

THE CBI INDUSTRIAL TRENDS SURVEY IN SCOTLAND :
A QUANTITATIVE APPRAISAL

The CBI have been carrying out a separate Survey of their Scottish membership since 1959. Until 1972 the Survey was carried out three times a year. Since then it has been carried out quarterly. At present, about two hundred firms regularly participate in the Survey, and, of these, approximately 75% have direct exports exceeding £10,000 per annum. About 50% of the respondents employ less than 200 workers and around 25% have a workforce greater than 500. The 1972 Census of Production indicates that there are 240 manufacturing establishments in Scotland employing more than 500 workers. Thus, it appears that around 23% of these respond to the questionnaire. For smaller firms, however, coverage is rather sparse, with Census data indicating that the Survey covers only about 2% of firms employing less than 200 workers.

Survey responses are weighted by output and employment. Questions on exports are weighted by the value of the firm's direct exports. The results of the weighting procedure are then expressed as percentages, where these are intended to give the proportion of all industry, measured by net output, which would give these answers.

The purpose of this paper is to assess the operation of the Survey in Scotland and, in particular, to evaluate its quantitative implications. The analysis is carried out solely on the results from all respondents. No attempt, as yet, has been made to disaggregate by industry or by size group. The paper is divided into three sections. In the first section some analyses of the Survey results for Britain as a whole are reviewed. Following that, in the next section a number of hypotheses concerning the Scottish Survey are proposed and tested. The final section contains some tentative conclusions. Statistical details of the results will be made available to interested readers on request. We begin by reviewing the previous literature on the Survey for Britain as a whole.

1. Previous Analyses

Analysis of the CBI Industrial Trends Survey began with Shepherd (5) in 1963. He suggested that:

- (a) businessmen tend to report changes over a longer period than the four months about which they were asked.

- (b) sometimes recent changes are more highly correlated with movements in the expected, rather than current balances

Concerning individual series, he concluded:

- (1) Both the output and expected output series have, on occasion, signalled a trend in the official index of production in advance.
- (2) Orders (for which there is little official data for comparison) tend to move in the same direction as output.
- (3) Before 1963, exports were not very successfully predicted by the survey.
- (4) Trends in capital expenditure were successfully forecast, with a fairly long lead, by the survey response.
- (5) Changes in manufacturing employment have been well indicated by the balance (both reported and expected) of firms indicating an increase in employment.

Glynn (2) reviewed a more detailed survey into the manner in which firms respond to the enquiry. Some of his more interesting conclusions were:-

- (i) That the person completing the questionnaire was normally in a position of some authority in the company concerned.
- (ii) Generally, firms felt that the term "authorisation" in the question on capital expenditure was synonymous with "board approval".
- (iii) There was a certain ambiguity in the interpretation of the term 'capacity' in question 4. (Is your present level of output below capacity? (i.e. are you working below a satisfactory full rate of operation?). Most firms took 'capacity' to mean plant operating at a certain percentage of their theoretical capacity, but some interpreted the question in relation to labour force utilisation, rather than plant.
- (iv) The question found most useful by respondents after the survey results had been circulated was that on optimism. Virtually no interest was expressed in questions on employment or stocks; all other questions were placed at an intermediate level of interest.

- (v) There was definite resistance to the view that the Survey should include some quantitative questions both because additional effort would have to be expended on the questionnaire and for reasons of confidentiality.

Reid (3) considered the results of the Survey in the light of the rather esoteric statistical technique of spectral analysis. The principal difficulty with this approach is the large numbers of observations which are required before definitive statements can be made on hypotheses. Given this, the shortness of the data series from the CBI Survey suggest that all conclusions should be treated with some caution. With this proviso, Reid showed:

- (1) That there was no evidence that businessmen were unable to exclude seasonal variation from their replies. There was no discernible seasonal pattern in the replies to questions on employment, new orders, output, exports, stocks of raw materials, stocks of finished good, average unit costs and average prices, and expected capital expenditure.
- (2) That the expectations data were not particularly useful in predicting short-run movements in corresponding official series.
- (3) In the short run, business optimism was found to be correlated with series on actual and expected new orders and with expected employment while in the longer run optimism was weakly correlated with a number of official series such as employment, industrial production and GDP.

