The (ir)relevance of financial statements

From our knowledge of valuation models we know that accounting numbers are only part of the information needed to value securities. In the Ohlson model, value is a function of (i) the book value of the firm's assets and (ii) the present value of expected residual incomes. In the MM61 model we need (i) sustainable cash flow from existing assets (something very akin to earnings) and (ii) excess profits from future investments. Both of these models have one component relating to what the firm does now, and another component relating to future activity.

A number of academic authors (and investment analysts) now believe that accounting numbers have become less and less relevant for company valuation. Their reasons differ slightly but boil down to two basic criticisms:

> Accounting practices do not measure well the first component of valuation. For example, historical cost is still the norm and this makes it difficult for financial statements to show either the book value of assets or the sustainable cash flow from existing operations
>
> Accounting practices have not kept up with the changing nature of business, namely that change (meaning investment) is necessary for survival. As the second component of valuation has become more important, accounting standards have not kept pace. Accounting for such activities (eg research & development) is still too crude.

In the context of this debate, two key papers based on US data have been published:

Francis & Schipper, Have financial statements lost their relevance?, Journal of Accounting Research, Autumn 1999

and

Lev & Zarowin, The boundaries of financial reporting and how to extend them, Journal of Accounting Research, Autumn 1999

The second paper is more critical of accounting practice than the first, but we shall discuss them in turn.

Francis & Schipper, "Have financial statements lost their relevance?", Journal of Accounting Research, Autumn 1999

F&S start off with a substantial discussion of what "relevance of financial statements" means. For example, is it the function of accounting to confirm events or to predict them? Should accounting numbers lead stock prices and bring news to the market? Or should accounting number simply be associated with stock prices.

The interpretation which they choose does not require that financial statements be the earliest source of information, merely that accounting numbers are correlated with stock prices over a long (15 month) window. In this context, they perform two types of test: portfolio tests and regression based tests. These are discussed in turn.

1. What proportion of stock returns is explained by key accounting numbers?

I - PORTFOLIO TESTS

The main idea here is to measure the excess returns that an investor would have made if at the beginning of the financial year the performance of the company were known with certainty. This is a measure of the "worth" of the accounting measure of performance; how much could be made if we had hindsight knowledge of it.

An example of this test is the formation of a portfolio on the basis of the sign of the earnings change in year "t", relative to the previous year. This is called the SIGN-$\Delta EARN_t$ portfolio. Long positions are taken for stocks with a positive change and short positions are taken for stocks with a negative change. Returns to these positions are measured over a 15 month period commencing from the beginning of the company's financial year "t" and are market adjusted (deducting the return on the equally weighted market portfolio). The performance of this portfolio measures how much excess return would have been made by knowing at the beginning of the financial year "t", whether earnings were going to rise or fall.

Other basic measures of performance are also tested in the same way:

The $\Delta EARN_t$ portfolio measures the excess returns to made by knowing the actual value of earnings for year "t". Companies are ranked by their change in earnings[1] in year "t", and long positions are taken in the top 40% of companies, and short positions are taken in the bottom 40% of companies.

The $\Delta CASH_t$ portfolio measures the excess returns to made by knowing the actual value of cash flows for year "t". Companies are ranked by their change in cash flows in year "t", and long positions are taken in the top 40% of companies, and short positions are taken in the bottom 40% of companies.

In addition, the RATIO-1_t and the RATIO-2_t portfolios are constructed on the basis of knowledge of certain key financial ratios.

The tests are carried out for each of the years 1952-1994 inclusive and the excess returns (denoted %) are as follows (taken from their Table 1).

Excess returns to hindsight knowledge of key accounting measures					
	SIGN-ΔEARN	ΔEARN	ΔCASH	RATIO-1	RATIO-2
	%	%	%	%	%
Annual average across 1952-1994	13.9	19.6	6.0	17.0	17.6

One observation on these results is that the ΔCASH portfolio performs the poorest; this is as expected since it is here that the accounting procedures are at their crudest.

