock prices (e.g., Fama 1970, 1991). On the other hand, in bank-based systems such as Germany and other continental European countries, the reverse is true so relatively little information (public and private) is available from financial markets. While financial markets provide more information to investors in market-based systems like the US than in bank-based systems like Germany, the reverse is true for intermediaries in these countries. With more prevalent and better long-term relationships in bank-based systems, financial intermediaries in these countries are able to acquire considerable amounts of

information about their borrowers, more than what is released to the markets. This can be used to allocate resources more efficiently in these bank-based systems.

Conventional wisdom is that better information improves allocative efficiency, thus the more information, the better. The implication for this result is that better accounting standards and related disclosure measures aimed at improving transparency improves welfare. This call for higher accounting standards and better information disclosure is receiving a lot of support at the moment in the US, after the Enron debacle and other accounting scandals and in Europe after the Parmalat scandal. However, *informational* efficiency, which can be achieved in efficient financial markets, does not necessarily imply *welfare* efficiency. In some cases, in order to reveal information, prices for securities have to fluctuate with any changes in underlying information; but price fluctuations themselves are costly to the extent that they may impose risk of uninsured changes in wealth on investors. Therefore, improved information disclosure increases stock price volatility, which can lead to a welfare decrease, in particular in a financial system with active financial markets. People who are forced to sell based on newly released information will bear unnecessary risk. In this regard, welfare can be improved by having opaqueness in the information disclosure process.[1]

The trade-off between allocative efficiency and risk sharing is important for the structure of financial systems. Although there may be allocative advantages, the mere existence of more price data from stock markets in the US is not a critical point in favor of a market-oriented system over a bank-oriented system. In financial systems like Germany's, few companies are publicly quoted and little information is revealed by those listed companies. The lack of information, which may be bad from the point of view of efficient decision-making in investment, may actually be a good thing from the point of view of risk sharing. There is no theoretical presumption that more information leads to a better outcome, even if that information is useful for allocative efficiency. Allocative efficiency is offset by the fact that investors bear a lot of risk.

[1] See for example, Hirshleifer (1971), Grossman and Stiglitz (1980), Dow and Gorton (1997), and Allen and Gale (2000a, Chapter 7).

2.3 Corporate governance

Conventional wisdom, based on how firms in the US are managed, says that strong corporate governance helps to resolve the agency problem resulting from the separation of ownership and control in publicly owned and traded firms (e.g., Jensen and Meckling 1976, Fama and Jensen 1983), and thus improves firm's performance and increases the overall allocative efficiency of the economy. The set of corporate governance mechanisms, including active markets for corporate control, effective Board of Directors and CEO compensation, and the use of debt in capital structure, ensure that managers of the firm act in shareholders' interests. It is widely believed that the most effective corporate governance mechanism is markets for corporate control, where hostile takeovers are possible and provides the strongest form of discipline for managers (e.g., Jensen 1986). However, there are many problems with this mechanism. The first is the Grossman and Hart (1980) free-rider problem among minority shareholders of the target firm, which forces the bidding firm to offer a high premium over the current target price in order to gain control. There are ways around this problem but they are not perfect. There is also a free-rider problem among bidders. Once a takeover bid is announced other bidders will realize it is an attractive target and will join the corporate control contest. This implies it is not worthwhile for the initial potential bidder to recoup any fixed costs from identifying the target in the first place. The third problem in the operation of the market for corporate control is that target managers, who may be incompetent but still want to preserve their control and private benefits, can entrench themselves and launch defensive measures against potential takeovers, so that it is much more difficult to remove them from targets. Similarly, we can show that there are problems with each of the corporate governance mechanisms.

However, there seem to be many examples of companies, particularly in Asia, where the argument linking standard corporate governance mechanism to firm performance fail. In fact, none of the above mechanisms are particularly effective in Asian countries. For example, there is virtually no hostile takeover market in Japan, the most developed country in Asia. It has not been an important mechanism for corporate governance at all. Executive compensation is much lower in Japan than in the US and the

use of stocks and stock options for this purpose is much less; hence it is difficult to believe that there are not equally good substitute mechanisms that provide incentives for good corporate governance. Boards of directors are even more ineffective and clumsy in Japan than in the US and tend to be dominated by the President of the company. To present a concrete example, consider Toyota and GM, both well-known companies and industry leaders in the automobile industry. As above, Toyota scores very poorly in terms of corporate governance, but in contrast to GM it has been one of the most successful companies in the world during the past 25 years both in terms of acquiring market share and creating wealth for shareholders.

What are the corporate governance mechanisms that have allowed Asian firms to do so well for so long? The mechanisms that are usually argued to be the most important are first, concentrated holdings and monitoring by financial institutions. In Japan, monitoring of firms' executives is done through the main bank system. The characteristics of this system are the long-term relationship between a bank and its client firm, the holding of both debt and equity by the bank, and the active intervention of the bank should its client firm become financially distressed. It has been widely argued that this main bank relationship ensures that the bank acts like a delegated monitor and helps to overcome the agency problem between managers and the firm (e.g., Hoshi, Kashap, and Scharfstein 1990). While the main bank system seems to be important in times of financial distress, it is not clear about how important their role is when the firm is doing well.

