

**A Response to Hackethal and Schmidt (2003) “Financing Patterns:
Measurement Concepts and Empirical Results”**

Jenny Corbett

Nissan Institute, University of Oxford

Jeremy Edwards

Faculty of Economics and Politics, University of Cambridge

Tim Jenkinson

Saïd Business School, University of Oxford

Colin Mayer

Saïd Business School, University of Oxford

Oren Sussman

Saïd Business School, University of Oxford

15 January 2004

Abstract

Hackethal and Schmidt (2003) criticize a large body of literature on the financing of corporate sectors in different countries that questions some of the distinctions conventionally drawn between financial systems. Their criticism is directed against the use of net flows of finance and they propose alternative measures based on gross flows which they claim re-establish conventional distinctions. This paper argues that their criticism is invalid and that their alternative measures are misleading. There are real issues raised by the use of aggregate data but they are not the ones discussed in Hackethal and Schmidt's paper.

Key words: corporate finance, financial systems

JEL Classification: G30

1 Introduction

In a widely circulated working paper entitled “Financing Patterns: Measurement Concepts and Empirical Results”, Andreas Hackethal and Reinhard Schmidt of the University of Frankfurt criticise a large body of recent literature that uses aggregate data to analyse the financing of firms. In particular they argue that the results presented by Corbett and Jenkinson (1996 and 1997), Edwards and Fischer (1994), Mayer (1988 and 1990) and Rajan and Zingales (1995) are misleading. They take particular exception to the conclusions that “differences in leverage across the G-7 countries are not as large as previously thought” (Rajan and Zingales (1995)) and “the celebrated distinction between the market based financial patterns of the United Kingdom and the United States and the bank-based pattern of Germany is inaccurate” (Corbett and Jenkinson (1997)).

The criticism of the paper centres on the “net-flow” methodology employed in these studies. That methodology involves constructing aggregate flows of funds for different countries over extended periods of time using National Accounting Statistics provided by companies, financial institutions and securities markets. Estimates of the proportion of aggregate investment financed from different sources are derived by categorizing flows of funds under various headings, such as retained earnings, bank loans, trade credit, bonds and new equity and averaging them over several years. The methodology provides internationally comparable estimates of the financing of physical investment by the non-financial corporate sectors of different countries over particular periods.

The issue that concerns Hackethal and Schmidt is the process of subtracting outflows from inflows from specific financing instruments to derive net flows. They argue that this disguises the underlying flows and leads to an understatement of external sources of finance. Furthermore, since “internal funds do not have to be repaid” (page 2) this “overestimates the role of internal funds and underestimates that of external sources of the financing of investments” (page 2).

The authors instead propose a methodology based on gross rather than net flows and conclude that “the empirical results which the alternative concept yields turn out to be in line with expectations grounded in financial system theory as well as with commonly held beliefs about the dominance of banks as a source of financing in Germany and Japan and of markets as a source in the case of US firms” (page 2).

We believe that Hackethal and Schmidt’s critique is misconceived and that the results that they derive from their alternative methodology are misleading. While the use of aggregate data does raise important questions, they are not the ones regarding gross versus net finance to which Hackethal and Schmidt refer.

We begin in Section 2 by describing and evaluating Hackethal and Schmidt’s critique. In Section 3, we then consider the real issues that arise as a consequence of using aggregate data, based on Mayer and Sussman’s (2003) approach. Finally, Section 4 concludes this note and considers directions in which research in this area can most profitably progress.

2 The Critique

Hackethal and Schmidt's objection to the methodology employed in many recent aggregate studies of corporate financing is best explained using the example that they employ in Table 1 of their paper, which is in turn based on the example in Table 1 of Mayer and Sussman (2003). Table 1 of this paper reproduces their table. There are three firms and three time periods. Each firm undertakes regular routine investment of 5 in each period, which can be interpreted as replacement or depreciation investment, and an investment spike of 20 in one of the three periods. Firm A undertakes the investment spike in period 1, firm B in period 2 and firm C in period 3. Each firm generates an internal source of finance from retained profits of 10 in each period. Firm A borrows 10 to fund the remaining 10 of the investment of 20 in period 1 that cannot be funded internally, firm B has accumulated 5 from the excess of earnings over investment in period 1 and borrows 5 to fund its investment of 20 in period 2. Firm C has two periods of accumulated liquid assets available and so does not have to borrow at all.