The problem however, with this measure is that it doesn't tell all the story. The returns are

[1] as a % of beginning of year market value

market adjusted and therefore standardise across the general market conditions which will vary through the years. However, the tests above do not capture the size of the firm specific excess returns which are "up for grabs" in each year. Although accounting measures might earn a sizeable excess return, we do not know how this compares to the excess return that might have been made if we had had knowledge of all other firm specific information driving the share price. And this is the basic question we started with: how does the "accounting based" information set compare with other information?

In order to deal with this, F&S calculate for each portfolio, the excess returns that could have been made by knowledge of the excess returns during the 15 month test period. They then scale the previous % results by the excess returns of the "perfect foresight of excess returns" portfolio to give their %mkt results summarised below. As before, they are taken from Table 1 of F&S.

Excess returns to hindsight knowledge of key accounting measures as a proportion of all firm specific information					
	SIGN-ΔEARN	ΔEARN	ΔCASH	RATIO-1	RATIO-2
	%mkt	%mkt	%mkt	%mkt	%mkt
Annual average across 1952-1994	45.1	59.1	18.2	52.3	60.8

As before, the accrual accounting numbers dominate the cash flow measure, and capture a respectable 60% of all excess returns to be made from knowing firm specific information.

II - REGRESSION TESTS

Another approach to answering this question is simply to run regressions to see if accounting number are contemporaneously associated with stock returns. As before, returns (R_t) are measured over a 15 month period commencing from the beginning of the company's financial year "t" and are market adjusted. They run 3 models.

Earnings model

$R_t = a + b.\Delta EARN_t + c.EARN_t$

Balance sheet model

$MV_t = a + b.ASSETS_t + c.LIABS_t$

Combined model (Ohlson based)

$MV_t = a + b.BV_t + c.EARN_t$

The variables are fairly easy to guess, but to make it clear:

R	is market adjusted return as above
ΔEARN	is as before, the change in earnings during year t, scaled by market value
EARN	is earnings during year t, scaled by market value
MV	is the per share market value of the stock at the end of year t (note: not at the end of the 15 month period as in R)
ASSETS	is the per share book value of the total assets at the end of year t
LIABS	is the per share book value of the total liabilities at the end of year t
BV	is the per share book value of the company's equity at the end of year t

Each of these regressions are run across the sample companies for each year. The R^2 values for each year are given in their Table 3, and the annual averages are given below.

Contemporaneous association of market adjusted stock returns with accounting variables			
	Earnings model	Balance sheet model	Combined model
	R^2	R^2	R^2
Annual average across 1952-1994	22%	41%	62%

Much the same picture emerges as before. Accounting information captures about half (sometimes more, sometimes less) of what is going on in stock prices. But now we come to real substance of the debate; has the relevance of accounting declined over time?

2. Has the importance of accounting numbers changed over time?

In order to address this issue, F&S extend the tests we have discussed above.

I - PORTFOLIO TESTS

Recall that in the portfolio tests F&S calculated the %mkt variable for each year (above is given just the annual average). They assess the changing relevance question by asking whether %mt has changed over time; that is, by regressing %mkt on time. The basic results (showing only the sign of the coefficients) are given below. The full results are given in their Table 2.

Regression of %mkt for a given portfolio on time (years)				
Portfolio used	constant	significance	time coefficient	significance
SIGN-ΔEARN	+	**	-	
ΔEARN	+	**	-	**
ΔCASH	+	**	+	
RATIO-1	+	**	-	**
RATIO-2	+	**	-	**
Note: The signs only of the coefficients are given. F&S give the full results ** indicates significant from 0 at the 1% level of significance				

There is some evidence that the relevance of earnings and accounting ratios has declined over the years. The fact that SIGN-ΔEARN and ΔCASH show no signs of decline is probably an indication of the underlying crudity of the measures of performance.

II - REGRESSION TESTS

Recall that in each of the regression tests discussed above, one regression was run for each year across the sample of companies. F&S address the changing relevance question by asking whether the R^2 from these regressions has changed over time. Again the basic results (showing only the sign of the coefficients) are given below. The full results are given in their Table 4.

