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Financial Development and Household Portfolios

Evidence from Spain, the U.K. and the U.S.

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Abstract

We examine the impact of financial market development on the composition of household portfolios in Spain, the U.K. and the U.S., three countries whose financial systems underwent profound changes over the last two decades and for which relevant data exist for sufficiently long time periods. We find that the indices measuring financial market development affect significantly both the long and the short-run dynamics of household portfolios.

Keywords : Financial Development Indices, Household Portfolios, Error-Correction Models

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1. Introduction

Over the last two decades, the financial system in almost all industrial countries underwent major changes. Very briefly, the role of traditional bank intermediation decreased, while that of capital markets increased, especially in Europe (Rajan and Zingales [2002], Allen and Santomero [1999]). Also, other forms of intermediaries, such as, pension funds and mutual funds, grew significantly, responding to a shift towards institutionalized management of savings, and new financial markets and products were created. These changes did not occur in a vacuum. The revolution in information technology played a significant role, as it reduced transaction costs and asymmetric information problems (Allen and Santomero [1999], Mishkin and Strahan [1999]). Two other important drivers were the wave of financial liberalization and major institutional developments. The authorities were at times reacting to developments like the integration of world financial markets and to financial innovation that put pressure on the existing regulatory system and threatened the stability of financial systems (Kaminsky and Shmuckler [2002]). At other times, they implemented changes to improve the efficiency on resource allocation through fostering competition and removing artificial constraints on the allocation of finance (Edey and Hviding [1995]). Consider, for example, the implementation of the European Union's Second Banking Directive (1993) and Third Generation Insurance Directive (1994), which aimed at deregulating the E.U. banking and insurance markets (Cummins and Rubio-Misas [2002]).

The above changes may have affected the composition of households' wealth. The channels, both direct and indirect, abound: reduced borrowing constraints, better functioning of financial markets, lower information and transaction costs, lower risk and liquidity premia. Yet, despite the existence of a lot of anecdotal evidence, there are very few pertinent studies, owing, perhaps, to the difficulty of obtaining relevant data.

In this paper, we attempt to fill this gap. Specifically, we examine the impact of financial market development on the composition of household portfolios in three countries for which relevant data exist, at quarterly intervals, since the 1980s or earlier; namely, Spain, the U.K. and the U.S.. In Section 2 we argue intuitively that for countries undergoing significant changes in their financial systems, the typical portfolio

theory, which stresses the importance of asset returns and their variance/covariance matrix in asset allocation, should be augmented to account for these changes. Also, to put the analysis into perspective, we discuss briefly the changes in the financial systems of the sample countries, over the past two decades. A common theme is the increasing importance of the bond and stock markets and of the insurance and pension funds industry, and the decreasing and changing role of banks. Another common theme is the rapid expansion of household credit.

In Section 3, we present the data, paying particular attention to the indices measuring the development of the four main segments of the financial system, namely, financial intermediaries, the stock market, the bond market, and insurance and pension funds. In doing so, we essentially measure financial development based on the outcomes, not on the regulatory measures that triggered the changes. These indices come from the extensive and expanding literature on finance and growth (see, for example, Beck, Demirgüç-Kunt and Levine [1999], Levine [2002, 2004]). Moreover, to reduce the number of potential explanatory variables, we use principal components analyses for the financial intermediaries indices (ten) and the stock market indices (three).

As it turns out, the first principal components not only explain a very high proportion of the variance of the aforementioned indices, but, most importantly, have a clear meaning regarding the development of the financial intermediaries segment relative to the other segments of the financial system. Indicatively, an increase in Spain's first financial intermediaries principal component –which explains 73.2% of the variance of the raw indices— is consistent with an expanding, yet more competitive, financial intermediaries segment. An increase in the second –which explains an additional 18.4%— reflects a decreasing role of financial intermediaries in the mobilization of household savings.

The results of the empirical analysis, in Section 4, are quite interesting. The indices measuring the development of the financial system –the actual indices for the bond market and the insurance and pensions funds, and the principal components for the financial intermediaries and the stock market— affect both the long and the short-run dynamics of household portfolios. Continuing with the results for Spain, the share of *currency and deposits* tends to decrease as the financial system becomes more

competitive and the role of financial intermediaries in mobilizing household savings declines. In technical terms, the coefficients of Spain's aforementioned two principal components are, respectively, positive and negative in the long-run co-integrating equation. The opposite holds for the share of *shares and other equity*.

In contrast, the effect of asset returns and their variances/covariances is generally very small. Though this may be due to the fact that we proxy expected returns and their variances/covariances with their realized contemporaneous and lagged values, Section 5, which concludes, argues that this fact is not likely to drive the significance of the financial development indices. In essence, the effect of financial development on the composition of household portfolios seems robust.

2. On Financial Development and Household Portfolios

As mentioned above, the changes in the financial system over the past two decades may have affected the composition of households' wealth. Moreover, since all its sectors are interconnected, developments in one sector most likely affects all others and, hence, the asset allocation decisions of households in a rather unpredictable way. Consider, for example, two changes related to the banking sector. The elimination of deposit rate ceilings may lead to higher rates and thus, ceteris paribus, to higher share of deposits in household portfolios. At the same time, they may lead to lower lending rates and higher volume of loans which, in turn, may affect negatively the supply of stocks and corporate bonds (for an intuitive presentation, see Beim and Calomoiris [2000], p.48) and hence lead to lower shares of stocks and bonds. In contrast, the liberalization of consumer credit, by easing the short-sale constraint pertaining to liquid assets that households face, may lead to higher shares of stocks and bonds. Needless to say, lowering the regulatory hurdles for issuing stocks and corporate bonds, increasing investor protection, improving the quantity and quality of information, will increase liquidity (lower liquidity premia) and reduce risk premia, and lead, as a result, to higher shares of stocks and bonds.

To make a long story short, the above suggest that, for countries undergoing significant changes in their financial systems, the typical portfolio theory, which stresses the

importance of asset returns and their variance/covariance matrix in asset allocation, should be augmented to account for these changes. In mathematical terms, the share of an asset *h* should be a function not only of expected returns, $E_{t-1}R_{i,t}$, their variances, $E_{t-1}\sigma^2_{i,t}$ and covariances $E_{t-1}\sigma_{ij,t}$ (*i* spans the space of financial assets), but also of (lagged) indices measuring the depth and development of, respectively, financial intermediaries, the bond market, the stock market and insurance and pension funds, FI_{t-1}, BM_{t-1}, SM_{t-1} and IPF_{t-1}, as shown in the equation below.

$$S_{h,t} = f\{E_{t-1}R_{i,t}; E_{t-1}\sigma^2_{i,t}; E_{t-1}\sigma_{ij,t} (i,j=1,2,3; i\neq j); FI_{t-1}; BM_{t-1}; SM_{t-1}; IPF_{t-1}\} \qquad (1)$$

To put the analysis into perspective, it is worth describing the main changes in the financial systems of Spain, the U.K. and the U.S., three countries from which relevant data exist since the 1980s or earlier.

Spain. Over the past two decades, Spain's traditional bank-oriented financial system changed to a much more developed and competitive one that operates in a market-driven environment. The most important forces for change were the consolidation of European and global financial markets, the accession to the E.U., improvements in technology, and institutional reforms. Prominent among the latter are the liberalization of interest rates in 1987 – completing a gradual process that begun in 1974, partial liberalization of foreign portfolio investment in 1986, major stock market reforms in 1989, the abolishment of almost all remaining capital controls in 1992, the independence of the Bank of Spain in 1995, and the institutionalization of private saving. As a result, other financial intermediaries acquired a more prominent role, and a number of large international banks entered the market; financial intermediaries experienced a remarkable growth; the public bond market achieved high levels of liquidity but on the other hand, the development of the private debt market was much more limited. As for the insurance industry, the development of the financial system and the pressing demographic trends led to an increase in investment in supplementary and private pension schemes. (Cummins and Rubio-Misas [2002], ECB [2002], Kaminsky and Schmukler [2002], Williamson and Mahar [1998]).

U.K.. Starting in the early 1980s, when major institutional reforms were implemented, U.K.'s market-oriented system underwent a profound transformation. The most

significant of these reforms were the abandonment of credit controls at the beginning of the 1980s, the elimination of the ceilings on deposit rates in 1981 and on lending rates in 1986, the allowance of competition between banks and building societies in mid 1980s, and the introduction of securitization in 1987. The stock market was already fully liberalized since the late 1970s. By now, banks, other financial intermediaries and life insurers and pension funds are major players in the U.K.'s financial system. The big U.K.-owned banks account for the largest share of both deposit taking and lending activity, while small banks typically carry relatively larger exposures to the interbank and corporate sectors. Deposit concentration in 2003 remained about the same as 15 years ago, while bank loans are slightly more concentrated than deposits. Foreign banks are heavily involved in wholesale markets. Also, U.K. banks have more significant ownership exposures to the U.K. life insurance sector than the non-life sector. Moreover, life insurers tend to have much larger financial-asset holdings than non-life insurers (Bank of England [2003a, 2003b, 2004], Kaminsky and Schmukler [2002], Logan [2004], Williamson and Mahar [1998]).

