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Financial Intermediation in Developed Countries: Heterogeneity, Lengthening and Risk Transfer[1]

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Abstract

We built an original database of the flow of funds accounts to assess the final destination of household financial wealth. The method, based on matrix stepwise calculation, made all financial intermediaries transparent. Our results rejected the usual dichotomy between bank- and market-based systems. The diversification of monetary and non-monetary financial intermediaries' roles revealed various ways of interpenetration, including consolidation in Europe, credit risk transfer techniques in the United States, and the lengthening of the intermediation chain. Based on the same function of transformation of indirect debt securities, our findings reinforce Gurley and Shaw's unifying definition of financial intermediation.

KEY WORDS: Financial intermediation, risk management, input-output matrix, household wealth, bank-based systems, market-based systems, cross-sectoral activities.

JEL Classification: C67, E01, E21, G2, G32, L16.

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1. INTRODUCTION

Core analysis of the resource allocation process between savings and investment aims at identifying the final destination of household savings. Within this process, financial intermediation has a central position in channeling household savings towards the financial requirements of ultimate borrowers. Recent transformation of financial intermediation, notably highlighted by Allen and Santomero (1998) in the United States (US) and Schmidt et al. (1999) in Europe, can be characterized into two main features.

(i) The reinforcement of non-monetary financial intermediaries (NMFIs), such as mutual funds, insurance and pension funds, beside banks, demonstrates the diversification of the financial sector and emphasizes the complexity of multiple intermediation circuits. Mutual fund shares or life insurance products are often distributed by bank branches. As they have become both an important source of funds for banks and an important collector of savings, NMFIs have lengthened the chain of intermediation. This has implications concerning the role of banks, as shown by Schmidt et al. (1999). What are the effects on the general level of intermediation activity? Are monetary financial intermediaries (MFIs) and NMFIs substitutable or do they complement each other?

(ii) The growing diversification of financial intermediaries parallels a decrease in traditional banking instruments (credits and deposits) in favor of new market products combining old instruments with innovative ones. This new dynamic of financial markets corresponds to the withdrawal of direct participation of individuals from markets. This trend can be explained by the higher complexity of new financial instruments and by the ability of financial intermediaries to tailor them to fit the needs of individuals. The dominant position of financial intermediaries in new markets, which comes from securitization and also from derivative products, highlights the strong connection between intermediaries and markets in the process of mobilizing and channeling savings to investment requirements. Considering this interpenetration, are the arguments which confront bank-based and market-based systems still relevant?

These two main questions justify our focus on the diversification of intermediaries and their interpenetration within financial markets. The aim of this paper is to measure the contribution of monetary and non-monetary intermediaries in collecting and allocating household financial wealth towards its final destination.

The financial intermediation process is generally treated from the point of view of financing, i.e., that of the debt structure (see Rajan and Zingales, 1995; Frankel and Montgomery, 1991; Corbett and Jenkinson, 1996). The main difference between this approach and the one presented here lies in the way we tackle the issue: we chose the angle of financial asset structure[3], which had already been chosen by Schmidt et al. (1999) in their analysis of the financial intermediation process and its evolution in Europe. It was also adopted by Allen and Santomero (2001), since they rely on the results of Schmidt et al. (1999), and on the analysis of the final asset structure of household portfolios to renew the theory of financial intermediation. Our approach systematizes Allen and Santomero's (2001) use of household financial asset structure to analyze transformation of the intermediation process, more particularly, the recent evolution of risk management.

Though we deal with the whole detailed flow of funds as Schmidt et al. (1999) did, our approach differs by using an original algebraic method and by making all financial intermediaries transparent. We describe the inflow of household savings from original to final asset structure in Europe, Japan and the US throughout the financial circuits, in order to assess

[3] The differences between the two approaches have been stressed in studies embedded in various annual reports of the Conseil National du Crédit et du Titre (CNCT), a consultative body close to the Banque de France (see the annual report of 1998 and also Boutillier and Bricongne, 2006).

and discuss the respective roles of monetary and non-monetary intermediaries in the reallocation of household financial wealth.

The paper is structured as follows. Section 2 provides a theoretical background which bases our methodology on Gurley and Shaw's (1955, 1956) broad unifying conception of financial intermediation. Section 3 presents the data and describes the method used to make all financial intermediaries transparent. Our method consists of applying Leontief's input-output analysis of industrial relationships to the financial industry by constructing an input-output matrix of household financial investment. Section 4 provides the global financial intermediation ratio (IR) of household financial wealth, and shows how the whole financial intermediation process stood up from 1991 to 2003. This stability raises the question of a possible substitution or complementarity effect between the various circuits of intermediation. By measuring the respective contributions from MFIs and NMFIs to the collection of household financial assets, we show that during the last decade, there was no monetary disintermediation to the benefit of non-monetary intermediation, but rather interpenetration of monetary and non-monetary activities. This step illustrates the unity of the financial intermediation advocated by Gurley and Shaw and clarifies the phenomenon of its global resistance. Section 5 highlights the diversity of financial intermediaries and its impact on the allocation of financial assets ultimately owned by households. By providing a cross-country comparison of the respective contribution of MFIs and NMFIs to the indirect holdings of final assets, we question the dichotomy between bank-based and market-based systems to identify financial risks borne by households. According to Allen and Santomero (1998, 2001), a higher degree of risk in market-based systems would refocus the intermediation function on new forms of risk management. Our results show that the diversification of financial intermediation does not match this dichotomy and reveal various forms of interpenetration, conforming with the traditional theory of financial intermediation of Gurley and Shaw and its consistency with innovations in the financial market (see Rajan, 2005). Section 6 concludes.

2. FINANCIAL INTERMEDIATION AND MARKETS: LOOKING FOR AN INTEGRATED THEORETICAL FRAMEWORK

The well known classification into bank-based and market-based systems aims at comparing the advantages of each system to promote long-run economic growth (see Levine 2002, and 2005 for a survey). Some claim that bank-based systems would be better at overcoming market frictions, mobilizing savings, and identifying and monitoring good investments. Others pretend that stock markets are better qualified to provide risk-management tools, enhance corporate governance, particularly through takeovers, and reduce informational capture by powerful banks. And yet, there is no empirical evidence that this classification is relevant to explain the link between the allocation process of savings and economic growth. Ndikumana (2005) demonstrates that financial development tends to facilitate domestic investment; however, for a given level of financial development, the bank- or market-based structure of the financial system has no impact on domestic investment. This result seems consistent with the view that banks and markets perform valuable functions which may require complementarity (Levine, 2002). Therefore, instead of opposing outright bank- and market-based financing when investigating the relationship between finance and growth, one might consider the development of the overall financial system.

This approach is shared by the "financial services view" (Merton and Bodie, 1995). The accent is put on the stability of financial functions carried out by both banks and markets to explain resource transfer. The focus is on the capacity of the overall system to offer significant financial services, regardless of the institutional structure or its evolution. This provides a relevant analytical framework to understand the recent financial transformations

and particularly what Allen and Santomero (2001) have called the "symbiotic nature of the relationships between financial intermediaries and markets". They argue that the role of contemporary financial intermediaries is to perform the interface between individuals and more and more complex financial markets. By reducing participation costs, intermediaries provide savers with access to these new markets. Correspondingly, financial markets enable intermediaries to manage risk trading more efficiently.

The relationship between intermediaries and markets has become a central element of the literature to explain the effects of recent financial transformations on the resource allocation process. According to Allen and Gale (1997), US banks and other intermediaries, pressured by market competition and in order to maintain their position within the financial system, were forced to move away from their traditional borrowing and lending activities and develop new fee-based revenues. By entering new markets, such as derivative markets, and developing new products, the risk management activity of banks through inter-temporal smoothing has necessarily been reduced to the benefit of cross-sectional risk sharing. As a consequence, individuals hold significantly more risky assets. Among the various functions of US financial intermediaries, the authors conclude to a refocusing on risk management with special emphasis on the new form taken by this function.

Considering these different analyses, it seems that financial intermediation and markets are closely intertwined. As a consequence, the changing forms of risk management have become a main feature in recent literature on the financial intermediation process (see Bernard and Bisignano, 2003; Rajan, 2005). Yet, on these issues, the contribution of Gurley and Shaw (1955) is still relevant, especially because "*current research on the macroeconomic implications of financial intermediation incorporates many of the earlier ideas of Gurley and Shaw*" (Gertler, 1988, p. 574). Indeed, Gurley and Shaw's model still provides both a functional explanation of the existence of financial intermediaries and a consistent analytical framework to define the relationships between markets and financial institutions. This should help to clarify the present transformation of intermediation forms and their macroeconomic impact on the resource allocation process[4].

According to Gurley and Shaw (1960), on the one hand, financial intermediaries hold primary debt securities issued by borrowers. These assets are usually characterized by long-term maturity as well as capital loss risk. On the other hand, financial intermediaries collect resources from savers by issuing indirect debt securities which may take various forms. They are generally either short-term assets providing liquidity services, or long-term assets hedging interest rate risk. After collecting these resources, intermediaries subscribe to primary securities on the market. As in recent models, the intermediaries' intervention results from imperfections in direct finance: primary securities do not meet savers' demand for portfolio diversification. By offering an appropriate solution in terms of liquidity, return and risk, issuing indirect securities contributes to efficient allocation of savings.

The interest of this analysis is threefold.

(i) Firstly, it explains financial innovations are driven by financial intermediaries in response to other intermediaries and also to markets. More particularly, it considers that "*each intermediary issues its distinctive form of indirect debt – for example, savings deposits, savings and loan shares, pension claims − and thus provides a distinctive package of financial services as a financial asset for spending units. […] Non-monetary financial intermediaries compete among themselves, with banks, and with direct finance, for the direct securities that emerge from deficit units."* (Gurley and Shaw, 1955, p. 520). This seems fully consistent with the analysis of Merton and Bodie (1995). According to them, the market competition generates a "financial innovation spiral", encouraging intermediaries to create

[4] See Renversez (1988), who provides an interpretation of Gurley and Shaw's financial intermediation model in order to explain the evolution of the French financial system in the 1980s.

more and more customized financial products and services. The success of these new products will inevitably migrate from intermediaries to markets, prompting intermediaries to carry on their innovation efforts.

(ii) Secondly, it defines the main function of financial intermediaries, i.e., the transformation of maturities and services associated with indirect debt securities and thus the management of subsequent risks. "*There is no feasible mixture of primary securities that provides adequately such distinctive qualities of indirect securities as stability of price and yield or divisibility… The incremental demand for indirect assets reflects an attraction to the many services attached to indirect assets such as insurance and pension services and convenience of accumulation"* (Gurley and Shaw, 1956, p. 264). The risk management activity is not the result of a recent transformation of financial intermediation activity but, as underlined by Tobin (1992), results from their main function. The transformation activity described by Gurley and Shaw is very similar to the financial intermediation conception provided by Scholtens and van Wensveen (2000) and developed by Rajan (2005). This function places intermediaries at the very heart of a dynamic process of qualitative asset transformation and stresses their core business, i.e., customization, financial innovation and risk management.

(iii) Finally, it proposes a unifying perspective of the financial intermediation process by insisting on common aspects between monetary and non-monetary financial intermediaries: "*Both banks and other intermediaries have the capacity to create special forms of financial assets that surplus units may accumulate… Both "create credit", both transmit loanable funds, both enable spending units to diversify their portfolios"* (Gurley and Shaw, 1955, p. 521). In this way, each financial intermediary matches the surpluses of some agents − households − to the deficit of others.

Our approach is based on Gurley and Shaw's broad unifying definition of financial intermediation because it offers a consistent framework to the analysis of the multidimensional financial intermediation process. This perspective justifies our focus on the complex course followed by household financial wealth through the meanderings of intermediation circuits. It justifies our taking into account the very nature of the multiple links within the financial system. It sets up the methodology we use to identify the final destination of household financial wealth. The following section presents the data and our method.

3. DATABASE AND METHODOLOGY

This study uses flow of funds algebra to identify the final destination of household financial wealth. We first present the data and then the method.

3.1. Data

Our data set comprises the six major economies of the European Union (France, Germany, Italy, Spain, the Netherlands, and the United Kingdom [UK]), Japan, and the US. The European countries studied represent 80% of GDP and 70% of the population in EU25 in 2003 and, therefore, are very representative of the European Union. The database covers the period from 1991 to 2003 for all countries, except France and Italy (Table 1). These differences are due to the availability of comparable data series.

The data source comprises the national flow of funds (FOF) accounts of the countries in the data set. For the six European countries, the data is in the standard of the European System of Accounts (ESA95) and is, therefore, largely harmonized; the data were provided by national central banks, except for the UK where it came from the Office for National Statistics. Financial accounts for Japan are in accordance with the System of National

Accounts (SNA93) that is the recognized international standard that largely inspired the ESA95, and were delivered from the Bank of Japan[5]. The US macroeconomic accounts are specific in their construction, so we used the methodology developed by Antoniewicz et al. (2004) to break down US FOF accounts in accordance with SNA93 recommendations. Hence, our first contribution consists of the construction of an original database of FOF accounts with consistent definitions of sectors and items for the eight countries of the data set. We also computed the weighed average for the six European countries[6], henceforth EU6. To our knowledge, there is no similar work.