Standard theory suggests that corporate governance in Asia is inferior to the US. But if this is true how can the East Asian Miracle have occurred? How were these countries so successful for so long with these ineffective corporate governance mechanisms? Is it that corporate governance is not that important or is that the standard theories miss something? It can be argued that standard theories are too narrowly focused. For example, Burkart, Panunzi, and Shleifer (2003) link the degree of separation of ownership and control to different legal environments, and show that family-run firms will emerge as the dominant form of ownership structure in countries with weak minority shareholder protections, whereas professionally managed firms must be the optimal form in countries with strong investor protection. Evidence in Claessens, Djankov and Lang

(2000) and Claessens et al. (2002) suggests that family-owned firms with a very high concentration of ownership is the norm in many Asian countries and these firms have performed well.

More importantly, there are other alternative mechanisms that ensure strong corporate governance that have not been studied enough. One very important factor is competition in product and input markets (Allen and Gale, 2000b). If the managers of a firm waste or consume large amounts of resources, the firm will be unable to compete and will go bankrupt eventually. Rather than taking over a firm if it is inefficiently run it is possible for a well-run competing company to capture the inefficient firm's market share. The more efficient firm can then purchase the inefficient firm's assets and other inputs. Competition in particular international competition is a mechanism that can potentially work in all countries. It seems that it is particularly important in Asia where so many countries have based their success on export led growth.

Allen and Gale (2000a; Chapter 12) show that if cooperation among different workers and other suppliers of inputs is necessary and all suppliers benefit from the firm doing well then a good equilibrium with no external governance is possible. They suggest that this mutual monitoring is one way to think about corporate governance in Japan. Gomes (2000) demonstrates that managerial reputation effect can replace governance in an IPO firm.

2.4 Funding new industries

Allen (1993) has suggested that stock market-based economies, such as the UK in the 19th century and the US in the 20th century, have been more successful in developing new industries than intermediary-based economies such Germany and Japan. For example, railways were first developed in the UK in the 19th century and were financed largely through the London Stock Exchange. In the 20th century, the US has been the most successful country at developing and financing new industries: at the turn of the century, the US successfully developed the automobile industry even though the automobile was invented in Germany. After World War I, the commercial aircraft industry was mainly developed in the US. It also had a similar success with the computer

industry after World War II and more recently with the biotechnology and (to some degree) the Internet industries.[2] On the other hand, Germany and Japan, two countries that are both intermediation-based, are very good at traditional or mature industries. Recent examples in this context would be automobiles in both countries and electronics in Japan.

Allen and Gale (1999) provide theoretical arguments to explain the above observations. Markets are associated with costly information acquisition by investors who then decide whether or not to invest. With banks the costly information acquisition is delegated to managers. Allen and Gale argue that markets are better than banks for funding new industries. In such circumstances, evidence based on experience is sparse, and there is wide diversity of opinion. As argued above in Section 2.2, stock market-based economies such as the US and UK also tend to have well-developed systems for the acquisition and distribution of information, so the cost of information to investors is low. Markets then work well because investors can gather information at low cost and those that anticipate high profits can provide the finance to the new firms. In contrast, the delegation employed by intermediaries does not work well when there is diversity of opinion. Investors rationally anticipate that they may well disagree with the manager and are less willing to provide funds without acquiring information on their own.

Allen and Gale (1999) then argue that banks are better than financial markets for funding mature industries because there is wide agreement on how they should be managed so the delegation of the investment decision to a bank works well. As a result, individual investors feel that there is no need for them to acquire costly information regarding firms operating in these industries. This, and the economies of scale in information acquisition through delegation, makes bank-based systems more efficient in terms of financing the growth in these industries.

It is often argued that one of the reasons the US has been so successful in recent years in developing new industries is the existence of a strong venture capital sector. For example, Kortum and Lerner (2000) have documented a strong relationship in the US

[2] There are counterexamples to the conclusion, such as the development of the chemical industry on a large scale in 19th century Germany, but it is interesting to note that chemical industry had existed on a small scale before, so the degree of diversity of opinion that is crucial to market financing might be expected to be less than for entirely new industries.

between the extent to which venture capital is used in an industry and the rate of patenting. Venture capital should be thought of as being market finance rather than intermediated finance, because venture capitalists can easily cash out by selling firms in IPOs in the market that makes them willing to provide seed capital initially. The high price that can be obtained in the market is consistent with the theory that it is only people with favorable beliefs that are providing the funding.

2.5 Law, politics and finance

In an important contribution, Roe (1994) argues that political factors play a crucial role in the development of the legal and regulatory system and, hence, the structure of corporate governance in different countries. In particular, he argues that the US chose to have a financial system where the power of financial institutions such as banks and insurance companies is very limited. As a result, they cannot play a significant role in corporate governance. In Germany and Japan, a different political climate allows financial institutions to become more deeply involved in corporate governance.

Political factors are important, without a doubt, but there is a question about the extent of their importance. Allen (1995) argues that the UK presents an interesting contrast to the US. It has a similar separation of ownership and control in corporations, but very different financial institutions. In particular, the banking system is concentrated and, although the Bank of England (and more recently the Financial Services Authority) has traditionally had wide powers of intervention, there are few explicit restrictions on the activities that banks may undertake. Nevertheless, banks have chosen not to become involved in corporate governance. Similarly, insurance companies have not been barred from playing an important governance role, but have chosen not to do so. If banks and insurance companies in the UK chose not to become involved in corporate governance, the same might have been true in the US even if they had the legal freedom to do so. This comparison is difficult to reconcile with the idea that it is politics and legal and regulatory constraints that is the sole determinant of differences in corporate governance across countries.

