FINANCING PATTERNS: MEASUREMENT CONCEPTS AND EMPIRICAL RESULTS

by

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Abstract

A widely recognized paper by Colin Mayer (1988) has led to a profound revision of academic thinking about financing patterns of corporations in different countries. Using flow-of-funds data instead of balance sheet data, Mayer and others who followed his lead found that internal financing is the dominant mode of financing in all countries, that therefore financial patterns do not differ very much between countries and that those differences which still seem to exist are not at all consistent with the common conviction that financial systems can be classified as being either bank-based or capital market-based. This leads to a puzzle insofar as it calls into question the empirical foundation of the widely held belief that there is a correspondence between the financing patterns of corporations on the one side, and the structure of the financial sector and the prevailing corporate governance system in a given country on the other side.

The present paper addresses this puzzle on a methodological and an empirical basis. It starts by demonstrating that the surprising empirical results found by Mayer et al. are due to an unwarranted hidden assumption underlying their methodology. It then derives an alternative method of measuring financing patterns, which also uses flow-of-funds data, but avoids the questionable assumption. This measurement concept is then applied to patterns of corporate financing in Germany, Japan and the United States. The empirical results are very much in line with the commonly held belief prior to Mayer's influential contribution and indicate that the financial systems of the three countries do indeed differ from one another in a substantial way
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1. Introduction

How is investment financed? Or, to put it another way, from where do corporations, and firms in general, obtain the funds they use for making real investments? If there are certain common features of firms in different countries with respect to this question, we speak of financing patterns. If they exist, financing patterns are an essential element of the financial system of a country. There are several reasons why it would be interesting to know the prevailing financing patterns. A non-exhaustive list includes the following four reasons:

- Financial managers may want to know how others fund investments because they might have good reasons for choosing their specific financing strategies. As providers of funds might be more likely to accept as reasonable what they are used to, sticking to the conventional could lower the cost of capital to a given corporation and assure its liquidity (Stützel, 1964).
- Policymakers in a given country may want to understand how their national financial system functions if they wish to improve its functioning and thereby serve their national business community (Mayer, 1990; OECD, 1995).
- International policymakers need to understand how financial systems function and how firms are typically financed if they wish to assist in the introduction of a market-based financial infrastructure, as has been, and still is, a main task with respect to the transition economies of Eastern Europe and the NIS as well as many developing countries (Mayer, 1989).
- Financial economists want to be able to put microeconomic theories of finance to an empirical test using aggregate data (Corbett/Jenkinson, 1997, p. 70).

The capital structures of corporations in different countries have been a major research topic for many years.[2]There are substantial differences between the results obtained by the various studies which use balance sheet data, and indeed the results as a whole seem to be quite unreliable. This is due to problems of methodology.[3] The work of Colin Mayer has led to a profound revision of academic thinking in this field, both in terms of methodology and in terms of results. Mayer, and

[2] Rutherford (1988) surveys older studies. More recent studies include Berglöf (1991), Aggarwal (1994) and Rajan/ Zingales (1995).

[3] Their main shortcomings are due to the distorting influence of different national accounting rules and conventions – a problem which is addressed with considerable acumen in Rajan/Zingales (1995) – and sampling problems, in particular a selection bias which is due to the fact that several studies use a data base including only large firms. In several countries the capital structure of large firms differs systematically from those of smaller firms. For an extended discussion, see e.g. Schmidt/Tyrell (1997).

others who followed his line of research,[4] use flow-of-funds data to analyze national financing patterns. Their general finding is that internal financing is by far the dominant mode of financing in all countries and that, not least for this reason, financing patterns do not differ very much between countries.[5] Their most interesting finding, however, is that those differences which still seem to exist are not at all consistent with the generally held belief that financial systems can be usefully classified as either bank- or capital market-dominated. This result is important not only because it challenges established views, but also because it leads to a research puzzle (Schmidt/Tyrell, 1997): There does not seem to be a correspondence between the financing pattern of corporations in a given country on the one side and the prevailing corporate governance system in that country on the other side – a correspondence which the theory of incomplete contracts would lead one to expect. In fact, one would expect the financing patterns to "fit" the governance systems in the sense that those to whom the governance system gives most power to influence the policies of the corporations would also be the main providers of funds. One possible explanation for this apparent inconsistency is that the empirical findings of Mayer *et al.* might not be correct or at least that they might not actually support the interpretations of them which are often given. The present paper argues that this is indeed the case.

The paper addresses the puzzle on methodological and empirical grounds. It is structured as follows: In the next section, empirical results of flow-of-funds studies in the spirit of Mayer (1988) are presented. It is then demonstrated that the methodology used to derive these results is based on a hidden assumption as to which sources of funds finance which uses of funds. This assumption is not warranted; nevertheless, it is fully responsible for the surprising results. The paper then develops an alternative method of measuring financial patterns which is as close as possible in its spirit to the Mayer at al. approach, but avoids the critical assumption. The new measurement concept is presented in section 3 and applied to corporate financing patterns in Germany, the United States and Japan in section 4. The *empirical* results of the present paper are in line with expectations grounded in recent theory as well as with commonly held beliefs prior to Mayer's influential contribution. Section 5 interprets these empirical results and briefly shows how they fit

[4] See Mayer (1988, 1990), Mayer/Alexander (1990), Bertero (1994), Corbett/Jenkinson (1996,1997), Prowse (1995) and Edwards/Fischer (1994).
[5] This can be perceived as general evidence for the Pecking Order Theory proposed by Myers/Majluf (1984).

into the context of differences between financial systems in general and corporate governance systems in particular in order to demonstrate that the puzzle mentioned above is resolved.

2. The flow-of-funds approach

a) The methodology and the main results

Among the studies of financing patterns in various countries that have followed in the tradition of Mayer, the most extensive to date are those by Jenny Corbett and Tim Jenkinson (1996, 1997). They ask the seemingly simple empirical question: "*How is investment financed [in Germany, Japan, the United Kingdom and the United States]?*" To answer this question, Corbett/Jenkinson use flow-of funds data for several reasons. Flow-of-funds data are more reliable than balance sheet data because they do not depend on accounting rules and conventions; they are more comprehensive because they cover all firms in an economy; and they are collected in ways which are largely comparable between countries. By definition, flow-of-funds data capture only flows of funds from one economic sector to another; thus, intra-sectoral flows are almost entirely consolidated and thus eliminated.