TABLE 1
Countries, period and financial business sub-sectors

Country	Period	Financial business sub-sectors		
France	1994-2003	MFIs (Depository institutions and money market mutual funds)	OFIs (including long-term mutual funds)	Insurance and pension funds
Germany	1991-2003	MFIs (Depository institutions and money market mutual funds)	OFIs (including long-term mutual funds)	Insurance and pension funds
Italy	1995-2003	MFIs (Depository institutions and money market mutual funds)	OFIs (including long-term mutual funds)	Insurance and pension funds
Japan	1991-2003	Depository institutions	OFIs (including short- and long-term mutual funds)	Insurance and pension funds
Spain	1991-2003	MFIs (Depository institutions and money market mutual funds)	NMFIs (including long-term mutual funds, insurance and pension funds)	
The Netherlands	1991-2003	Depository institutions	OFIs (including short- and long-term mutual funds)	Insurance and pension funds
United Kingdom	1991-2003	Depository institutions	OFIs (including short-and long-term mutual funds)	Insurance and pension funds
United States	1991-2003	MFIs (Depository institutions and money market mutual funds)	OFIs (including long-term mutual funds)	Insurance and pension funds

MFIs: Monetary financial institutions
NMFIs: Non-monetary financial institutions
OFIs: Other financial institutions.

Notwithstanding a common standard, some differences remain in the definition of sectors and assets. The former are discussed below, while the latter are dealt with in the following sub-section presenting the methodology. The household sector is homogenous and comprises households, non-profit institutions serving households and unincorporated businesses in all countries. As reported in Table 1, the financial business sector is broken down into quite different sub-sectors according to the countries. For instance, depository institutions, i.e., banks, are grouped with money market mutual funds in five of the eight countries of the data set in order to cluster MFIs according to the ECB monetary aggregates' view, generalizing the

[5] A well known particularity of the most used and detailed Japanese FOF data series is that they are available for the fiscal year covering the period from April 1 through March 31.
[6] This average is weighted by household financial wealth for each European country and each year. We consider that the exchange rate between pound sterling and the euro is constant and set at 1.5, roughly corresponding to the mean over the period from 1999 to 2003.

European point of view to the US and Japan[7]. With the exception of Spain, other financial institutions (OFIs) are separated from the insurance and pension funds sector. Notice that OFIs here are consistent with those defined by FOF accounts in Europe and Japan and with Antoniewicz et al. (2004) for the US, implying a huge loan portfolio on the asset side for OFIs in some countries[8]. In order to facilitate comparisons, we only consider two different sub-sectors[9]: (i) MFIs, including banks and money market mutual funds, and (ii) NMFIs comprising insurance and pension funds, and OFIs with the exception of money market mutual funds. This simplified classification corresponds to the one proposed by Gurley and Shaw. As we intend to analyze both the unity and the diversification of financial intermediation using Gurley and Shaw's broad framework, this typology enables us to clearly assess the respective roles of MFIs and NMFIs in collecting household financial wealth and, therefore, the two intermediation circuits through which this wealth is reallocated.

3.2. Methodology

Our aim is to measure the contribution of monetary and non-monetary intermediation channels in the reallocation process of household financial portfolios. We start with the structure of household portfolios stemming from national FOF accounts. To identify the final destination of household financial wealth, we intend to make all financial intermediaries transparent. This objective is reached by reallocating all the intermediated assets initially held by households to claims on units of the non-financial sectors. Our method is based on flow of funds matrix calculation. We first give an overview of the whole reallocation process. Then we explain how we represent household financial portfolios by a vector for original allocation, and the intermediation process by an input-output matrix. We finally detail the matrix calculations made to obtain the vector of household holdings of final claims on resident and non-resident non-financial sectors.

3.2.1. Overview

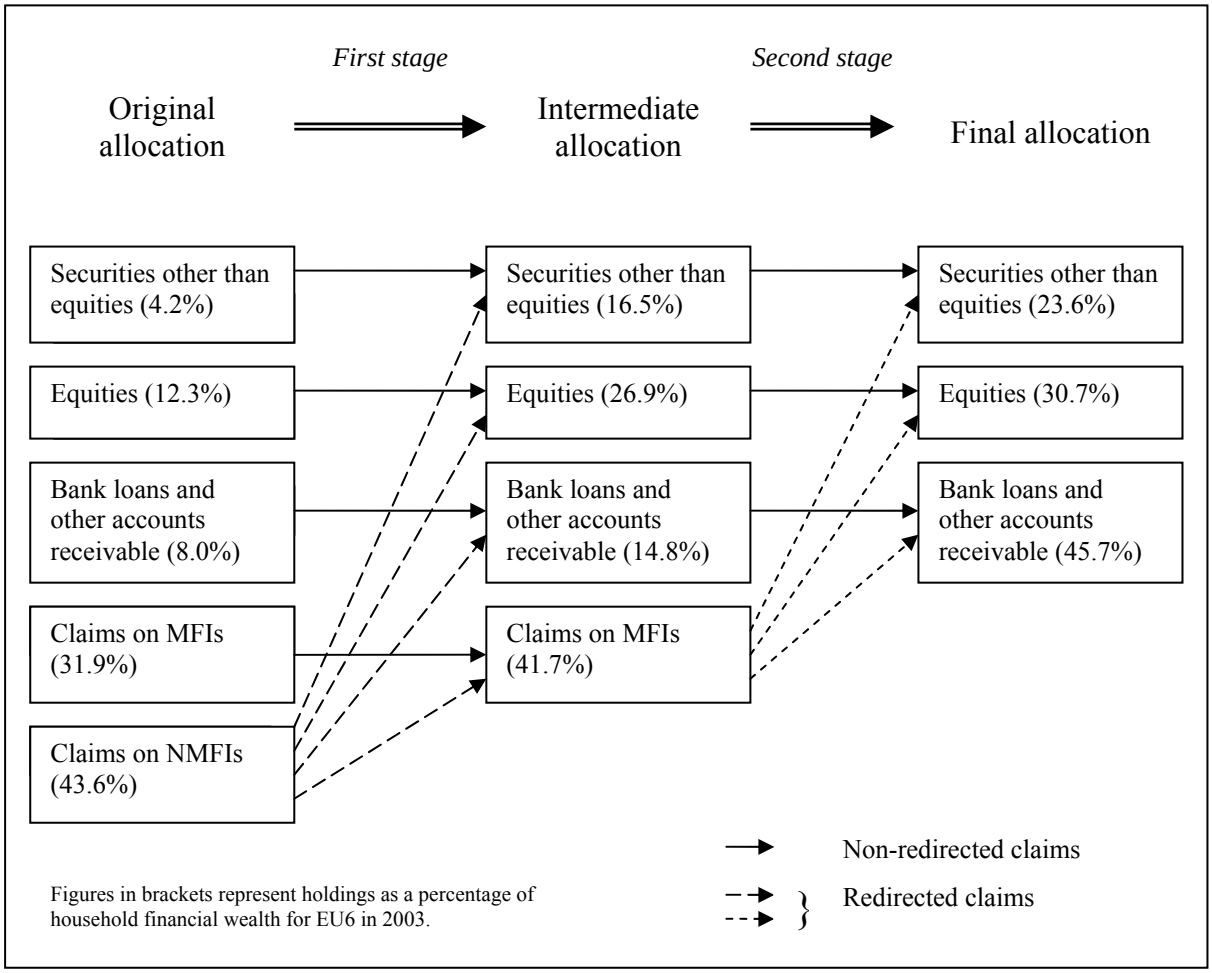
As shown in Figure 1, we distinguish three different levels of allocation: original, intermediate and final. The original level of allocation simply corresponds to the original distribution which households effect when choosing the different assets in which to invest their financial wealth. We consider that they initially allocate their financial wealth to five types of assets organized into three categories of final assets: one category of claims on non-financial units including (1) securities other than equities, (2) equities and (3) bank loans and other accounts receivable; and two categories of claims on financial units including (4) claims on MFIs, and (5) claims on NMFIs. In this paper (Figure 1), the calculations are performed with far more numerous types of assets according to the richness of the FOF database.

[7] In Japan, as well as in the Netherlands and the UK, money market mutual funds are not as developed as they are in the US or in France. Therefore, the distinction between monetary and banking financial institutions is quite irrelevant. Happily, these countries are the only ones where it is not possible to distinguish short-term and long-term mutual funds in FOF accounts, as indicated in Table 1.

[8] In the US for instance, the remarkable role played by the mortgage pool agencies, included in OFIs, is at the center of a long discussion in Section 5.

[9] All the details relevant to the different financial sub-sectors are exploited in the calculations we make.

FIGURE 1
Overview of the reallocation process of household financial portfolios



The first stage of the reallocation process consists of making NMFIs transparent and leads to an intermediate distribution that is the result of a partial redirecting. We choose to first reallocate claims on NMFIs because, according to Schmidt et al. (1999) and considerations in Section 1, NMFIs have become an important collector of savings and, thus, an important source of funds for MFIs. Hence, there is a hierarchy in the relationships within the financial services industry. At the end of this first stage, all the claims on NMFIs initially held by households are reallocated to one of the three categories of final assets and to claims on MFIs. After the second stage of the reallocation process, claims on MFIs are spread over the three categories of final assets, and we obtain the final distribution of household financial wealth. At this point all the claims on financial institutions (FIs) have been redirected.

We express the results as a proportion of household financial wealth in order to facilitate comparisons among the three levels of allocation and among countries. The difference in the proportion of a category of assets between two successive stages of the reallocation process accounts for the respective roles of the two categories of FIs in redirecting household financial wealth. The gap between the intermediate and the original allocations shows the extent of non-monetary intermediation, whereas the difference between the final and the intermediate distributions reveals the scale of monetary intermediation. The spread between the share of claims on MFIs at the original and intermediate levels testifies to the extent of multiple intermediation circuits, which is 10% of household financial wealth for the EU6 in

2003. It actually exhibits the magnitude of the relationship between the two financial sub-sectors, and more precisely measures the proportion of claims on MFIs held by NMFIs.

Results in Sections 4 and 5 are presented using this three-level distribution, distinguishing between the five types of assets. However, the matrix calculations to obtain these results require a much more detailed vector representation of household financial wealth.

3.2.2. Vector representation of household portfolios

The structure of household financial wealth depicted in Figure 1 is now identified using three vectors denoted e_i with $i = O, I$ *and* F, each representing a different level of allocation: e_O is the original allocation, e_I the intermediate allocation and e_F denotes the final allocation.

The original distribution of assets e_O is obtained from financial accounts and composed of sub-vector f_O which represents the portion of household financial wealth directly invested in final assets, i.e., in claims on non-financial units (or primary debt securities), and sub-vector b_O which denotes the portion allocated to claims on FIs (or indirect debt securities). In accordance with the overview in Figure 1, vectors f_O and b_O are, respectively, of orders 3 and 2. By piling up these two vectors, we obtain vector e_O of dimension 5.

In the same way, the intermediate allocation is also represented by vector e_I of dimension 5 which is made up of the two sub-vectors f_I and b_I of dimensions 3 and 2, respectively. At each stage of the reallocation process, one element of vector b_I is set to zero, meaning that the corresponding financial intermediation is torn. Therefore, the final structure of household financial wealth is represented by vector e_F, the information content of which is reduced to vector f_F as vector b_F of dimension 2 is a zero vector.

So the results at the three levels of allocation presented in Figure 1 can be rewritten using the following vectors:

$$e_O = \begin{pmatrix} f_O \\ b_O \end{pmatrix} \quad \Rightarrow \quad e_I = \begin{pmatrix} f_I \\ b_I \end{pmatrix} \quad \Rightarrow \quad e_F = \begin{pmatrix} f_F \\ b_F \end{pmatrix} = \begin{pmatrix} f_F \\ 0 \end{pmatrix}$$

However, financial accounts give us much more detail about the distribution of household portfolios. As a consequence, vectors e_i, f_i and b_i comprise numerous items. The precise structure of vector e_O that we use in the calculations is as follows:

1. Securities other than equities (excluding those issued by domestic FIs)
   - Private securities other than equities
   - Public securities
   - Foreign securities other than equities
2. Equities (excluding those issued by domestic FIs)
   - Listed shares
   - Unlisted shares
   - Other equity
   - Foreign equity
3. Bank loans and other accounts receivable
   - Foreign and public deposits
   - Bank loans (to households, non-financial businesses and government) and claims on the rest of the world (miscellaneous assets)
   - Other claims on households, businesses and government, and corresponding statistical discrepancies
4. Claims on MFIs (depository institutions and money market mutual funds)
   - Currency
   - Deposits (transferable deposits, time and savings deposits, and other deposits)
   - Money market mutual fund shares

- Securities (including equities)

5. Claims on NMFIs (OFIs, and insurance and pension funds)
   - Long-term mutual fund shares
   - Life insurance and pension funds reserves
   - Other insurance companies reserves
   - Securities (including equities)

The first two categories of assets comprise securities issued by non-financial domestic units and by financial or non-financial foreign ones. Household holdings of securities issued by foreign FIs are, therefore, part of final assets, because no distinction is made between financial and non-financial units within the overseas sector[10]. Let us note that the valuation methods of unlisted shares and other equities are the subject of a constant debate[11]. The last elements of the fourth and fifth categories have to be explained as such an allocation can be obviously criticized. One could actually consider household holdings of securities issued by a bank or a financial company as final assets, just like the holdings of non-financial corporate securities. However, the logic of financial intermediation, particularly Gurley and Shaw's unified analytical framework, leads to the assumption that these holdings of securities by households is intended for credit granting in the same way as deposits[12].