In an influential set of papers, La Porta, Lopez-de-Silanes, Shleifer and Vishny have developed an approach to comparative financial systems based on legal systems. They consider two basic issues. The first is the extent to which legal systems differ in the protection afforded to shareholders and creditors in different countries. The second is the impact that this has on corporations' financing, governance, payout and other policies. La Porta et al. (1998) examine how laws protecting investors differ across 49 countries. They identify two legal traditions for commercial law. The first is the common law tradition, which originated in England. The second is the civil law tradition. There are three branches of the civil law tradition, French, German and Scandinavian. Through a variety of means, such as conquest, imperialism, and imitation, the English, French and German systems have spread around the world. In general, La Porta et al. (1998) find that civil law systems give investors weaker legal rights than do common law systems. Common law countries give both shareholders and creditors the strongest protection. The quality of enforcement of legal rules is highest in Scandinavian and German civil-law countries, next highest in common-law countries and weakest in French civil-law countries. Given these differences in rights and enforcement, La Porta et al. (1998) investigate whether there are substitute mechanisms for corporate governance. One example is "bright-line" rules that specify mandatory dividends. They find that only French civil-law countries have these. Another example is ownership concentration. It turns out that there is a negative correlation between the extent of minority shareholder protection and concentrated equity ownership. The implication is that the easiest way to prevent abuse of minority shareholders when legal protection is poor is to hold large blocks of stock.

La Porta et al. (1997) consider the relationship between the form of finance and the legal system. They find a relationship between investor protection and the importance of capital markets. Countries with stronger rights for shareholders and creditors have broader and deeper capital markets. French civil-law countries have the weakest rights, the worst enforcement and have the least developed capital markets. La Porta, Lopez-de-Silanes and Shleifer (1999) consider the incidence of widely held corporations in 27 wealthy economies. They find that with the exception of countries such as the US and UK, where minority investors are well protected, corporations are not widely held but instead are controlled by families or the State. Another exception is Germany, where

banks play a significant role in the governance of some large corporations through their ownership of shares. La Porta et al. (2000a) consider the relationship between payout policies and investor protection in 33 countries. They distinguish between an "outcome model" where minority holders are able to pressure insiders to pay dividends and a "substitute model" where firms develop a reputation for paying out dividends. They find that firms in common law countries, which usually have better investment protection, pay more dividends than firms in civil law countries. This is interpreted as support for the outcome model. La Porta et al. (2000b) describe the differences in laws and enforcement across 49 countries, discuss the possible origins of these differences, and consider their consequences and potential strategies for corporate governance reform.

Rajan and Zingales (2003a, 2003b) argue that political factors are more important in determining the financial structure of a country than the origin of the legal system. They document the relative sizes of capital markets through the twentieth century. Contrary to the received wisdom, they find that continental European countries, such as France, Belgium and Germany, have had large capital markets in certain periods. When measured by the ratio of capitalization to GDP, they were not that much different in size from those in the UK and bigger than those in the US. The modern view that capital markets are not important for these countries is true for the period after the Second World War, but was not true at the start of the century. In recent years, markets have regained their importance in countries such as France and are moving in that direction in countries such as Germany. Rajan and Zingales argue that understanding this reversal requires an analysis of political factors, including the openness of the country to outside influences and the centralization of the political system. Interest groups representing intermediaries that earn rents may prevent changes that would lead to a more efficient allocation of resources.

2.6 Discussion

It can be seen that there are many dimensions to a comparison on banks and markets in terms of efficiency properties. With regard to risk sharing, markets give better cross-sectional risk sharing while a bank-based system is better for intertemporal

smoothing. For information provision, markets provide better information for allocation of resources but have the downside that they impose more risk on investors. With regard to corporate governance, there are many ways to achieve efficient allocations of resources and it is not clear either banks or markets have a clear advantage. For funding new industries, markets have an advantage while banks are better for funding mature industries. Bank-based systems are likely to be less dynamic because of rent-seeking interest groups that will prevent changes that might erode their rents. Competitive markets will avoid this problem.

In summary, there is no clear conclusion as to whether bank-based systems or market-based systems are better in terms of efficiency properties. Which is best depends on what properties the financial system is desired to have.

3. Stability Properties

3.1 A brief history

Financial crises often accompany the development of a financial system. Conventional wisdom says that financial crises are bad. Often they are very bad, as they disrupt production and lower social welfare as in the Great Depression in the US. Crises can occur even in developed financial systems: for example, Scandinavia and Japan in the 1990s.

Prior to the 20th Century, banking crises, currency crises, and stock market crashes occurred frequently in Europe and the US. Among these crises banking panics, caused by the fact that banks do not have sufficient liquid assets to meet total withdrawal demands (anticipated and unanticipated), were often particularly disruptive. Over time one of the most important roles of central banks came to be to eliminate banking panics and ensure financial stability. In the US, the foundation of the Federal Reserve System in 1913 was a result of a debate triggered by the severe banking crisis of 1907. To a large degree central banks in different countries have performed well in this regard. For example, the Bank of England became particularly adept at solving this during the 19th century and the last true financial crisis in the United Kingdom was in 1866.

However, a new breed of financial crises emerged after the collapse of the Bretton Woods system in early 1970s. Lindgren, Garcia, and Saal (1996) find that about three quarters of the IMF's member countries suffered some form of banking crises between 1980 and 1996, and their study did not include the subsequent Asian financial crisis in 1997. In many of these crises, banking panics in the traditional sense were avoided either by central bank intervention or by explicit or implicit government guarantees. But as Kaminsky and Reinhart (1999) find, the advent of financial liberalization in many economies in the 1980s, in which free capital in- and out-flows and the entrance and competition from foreign investors and financial institutions follow in the home country, has led to the "twin" banking and currency crises.