U.S.. Even the U.S.s' financial system, the archetypal paradigm for a market-based system, saw dramatic changes over the same period. The main institutional reforms were the lifting of deposit rate ceilings (regulation Q) in 1982, the abolishment of all restrictions in foreign borrowing by firms by 1978, the elimination of portfolio restrictions for savings banks and savings and loans associations in 1980, the liberalization of bank branching restrictions, and the ability of bank holding companies to operate nationwide. As a result, the banking industry experienced a rapid consolidation starting in the 1980s, with the emergence of a small number of very large, complex, bank-centered financial institutions that now account for a substantial share of the assets and liabilities of the U.S. banking system. However, despite their size and scope of activities, banks have lost ground to other intermediaries, such as finance companies, and to securities markets. Yet, they are still important in the credit origination process and wholesale financial markets. There has also been substantial convergence in the types of financial transactions bank-centered and other financial intermediaries perform. This translates to a more competitive and more innovative financial system (Bank of England [2003b], Cohen and Mazzeo [2004], Kaminsky and Schmukler [2002], Logan [2004], Rhoades [2000], Williamson and Mahar [1998]).

3. Data

3.1. Financial Development

Measuring financial development is not an easy task. Several indices have been used in the extensive literature on financial development and growth, all of which, however, are imperfect proxies. In any event, the indices analyzed in this paper were calculated using the World Bank's Financial Development and Structure Database definitions (Beck, Demirgüç-Kunt, and Levine [1999]). The analysis is confined to Spain, the U.K. and the U.S., for which the relevant series are available on a quarterly basis. The sample period is also determined by data availability. Specifically, the raw data for the calculation of the said indices come from the "Financial Accounts of the Spanish Economy – ESA 95", available at the Bank of Spain's website www.bde.es from 1989:4 to 2003:4; the "Financial Balance Sheet (Consistent)", available at the U.K.'s National Statistics Service website www.statistics.gov.uk from 1987:1 to 2003:4; and the "Federal Reserve's Flow of Funds Accounts" for the U.S., available in the Ecowin's economic database from 1973:1 to 2003:4.

The indices are organized in four groups, each group corresponding to a major segment of the financial system: indices pertaining to financial intermediaries, which measure the evolution of both banks and other financial intermediaries; to the stock market, which measure its size, depth and liquidity; to the bond market, which measure the size of the public and private bond markets; and to insurance and pension funds, which measure the expansion of these institutions.

The indices used are outlined below. Details about their construction are provided in the Appendix Table A.

Financial Intermediaries Indices:

FI_1: Claims on domestic non-financial real sector of banks to total financial claims on non-financial real sector

FI_2: Claims on domestic non-financial real sector of other financial intermediaries to total financial claims on non-financial real sector

FI_3: Claims on domestic non-financial real sector of banks as a share of GDP

FI_4: Claims on domestic non-financial real sector of other financial intermediaries as a share of GDP

FI_5: Private credit by banks as a share of GDP

FI_6: Private credit by other financial intermediaries as a share of GDP

FI_7: Demand, time and savings deposits in banks as a share of GDP

FI_8: Demand, time and savings deposits in banks and other financial intermediaries as a share of GDP

FI_9: Liquid liabilities as a share of GDP

FI_{10}: Accounting value of banks' net interest revenue as a share of their assets

Stock Market Indices:

SM_1: Value of listed shares as a share of GDP

SM_2: Value of total shares traded as a share of GDP

SM_3: Ratio of the value of total shares traded over stock market capitalization

Bond Market Indices:

BM_1: Private domestic debt securities issued by financial intermediaries and corporations as a share of GDP

BM_2: Public domestic debt securities issued by government as a share of GDP

Insurance and Pension Funds Indices:

IPF_1: Life insurance premium volume as a share of GDP

IPF_2: Non-life insurance premium volume as a share of GDP

Figure 1 presents the evolution of these indices for the sample countries.

Insert Figure 1 Here

Very briefly, as Figure 1 documents, in Spain, there was a rapid credit expansion by banks and other financial intermediaries to the real sector and households, as a share of

GDP, since the mid 1990s. This expansion was due to the growth in household credit, since claims on the domestic non-financial real sector by banks declined over the sample period. Liquidity in the economy had an upward trend, while deposits rose at the beginning of the sample period and remained relatively stable thereafter. The net interest margin declined almost monotonically. The public bond market capitalization expanded until 1998 and declined thereafter, while private bond market's evolution was more limited. The stock market also expanded, in terms of size, depth and liquidity throughout the sample. Lastly, both insurance and pension funds reserves more than doubled until the end of 2003.

In the U.K., private credit by banks and building societies as a share of GDP showed a peak at the beginning of the 1990s, which was followed by a decline and a subsequent rise from the mid 1990s. This rise was due to the expansion of household credit, which was also supported by other financial intermediaries, since claims on non-financial real sector by all financial intermediaries as a share of GDP declined. Liquidity and deposits had an upward trend, while the net interest margin of banks declined, although to a more limited extent than in Spain. Private bond market capitalization as a share of GDP soared, while the relevant index for the public bond market peaked before the end of the 1990s. The stock market exhibited the same evolution as in the case of Spain, while the life insurance reserves increased substantially.

Lastly, in the U.S., the banks' share of claims on non-financial real sector generally declined from early 1980s until 2003, while the reverse holds for that of other financial intermediaries. In contrast, private credit increased, mostly by other financial intermediaries rather than banks. The above suggest that private credit rose mostly due to the expansion of household credit, as in Spain and the U.K.. Liquidity, as well as deposits in all financial intermediaries, had in general a downward trend, while deposits in banks remained relatively stable on average. Financial corporate business doubled its value added over the sample period, while stock and bond markets expanded, as in the other two countries, mainly after early 1980s. The same is true for pension funds reserves, while life insurance reserves declined since the mid 1980s and rose monotonically thereafter.

Although a ranking is difficult to construct, the visual evidence suggests that the most profound changes occurred in Spain's financial system. Then comes the U.K. and last the U.S..

3.2. Household Portfolios

The data for household portfolios comes from the same sources as the data for the construction of the aforementioned indices. In more detail, the "Financial Accounts of the Spanish Economy – ESA 95" for Spain and the "Financial Balance Sheet (Consistent)" for the U.K. report for households and non-profit institutions serving households (henceforth NPISH), according to the European System of Accounts (ESA), on a quarterly frequency and on a current basis the items: *currency and deposits*, *shares and other equity* and *securities other than shares*. *Currency and deposits* includes currency, transferable deposits and other deposits. *Shares and other equity* includes quoted and unquoted shares plus mutual funds shares (Eurostat [1996, p. 96]). *Securities other than shares* include short-term and long-term securities other than shares plus financial derivatives. For the U.S., the "Flow of Funds Accounts" report for households and NPISHs the following items: currency, checkable deposits and time and savings deposits, which correspond to *currency and deposits;* corporate equities and mutual fund shares, which correspond to *shares and other equity*; and corporate and foreign bonds, municipal securities, treasury, other treasury, savings bonds, open market paper, credit market instruments and money market fund shares, which correspond to *securities other than shares.*

From these items we calculate three ratios, one for each category of generic assets (deposits, stocks, bonds) that constitute household portfolios:

$$S_{1t} = 100*(\textit{currency and deposits} \text{ at } t)/(\textit{total financial assets} \text{ at } t)$$

$$S_{2t} = 100*(\textit{shares and other equity} \text{ at } t)/(\textit{total financial assets} \text{ at } t)$$

$$S_{3t} = 100*(\textit{securities other than shares} \text{ at } t)/(\textit{total financial assets} \text{ at } t)$$

Total financial assets is equal to sum of the three items in the numerator of the three ratios and t is the usual time subscript.

Figure 2 shows the evolution of these assets for each country. Briefly, in Spain the share of *currency and deposits* declined significantly from about 70% in 1990 to less than 45% at the end of the decade and rose again since then, exceeding 50%. The reverse holds for the share of *shares and other equity*; starting at about 20%, peaked at over 50% at the end of the 1990s and ended at approximately 45%. The very modest share of *securities other than shares* declined steadily, ending at about 3%, nearly one third of that at the beginning of the sample period. In the U.K., *currency and deposits* declined significantly until 2000, from over 60% in 1988 to almost 45% in 2000, and recovered to its initial level by 2003. In contrast, *shares and other equity* started below 40%, rose to over 50% and ended at the same level as at the beginning of the sample period. The share of *securities other than shares* was very small and declined from about 6% in 1988 to less than 3% in 2003. Lastly, in the U.S., *currency and deposits* rose from 40% in 1973 to about 50% by the end of the decade, declined steadily since then to 20% in 2000 and rose to less than 30% in the last three years of the sample period. *Shares and other equity*, started at 35% in 1973, declined to approximately 20% before mid 1980s, rose to almost 55% until 2000 and ended below 45% in 2003, while *securities other than shares* started at 24%, reached almost 40% in early 1990s and ended at about 28% in 2003.

Insert Figure 2 Here

3.3. Other Data

The returns for the three categories of assets are calculated with data from Datastream. Specifically, the return of the generic asset *currency and deposits*, denoted as R_1, is the three month Treasury bill rate for Spain and the U.K., and the three month Treasury bill secondary market rate on a discount basis for the U.S.. The return of *shares and other equity*, R_2, is calculated with the end-of-quarter total market return index for Spain and the U.K., and with the total return of the S&P500 price index for the U.S.. The return of *securities other than shares*, R_3, is calculated with the total return index for all government bonds for Spain and with the total return index for the ten-year benchmark government bonds for the U.K. – end-of-quarter data (for details, see Datastream

Manual, page Bonds-84). The respective total return index for Spain's ten-year benchmark government bonds is not used because of fewer observations. In any case, this is not likely to affect the results for the correlation coefficient of the two Spanish bond returns, for the period for which there are data for both, is 0.977. For the U.S., we use the Merrill Lynch total return index for the 7-10 years U.S. treasury bonds. The within-the-year variance/covariance matrix for each asset is calculated from the monthly return series.