Regression of "R2 from a given regression model" on time (years)				
Regression model used	constant	significance	time coefficient	significance
Earnings model	+	**	-	**
Balance sheet model	+	**	+	**
Combined model	+	**	+	**
Note: The signs only of the coefficients are given. F&S give the full results ** indicates significant from 0 at the 1% level of significance				

The results of these tests confirm that earnings has suffered a decline in usefulness over the years. However, in stark contrast, balance sheet numbers shave become *more* important. Also, the combined model has improved its explanation of stock returns, suggesting that overall accounting has actually improved its information role and has been more than able to cope with the changing patterns of business indicated in the opening section.

3. The new economy vs the old economy

A possibility that F&S deal with is that their results mask differences between old and new economy stocks. Therefore they repeat the tests above distinguishing between high tech and low companies reporting the results in their Tables 6 & 7. A summary of them is given below.

I - THE PROPORTION OF STOCK RETURNS EXPLAINED BY KEY ACCOUNTING NUMBERS

Excess returns to hindsight knowledge of key accounting measures as a proportion of all firm specific information					
	SIGN-ΔEARN	ΔEARN	ΔCASH	RATIO-1	RATIO-2
Annual average across 1952-1994	%mkt	%mkt	%mkt	%mkt	%mkt
All stocks	45.1	59.1	18.2	52.3	60.8
High tech stocks	47.7	59.1	17.1**	55.7	61.1
Low tech stocks	49.7	60.6	24.5**	56.0	62.0
Note: ** denotes a significant difference between high and low tech at 1% level					

The only differences which are significant are for ΔCASH. Having foresight of the future change in cash brings smaller excess returns for high tech stocks. This makes sense since for high tech companies there is a substantial differences between cash and accrual accounting; they need to make large investments which generate relatively risky returns over a long time period.

Contemporaneous association of market adjusted stock returns with accounting variables			
	Earnings model	Balance sheet model	Combined model
Annual average across 1952-1994	R^2	R^2	R^2
All stocks	22%	41%	62%
High tech stocks	23%	36%**	60%*
Low tech stocks	23%	43%**	65%*
Note: ** denotes a significant difference between high and low tech at 1% level			

The results above, which examine R^2, show that the balance sheet model is not so good for high tech stocks and this seems to impact on the combined model. This difference is to be expected given the way that R&D is mostly treated as an expense in current accounting practice.

II - THE CHANGING IMPORTANCE OVER TIME

Regression of %mkt for a given portfolio on time (years)						
Portfolio used	constant	time coefficient for high tech stocks	sig from zero?	time coefficient for low tech stocks	sig from zero?	high tech sig from low tech?
SIGN-ΔEARN	+	-		-		
ΔEARN	+	-		-		
ΔCASH	+	-		+		
RATIO-1	+	-		-		
RATIO-2	+	-	*	-		
Note: The signs only of the coefficients are given. F&S give the full results * indicates significant from 0 at 5% or lower $ indicates that high tech are significantly different from low tech at 5% or lower						

The table above indicates that there are no differences over time between high and low tech stocks. However, the bad news is that the only decline over time is for RATIO-2; when this test was undertaken with the two types of stocks aggregated ΔEARN, RATIO-1 and RATIO-2 showed declines over time. So the disaggregated portfolio results do not seem consistent with the aggregate results.

Looking at the regression based models, the evidence looks more reliable. As before (when looking at both types of company), the earnings model declines over time, but the two other models improve. The results show that there is no significant difference between the two types of stock.

Regression of "R2 from a given regression model" on time (years)						
Regression model used	constant	time coefficient for high tech stocks	sig from zero?	time coefficient for low tech stocks	sig from zero?	high tech sig from low tech?
Earnings model	+	-	*	-	*	
Balance sheet model	+	+	*	+	*	
Combined model	+	+	*	+	*	
Note: The signs only of the coefficients are given. F&S give the full results * indicates significant from 0 at 5% or lower $ indicates that high tech are significantly different from low tech at 5% or lower						

4. Do the results make sense?

I - THE CHOICE OF SAMPLE PERIOD

This is clearly an important and thorough piece of work. A full understanding will come only gradually after many detailed read throughs. However, some initial thoughts might be useful at this stage. The thrust of the evidence suggests that although earnings number have become less useful, balance sheet numbers have become more useful. Two initial comments may be made:

1. We need to be cautious since the authors explicitly do not concern themselves, even at a speculative level, as to why these results make sense in the face of the *prima facie* problem with accounting for R&D referred to above.