A detailed splitting up according to the categories of issuers is generally not directly available on the asset side of household financial accounts for the five classes, and especially sub-classes of assets. As an example, in almost every country, it is not possible to know if shares owned by households are a claim on units of the domestic non-financial sectors or the domestic financial intermediaries, or even foreign (financial or non-financial) units. It is essential to complete the information coming from the asset side of financial accounts by what we have at our disposal on the liability side. So, when information is not directly available in a given economy or for a given year, we compute the proportion of securities issued by each relevant sector or sub-sector according to the structure of the total amounts of issued securities. Then we make the assumption that the structure of household portfolios for each category of securities corresponds to the one of issuance, i.e., exactly reflects the market portfolio structure in the economy. In other words, we complete the missing information about security holders by extrapolating information on security issuers, even if the two can be considered as independent. This method implies resorting to approximations, but presents the advantage of using all the available information from financial accounts[13]. However, non-financial corporate securities are netted on the liability side for the US, while trade credit and other accounts are netted on the asset side for the Netherlands. Trade credit and other accounts are, therefore, excluded from household financial wealth in the Netherlands[14], and the proportion of securities issued by non-financial corporations in the US is lowered, while the proportion of securities issued by the other sectors, particularly FIs, is raised. In both cases, it leads to a slight overestimation of intermediation.

[10] This should lead to underestimating financial intermediation, however, this is a problem inherent in the very construction of national accounts. Boutillier and Bricongne (2006) solve this problem by adding information extracted from the balance of payments to the FOF statistics, and verify the openness is even more a reintermediation.

[11] See Babeau (2000) for a comparison of the valuation methods of unlisted equities in Europe.

[12] If we consider bank equity, it amounts to computing an implicit Cooke ratio.

[13] The same difficulty is encountered in other studies devoted to the measurement of IRs. The same assumption is made by Schmidt et al. (1999) and Capelle-Blancard et al. (2007).

[14] This corresponds to an underestimation of about 2% of household financial wealth.

3.2.3. Input-output matrices for financial intermediation and calculations

The reallocation process schematically described in Figure 1 is based on matrix calculations well known since Leontief's input-output analysis of interindustrial relationships. When applied to the financial industry, this analysis deals with the engineering of complex financial products by the various categories of financial units, buying primary debt securities issued by non-financial deficit units, and/or issuing indirect debt securities as well as selling them to non-financial surplus units. So we build the input-output matrix P of financial intermediation.

Vector e_O, denoting the original allocation, is multiplied by the financial intermediation matrix P to infinity to obtain vector e_F which represents the final allocation:

$$e_F = P^{\infty}\, e_O \Leftrightarrow \begin{pmatrix} f_F \\ b_F \end{pmatrix} = P^{\infty} \begin{pmatrix} f_O \\ b_O \end{pmatrix}. \tag{1}$$

As we see above, vector e_O is composed of sub-vectors f_O and b_O corresponding to the m classes of final assets and the claims on the p categories of financial institutions held by households, respectively. Vectors f_O and b_O are of orders m and p, respectively, so vector e_O is of dimension $m + p$.

Similarly, for the sake of the analysis, the square matrix P of order $m+p$ can be partitioned into four sub-matrices as follows:

$$P = \begin{bmatrix} I_m & A \\ 0 & C \end{bmatrix}. \tag{2}$$

Sub-matrix I_m simply is the identity matrix of order m, with m denoting the number of final assets. This means that when multiplied by I_m the components of f_O are just translated to vector e_F, because they are already considered as final assets. On the contrary, sub-matrix 0 located in the southwest corner of P is a *(p, m)* zero matrix that logically indicates that the elements of f_O do not have to be redirected because they are already final assets.

Only sub-matrices A and C actually represent the reallocation process. The entries of A denote the proportions of financial intermediaries' balance sheets invested in final assets, so $0 \le \lfloor a_{ij} \rfloor < 1$. Thus this sub-matrix is of dimension *(m, p)* where p is the number of financial sub-sectors. When the entries of b_O are multiplied by sub-matrix A, the proportion a_{ij} of claims on financial units $b_{O,j}$ is reallocated to the final asset i.

The square sub-matrix C of order p consists of the fractions of financial intermediaries' balance sheets invested in claims on other financial units, with $0 \le \lfloor c_{ij} \rfloor < 1$. When the elements of b_O are multiplied by C, the proportion c_{ij} of claims on financial units $b_{O,j}$ is reallocated to the claims on the ith category of financial units. The non-nullity of this matrix provides the exact rationale to repeat infinitely the reallocation process until claims on financial units are torn.

Therefore, each column of the matrix obtained by piling up A and C corresponds to the complete balance sheet structure of one sub-category of financial institutions. This means that each column sum of the entries of this matrix is equal to 1:

$$\sum_{i=1}^{m} a_{ij} + \sum_{i=1}^{p} c_{ij} = 1, \quad \forall\ j = 1,\ldots p. \tag{3}$$

It should be emphasized that no resource has a privileged allocation; for instance, there is no clear-cut distinction between financial intermediaries' activity in national currency and foreign currencies, nor between domestic and foreign clients.

Therefore, after multiplying matrix P by vector e_O just once, we obtain a first reallocation of household financial wealth represented by the following vector:

$$P\,e_O = \begin{bmatrix} I_m & A \\ 0 & C \end{bmatrix} \begin{pmatrix} f_O \\ b_O \end{pmatrix} = \begin{pmatrix} I_m & f_O + A\,b_O \\ 0 & f_O + C\,b_O \end{pmatrix} = \begin{pmatrix} \vdots \\ f_{O,i} + \sum_{j=1}^{p} a_{ij}\; b_{O,j} \\ \vdots \\ \sum_{j=1}^{p} c_{ij}\; b_{O,j} \\ \vdots \end{pmatrix}. \tag{4}$$

At this stage, the proportion of final assets in household financial wealth is increased, but claims on financial institutions still remain, although to a lesser extent. Financial intermediaries invest in claims on other financial units which either belong or not to the same sub-sector. For instance, mutual funds can hold securities issued by banks (certificates of deposit), or even other mutual fund shares (funds of funds). Equity in unit-linked life insurance contracts is partially reinvested in mutual fund shares, often especially created for this purpose.

All these examples show the growing complexity of financial intermediation through the recycling of household financial wealth within the financial industry in developed economies. As double or multiple intermediation processes became more and more usual during the period under review, we must multiply matrix P by vector e_O as many times as necessary to obtain a complete redirecting of claims on financial units toward final assets. Each multiplying by P thus represents one step of the whole intermediation process and leads to a partial reallocation.

Let us compute P^n:

$$P^2 = \begin{bmatrix} I_m & A + AC \\ 0 & C^2 \end{bmatrix} \tag{5}$$

$$P^3 = \begin{bmatrix} I_m & A + AC + AC^2 \\ 0 & C^3 \end{bmatrix} \tag{6}$$

$$P^n = \begin{bmatrix} I_m & A + AC + \ldots + AC^{n-1} \\ 0 & C^n \end{bmatrix} \tag{7}$$

The square matrix C is positive and the sum of each column lies in the interval $[0,1[$. Therefore, according to the Perron-Frobenius theorem (Gantmacher, 1990), every eigenvalue of matrix C has a modulus strictly inferior to 1, and the n^{th} power of matrix C tends toward the zero matrix when n becomes large, meaning $C^\infty = \lim_{n\to\infty} C^n = 0$. This also means the sub-matrix located in the southeast corner of P^∞ is trivial. Consequently, the infinite sum of matrices located in the northeast corner of P^∞ has a finite value:

$$A + AC + AC^2 + \ldots + AC^\infty = A(I_p - C)^{-1}. \tag{8}$$

Hence, we obtain matrix P^∞

$$P^\infty = \begin{bmatrix} I_m & A(I_p - C)^{-1} \\ 0 & 0 \end{bmatrix}, \tag{9}$$

and vector e_F

$$e_F = P^\infty\, e_O = \begin{pmatrix} f_F \\ 0 \end{pmatrix} = \begin{bmatrix} I_m & A(I_p - C)^{-1} \\ 0 & 0 \end{bmatrix} \begin{pmatrix} f_O \\ b_O \end{pmatrix}. \tag{10}$$

We can express vector f_F, which represents total holdings, both direct and indirect, of m classes of final assets as a proportion of household financial wealth:

$$f_F = f_O + A(I_p - C)^{-1} b_O = \begin{pmatrix} f_{O,1} + a_{1j}\left[(I_p - C)^{-1} b_O\right]_j \\ \vdots \\ f_{O,m} + a_{mj}\left[(I_p - C)^{-1} b_O\right]_j \end{pmatrix}. \quad (11)$$

Thus, the full process of redirecting household original holdings toward final assets is achieved. Matrix calculations provide the mathematical translation of tearing financial intermediaries.

However, as we intend to assess the respective roles of MFIs and NMFIs in the intermediation process, matrix calculations have to be conducted in two distinct stages to obtain an intermediate allocation in addition to the final one. Thus the intermediate allocation only considers the redistribution performed by NMFIs, in other words, it takes the claims on MFIs as they would be supplementary "final" assets. The calculations are simply performed by replacing every row corresponding to the portfolio structure of an MFI by the relevant unitary vector. We therefore introduce matrix *P** where the identity sub-matrix is extended to include these new "final" assets. Equations (1) and (2) are then rewritten as

$$e_I = P^{*\infty}\, e_O \Leftrightarrow \begin{pmatrix} f_I \\ b_I \end{pmatrix} = P^{*\infty} \begin{pmatrix} f_O \\ b_O \end{pmatrix} \quad (1')$$

with the modified input-output matrix of financial intermediation *P** partitioned as follows

$$P^* = \begin{bmatrix} I_{m+q} & A^* \\ 0 & C^* \end{bmatrix} \quad (2')$$

with $q \in [1,...p[$ the number of monetary financial sub-sectors (Table 1), I_{m+q} corresponds to the identity matrix adjusted to "final" assets considered in this intermediate allocation, i.e., *m* "true final" assets and claims on *q* sub-categories of MFIs. The modified sub-matrices *A** and *C** only represent NMFIs' balance sheet structure.

To sum up, we built vector e_O and computed three different IRs, to assess the roles played by MFIs, NMFIs and FIs in collecting household financial wealth. The total IR is the sum of the monetary IR and the non-monetary IR

$$monetary\ IR = \sum_{j=1}^{q} b_{O,j} \quad (12)$$

$$non-monetary\ IR = \sum_{j=q+1}^{p} b_{O,j} \quad (13)$$

$$total\ IR = \sum_{j=1}^{p} b_{O,j} = \sum_{j=1}^{q} b_{O,j} + \sum_{j=q+1}^{p} b_{O,j}\ . \quad (14)$$

Then we calculated vectors e_I and e_F and the respective contributions of MFIs and NMFIs to the household holdings of each category of final assets

$$NMFI\ contribution = f_{I,i} - f_{O,i} \quad \forall\, i = 1,... m \quad (15)$$

$$MFI\ contribution = f_{F,i} - f_{I,i} \quad \forall\, i = 1,... m\,. \quad (16)$$

These results are obtained by using all the detailed information available in national financial accounts for each year for the eight studied countries. However, for the sake of facilitating comparisons, the dimensions of vectors e_i, f_i and b_i are fixed at 5, 3 and 2, respectively, in the remainder of the paper in accordance with the above overview. This means that the value of parameters *m*, *p* and *q* are, respectively, set at 3, 2 and 1.

The three levels of allocation of household financial wealth, and the corresponding ratios and contributions are computed using stock series, whose evolution is much less erratic and

thus much more appropriate to long-term analysis than flows. As stocks of securities are generally provided on a market value basis, they can induce both over- and underestimation of household holdings of securities, IRs and even FI contributions. Even though the study covers a period characterized by various phases of bull and bear markets, we did not make any corrections[15] but took these evolutions into account when analyzing the results. IRs − Eqs. (12) to (14) − are commented on in Section 4 to analyze the unity and the global resistance of financial intermediation, while FI contributions − Eqs. (15) and (16) − are used to discuss its diversification in Section 5.