Aggregating across firms in Panel B, in each of the periods, there is a total investment of 30, total internal sources of 30, borrowing net of repayments of 10 in period 1, zero in period 2 and -10 in period 3, averaging out to zero over the three periods. At the aggregate level, the net-flow figures show that 100% of investment is financed from internal sources and none externally.

This is the heart of Hackethal and Schmidt's objection to the net-flow studies. They argue that these aggregate statistics are misleading because they suggest that all investment is internally funded when in fact there has been borrowing by both firms A and B. They suggest (on page 13) that, on the basis of the net-flow figures, "someone would conclude that there was no reason to have banks or any other source of external finance at all!" Users of the net-flow approach have in fact been careful to make clear that such a conclusion is not warranted. In the paper that introduced this approach, Mayer (1988) says that, when the net-flow approach shows that all investment is internally financed, the conclusion to be drawn is that "in terms of financing of physical investment, the non-financial corporate sector could have been floated off separately from the financial sector with no net consequence for corporate investment". However, he is careful to point out that "this does not, of course, take account of the other services provided by the financial sector...or the role of the financial sector in facilitating intra-corporate financial relationships. It is merely an observation on the net funding of cash purchases of capital goods" (p. 1172).

To overcome what they regard as the problem with the net-flow approach, Hackethal and Schmidt propose using gross rather than net sources of external finance. They state that "in the example from Table 1, the sum of physical and financial investments amount to 35 units in each of the three periods on average (see last column). 5 units stem from external sources, another 5 units are financed by selling liquid assets and 25 units are financed by internal sources. Because the 5 units in liquid assets exclusively comprise internal sources from previous periods that are already accounted for by the 25 units, they can be omitted from the analysis. As a consequence, 5/30 or roughly 17 percent of each dollar invested stems from external sources. The remaining 83 percent are internally financed" (pages 14 and 15).

This is extremely confusing. Why are only 25 of the 30 units of physical investment financed from internal sources? What has happened to the 5 units of debt on average that have been repaid? Does one need to know from where liquid assets have been accumulated (internal sources or external finance) before the calculations can be performed?

A more sensible way of incorporating gross financial flows into the analysis (and one that has been adopted by, for example, Mayer (1988, 1990) and Edwards and Fischer (1994)) would have been to say that there have been 35 units of total investment (30 in physical assets and 5 in liquid assets) which, on average, were financed 30 from internal sources and 5 from debt borrowing. Thus 5/35 or roughly 14 percent were financed externally.

This still leaves open the question of how to treat the 5 sales of liquid assets and the 5 repayment of debt that take place on average over the three periods. In a simple example like this it is easy to exclude them but in aggregate figures distinguishing between sales and purchases in this way is not possible. In any event, why does one want to exclude them? After all what, in terms of the ability to finance physical investment, is the difference between purchasing liquid assets and purchasing back ones own debt securities, and what is the difference between issuing debt securities and selling holdings of liquid asset securities?

The Hackethal and Schmidt concept of gross financing is not only gross of accumulation of financial assets (the way in which much of the literature discusses gross financing), but also gross of repayments of the same financial instruments. This creates serious problems. Suppose that instead of borrowing 10 in period 1 and repaying 5 in each of periods 2 and 3, firm A had borrowed 10 in period 1 repaying 10 in period 2, 5 in period 2 repaying 5 in period 3, and then nothing in period 3. It could equally well have financed its investment of 20 in period 1 and its repayment of debt of 10 and its investment of 5 in period 2. But its gross financing would then have been 15 not 10. If it had borrowed for a shorter period then its gross financing would have been still higher. In other words external financing measured in the Hackethal and Schmidt way is highly sensitive to maturity, even though the flows of financing to firms are unchanged.