2. Is 1952-1994 the right period over which to judge the progress (or otherwise) of accounting? Might there not be cycles within this period: improvements as the wide variation in accounting practice is narrowed by the formation of regulatory bodies and; a later decline as a result of the rise of high tech industries.? If the earnings number really is less useful than it was in 1952, then to what effect have the many very costly changes in standards been made?

II - IS THE BALANCE SHEET REALLY BECOMING MORE IMPORTANT?

One of the main findings of F&S, and therefore one of the results that really does need to be explained is that although the informativeness of earnings have been declining over time, the significance of balance sheet information has been improving. How can this be? F&S interpret the result to mean that the evidence for the decline in relevance of accounting does not point all in one direction. However, I do not believe this to be the case. Let me explain why.

In order for the tests of declining relevance to be valid, the equations that are used must be justifiable. The equations that give rise to an increasing relevance for accounting numbers are:

Balance sheet model

$MV_t = a + b.ASSETS_t + c.LIABS_t$

Combined model (Ohlson based)

$MV_t = a + b.BV_t + c.EARN_t$

Since the Ohlson model is the most theoretically justifiable of these, I shall concentrate on that, although much the same comment can be made of the balance sheet model.

There are two relevant characteristics of the Ohlson model which are pertinent.

- When price is on the left hand side, the coefficient on book value should be *unity*.

- The justification for having earnings as the sole additional variable depends on the properties of the residual income stream[2]

[2] See the discussion in Dechow, Hutton and Sloan, 1999, "An empirical assessment of the residual income valuation model", Journal of Accounting & Economics, 26/1-3 January,1-34.

The results of F&S in their Table 3 are relevant to this. The coefficient on book value is sometimes far from 1; a selection of years is given below.

1952	0.01
1962	-0.13
1972	-0.05
1982	0.47
1985	0.78
1992	0.90

In the early years the coefficient is close to zero and sometimes negative. Only in the later years is it near 1. This suggests that this particular form of the Ohlson model (that is, this particular version of the residual income stream) is not valid in the early years, and becomes representative later on. This would explain the increase in the R^2 over time. That is to say; the increasing R^2 over time does not indicate that accounting numbers are becoming more useful, rather that the particular implementation of the Ohlson model is becoming more relevant over time.

Lev & Zarowin, "The boundaries of financial reporting and how to extend them", Journal of Accounting Research, Autumn 1999

1. The basic idea

L&Z's basic experiment is to examine the association between earnings and share returns over the period 1977-96. This is a shorter period than F&S. L&Z's main contention is that the association has worsened over time. They argue that this is due in large part to the increasing importance of innovative activities (such as R&D, restructuring, human resource development and marketing) and the crude manner in which accounting standards require companies to account for these intangible investments. By and large, because such expenditures cannot be classified as assets under current accounting conventions, they are written off to the P&L thus reducing the informativeness of earnings.

2. The earnings association

They run the same earnings equation (the same definitions as above) as F&S for each year between 1978 and 1996:

$$R_t = a + b.\Delta EARN_t + c.EARN_t$$

but report the Earnings Response Coefficient (ERC) as well as the R^2. The ERC is the sum of the coefficients "b" and "c" and represent the importance which the market attaches to a unit change in either of the variables. An extract from their Table 1 is given below.

Regression of returns on (i) changes in earnings and (ii) earnings		
Year	**R^2**	**ERC = (b+c)**
1978	0.115	0.907
1987	0.069	0.646

1996	0.037	0.610

The table shows that R^2 and ERC has been falling throughout the period, and this is confirmed by a regression of each of the measures over time. This is the same finding as F&S, that the informativeness of earnings has been declining.

