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THE EXPERT OPINIONS ON CASH FLOW FORECASTING PRACTICES: THE CASE OF BRITISH COMPANIES

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ABSTRACT

The existence of cash flow differences between inflows and outflows, in terms of both amount and time, are prevalent for most of the firms. For any firm to be able to keep on its operations as planned, it has to deliver its operational, financial, and managerial responsibilities on time. In order for a firm to deliver these responsibilities, it may have to generate and manage cash flows, the main concern of cash flow management. Cash flow forecasting is a functional tool for cash flow management in effectively performing its function. It plays a major role in removing the uncertainties with it and produces information about the future realisation of cash flows. This study presents the findings from a survey of short-term cash flow forecasting practices of a number of forecasting experts in UK companies from various aspects.

Cash flow, cash flow forecasting, forecasting, cash management, expert opinion

1. INTRODUCTION

It is a common saying among cash managers that "cash flow is the blood of a firm." A firm needs to make payment to many different entities (e.g. its suppliers, workers, contractors, and tax office). While some of these payments are in regular times and intervals (e.g. wages and taxes), the others might not be so (e.g. payments to suppliers). These payments may also vary in magnitude like that some are in regular amount (e.g. wages and some fixed expenses) while the others might be in bulky payments (e.g. tax payments and payments to contractors). No matter what the intervals and amounts of those payments are, it is required to maintain a certain amount of cash inflow in order to meet the firm's operational, financial, and investment requirements, which refer to cash outflow. The firm also has its cash inflows, mainly from its customers. For the majority of firms, those cash inflows have

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their own patterns and may not occur in regular amounts and times. In other words, cash flows contain some degree of uncertainty in time and amount.

For a firm to keep on its operations on track, it has to match its cash inflows and cash outflows both in time and amount. However, there is little chance for this to happen for the firm due to the variations in the realisations of cash inflows and outflows. Since it can not postpone its payments continuously and should deliver them, it has to maintain a certain level of cash flow. The existence of cash flow problems (e.g. insufficient cash flows and the lack of matching in time and/or amount) may cause serious difficulties for the firm, bringing about severe problems between the firm and its third parties.

The likely differences in the amount and time realisations of cash inflows and cash outflows and the matching of these are the main concern of cash management. Cash flow management performs its operations by using some cash management tools and techniques. It aims at using cash (and cash equivalent) resources in a firm in the most efficient way. This includes making the payments required for regular operations of the firm without disturbing them, meeting financial responsibilities (e.g. payment of company debts on time) and, at the same time, obtaining the highest return from the firm's excess cash (and cash equivalent resources) by making timely investment of the resources. For all these management activities and responsibilities to be carried on effectively, the firm needs to have and utilise the information of the current patterns and future behaviour of cash flows. That is why, the future realisations of cash flows have a particular value for cash management. Cash flow forecasting (CFF) is a collection of procedures and a tool that helps produce the information required by cash management about the future realisation of cash flows. Considering that the future almost always contains some degree of uncertainty, the treatment of that risk factor is the basic requirement for a decision-maker before any managerial decision is made. CFF primarily focuses on removing it or, at least, reducing this uncertainty through well-defined standard forecasting procedures. Therefore, it can easily be understood why CFF is one of the proper tools with many potential benefits for cash management.

Another factor that increases the importance of CFF is the changes in the structure of cash flows due to the developments in the technology, and consequently, payment methods (e.g. electronic checks and e-money) and banking. With the effect of these changes, the style of cash management and cash management techniques have changed considerably, and so is the importance of CFF, subsequently. For instance, due to the increase in the speed of cash flows caused by the factors such as electronic fund transfer (EFT) methods in banking and payment systems (e.g. Electronic Data

Interchange[1], EDI), cash managers are no longer able to use 'float[2]' in the desired level and get the expected benefits out of it. These changes in the cash flow patterns require cash managers to react the cash flow situations quicker in the new cash management environment, where the time turns out to be a critical factor, than those in traditional one. Therefore, cash managers have to accommodate new techniques to have adequate time to respond to new situations before they occur, which can be sustained by obtaining the future estimates of cash flows with the utilisation of forecasting.

Earlier research also reported on the importance of CFF and the practical difficulties experienced.[3,4] It is, therefore, a noteworthy issue to raise what the current practices are and how they match with the approaches used in theory. In this matter, any information of CFF practices and opinions of CFF experts in companies are of practical value.