Hackethal and Schmidt acknowledge this problem in regard to short-term flows and state that “short-term flows are an exception for which the use of net flows to measure financing patterns might make more sense than use of gross flows” (page 17). So in their empirical results they employ a curious hybrid of gross flows for medium and long-term finance and net for short-term finance. It is not at all clear where a dividing line should be drawn, particularly as there are significant differences across countries in the treatment of the maturity of debt finance. In some countries, maturity refers to origination, that is the maturity of the debt at the date at which it was issued, and in others to residual maturity on outstanding debt. The gross/net hybrid will therefore be sensitive to the particular conventions that countries employ.

Likewise, if firm A borrows 10 from one bank in period 1, then borrows 10 from another bank in period 2 to repay the first bank, and repays the second bank in period 3, then gross external financing of 20 not 10 would be recorded. Not only is gross

financing sensitive to assumptions of maturity but it is also dependent on the banking arrangements of firms and their transactions with banks.

But the main objection to gross flows concerns precisely the feature of this concept that Hackethal and Schmidt find the most attractive, which is that gross flows are related to stocks of finance at the beginning of the period. Suppose that firm A had 90 units of outstanding debt at the start of period 1, one third of which matured in each of the three periods shown, so that it had to refinance 30 of debt each period. It would then record gross debt financing of 40, 30 and 30 in each of the three periods and repayments of -30, -35 and -35. In comparison with the firm A shown in Table 1 it would appear to be raising vast amounts of debt to finance exactly the same investments.

Furthermore, gross flows are a highly inaccurate way of recovering the underlying stocks because of their sensitivity to the maturities of the financial instruments. Permanent sources of capital such as equity generate no refinancing flows and therefore are not recovered at all. If the question being considered requires stocks of finance then stocks should be used, but when the question concerns the sources of financing of physical investment flows over particular periods then net flow of funds are appropriate.

The use of gross financing at the level of individual instruments creates problems over and above those associated with the normal gross/net debate as to whether financing should be shown net of accumulations of equivalent financial assets. Suppose that firm A had borrowed 15 instead of 10 and had put 5 of the borrowing into liquid assets. It would therefore have recorded gross financing in period 1 of 15 which together with 10 of internal sources is used to finance 20 physical investment and 5 accumulation of financial assets. Its borrowings could legitimately be regarded as 5 higher than previously. But if, as is the case in many countries, the 5 put into liquid assets was a “compensating deposit” that the firm was required to make by banks as a condition of the loan, should we regard the firm as having borrowed 15 or 10?

Clearly one issue that arises in answering this question is the form of the investment whose financing is being determined. Most previous analyses have focused on the financing of *physical* rather than *financial* investment, in which case individual financing instruments should be measured not only net of their repayments but also net of accumulation of financial assets, i.e. net of accumulation of liquid assets in this example, what is termed “double netting” in Hackethal and Schmidt’s paper.¹

Hackethal and Schmidt conclude on the basis of the example in Table 1 that net flows will only be recorded over a period to the extent that there are changes in stocks of the relevant financial instruments. Thus none of the three companies record net debt financing over the three periods because the debt finance is repaid. That is exactly right and that is precisely what should be observed. Flows should be about changes in stocks, not levels of stocks. They are conceptually different from stocks. Over the three periods as a whole all three firms have entirely financed investment through

¹ In fact, many studies, for example Mayer (1988 and 1990) and Edwards and Fischer (1994) refer to both gross and net flows and find that the conclusions about financing patterns and financial systems apply to both measures.

internal sources. There has therefore been no change in the stock of debt over the three periods as a whole.

The contribution of debt financing in aggregate is appropriately recorded for each of the three periods. In period 1, 10 of the 30 physical investment or 40 physical and financial investment is in aggregate financed from debt. In period 2 none is (since repayment by firm A offsets new debt issued by firm B) and in period 3 there is a net repayment of 10.

The assertion that “internal funds do not have to repaid” (page 2) is particularly curious. Firm A may have had 20 units of profits from which it decided to repay 10 units as dividends to leave 10 units as internal sources. It might have decided to pay 5 units as dividends in period 1 and 12.5 in each of periods 2 and 3 in which case it would only had to have borrowed 5 units of debt in period 1 and repaid -2.5 in each of periods 2 and 3.