In their study, Corbett/Jenkinson employ net flows, and this in a double sense. The first step of netting consists in eliminating firms' financial investments. For instance, net flows between banks and non-financial companies are the difference between the volume of financing of firms by banks, e.g. in the form of loans, and firms' financial investments with banks, e.g. in the form of bank deposits. One could call this "balance sheet netting". The second step of netting refers to the payment flows in a given year: Those net flows which Corbett/Jenkinson report are the difference between payments received through, for instance, bank financing in a given period and repayments made during that period. Similarly, equity financing is calculated as the difference between the proceeds from issuing new shares and the expenses for redeeming outstanding shares including the acquisition of shares in other companies from the public. One could call this "repayment netting". The flows – netted twice – are then expressed as a fraction of total physical investment. Corbett/Jenkinson define the ratio of the net financing i_j from any one source j of financing – namely internal funds, banks, bonds, equity, trade credit, capital transfers, and others – to aggregate investment as the contribution of source *j* to the financing of total investment in a five-

year period. The formula they use is $\Sigma_t\ i_{tj}\ p_t/\Sigma_t\ I_t\ q_t.$, where I_t represents the total amount of gross investment in plant, machinery and other fixed assets and (net) additions to working capital in year *t*. The summation over *t* serves the purpose of aggregating over a certain number of periods in order to eliminate business cycle effects and other peculiarities of any given year. p_t and q_t are appropriate price indices. Table 1 shows the Corbett/Jenkinson results.

Table 1: Net sources of finance in five countries

Net Source of Finance	*Germany*	*Japan*	*Great Britain*	*United States*
		In percent of physical investment (1970-1994)		
Internal	78.9	69.9	93.3	96.1
Bank finance	11.9	26.7	14.6	11.1
Bonds	-1.0	4.0	4.2	15.4
New Equity	0.1	3.5	-4.6	-7.6
Trade Credit	-1.2	-5.0	-0.9	-2.4
Capital Transfers	8.7	-	1.7	-
Other	1.4	1.0	0.0	-4.4
Statistical adjustment	1.2	0.0	-8.4	-8.3

Source: Corbett/Jenkinson (1997)

These results do not differ in any important respect from those derived and published almost a decade earlier by Mayer, which have by now been accepted by many authors as at least a very important insight into the real financing patterns of firms.[6]

As Mayer did at that time, Corbett/Jenkinson then discuss the overwhelming importance of internal finance in all countries covered in their study, and also the finding that, compared with Germany, whose financial system is allegedly dominated by banks, bank financing in fact appears to be more important in the UK and almost equally important in the United States, even though the

[6] The phenomenon discussed in depth by Mayer et al. seems to be common knowledge. It is described in almost every recent corporate finance textbook, without, however, quoting Mayer. For instance, Brealey/Myers present extensive tables with net sources of financing on pp. 364-367 of the 5th edition of their well-known textbook. With reference to the U.S., they write on p. 367: "The most striking aspect [of these tables] is the dominance of internally generated cash, defined as cash flow from operations less cash dividends paid to stockholders. Internally generated cash normally covers a majority of firm's capital requirements." Page 324 of their 4th edition contains the additional comment: "Notice that the reliance on internally generated cash is the same the whole world over." Similar textbook presentations of net sources of financing include Arnold (1998), p. 351, and Pike/Neale (1996), p. 465 (both with special reference to the United Kingdom), Buckley/Ross/Westerfield/Jaffe (1998) p. 354, Damodaran.(1997), p. 404 (with special reference to the G6-countries). Explicit references to Mayer include Allen (1993), Allen/Gale (1999), Conti (1992), Dewatripont/Tirole (1994), Hellwig (1991, 1997), and Thakor (1996).

UK and the U.S. are commonly considered to have capital-market dominated financial systems; and they discuss the seemingly paradoxical result that equity financing through share issues is negligible everywhere and even negative in both the UK and the U.S. They summarize their findings by concluding that:

> *"The celebrated distinction between the market based financial pattern of the United Kingdom and the United States and the bank-based pattern of Germany is inaccurate."*(p. 85)

Given hat the "celebrated distinction" has a lot of theoretical as well as empirical arguments to support it, this is indeed a puzzle which needs to be solved. If one wished to reconcile the findings of Mayer, Corbett/Jenkinson (henceforth MCJ) and of researchers working along the same lines with what others have postulated or would still feel inclined to believe, there are essentially three alternative routes by which one could attempt to do so. (1) One could take the evidence produced by MCJ at face value and discard a great deal of theory, or at least theoretically inspired "established wisdom"; we would consider this consequence to be premature. (2) One could question the use of flow-of-funds data for the investigation of financial patterns; we reject this alternative and instead fully support the MCJ position that this is the appropriate data base to use in spite of certain shortcomings which MCJ see very clearly too, and that it is also appropriate to measure financing patterns on the basis of flows. (3) One could investigate whether the measurement method used by MCJ is appropriate; and this is what we wish to do now. So the natural question arises: which factors determine the MCJ results?

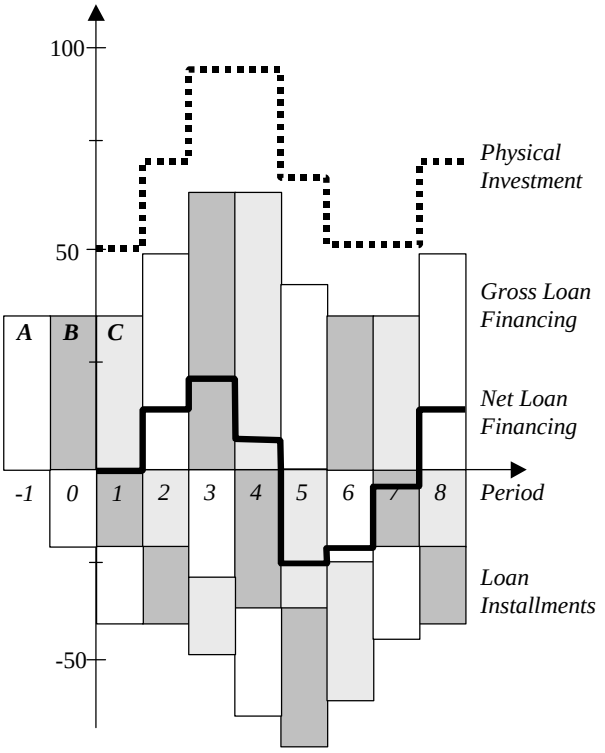
b) How can the results be explained?