3.4. Summary Indices of Financial Development

To limit the number of potential explanatory variables pertaining to financial development, we use Principal Components Analysis. Table 1 summarizes the results. For each country, it reports the cumulative variance explained by the first principal components, plus the results of unit root tests. The later are conducted using the Augmented Dickey Fuller (ADF), the Phillips-Perron (PP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) methods. Lastly, details about the principal components are reported in Appendix Table B, while details about their order of integration are available from the authors upon request.

Insert Table 1 Here

As Table 1 indicates, the first three principal components, PFI_1, PFI_2 and PFI_3, explain more than 90% of the variance of the indices pertaining to financial intermediaries. Specifically, they explain 96.3% for Spain, 93.3% for the U.K. and 91.7% for the U.S. From these three components, the first two of Spain and the first of the U.K. and the U.S. are I(1), while the remaining are I(0).

For the stock market, the first principal component, PSM_1, explains 95.2% and 95% of the variance for Spain and the U.S. respectively. For the U.K., the first component explains 83.1%, while the first and the second, PSM_1 and PSM_2, together explain 99.5%. The first component is I(1) for all three countries, while the second is I(0).

No principal component analysis was conducted for the bond market and the insurance and pension funds industry because there are only two indices for each. In addition, the two indices for the insurance and pension funds industry are highly correlated in Spain and the U.K., with a correlation coefficient exceeding 0.99 in both countries. This allows using only one of the two indices for these two countries in the regression below.

Appendix Table B reveals some interesting aspects of the principal components. To begin with, Spain's first financial intermediaries component, PFI_1, is consistent with an expanding, yet more competitive, intermediaries segment of the financial system; it is negatively related to the share of banks in total financial claims on non-financial real sector (index FI_1) and to banks' net interest margin (index FI_{10}), and positively related to all others. Thus, PFI_1 increases when the role of banks decreases relative to that of other financial intermediaries and when competition increases. PFI_2, which depends negatively on deposits in banks and financial intermediaries (indices FI_7 and FI_8), captures the diminishing role of these institutions in the mobilization of household savings. Lastly, an increase in the first stock market component, PSM_1, which depends positively on all three stock market indices, is associated with an increase in the size, liquidity and depth of the stock market.

For the U.K., PFI_1, which is positively related to claims on non-financial real sector by banks and by other financial intermediaries (indices FI_1, FI_2, FI_3 and FI_4) and to the banks' net interest margin (index FI_{10}) and negatively on financial intermediaries credit and deposits as shares of GDP (indices FI_5, FI_6 and FI_7), declines as other segments of the financial system take away financial intermediaries' business; i.e., as the financial system moves away from banks. The other two components, PFI_2 and PFI_3, do not have a clear economic meaning. The first stock market component, PSM_1, which is positively related to the three stock market indices, has the same meaning as Spain's PSM_1. However, the meaning of the second component PSM_2, which depends positively on the stock market value traded (index SM_2) and the stock market turnover (index SM_3) and negatively on the stock market capitalization (index SM_1), is not clear-cut.

Lastly, for the U.S., PFI_1, which is positively related to claims on non-financial real sector of banks (indices FI_1 and FI_3), to deposits in banks and in financial intermediaries (indices FI_7 and FI_8) and to liquidity as a share of GDP (index FI_9), declines as the

financial system moves away from banks. As in the U.K., the other two components, PFI_2 and PFI_3, do not have a clear economic meaning. The first component of the stock market indices, PSM_1, exhibits the same pattern and has the same meaning as the relevant component in the cases of Spain and the U.K.

The unit root tests for the shares of assets, their returns and variances/covariances are summarized in Table 2. Briefly, the shares of assets in household portfolios (S_1, S_2, S_3) are I(1) for all countries, except for the share of *securities other than shares* (S_3) for the U.K. which is I(0). All returns are I(0), with the exception of R_1 which is I(1) for the U.S. and the U.K. and all variances/covariances series are also I(0) with the exception of σ^2_3 which is I(1) for Spain.

Insert Table 2 Here

4. Analysis.

4.1. Econometric Issues

The potential explanatory variables, besides the expected returns and variances/covariances, are: for Spain, the first two principal components of the financial intermediaries indices, PFI_1 and PFI_2, which explain 91.6% of the variance of the actual indices; the first component of the stock market indices, PSM_1, which explains 95.2% of the two actual indices; the actual indices for the bond market, BM_1 and BM_2; and one of the two indices for insurance and pension funds, IPF_1, for their correlation coefficient is 0.99). For the U.K., the first three principal components of the financial intermediaries indices; the first two components of the stock market indices; the actual indices for the bond market; and one of the two indices for insurance and pension funds, since, as in the case of Spain, they are strongly correlated (their correlation coefficient is 0.99). Finally, for the U.S., the first three principal components of the financial intermediaries indices; the first component of the stock market indices; and the actual bond market and insurance and pension funds indices.

The equation to be estimated is a linear form of equation (1):

$$S_{h,t} = \alpha_0 + \alpha_1 E_{t-1} R_{1,t} + \alpha_2 E_{t-1} R_{2,t} + \alpha_3 E_{t-1} R_{3,t}$$
$$+ \beta_1 E_{t-1} \sigma^2_{1,t} + \beta_2 E_{t-1} \sigma^2_{2,t} + \beta_3 E_{t-1} \sigma^2_{3,t}$$
$$+ \gamma_1 E_{t-1} \sigma_{12,t} + \gamma_2 E_{t-1} \sigma_{13,t} + \gamma_3 E_{t-1} \sigma_{23,t}$$
$$+ \sum_{j\geq 1} \delta_j PFI_{j,t-1} + \sum_{j\geq 1} \varepsilon_j PSM_{j,t-1} + \sum_{j=1}^{2} \zeta_j BM_{j,t-1} + \sum_{j\geq 1} \theta_j IPF_{j,t-1} + \varepsilon_{h,t} \qquad (2)$$

Since equation (2) includes both I(1) and I(0) variables, we use the Dynamic Ordinary Least Squares estimator (Maddala and In-Moo Kim [1998], p. 163), in order to take care of possible endogeneity and/or long-run correlation problems. This method corresponds to the estimation of the above equation augmented with leads and lags of the changes of all I(1) variables. Since the financial development indices in equation (2) are dated *t-1*, the leads and lags of the first differences of these I(1) variables start at *t-1*. We also use the Schwarz criterion to choose the number of leads and lags for each country, taking into consideration the sample size. Thus, we use one lead and lag for Spain and the U.K., and three leads and lags for the U.S.. We also apply the Newey-West method wherever is necessary, to correct for heteroskedasticity and/or autocorrelation in the residuals of equation (2). Lastly, we proxy expected returns and variances/covariances with both lagged and contemporaneous values.

From this regression we obtain the statistically significant I(1) variables in the cointegrating vectors for the shares of assets for each country, as well as the corresponding error correction terms.

Next, we subtract the lagged dependent variable from both sides of equation (3) to get the error correction representation. For example, the error correction representation for Spain is shown in equation (3).

$$\Delta S_{h,t} = \alpha_0 + \alpha_1 E_{t-1} R_{1,t} + \alpha_2 E_{t-1} R_{2,t} + \alpha_3 E_{t-1} R_{3,t}$$
$$+ \beta_1 E_{t-1} \sigma^2_{1,t} + \beta_2 E_{t-1} \sigma^2_{2,t} + \beta_3 E_{t-1} \Delta\sigma^2_{3,t}$$
$$+ \gamma_1 E_{t-1} \sigma_{12,t} + \gamma_2 E_{t-1} \sigma_{13,t} + \gamma_3 E_{t-1} \sigma_{23,t}$$

$$+\sum_{j=1}^{2}\delta_j \Delta PFI_{j,t-1}+\varepsilon_1 \Delta PSM_{1,t-1}+\sum_{j=1}^{2}\zeta_j \Delta BM_{j,t-1}+\theta_1 \Delta IPF_{1,t-1}-ECT_{h,t-1}+\varepsilon_{h,t} \quad (3)$$

Spain's error correction term, $ECT_{h,t-1}$, is the lagged residual of the cointegrating equation obtained from the Dynamic Ordinary Least Squares (DOLS) regression, which is shown in equation (4) below. Note that only the statistically significant I(1) variables from the DOLS regression –among them σ^2_{23}—appear in differences in equation (3) and in the *ECT* in equation (4). Standard unit root tests, using the corrected critical values for the t-statistic as proposed by MacKinnon (Maddala and In-Moo Kim [1998] p. 201), indicate that in all cases, for all countries, the *ECT* is stationary.

$$S_{h,t}=\lambda+\sum_{j=1}^{2}\mu_j PFI_{j,t-1}+\nu_1 PSM_{1,t-1}+\sum_{j=1}^{2}\xi_j BM_{j,t-1}+\pi_1 IPF_{j,t-1}+\rho E_{t-1}\sigma_{23,t}+ECT_{h,t} \quad (4)$$

4.2. Results

Tables 3 through 8 summarize the empirical results. Specifically, Tables 3, 5 and 7 present the cointegrating vectors for Spain, the U.K. and the U.S., respectively, while Tables 4, 6 and 8 present the corresponding error correction models. All Tables have the same structure and consist of two Panels. Panel A presents the results with contemporaneous values of returns and their variances/covariances, while Panel B presents the results with lagged values of returns and their variances/covariances. The first column shows the dependent variable. The remaining columns show the statistically significant regressors, their estimated coefficients and t-statistics (in parentheses), plus the adjusted R^2s and the D.W. statistic. The analysis is restricted to the shares of *currency and deposits*, S_1, and *shares and other equity*, S_2. The share of *securities other than shares* is not examined further for is generally very low.

