FORECASTING PERFORMANCE:

The case of the Dutch business services*)

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This paper examines the forecasting performance of firms in the business services. The performance accuracy is quite satisfactory, even with respect to turning points. This is concluded from a survey which is conducted among some important business services subsectors. There are differences by firm size and sector. The largest firms predict relatively worse. On average firms in the computer services predict best, though with relative high variance. There also is a clear seasonal effect in forecasting performance.

Firms use forecast information to decide now on investment and work force adjustments in order to maximize future revenues. This imposes a burden on predicting adequacy: decisions on incorrect forecasts might cause costly revisions in production. Therefore, it might pay the firm to gather as much information that is necessary to minimize the forecasting error.

Little is known about the forecasting performance of firms. This study provides an assessment on how good or bad, firms judge their future turnover. The analysis is restricted to a sample of firms in the business services sector. The data source is a survey which is conducted among some important business services subsectors. The paper is laid out as follows. In the first section the survey method is described. The second section contains the results. They are differentiated by firm size and sector of activity. The third section concludes with some preliminary reflections on how to increase the scope and usefulness of the survey. The suggestions are mainly *ad hoc* and relate to coverage of the survey, speed of publication and dissemination of the results.

1. Survey Description

The survey under consideration has been conducted with a periodicity of a quarter since 1992 with a sample of about 650 firms in selected sectors of the Dutch business service branch. Firms are asked some 'qualitative' questions to judge their present and future order books and employment situation.

The survey is designed to observe predominantly the same firms each quarter. Firms, however are free to attend. Of all responding firms (around 525 permanently each quarter) almost sixty percent participated each quarter during the period 1992.1-1995.1. Most other firms did attend, not each quarter, but most of the quarters in this period.

Three sectors of the business services branch are covered, i.e. the :

- computer services;
- engineers, architects, other technical designing and consultancy agencies; and
- economic consultancy agencies.

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To be included in the sample, firms additionally must have a minimum number of employees. For the economic consultancy sector a number of at least ten employees is imposed, for the two other sectors a lower limit of twenty employees applies.[1] This rule resulted in on average 115 firms in the economic consultancy sector, 145 in the computer services and 265 in the engineers, architects *etc.* (period 1992.1-1995.1). The selected sample of firms contributes for the most part of total branch turnover.

Business services firms not included in the sample are auditors, accountants, tax experts, publicity and advertising agencies, temporary employment agencies and press and new agencies and other business services. In this respect the survey is not fully representative for the business services. Table 1 (see Annex) gives some idea of the sample coverage in terms of net turnover, number of employees and number of firms. In 1992, total net turnover in the business services comprised 48 billions of guilders, of which about 45 percent may be attributed to the concerning three sectors. In terms of employees and firms, the coverage is 48 percent and 50 percent, respectively.

The survey questionnaire is adressed to the manager of the firm. It contains only four questions. These questions are qualitative in nature. The following two questions are directly of interest to us:[2]

Question 1. Your present turnover in relation to the previous quarter is:

- ☐ higher
- ☐ almost the same
- ☐ lower

Question 2. Do you expect your turnover in the next (relative to the current) quarter to be:

- ☐ higher
- ☐ almost the same
- ☐ lower

Forecasting accuracy is easily determined by comparing the firm's answers to the second question in the current quarter and the first question of the subsequent quarter.[3]

1) The lower limit of 10 employees for the economic consultancy sector is applied for statistical reasons.

2) The questionnaire in Dutch also includes comparable questions with respect to order books and employment.