3.2 Banking crises

There are two traditional views of banking panics. One is that they are random events, unrelated to changes in the real economy. The classical form of this view suggests that panics are the result of "mob psychology" or "mass hysteria" (see, e.g., Kindleberger (1978)). The modern version, developed by Diamond and Dybvig (1983) and others, is that bank runs are self-fulfilling prophecies. Given the assumption of first-come, first-served and costly liquidation of some assets there are multiple equilibria. If everybody believes no panic will occur only those with genuine liquidity needs will withdraw their funds and these demands can be met without costly liquidation of assets. However, if everybody believes a crisis will occur then it becomes a self-fulfilling prophecy as people rush to avoid being last in line. Which of these two equilibria occurs depends on extraneous variables or "sunspots". Although "sunspots" have no effect on the real data of the economy, they affect depositors' beliefs in a way that turns out to be self-fulfilling.

An alternative to the "sunspot" view is that banking panics are a natural outgrowth of the business cycle. An economic downturn will reduce the value of bank assets, raising the possibility that banks are unable to meet their commitments. If depositors receive information about an impending downturn in the cycle, they will anticipate financial difficulties in the banking sector and try to withdraw their funds. This attempt will

precipitate the crisis. According to this interpretation, panics are not random events but a response to unfolding economic circumstances.

A number of authors have developed models of banking panics caused by aggregate risk. For example, Chari and Jagannathan (1988) focus on a signal extraction problem where part of the population observes a signal about future returns. Others must then try to deduce from observed withdrawals whether an unfavorable signal was received by this group or whether liquidity needs happen to be high. Chari and Jagannathan are able to show panics occur not only when the outlook is poor but also when liquidity needs turn out to be high.

Building on the empirical work of Gorton (1988) and Calomiris and Gorton (1991) that nineteenth century banking crises were predicted by leading economic indicators, Allen and Gale (1998) develop a model that is consistent with the business cycle view of the origins of banking panics. In their model, crises can improve risk sharing but they also involve deadweight costs if they cause projects to be prematurely liquidated. A central bank can avoid these deadweight costs and implement an optimal allocation of resources through an appropriate monetary policy. By creating fiat money and lending it to banks, the central bank can prevent the inefficient liquidation of investments while at the same time allowing optimal sharing of risks.

3.3 Theories of currency crises and twin crises

The large movements in exchange rates that occurred in many East Asian countries in 1997 have revived interest in the topic of currency crises. In many of the early models of currency crises, such as Krugman (1979), currency crises occur because of inconsistent and unsustainable government policies (see Flood and Marion (1999) for a survey of the literature on currency crises). These models were designed to explain the problems experienced by a number of Latin American countries in the 1970's and early 1980's. In the recent East Asian crises, by contrast, many of the countries which experienced problems had pursued macroeconomic policies that were consistent and sustainable. This characteristic of the recent crises has prompted a re-examination of theoretical models of currency crises.

The other characteristic of the South East Asian crises that has received considerable attention is that the banking systems of these countries also experienced crises. Kaminsky and Reinhart (1999) have investigated the relationship between banking crises and currency crises. They find that in the 1970's, when financial systems were highly regulated in many countries, currency crises were not accompanied by banking crises. However, after the financial liberalization that occurred during the 1980's, currency crises and banking crises became intertwined and there were "twin crises". The usual sequence of events is that initial problems in the banking sector are followed by a currency crisis and this in turn exacerbates and deepens the banking crisis. Although banking crises typically precede currency crises, the common cause of both is usually a fall in asset values due to a recession or a weak economy. Often the fall is part of a boom-bust cycle that follows financial liberalization. It appears to be rare that banking and currency crises occur when economic fundamentals are sound.

Despite the apparent inter-relationship between currency crises and banking crises in recent episodes, the literatures on the two topics have for the most part developed separately. Important exceptions are Chang and Velasco (2000, 2001). In these papers banking and currency crises are "sunspot" phenomena that arise because of the existence of multiple equilibria as in Diamond and Dybvig (1983).

A number of other papers have focused on the possibility of multiple equilibria. These include Flood and Garber (1984), Obstfeld (1986; 1996) and Calvo (1988). In these models governments are unable to commit to policies and this lack of commitment can give rise to multiple equilibria, at least one of which is a self-fulfilling crisis. The selection of equilibrium is problematic. An exception is Morris and Shin (1998) who show that traders' lack of common knowledge about the state of the economy can lead to a unique equilibrium selection.

Kaminsky and Reinhart's (1999) finding that crises are related to economic fundamentals is consistent with work on US financial crises in the nineteenth and early twentieth centuries. Gorton (1988) and Calomiris and Gorton (1991) argue that the evidence is consistent with the hypothesis that banking crises are an essential part of the business cycle rather than a sunspot phenomenon. Allen and Gale (2000c) extend the model of Allen and Gale (1998) to consider twin crises. A model is developed where the

"twin" crises result from low asset returns. Large movements in exchange rates are desirable to the extent that they allow better risk sharing between a country's bank depositors and the international bond market.

3.4 Bubbles and crises

There is some evidence that crises often follow apparent bubbles in asset prices. Allen and Gale (2000d) provide a theory of bubbles and ensuing crises based on the existence of an agency problem. Many investors in real estate and stock markets obtain their investment funds from external sources. If the ultimate providers of funds are unable to observe the characteristics of the investment, there is a classic risk shifting problem. Risk shifting increases the return to investment in the assets and causes investors to bid up the asset price above its fundamental value. A crucial determinant of asset prices is the amount of credit that is provided for speculative investment. Financial liberalization, by expanding the volume of credit for speculative investments, can interact with the agency problem and lead to a bubble in asset prices.