Briefly, as Tables 3, 5 and 7 attest to, there is a long-run relationship between the shares of the two generic assets under examination and lagged values of several financial development variables in all countries. This apparent statistical relationship between asset shares and financial development is reinforced by the results in Tables 4, 6 and 8, which document that the error correction term is statistically significant in the error correction equations. These results suggest that the development of the financial system

affected not only the long-run trends, but the short-run dynamics of household portfolios as well!

More details follow.

Spain. Table 3 documents that there is a long-run relationship between the asset shares in household portfolios and lagged values of financial development variables, together with the variance of the return of the *securities other than shares*. Moreover, the same variables constitute the cointegrating vectors for both *currency and deposits* and *shares and other equity* in both Panels of Table 3.

Insert Table 3 Here

The sign of the variables in these vectors is both reasonable and interesting. In more detail, the share of *currency and deposits* depends positively on the first principal component, $PFI_{1,t-1}$, and negatively on the second, $PFI_{2,t-1}$, for the financial intermediaries indices. In essence, an increase in $PFI_{1,t-1}$, which indicates a more competitive financial intermediaries segment of the financial system, is associated with a higher share of *currency and deposits*. Similarly, an increase in PFI_2, which indicates a decreasing role for banks, is associated with a lower share of *currency and deposits*. The negative signs of the first principal component of the stock market, $PSM_{1,t-1}$, the two bond market indices, $BM_{1,t-1}$ and $BM_{2,t-1}$, and the insurance and pension fund index, $IPF_{1,t-1}$, reflect the adverse effect of the development of the respective segments of the financial system on the share of *currency and deposits*. Lastly, the negative sign of the variance of the return of the *securities other than shares*, σ^2_3, indicates that higher interest rate volatility is associated with a lower share of *currency and deposits*.

For the share of *share and other equities* the same variables enter the cointegrating vector but with opposite coefficients, as one would reasonably expect, based on the low share of *securities other than shares*.

Table 4 documents that, the changes in financial development variables also affected the changes in the shares of the two generic assets, in addition to the error correction term and the returns/variances/covariances.

Insert Table 4 Here

Specifically, in Panel A and for the change of the share of *currency and deposits*, the estimated coefficient of the error correction term ECT_{t-1} is –0.204 with t-statistic –2.782. From the returns and variances/covariances variables, significant are the return of *shares and other equity,* $R_{2,t}$ (coefficient/t-statistic: -0.001/-9.05) and the difference in the variance of the return of *securities other than shares,* $\Delta\sigma^2_{3,t}$ (coefficient/t-statistic: -0.007/ –3.17), while from the financial development variables significant are the difference in the first component of financial intermediaries indices $\Delta PFI_{1,t-1}$ (coefficient/t-statistic: 0.009/3.09) and the change in public bond index $\Delta BM_{2,t-1}$ (coefficient/t-statistic: -0.067/-3.52).

In essence, both the level and the change in the share of *currency and deposits* was positively affected by the change in the development of financial intermediaries segment and negatively by the expansion of the public bond market. The same variables but with opposite sign explained the level and the change in the share of *shares and other equity*.

The results in Panel B are qualitatively similar. The error correction terms are significant for both dependent variables (coefficient/t-statistic: -0.502 and –0.492/-4.57 and –4.44) for *currency and deposits* and *shares and other equity* respectively. Also significant are the lagged values of the return of *currency and deposits*, $\sigma^2_{1,t-1}$, the covariance between the returns of *currency and deposits* and *securities other than shares*, $\sigma_{13,t-1}$, while for the financial development variables, except those which where present in Panel A, the $\Delta IPF_{1,t-1}$ is also significant. Its sign is negative for *currency and deposits* indicating that insurance industry evolution affected negatively the change of this item in the short-run, while is positive for the other dependent variable.

U.K.. Table 5 documents that, as in Spain, there is a long-run relationship between the asset shares in household portfolios and lagged values of financial development variables. Unlike Spain however, the development of the stock and the public bond markets had no effect on household portfolios in the long-run.

Insert Table 5 Here

In greater detail, the sign of the variables that enter the cointegrating vectors has the same economic meaning, as in the case of Spain. Specifically, the share of *currency and deposits* depends negatively on the first financial intermediaries principal component $PFI_{1,t-1}$. A decrease in this variable, which indicates a higher volume of private credit from financial intermediaries, is associated with a higher share of currency and deposits. The negative signs of the private bond market index, $BM_{1,t-1}$, and the life insurance index, $IPF_{1,t-1}$, indicate the negative impact of the development of the bond market and the insurance and pension funds industry on the share of *currency and deposits*. In Panel B however, the development of the private bond market did not affect currency and deposits in household portfolios in the long-run.

As in the case of Spain, the coefficients of the relevant variables for the share of *share and other equities* are opposite, as one would reasonably expect based on the small share of *securities other than shares*.

As for the short-run dynamics, the relevant results are presented in Table 6. According to this Table, in contrast to Spain, changes in household portfolios were not affected by changes in any financial development variables. Asset returns are present in Panel A but not in Panel B.

Insert Table 6 Here

In more detail, in Panel A, the change in *currency and deposits* is negatively related to the error correction term ECT_{t-1} (coefficient/t-statistic: -0.149/-2.51). It is also negatively related to the return of *shares and other equity*, $R_{2,t}$ (coefficient/t-statistic: -0.002/-8.47), and positively to the return of *securities other than shares*, $R_{3,t}$, and the variance of the stock return, $\sigma^2_{2,t}$ (coefficients/t-statistics: 0.001/2.62 and 0.0002/2.55, respectively). As before, the change in the share of *shares and other equity* is affected by the same variables but with opposite sign. In Panel B, only the error correction term ECT_{t-1} is significant (coefficients/t-statistics: -0.224/-2.56 and –0.259/–2.79) for the change in *currency and deposits* and *shares and other equity*.

U.S.. In the U.S., the results are more complicated. As Table 7 documents, $BM_{2,t-1}$, affected negatively both the shares of *currency and deposits* and *shares and other equity*, while the insurance and pension funds indices affected negatively the share of *currency and deposits* and positively the share of *shares and other equity*. The latter probably reflects the growing institutionalisation of household portfolios. As for $PFI_{1,t-1}$, an increase of which indicates a more competitive and financial intermediaries segment of the financial system, it affected positively the share of *shares and other equity* but not the share of *currency and deposits*.

Insert Table 7 Here

Table 8 reports the results for the error correction models. As in Spain, and in contrast to the U.K., financial development variables had also affected the short-term dynamics of household portfolios.

Insert Table 8 Here

In more detail, in Panel A, the error correction term ECT_{t-1} is not significant for either dependent variable. But in Panel B, ECT_{t-1} is significant for both dependent variables (coefficients/t-statistics: -0.117/-2.18 and –0.0335/–4.22, respectively). For the change in the share of *currency and deposits*, the differences in the third component of financial intermediaries indices, $\Delta PFI_{3,t-1}$, and the public bond market index, $\Delta BM_{2,t-1}$, are also significant, with coefficients 0.004 and –0.055 and t-statistics 3.12 and –3.73 respectively. As for the change in the share of *shares and other equity*, the other significant regressors are $R_{2,t-1}$ and $\Delta BM_{2,t-1}$ (coefficients/t-statistics: 0.001/2.48 and 0.077/2.95).

5. Concluding Remarks.

An interesting aspect of the empirical results is the relative insignificance of asset returns, and especially in the case of Spain—the sample country whose financial system underwent the most profound changes. This could be the product of proxying expected returns with their contemporaneous and lagged realized values. But even if this is true,

it is not likely behind the significance of the indices measuring the development of the financial system. For one thing, the neat economic explanation for the signs of their estimated coefficients strongly suggests that their statistical significance reflects the effect of real economic forces and is not an artifact. Certainly, though, more robustness checks are needed to strengthen this conclusion—something we are planning to do.