In order to identify what we consider to be the main factor behind the MCJ results, we present a simple model of a stylized economy. There are three firms (or industries) *A*, *B*, and *C* in the economy which undertake investments in real assets. In each period, only one of the three firms invests. Every investment is financed in the same way, namely 30% with internal funds and 70% with bank loans. Thus the 30 to 70 relationship could be said to be the financing pattern in this economy, as almost everybody would agree. The economy runs over 10 periods, $t = -1$ to 8. Physical investment is 50 in the first three periods, then goes up to almost 100 and subsequently declines and rises again, as is shown by the dotted line in Figure 1. Thus, there are business cycles in this economy. The bars above the horizontal axis – which are 35 for the first three periods –

show the amount of external financing by banks. These financing figures are gross financing flows in the sense of the second step of netting in the MCJ methodology.

But loans have to be repaid. For our model economy, we assume that they are repaid in equal installments in *M* periods after they have been taken on. Let *M* be 2. Figure 1 shows the (gross) repayment flows as bars below the horizontal axis. For instance, in period 1, half of the loan taken out by firm *A* in period –1 and half of the loan of firm *B* from period 0 are repaid. As firm *C* invests and borrows, the *net* external or bank financing in period 1 is 0. This is shown by the bold line. In the following periods investment and thus also financing go up, while smaller loans are repaid. Therefore net financing goes up and later on declines when investment declines cyclically. In the "recession periods" net financing even becomes negative – and all this in spite of the fact that, consistently, 70% of all investments are financed externally by banks.

Figure 1: Flow of funds in a model economy with three investing firms



The simple model captures the essence of what MCJ use as the measure of "*the relative significance of different sources of finance in physical investment*" (Mayer/Alexander, 1990, p. 454). The essential point in the MCJ measurement concept is that the financing from each of the individual sources of funds *j* is on a net basis as explained above and as illustrated with our model.

Table 2 applies the MCJ concept and their formula to two four-year intervals and to the entire period covering $t = 1$ to $t = 8$ in our example. As one would already expect from comparing the dotted line and the bold line, internal financing dominates clearly even in the phase of expansion. For the entire period bank financing seems to be completely irrelevant, although it has been consistently assumed that banks finance 70 percent of all investments. Thus, it is fair to say that this method of determining "*the relative significance of different sources of finance*

distorted picture of the reality which it aspires to capture, and that it might even suggest far-reaching, but misleading implications. Imagine that, based on the results for the model economy, someone would conclude that there was no reason to have banks at all!

Table 2: Net financing patterns in the model economy

Net Source of Finance	*Periods 1-4*	*Periods 4-8*	*Periods 1-8*
		Percentage of physical investment	
Internal funds	89%	117%	101%
Bank loans	11%	-17%	-1%

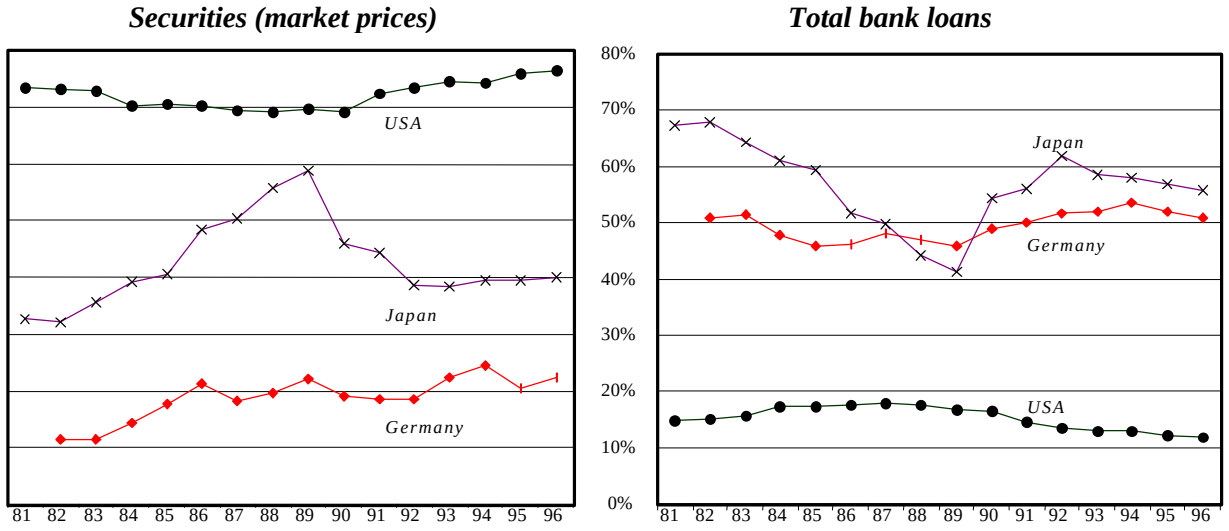
The factor which produce the MCJ results seems to be the aggregation implicit in their measurement method, as it does indeed aggregate over firms in the entire sector, over periods and over financial and real investments. However, this is not the essential point. Much more important is the implicit assumption concerning how funds from each particular source are being used: It is assumed that funds from bank loans are used in the first instance to pay back bank loans, while proceeds from the issue of new bonds or shares are first of all – and this on a sector-wide level – used to redeem or buy back bonds and shares, respectively. Only what remains after these "primary" uses of funds is assumed to finance investment. The case of internal financing is the only one in which there is no corresponding “use of first resort”, and this creates the impression that investment is almost exclusively financed internally.[7] Only if this allocation of sources to uses of funds is avoided can one arrive at a realistic picture of how investment is financed: All sources of funds are jointly employed for all uses of funds, and thus all sources of funds jointly provide the funding of investment. This is why it may be less useful to look at net financing than at gross financing, which suggests that it may be worthwhile to try out a method of measuring the financing of investment on the basis of gross financial flows, to which we turn our attention in the next section. But before doing so, we will briefly consider what appears to be the straightforward alternative to looking at net flows in a flow-of-funds framework, namely to look at stocks.