4. UNITY AND RESISTANCE OF GLOBAL FINANCIAL INTERMEDIATION

In this section, we focus on the original allocation of the household financial wealth which proceeds from the choice of individuals between holding securities directly and entrusting their savings to a financial intermediary. This first choice reveals both their behavior towards savings and the capability of financial intermediaries to mobilize the resources and channel them towards specific investments. In this respect, the weight of financial intermediation and the specificity of its circuits are essential to clarify the partition between the direct holdings of financial claims and intermediated savings. We first analyze the global financial IR of household financial wealth. Then we isolate the monetary and non-monetary IRs.

4.1 Household financial wealth is predominantly intermediated in all the countries

At the beginning of the 1990s, indirect holdings of household financial wealth were predominant in every country, except in Italy. The analysis of the global IR (see Figure 2) gave rise to a group of five countries for which approximately three quarters of household financial wealth was intermediated in 1991: the Netherlands (81%), Germany and France (both 78% in 1991 and 1994), the UK (76%), and Spain (73%). Outside this European group, two countries can be set apart: Japan with a record IR (86%) and the US, which level (58%) was much lower than that of the weighted average of our European sample (EU6). Let us note that Italy constitutes the true European exception with a rate of about 49% in 1995.

Beyond an IR predominantly high at the beginning of the 1990s, the second remarkable point is the evolution of the ratio up to 2003: IR increased in most of the countries and remained stable in the others. In 2003, the contrast between Japan and Europe disappeared: with a rise of 6 to 7 points, the IR of the UK (83%) and of the Netherlands (87%) clearly caught up to the record level of Japan (89%). Spain, Germany and France kept their IR to a level close to that of EU6 (75%). Lastly, the US (64%) and Italy (58%) showed a significant rise (no less than 6 and 9 points, respectively, over the period), thus reducing the gap with the EU6.

Households thus entrust most of their financial wealth to an intermediary, though to a lesser extent in the US and Italy. The relative weakness of intermediation has a totally different origin in these two countries. In the US, it was due to a significant proportion of the financial wealth directly invested on the equity market, whereas in Italy it was from the financing of public debt. The direct holdings of public securities derive from the various Italian governments' management of debt before they chose to implement drastic transformation of financial markets ensuring an active management of portfolios entrusted to financial intermediaries.

Let us note, finally, a transitory phase of weaker intermediation, in 1999, for Spain, France, Italy, Japan and the US. This trend, largely related to the significant rise in the price

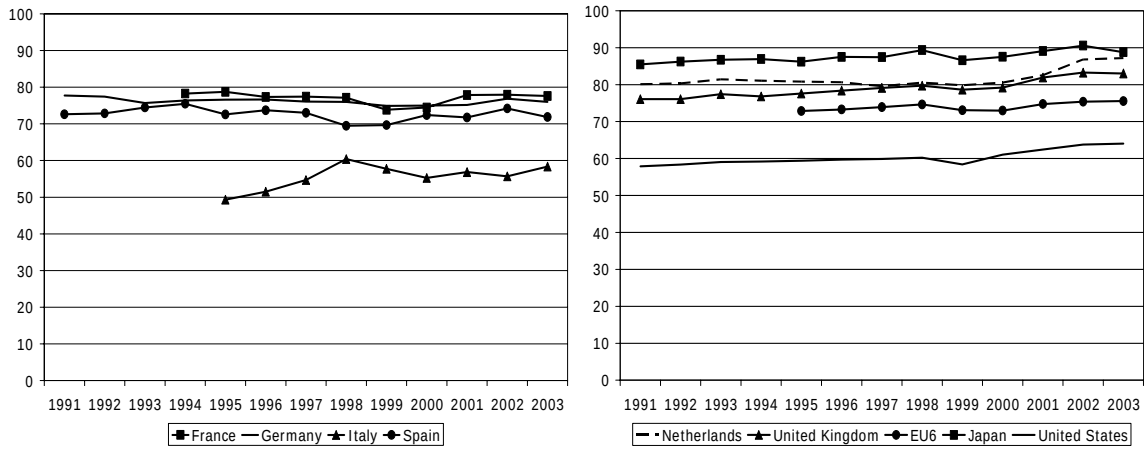
[15] For the measurement of IRs on a book value basis in Japan, see Capelle-Blancard et al. (2007).

of equities which mechanically increased the value and the share of risky claims, was offset in 2000-2001 after the fall in stock prices. In fact, bull and bear markets did not seem to mask nor modify the long-term trend of the total IR.

Two points are worth mentioning.

(i) The partition of our sample resulting from analysis based on the weight of the financial intermediation does not overlap with the usual classification between bank-based and market-based systems. The UK and the Netherlands, generally regarded as market-based systems, are indeed characterized by a high level of intermediation which sets them apart from the US and draws them closer to Japan, a country usually associated with a bank-based system[16].

FIGURE 2
Total intermediation ratio of household financial wealth (%)



(ii) There was no overall disintermediation in Europe or the US between 1991 and 2003. For Germany, Spain and France, a stable and high level of financial intermediaries in collecting household financial wealth was to be observed as well as a significant reinforcement of intermediation everywhere else, including in the countries such as the US and Italy where households clearly expressed a preference for direct holdings of securities. Nonetheless, strong disparities could appear in the choice of the intermediary. Hence our questioning of the identification of intermediation channels, especially the respective roles of MFIs and NMFIs in the collecting of household financial wealth.

4.2. Monetary and non-monetary financial intermediation in the collecting of household financial wealth: complementarity or substitutability?

Three questions must be raised. One concerns the respective weight of monetary and non-monetary intermediation circuits in collecting household financial wealth. The purpose is to identify the financial systems according to the preponderance of their channels, either monetary intermediation – also known as traditional or banking intermediation – or non-monetary intermediation, i.e., market intermediation. The second question deals with the changing role of these channels. A constant – even increasing – total IR could indeed hide a shift within the intermediation process, and conceal a substitution effect of banking intermediation in favor of non-banking intermediation (an argument developed by Schmidt et al., 1999). It is thus essential to break down global intermediation in order to assess the emergence of non-monetary intermediation channels. Far from exhausting the analysis, this question immediately raises another: does the stability of the global IR of household financial

[16] See Capelle-Blancard et al. (2007).

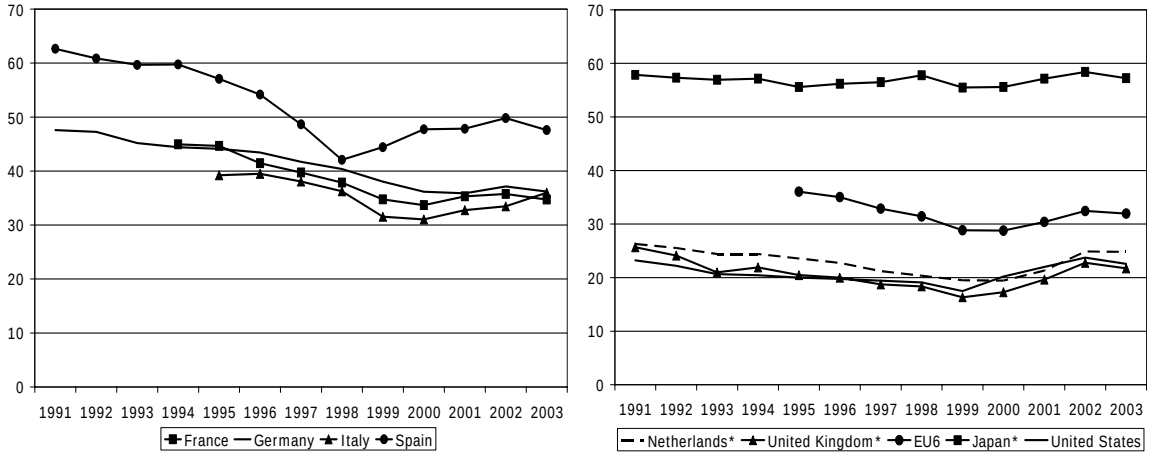
wealth correspond to a process of substitution or complementarity between the various circuits of intermediation?

4.2.1. Relative decline in monetary financial intermediation

The contribution of MFIs to the global intermediation of household financial wealth is predominant in countries where the retail banking networks constitute a privileged way of collecting savings. As early as the beginning of the 1990s, a group of countries emerged where households entrusted the greatest share of their financial wealth to a monetary intermediary (see Figure 3): 60% on average in Spain and Japan in 1991, around 46% in Germany and France, and 39% in Italy in 1995. Conversely, in the US, the UK and the Netherlands, a much weaker role was devoted to MFIs, about 25%. The declining role of MFIs in the US is well-researched (see Gurley and Shaw, 1956 and 1957; Kaufman and Mote, 1994; Boyd and Gertler, 1994).

Japan, a frequent exception in our sample, shows remarkable stability with regard to the circuits taken by financial flows. This was all the more so since this context was marked by the bursting of the stock exchange and real estate bubbles in 1990, followed by very slow and difficult digestion and the consequent painful writing off of non-performing loans. Everywhere else, a phase of withdrawal of monetary intermediation, largely due to the bullish stock market, was observed until the end of 1990s. But an inverse trend was noticed almost everywhere when this market turned bearish, so that in 2003, the UK, the US and the Netherlands got back to a stable though low monetary intermediation level. And yet, the movement of monetary reintermediation observed in Spain, and to a lesser extent in France and Italy, did not allow these countries to recover to their initial levels.

FIGURE 3
Monetary intermediation ratio of household financial wealth (%)



* Money market mutual funds not included.

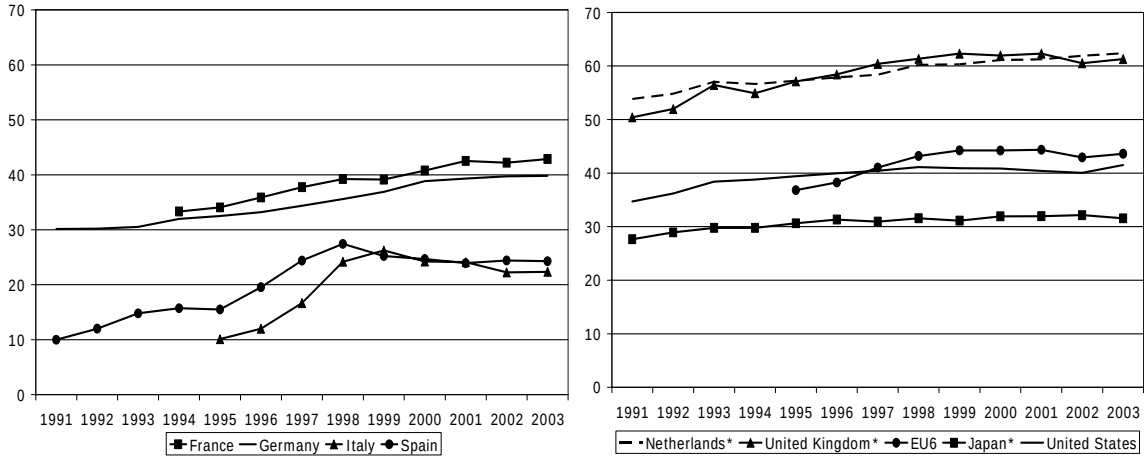
On the whole, if the monetary disintermediation that Spain, Germany, France and Italy experienced between 1991 and 2003 did not generate homogeneous levels of monetary intermediation within our sample, it nonetheless decreased the differential within each set of countries: the low fork (23% on average) seemed to isolate the market-based financial systems, the US, the UK and the Netherlands, the intermediate group (36%), France, Germany and Italy, reflecting clearly the evolution of EU6, and finally, the high fork gathering Japan (57%) and Spain (48%) whose monetary level of intermediation remained high in spite of a fall of 15 points during the period. The relative decline in monetary

intermediation associated with the stability or even with the growth of the total IR leads us to note an intensification of non-monetary, i.e., market, intermediation.

4.2.2. Reinforcement of non-monetary intermediation channels

At the beginning of the 1990s, the weight of NMFIs reflected deep disparities within our sample (see Figure 4). Unlike Spain and Italy, which are still at an embryonic stage of development, where NMFIs mobilize about 10% of household financial wealth, the Netherlands and the U.K. occupy indeed a leading position: institutional investors, mainly insurance and pension funds, channelled most of household financial wealth, 53% and 50%, respectively, in 1991. Inbetween, in Japan, Germany, France, and the US[17] the non-monetary IR varied between 28% and 35%.