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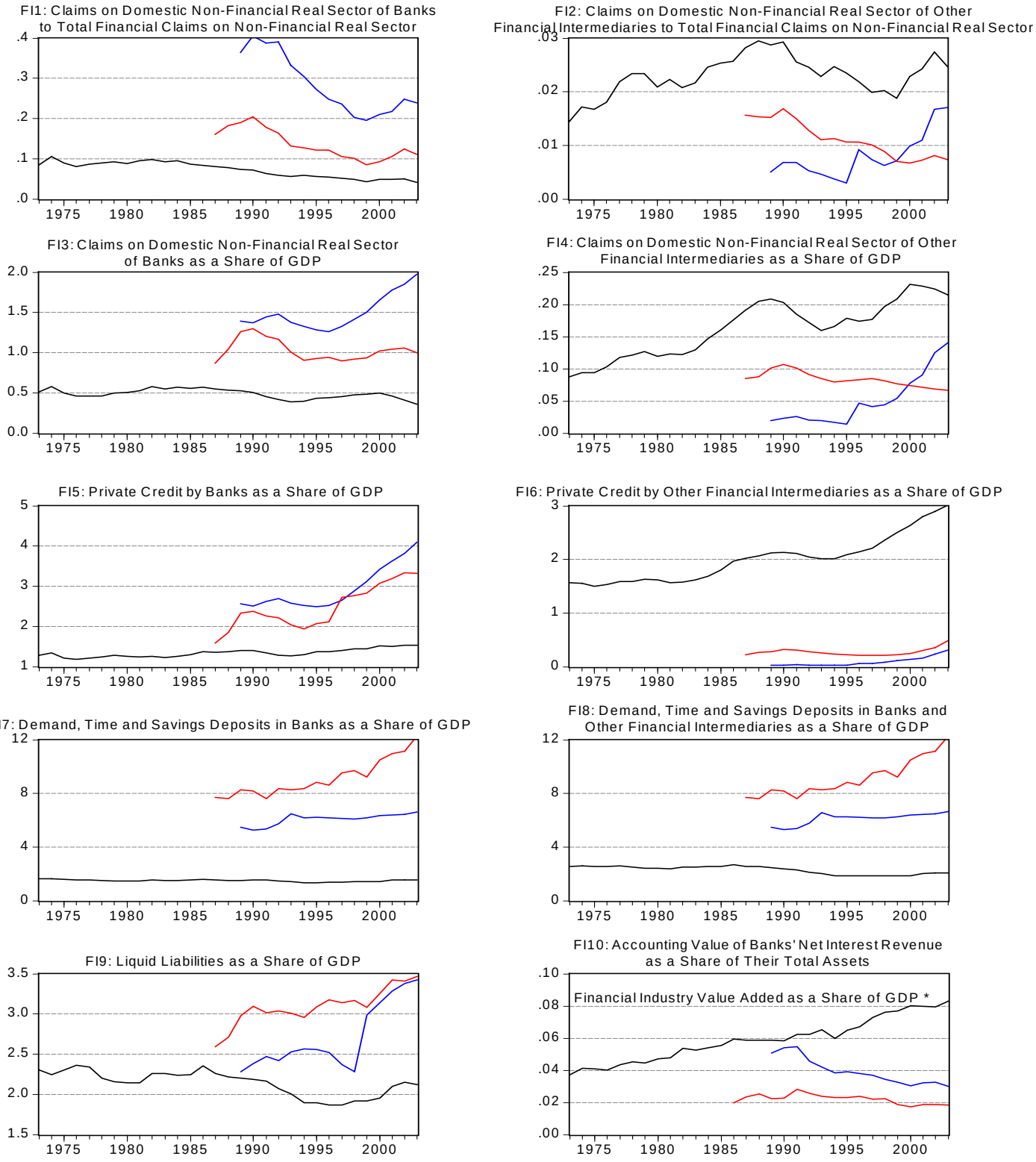
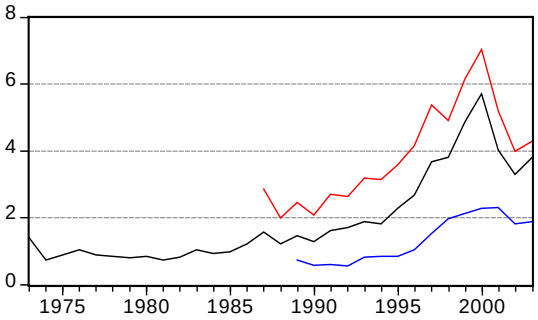
Figure 1.
Financial Development Indices – Spain (blue), U.K. (red), U.S. (black line)

Panel A. Financial Intermediaries

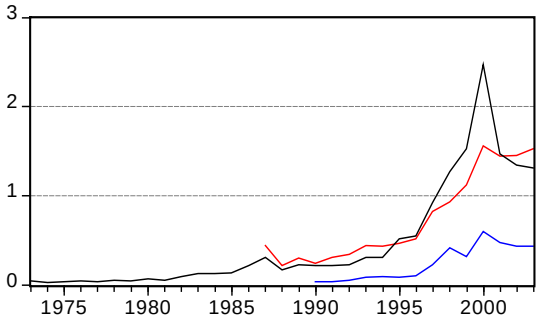


Panel B. Stock Market

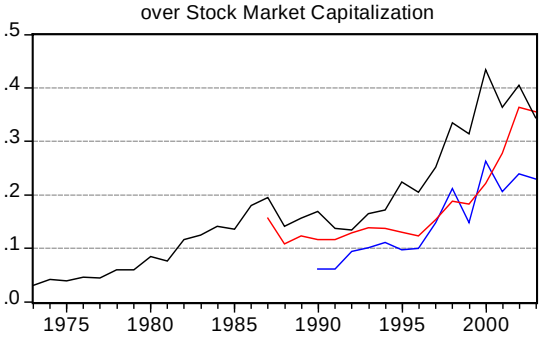
SM1: Value of Listed Shares as a Share of GDP



SM2: Value of Total Shares Traded as a Share of GDP

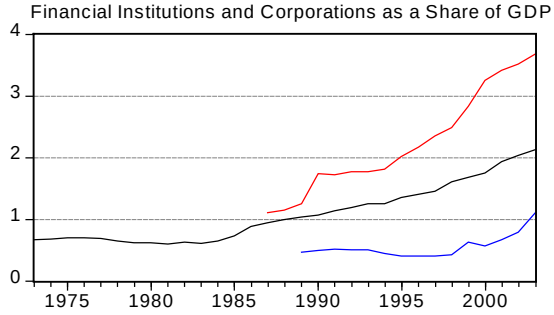


SM3: Ratio of the Value of Total Shares Traded over Stock Market Capitalization

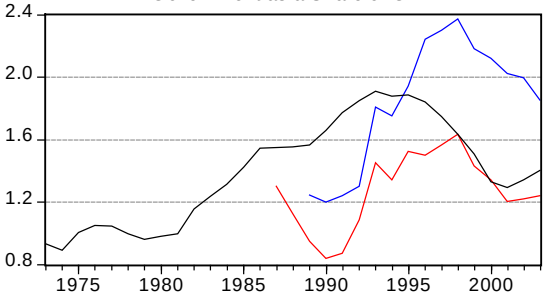


Panel C. Bond Market

BM1: Private Domestic Debt Securities Issued by Financial Institutions and Corporations as a Share of GDP

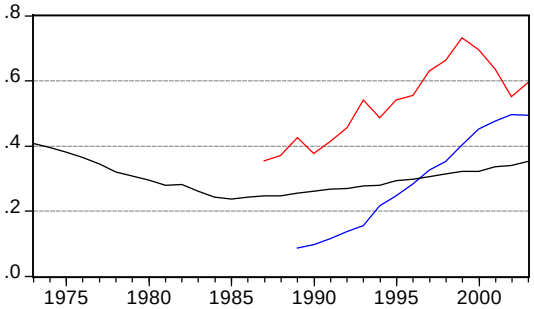


BM2: Public Domestic Debt Securities Issued by Government as a Share of GDP



Panel D. Life Insurance and Pension Funds

IPF1: Life Insurance Premium Volume as a Share of GDP



IPF2: Non-Life Insurance Premium Volume as a Share of GDP

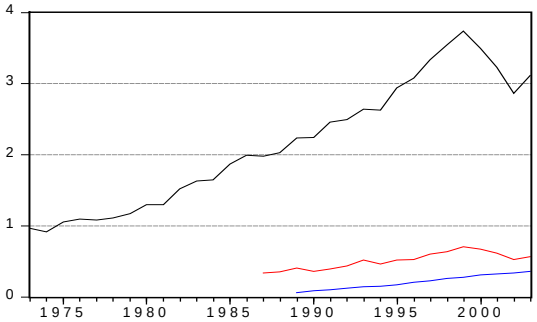


Figure 2.
Assets Shares in Household Portfolios
Currency & Deposits (blue), *Shares & Other Equity* (red), *Securities Other than Shares* (black line)