Aczel (1) investigated the usefulness of the CBI Survey in forecasting turning points in the chemical industry. His main results were the following:

- (a) As far as chemical output is concerned, there is some correlation between the reported balances in the CBI Surveys and the twelve month percentage change in the official index of chemical production. The relationship was more tenuous when a four month percentage change was used. The conclusion was that "Used with proper caution and judgement, the CBI balances for chemical output can provide some indication, though not always accurately, of trends during the current four months of likely developments in the future".
- (b) The usefulness of the Survey in predicting movements in exports was much more limited.

- (c) Optimism in the chemical industry was found to be related to the series for new orders. Unlike Reid, Aczel found little connection between optimism and employment. However, tentative evidence was forwarded suggesting that there might be a connection between profitability and optimism, as one might have expected.

Savage (4) analysed the effectiveness of the question on investment intentions in predicting movements in aggregate investment. A strong correlation was found between the balance of firms expecting to increase investment and the percentage change in actual investment at current prices for the twelve month period beginning one quarter after the CBI Survey. The evidence shows clearly that the CBI Survey can be of use in detecting turning points in actual investment. Movements in the CBI data generally precede those in the actual series by twelve to eighteen months.

A final piece of evidence on the usefulness of the CBI Survey for the UK as a whole is given by Taylor and McKendrick (6). They compare each of four commonly used indicators of the pressure of demand with what they assume to be the theoretically best available measure - a Wharton index of capacity utilisation. Their findings suggest that the CBI index of capacity utilisation, although not perfect, is a more reliable guide to the pressure of aggregate demand, particularly in recent years, than the unemployment rate, the vacancy rate or the Bank of England index of capital utilisation.

In conclusion, it is reasonable to argue that most of the UK studies have found that, in addition to its role in disseminating information amongst the membership, the CBI Survey can, if used with caution, provide a useful indicator of overall economic trends. We now turn to the question of whether the Scottish Survey can prove equally useful in forecasting movements in the Scottish economy.

2. Evaluation of the CBI Survey in Scotland

Before developing specific hypotheses concerning the performance of the Scottish Survey, a number of general points regarding the nature of the proposed analysis ought to be made.

Firstly, there is scope for the use of the Scottish Survey as an indicators of trends in the Scottish economy, particularly for output, investment and employment, just as the UK Survey can be used

to forecast trends in the UK. However, the official series with which one is comparing the Survey results tend to be of lower quality in Scotland than they do in the UK. For instance, investment data for Scotland are now only available on an annual basis and tend to have a production lag of about two years. The index of industrial production for Scotland is often subject to quite extensive revision and employment data are usually revised in the light of the most recent census of employment (currently 1976). Thus, one may find that using the CBI Survey to predict movements in the Scottish economy is hazardous, not because of inherent weaknesses in the Survey, but because our perception of what is really happening to the Scottish economy is rather hazy and outdated.

Secondly, there are areas where no official data on the Scottish economy is available. Principal amongst these are exports and prices. However, data on these variables exist for the UK as a whole. This opens up a very interesting, if hitherto unexplored, area of analysis which demonstrates that, in a sense, the CBI Survey is relatively more useful for analysing the Scottish economy than for the UK economy as a whole. The point is that the Survey can be used as an indicator of trends in variables for which no official data exist in Scotland. If, as we might expect, prices and exports in the Scottish economy tend to move along broadly similar lines as those in the UK as a whole and these trends are accurately reflected in the Survey, then one would expect a high correlation to exist between the results for Scotland and those for the UK. A relatively faster (or slower) rate of growth in, say, exports, resulting from differing demand or cost structures, could be detected by examining trends in the Survey response on exports in both areas.

Finally, although, as indicated above, it is useful to compare Scottish and UK Survey responses for variables for which no comparable Scottish data exist, there is also obviously scope for comparison of those series for which official counterparts do exist. Comparison of these series might well provide further insights into the relatively strong performance of the Scottish economy vis-a-vis the rest of the UK until the end of 1976 and into its vacillating performance since then.