[7] It is interesting to note that Jensen’s (1986) theory of free cash flow also postulates a specific use of internally generated funds for specific sources. But Jensen’s explicit assignment of funds is exactly the opposite of that implicitly assumed by the double netting procedure employed by net flow-of-funds studies.

c) Looking at stocks in a flow-of-funds context

The same data bases which provide flow figures also provide figures on stocks of inter-sectoral claims and obligations or liabilities in a broad sense, i.e. including those of, and to, the providers of equity. In spite of the disadvantage that the stock figures in the National Accounts are strongly influenced by price changes which are not connected to the ways in which investment is financed, a brief review is offered here.[8]

Figure 2: Portions of securities and bank loans in total inter-sectoral liabilities of non-financial companies



Source: National Account statistics and own calculation

Table 3 presents the general patterns of inter-sectoral claims on corporations. The left panel shows the fraction which is securitized, and the right panel the percentage accounted for by bank loans. Without going into details, one can easily see that the standard notion of Germany and Japan as having a bank-based, and of the Anglo-Saxon countries as having a capital market-based financial system stands up well to this test. The differences are visible and stable and confirm what conventional wisdom and theory suggest.[9] The graphs demonstrate that it is indeed appropriate to pursue further our attempt to modify the MCJ approach in such a way that it yields more meaningful results, while retaining the objective of measuring flows as the central aspect of financial patterns.

[8] Although the consideration of stocks in a flow-of-funds framework appears to be a natural alternative to that of flows, none of the sources quoted in footnotes 4 and 5 even mentions that this alternative exists.

3. A new approach to the measurement of financing patterns

a) The general idea – gross flows

This section develops a new approach to measuring financing patterns. The aim is to arrive at a reliable picture of how firms are financed. As the example presented in the preceding section shows, the gross flows, the bank-financed part of which are indicated by the bars above the horizontal axis in Figure 1, provide the correct answer to the question of how investment is financed. However, the official flow-of-funds data only provide two sets of data, namely stocks of claims and net flows-of-funds per period, between sectors. The problem is, therefore, to find a way to reconstruct gross flows. The general idea behind the method of reconstruction proposed here is that – in the case of debt instruments – the gross flows are given by the sum of the net flows of any given period plus the repayments for debt taken out in earlier periods.

b) The conversion from net to gross flows

In reality financial contracts differ with respect to their terms to maturity and their repayment patterns. In order to reconstruct gross flows, we need to make two simplifying assumptions. One is that financial instruments of any given type have a "standard" maturity, which is the estimated average maturity in a given economy; the other is that repayment is always in equal installments. The first assumption is unavoidable, and is made necessary by the unavailability of precise data, while the second one is made only for convenience.

Consider a class j of loans[10] with a term to maturity of M years. Denote the *c*ash *i*nflow from taking out new loans in period t by $CI(t)$, the *c*ash *o*utflow for repaying old loans in period t by $CO(t)$ and the resulting *n*et *c*ash flow $CN(t)$. By definition, $CI(t)$ – which is the figure we are seeking – is given by the following equation:

(1) $CI(t) = CN(t) + CO(t)$

By construction, that is by applying the two simplifying assumptions from above

(2) $CO(t) = CI(t\text{-}M)/M + CI(t\text{-}M\text{-}1)/M + \ldots + CI(t\text{-}1)/M$

[9] The corresponding results for the United Kingdom, which are not shown in Figure 2, are almost indistinguishable from those for the United States.
[10] The index j for the class of financial instruments is left out in this subsection to simplify the notation.

must also hold. Now let $S(t)$ denote the accumulated *s*tock of loans of type j at the end of period t. A third assumption then allows us to reconstruct $CI(t^*)$ from $S(t^*)$ and $CN(t^*)$ for a chosen "base"[11] year t^*: We assume that the volumes of new loans taken out in the M periods prior to the base year t^* are identical: $CI^* = CI(t^*\text{-}1) = CI(t^*\text{-}2) = \ldots = CI(t^*\text{-}M)$. As can be easily verified, CI^* must then be given by[12]

(3) $\quad CI^* = 2S(t^*)/(M+1).$

Inserting CI^* from equation (3) into equation (2), we can then use $CO(t^*)$ and equation (1) to compute $CI(t^*)$. Now that $CI(t^*)$ is known, equation (2) can be solved for $CO(t^*+1)$, which in turn will yield $CI(t^*+1)$ through equation (1). As becomes obvious, all the cash inflows for the subsequent years can be computed by "rolling forward" equations (1) and (2). In summary, all that we need in order to reconstruct gross flows for debt instruments is an estimate of the average maturity M of all instruments that fall into a given class j and assumptions concerning the typical repayment schedule and the *relative* volumes of the M_j cash flows $CI_j(t)$ prior to t^*.

c) The reconstruction of gross flows: an example

Whether the information necessary for estimating $CI_j(t^*)$ from the outstanding stock $S_j(t^*)$, the net flow $CN_j(t^*)$, and the term to maturity M_j is available, or can at least be estimated with a sufficient degree of accuracy, is an empirical question. As can be seen from equation (3), estimation errors with respect to the unknown parameter M matter less the greater the lower bound for the estimate. The lower bound itself can be derived from official statistics.

Take the case of long-term bank loan financing of German firms. In its monthly reports, the Deutsche Bundesbank reports how the total volume of bank loans to businesses outstanding at the end of a given year divides up into loans with an original maturity of between one and four years, and into those with an original maturity of more than four years. During the years between 1990 and 1996, only 14% fell into the first category, whereas the majority fell into the second cate-

[11] For all three countries and all debt instruments j we chose 1960 to be the "base" year t^*.

[12] To verify, take the example of $S(t)$=750 and M=2. Loans granted in period t-2 have been repaid in full at t, while loans taken out in period t-1 have only been repaid in half, so that the other half of $C^*(t\text{-}1)$ together with all of $C^*(t)$ show up on the firms' balance sheets in t. Only C^*=500 solves $C^*/2+C^*=750$. If the average maturity spans three years C^* has to solve $C^*/3+2C^*/3+C^*=750$. C^* then decreases to 375.

gory.[13] Even when allowing for extreme distributions of maturities within the two categories it seems safe to conclude that 4 years marks the lower bound for any estimate of M_j; with *j* denoting "long-term bank loans to German enterprises". If we assume the maturities to be more uniformly distributed, an estimated average value for M_j of 6 years seems more appropriate. Applying this estimate to the German data on long-term bank loans leads to the empirical result presented in Table 4 and Appendix 1, namely that 73% (1970-1996) of gross investment has been "financed [14] This should not be misinterpreted as saying that these long term loans were "really" used to pay for capital goods etc., as of course this would also imply an inappropriate attribution or allocation of one source of funds to one specific use of funds. The long-term loans were used to contribute, together with all other sources of medium to long-term funds, to the totality of all medium to long-term uses of funds.