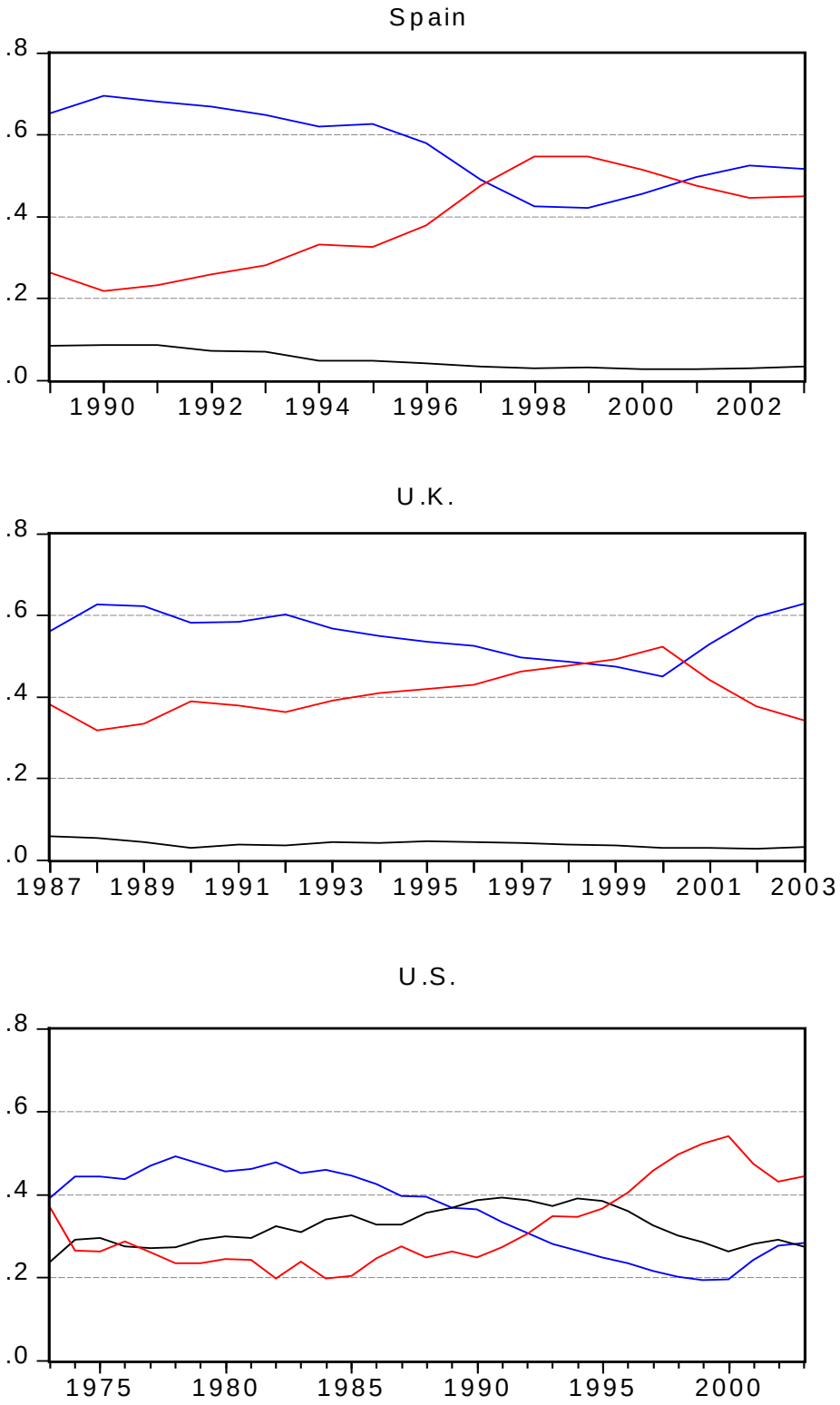


Table 1. Principal Component Analysis

	Spain			U.K.			U.S.		
	Financial Intermediaries Indices								
	PFI_1	PFI_2	PFI_3	PFI_1	PFI_2	PFI_3	PFI_1	PFI_2	PFI_3
Cumulative Variance explained	0.732	0.916	0.963	0.619	0.873	0.933	0.627	0.827	0.917
Order of Integration	I(1)	I(1)	I(0)	I(1)	I(0)	I(0)	I(1)	I(0)	I(0)
	Stock Market Indices								
	PSM_1	PSM_2		PSM_1	PSM_2		PSM_1	PSM_2	
Cumulative Variance explained	0.952	0.996		0.831	0.995		0.950	0.990	
Order of Integration	I(1)	I(0)		I(1)	I(0)		I(1)	I(0)	

Notes:

1. Variable definitions:
   - PFI_i (i=1,2,3): Principal components of the Financial Intermediaries indices
   - PSM_i (i=1,2): Principal components of the Stock Market indices
2. Cumulative Variance explained is the cumulative variance of the indices explained by the principal components shown.
3. No principal component analysis was performed for the Bond Market and the Insurance & Pension Funds industry, because for each of them only two indices are used.
4. Unit root tests were conducted with the Augmented Dickey Fuller (ADF), the Phillips-Perron (PP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) methods. A series is recorded as non stationary (I(1)) when at least two of the three tests provides evidence.

Table 2. Unit Root Tests – Summary

Country / Series	Spain	U.K.	U.S.
S_1	I(1)	I(1)	I(1)
S_2	I(1)	I(1)	I(1)
S_3	I(1)	I(0)	I(1)
R_1	I(0)	I(1)	I(1)
R_2	I(0)	I(0)	I(0)
R_3	I(0)	I(0)	I(0)
σ^2_1	I(0)	I(0)	I(0)
σ^2_2	I(0)	I(0)	I(0)
σ^2_3	I(1)	I(0)	I(0)
σ_{12}	I(0)	I(0)	I(0)
σ_{13}	I(0)	I(0)	I(0)
σ_{23}	I(0)	I(0)	I(0)

Notes:

1. Variable definitions:
   - S_i (i=1,2,3): Share of asset i (currency and deposits, shares and other equity, securities other than shares) in household portfolios
   - R_i (i=1,2,3): Returns of asset i
   - σ^2_i (i=1,2,3): Variance of return of asset i
   - σ_{ij} (i,j=1,2,3 i≠j): Covariance of returns of assets i,j
2. Sources: www.bde.es, www.statistics.gov.uk, Ecowin Pro, Datastream and authors' calculations
3. Unit root tests were conducted with the Augmented Dickey Fuller (ADF), the Phillips-Perron (PP) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) methods. A series is recorded as non stationary, I(1), when at least two of the three tests provides evidence.

Table 3. Cointegrating Vectors for Spain

Panel A: Expected Returns and Variances/Covariances Proxied with Contemporaneous Actual Values

	Constant	$PFI_{1,t-1}$	$PFI_{2,t-1}$	$PSM_{1,t-1}$	$BM_{1,t-1}$	$BM_{2,t-1}$	$IPF_{1,t-1}$	$\sigma^2_{3,t}$	R^2 – Adj.	D.W.
S_1	1.432 (18.31)***	0.065 (7.90)***	-0.013 (-2.88)***	-0.042 (-9.36)***	-0.428 (-6.79)***	-0.231 (-10.42)***	-0.619 (-3.95)***	-0.015 (-3.98)***	0.98	1.86
S_2	-0.402 (-3.31)***	-0.064 (-8.07)***	0.013 (2.72)***	0.034 (7.49)***	0.413 (6.41)***	0.223 (5.28)***	0.675 (4.45)***	0.009 (2.34)***	0.99	1.95

Panel B: Expected Returns and Variances/Covariances Proxied with Lagged Actual Values

	C	$PFI_{1,t-1}$	$PFI_{2,t-1}$	$PSM_{1,t-1}$	$BM_{1,t-1}$	$BM_{2,t-1}$	$IPF_{1,t-1}$	$\sigma^2_{3,t-1}$	R^2 – Adj.	D.W.
S_1	1.384 (21.02)***	0.051 (6.43)***	-0.012 (-2.69)***	-0.039 (-9.67)***	-0.385 (-6.43)***	-0.262 (-12.50)***	-0.330 (-2.12)**	-0.017 (-4.52)***	0.98	2.19
S_2	-0.279 (-2.38)***	-0.053 (-7.15)***	0.009 (2.08)***	0.041 (8.79)***	0.337 (5.23)***	0.225 (6.42)***	0.374 (2.28)***	0.017 (4.31)***	0.99	2.17

Notes:

1. Sample period: 1989:4 -2003:4.
2. Estimation technique: Dynamic OLS with 1 leads and lags of the I(1) variables (decided with Schwarz criterion and taking into consideration the sample size).
3. Variable definitions:
   - PFI_1: First principal component of the financial intermediaries indices
   - PFI_2: Second principal component of the financial intermediaries indices
   - PSM_1: First principal component of stock market indices
   - BM_1: Private domestic debt securities issued by financial intermediaries and coprorations as a share of GDP
   - BM_2: Public domestic debt securities issued by government as a share of GDP
   - IPF_1: Life insurance premium volume as a share of GDP
   - σ^2_3: Variance of the return of *securities other than shares.*
4. Only the statistically significant non-stationary variables are reported. t-statistics are reported in parentheses. One (*), (**) and three (***) asterisks denote significance at respectively the 10%, 5% and 1% level.
5. Sources: www.bde.es, DATASTREAM and authors' calculations.

Table 4. Error Correction Models for Spain

Panel A: Expected Returns and Variances/Covariances Proxied with Contemporaneous Actual Values

	Constant	$R_{2,t}$	$\sigma^2_{1,t}$	$\Delta\sigma^2_{3,t}$	$\sigma_{13,t}$	$\Delta PFI_{1,t-1}$	$\Delta BM_{2,t-1}$	$\Delta IPF_{1,t-1}$	ECT_{t-1}	R^2 – Adj.	D.W.
ΔS_1	-0.0002 (00.18)	-0.001 (-9.05)***		-0.007 (-3.17)***		0.009 (3.09)***	-0.067 (-3.52)***		-0.204 (-2.78)***	0.76	1.93
ΔS_2	0.001 (0.72)	0.001 (7.47)***		0.005 (1.92)**		-0.011 (-3.13)***	0.094 (4.16)***		-0.164 (-1.91)**	0.70	1.63

Panel B: Expected Returns and Variances/Covariances Proxied with Lagged Actual Values

	Constant	$R_{2,t-1}$	$\sigma^2_{1,t-1}$	$\Delta\sigma^2_{3,t-1}$	$\sigma_{13,t-1}$	$\Delta PFI_{1,t-1}$	$\Delta BM_{2,t-1}$	$\Delta IPF_{1,t-1}$	ECT_{t-1}	R^2 – Adj.	D.W.
ΔS_1	0.003 (0.99)		-0.008 (-3.14)***		0.020 (2.28)***	0.011 (2.10)**	-0.061 (-2.53)**	-0.536 (-2.07)**	-0.502 (-4.57)***	0.36	1.70
ΔS_2	-0.004 (-1.00)		0.010 (2.47)***		-0.021 (-2.05)**	-0.012 (-2.37)***	0.080 (2.29)***	0.585 (2.13)***	-0.492 (-4.44)***	0.40	1.73

Notes:

1. Sample period: 1989:4 -2003:4.
2. Variable definitions:
   - R_2: Return of *shares and other equity*
   - σ^2_1: Variance of the return of *currency and deposits*
   - $\Delta\sigma^2_3$: Change in the variance of the return of *securities other than shares*
   - σ_{13}: Covariance between the returns of *currency and deposits* and *securities other than shares*
   - ΔPFI_1: Change in the first principal component of the financial intermediaries indices
   - ΔBM_2: Change in public domestic debt securities issued by government as a share of GDP
   - ΔIPF_1: Change in life insurance premium volume as a share of GDP.
   - ECT: Error Correction Term
3. t-statistics are reported in parentheses. One (*), (**) and three (***) asterisks denote significance at respectively the 10%, 5% and 1% level.
4. Sources: www.bde.es, DATASTREAM and authors' calculations.