L&Z suggest that one of the potential reasons why the informativeness of earnings has declined might be that the market places a different (and changing) weight on cash flows and accruals and that therefore the above earnings equation is misspecified. In order to address this issue L&Z run the same model but allow the coefficients to change over time, as follows.

$$R_t = a + b.\Delta CF_t + c.CF_t + d.\Delta ACC_t + e.ACC_t$$

where
CF = cash flow, and
ACC = accruals = EARN - CF

However, this experiment gives much the same results.

3. The Combined (Ohlson based) model

L&Z also run F&S's combined model, which combines the book value of the equity and earnings.

$$P_t = a + b.BV_t + c.EARN_t$$

In this equation, the variable P (price at the end of the fiscal year) is very similar to MV in F&S. Recall that F&S find that the R^2 for this equation has been increasing over time. However, L&Z do not find this. They find a decline in R^2, just as for the earnings equation. An extract from their Table 3 is given below.

Goodness of fit for regression of stock prices on earnings and book values	
Year	**R^2**
1978	0.932
1987	0.993
1996	0.618

This result is confirmed by a regression of R^2 on time.

One issue is how is this decline in the explanatory power of the combined model consistent with the F&S finding that the goodness of fit increases over time. As suggested above, the explanation might be that the F&S period is far too long for a single version of the Ohlson model (the behaviour of residual income) to be valid; this is confirmed by the fact that the coefficient on book value is far away from the unity value it should have. The combined model, as both F&S and L&Z employ it, might be a more realistic assumption for the shorter period examined by L&Z. Unfortunately, L&Z do not give the coefficient on book value in order to check this interpretation more thoroughly.

4. The new economy vs the old economy

I - IN WHAT SITUATIONS IS THE ACCOUNTING FOR COMPANIES IN THE NEW ECONOMY LIKELY TO BE DEFICIENT?

As in F&S, L&Z address the issue of whether the decline is associated with the new economy, as discussed at the very beginning; that is, accounting practices have not kept up with the changing nature of business, with the increased importance on R&D activities. It is worth noting at this point that the L&Z interpretation of what this means differs substantially from that in F&S.

F&S conduct separate tests for new and old technology industries. However, this is a rather crude approach, partly because of:

> the vagaries of SIC industry classifications used and the difficulty of allocating a companies to just one industry;
>
> but mostly because it misses the accounting point that in a steady state (when the company has a variety of projects at different stages of completion and with different risks of failure) the charges to the P&L will be much the same whatever the accounting procedures. In a steady state, the amount charged to the P&L will be the same whether the costs are immediately expensed, or capitalised and then amortised. Consequently, the informativeness of earnings are not likely to vary across steady state companies even in industries with different amounts of R&D and intangible investments.

This second point is illustrated in the simple example below. A company regularly spends £90 on some form of intangible investment such as R&D, training or reorganisation which is known to have a benefit over the following 3 years.

Profit and loss charge for immediate expensing of expenditure					
	P&L charge in year 1	P&L charge in year 2	P&L charge in year 3	P&L charge in year 4	P&L charge in year 5
Expense in year 1	90				
Expense in year 2		90			
Expense in year 3			90		
Expense in year 4				90	
Expense in year 5					90
Total P&L charge	90	90	90	90	90

Profit and loss charge for amortising of expenditure over 3 years					
	P&L charge in year 1	P&L charge in year 2	P&L charge in year 3	P&L charge in year 4	P&L charge in year 5
Expense in year 1	30	30	30		
Expense in year 2		30	30	30	
Expense in year 3			30	30	30
Expense in year 4				30	30
Expense in year 5					30
Total P&L charge	30	60	90	90	90

In the first two years the P&L charges will differ according to the accounting practice. However, from the 3rd year on, when the company has a portfolio of intangible assets (some in the early stages of their lives and some in the later stages) then the P&L charge will not vary with the accounting practice.