An alternative theory of financial crises has been suggested by McKinnon and Pill (1997), Krugman (1998) and Corsetti, Pesenti and Roubini (1999). They suggest that government guarantees are the fundamental cause of crises. Because deposits are guaranteed by the government, banks are not subject to the usual discipline of the market. This allows banks to engage in speculative investment, which bids up asset prices and creates a bubble that eventually bursts.

3.5 Contagion and financial fragility

The prevalence of financial crises has led many to conclude that the financial sector is unusually susceptible to shocks. One theory is that small shocks can have a large impact. A shock that initially affects only a particular region or sector or perhaps even a few institutions can spread by contagion to the rest of the financial sector and then infect the larger economy. There are a number of different types of contagion that have been suggested in the literature. The first is contagion through interlinkages between banks and

financial institutions (see, e.g., Rochet and Tirole (1996a, b), Freixas and Parigi (1998), Freixas, Parigi and Rochet (2000), and Allen and Gale (2000e) for theoretical analyses and Van Rijckeghem and Weber (2000) for empirical evidence). The second is contagion of currency crises (see, e.g., Masson (1999), Eichengreen, Rose and Wyplosz (1996) and Glick and Rose (1999)). The third is contagion through financial markets (see, e.g., King and Wadwhani (1990), Kyle and Xiong (2001) and Kodres and Pritsker (2002)).

The notion of financial fragility is closely related to that of contagion. When a financial system is fragile a small shock can have a big effect. The shock may be spread by contagion. A financial crisis may rage out of control and bring down the entire economic edifice. (see, e.g., Kiyotaki and Moore (1997), Chari and Kehoe (2000), Lagunoff and Schreft (2001) and Allen and Gale (2004c)).

3.6 Banks versus markets: financial stability

The overview of the literature on financial stability above shows that both bank-based and market based systems are susceptible to crises. Bank-based systems clearly face the possibility of banking crises. However market-based systems are also susceptible to crisis as well. The literature on bubbles and crises shows that markets can misvalue assets and this can cause substantial problems subsequently. Contagion and financial fragility can also occur in bank-based and market-based systems. In terms of stability neither system has a particular advantage.

4. Conclusions

With regard to efficiency properties bank-based systems have some advantages while market-based have others. In terms of stability properties both systems are susceptible to crises. Given these factors, what is the best financial system for Europe?

My own answer to this question would be that Europe should develop a financial system based on both financial intermediaries and markets. In this way it can to some extent get the best of both worlds. In terms of efficiency properties, it will get the benefits of cross-sectional risk sharing. It will have to give up the benefits of

intertemporal smoothing. However, governments can perhaps substitute for this role. They undertake many policies to smooth resources intertemporally such as public pension systems and the tax versus borrowing decision for funding government expenditures. In terms of information provision, the advantages of both systems should be obtainable. Information for resource allocation will be available while appropriate accounting rules may allow companies to choose to release the optimal amount of information. For corporate governance, regulations can be drafted to enact the kind of system desired. This may involve Anglo-Saxon style hostile takeovers but these are not necessary. For funding new industries, markets would be available to ensure a dynamic real economy. Banks would be available for mature industries. In terms of law, politics and finance the advantages of both markets and banks can also be simultaneously obtained. Competition between banks and markets will help to ensure that there are limited rents to be protected so that change will not be held back by vested interests.

In terms of stability properties, it is not so clear how such a hybrid system will operate. A simple analysis would suggest that a hybrid system should be no more unstable. However, the interaction between financial intermediaries and markets can lead to subtle effects (see Allen and Gale (2004b, 2004c)). More research needs to be done on this topic.

References

Allen, Franklin, 1993. "Stock Market and Resource Allocation," in C. Mayer and X. Vives (eds.), *Capital Markets and Financial Intermediation*, Cambridge: Cambridge University Press.

____, 1995. Book review of Strong Managers, Weak Owners by M. Roe, Princeton University Press, Journal of Economic Literature, Vol. 33, 1994-1996.

____, and Douglas Gale, 1997. "Financial Markets, Intermediaries, and Intertemporal Smoothing," *Journal of Political Economy*, Vol. 105, 523-546.

____, and ____, 1998. "Optimal Financial Crises," *Journal of Finance*, Vol. 53, 1245-1287.

____, and ____, 1999. "Diversity of Opinion and the Financing of New Technologies," *Journal of Financial Intermediation*, Vol. 8, 68-89.

____, and ____, 2000a. *Comparing Financial Systems*, MIT Press, Cambridge, MA.

____, and ____, 2000b. "Corporate Governance and Competition," in *Corporate Governance: Theoretical and Empirical Perspectives*, edited by X. Vives, Cambridge University Press, London, 23-94.

____, and ____, 2000c. "Optimal Currency Crises," Carnegie Rochester Series on Public Policy, Vol. 53, 177-230.

____, and ____, 2000d. "Bubbles and Crises," *Economic Journal*, Vol. 110, 236-255.

____, and ____, 2000e. "Financial Contagion," *Journal of Political Economy*, Vol. 108, 1-33.

____, and ____, 2004a. "Comparative Financial Systems: A Survey," in *Financial Intermediation*, edited by A. Boot, S. Bhattacharya and A. Thakor, Oxford University Press, forthcoming (http://fic.wharton.upenn.edu/fic/papers/01/0115.pdf).