Table 5. Cointegrating Vectors for the U.K.

Panel A: Expected Returns and Variances/Covariances Proxied with Contemporaneous Actual Values

	Constant	$PFI_{1,t-1}$	$BM_{1,t-1}$	$IPF_{1,t-1}$	R^2 – Adj.	D.W.
S_1	1.068 (25.40)***	-0.037 (-8.281)***	-0.065 (-4.15)***	-0.067 (-11.69)***	0.91	1.30
S_2	-0.145 (-3.41)***	0.039 (9.18)***	0.0721 (4.85)***	0.071 (11.82)***	0.91	1.39

Panel B: Expected Returns and Variances/Covariances Proxied with Lagged Actual Values

	Constant	$PFI_{1,t-1}$	$BM_{1,t-1}$	$IPF_{1,t-1}$	R^2 – Adj.	D.W.
S_1	0.827 (16.16)***	-0.010 (-2.63)***		-0.051 (-5.36)***	0.87	1.19
S_2	0.149 (2.27)***	0.010 (2.12)**		0.049 (4.09)***	0.91	1.37

Notes:

1. Sample period: 1987:1 -2003:4.
2. Estimation technique: Dynamic OLS with one leads and lags of the I(1) variables, with Newey-West correction
3. Variable definitions: See Table 3 and the main text.
4. Only the statistically significant non-stationary variables are reported. t-statistics are reported in parentheses. One (*), (**) and three (***) asterisks denote significance at respectively the 10%, 5% and 1% level.
5. Sources: www.statistiscs.gov.uk, DATASTREAM and authors' calculations.

Table 6: Error Correction Models for the U.K.

Panel A: Expected Returns and Variances/Covariances Proxied with Contemporaneous Actual Values

	Constant	$R_{2,t}$	$R_{3,t}$	$\sigma^2_{2,t}$	ECT_{t-1}	R^2 – Adj.	D.W.
ΔS_1	-0.003 (-0.99)	-0.002 (-8.47)***	0.001 (2.62)***	0.0002 (2.55)***	-0.149 (-2.51)***	0.64	2.16
ΔS_2	0.004 (1.38)	0.002 (8.55)***	-0.002 (-3.56)***	-0.0002 (-2.46)**	-0.147 (-2.40)***	0.65	2.03

Panel B: Expected Returns and Variances/Covariances Proxied with Lagged Actual Values

	Constant	$R_{2,t-1}$	$R_{3,t-1}$	$\sigma^2_{2,t-1}$	ECT_{t-1}	R^2 – Adj.	D.W.
ΔS_1	0.001 (0.37)				-0.224 (-2.56)***	0.08	1.88
ΔS_2	-0.0007 (-0.23)				-0.259 (-2.79)***	0.09	1.83

Notes:

1. Sample period: 1987:1-2003:4.
2. Variable definitions:
   - R_2: Return of *shares and other equity*
   - R_3: Return of *securities other than shares*
   - σ^2_2: Variance of the return of *shares and other equity*
   - ECT: Error Correction Term.
3. t-statistics are reported in parentheses. One (*), (**) and three (***) asterisks denote significance at respectively the 10%, 5% and 1% level.
4. Sources: www.statistiscs.gov.uk, DATASTREAM and authors' calculations.

Table 7: Cointegrating Vectors for the U.S.

Panel A: Expected Returns and Variances/Covariances Proxied with Contemporaneous Actual Values

	Constant	$PFI_{1,t-1}$	$PSM_{1,t-1}$	$BM_{1,t-1}$	$BM_{2,t-1}$	$IPF_{1,t-1}$	$IPF_{2,t-1}$	$R_{1,t}$	R^2 – Adj.	D.W.
S_1	1.008 (29.64)***				-0.120 (-14.32)***	-757.439 (-11.77)***	-97.863 (-31.40)***	-0.004 (-4.43)***	0.99	0.85
S_2	-0.178 (-7.01)***	0.014 (3.44)***		0.054 (2.31)***	-0.057 (-7.02)***	719.064 (8.68)***	131.353 (20.66)***		0.99	0.94

Panel B: Expected Returns and Variances/Covariances Proxied with Lagged Actual Values

	Constant	$PFI_{1,t-1}$	$PSM_{1,t-1}$	$BM_{1,t-1}$	$BM_{2,t-1}$	$IPF_{1,t-1}$	$IPF_{2,t-1}$	$R_{1,t-1}$	R^2 – Adj.	D.W.
S_1	1.044 (31.79)***		-0.010 (-4.15)***		-0.150 (-11.99)***	-876.728 (-20.22)***	-74.627 (-12.62)***	-0.005 (-5.00)***	0.99	0.73
S_2	-0.107 (-2.43)***	0.012 (3.11)***		0.067 (2.76)***	-0.066 (-5.96)***	639.033 (8.49)***	115.759 (13.17)***	-0.003 (-2.61)***	0.99	1.45

Notes:

1. Sample period: 1973:1-2003:4.
2. Estimation technique: Dynamic OLS with 3 leads and lags of the I(1) variables, with Newey-West correction
3. Variable definitions:
   - PFI_1: First principal component of the financial intermediaries indices
   - PSM_1: First principal component of stock market indices
   - BM_1: Private domestic debt securities issued by financial intermediaries and coprorations as a share of GDP
   - BM_2: Public domestic debt securities issued by government as a share of GDP
   - IPF_1: Life insurance premium volume as a share of GDP
   - IPF_2: Non-life insurance premium volume as a share of GDP
   - R_1: Return of *currency and deposits*.
4. Only the statistically significant non-stationary variables are reported. t-statistics are reported in parentheses. One (*), (**) and three (***) asterisks denote significance at respectively the 10%, 5% and 1% level.
5. Sources: Ecowin Pro, DATASTREAM and authors' calculations.

Table 8: Error Correction Models for the U.S.

Panel A: Expected Returns and Variances/Covariances Proxied with Contemporaneous Actual Values

	C	$\Delta R_{1,t}$	$R_{2,t}$	$\sigma^2_{1,t}$	$\sigma^2_{2,t}$	$\sigma_{23,t}$	$PFI_{3,t-1}$	$\Delta BM_{1,t-1}$	$\Delta BM_{2,t-1}$	ECT_{t-1}	R^2 – Adj.	D.W.
ΔS_1	0.004 (6.45)***	-0.001 (-2.51)***	-0.001 (-16.58)***	0.001 (2.47)***			0.002 (2.94)***				0.72	1.94
ΔS_2	-0.007 (-4.52)***		0.002 (19.73)***		-0.0001 (-2.82)***	-0.001 (-3.62)***		0.026 (2.19)**			0.83	1.56

Panel B: Expected Returns and Variances/Covariances Proxied with Lagged Actual Values

	C	$\Delta R_{1,t-1}$	$R_{2,t-1}$	$\sigma^2_{1,t-1}$	$\sigma^2_{2,t-1}$	$\sigma_{23,t-1}$	$PFI_{3,t-1}$	$\Delta BM_{1,t-1}$	$\Delta BM_{2,t-1}$	ECT_{t-1}	R^2 – Adj.	D.W.
ΔS_1	-0.001 (-0.58)						0.004 (3.12)***		-0.055 (-3.73)***	-0.117 (-2.18)**	0.17	1.59
ΔS_2	-0.003 (-1.34)		0.001 (2.48)***						0.077 (2.95)***	-0.335 (-4.22)***	0.16	1.76

Notes:

1. Sample period: 1973:1-2003:4.
2. Variable definitions:
   - ΔR_1: Change in the return of *currency and deposits*
   - R_2: Return of *shares and other equity*
   - σ^2_i (i=1,2): Variance of the return of *currency and deposits* (i=1) and *shares and other equity* (i=2)
   - σ_{23}: Covariance between the returns of *shares and other equity* and *securities other than shares*
   - PFI_3: Third principal component of the financial intermediaries indices
   - ΔBM_1: Change in private domestic debt securities issued by financial intermediaries and coprorations as a share of GDP
   - ΔBM_2: Change in public domestic debt securities issued by government as a share of GDP
   - ECT: Error Correction Term
3. The Newey-West correction was used for ΔS_2 in Panel A and ΔS_1 in Panel B
4. t-statistics are reported in parentheses. One (*), (**) and three (***) asterisks denote significance at respectively the 10%, 5% and 1% level.
5. Sources: Ecowin Pro, Datastream and authors' calculations.