How does the exploration of such an issue broaden the view of the relevant parties, briefly practitioners and researchers here, then? The relevance of the issue, in fact, lies in the potential benefits of the application of CFF to the management of cash flows. *Learning* the opinions of forecasting experts in the field can therefore broaden the view of the practitioners in several ways: the practitioners can (i) obtain information about other decision areas where cash flow forecasts can be used; (ii) obtain a more comprehensive picture of the forecasting issue and develop a through understanding of the forecasting concept and forecasting problem; and (iii) develop their understanding further in this particular application area.

In this respect the issue can also be said to be relevant to the researchers based on its potential contribution to cash management. The issue may become a natural research area with many research issues, given that cash management is seen as a managerial field (by practitioners) that includes a potential for increasing the effectiveness. Under such a circumstance, the researchers, based on such a study in a specific application area, can explore the issue from various aspects, potential problem areas, and, maybe, some other research issues stated explicitly or implicitly by the forecasting experts. Thus, forecasting researchers can develop new dimensions to forecasting practices and also can determine the priorities in the selection of research

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1 Establishes direct connection between two firms with standard electronic protocols and enables firms to change electronic documents including those for payment mediums.

2 Difference in the actual amount in the bank accounts and that in the records of the firm, which is caused mainly by the time that checks written and the time that checks submitted for clearance to bank, which is caused by the factors such as geographical distances, the time in the post and the time required for processing.

3 T. W. Miller and B. K. Stone, "Daily Cash Forecasting and Seasonal Resolution: Alternative Models and Techniques for Using the Distribution Approach," **J. of Financial and Quantitative Analysis**, 20 (3), 1985, pp. 335-351

4 B. K. Stone and T. W. Miller, "Daily Cash Forecasting with Multiplicative Models of Cash Flow Patterns," **Financial Management**, Winter, 1987, pp. 45-54

issues. That is why, the author believes the benefits of obtaining expert opinions for both practitioners and researchers.

The study provided a standard form of questionnaire to a sample of CFF experts[5] in 10 British companies, chosen non-randomly, from London Stock Exchange (LSE) in order to explore the dimensions of CFF practices. The questionnaire was flexible and detailed enough for the experts to express their opinions adequately. The main reason for organising the study in such a format was to better determine the borders of the forecasting issues, give sufficient flexibility to the experts and provide the consistency among the experts' replies as much as possible by standardising the responses so as to minimise the possible bias that could be included, otherwise.

1.1. The Studies with Experts versus Large Samples

Prior to the discussions of the findings, it should be point out the differences between the studies of expert opinions and regular surveys (of large samples). Finding many experts in a specific area or accessing to them for research purposes are generally too difficult compared to more general-purpose surveys with large sample sizes, also supported by this study. The studies based on expert opinions may have to be performed with a limited number of experts, especially when there are no many experts in the field and accessing to many experts is costly (in terms of time and money), which is the case for most of the times. The researcher has, therefore, a limited discretion in the control of experts and the information that can be obtained from them. Therefore, a study of expert opinion naturally reflects the conceptions of a limited number of people. In contrast to the surveys with large samples, the individual behaviours and approaches of the experts gain more weights. This makes the 'generalisability' of the findings more limited. Also, the results from this type of studies may not allow the researcher to apply sufficient statistical testing procedures to reach 'generalised results.' Furthermore, the studies with experts are potentially more subject to biases in terms of representation and shortcomings in terms of the structure of the collection and analysis of experts' opinions compared to a sample survey[6]. Unless there is a large enough sample of experts, the result of the studies with experts should be taken as indicates of 'tendency' of specific type of applications rather than generalisable conclusions.

For this study, in spite of all the efforts made to access cash flow forecasters in more than 200 companies with different methods including phone, mail, and e-mail, it has been able to access and convince a total of only 10 experts to take part. The companies included 8 different sectors:

[5] In the context of this study, the term "expert" refers to the people who are involved in cash management, are familiar with CFF problem, are responsible for and/or carry out cash flow forecasts in their companies.

[6] see J. S. Armstrong, Principles of Forecasting: **A Handbook for Researchers and Practitioners**, Kluwer Academic Publishers, USA, 2001, pg. 57

Science and technology, pharmaceuticals, telecommunications, marketing support services, banking, insurance, real estate, and support services. The main difficulties appeared that the CFF experts in the companies contacted mainly involved in higher positions such as financial managers and financial controllers. That is why they had very limited or no time at all to spend for such a study; and that is why, it was more difficult to contact to them, compared to the people in the lower ranks of their organisations. Being more or equally important, the higher sensitivity of financial issues, particularly cash flow, made it more difficult for cash flow forecasters to participate in the study and reveal any information about that sort of issues.

