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The effect of inventory valuation methods on share prices: Some new evidence for the JSE

Introduction

In recent years there has been an active debate in the finance and accounting literature on the relative merits of a change from the first-in-first-out (FIFO) to the last-in-first-out (LIFO) method of inventory valuation. In particular, research interest has focused on the effect that such a change is likely to have on share prices.

The reason why the LIFO/FIFO decision has been of such great interest to capital market researchers is that there are two distinct effects resulting from the change during periods of inflation. The first is that the earnings reported in the annual financial statements are normally lower under the LIFO system. The second is that because the company reports lower earnings, it pays less tax and thus there is a positive cash flow benefit to the firm. These two characteristics of the LIFO change will clearly have opposite effects on the share price and, hence, it is of interest to determine whether the accounting or the economic (cash flow) factor is dominant.

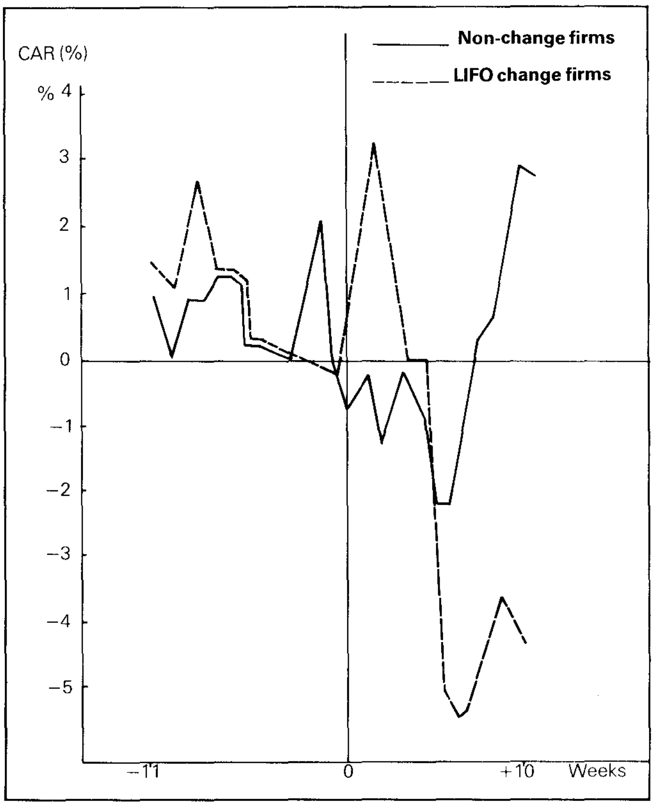
In this paper we extend the results presented in an earlier study (Knight and Affleck-Graves (1983)). By making use of a new control group we are better able to isolate whether the share price reacts in the direction of the lower earnings figure or in the direction of the positive cash flow benefits. This in turn enables us to understand the process of price formation on the JSE better and also indicates the extent to which accounting numbers may be used as a valuable source of information to South African investors.

It is worth noting at the outset that the announcement by the Minister of Finance in March 1984 that the LIFO option is to be withdrawn for tax purposes, in no way invalidates this study. The aim of capital market research is to examine and explain the process of price formation, and the LIFO change provides an ideal medium for investigating this process. Indeed, the Minister's announcement provides further possibilities for future research in that the opportunity now exists to examine the impact on the affected companies of the removal of the LIFO option. However, such results will not be presented in this paper.

Review of earlier results

Most of the studies relating to the impact on share prices of a decision to change from the FIFO to the LIFO method of stock valuation have been performed in the New York and the American stock exchanges. The results have been somewhat contradictory and as yet no clear-cut conclusion or consensus has emerged. For example, Sunder (1973) and Murray (1983) have both found a positive reaction to the change, while Abdel-Khalik and McKeown (1978) and Ricks (1982) have all found evidence of a negative reaction. As far as the JSE is concerned, the study by Knight and Affleck-Graves (1983) provides evidence of a negative short-term reaction to the announcement of a change to LIFO. Figure 1 below summarises these earlier results and it can be seen that the announcement of the change in inventory valuation policy was followed by a sharp downward reaction in share price performance. This reaction lasted for almost seven weeks after the announcement.

Figure 1



These results are very similar to those of Ricks (1982), although in the case of the NYSE the negative reaction was of much shorter duration being only one or two weeks. In the light of these results it was argued that the announcement of a change to LIFO appears to have a negative impact on subsequent share price performance on the JSE. One feature of the results which requires some explanation is the large abnormal positive return in the week of the announcement for the LIFO group on average. Previously, we were unable to explain this effect but subsequent research (Knight (1983)) has highlighted a possible reason. Most of the LIFO change firms announced their decision to change concurrently with the release of their preliminary results. In a study similar to that of Ball and Brown (1968), Knight (1983) found a large positive residual in the week of the preliminary announcement for both "good news" and "bad news" companies. Thus, the positive residual in week 0 can partly be explained in terms of the information content of the preliminary announcement rather than in terms of a LIFO effect. Note, however, that the subsequent drop in the CAR cannot be explained by a preliminary announcement effect and is, thus, more likely to be the true LIFO effect.