There are real issues concerned with the measurement of the finance of investment at the aggregate level, which are discussed in the next section, but using gross flows is not the appropriate way to resolve them. This conclusion emerges at a conceptual level before the practical issues of measurement are considered. As Hackethal and Schmidt note “unlike levels and net flows, gross flows from external sources are typically not reported in National Account Statistics” (page 19). To construct their gross figures they have therefore had to resort to a variety of different sources that may or may not be consistent with National Accounting Statistics and to derive estimates on the basis of a number of heroic assumptions, concerning for example the maturity of debt. One of the practical attractions of deriving flow of funds figures on a net basis is that they display a greater degree of cross-country consistency than their gross equivalents.

3 The Real Issues

The reason that the net flows are the appropriate basis for measurement at the aggregate level is that they correctly answer questions concerning the flows that have taken place across the boundaries between different sectors. So they can answer questions about flows between the banking and corporate sectors or between bond markets and the corporate sector over particular time periods. They cannot answer questions about what goes on within sectors or within time periods.

The above observation that there has in aggregate been no net flow to the three firms in Table 1 over the three periods is the correct description of funding of this particular combined corporate sector over this particular time period. The merit of this is that it is comprehensive in providing complete rather than partial coverage of the corporate sector. What is unsatisfactory about it is, firstly, the aggregation across firms and, secondly, the aggregation across time periods both of which disguise what is happening in relation to particular investments.

Consider the aggregation across firms issue first. We noted above that in time period one, $1/4$ of the aggregate physical and financial investment of 40 across the three firms is being financed from debt. But in fact only one firm (firm A) is engaging in physical investment and it is financing 50% from debt. The other two firms are just

funding their routine investment of 5 and accumulating some financial assets. Even in one time period, the large volume of routine replacement investment that is being internally funded is diluting the external financing flows.²

The much more interesting question is how are the non-routine investments of 20 being funded. The answer is 50% by debt by firm A, 25% by debt by firm B and entirely internally by firm C. On average 25% is externally funded. As Mayer and Sussman (2003) note, the difficulty that aggregate studies face is that investments should be lined up across firms in investment not calendar time, i.e. firm A's investment spike of 20 in period 1 should be aligned with that of firm B in period 2 and firm C's in period 3. However, this requires individual firm data not aggregate statistics, and not surprisingly, the picture that emerges from such studies is quite different from analyses that aggregate across calendar time.³

Turning to the time aggregation problem, even within a firm the fact that one period of a large investment is combined with two other periods of routine investment means that 50% debt financing by firm A in period 1 becomes zero over all three periods. The problem is not the subtraction of the repayment figures and excluding them does not rectify the problem – even the gross figure suggests that one-third not one-half of firm A's total investment is debt financed. Nor do stocks of outstanding debt and equity rather than flows resolve the issue: firm C might have had the largest stock of debt of all three firms none of which falls due in these three time periods and no need to raise any new external finance during these three periods.

Instead, the real problem is the merging of periods in which there is nothing interesting happening by way of non-routine investment with a period in which there is. To overcome this, Mayer and Sussman (2003) propose a filter for identifying economically interesting events in firms. One event, which is the subject of their paper, is a large temporary investment spike (like the investments of 20 in Table 1). But others might be a step change in investment or the financing of a cash flow crisis. It is possible to link these empirical measures to theories of the financing of firms.

The filtering approach therefore gets much closer to providing a basis on which to test corporate finance theories but because it is selective it cannot provide a comprehensive description of the financing of corporate sectors as a whole over particular periods. For that, aggregate flows are required and a net financing basis is the only consistent one on which to construct them.

² One approach that the aggregate estimates can take to solving this is to compute internal finance net of depreciation. Thus instead of measuring financing relative to investment gross of depreciation, the 5 of depreciation could be subtracted from both investment and internal sources giving external financing of firm A as being 75% (i.e. 10 out of 15) of investment net of depreciation. Given that, as noted above, the flows relate to changes in stocks, there is some merit in this and some of the studies report financing flows relative to investment net as well as gross of depreciation. The objection is that the relation between economic depreciation and capital consumption in National Accounting Statistics is unclear and varies across countries.