____, and ____, 2004b. "Financial Intermediaries and Markets." Working Paper 00-44-C, Wharton Financial Institutions Center. Forthcoming in *Econometrica*.

____, and ____, 2004c. "Financial Fragility, Liquidity and Asset Prices." Working Paper 01-37-B, Wharton Financial Institutions Center.

Burkart, M., F. Panunzi, and A. Shleifer, 2003. "Family Firms," *Journal of Finance*, Vol. 58, 2167-2201.

Calomiris, C. and G. Gorton 1991. “The Origins of Banking Panics, Models, Facts, and Bank Regulation,” in R. G. Hubbard (ed.), Financial Markets and Financial Crises, Chicago, IL: University of Chicago Press.

Calvo, G. 1988. "Servicing the Public Debt: The Role of Expectations," American Economic Review, Vol. 78, 1411-1428.

Chang, R., and A. Velasco, 2000. “Financial Fragility and the Exchange Rate Regime,” *Journal of Economic Theory*, Vol. 92, 1-34.

____, and ____, 2001. “A Model of Financial Crises in Emerging Markets,” *Quarterly Journal of Economics*, Vol. 116(2), 489-518.

Chari, V. and R. Jagannathan 1988. “Banking Panics, Information, and Rational Expectations Equilibrium,” *Journal of Finance* Vol. 43, 749-60.

____ and P. Kehoe 2000. Financial Crises as Herds," Working Paper, Federal Reserve Bank of Minneapolis.

Claessens, Stijn, Simeon Djankov, and Larry Lang, 2000. “The Separation of Ownership and Control in East Asian Corporations,” *Journal of Financial Economics*, 58, 81-112.

____, ____, Joseph Fan and, and Larry Lang, 2002. “Expropriation of Minority Shareholders in East Asia,” *Journal of Finance*, Vol. 57 (6), 2741-2771.

Corsetti, G., P. Pesenti and N. Roubini (1999). “Paper Tigers? A Model of the Asian Crisis,” *European Economic Review* Vol. 43, 1211-1236.

Diamond, Douglas, and Philip Dybvig, 1983. “Bank Runs, Liquidity, and Deposit Insurance,” *Journal of Political Economy*, Vol. 91, 401-419.

Dow, J., and Gary Gorton, 1997. “Stock Market Efficiency and Economic Efficiency: Is there a Connection?” *Journal of Finance*, Vol. 52, 1087-1129.

Eichengreen, B., A. Rose and C. Wyplocz 1996. “Contagious Currency Crises: First Tests,” *Scandinavian Journal of Economics* Vol. 98, 463-484.

Fama, Eugene, 1970. “Efficient Capital Markets: A Review of Theory and Empirical Work,” *Journal of Finance*, Vol. 35, 383-417.

____, 1991. “Efficient Capital Markets II,” *Journal of Finance*, Vol. 46, 1575-1617.

____, and Michael Jensen, 1983. “The Separation of Ownership and Control,” *Journal of Law and Economics*, Vol. 26, 301-325.

Flood, R. and P. Garber 1984. "Gold Monetization and Gold Discipline," *Journal of Political Economy* Vol. 92, 90-107.

Flood, R. and N. Marion 1999. "Perspectives on the Recent Currency Crisis Literature," *International Journal of Finance & Economics*, Vol. 4, 1-26.

Freixas, X. and B. Parigi 1998. "Contagion and Efficiency in Gross and Net Interbank Payment Systems," *Journal of Financial Intermediation* Vol. 7, 3-31.

____, ____ and Rochet 2000. "Systemic Risk, Interbank Relations and Liquidity Provision by the Central Bank," *Journal of Money, Credit & Banking* Vol. 32, 611-38.

Glick, R. and A. Rose 1999. "Contagion and Trade: Why Are Currency Crises Regional?" Chapter 9 in P. Agénor, M. Miller, D. Vines and A. Weber (eds.), The Asian Financial Crisis: Causes, Contagion and Consequences, Cambridge, U.K.: Cambridge University Press.

Gomes, Armando, 2000. "Going public without governance: managerial reputation effects," *Journal of Finance*, Vol. 55, 615-646.

Gorton, G. 1988. "Banking Panics and Business Cycles," *Oxford Economic Papers* Vol. 40, 751-781.

Grossman, Sanford, and Oliver Hart, 1980. "Takeover Bids, the Free-rider Problem, and the Theory of Corporation," *Bell Journal of Economics*, Vol. 11, 42-64.

Grossman, Sanford, and Joseph Stiglitz, 1980. "On the Impossibility of Infomationally Efficient Markets," *American Economic Review*, Vol. 70, 393-408.

Hirshleifer, J. 1971. "The Private and Social Value of Information and the Reward to Inventive Activity," *American Economic Review*, Vol. 61, 561-574.

Hoshi, T., A. Kashyap, and D. Scharfstein, 1990. "The Role of Banks in Reducing the Costs of Financial Distress in Japan," *Journal of Financial Economics*, Vol. 27, 67-98.

Jensen, Michael, 1986. "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review*, Vol. 76, 323-329.

____, and William Meckling, 1976. "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure," *Journal of Financial Economics*, Vol. 3, 305-360.

Kaminsky, G., and C. Reinhart, 1999. “The Twin Crises: The Causes of Banking and Balance-of-payments Problems,” *American Economic Review,* Vol. 89, 473-500.

Kindleberger, C. 1978. *Manias, Panics, and Crashes: A History of Financial Crises*, New York: Basic Books.