FIGURE 4
Non-monetary intermediation ratio of household financial wealth (%)



* Money market mutual funds included

These disparities persisted until 2003, in spite of a general increase in the weight of non-monetary intermediation by about 10 points. Spain and Italy experienced exceptional growth in NMFIs during the 1990s with an increase of more than 15 points in the collecting of household financial wealth. The withdrawal of Italian banks observed at the end of the 1990s was overwhelmly paralleled by the development of NMFIs, and especially by the capacity of long-term mutual funds to attract capital that was previously directly invested in government bonds or collected by MFIs. Regarding France, Germany and Spain, the growth of NMFIs coincided precisely with the decline in monetary intermediation. This evolution suggests that households gradually gave up banking assets to the benefit of long-term mutual funds, life insurance and pension funds claims. Conversely, in the Netherlands, the UK, the US and even Japan, the further development of NMFIs in collecting household financial wealth coexisted with the stability of monetary intermediation over the period, which clearly explains the increase in global IR in these four countries. It is finally in the US and Japan that the growth of the NMFIs is undoubtedly the weakest (7 and 4 points, respectively): the reason probably lies in the importance of the direct holdings of equities by American households and the holdings of banking claims by Japanese ones.

To sum up our results, the two main features of our data set are the heterogeneous role of NMFIs in collecting household financial wealth, and the reinforcement of these channels of

[17] The emergence and the growth of institutional investors in the US are described in the long run by Gurley and Shaw (1956 and 1957) and by Kaufman and Mote (1994) with data comparable to ours.

collection with the development of claims on insurance and pension funds. This calls for two remarks. The first remark concerns household savings behavior and the choice of the financial intermediary. The latter crucially depends on the accumulation of private pensions, one major motivation for financial savings. The second remark deals with the evolution of the role of MFIs and, more particularly, with the existence of monetary disintermediation, and a decline in banking activities.

(i) The disparities in the weight of NMFIs are partly related to the choices concerning the pension systems. The predominance of insurance and pension funds in the Netherlands and the UK can be explained by low replacement rates[18] determined by the basic retirement schemes (about 40%). On the other hand, the South European countries such as Spain and Italy, with replacement rates of over 80%, have resisted the conception of individual social protection for a long time, which explains the tiny share of claims on pension funds and on insurance companies. France, characterized until very recently by singular forms of pension funds, could resemble the latter group were it not for a strong and dynamic life insurance industry, largely related to pension matters and ultimately to the taxation system (Boubel and Séjourné, 2002; Boubel and Pansard, 2004)[19]. It should be noted that the increasing role of NMFIs is not merely a process of catching up; it constitutes a common feature shared by all the countries, seeming to reflect the emergence of the precaution motive for all savers in developed countries. The general development of precaution savings accumulated in order to constitute a private pension is thus partly independent of the pension systems and of the importance of basic schemes. The ageing of the population, a common feature in the OECD zone, should not be neglected. Besides, there is a growing awareness of the risks weighing on the future balance of the general pension schemes. The combination of both factors must be taken into account to explain the choice in favour of pension savings products proposed not only by pension funds but by all types of financial intermediaries.

(ii) In the case of the Netherlands, the UK, the US, and Japan, the increasing contribution of NMFIs in collecting household financial wealth was not made to the detriment of the role of MFIs but seems to complement it. Only the weight of NMFIs can explain the increase in global IR. On the other hand, in the case of Spain, Germany, Italy and France, the increasing role of the NMFIs seems substitutable for monetary intermediation. In these countries where banking intermediation is traditionally anchored in the collecting of household financial wealth, the substitution effect suggests a shift in the role of monetary intermediaries, and more particularly of banks, in the relationship between savers and borrowers. However, this evolution does not imply necessarily monetary disintermediation. Schmidt et al. (1999) defend the idea of a specialization of the functions between banks and non-bank intermediaries. They argue the latter play a growing role in the collecting of household savings, thus providing the portion of the savings to the banks which remain specialized in lending funds. This lengthening of the intermediation chain would suggest the increasing role of MFIs in investing and recycling part of the funds channelled by non-bank intermediaries. Their assumption of a functional specialization of the intermediation channels is based on the existence of a partition between the different financial intermediaries' activities. However, the present increasing interpenetration between the activities of the various FIs leads us to question the very existence of this specialization. MFIs now invest in spheres of activity originally devoted to non-bank institutions, such as mutual funds and life insurance, mostly

[18] The ratio of an individual's − or a given population's − (average) pension in a given time period and the (average) income in a given time period (see OECD, 2005).

[19] The specificities of the organization and management of pension funds have repercussions even within NMFIs. For example, the British coupling of pension funds and insurance companies privileged the latter whereas the development of individual retirement accounts (IRAs) in the US especially reinforced the mutual funds, to the detriment of the insurance companies (Boubel and Pansard, 2004).

by means of distinct subsidiary companies, which respect the partition generally imposed by the prudential regulation. The interpenetration of monetary and non-monetary activities in the collecting of household financial wealth suggests there was no monetary disintermediation during the last decade, but rather a diversification of the forms of MFI activity. Our hypothesis of interpenetration, which will be discussed in the following sub-section, argues in favor of a unifying conception of financial intermediation, thus providing a new illustration to Gurley and Shaw's analysis and clarifying the phenomenon of global resistance of the financial intermediation process.

4.3. Interpenetration of financial intermediary activity

We observe the interpenetration of FI activity through two types of indicator: on the one hand, the control over asset management companies exerted by either banking groups or insurance groups; and on the other hand, the role of banks in the distribution of life insurance products (see Table 2). These cross-sectoral activities stressed by the Joint Forum (2001) clearly reveal that, in many countries of continental Europe, banks are responsible for the boom in institutional investors. Through the constitution of financial conglomerates, banks have largely taken over in two fields, asset management on behalf of third parties and life insurance (see Boubel and Séjourné, 2002). In Portugal, Belgium, Spain and Italy, countries where the absence of pension funds did not promote an autonomous industry of asset management, it appears without ambiguity that banking groups control most of the mutual funds industry, not to say all of them. Banking domination can also be observed in the field of life insurance. In Southern Europe, Spain, Italy, Portugal as well as in France, the banking networks predominate (from 60 to more than 80%) among the distribution channels of life insurance products. In France, this situation has arisen from the development of bancassurance strategies since the 1980s, implying the creation of banks' subsidiaries specifically devoted to the conception, management and marketing of life insurance contracts.

In Germany, the Netherlands and the UK, interpenetration does not systematically imply banking domination in the two fields previously mentioned. The UK, with its very old insurance industry, and Germany, characterized by a strong one (Allianz Group), show how reactive, even proactive, the life insurance sector has become. In these two cases, the presence of banks in the distribution of insurance products is very weak, about 17% against 53% on average for the other European countries. Conversely, banks' control of asset management is more significant: in 2005, banking groups controlled 65% of the activity of German mutual funds – a level close to the French one – and 36% in the UK. Let us note that the last percentage underestimates the control of British banks as it does not take into account the discretionary management which is widely spread in this country mainly to the benefit of pension funds. The Netherlands provide a bancassurance model characterized by a more balanced cohabitation between banking and insurance networks. One can quote the example of a holding company, the ING group, which holds capital in both a bank and an insurance company. This overlapping leads to dual control of the mutual funds' activity by banks and insurance companies (57% in 2000) and to an increased bank presence in the distribution of life insurance products as high as in Southern European countries (about 70%).

TABLE 2
Control of asset management and life insurance by other financial intermediaries[a]
(%)

Austria	Belgium	France	Germany	Italy	Japan	Portugal	Spain	Sweden	The Netherlands[b]	United Kingdom	United States
Market share of mutual funds controlled by bank groups											
88,1	94,6	65,6	64,8	86,0	15[f]	99,9	90,0	74,4	57[g]	35,8	11[d]
Market share of mutual funds controlled by insurance groups											
11,5	–	29,2	8,0	very small	12[f]	–	–	10,4	[g]	33,3	10[d]
Market share of bank branches in the distribution of life insurance											
54,4	44,7	62,0	17[c]	68,1	3[e]	83,1	68,9	45,0	73	17,4	2,6[e]

(a) In 2005, for asset management (except in 2004 for Italy, Japan and Sweden, and in 2000 for the Netherlands), and in 2004 for life insurance (except in 2000 for Germany and the Netherlands).
(b) Information about the Netherlands for 2000 (see Bikker and Wesseling, 2003; they also state that financial conglomerates control 91% of banking activities).
(c) This estimation for 2000 comes from McKinsey & Co.
(d) These percentages for 2005 concern the numbers of mutual funds sponsored by all types of financial intermediaries (source: ICI).
(e) This information for 2004 comes from LIMRA.
(f) The source of this information for 2004 is Nomura.
(g) Statistics for the Netherlands do not distinguish between bank and insurance control over mutual funds.

The US and Japan constitute two atypical cases. The role of banks in the control of asset management and distribution of life insurance products is the weakest of our sample, though in an uptrend, about 13% and 3%, respectively, in 2004 for both countries. In the US, this weakness can be explained by the Glass-Steagall Act (1933) which, until 1999, separated commercial banking from asset management[20]. Another similarity between both countries is insurance groups' control over mutual funds of about 11%, an intermediate position between the UK and France on the one hand (about 30%) and the rest of Europe on the other hand (from 0 to 8%).

Once again, the usual classification between bank-based and market-based systems does not fit the diversification of the cross-sectoral activities. Moreover, the generalized presence in several countries of banking groups in the mutual fund and life insurance industries leads to a different interpretation of the withdrawal trend of monetary intermediation we analyzed in a former paragraph (see 4.2.1.). During the last decade in Germany, France, Italy and Spain, this trend resulted in the substitution of long-term assets offered by institutional investors for bank assets in household financial wealth. And yet, we established that in Europe, except for the UK, banks control most of the collecting process of household financial wealth, including that of non-banking forms. This banking supremacy is undeniable in Spain and Italy, in the field of asset management as well as in the distribution of life insurance products. In France, the apparent weakness of monetary intermediation, highlighted by monetary IR, can be explained by a very strong demand for life insurance products, whose distribution is now predominantly controlled by banks. In Germany, banks are as dominant as in France in asset management. Thus, to determine the effective place of banks in the collecting of household financial wealth, measuring the share of the banking products in household portfolios is not enough. It is necessary to also take into account the issuance of mutual funds and insurance companies' liabilities resulting from banking activity. This is why, in countries where a decrease in the monetary IR suggests a monetary disintermediation, the penetration by banks of non-monetary activities should be interpreted as a strategy of development and

[20] The Federal Reserve Board's approval of the merger of Citicorp and Travelers in 1998 was the only exception.

diversification of the banking channels for collecting savings. Investing in the field of asset management or that of life insurance is the response of the banking industry to the direct competition exerted during the last decade by the financial markets in the collection and use of resources. Consequently, in the countries of continental Europe, there is a general tendency to institutionalize savings, largely initiated by banks. This might explain the resistance of global intermediation we mentioned earlier (see sub-section 4.1.), which does not result from the sole substitution effect of non-monetary intermediation by monetary channels but also from the penetration by banks of non-monetary activities. The interpenetration of monetary and non-monetary activities is the concrete expression of their complementarity. This justifies the irreplaceable role of financial intermediation as presented by Santomero (1984) and discussed by Levine (2002, 2005). Its increasing role, even in market-based systems, reinforces the key position held by intermediation (Allen and Gale, 1999). Thus, there can be at the same time both a quantitative substitution effect **and** a qualitative complementarity effect between monetary and non-monetary channels of intermediation.

The coexistence of the intermediation channels and the penetration of activity that follows reinforce Gurley and Shaw's broad unifying conception of financial intermediation (Gurley and Shaw, 1955). Financial intermediaries, whatever their institutional statute – monetary or non-monetary – perform the same function: they mobilize household savings by offering specific products and services adapted to the needs for financial wealth diversification, all in the process of aiming at transformation. This definition, which unifies all types of FI activity, is all the more legitimate in continental Europe as it gets more and more difficult to establish a precise partition between the various intermediaries on the basis of their institutional statute. Today, the collecting of financial resources by banks is no longer considered as a strictly traditional activity of collecting deposits as it is also carried out through mutual funds placed under their control and through life insurance products distributed in their own branches. The unity of the financial intermediation process results from the interpenetration of the activities of the various financial intermediaries which widens their fields of intervention and unifies their financial functions.

The unity is based on the diversification of the main actors, whose financial activity generates the juxtaposition of their balance sheets, causing the lengthening of the intermediation chain. The same funds collected from households are registered in the balance sheet of several intermediaries. This is the case, for example, of mutual fund securities held by insurance companies (especially in the case of unit-linked policies) within life insurance contracts distributed at bank branches. The lengthening of the intermediation chain is characterized by the presence of intermediaries whose assets are predominantly securitized. Hence our question, also shared by Allen and Gale (1997) and by Bernard and Bisignano (2003), about the consequences of financial wealth securitization on the financial risk borne by households. A common feature between the products offered by pension funds, life insurance companies and most of mutual funds is that they are all long-term assets. Unlike more traditional forms of collecting, these securities include a transformation cost in means of payment and/or a risk of capital loss, which are higher than those associated with bank deposits. Are households exposed today to a higher degree of risk on their financial wealth? It is probable that differences between the countries as regards exposure to financial risk should appear according to the way in which the various types of FIs invest the funds collected from households. The scope of the following section is, for each country, to make these choices transparent all the way through the chain of intermediation, in order to highlight the diversification of the intermediation process and its impact on the final structure of household financial wealth.