Having made some general observations on proposed methods of analysis, we can now consider each of these in more detail. We begin by evaluating relationships between official data on the Scottish economy and the CBI Scottish Survey.

There are three main areas where official data on Scotland exist

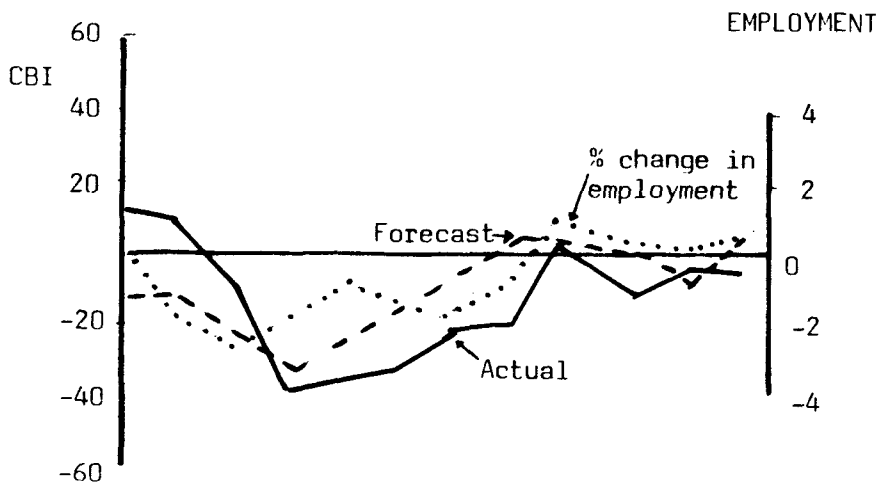
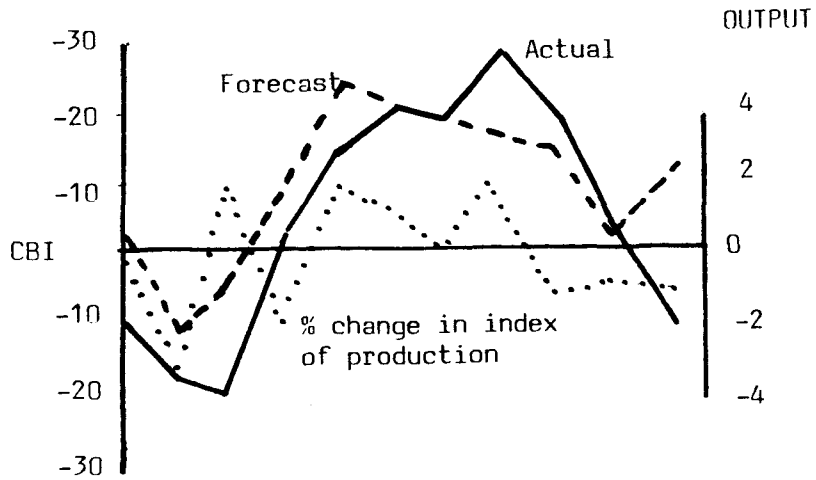
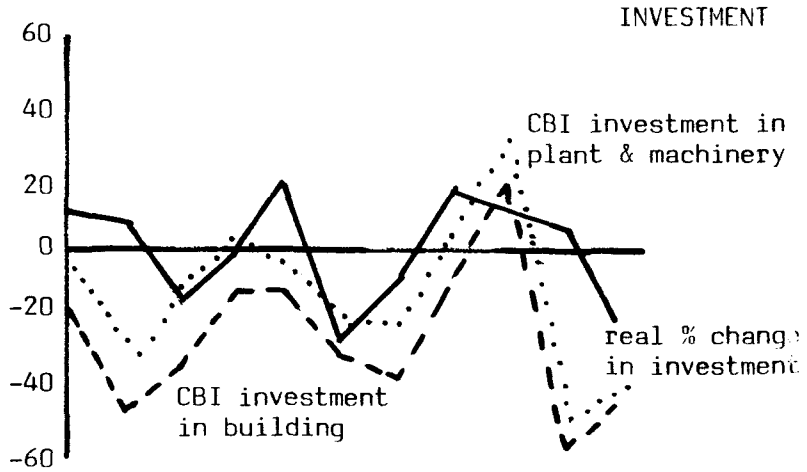
which can be compared with the Survey results. These are (A) investment, (B) output, (C) employment. These are now considered in turn.