1.2. The Purpose of Study

Being aware of the stated limitations of a study with experts, the purpose of this study was determined under those conditions. The study thereby aimed at detecting, identifying, and describing the '*tendency'* and '*indicators'* of short-term CFF problems in LSE companies with respect to the types of methods used, the factors that affect the forecasting procedures, and the difficulties and the problems experienced. In this framework the study focused particularly on:

1) Determining and presenting a general picture of the methods and techniques being applied, the problems and difficulties, and the way the modelling issue is understood by cash flow forecasters. The study attempts to discover the way that real world companies perceive short-term cash forecasting issue, the importance given to it, how they use (short-term) cash flow forecasts, etc.

2) Detecting the forecasting infrastructures and capabilities in the surveyed companies with respect to the recent developments especially in IT (e.g. data storage and processing facilities, automatic identification and model building capabilities in many forecasting software available in the market recently).

The survey of short-term CFF practices broadens our perspective in:

1) Understanding the views of the practitioners on the importance of short-term CFF so as to justify whether or not more emphasis should be given to modelling short-term cash flows in future studies.

2) Determining the factors affecting the choice and evaluation of (short-term) CFF methods in practice.

3) Understanding the familiarity of practitioners with short-term CFF methods. This should help to determine new approaches that are suitable and applicable to the conditions determined with the survey study.

The paper presents the findings and discussion of the results from the analysis of the expert opinions in UK companies. It contains four main parts. The second part summarises the findings of the previous surveys of

forecasting and CFF in companies and detects the common points between general forecasting applications (GFA) and specific CFF applications (CFFAs). The third part introduces and discusses the findings of the expert opinions. The last part contains the summary, conclusion, and some suggestions for the future research.

2. THE BACKGROUND

A number of survey studies have been conducted to investigate the forecasting practices of companies. While some of these studies[7] focused on a wider-context such as general forecasting practices, the majority focused on more specific applications. Sales forecasting practices perhaps have been the most researched area.[8,9,10,11] In contrast to this, the studies of CFFAs[12] are rare. As this increases the importance and contribution of this study to the literature, it should also be remembered that a direct comparison of the results of this study with those general-purposed and field specific forecasting studies (e.g. sales forecasting) are difficult except the general characteristics of those forecasting studies. However, it should be stated in order not to lead any misunderstanding that most of the forecasting procedures and methods, more or less, are standard and there are many common points between these two types of applications. Some of the *main findings* of the previous surveys of forecasting applications (FAs) are summarised below in order to catch a glimpse of the findings from the previous ones.

Duran & Flores[13] surveyed the (general) forecasting practices of the largest 1000 Mexican companies by mail. The authors concluded that:

1) Many companies make limited use of modern forecasting methods
2) The most commonly used methods are the judgmental (manager's opinion and sales-force composite, mainly). While the respondents are somewhat familiar with moving average and linear regression, other techniques such as Box-Jenkins, Expert Systems, and Neural Networks are not known.

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[7] e.g. J. A.. Duran, and B. E. Flores, "Forecasting Practices in Mexican Companies," **Interfaces**, 28 (6), 1998, pp. 56-62.

[8] e.g. J. T. Mentzer and J. E. Cox, Jr., "Familiarity, Application, and Performance of Sales Forecasting Techniques," **J. of Forecasting**, 3, 1984, pp. 27-36

[9] e.g. D. J. Dalrymple, "Sales Forecasting Practices: Results from a United States Survey," **Int'l J. of Forecasting**, 3, 1987, pp. 379-391

[10] e.g. R. Fildes and R. Hastings, "The Organization and Improvement of Market Forecasting," **The J. of Operational Research Society**, 45 (1), 1994, pp. 1-16.

[11] e.g. M. C. Watson, "Forecasting in the Scottish Electronics Industry," **Int'l. J. of Forecasting**, 12, 1996, 361-371.

[12] e.g. Randolph A. Pohlman, Emmanuel S. Santiago, F. Lynn Market, "Cash Flow Practices of Large Firms," **Financial Management**, Summer, 1988, pp. 71-79

[13] Duran & Flores (1998)

3) Firms reported their satisfaction with all forecasting techniques as 'average' and it did not differ for quantitative and qualitative techniques.