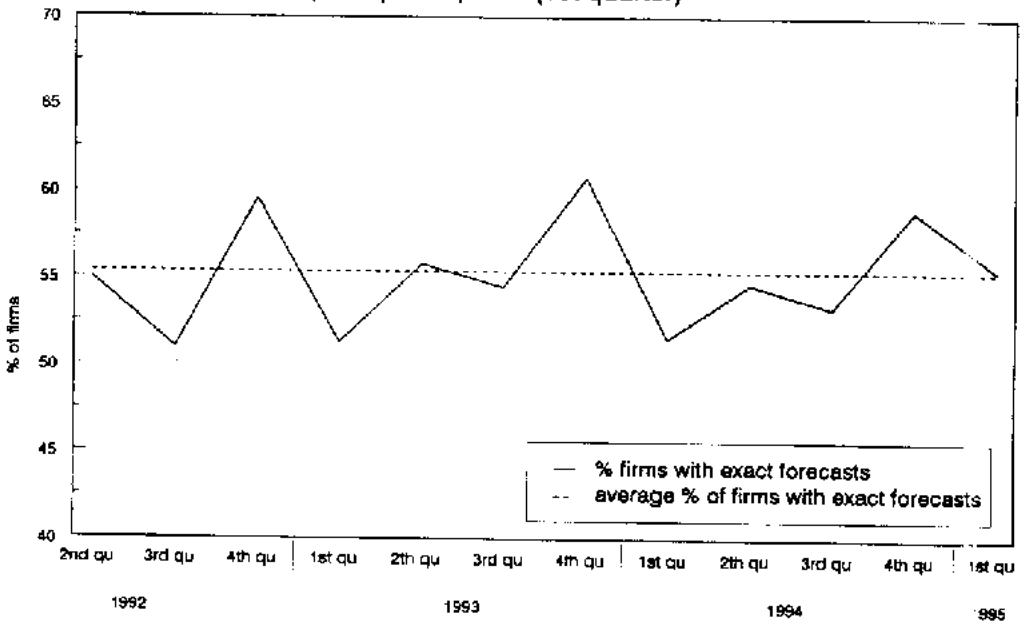
3) Throughout the paper, we speak about the forecasting performance of the **firm**. Actually, we do not know who completes the questionnaire within the firm. The questionnaire is send to the managers of the firm, but it could also be answered by the accounts department. In theory, both could judge the current business position differently.

2. Results

As a measure of forecasting performance, the percentage of firms with the same answers on both questions in the subsequent quarters is used. Given the three answer possibilities, if only one third of the firms predicts correctly, forecasting is simply a toss-up. The percentage of exact forecasts therefore needs to be substantially higher to speak of a good forecasting performance.

Figure 1 displays the quarterly data on forecasting performance over the period 1992.2-1995.1. To understand the figure correctly, consider the first data point in 1992.2. It reflects that in 1992.1 about 55% percent of the firms did correctly judge turnover development for 1992.2. The average percentage of firms with exact forecasts was somewhat above 55%. This is significantly higher than the reference of one third, implying a quite satisfactory forecasting performance.

Figure 1 Firm's forecast accuracy of turnover developments in the business services, 1992(2nd quarter)-1995(1st quarter)