³ See also Elsas, Flannery and Garfinkel (2003) for a further application of the filtering approach that Mayer and Sussman (2003) advocate.

4 Conclusions

A large body of recent literature has pointed to the dominance of internal sources for funding investment, the importance of banks as external sources of finance and the relative insignificance of finance from stock markets in aggregate flows to the corporate sector. Banks are not a particularly important source of finance in some countries, such as Germany, that are traditionally regarded as possessing bank oriented financial systems and the significance of new equity is not closely related to the size or development of different countries financial systems.

These results have come under attack from Hackethal and Schmidt's paper that criticizes the net-flow approach employed in these studies. However, their critique is based on a misconception of what aggregate studies can and should be doing. The objective of the aggregate statistics is to record the significance of different sources of finance in funding investment (in particular physical investment) over certain periods. For that purpose, net flows are conceptually and practically the right approach and gross flows are distorted by irrelevant considerations such as outstanding stocks, the maturity of these stocks and intra- as against inter-sector flows.

Nevertheless, there are significant limitations to what aggregate studies can achieve. In particular, they cannot answer many of the questions that corporate finance theories are interested in addressing. For example, they cannot answer questions about the financing of investment projects, acquisitions or financial distress. Individual firm data combined with some filtering device to identify significant events are required to be able to tackle these. Evidence to date suggests that studies using this approach will re-establish the importance of external sources and they may well rehabilitate the conventional distinctions between financial systems. But the gross flow approach suggested by Hackethal and Schmidt is not the way to do this.

References

- Corbett, J. and T. Jenkinson (1996), "The financing of industry, 1970-1989: An international comparison", *Journal of the Japanese and International Economies*, 10, 71-96
- Corbett, J. and T. Jenkinson (1997), "How is investment financed? A study of Germany, Japan, the United Kingdom and the United States", *The Manchester School*, Supplement, 69-93.
- Edwards, J. and K. Fischer (1994), *Banks, Finance and Investment in Germany*, Cambridge: Cambridge University Press.
- Elsas, R., M. Flannery and J. Garfinkel (2003), "Firm financing decisions and long-run performance surrounding major investments", mimeo, University of Florida.
- Hackethal, A. and R. Schmidt (2003), "Financing patterns: Measurement concepts and empirical results", mimeo, University of Frankfurt.
- Mayer, C. (1988), "New issues in corporate finance", *European Economic Review*, 32, 1167-1188.
- Mayer, C. (1990), "Financial systems, corporate finance, and economic development", in R. Hubbard (ed), *Asymmetric Information, Corporate Finance and Investment*, Chicago: University of Chicago Press.
- Mayer, C. and O. Sussman (2003), "A new test of capital structure", Oxford Financial Research Centre Working Paper, 2003-FE-16.
- Rajan, R. and L. Zingales (1995), "What do we know about capital structure? Some evidence from international data", *Journal of Finance*, 50, 1421-1460.

Table 1**Illustrative Financing Flows**

This table is reproduced from Table 1 of Hackethal and Schmidt (2003). It shows financing flows for three firms over three periods. Panel A shows annual financial flows of the individual firms and Panel B the aggregate flows for all three firms and the average across all three periods.

	Panel A									Panel B			
	Firm A			Firm B			Firm C			All Firms			Ave.
Period	1	2	3	1	2	3	1	2	3	1	2	3	
Investment	-20	-5	-5	-5	-20	-5	-5	-5	-20	-30	-30	-30	-30
Flows													
Internal sources	10	10	10	10		10	10	10	10	30	30	30	30
Liquid assets													
Purchases-gross				-5			-5	-5		-10	-5	0	-5
Sales-gross					5				10	0	5	10	5
Net flows				-5	5		-5	-5	10	-10	0	10	0
Debt													
Financing-gross	10				5					10	5	0	5
Repayments-gross		-5	-5			-5				0	-5	-10	-5
Net flows	10	-5	-5		5	-5				10	0	-10	0