5. DIVERSIFICATION OF FINANCIAL INTERMEDIATION AND GROWING IMPORTANCE OF RISK TRANSFER

In the section above, we showed the phenomenon of global resistance characterizing the evolution of financial intermediation. This means that the direct ownership of securities by households remained unchanged or decreased in the different countries studied over the period. A high level of direct holdings of securities did not appear to be a good criterion for characterizing market-based financial systems as opposed to bank-based ones, since Italy and the US had the highest levels (around 40%), contrary to all the other countries. Furthermore, the level of non-monetary intermediation was very different across the countries. So what can we infer from these results regarding the differences in risks borne by households? We make ours the question by Allen and Santomero (2001): do banks (MFIs) and other FIs (NMFIs) deal with risk differently? To shed light on this issue, we made a cross-country comparison of the allocation of total financial assets ultimately owned by households. As diversifiable risk is eliminated by NMFIs in the follow-on of the literature and in Allen and Santomero (2001), we concentrated on non-diversifiable risk and default risk. First, we analyzed the respective contributions of MFIs and NMFIs to the indirect holdings of the three categories of final assets which we computed in Section 3, i.e., securities other than equities, equities and loans. Second, we show that there is a growing importance of risk management by FIs, MFIs as well as NMFIs, and that it lies in the development of cross-sectoral activities which can take the form of either internal or external risk transfer mechanisms. Third, we find that cross-sectoral risk transfer results in a lengthening of the intermediation chain dedicated to satisfy the demand for diversification of financial assets, consistent with Gurley and Shaw's unifying view of financial intermediation.

5.1. Contributions of MFIs and NMFIs to the indirect holdings of final assets by households

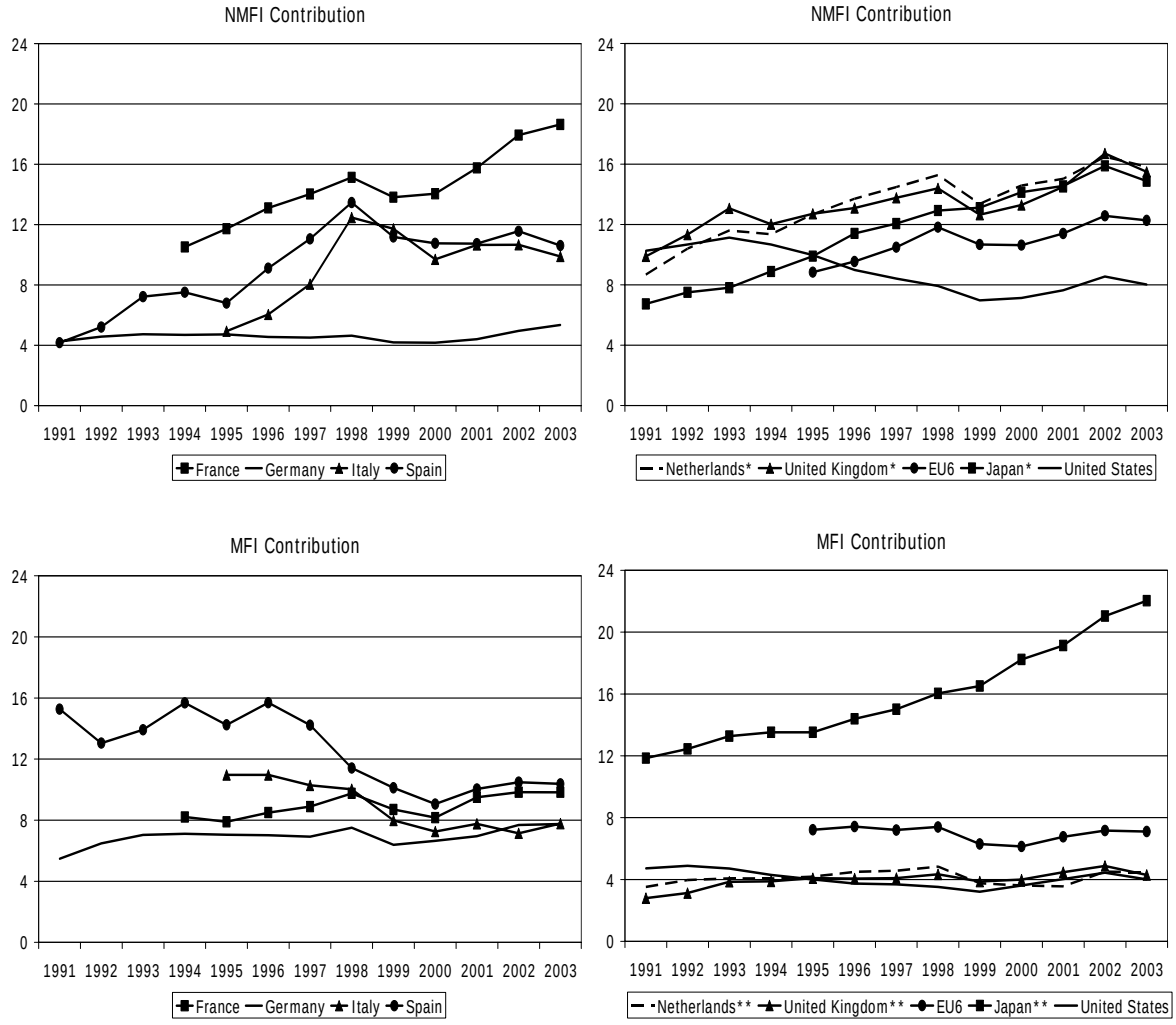
What can we deduce from the role of MFIs and NMFIs regarding the risk borne by households through the indirect holdings of more or less risky securities? Do NMFIs play a greater role in redirecting household financial wealth toward equities?

In all European countries, with the exception of Germany, and in Japan, NMFI contribution to the indirect ownership of securities other than equities increased greatly over the whole period (Figure 5). The impact of the bearish market following the Russian bond default crisis in August 1998 and the near failure of LTCM was patently observed in all European countries which had been in an uptrend, but not in Japan. With a contribution of 18% of household financial wealth in 2003, France surpassed the Netherlands, the UK and Japan, whereas NMFI contributions in Italy and Spain remained unchanged at 10% since the 1998 crisis. Germany distinguished itself by a small and stable contribution, while in the US a slight decrease led to a contribution of 8% in 2003.

MFI contribution was low and stable in the Netherlands, the UK and the US (Figure 5). In all the other European countries, MFIs contributed between 8 to 10% to the final holdings of debt securities. Japan experienced a sharp rise from 12 to 22% from 1995. Consequently, Japan was the only country where the role of both categories of financial institutions increased, mostly MFIs. This trend resulted from the growing stocks of debt securities issued by the Japanese government and bought by domestic FIs[21].

[21] See Capelle-Blancard et al. (2007).

FIGURE 5
Securities other than equities of household financial wealth (%)



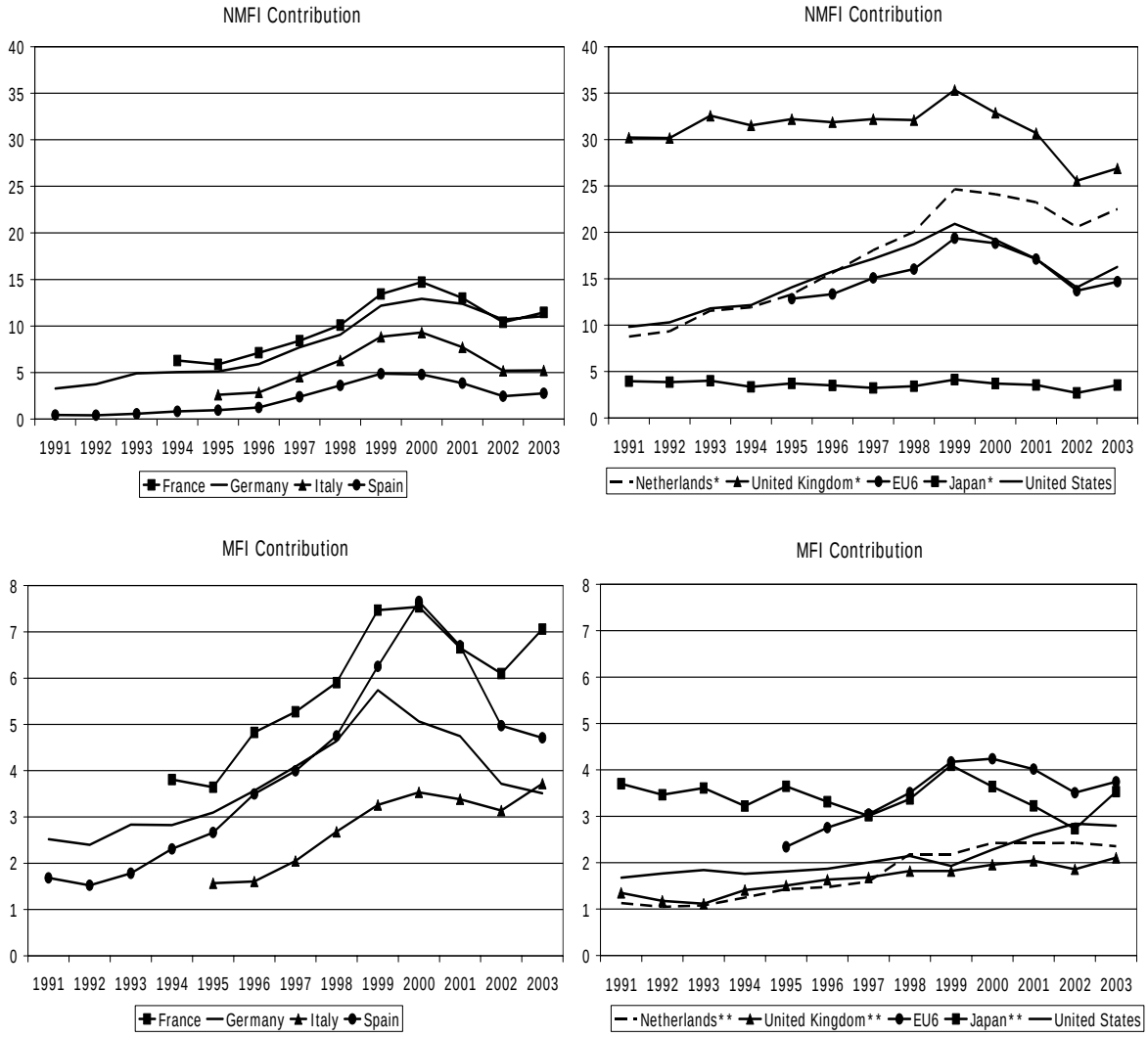
* Money market mutual funds included
** Money market mutual funds not included.

Once more, we discover the diversification of FI positions. This diversification is not reducible to market-based versus bank-based financial systems. This result, already pointed out in Section 4, finds again the conclusions of Rajan and Zingales (1995) regarding liabilities of the non-financial corporate sector: the usual classification of financial systems does not hold.

NMFI contribution to the indirect holdings of equities by households is strikingly identical in EU6 and the US (15% of household financial wealth in 2003), but the European weighted average hides huge disparities across countries (Figure 6). It is actually in the Netherlands and the UK that NMFI investments in equity most contributed to household ultimate holdings (around 25% in 2003). But these two countries experienced opposite trends, as the UK started from 30% in 1991, whereas the Netherlands' level was the same as that in the US at that time (10%). All the other countries stand clearly below, not exceeding 10%. MFI contribution is clearly smaller than that of NMFIs, as it stood between 2 and 7% in 2003, revealing opposite relative positions of the countries. This shows that MFIs generally contribute less to the indirect ownership of equities, and that their contribution is the highest in the supposed bank-based continental European countries.

As FI investments in equity were substantial, the results demonstrate the valuation effects of the bearish stock markets in 2000-2002 following the 'Internet bubble'. However, the rising long-term trends did not appear to be modified and are clearly revealed. The total ultimate ownership of equities[22] by households increased everywhere, except in Japan and in the UK, which respectively experienced 4- and 7-point falls. Consequently, total holdings of equities exhibited three very different positions in 2003. Japan and the US represent two extreme cases, with respective final proportion of household financial wealth of 13 and 48%. This is the fork within which European countries converge around 30%.