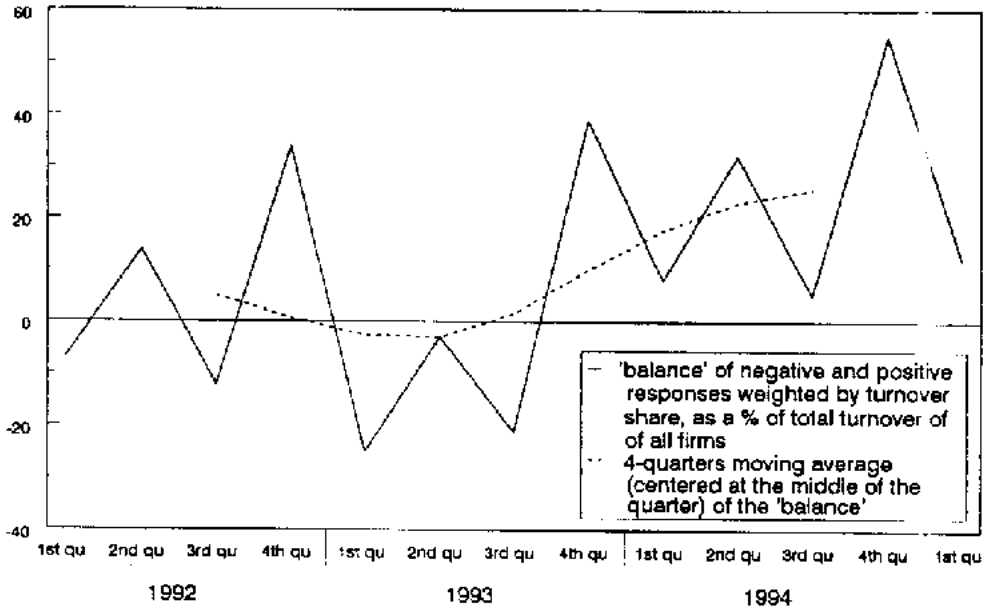
Source: Statistics Netherlands

Over time there are some fluctuations which appear to follow a seasonal pattern, with the fourth quarter relatively easy to predict and the first relatively worse. It would be interesting to ask some firms why this is the case.

Forecasting accuracy may not be valued the same each moment **in time**. In an economic upswing or downturn, predicting is relatively easy. The real achievement is in the prediction of turning points. Figure 2 contains the quarterly data on a measure indicating how firms judge their turnover development. This indicator measures the difference ('balance') between the number of firms which realized a 'higher' and a 'lower' turnover relative to the previous quarter. In the figure 'higher' is indicated as a 'positive

answer' and 'lower' as a negative answer.[4] The numbers are weighted by the firm's individual turnover to yield an aggregate estimate for the whole branch. The 4-quarters moving average representing some kind of 'trend' indicator' clearly indicates the turning point in 1993.3.[5] From Figure 2 it follows that the turning point is predicted fairly well. Remarkably, the forecasting performance in this point is even higher than for 1992.3 and 1994.3.

Figure 2 Firm's judgement of turnover development, business services, 1992(2nd quarter)-1995(1st quarter)



Source: Statistics Netherlands

It is perceivable that forecasting performance differs by firm size or sector. One view is that for the owner-entrepreneur of a relatively small firm the market is more transparent than for the manager of a large firm (e.g., the product mix is more simple, less markets need to be supplied and there is a limited group of customers), whereas sector differences might reveal differences in market complexities and dynamics.

In Figure 3 the quarterly results by **size** of the firm are shown. Three turnover categories are distinguished:

. 10 million guilders or more a year;
. 5 - 10 millions guilders a year;
. 5 million guilders or less a year.

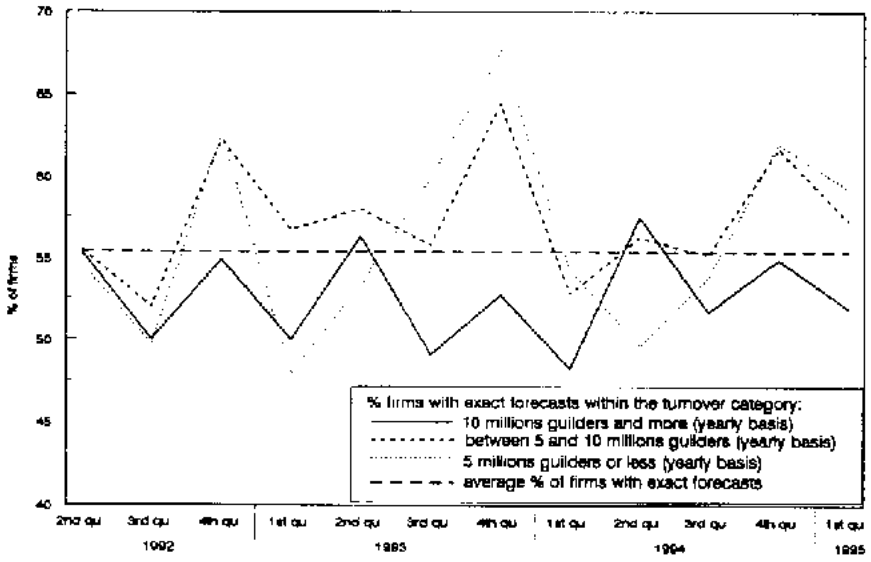
4) The graph should be interpreted in terms of changes in opinion. A movement over time in the reply percentages signifies a change in the opinions of those questioned. It is verified by experience that the reply behavior of those surveyed does not alter very much over time (European Economy, 1991).