A. Investment

Official data on investment in Scottish manufacturing industry are largely derived from the census of production. These are annual, and the most recently available figure relates to 1976. The data is in current, rather than constant prices. One can crudely deflate the current price figures using the implicit investment deflator from the Blue Book. However, this begs the question as to whether or not industrialists normally respond to the Survey question on investment intentions by adjusting expenditure to allow for price changes. It appears likely that some respondents make an effort to adjust to constant prices while others do not. Thus, the observed Survey response is some weighted average of replies given in constant and in current prices. This obviously is a formidable obstacle to comparison of the series.

A further difficulty concerns the timing of the Survey. The question answered by industrialists is the following: "Do you expect to authorise more or less capital expenditure in the next twelve months than you authorised in the past twelve months?" Note that the question relates to authorisations rather than expenditures. As mentioned earlier, this point was brought out by Glynn (2) for the UK Survey as a whole. One would generally expect some delay before board authorisations are transformed into expenditure. Now, given that investment data for Scotland are available only on an annual basis some annual figure has to be derived from the quarterly results of the Survey. Using some averaging procedure for the quarterly data would involve problems of overlapping time periods. This problem was avoided by choosing one particular survey response and comparing it with the official outcome. The January response comparing authorisations over the past twelve months with those for the forthcoming year would appear to be the most obvious choice. However, as argued above, given that there is likely to be some delay between authorisation and expenditure, one might also consider the October, or perhaps even earlier, responses.

A final difficulty is that the CBI Survey disaggregates investment between plant and machinery and buildings. No such breakdown is available for the latest official data. Rather than impose what would be a somewhat arbitrary weighting scheme to the two series to form an aggregate series, both are considered separately in the following analysis.



Source: Confederation of British Industry

Clearly, there are immense problems in ensuring comparability between the official investment series and the CBI series. However, one must bear in mind that at the UK level, the investment intentions series are probably the most accurate indicators of short-term changes in aggregate demand.

Regression analysis of the data does in fact show that there is a strong positive relationship between percentage changes in the aggregate level of investment in Scotland and the changes in investment in plant and machinery and in buildings implied by the CBI Survey. The relationship is strongest when the actual investment data are adjusted to take account of price changes and the October CBI Survey results (see Figure 1) are used. This latter point suggests that there is some truth in the argument that there is a delay between board authorisations and actual investment expenditures.

A further point is worth noting, namely, that the CBI response tends to underestimate the level of change in investment expenditures and to overestimate the fluctuations of the change in investment expenditures. In other words businessmen are generally over-pessimistic about investment, but when any improvement takes place they tend to err on the side of optimism. In concrete terms, when the balance of firms expecting to increase expenditure on buildings is zero, one can in fact expect an increase of some 12% in real terms in building investment. (Only once since 1965 has there been a positive balance favouring an increase in building investment in the October Survey.) If the balance in favour of increasing building expenditure increases by 10, then the real increase which can be expected will only be of the order of 5%. For plant and machinery for a similar increase in the CBI balance the real increase to be expected is marginally less, at 4%. Perhaps businessmen, given the long term nature of investment in buildings, implicitly compare the coming twelve months with a period greater than twelve months in the past, during which their building programme has been developing. This would explain their tendency to over-pessimism about future changes in investment. Certainly, the intentions data for investment in plant and machinery, which one would expect to be a more short term investment, suggest a much less pronounced tendency to overpessimism.