FIGURE 6
Equities of household financial wealth (%)



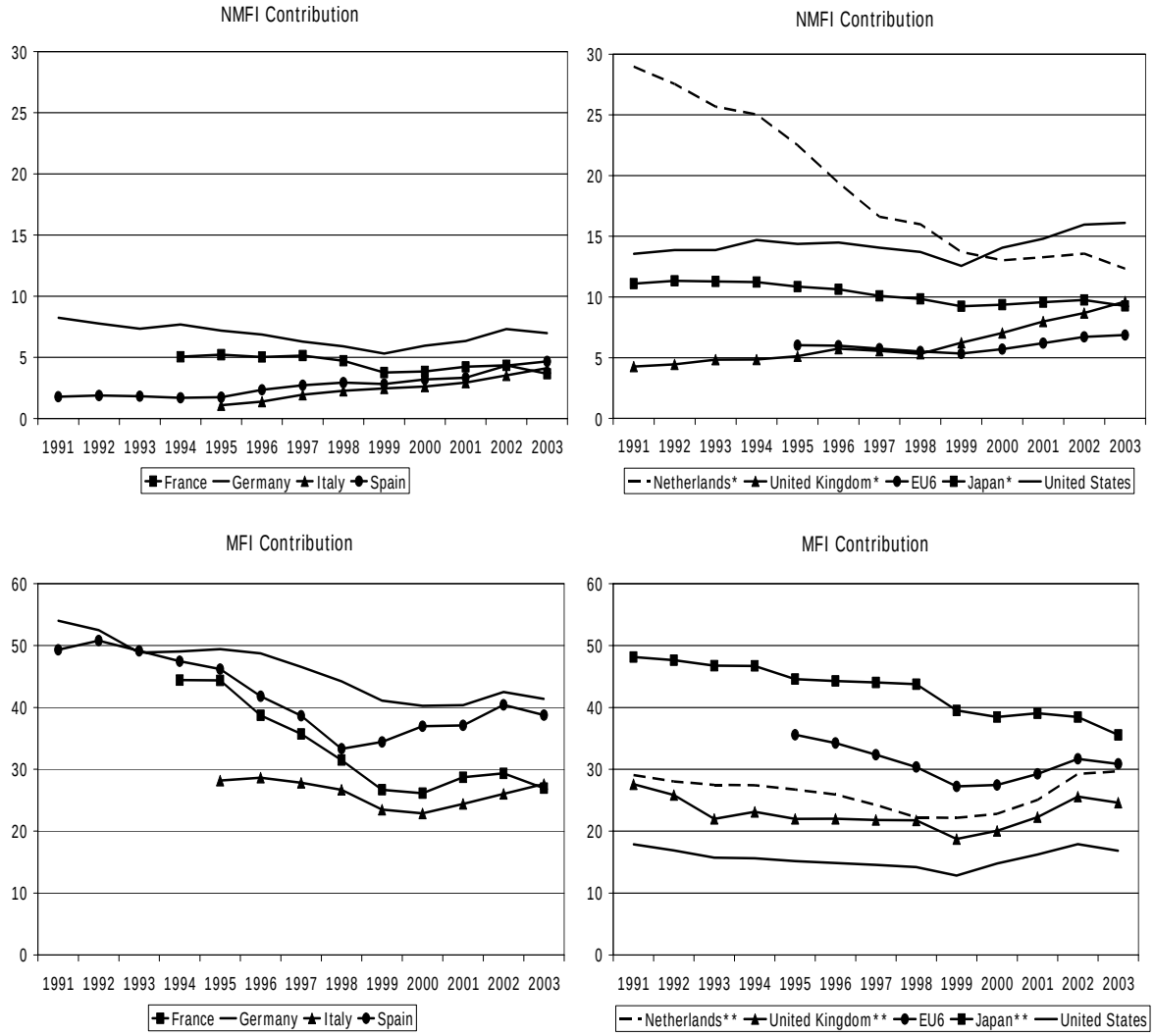
* Money market mutual funds included
** Money market mutual funds not included.

The final financial portfolio of British households, therefore, became less risky than it was at the beginning of the 1990s, becoming even less than that of American households, although the risk borne increased everywhere else, with the notable exception of Japan. NMFIs' role in redirecting household financial wealth towards risky assets is, therefore, very important in the Netherlands and the UK, and average in the US, whereas the contribution of MFIs slightly

[22] That is to say the second element of vector f_F, if parameter m is set at 3.

increased in other continental European countries. Once again, we conclude on diversification, although some seeds of convergence are noticeable.

FIGURE 7
Bank loans and other accounts receivable of household financial wealth (%)



* Money market mutual funds included
** Money market mutual funds not included.

The NMFI contribution to the indirect holdings of loans granted to the non-financial sector remained below 10% of household financial wealth everywhere, except in the Netherlands and the US where it converged towards 15% in 2003, resulting from two opposite trends. Figure 7 clearly shows that loans halved since 1991 in the Netherlands, while they were in a slight uptrend in the US. However, the data reveals a sharp rise over the long term in the US[23]. On the contrary, MFI contribution was the lowest in the US (17% in 2003), the highest in Germany and Spain (40%), and around 30% everywhere else. The total ownership of loans by households, therefore, increased in two of the three countries where it was initially quite low (the US and Italy), while it remained unchanged in the UK. In all the other European countries and in Japan, a significant drop was observed, which reached 20 points in France and 15 points in Japan.

[23] The calculations we made show that NMFI contribution to the indirect holdings of loans quadrupled between 1952 and 2003. These results are available upon request.

These empirical results show that the benchmarks are blurred (Rajan and Zingales 1995, Levine 2002). Consequently, it appears difficult to keep arguing in favor of an American or Anglo-Saxon specificity concerning the respective roles of NMFIs and MFIs in the allocation process of household financial wealth towards particular final assets, i.e., risky securities. NMFIs notably contributed less to the total ownership of securities in the US than in the Netherlands and the UK, whereas their contribution to loan holdings sharply increased over the long term in the US. It is finally the MFIs' role that appeared to be very similar in these three countries. Thus, American NMFIs did not seem to be as much market-oriented as is usually supposed.

5.2. Growing importance of risk management and cross-sectoral risk transfer

However, do the development of cross-sectoral activities, especially the growing interpenetration of FI activities in Europe (described in Section 4), and the burst of credit risk transfer (CRT) activities in the US (underlined in Figure 7), which have both been observed since the 1990s, relativize this analysis? Considering the extent of the conglomeration process in Europe, and the size of CRT markets in the US and their emergence in Europe, is the risk of default still faced by banks? Could efficient risk management by American MFIs, via the extensive use of financial derivatives, particularly credit derivatives, and asset securitization, be considered as a new kind of intermediation or function performed by FIs as upheld by Allen and Santomero (1998)? Or, following the critique addressed to them by Scholtens and van Wensveen (2000), could one consider that risk management instruments and techniques have simply become much more complex than they used to be?

In other words, does Gurley and Shaw's broad and unifying framework apply to the two main changes that took place in the financial services industry since the 1990s, i.e., consolidation and the recent financial innovations in CRT? As we showed in Section 2, according to Gurley and Shaw (1955, 1956), the function of transformation and risk management is one of the main functions performed by FIs and comprises (i) holding direct securities, i.e., claims on non-financial deficit units, and (ii) issuing indirect securities offering both diversification and stable return. It is what Allen and Gale (1999) refer to as the 'traditional' risk management function which leads to intertemporal smoothing, i.e., the ability of banks to smooth returns and insure investors against non-diversifiable risk. According to Allen and Santomero (1998), this 'traditional' view does not take into account the recent developments in risk management.

To shed light on this issue, it is necessary to precisely analyze the rationale for the process of cross-sectoral risk transfer taking place through consolidation and CRT activities, and to identify the characteristics of these new risk management tools.

In Europe, although to a lesser extent in the UK, banks engaged in the consolidation of the financial services industry, which resulted in the growing interpenetration of financial activities via cross-sectoral ownerships, as described in Section 4. This consolidation process led to the creation of decentralized financial conglomerates due to the European regulation that considers it illegal to combine insurance with banking, or securities business within the same legal integrated entity (Dierick, 2004)[24]. Invoking the Joint Forum (2001) but criticizing its conclusions, Freixas et al. (2007) found that risk transfer that takes place at market price within a decentralized conglomerate, especially a bancassurance conglomerate, enhances welfare benefits and market discipline, because within a decentralized conglomerate it is the financial institution which has the lower social cost in case of failure that holds the risky

[24] A conglomerate structured as an integrated entity is subject to a single capital requirement, while each division of a decentralized conglomerate topped with a holding company generally faces separate capital requirements depending on the regulations.

assets[25]. They therefore stressed the importance of decentralized financial conglomerates in facilitating cross-sectoral risk transfer and regulatory capital arbitrage. As a result, the consolidation of the financial services industry led to an increase in risk absorptive capacity (Bernard and Bisignano, 2003).

In the US, in order to improve risk management, banks have made extensive use of credit derivative instruments and asset securitization, which have been spurred by advances in information technology and, for the latter, by the existence of government-sponsored enterprises (GSEs) dedicated to mortgage securitization, offering an implicit government guarantee. The development of credit derivatives and asset securitization also led to cross-sectoral investments[26] and can, therefore, be considered as a response to risks that cannot be easily diversified by consolidation (Bernard and Bisignano, 2003). This is precisely the case in the US where legal barriers to the consolidation of the financial services industry were only recently dismantled by the Gramm-Leach-Bliley Act of 1999 which replaced the Glass-Steagall Act of 1933. Securitization offers banks efficient risk management instruments and techniques which allows them to circumvent the prudential regulation in force by making regulatory capital arbitrage. Just like cross-sectoral ownership, asset securitization is a means to transfer both credit risk and loans to other FIs as a rationale for diversification.

These two institutional and regulatory specificities thus explain the development of an external risk transfer process in the US, based on market instruments, as opposed to the internal risk transfer process observed in continental Europe which rests upon the creation of decentralized financial conglomerates.

CRT activities are based on two techniques: credit derivatives and asset securitization. The former mainly consists of various kinds of credit default swaps (CDSs), while the latter corresponds to issues of asset-backed securities (ABSs) and collaterized debt obligations (CDOs)[27]. The issuance of ABSs and CDOs by European banks has grown rapidly, but still remains very limited compared to the US market, even if CDO issues have been soaring dramatically in Europe since 2004. So far, Japanese banks have been less involved in CRT as they have been too preoccupied with safeguarding the banking system through the management of their outstanding non-performing loans. Actually, in all these CRT markets, the bulk of credit risk shifting is taking place between FIs. Banks are the net purchasers of credit protection, whereas insurance companies and other institutional investors are the net sellers (BIS, 2003; Bernard and Bisignano, 2003). This means that the developments that recently took place in the financial sector − both consolidation and CRT activities − have led to an increase in risk spreading but solely within the financial services industry itself.

Two important implications can be induced from these evolutions. First, the new allocation of risks between FIs resulting from this process is more efficient as it rests on the ability to bear risks of different FI categories according to their respective comparative advantages (see Rajan, 2005).

Second, it results in higher risk taking by MFIs. As emphasized by Rajan (2005), banks make returns both by originating risks and bearing them. Since banks can transfer their credit risk to other financial intermediaries, they have an incentive to take more complicated risks. However, only 'plain vanilla' risks are transferred to other FIs via the development of new CRT market instruments. Some CRT instruments (ABSs and CDOs) enable banks to move loans off their balance sheets onto the balance sheets of NMFIs via securitization. This activity took off in the 1990s in the US under the impetus of GSEs specialized in mortgage

[25] While within an integrated conglomerate, the reach of the deposit insurance safety net may be extended and thus provide incentives for increased risk-taking.
[26] But they do not imply ownership, i.e. control.
[27] They respectively consist of securitizing a pool of homogenous or heterogeneous assets.

securitization, which implicitly or explicitly benefit from a federal guarantee[28]. The Federal National Mortgage Association (better known as Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac) are GSEs, whereas the Government National Mortgage Association (Ginnie Mae) is solely owned by the Federal State[29]. Fannie Mae and Freddie Mac played a crucial role in the expansion of the US mortgage markets. They have two core businesses: (i) they swap mortgages with originators for mortgage-backed securities (MBSs) that represent an interest in the same pool, and (ii) they largely invest in MBSs in the open market and purchase mortgages from originators, financing this activity by issuing debt. Fannie Mae and Freddie Mac became huge NMFIs, with total assets of over $1.8 trillion, and held or securitized about 47% of residential mortgages in 2003. Their dominant position is the consequence of various advantages in comparison to their private competitors. They mainly benefit from an implicit government guarantee[30] that allows them to raise funds cheaply because financial markets treat their debt as quasi un-risky securities[31]. This specific institutional framework does not exist on such a scale anywhere else in the world[32], and explains the growth of the distribution of loans by MFIs, as well as the extent of NMFI contribution to the final holdings of loans by households (see Figure 7). It delivers low-cost funding and supports liquidity by allowing MFIs to refinance their mortgage portfolio and because GSEs play an active role in the secondary market for MBSs, even in times of financial crisis. Therefore, securitization mitigates insufficient liquidity in some financial markets. Green and Wachter (2005) report that, in the aftermath of the Russian debt crisis, Fannie Mae and Freddie Mac bought 75% of the mortgages issued. This is shown in sub-section 5.1 and should explain why no impact of the Russian crisis was noticeable in the US.