5) Surprisingly, the seasonal pattern of Figure 1 is more or less also present in Figure 2, giving some support to the hypothesis that good times (read the fourth quarter) are more easily to predict than bad times (first quarter).

It should be noted that in the figure firms are classified by their turnover in 1991; quarterly data and updated yearly information for the sample under consideration is not available. The fixing of turnover at the year 1991 actually is unwanted if one wishes to establish a possible relationship between size and forecasting performance. At best, the effects cancel out and there is no systematic movement over time towards one of the three categories. Since we are not sure, we can only make the careful conclusion that the forecasting accuracy of the largest firms is below average. This is substantiated by the fact that the forecasting accuracy is quite stable and below the average over the entire period. Moreover, expert opinion suggests turnover growth of the largest firms from 1991 to 1994. This result gives some support to our earlier hypothesis that the larger firms predict relatively worse.

The quarterly results by **sector** are displayed in the Figures 4 to 6. Respectively, they relate to the economic consultancy agencies, the computer services and the engineers, architects and other technical designing and

Figure 3 Firm's forecast accuracy of turnover developments in the business services by size, 1992(2nd quarter)-1995(1st quarter)



Source: Statistics Netherlands

consultancy agencies. The sequence used follows the importance in terms of turnover (see Table 1, Annex). On average, firms in the computer services have the best forecasting performance, followed by the engineers a.o. and the economic consultancy agencies. The percentages are 56, 53,6 and 52,4. The standard deviation of the forecasting performance is highest for the economic consultancy agencies (10,8) and lowest for the engineers a.o. firms (4,3); for the computer services firms it is 8,7. In all, the differences in forecasting performance between the sectors are quite small.

Figure 4 Firm's forecast accuracy of turnover in the economic consultancy agencies, 1992(1st quarter)-1995(1st quarter)