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Methodological issues

One of the problems of the cumulative abnormal residual (CAR) methodology (Fama, Fisher, Jensen and Roll (1968)) used in the above studies is that while it does isolate clearly the impact that the change in policy had on share prices, it does not permit an unambiguous conclusion. In fact, there are two main criticisms which have been raised against this methodology. Firstly, the results might be caused by what is known as a "self-selection bias"; that is, the firms which changed from the FIFO to the LIFO method of inventory valuation might constitute a special sub-group of companies (other than in terms of their stock valuation policy) and it might be this third (unknown) common factor which is causing the negative reaction and not the LIFO change itself. For example, the LIFO change firms could comprise firms with working capital or liquidity problems and the LIFO change might constitute a desperate attempt to improve cash flow. This would of course be a valid reason for the observed negative impact.

In practice, an attempt is made to overcome this problem by use of a control group. This control group consists of companies which are chosen from the non-LIFO change firms which are as similar as possible to the LIFO change firms in all other respects. This procedure was followed in both the Ricks and the Knight and Affleck-Graves studies. In addition, Murray (1983) demonstrated the impact that different control groups might have on the results. The second problem that arises is that the announcement of a change to LIFO is usually accompanied by additional new information to the shareholder and it could be this information which is causing the negative reaction and not the announcement of the LIFO change per se. For example, the actual impact of inflation on the company's profit is quantified for shareholders in the annual financial statements for the first time. While the market may have been aware that inflation was affecting the company's true profitability, it may not have reflected the extent of this effect and this could also explain the observed negative reaction. In practice, it is extremely difficult, if not impossible, to control for such factors and these problems have, therefore, been largely ignored. However, the averaging process used in the methodology should greatly reduce the problem.

The current study

From November 1980 until April 1983 a special situation arose on the JSE which enables a second control group of companies to be formed. This situation arose because South African companies are, in effect, taxed at the subsidiary level and not at the group level. Consequently, it is possible for the holding company to adopt an inventory valuation policy which is different from that adopted by its subsidiaries. Thus, it is possible for the subsidiary companies to report on a LIFO basis while the holding company reports on the FIFO basis. However, if the holding company is the listed company then it follows that the subsidiaries (and hence the group to an extent) can enjoy the taxation benefits of the switch to LIFO while the holding company, by reversing the LIFO effect on consolidation, reports the higher earnings figure. This practice became known locally as "flip-flopping". Between November 1980 and April 1983, twenty companies quoted on the JSE adopted the "flip-flop" procedure. However, one of the companies (Haggie) was a new listing and, hence, had to be excluded from the study. Thus, three mutually exclusive groups of companies may be examined:

(i) the 21 LIFO change companies studied in Knight and Affleck-Graves (1983);

(ii) the 21 non-LIFO companies (Knight and Affleck-Graves (1983)); and

(iii) the 19 "flip-flop" companies (Appendix A).

The research methodology used was identical to that employed in Knight and Affleck-Graves (1983) and is, therefore, only briefly reviewed below. For a more detailed discussion, the reader is referred to the earlier paper.

The general market movement was removed using the well-known market model:

$$R_{it} = \alpha_i + \beta_i R_{m;t} + e_{it}$$

where

R_{it} = the excess return on the ith security in period t;

$R_{m;t}$ = the excess return on the market in period t;

$\alpha_i \beta_i$ = the regression parameters (estimated using ordinary least squares); and

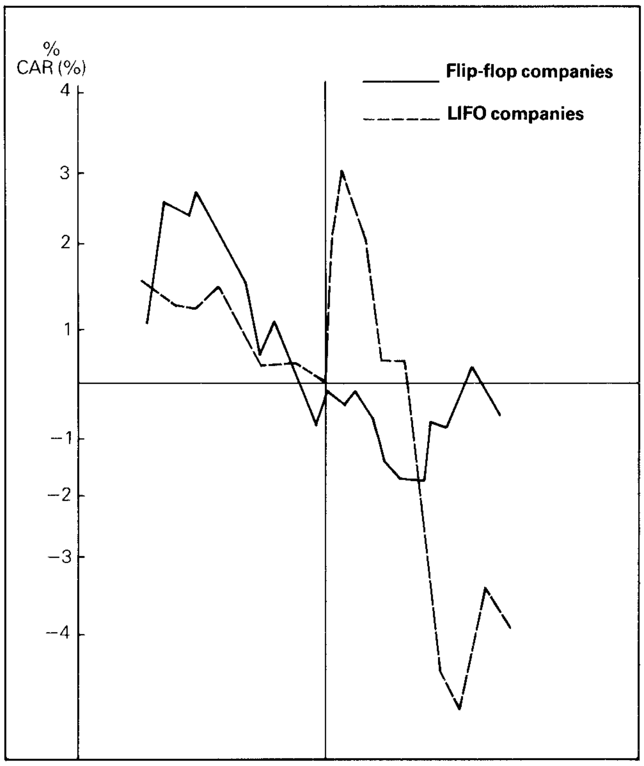
e_{it} = the random error term for security i in period t.