Generalizing the results for long-term bank financing in Germany, one can collect data for the terms to maturity and the amounts of stocks and net flows for various classes of financial instruments for different countries and estimate the gross flows by applying the procedure described above and summarized in equations (1) to (3).

4. Measuring financial patterns in three large economies

a) Data and assumptions

The data sources which have been used for measuring the gross flows as indicators of financial patterns in Germany, Japan and the United States are the official statistics of the respective authorities.[15] Gross figures on equity financing are taken from various stock exchange publications. The following two important assumptions were made. First, we followed the practice of MCJ in assuming that *short-term* financing is indeed used for *short-term* investment only. In

[13] Interestingly, the distribution of loans between the two classes has not varied strongly over time: The portions for loans in the second category in the four 5-year periods between 1970 and 1989 have been 78%, 84%, 84%, and 87%, respectively.

[14] A simple sensitivity analysis applied to the estmate of the maturities yields the following result. If we assume the average maturity of bank loans in Germany to be 4 (8) years instead of 6, the emprical estimate of .73 reported in the last column of Table 4 below would have to be replaced by .93 (.65), which would leave the qualitative result unaffected.

[15] In the case of Germany, they are from the *Gesamtwirtschaftliche Finanzierungsrechnung* of the Deutsche Bundesbank, in the case of Japan they have been obtained from the Japanese National Accounts compiled by the Bank of Japan, and for the U.S. the data are from the Federal Reserve System's Flow of Funds Accounts.

this special case their assumption seems to be more appropriate than it is as a general assumption; in addition, including short-term financial instruments would make interpretation in terms of the gross flows extremely difficult because the short-term flows would appear to have an inappropriately large influence on total financing.[16] Thus we restricted the following calculations to financing instruments for which the time to maturity is at least one year, and called this long-term financing for the sake of brevity.

The second important assumption is that all fixed income financial instruments are repaid in equal installments over their estimated maturities. The first columns in Appendices 1-3 show our estimates (in years) for the various instruments considered in the three countries. Columns 3 and 5 list average figures (1970-1996) for all gross financial flows, i.e. sources and uses of funds, including short-term instruments.[17]

b) Empirical results

One of the most prominent results of the studies by Mayer and Corbett/Jenkinson is that internal financing is by far the most important source of financing in all countries which these authors analyzed. Only in Japan is the share of internal financing less pronounced, which Sussman (1994) explains by observing that due to the phenomenal growth of the Japanese economy during the past two decades, internal funds may simply not have been sufficient to finance all investments which have been undertaken.

The upper panel of Table 3 shows the results concerning the importance of external financing in the three countries for the time span between 1970 and 1996 (the respective figures for internal funds are shown in Table 4 below, together with the gross contribution of individual sources of external funds). To reiterate the basic idea of the measurement concept applied here, we estimated the values of all sources of long-term financing in the sense of gross flows estimated on the basis of equations (1) to (3), added them up and expressed them as a percentage of total physical investment. The values for the three countries vary over time, and they differ in a way which is not

[16] Setting M_j=1 in our method is equivalent to the assumption that the total volume $S_j(t\text{-}1)$ outstanding at the end of period t-1 has been fully repaid in t and that all of $S_j(t)$ has been a cash inflow during the same period. Even if the resulting gross figures were good estimates for the true flows, they do not help us very much in answering the initial question "How is (long-term) investment financed?" but rather characterize the liquidity management of the enterprise sectors analyzed.

[17] Much more detailed information on the data base is contained in Hackethal (1999).

unexpected given the different characteristics of the three financial systems. In the case of Germany, the weight of external financing is lower than in the other two countries. This can be in part explained by the legal relationship between accounting profit and dividend policy and possibly also by the German corporate governance system. In the U.S., one would expect external financing to be more important for the corresponding, though clearly different, reasons. For Japan, the high value for external financing is probably due to the factor mentioned by Sussman (1994).

Table 3: The importance of external funds and securities

External Funds	*70-74*	*75-79*	*80-84*	*85-89*	*90-96*	*70-96*
			new long-term external funds / physical investment (in %)			
Germany	81	93	95	97	95	93
USA	137	137	141	182	189	163
Japan	114	169	169	189	203	176
Securitized Funds						
			new long-term securities issued / physical investment (in %)			
Germany	12	9	8	11	13	12
USA	42	42	41	45	48	45
Japan	10	10	10	15	16	13

Disregarding all details, Table 3 provides a completely different picture from that of the Corbett/Jenkinson study in Table 1. Most important, we arrive at different indicators for the relative importance of external and internal funding. In addition, our first result already shows that there are indeed significant differences between the three financial systems which the new measurement method brings out clearly. The latter point is underscored by the results in the lower panel of Table 3. With a surprising consistency over time, the share of securities, or capital markets, as a source of financing is obviously very different between the three countries. It is completely in line with generally held expectations that capital markets are a much more important source of financing in the U.S. than in Germany and Japan. Even though securitized financing is not necessarily financing by providers of funds other than financial intermediaries and in particular other than banks[18], this results supports the assumptions that the three financial systems differ greatly and in a predictable way. The following Table 4 offers a closer look at the composition or patterns of external financing for the three countries in a way which is directly comparable to the Corbett/Jenkinson results, i.e. as a percentage of physical investment.

[18] For a discussion of this point, see Schmidt/Hackethal/Tyrell (1999).

Note that these figures are gross flows and thus do not add up to 100%.