Hence the important distinction is not between old and new industries, but between changing and steady state companies. In order to make this operational, in each of the sub periods 1977-83, 1984-91, 1992-96, L&Z rank firms by book value[3], forming 5 portfolios. They measure the extent to which companies switch between portfolios from one sub period to another and classify companies according to whether they exhibit low change or high change.

II - RUNNING THE TESTS FOR LOW CHANGE AND HIGH CHANGE COMPANIES

L&Z then perform the same tests as before but for low change and high change firms separately. The results below are taken from their Table 5. For low change firms neither the R^2 nor ERC has changed over the period. However, high change firms show a decline in R^2 during the period (although it just misses being significant at 5%) and also a decline in ERC.

Regressing R^2 and ERC from the earnings equation on time (1977-96)			
		Coefficient on time	t value
	Dependent variable		
Low change			
	R^2	-0.002	-0.93
	ERC	0.001	0.05
High change			
	R^2	-0.002	-1.84
	ERC	-0.007	-2.23

[3]They also mention the ranking of firms by market value, but it is not too clear how it relates to the ranking by book value.

III - RUNNING THE TESTS FOR COMPANIES WITH LOW AND HIGH R&D TO SALES RATIO

L&Z refine their evidence further by identifying firms with changes in the ratio of R&D/Sales between the early sub period (1976-83) and the later sub period (1989-95). The following results examine the changes in R^2 and ERC for these companies. The two tables below are taken from their Table 6.

Change in average R^2 from earnings equation between sub-periods 1976-83 and 1989-95, classified by the company change (Low, high) in R&D/Sales ratio

	Recent period (1989-95) R&D/Sales ratio	Low		High	
		Average R^2	Average R^2	Average R^2	Average R^2
		1976-83	1989-95	1976-83	1989-95
Early period (1976-83) R&D/Sales ratio					
Low		0.137	0.099	0.233	0.126*
High		0.080	0.178	0.156	0.126

Note: * indicates statistically significant change (at 5% or less) in average R^2 between the two sub periods.

The results above show that for companies experiencing an increase in R&D to sales (low in the early period and high in the later period) had a significant reduction in R^2 from 0.233 to 0.126 during the two periods. Also those companies having a fall in R&D/sales actually had an increase in R^2 (from 0.080 to 0.178) although it is not quite significant at 5%.

Change in average ERC from earnings equation between sub-periods 1976-83 and 1989-95, classified by the company change (Low, high) in R&D/Sales ratio					
	Recent period (1989-95) R&D/Sales ratio	Low		High	
		Average ERC	Average ERC	Average ERC	Average ERC
		1976-83	1989-95	1976-83	1989-95
Early period (1976-83) R&D/Sales ratio					
Low		1.440	0.820*	2.170	1.060*
High		0.750	1.290	1.940	1.140*
Note: * indicates statistically significant change (at 5% or less) in average ERC between the two sub periods.					

The results above indicate that the ERC generally decreased over the sample period. Two points are worthy of note:

> companies in the high-low category actually experienced an increase in ERC from 0.750 to 1.290 (although significant at only13%);
>
> the decline in the low-high group (from 2.170 to 1.060) is particularly steep.

5. In conclusion

The results of both studies seem to indicate that the informativeness of accounting information has been falling over the last 20 years. We should be clear that this should not *necessarily* be interpreted as a criticism of accounting, although L&Z do make that inference.

Thinking about equity value in terms of the MM model, one of the functions of accounting numbers is to provide an estimate of a particular component of equity value, that is, the sustainable cash flow from existing assets; it just so happens that this component has fallen in relevance over the years. The other component, the excess profits from future investment, has increased in importance.

You eat chocolate because you like it; the fact that it will not make you thinner is neither here nor there. It is simply a question of having suitable expectations. Accounting statements have a relevance for assessing the current position of companies; the fact that the future activities are becoming of greater interest in some cases is not the fault of the standard setters.

Having said that, it may well be that accounting numbers could, if suitably developed, *could* provide more information about the second component of valuation. But that is a different story. In that context, the final section of the paper makes some proposals to improve the accounting for R&D, but this aspect of the paper is not covered here.