B. Output

Recently, the CBI Survey has changed its question regarding changes in output from value to volume terms. Clearly, given the large fluctuations in prices which have taken place in recent years, this was an important and potentially useful change. Comparison of the

volume series (see Figure 2)* with the Scottish index of industrial production is possible for the period covering the first quarter 1975 to the third quarter 1977. Compared with the investment data, the output data pose much less severe statistical problems. Using regression analysis to compare the CBI and official series was therefore much more straightforward. Over the period, taking account of the inevitable seasonal fluctuations in the official index, there was a clear positive correlation between percentage changes in the index of industrial production and the net balance of firms reporting a change in output over the past four months. What is surprising, however, is that an even stronger positive correlation emerges if, rather than using the reported change over the past four months, one uses the forecast change over the coming four months. One possible explanation of this seeming anomaly is that, for many industries, sales, rather than production, are used as indices of output; and it is these figures which are used to construct the Scottish index of industrial production. There is an inevitable lag between production and sales which will tend to vary from industry to industry. Thus the index of industrial production may tend to lag slightly behind actual fluctuations in output. If the businessman tries to maintain a constant stock level then he will aim at a forecast level of production which equals his expected sales. If he can estimate future sales with some accuracy, then given our earlier argument that the index of production to some extent reflects sales rather than output, then one should not be surprised to find a strong correlation between the forecast volume of production and the volume as measured by the index of production.

Again, the results demonstrate that the responses to the CBI Survey show a great deal more variability than do actual fluctuations in output, an increase of 10 in the CBI balance forecasting an increase in the volume of output generally only accompanying approximately a 1% rise in measured output.

If one wishes to relate changes in output to the CBI Survey over a longer time period than that considered above, one cannot use the CBI output data, because, as mentioned earlier, the series has changed from a value to a volume basis. However, an obvious alternative series to use, which has been maintained consistently since the instigation of the CBI Survey, is that on capacity utilisation. Decreases in capacity utilisation generally accompany reductions in output, one would expect. However, this is not always the case. An increase in the stock of plant and

* Additional unpublished figures on the volume of output were kindly furnished to us by the CBI in Scotland.

machinery can have the effect of simultaneously increasing output and capacity utilisation for fluctuations in the capital stock, using the official investment series, mentioned earlier. Having done this, using annual data for the period 1965-1975, the results indicated that, *ceteris paribus*, the level of capacity utilisation tended to increase when output increased and fall when the capital stock increased, as one would expect. Again, the correlation was quite strong, a rise of 1 unit in the index of industrial production generally accompanying a fall of 4 units in the balance of firms working below full capacity.

C. Employment

The final area of comparison between official Scottish data and the Scottish CBI Survey is that of employment. Quarterly data on the number of employees employed in manufacturing industry have been produced by the Department of Employment in Scotland since 1974, and these were compared with reported and forecast changes in employment from the Scottish CBI Survey over the same period, (Figure 3).

The results, somewhat surprisingly, given the apparent success of the investment and output analyses, do not lend much support to the view that the Scottish CBI Survey can usefully predict movements in Scottish manufacturing employment. In fact, the relationship between reported changes in employment and manufacturing employment appears to be negative, although not significant. The relationship with forecast changes in employment is positive and therefore not counter-intuitive. However, the positive relationship is not statistically significant.

The failure to establish significant correlations between the Scottish survey data and the official employment series is not encouraging. However, as an alternative it was decided to determine whether the UK survey results might provide a better forecasting base for trends in employment. Surprisingly, the relationships between the UK survey results and Scottish employment are much stronger. The relationship between the forecast growth in employment in the UK over the next four months and the percentage change in Scottish employment is positive and statistically significant. It suggests that a 1% rise in manufacturing employment is normally heralded by an increase of 14 in the balance of firms in the UK expecting to increase employment over the next four months.

Clearly, the fact that the UK survey is more closely related to Scottish employment trends than is the Scottish survey is puzzling. One might argue that the Scottish sample is heavily weighted away from small firms in which the bulk of employment changes take place. But even if it were known that small firms accounted for most of the variance in employment then it is surely the case that the UK survey is just as heavily weighted against small firms as is the Scottish survey. Alternatively, one might argue that the Scottish survey must be drawn from a biased sample even for large firms. However, if this is the case one would surely expect similarly bad results from the investment and the output data. The bias is unlikely to relate only to employment and not either to investment or output.