Table 4: Patterns of gross external financing by instrument

Instruments	***70-74***	***75-79***	***80-84***	***85-89***	***90-96***	*70-96*
			***USA** (% of physical investment)*			
Internal finance	71	82	83	93	103	89
Bank loans	64	61	64	75	62	65
NBFI loans	15	19	19	26	36	25
Bonds	39	38	37	55	62	49
Commercial paper	4	4	7	11	15	9
New equity	n.a.	n.a.	n.a.	n.a.	n.a.	15*
			***Germany** (% of physical investment)*			
Internal finance	77	96	94	98	83	88
Bank loans	62	74	76	76	75	73
Loans from insurance companies	10	11	10	10	8	9
Bonds	7	5	5	7	8	7
New equity	3	3	3	4	5	3
			***Japan** (% of physical investment)*			
Internal finance	50	72	71	76	75	70
Bank Loans	93	136	136	141	142	132
from Public financial institutions	9	16	16	20	29	20
Bonds	8	14	12	12	20	14
Commercial paper	0	0	0	9	11	6
New equity	4	4	4	7	2	4

* The available data permitted us to report a figure for the average cash inflow through equity issues for the period 1988-1995 only. For the same reason, no figures for the equity financing of the non-corporate businesses can be shown. Crude estimates on the basis of levels outstanding range from around 20% in the early 1970s to approximately 10% in the mid-1990s.

After focusing on different financial instruments in Tables 3 and 4, we now switch to an institutional perspective. Table 5 presents the composition of gross external financing according to the sectors which provide funds to the sector of non-financial companies. In keeping with the standard sector classification of flow-of-funds statistics, five sectors are distinguished, with the rest of the world (RoW) and government lumped together.[19] The banks and the non-bank financial intermediaries (NBFI) are distinguished as two subsectors of the financial sector in order to point

[19] Whereas in the case of the instrument "bank loans" it is clear to which sector the creditor belongs, in the case of some other instruments, notably shares, bonds, and commercial paper, the National Accounts do not name the claim-holders' sector explicitly. Thus, for deriving Table 6, we had to make another simplifying assumption, namely that investors map the market in their portfolios. Let households hold shares worth 200 units in a given year and let total market capitalization be split in 60% issued by non-financial companies, 30% issued by banks, and 10% issued by NBFI. We assume that households hold non-financial companies shares worth 120, bank shares worth 60 and NBFI-shares worth 20 units and thus follow the proposition of the standard CAPM.

out interesting differences and developments. In this table, the figures are percentages of total external long-term funding and thus add up to 100.

Table 5: Patterns of external gross financing by sector

Sectors	***70-74***	***75-79***	***80-84***	***85-89***	***90-96***	***70-96***
			***USA** (% of total long-term external finance)*			
Banks	51	49	49	46	36	44
NBFI	36	39	40	41	49	42
Households	12	11	7	7	9	9
RoW/Government	1	2	4	6	6	4
			***Germany** (% of total long-term external finance)*			
Banks	80	82	84	82	83	82
NBFI	14	14	12	13	11	12
Households	4	3	3	4	4	4
RoW/Government	2	1	1	2	3	2
			***Japan** (% of total long-term external finance)*			
Banks	95	95	95	91	92	93
of which: public financial institutions	8	10	10	11	17	13
NBFI	2	2	3	6	6	5
Households	2	2	1	2	1	2
RoW/Government	1	0	1	0	1	1

As one can easily see from Tables 3 to 5, the patterns of external financing differ very much between the U.S. on the one side and Germany and Japan on the other. In the case of the banks, the difference is most pronounced. Assuming, as one can do with only some slight reservations, that NBFI financing mainly takes the form of buying and holding securities, one also recognizes a marked difference between the relative weights of capital market financing via NBFIs not only between the three countries, but in the case of the United States also over time. Capital market or NBFI financing, which is almost synonymous in the United States, appears to have changed places with bank financing in the course of the last 25 years. Note that the differences between Japan and Germany in terms of the share of banks in overall external financing are not at all great. This completes our presentation of results.

5. Financial systems *do* differ

The comparisons of stocks of inter-sectoral financial claims and of gross flows of funds between sectors show that the financing patterns in the three large economies discussed in this

paper differ substantially. This suggests that it makes sense to speak of different types of national financing patterns. The "celebrated distinction between the market-based financial patterns of ... the United States and of the bank-based pattern of Germany" is *not* inaccurate, as Corbett/Jenkinson seem to believe. To conclude the paper, we briefly analyze whether this result can be generalized in such a way that it also makes sense to speak of national types of financial systems and to distinguish between real financial systems accordingly. Our answer will be sketched out in two steps.

One would expect the financing patterns in a given country to be a reflection of the corporate governance system of that country. National corporate governance systems differ considerably. Anglo-Saxon countries, in particular the United States, have corporate governance systems in which the market for corporate control plays a key role. Their main corporate governance problem is seen as being that of making managers act in the interests of shareholders. Maximizing shareholder value is not merely the paramount objective of corporations, it is also the only legitimate objective. Thus, capital markets are very important for corporate governance. The relationship between Anglo-Saxon banks as lenders and firms as borrowers is typically at arm's length, and banks are not even allowed to play an active role in the governance of the corporations to which they lend. Finally, in Anglo-Saxon corporations there is no place for anything which would resemble codetermination. Like those of shareholders and lenders, the interests of employees are typically secured by giving them outside – or exit - opportunities rather than by creating internal structures through which their voices can be heard. To use the term coined by Franks/Mayer (1995), the entire systems are "outsider-controlled".

Although they differ from one another in several important respects, both the German and the Japanese corporate governance systems are based on principles that are diametrically opposed to those of the Anglo-Saxon outsider-controlled systems. Active takeover markets hardly exist. It is more than questionable that management's main task – let alone its only task – should be to maximize the share price. Not only do most managers see themselves as having a commitment to serve the interests of several groups of stakeholders, but the legal system also obliges them to do so.[20] Thus the capital market has a limited role to play in disciplining and guiding management.

[20] Interesting empirical evidence on the importance which managers in different countries attach to vaious constituencies is reported in the first chapter of Allen/Gale (1999). For an economic and legal analysis of the shareholder-value rule in the case of Germany, see Schmidt/Spindler (1997).

Banks as lenders are closer to their borrower-clients, and they are also heavily involved in the internal mechanisms of corporate governance – when things are going well for the respective firm and even more so when it gets into trouble. Both systems feature mechanisms whereby persons who represent the interests of employees – or of certain core groups of employees – are able to directly influence the governance of corporations, be it in the framework of legally mandatory codetermination as in Germany, or merely as a result of established practice and implicit labor contracts as in Japan.[21] All in all, the two corporate governance systems are, to use the terminology of Franks/Mayer, "insider-controlled".