Moreover, the recent development of CDOs, since the mid-1990s in the US, has allowed risk diversification through a portfolio of heterogeneous assets (various kinds of loans, corporate bonds or CDSs). When the subordination principle applies, CDO issues are tranched in generally three pieces. The first loss piece (FLP) or equity piece, which takes on a major portion of the CDO risk but only a small part of the notional exposure amount, is generally retained by the institution originating the issue (the bank)[33]. Therefore, only the best risks are really transferred (through the senior and mezzanine tranches), and effective risk transfer is limited and depends on FLP size and retention decisions. Cebenoyan and Strahan (2004) found that banks using the loan sales market for risk management purposes hold less

[28] This corresponds to the characteristics of intertemporal smoothing depicted by Allen and Gale (1997).

[29] GSEs have been created to support mortgage markets. Fannie Mae has existed since 1934 and its activity initially only consisted of issuing bonds to purchase mortgages originated by banks, while Freddie Mac was created in 1970 to securitize mortgages originated largely by savings and loans associations. They became public companies in 1968 and 1989, respectively. By the 1990s, however, the two companies' activities and balance sheets became quite similar (Frame and White, 2005).

[30] This is due to their special federal charters and the past supervisory forbearance towards Fannie Mae when it nearly became insolvent in the late 1970s and the early 1980s. This contrasts with the situation of some quasi state-owned financial entities on which the European Commission and its competition commissar put constant pressure to lose their government guarantee: for instance, in France, the bank subsidiary of the *Caisse des dépôts et consignations* (CDC-Ixis) from 2003 and, in Germany, the various *Landesbanken* (tied to the *Sparkassen*, the German savings and loans) in July 2005 held no more AAA ratings, unlike Fannie Mae and Freddie Mac.

[31] Moreover, Fannie Mae and Freddie Mac are lightly regulated with a required ratio of only 2.5% of capital against mortgages and MBSs, while banks, savings and loans have a required ratio of 1.6% for holding MBSs.

[32] Often issued by the *Landesbanken*, the German *Pfandbriefe* are covered bonds that correspond to an on-balance sheet securitization device. This mature market allows the securitization of loans to local authorities and, to a lesser extent, of mortgages that the originating banks keep in their balance sheet. The Japanese government authorized mortgage-backed securitization by the Government Housing Loan Corporation in 1998, but this activity only represents a small share of the mortgage market. See Green and Wachter (2005) for an international comparison.

[33] Recently, hedge funds more frequently invest in equity tranches. This reveals their increasing involvement in CRT markets (Joint Forum, 2005).

capital and make more risky loans than other banks[34]. Franke and Krahnen (2006) showed that if a bank repeatedly reinvests the proceeds of securitization in new loans, the risks it undertakes increase. These risk-sharing instruments are increasingly used in the banking industry, and more recently the insurance industry[35].

The differences in the risk transfer mechanisms in Europe and the US exhibit the diversification of financial intermediation and financial systems, and once more do not fit the usual distinction between bank-based and market-based financial systems. There are institutional and regulatory specificities that explain the recourse to internal or external risk transfer. Each of these two different risk management devices appears to be efficient depending on the institutional and regulatory environment. The existence of a government-based implicit guarantee system for asset securitization seems to overcome the informational and institutional frictions, and, therefore, the supposed higher cost, of external risk transfer through the market for asset securitization. As a consequence, households do not seem to bear more risk in the US than elsewhere through the indirect holdings of loans, even when these loans are transferred to insurance companies and investment funds.

However, if internal and external risk transfer processes increase the efficiency of financial systems through a better allocation of risks between FIs, they also induce a growing opacity of financial systems. The lack of transparency of external risk transfer could lead to a sudden loss in market confidence and market-making, and so to a rapid disruption in liquidity in either the spot or futures market. Such a phenomenon is well exemplified by the Russian bond crisis of August 1998 and the near failure of LTCM (see Bernard and Bisignano, 2003)[36]. As the efficiency of internal risk transfer lies on a more lenient regulation for decentralized conglomerates, it also implies a similar lack of transparency if market discipline is not strong enough.

5.3. Lengthening of the intermediation chain and diversification of financial assets

The growing importance of cross-sectoral risk transfer − through internal and external mechanisms − as well as the development of cross-sectoral investments whose rationale is not explicitly risk transfer (Section 4) both led to a growing overlapping of MFI and NMFI balance sheets, and even off-balance sheets, which induced a lengthening of the chain of intermediation. Gurley and Shaw's broad definition of financial intermediation offers a conceptual framework which is consistent with these evolutions, provided that (i) the definition of indirect securities are enlarged to take into account new financial products, i.e., the most recent forms of financial innovations, and (ii) that indirect securities issued by MFIs and NMFIs are held not only by non-financial sectors – as within Gurley and Shaw's framework – but also and increasingly by FIs themselves.

Therefore, credit derivatives and securitized debt instruments are new kinds of indirect securities issued by FIs in order to satisfy the demand for diversification of other FIs, mostly NMFIs, which collect an increasing portion of household savings[37]. These new forms of indirect securities are more often created by mixing other indirect assets. Loans, bonds and

[34] This study concerns all domestic banks in the US over the period 1987 to 1993, but excludes residential real estate and consumer loans.

[35] The securitization of insurance risks that are not pure financial risks is referred to under the broad term of alternative risk transfer (ART).

[36] We will no more tackle the question of the impact of GSEs and securitization on systemic risk in the US financial system. See Frame and White (2005) and Green and Wachter (2005), respectively, for the pros and cons. Let us just note that GSE activity is restricted to the so-called "conforming" mortgages that are considered non-risky loans.

[37] Regulatory capital arbitrage rationale only offers a partial explanation of the development of both CRT activities and the consolidation of the financial services industry as the Cooke ratio is not binding.

CDSs are pooled to be securitized, then the pools are frequently sliced in various pieces, and even reshuffled to constitute new and more complicated financial products. The dynamics of financial innovation at the core of this phenomenon is clearly dedicated to satisfy the demand for new products and services expressed by FIs themselves, and not only the ultimate savers as initially assumed by Gurley and Shaw. Securitization has experienced an outstanding development in the US owing to plenty of long-term savings, shortage of primary securities resulting from the repurchase of shares by firms and of debt securities by the government, and a very specific institutional framework. Recently, much of the activity in the credit derivatives market is partly in the process of creating new portfolio products such as synthetic CDOs, built from CDSs (Joint Forum, 2005). Arbitrage CDOs initiated by investment banks, who act as intermediaries, have been growing faster than balance sheet CDOs sponsored by loan-originating banks (BIS, 2003). This evidence suggests that CRT market activity is being driven increasingly by NMFI demand for risk diversification, mainly credit risk exposures. Banks play a crucial role in creating new products to offer investors always more customized and often over-the-counter products. These products tailored to specific client needs provide distinctive qualities that cannot be obtained by simply mixing existing exchange-traded instruments (Rajan, 2005), and consequently rest on a dynamic transformation process.

It is this very process of the engineering of complex financial products within the financial industry inducing the increase in cross-sectoral investments that is partly[38] depicted by the input-output matrix P of financial intermediation, and results in higher values of the entries a_{ij} and c_{ij} (Section 3). The induced lengthening of the intermediation chain is aimed at transferring and redistributing the risks initially undertaken by FIs when acquiring direct securities and is, therefore, finally dedicated to indirectly satisfy the needs of the ultimate savers and borrowers.

We have shown that FIs are at the very heart of a dynamic process of qualitative asset transformation that consists of customization, financial innovation and risk management, and which is driven by the demand for diversification of savers but also and increasingly by FIs themselves. It therefore leads to relativization of the leading role of informational asymmetries and principal-agent relationships in the architecture of financial systems. Consequently, Gurley and Shaw's unifying conceptual framework is made consistent with the dynamic conception of financial intermediation "*in which new markets are developed for new products, where financial institutions do not act as 'agents' who intermediate between savers and investors and thus alleviate 'market imperfections' like asymmetric information and participation costs, but are independent market parties that create financial products and whose value added to their clients is the transformation of financial risk, term, scale, location, and liquidity"* advocated by Scholtens and van Wensveen (2000) [p. 1249] and, although in a more implicit manner, by Rajan (2005)[39].

We have shown that Gurley and Shaw's unified analytical framework includes the most recent financial evolutions and allows a better grasping of the diversification of financial systems that is clearly not reducible to marked- versus bank-based systems. This unifying approach of financial intermediation and, therefore, of financial systems, enables going beyond the traditional and too simplistic dichotomy. The growing complexity and diversification of financial intermediation, highlighted by the burst of financial innovations and the lengthening of the chain of intermediation, rests upon a dynamic process of transformation dedicated to satisfying the demand for diversification of financial assets expressed by non-financial and financial agents. Gurley and Shaw's unifying approach is,

[38] Derivatives are not taken into account in our computations, even in Europe where they are available.

[39] Coval and Thakor (2005) provide an alternative framework for explaining financial intermediation thriving in information-advanced economies, which is based on the endogenous arising of rational intermediaries who act as "belief-matchers" between optimistic borrowers and pessimistic savers.

therefore, in accordance with the functional approach of the financial services view that is largely agreed upon.

6. CONCLUSION

In this paper, we built an original database of FOF accounts in order to describe the path followed by household financial wealth in Europe, Japan and the US through financial circuits. Our method is based on matrix calculation which aims at making all financial intermediaries transparent. Our results bring a first set of two main findings.

(i) They lead us to reject the usual dichotomy between bank-based and market-based systems. We first show that the measurement of direct holdings of securities by households is irrelevant for characterizing financial systems. We also bring proof of the diversification of NMFIs' and MFIs' respective roles in collecting household financial wealth and allocating it to final assets.

(ii) They confirm the lengthening of the intermediation chain by showing that the stability (or expansion) of the whole financial intermediation process from 1991 to 2003 results from the growing interpenetration of monetary and non-monetary activities.

However, our calculations include two limitations: they are based on non-consolidated balance sheet data and they do not take into account off-balance sheet activities. They do not allow us to specify the nature of the cross-sectoral activities or to determine their impact on risk management. That is why we completed our calculations with data on the consolidation of the financial services industry via cross-sectoral relationships and with information on the use of credit derivative instruments and asset securitization.

It appeared that in many countries of continental Europe, banks control most of the collecting process of household financial wealth, including that of non-banking forms. Through the constitution of financial conglomerates, we observed the overall presence of banking groups in the activity of mutual funds and life insurance activities. The European interpenetration concretely expresses the complementarity between monetary and non-monetary circuits. This results from bancassurance strategies that spread in reaction to household portfolio choices: households mainly allocate their savings to long-term products that are adapted to their personal pension concerns. The consolidation of the financial services industry is the way chosen by European banks to increase their risk absorptive capacity.

Unlike their European neighbors, American banks, subjected to the same competition by long-term products but in a different institutional and legal environment, have made extensive use of credit derivative instruments and asset securitization. We have shown that the burst of these CRT activities in the US is linked to government-sponsored enterprises specializing in mortgage securitization which benefit from an implicit federal guarantee. Just like cross-sectoral investments in Europe, asset securitization is a means of transferring both credit risk and loans to other FIs as a rationale for diversification.

These elements lead us to a second set of three main results.

(i) The diversification of financial intermediation is based on the development of external risk transfer via financial markets in the US as opposed to internal risk transfer within financial conglomerates in Europe. It does not match the usual opposition between bank-based and market-based systems. Institutional and regulatory specificities seem much more relevant to explain the diversity of the answers given by financial intermediaries confronted with the same household behavior whatever the studied country. By increasingly entrusting their savings to NMFIs, households choose a final destination of their portfolio mainly oriented towards market securities.

(ii) The diversification stressed above includes various ways of interpenetration, among them the consolidation of the financial services industry in Europe and CRT techniques in the

US. In accordance with the "financial services view", this shows the core position held by financial intermediation, even in market-based systems, and reinforces Gurley and Shaw's broad unifying conception of financial intermediation. Far from an artificial opposition between MFIs and NMFIs, the unity of the financial intermediation process results from the cross-sectoral activities which widen the various financial intermediaries' fields of intervention and unify their financial functions.

(iii) All types of financial intermediaries, whatever their institutional statute and the context in which they act, perform the same main function: the transformation of indirect debt securities. This transformation is based on cross-sectoral activities aimed at sharing and transferring inherent risks. Nowadays, the function of transformation involves forms of risk management which are more sophisticated than the ones originally described by Gurley and Shaw. It continues to meet the demand for asset diversification which is not only expressed by savers but also by financial intermediaries themselves. So, it generates multiple intermediation processes which lengthen the intermediation chain and explain both the burst of NMFI activities and their complementarity with MFI activities.

Finally, Gurley and Shaw's approach justifies that financial intermediaries remain at the very heart of a dynamic process of asset transformation and keep their central position in channeling household savings towards the financial requirements of ultimate borrowers. By integrating modern literature on intermediaries' comparative advantages and on the impact of institutional and legal environment, we demonstrated that Gurley and Shaw's unifying theoretical framework is applicable to the analysis of the modern and multidimensional financial intermediation process.

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