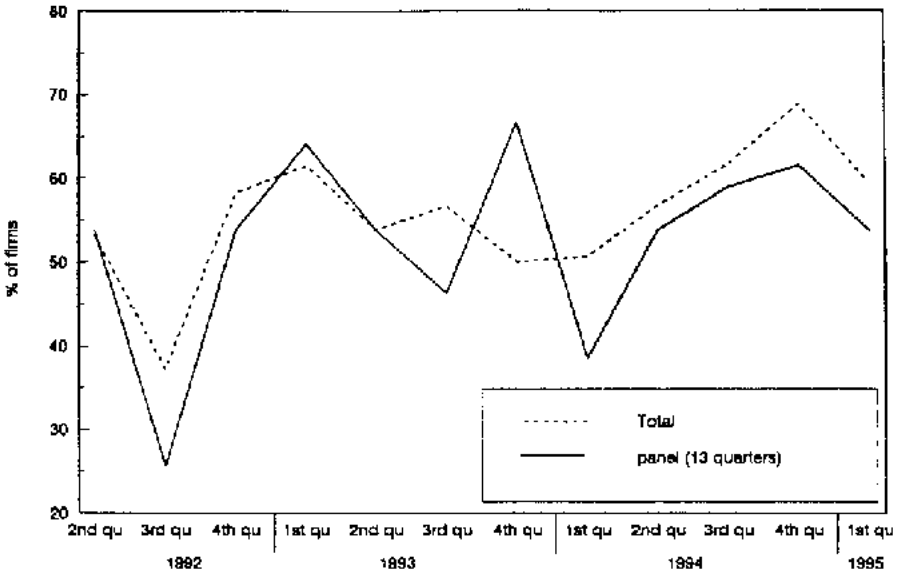
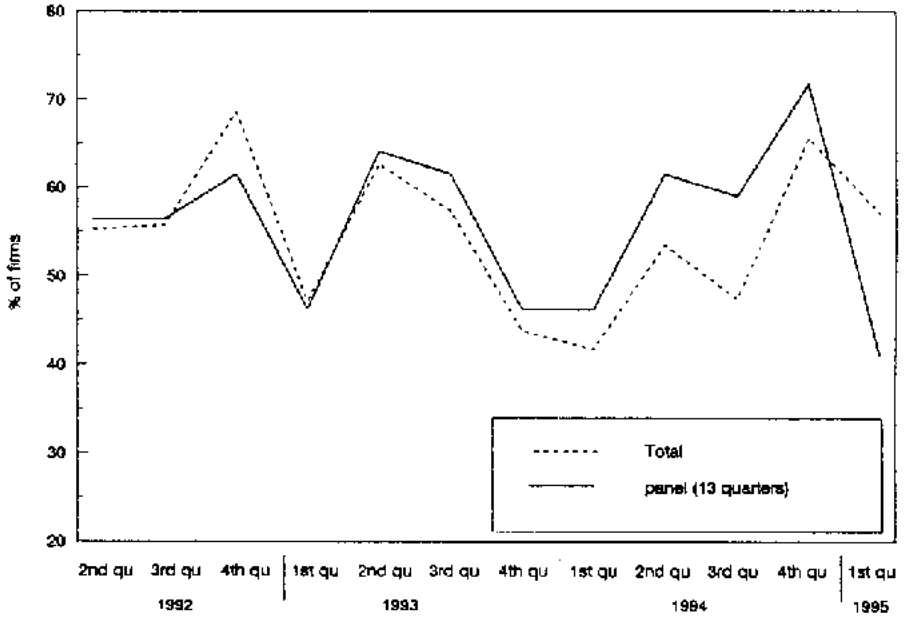
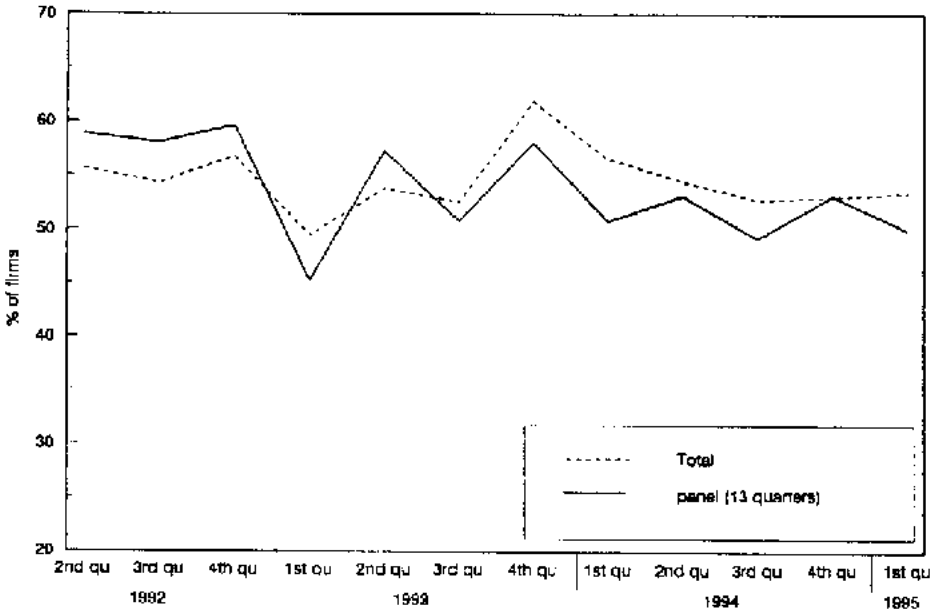