It would be more than strange if there were widely different corporate governance systems on the one side and basically identical financing patterns on the other. The new method of measuring financial patterns leads to empirical results with respect to the ways in which firms and their investment are financed which are in line with what one would expect on the basis of the respective corporate governance systems: Capital markets and banks are either important or unimportant, respectively, as a source of funding *and at the same time* as an element of corporate governance. Thus the puzzle presented by the findings of Mayer and those who followed his line of research, and which was pointed out by Schmidt/Tyrell (1997) seems to be solved.

We now come to the second step. A financial system consists of at least four elements or subsystems. Two of these, namely financing patterns and corporate governance systems, have already been discussed. Evidently, another element or subsystem of the financial system of a country is its financial sector, which is itself composed of financial markets and institutions and exhibits certain structural features. The fourth element or subsystem is the predominant business system, which is characterized by corporate structures and strategies and thus also the prevailing methods and processes of making adjustments to changing circumstances in the environment in which firms operate.[22]

As the colloquial use of the term "system" suggests, a system is more than a collection of elements. It is composed of complementary elements. Elements are *complementary* if they mutually increase the "benefits" they yield in terms of whatever the objective function or the standard for evaluating the system may be, and mutually reduce their disadvantages or "costs". A system is

[21] See Knobling (1999) and Hackethal (1999) for details.
[22] See Milgrom/Roberts (1995) and Hackethal/Schmidt (1999).

coherent if its complementary elements take on values which make the system attain a local optimum, i.e. if the elements or subsystems "fit together". Systems of complementary elements typically have more than one optimum, and the local optima are clearly distinct configurations of the values of the elements.[23]

Financial systems can be regarded as systems in this specific sense. The complementarity of their core elements or subsystems and the economic benefits which a coherent financial system can be assumed to produce are the factors which account for the tendency of the financial systems of successful economies to be consistent. At a conceptual level it can be shown that coherent financial systems are of two types: One type is characterized by a financial sector in which banks are the dominant element of the financial sector, firms are to a large extent financed by banks, corporate governance is "insider controlled", and the prevailing business system is one with much firm-specific human capital, many implicit contracts and a tendency towards gradual change. The other type is characterized by the opposing set of values for the four elements or subsystems: capital markets are a more important element of the financial sector than banks, there is less bank financing of firms, corporate governance is "outsider-controlled", and corporations are highly flexible, being able to undertake strategic adjustments with "big leaps".[24]

If one could establish that real financial systems were indeed coherent systems, this would have far-reaching implications. It would suggest how the financial and the non-financial sectors of different countries interact and, among other things, how they react to common monetary shocks (Schmidt, 1999); and it would help to answer the important question whether financial systems tend to converge or not.[25]

The financial systems of the United States and of Germany and Japan largely conform to the theoretical distinction between the two types of financial systems. At least the composition and structures of the financial sectors, the corporate governance systems and the business systems appear to be consistent. However, if one were to take the empirical results found by Mayer and Corbett/Jenkinson at face value there would seem to be a missing link: The financing patterns of

[23] This terminology is adapted from Milgrom/Roberts (1995) and developed further in Hackethal/Schmidt (1999).
[24] The link between relationship lending, insider-oriented governance and firm-specific human capital is analyzed greater depth by Hackethal/Tyrell (1998) and Berkovitch/Israel (1998). The correspondence between financial patterns and business systems is discussed by Aoki (1999) and Hackethal/Schmidt (1999).
[25] See Bebchuk/Roe (1998) on convergence and the comment on their paper by Schmidt/Spindler (1999).

corporations would not fit the picture, and this would call into question the validity of the entire concept of a financial system as a coherent set of complementary elements. Given that it is important to have a concept to describe financial systems, to analyze them and to make predictions about their development and their consequences, it is relevant that the new method of measuring financial patterns presented in this paper leads to empirical results which suggest that the financing patterns are indeed consistent with the other elements of the financial systems.

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Appendix 1: Sources and Uses of Finance of German Enterprises (1970-1996) as a Portion of Physical Investment

M[1]	*Sources*	*(%)*	*Uses*	*(%)*	*Net*
	Depreciation	72.2			
	Retained Earnings	3.2			
	Capital Transfers	8.3			
	Pension Provisions	4.7			
				Internal Finance	88.4
1	Trade Credit (obtained)	32.3	Trade Credit (repaid)	-30.4	1.9
1	Trade Credit (reimbursed)	49.2	Trade Credit (granted)	-52.2	-2.9
				Net finance through trade credit	-1.0
1	Short-term bank loans (obtained)	130.0	Short-term bank loans (repaid)	-121.1	8.8
1	Short-term deposits (withdrawn)	142.8	Short-term deposits (invested)	-154.9	-12.1
6	Long-term bank loans (obtained)	72.9	Long-term bank loans (repaid)	-55.9	17.0
4	Long-term deposits (withdrawn)	5.9	Short-term deposits (invested)	-7.1	-1.2
				Net finance from bank loans and deposits	12.5
6	NBFI Loans (obtained)	9.3	NBFI Loans (repaid)	-7.6	1.7
				Net finance from NBFIs	1.7
7	Own Bonds (issued)	7.0	Own bonds (redeemed)	-5.1	1.9
7	Other Bonds[2] (sold, reimbursed)	5.4	Other Bonds (purchased)	-7.6	-2.4
				Net finance through bonds	-0.5
	Equity (issued)[3]	3.8	Equity (bought back)	n.a	3.8
	Stocks from other corps. (sold)		Stocks from other corps. (bought)		-3.1
				Net finance through stocks	0.7
				Others (incl. rounding errors and statistical adjustments)	-0.1
			Physical investment in fixed assets	-96.9	
			Changes in working capital	-3.1	
				Gross physical investment	-100

For notes see Appendix 4.