King, M. and S. Wadhwani 1990. “Transmission of Volatility Between Stock Markets,” *Review of Financial Studies* Vol. 3, 5-33.

Kiyotaki, N. and J. Moore 1997. “Credit Chains,” *Journal of Political Economy* Vol. 105, 211-248.

Kodres L. and M. Pritsker 2002. “A Rational Expectations Model of Financial Contagion,” *Journal of Finance* Vol. 57, 768-99.

Kortum, Samuel, and Josh Lerner, 2000. “Assessing the Contribution of Venture Capital on Innovation,” *RAND Journal of Economics*, Vol. 31 (4), pp??

Krugman, Paul, 1979. “A Model of Balance of Payments Crises,” *Journal of Money, Credit, and Banking*, 311-325.

_____ 1998, `Bubble, Boom, Crash: Theoretical Notes on Asia's Crisis', working paper, MIT, Cambridge, Massachussetts.

Kyle, A. and W. Xiong 2001. “Contagion as a Wealth Effect,” *Journal of Finance* Vol. 56, 1401-1440.

Lagunoff, R. and S. Schreft 2001. “A Model of Financial Fragility,” *Journal of Economic Theory* Vol. 99, 220-264.

La Porta, R., F. Lopez-de-Silanes, and A. Shleifer 1999. “Corporate Ownership Around the World,” *Journal of Finance* Vol. 54, 471-517.

_____, and Robert Vishny, 1997. “Legal determinants of external finance,” *Journal of Finance*, Vol. 52, 1131-1150.

_____, 1998, “Law and Finance,” *Journal of Political Economy*, Vol. 106, 1113-1155.

_____, 2000. “Investor Protection and Corporate Governance,” *Journal of Financial Economics* Vol. 58, 3-27.

Lindgren, C., G. Garcia, and M. Saal, 1996. *Bank Soundness and Macroeconomic Policy*, Washington, D.C.: International Monetary Fund.

Masson, P. 1999. “Contagion: Monsoonal Effects, Spillovers and Jumps Between Multiple Equilibria,” Chapter 8 in P. Agénor, M. Miller, D. Vines and A. Weber

(eds.), *The Asian Financial Crisis: Causes, Contagion and Consequences*, Cambridge, U.K.: Cambridge University Press.

McKinnon, R. and H. Pill 1997, Credible Economic Liberalizations and Overborrowing," *American Economic Review* Vol. 87, 189-203.

Morris, S. and H. Shin 1998. "Unique Equilibrium in a Model of Self-Fulfilling Currency Attacks," *American Economic Review* 88, 587-597.

Obstfeld, M. 1986. "Rational and Self-Fulfilling Balance of Payments Crises," *American Economic Review* 76, 72-81.

_____1996. "Models of Currency Crises with Self-fulfilling Features," *European Economic Review* Vol. 40, 1037-1047.

Rajan, R. and L. Zingales 2003a. "The Great Reversals: The Politics of Financial Development in the 20th Century," *Journal of Financial Economics*, Vol. 69, 5-50.

_____ 2003b, *Saving Capitalism from the Capitalists*, New York: Crown Business.

Rochet, J. and J. Tirole 1996a. "Interbank Lending and Systemic Risk," *Journal of Money, Credit and Banking* Vol. 28, 733-762.

_____ 1996b. "Controlling Risk in Payment Systems," *Journal of Money, Credit and Banking* Vol. 28, 832-862.

Roe, M. 1994. *Strong Managers, Weak Owners*, Princeton: Princeton University Press.

Van Rijckeghem, C. and B. Weder 2000. "Spillovers Through Banking Centers: A Panel Data Analysis," IMF Working Paper WP/00/88, Washington D.C.: International Monetary Fund.

NATIONAL BANK OF BELGIUM - WORKING PAPERS SERIES

1. "Model-based inflation forecasts and monetary policy rules" by M. Dombrecht and R. Wouters, *Research Series*, February 2000.
2. "The use of robust estimators as measures of core inflation" by L. Aucremanne, *Research Series*, February 2000.
3. "Performances économiques des Etats-Unis dans les années nonante" by A. Nyssens, P. Butzen, P. Bisciari, *Document Series*, March 2000.
4. "A model with explicit expectations for Belgium" by P. Jeanfils, *Research Series*, March 2000.
5. "Growth in an open economy: some recent developments" by S. Turnovsky, *Research Series*, May 2000.
6. "Knowledge, technology and economic growth: an OECD perspective" by I. Visco, A. Bassanini, S. Scarpetta, *Research Series*, May 2000.
7. "Fiscal policy and growth in the context of European integration" by P. Masson, *Research Series*, May 2000.
8. "Economic growth and the labour market: Europe's challenge" by C. Wyplosz, *Research Series*, May 2000.
9. "The role of the exchange rate in economic growth: a euro-zone perspective" by R. MacDonald, *Research Series*, May 2000.
10. "Monetary union and economic growth" by J. Vickers, *Research Series*, May 2000.
11. "Politique monétaire et prix des actifs: le cas des Etats-Unis" by Q. Wibaut, *Document Series*, August 2000.
12. "The Belgian industrial confidence indicator: leading indicator of economic activity in the euro area?" by J.J. Vanhaelen, L. Dresse, J. De Mulder, *Document Series*, November 2000.
13. "Le financement des entreprises par capital-risque" by C. Rigo, *Document Series,* February 2001.
14. "La nouvelle économie" by P. Bisciari, *Document Series*, March 2001.
15. "De kostprijs van bankkredieten" by A. Bruggeman and R. Wouters, *Document Series*, April 2001.
16. "A guided tour of the world of rational expectations models and optimal policies" by Ph. Jeanfils, *Research Series*, May 2001.
17. "Attractive Prices and Euro - Rounding effects on inflation" by L. Aucremanne and D. Cornille, *Documents Series*, November 2001.
18. "The interest rate and credit channels in Belgium: an investigation with micro-level firm data" by P. Butzen, C. Fuss and Ph. Vermeulen, *Research series*, December 2001.