Figure 5 Firm's forecast accuracy of turnover in the computer services, 1992(1st quarter)-1995(1st quarter)



Source: Statistics Netherlands

Figure 6 Firm's forecast accuracy of turnover in the engineers, architects and other technical designing and consultancy agencies, 1992(1st quarter)-1995(1st quarter)



Source: Statistics Netherlands

With some exceptions the **seasonal pattern** in forecasting performance of the branch shown in Figure 1 repeats itself for firms in the engineers a.o. and the computer services sectors. For the economic consultancy agencies quite a different picture emerges. We do not know why.

Remarkably, the seasonal pattern in forecasting accuracy for firms in the engineers a.o. sector completely disappears from 1994.1 on, as a declining trend starts. This phenomenon is not observed for the other sectors. We speculated about likely causes and considered the possibility of survey weariness. To study this a sub category (panel) of firms was selected which have been responding each quarter throughout the period 1992.1-1995.1. The forecasting performance of this category is shown in Figure 6. There seems to be some evidence of a declining trend from the second quarter of 1994 on. As the number of observations is too small it would, however, be premature to come to conclusions. As a matter of fact, another possible explanation could also be that firms turnover has grown, possibly reflecting a relative high inflow in the highest size category with relative bad forecasting performance.

3. The broader perspective: dissemination of results

In this paper we have examined the forecasting accuracy of firms in the business services. Evidence from a survey which is conducted among some important business services subsectors indicated quite a good forecasting performance, even with respect to turning points. The results are analyzed by size and sector and seasonal patterns are detected.

Given the satisfactory forecasting performance, the survey results could provide an important means of rapid short term forecast information of high quality. At the same time they would prove their worthiness for governments or individual firms deciding on their policies.[6)]

Unfortunately, the results of the survey attract too little attention; in the daily newspapers they are hardly mentioned. So, the main challenge is how to change this situation. At this stage some *ad hoc* elements of a strategy are developed and some initial steps have been taken. They arose from what we thought to be the two main causes of the present dilemma.

First, *the scope of the survey is limited*. Only a selected part of the Dutch services economy is covered. In the short term, we therefore plan a co-operation with the statistics department taking care of the business survey for the industry with the intention to launch a joint press release. By now, the results of the business industry surveys already attract much attention by the press. The advantage of one press release is that at a certain moment in time a more exhaustive and coordinated view of the state of the economy can be given. This will probably increase the acceptance of the results by the press and what is most important the dissemination of the service sector results. In the longer term one might think of increasing the scope of the survey by covering all business services or even all services. Second, *our publication scheme is not up to date*. Measures have been taken to increase the speed of publication. At the end of this year forecasting information is published at the half of the forecasting quarter.

6) Apart from this, the survey is advocated as a means to pinpoint trend changes and to track cyclical movements (European Economy, 1991).

Annex

Table 1 Net turnover (including taxes) by activity in the business services, 1992

	Net turnover (Mln of guilders)	Number of	
		firms	employees
		x 1 000	
Computer services	7 639	5,9	41,6
Engineers, architects and other technical designing and consultancy agencies	10 442	9,8	74,1
Economic consultancy agencies	3 940	11,7	31,5
Sub total	22 021	27,4	147,2
Auditors, accountants, tax experts	6 983	9,7	64,3
Publicity and advertising agencies	8 113	7,3	25,4
Temporary employment agencies	5 348	0,3	8,6
Press and new agencies and other business services	5 598	9,5	58,8
Total	48 063	54,3	304,3

Reference

European Economy, Commission of the European Communities, Directorate-General for Economic and Financial Affairs, Supplement B, Business and Consumer Survey Results, Special Edition, July 1991