A final explanation relates to the nature of the employment statistics. The quarterly series are frequently revised in the light of new information (particularly when the annual census of employment becomes available). It may be the case that the use made here of figures which are still provisional should cast doubt on the reliability of the analysis. If this is correct then one will have to wait until a sufficiently long, reliable set of employment statistics become available before coming to definite conclusions as to the value of the Scottish survey responses on employment.

The second mode of analysis discussed at the beginning of this section was that of comparison of Scottish and UK CBI results for those questions for which no comparable official Scottish series exist. As mentioned earlier, the two principal areas in which it was decided to concentrate this analysis were prices and exports. These are now considered.

Prices

The CBI Survey has regularly featured questions on recent and expected trends in the prices at which domestic and export orders are booked. If these accurately reflect movements in manufacturers prices, then a result which suggested that the trend in prices was significantly different in Scotland from that in the UK as a whole would clearly have interesting implications for the Scottish economy. On the demand side, a fall in the relative price of Scottish goods might indicate a reduction in the demand for those goods. On the supply side, a fall in relative price might come about as a result of lower labour or capital costs (perhaps as a result of government regional policy) or by a reduction in the level of profits taken by firms. Obviously the effect on output of relative price changes will be different, depending on which side

of the market exerts more pressure. A fall in relative price, brought about as a result of demand pressures will probably be aimed at maintaining the current level of output whereas a fall brought about by supply side influences may enable some expansion of output.

Using data from the first quarter of 1972, when the Survey changed to quarterly enquiries, a comparison was made between the Scottish and UK responses on price changes. All Scottish series exhibited a strong positive correlation with their UK counterparts. Three of the four comparisons (past trend in domestic prices, past trend in export prices and expected trend in domestic prices) suggested that growth in prices over the period may have been somewhat slower in Scotland. However, only for the past trend in domestic price was the difference significant. One would hardly expect significant differences in movements in export prices due to the strong influence on these prices of exchange rate fluctuations which are common both to Scotland and to the UK as a whole.

For the data on expected trend in export prices the Scottish series appears to have grown marginally faster than that for the UK as a whole. However, the difference was not statistically significant.

Exports

The level of exports from Scotland has been a subject of much speculation in the past. The only direct attempt to measure Scottish exports was made by the Scottish Input-Output Project for the calendar year 1973 and the sole regularly available indicator of trends in exports is the Scottish CBI Survey. If there were a strong correlation between Scottish and UK responses on exports in the Survey and between official UK figures and the UK response, one might indeed be able to construct some crude index of fluctuations in Scottish exports. (Obviously the same procedure could be followed for prices). However, this discussion is restricted to a discussion of the relationship between Survey responses on exports in Scotland and in the UK as a whole.

As with output, the Survey questions on exports have recently been framed in volume, rather than value, terms. Since the series on volume is still rather short it was decided to base the comparisons on the earlier series based on value. This had the obvious disadvantage that similar trends in export prices, which have been

alluded to above, will tend to bias the results in favour of accepting the hypothesis that trends in Scottish and UK exports tend to be very similar. However, the results do not indicate any strong correlation whatsoever between the Scottish and UK series as far as both the value of past and future export deliveries. This is indeed surprising, given that almost all other Scottish Survey data correlate well with the corresponding UK figures. This difference might be explained by a number of factors.

1. Scottish businessmen have been interpreting the Survey questions on exports in a different manner from those in the rest of the UK. This seems an unlikely explanation given the close correlations on other questions.
2. The commodity structure of Scottish exports is quite different from that in the rest of the UK and responds to a different set of external economic factors. This seems quite plausible given that the Input-Output survey revealed that Scottish exports to the rest of the world are concentrated on a few particular commodities. Over 35% of Scottish exports to the rest of the world in 1973 came from whisky, electronics and shipbuilding. As a fraction of total UK exports these industries are much less significant.

The final form of analysis of the Scottish results of the CBI Survey is to consider comparisons between Scottish and UK series where corresponding official data does exist. To summarise the results it is true to say that strong positive correlations do exist between UK and Scottish series, and, in general, no significant differences exist between rates of change within each pair.