Appendix 2: Sources and Uses of Finance of American Enterprises (1970-1996) as a Portion of Physical Investment

M[1]	*Sources*	*(%)*	*Uses*	*(%)*	*Net*
	Depreciation	77.6			
	Retained Earnings	11.2			
				Internal Finance[4]	88.8
1	Trade Credit (obtained)	12.3	Trade Credit (repaid)	-13.4	1.2
1	Trade Credit (reimbursed)	32.6	Trade Credit (granted)	-35.4	-2.8
				Net finance through trade credit	-1.6
1	Short-term bank loans (obtained)	48.5	Short-term bank loans (repaid)	-46.7	1.8
1	Short-term deposits (withdrawn)	29.2	Short-term deposits (invested)	-31.1	-1.8
6	Long-term bank loans (obtained)	65.3	Long-term bank loans (repaid)	-52.4	13.0
4	Long-term deposits (withdrawn)	14.6	Short-term deposits (invested)	-16.5	-1.8
				Net finance from bank loans and deposits	11.2
6	NBFI-loans (obtained)	24.6	NBFI-loans (repaid)	-19.6	5.0
4	Loans to households (reimbursed)	8.0	Loans to households (granted)	-9.5	-1.4
				Net finance from NBFIs and households	3.6
2	Own commercial paper (issued)	9.2	Own commercial paper (repaid)	-7.9	1.3
2	Other CP (sold, reimbursed)	2.4	Other CP (bought)	-2.7	-0.2
				Net finance through commercial paper	1.1
7	Own Bonds (issued)	48.5	Own bonds (redeemed)	-35.9	12.6
7	Other Bonds[2] (sold, reimbursed)	3.1	Other bonds (purchased)	-4.2	-1.1
				Net finance through bonds	11.5
	Equity (issued)[6]	14.9	Equity (bought back)	-22.9	-8.0
	Equity of non-corp. bus. (issued)	>10	Equity of non-corp. bus. (bought back)	<-10	0.8
				Net finance through equity	-7.2
				Net finance through foreign direct investment	-2.5
				Others (incl. rounding errors and statistical adjustments)	-4.9
			Physical investment in fixed assets	-95.5	
			Changes in working capital	-4.5	
				Gross physical investment	-100

For notes see Appendix 4.

Appendix 3: Sources and Uses of Finance of Japanese Enterprises (1970-1996) as a Portion of Physical Investment

M[1]	*Sources*	*(%)*	*Uses*	*(%)*	*Net*
	Depreciation	49.5			
	Retained Earnings	20.5			
				Internal finance	70.0
1	Trade Credit (obtained)	21.1	Trade Credit (repaid)	-20.3	0.8
1	Trade Credit (reimbursed)	27.1	Trade Credit (granted)	-28.0	-0.9
				Net finance through Trade Credit	-0.1
	Short-term loans[7] (obtained)		Short-term loans (repaid))		
1	…from private banks	266.0	…to private banks	-250.9	15.0
1	…from public financial institutions	37.2	…to public financial institutions	-34.4	2.8
1	Short-term deposits (withdrawn)	105.1	Short-term deposits (invested)	-112.7	-7.6
	Long-term Loans (obtained)		Long-term Loans (repaid)		
7	…from private banks	132.1	…to private banks	-99.0	33.1
7	…from public financial institutions	20.2	…to public financial institutions	-13.6	6.6
4	Long-term deposits (withdrawn)	74.3	Long-term deposits (invested)	-86.7	-12.4
				Net finance from bank loans and deposits	37.5
2	Own commercial paper (issued)	5.7	Own commercial paper (repaid)	-4.8	0.9
2	Other CP (sold. reimbursed)	1.4	Other CP (bought)	-1.6	-0.2
				Net finance through Commercial Paper	0.7
7	Own Bonds (issued)	14.3	Own bonds (redeemed)	-9.6	4.7
7	Other Bonds[2] (sold. reimbursed)	4.7	Other Bonds (purchased)	-6.2	-1.5
				Net finance through bonds	3.2
	Equity (issued)[6]	3.8	Equity (bought back)	n.a.	3.8
	Stocks from other corps. (sold)		Stocks from other corps. (bought)		-0.2
				Net finance through equity	3.6
				Net finance from trusts	-6.9
				Net finance from Rest of World	-8.2
				Others (incl. rounding errors and statistical adjustments)	0.2
			Physical investment in fixed assets	-84.8	
			Changes in working capital	-15.2	
				Gross physical investment	-100

For notes see Appendix 4.

Appendix 4: Notes to Appendices 1 to 3

(1) Estimated average term to maturity of respective instrument.

(2) This entry also includes bills and commercial paper, whose average portion, however, does not exceed 10%.

(3) Of course, flows for new equity cannot be estimated using the same methodology as for fixed income instruments as there are no contracted redemption repayments. We thus had to assume that the flow figures from the National accounts are equal to the total volume of new issues. This simplifying assumption seems warranted for Germany, as buybacks of own equity hardly ever occur. In another publication, the Bundesbank reports the actual volume of newly issued equity for all domestic corporations, that is including financial companies. Based on these data, new equity would account for 5.0% of the gross total of all sources. This figure represents the upper bound for the new equity entry in appendix 1.
Equity issues of non-corporate enterprises are included in internal funds. However, according to the Bundesbank (monthly report Oct. 1998, p. 36) this source of finance only amounts to 1.5% of physical investment in 1997.

(4) The discrepancy between this figure and the corresponding figure (96.1%) in Corbett/Jenkinson (1997) is primarily due to the inclusion of the farm sector.

(5) Short-term loans are not explicitly reported in the U.S. data. The 1983 (20%) and 1993 (17%) figures for their share of total loans were taken from Borio (1995). We assume here that prior to 1983 and after 1993 the portion remained constant at 20% and 17% respectively. For the intervening ten years we used linear extrapolation.

(6) It is much more common for U.S. corporations to buy back their own shares than it is for their German and Japanese counterparts. Only since 1995 has it been it legally possible for Japanese corporations to do so. Whereas net flows of funds are only slightly smaller than gross flows in these two countries and could thus be used as lower bounds on our estimates, we had to take data from stock exchange publications to approximate gross flows for the U.S. corporations. For this purpose we had to adjust the data to allow for equity issued by financial institutions.

(7) Short-term loans are not explicitly reported in the Japanese data. The 1983 (41%) and 1993 (32%) figures for their share of total loans were taken from Borio (1995). We assume that prior to 1983 and after 1993 the portion remained constant at 41% and 32% respectively. For the intervening ten years we used linear extrapolation.