Finally, the CAR approach of Fama, Fisher, Jensen and Roll (1968) was employed to establish a measure of unexpected performance.

Results

The results obtained are summarised in Figure 2, which contrasts the performance of the LIFO change companies with that of the "flip-flop" companies.

Figure 2



The results indicate clearly that the "flip-flop" companies do not display the same downward drift after the announcement as do the LIFO change companies. In fact, it is apparent that there is very little reaction to the announced change in inventory policy for the "flip-flop" group. It is tempting to conclude that the results constitute strong proof that the share price reaction is dominated by the earnings effect rather than the positive cash flow benefits of the change. Once the reduction in earnings is rectified by reversal on consolidation as in the case of the "flip-flop" companies, the reaction is no longer negative. However, a word of warning is necessary. The two methodological weaknesses mentioned in section 3 still exist and they may be the cause for the difference in results.

Firstly, the question of a self-selection bias must be addressed. The fact that a better control group was used does not entirely overcome the problem. The "flip-flop" companies may represent a completely different subset of companies to the LIFO companies and, hence, the negative reaction in the LIFO change companies might be due to some other unknown factor. One could take an infinite number of different control groups by matching on a number of different factors and one would still not be able to overcome this problem entirely.

The second problem is more interesting but like the first can never be entirely overcome. However, certain explanations can be rejected in the light of the "flip-flop" results. Firstly, the liquidity or working capital argument falls away because the "flip-flop" companies obtain the same cash flow benefit as do the LIFO companies. Thus, if the LIFO companies' decision is interpreted as a scramble for cash why not the "flip-flop" companies' decision? Secondly, the argument that the LIFO change announcement indicates a lack of confidence in the future can be dismissed for the same reason. In this sense, the results presented indicate some degree of support for the findings of Biddle (1980). Finally, the argument that the exposure of the impact of inflation on earnings surprises shareholders also falls away because the effects are quantified in both the "flip-flop" and the LIFO change companies' annual financial statements. Of course, all of the above is subject to the caveat that there is no self-selection bias.

Conclusions

The overall conclusion is that the results presented above provide support for our earlier findings that the change to LIFO has a negative impact on share price in the short term. Of this, there can be little doubt.

The important question which remains unanswered is: Why is the reaction negative? Unfortunately, we cannot at this stage provide an answer. However, we can provide three alternative explanations. Firstly, the market may be inefficient in an information absorption sense in that, given a signal of economic benefit, it reacts in the direction of the accounting number which has little or no economic meaning and which is counter to the true economic benefit. Secondly, the market may be perfectly efficient and the downward reaction may be due to a self-selection bias. Finally, changes in accounting policy although themselves merely book entries may in fact provide information to the market on management's expectations which hitherto had not been available. In the case of the LIFO change, the market may attribute to management a motive other than cash saving which has a negative effect larger than the economic value of the cash saving. Further research on the long-term effects of the change to LIFO is necessary to answer these questions.

References

Abdel-Khalik, A R and McKeown, J C. Understanding Accounting Changes in an Efficient Market: Evidence of Differential Reaction. *The Accounting Review,* October 1978, pp 851–868.

Ball, R and Brown P. An Empirical Evaluation of Accounting Income Numbers. *Journal of Accounting Research,* Autumn 1968, pp 159–178.

Biddle, G C. Accounting Methods and Management Decisions: The Case of Inventory Costing and Inventory Policy. *Journal of Accounting Research,* Supplement 1980, pp 235–280.

Knight, R F. The Association Between Published Accounting Data and the Behaviour of Share Prices. Unpublished PhD thesis, *University of Cape Town,* 1983.

Knight, R F and Affleck-Graves J F. The Efficient Market Hypothesis and a Change to LIFO: An Empirical Study on the JSE. *Investment Analysts Journal,* June 1983, pp 21–33.

Murray, D. The Effect of Certain Research Design Choices on the Assessment of the Market's Reaction to LIFO Changes: A Methodological Study. *Journal of Accounting Research,* Spring 1983, pp 128–140.

Ricks, W. The Market's Response to the 1974 LIFO Adoptions. *Journal of Accounting Research,* Autumn 1982 pt 1, pp 367–387.

Sunder, S. Relationship Between Accounting Changes and Stock Prices: Problems of Measurement and Some Empirical Evidence. *Journal of Accounting Research,* Supplement 1973, pp 1–45.

Appendix A

1 Amalgamated Retail Limited
2 Dorbyl Limited
3 Greatermans Stores Limited
4 Gresham Industries Limited
5 Hunt, Leuchars & Hepburn
6 Kimet Limited
7 Lucem Holdings Limited
8 LTA Limited
9 Malbak Limited
10 Messina Limited
11 Metro Corp Limited
12 OK Bazaars (1929) Limited
13 Premier Group Limited
14 Protea Holdings Limited
15 Rennies Consolidated Holdings Limited
16 South African Breweries Limited
17 South African Druggists Limited
18 Tiger Oats and National Milling Company Limited
19 Trencor Limited