19 "Openness, imperfect exchange rate pass-through and monetary policy" by F. Smets and R. Wouters, *Research series*, March 2002.

20. "Inflation, relative prices and nominal rigidities" by L. Aucremanne, G. Brys, M. Hubert, P. J. Rousseeuw and A. Struyf, *Research series*, April 2002.

21. "Lifting the burden: fundamental tax reform and economic growth" by D. Jorgenson, *Research series*, May 2002.

22. "What do we know about investment under uncertainty?" by L. Trigeorgis, *Research series*, May 2002.

23. "Investment, uncertainty and irreversibility: evidence from Belgian accounting data" by D. Cassimon, P.-J. Engelen, H. Meersman, M. Van Wouwe, *Research series*, May 2002.

24. "The impact of uncertainty on investment plans" by P. Butzen, C. Fuss, Ph. Vermeulen, *Research series*, May 2002.

25. "Investment, protection, ownership, and the cost of capital" by Ch. P. Himmelberg, R. G. Hubbard, I. Love, *Research series*, May 2002.

26. "Finance, uncertainty and investment: assessing the gains and losses of a generalised non-linear structural approach using Belgian panel data", by M. Gérard, F. Verschueren, *Research series*, May 2002.

27. "Capital structure, firm liquidity and growth" by R. Anderson, *Research series*, May 2002.

28. "Structural modelling of investment and financial constraints: where do we stand?" by J.- B. Chatelain, *Research series*, May 2002.

29. "Financing and investment interdependencies in unquoted Belgian companies: the role of venture capital" by S. Manigart, K. Baeyens, I. Verschueren, *Research series*, May 2002.

30. "Development path and capital structure of Belgian biotechnology firms" by V. Bastin, A. Corhay, G. Hübner, P.-A. Michel, *Research series*, May 2002.

31. "Governance as a source of managerial discipline" by J. Franks, *Research series*, May 2002.

32. "Financing constraints, fixed capital and R&D investment decisions of Belgian firms" by M. Cincera, *Research series*, May 2002.

33. "Investment, R&D and liquidity constraints: a corporate governance approach to the Belgian evidence" by P. Van Cayseele, *Research series*, May 2002.

34. "On the Origins of the Franco-German EMU Controversies" by I. Maes, *Research series*, July 2002.

35. "An estimated dynamic stochastic general equilibrium model of the Euro Area", by F. Smets and R. Wouters, *Research series*, October 2002.

36. "The labour market and fiscal impact of labour tax reductions: The case of reduction of employers' social security contributions under a wage norm regime with automatic price indexing of wages", by K. Burggraeve and Ph. Du Caju, *Research series*, March 2003.

37. "Scope of asymmetries in the Euro Area", by S. Ide and Ph. Moës, *Document series*, March 2003.

38. "De autonijverheid in België: Het belang van het toeleveringsnetwerk rond de assemblage van personenauto's", by F. Coppens and G. van Gastel, *Document series*, June 2003.

39. "La consommation privée en Belgique", by B. Eugène, Ph. Jeanfils and B. Robert, *Document series*, June 2003.

40. "The process of European monetary integration: a comparison of the Belgian and Italian approaches", by I. Maes and L. Quaglia, *Research series*, August 2003.

41. "Stock market valuation in the United States", by P. Bisciari, A. Durré and A. Nyssens, *Document series*, November 2003.

42. "Modeling the Term Structure of Interest Rates: Where Do We Stand?", by K. Maes, *Research series*, February 2004.

43. "Interbank Exposures: An Empirical Examination of Systemic Risk in the Belgian Banking System", by H. Degryse and G. Nguyen, *Research series*, March 2004.

44. "How Frequently do Prices change? Evidence Based on the Micro Data Underlying the Belgian CPI", by L. Aucremanne and E. Dhyne, *Research series*, April 2004.

45. "Firm's investment decisions in reponse to demand and price uncertainty", by C. Fuss and Ph. Vermeulen, *Research series*, April 2004.

46. "SMEs and Bank Lending Relationships: the Impact of Mergers", by H. Degryse, N. Masschelein and J. Mitchell, *Research series*, May 2004.

47. "The Determinants of Pass-Through of Market Conditions to Bank Retail Interest Rates in Belgium", by F. De Graeve, O. De Jonghe and R. Vander Vennet, *Research series*, May 2004.

48. "Sectoral vs. country diversification benefits and downside risk", by M. Emiris, *Research series*, May 2004.

49. "How does liquidity react to stress periods in a limit order market?", by H. Beltran, A. Durré and P. Giot, *Research serie*s, May 2004.

50. "Financial consolidation and liquidity: prudential regulation and/or competition policy?", by P. Van Cayseele, *Research series*, May 2004.

51. "Basel II and Operational Risk: Implications for risk measurement and management in the financial sector", by A. Chapelle, Y. Crama, G. Hübner and J.-P. Peters, *Research series,* May 2004.

52. "The Efficiency and Stability of Banks and Markets", by F. Allen, *Research series*, May 2004.