APPENDIX

Table A. Financial Development Indices – Detailed Presentation

Index	Spain	U.K.	U.S.
FI_1: Claims on domestic non-financial real sector of banks to total financial claims on non-financial real sector.	MFIs loans to non-financial corporations divided by sum of loans, securities other than shares and shares and other equity (liabilities of non-financial corporations).	Loans by U.K. MFIs (excluding loans secured on dwells and finance leasing) to non-financial corporations divided by sum of loans, securities other than shares and shares and other equity (liabilities of non-financial corporations).	Commercial bank loans not elsewhere classified (henceforth n.e.c.) to non-financial business and other loans and advances divided by sum of bank loans, mortgages, credit market instruments, commercial paper, municipal securities, corporate bonds and equity of non-financial business.
FI_2: Claims on domestic non-financial sector of other financial intermediaries to total financial claims on non-financial real sector.	Non-MFIs loans to non-financial corporations divided by sum of loans, securities other than shares and shares and other equity (liabilities of non-financial corporations).	Finance leasing loans to non-financial corporations divided by sum of loans, securities other than shares and shares and other equity (liabilities of non-financial corporations).	Other loans and advances from savings institutions and finance companies to business, plus securitized loans held by ABS issuers (liabilities of non-financial corporations) divided by sum of bank loans, mortgages, credit market instruments, commercial paper, municipal securities, corporate bonds and equity of non-financial business.
FI_3: Claims on domestic non-financial real sector of banks as a share of GDP.	MFIs loans to non-financial corporations divided by GDP.	Loans by U.K. MFIs (excluding loans secured on dwells and finance leasing) to non-financial corporations divided by GDP.	Commercial bank loans to domestic non-financial real sector divided by GDP.
FI_4: Claims on domestic non-financial real sector of other financial intermediaries as a share of GDP.	Non-MFIs loans to non-financial corporations divided by GDP.	Finance leasing loans to non-financial corporations divided by GDP.	Other loans and advances from savings institutions and finance companies to business, plus securitized loans held by ABS issuers (liabilities of non-financial corporations) divided by GDP.

FI_5: Private credit by banks as a share of GDP.	MFIs loans to non-financial corporations and to households and NPISHs divided by GDP.	Sum of loans by U.K. MFIs (excluding loans secured on dwells and finance leasing) to non-financial corporations and to households and NPISHs, plus loans secured on dwellings by banks to households and NPISHs divided by GDP.	Sum of bank loans n.e.c., open market paper, mortgages, consumer credit and security credit to non financial business and to households and NPISHs by commercial banks divided by GDP.
FI_6: Private credit by other financial intermediaries as a share of GDP.	Sum of non-MFI loans to non-financial corporations and to households and NPISHs divided by GDP.	Finance leasing loans to non-financial corporations plus loans secured on dwellings except loans by banks and building societies to households and NPISHs divided by GDP.	Credit to non-financial real sector and to households and NPISHs from: savings institutions, finance companies, mortgages companies, credit unions, personal trusts and estates, ABS issuers, brokers and dealers, insurance companies and pension funds divided by GDP.
FI_7: Demand, time and savings deposits in banks as a share of GDP.	Currency and deposits held by MFIs divided by GDP.	Deposits with U.K. MFIs divided by GDP.	Sum of checkable, large time, small time and savings deposits in commercial banks divided by GDP.
FI_8: Demand, time and savings deposits in banks and other financial intermediaries as a share of GDP.	Currency and deposits held by FIs divided by GDP.	This variable is not calculated separately since only MFIs in the U.K. are accepting deposits.	Sum of checkable, large time, small time and savings deposits in commercial banks, savings institutions and credit unions divided by GDP.
FI_9: Liquid liabilities as a share of GDP.	Sum of currency in circulation and deposits (demand and other than demand) divided by GDP.	Money supply M2, divided by GDP.	Money supply M2, divided by GDP.
FI_{10}: Accounting value of banks' net interest revenue as a share of their assets.	Average net interest margin over all banks, which are traded in Spain's stock markets for the sample period. Net interest margin is calculated for each bank, on a yearly basis, as the ratio of net interest income to its total assets. Then this series is converted to quarterly basis considering the value for each year's	Average net interest margin over all constituents of FTSE 350 Banks index. Same method used as in the case of Spain.	Instead of net interest margin for U.S. banks, for the construction of which data are available only from 1980 in Datastream's Company Accounts, we use the index calculated as: gross product of financial corporate business, current prices, seasonally adjusted, divided by GDP, seasonally adjusted.

	quarter being the same as the one at the end of the respective year.		
SM_1: Value of listed shares as a share of GDP.	Total (Datastream calculated) market value divided by GDP.		
SM_2: Value of total shares traded as a share of GDP.	Total (Datastream calculated) market turnover by value divided by GDP.		
SM_3: Ratio of the value of total shares traded over stock market capitalization.	Total (Datastream calculated) market turnover by value divided by total (Datastream calculated) market value.		
BM_1: Private domestic debt securities issued by financial intermediaries and corporations as a share of GDP.	Securities other than shares, liabilities of financial institutions and non-financial corporations divided by GDP.	Securities other than shares, liabilities of financial and non-financial corporations divided by GDP.	Corporate and foreign bonds outstanding amounts, liabilities of non-financial corporate business and financial sectors divided by GDP.
BM_2: Public domestic debt securities issued by government as a share of GDP.	Securities other than shares, liabilities of General Government divided by GDP.	Securities other than shares, liabilities of General Government divided by GDP.	Treasury securities, Federal Government Debt, outstanding amounts divided by GDP.
IPF_1: Life insurance premium volume as a share of GDP.	As a proxy for life insurance premium volume we use life insurance reserves divided by GDP.		
IPF_2: Non-life insurance premium volume as a share of GDP.	Pension fund reserves divided by GDP.	Life assurance and pension fund reserves divided by GDP.	Pension fund reserves divided by GDP.

Notes:

1. Sources: www.bde.es (Spain), www.statistics.gov.uk (U.K.), Ecowin Pro (U.S.), Datastream and authors' calculations.
2. Monetary Financial Institutions (MFIs) consists of all financial corporations and quasi corporations, except those classified in the central bank sub-sector, which are principally engaged in financial intermediation and whose business is to receive deposits and/or close substitutes for deposits from institutional units other than monetary financial institutions, and, for their own account, to grant loans and/or to make investments in securities (ESA 1995 Manual, p.25).
3. Spains' MFIs consist of banks, savings banks, credit cooperatives, Official Credit Institute, specialised credit institutions and money market funds.
4. U.K.s' MFIs consist of banks and building societies.
5. U.S. commercial banks include: U.S. chartered commercial banks, foreign banking offices in the U.S., bank holding companies and banks in U.S. affiliated areas.
6. ABS: Asset Backed Securities.
7. NPISH: Non-Profit Institutions Serving Households.
8. Instruments of U.S. other financial intermediaries' private credit are: mortgages, consumer credit, security credit, other loans and advances and trade credit.

9. Spanish banks which are traded in Spain's stock markets for the sample period (listed alphabetically): Banco de Andalucia, Banco de Castilla, Banco de Credito Balear, Banco de Galicia, Banco de Sabadell, Banco de Valencia, Banco de Vasconia, Banco Espanol de Credito, Banco Guipuzcoano, Banco Pastor, Banco Popular Espanol, Banco Santander Central, Banco Zaragozano, Bankinter, BBV Argentaria.
10. Constituents of FTSE 350 Banks index (listed alphabetically): Abbey National, Alliance & Leicester, Barclays, Bradford and Bingley, Egg, HBOS, HSBC Holding, Lloyds TSB GP., Northern Rock, Royal Bank of Scotland, Standard Chartered.

Table B. Principal Components Analysis

	Spain			U.K.			U.S.A.		
Financial Intermediaries Indices									
	PFI_1	PFI_2	PFI_3	PFI_1	PFI_2	PFI_3	PFI_1	PFI_2	PFI_3
Eigenvalue	7.317	1.846	0.466	5.576	2.278	0.540	6.267	2.005	0.895
Variance Proportion	0.732	0.184	0.046	0.619	0.253	0.060	0.627	0.200	0.090
Cumulative Proportion	0.732	0.916	0.963	0.619	0.873	0.933	0.627	0.827	0.917
	Eigenvectors			Eigenvectors			Eigenvectors		
FI_1	-0.262	0.397	0.630	0.363	-0.309	0.200	0.377	-0.041	-0.223
FI_2	0.327	0.264	-0.058	0.409	-0.111	0.131	-0.148	-0.381	-0.773
FI_3	0.306	0.380	0.202	0.189	-0.559	-0.271	0.256	-0.311	-0.039
FI_4	0.355	0.172	-0.110	0.370	-0.184	-0.473	-0.343	-0.325	-0.173
FI_5	0.348	0.226	0.001	-0.351	-0.317	-0.231	-0.312	-0.346	0.283
FI_6	0.355	0.168	-0.052	-0.086	-0.564	0.617	-0.364	-0.252	0.179
FI_7	0.277	-0.422	0.478	-0.395	-0.181	0.122	0.217	-0.486	0.431
FI_8	0.274	-0.433	0.466	-	-	-	0.358	-0.290	-0.089
FI_9	0.340	0.140	0.036	-0.320	-0.307	-0.439	0.322	-0.358	0.105
FI_{10}	-0.299	0.366	0.312	0.373	0.005	-0.056	-0.379	-0.138	0.059
Stock Market Indices									
	PSM_1	PSM_2		PSM_1	PSM_2		PSM_1	PSM_2	
Eigenvalue	2.858	0.130		2.492	0.494		2.850	0.120	
Variance Proportion	0.952	0.043		0.831	0.165		0.950	0.040	
Cumulative Proportion	0.952	0.996		0.831	0.995		0.950	0.990	
	Eigenvectors			Eigenvectors			Eigenvectors		
SM_1	0.573	-0.672		0.546	-0.716		0.577	-0.603	
SM_2	0.589	-0.060		0.631	0.011		0.586	-0.166	
SM_3	0.570	0.738		0.551	0.698		0.570	0.780	

Notes:

1. Variables definitions and sample periods: see main text.
2. Sources: Datastream, www.bde.es (Spain), www.statistiscs.gov.uk (U.K.), Ecowin Pro (U.S.) and authors' calculations.
3. Since only two indices are used for the Bond Market and the Insurance and Pension Funds industry, no principal component was performed.