Rather than considering these results in detail let us examine some of their broader implications. Firstly, one might perhaps be somewhat surprised to find that the Survey indicates that the Scottish and UK economies have, as a whole, moved very closely together over the last five years. During this period the government has pursued an active regional policy and there has been substantial expansion of activity relating to the North Sea in Scotland. Both of these influences might lead one to expect faster growth of output, employment or investment in Scotland than in the UK. To a small extent official figures confirm this view. However, one must bear in mind that the Survey only consider manufacturing industry and therefore many North Sea activities do not come within its ambit. Also, regional policy also applies to many other areas of the United Kingdom, particularly those in which

manufacturing is concentrated. The advantages which Scotland enjoys as a result of regional policy are therefore much less than one might at first imagine.

Further, one must realise that, even if there did exist forces making for divergence of the Scottish and UK economies, there are strong reasons why such divergence might not be wholly reflected in the Scottish and UK Surveys. The decision makers who complete the questionnaires will tend to be influenced by the views of other businessmen from all parts of the UK especially with regard to future performance. The view to which they finally subscribe may therefore to some extent reflect a consensus view as well as the particular circumstances of their firms. Also, businessmen are open to the same media influences in all parts of the UK. Many of the views and attitudes emanating from the media will be absorbed by the business community. Again, the effect of widespread dissemination of information on the state of the economy etc. will tend to reduce the range of variation in survey results.

A second broader implication of the Scottish/UK Survey comparison is the following: given that there is a high correlation on nearly all Survey responses between the Scottish and UK Surveys and also that, in at least one instance, it appears that the UK results are likely to provide better forecasts of a Scottish macro-variable than are the Scottish results, does the independent Scottish CBI Survey serve any useful purpose? A number of points can be made in response to this query. Firstly, the knowledge that the economies of Scotland and the UK as a whole move very closely together is useful per se. The CBI Survey confirms this view. Secondly, should substantial divergence ever occur, the Scottish Survey may indicate the reasons behind it. (Though this divergence would have to be of a higher order of magnitude than that experienced in the recent past given the forces making for a convergence of views in the business community mentioned above.) Thirdly, the Scottish Survey, as mentioned earlier, does provide information in areas where no official data exist, and these do not necessarily correlate closely with the corresponding UK series. Lastly, even though it appears that the relationship of Scottish employment with the UK Survey response on employment is stronger than with the Scottish response, this pattern is not repeated for other variables. In general, official Scottish statistics are more strongly related to the Scottish Survey than to the UK Survey.

Conclusions

In this article the performance of the Scottish CBI Survey has been reviewed with respect to official Scottish statistics and with

respect to the overall UK CBI Survey. The results tend to show that fairly strong relationships exist between official series and the Scottish Survey, though interestingly, for Scottish employment, the relevant Scottish response performed less well than did that for the UK as a whole. Given the customary lag in the production of official statistics these findings suggest that the Scottish CBI Survey provides a useful service in providing a reasonably accurate picture of recent trends in, and the current performance of, the Scottish economy. Further, the Survey provides information in areas not currently encompassed within the range of official statistics, notably on exports and prices. Finally, although correlations between Scottish and UK Survey results are generally high, there is still a sound case for maintaining the Scottish Survey.

References:

- (1) Aczel, J A "The Usefulness of the CBI Industrial Trends Surveys for Forecasting in the Chemical Industry", Applied Economics, 1969 Vol.1, pp 205-210
- (2) Glynn, D R "The CBI Industrial Trends Survey", Applied Economics, 1969 Vol. 1, pp 183-196
- (3) Reid, D J "The CBI Industrial Trends Survey - A Statistical Note", Applied Economics, 1969 Vol.1 pp 197-203
- (4) Savage, D "Interpreting the Investment Intentions Data", NIESR Economic Review, No 73, August 1975
- (5) Shepherd, J R "The FBI Industrial Trends Enquiry", NIESR Economic Review, 1963
- (6) Taylor, J and McKendrick, S "How Should we Measure the Pressure of Demand", Lloyds Bank Review, January 1975