Among the studies of sales FAs, Mentzer & Cox[14] surveyed 500 US firms with mail to determine the degree of familiarity and usage, accuracy obtained, and evaluation of different forecasting techniques. Dalrymple[15] surveyed 860 US firms to learn about the use of sales forecasting techniques in business firms. Fildes & Hastings[16] surveyed the market forecasting practices of 55 forecasters (out of 440 staff with forecasting responsibilities) in a multinational company with ten divisions in the UK in addition to interviews with 45 forecasters. Watson[17] surveyed the sales forecasting practices of 378 companies in the Scottish electronics industry with mail. She also carried out structured interviews of 3 companies with the people in different stage of forecasting (e.g. the data supplier, the forecast producer, and the forecast user). The main findings of these studies can be summarised as follow :

1) Companies were more familiar with qualitative methods[18] and firms tended to mostly use more simple judgmental or extrapolative techniques.[19] Fildes & Hastings[20] also supported this finding; however, in terms of familiarity and usage of (formal) statistical forecasting techniques, the study implied that the UK respondents were less knowledgeable than those of US respondents reported earlier by Mentzer & Cox.[21] There was also an unsurprising correlation between familiarity and usage; a finding also supported by Pohlman et al.[22]

2) Accuracy was the overwhelming criterion used to evaluate forecasting techniques;[23,24,25] however, some of the respondents also mentioned ease of use, low cost, and credibility as secondary criteria.[26]

3) The use of forecasting techniques in US companies differed based on time horizon. For shorter-time horizons, more subjective techniques were most often used. As the time horizon increased, more objective quantitative techniques gain weight, a finding also

[14] Mentzer & Cox (1984)
[15] Dalrymple (1987)
[16] Fildes & Hastings (1994)
[17] Watson (1996)
[18] Mentzer & Cox (1984)
[19] Dalrymple (1987)
[20] Fildes & Hastings (1994)
[21] Mentzer & Cox (1984)
[22] Pohlman et al. (1988)
[23] Watson (1996)
[24] Fildes & Hastings (1994)
[25] Mentzer & Cox (1984)
[26] Mentzer & Cox (1984)

supported by Pohlman et al.;[27] however, subjective techniques were still important for all time horizons.

4) Two thirds of the respondents thought that sales forecasting was very important to their company's success in Menzter & Cox's study[28] and the majority of the respondents thought that forecasting activity was a worthwhile activity and deserved more support in Fildes & Hastings[29] and Watson[30] studies.

5) Most of the forecasters' time was spent on data collection and communicating the forecasts to other managers. In contrast, very limited time was allocated to innovative activities such as 'learning new techniques'.[31] Watson's study[32] also produced similar results.

6) Developing consistent data, increased software support, improved techniques, improved databases, and improved communications with users were thought to be the important factors in order of importance that contribute to improved forecasting.[33]

7) The amount of training received in relation to forecasting was insufficient.[34,35,36]

8) Low priority was given to forecasting activities.[37]

9) The main criteria for choosing a forecasting method, besides accuracy, was data availability, with management interest and ease of use of technique as secondary criteria. Software support was ranked as unimportant. [38]

10) Barriers inhibiting the use of forecasting were the lack of importance attached to forecasting by senior management, lack of knowledge of the potential of forecasting, and lack of knowledge of how to carry out the function, and the confidence in forecasting techniques. The forecasters were also unaware of the potential for improving decision making by using formal forecasting techniques.[39,40,41]

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27 Pohlman et al. (1988)
28 Menzter & Cox (1984)
29 Fildes & Hastings (1994)
30 Watson (1996)
31 Fildes & Hastings (1994)
32 Watson (1996)
33 Fildes & Hastings (1994)
34 Watson (1996)
35 Fildes & Hastings (1994)
36 Dalrymple (1987)
37 Watson (1996)
38 Watson (1996)
39 Fildes & Hastings (1994)
40 Watson (1996)
41 Duran & Flores (1998)

11) Data records (from the case studies) were not suitable for subsequent access or analysis in the three companies interviewed by Watson.[42] Fildes & Hastings[43] also reported that the respondents complained about data insufficiency. Even though these are different issues, the studies reported problems with data in all the companies in one way or another.

12) Senior management did not offer a great deal of support to forecasting function, particularly in terms of training, and no support or time was given for learning.[44]

The survey studies of CFF are not as plenty as sales forecasting studies in the literature. The only example (known to us) of the survey of CFF in companies is that of Pohlman et al.,[45] who surveyed the cash flows forecasting practices of 500 US firms for capital investment decisions. The study reported that:

1) Most of the companies (2/3) surveyed had company-wide standard practices in generating CF information.

2) Firms used different forecasting methods. Although qualitative forecasting methods are popular and perceived to be important when generating CF forecasts, companies did not solely depend on them. Four of the methods used by the majority of the sample firms were: management's subjective estimates (90%), sensitivity analysis (69%), consensus of experts' opinions (67%), and computer simulation (52%).

3) Companies with larger capital expenditures that prepared CF estimates for their capital investments did not only use multiple forecasting methods but also tended to be more quantitatively oriented.

4) Firms which were capital intensive and highly levered, with high debt ratios, were more likely to have company personnel co-coordinating/supervising CFF than those which were not capital intensive and had low debt ratios.

Even though it is difficult to generalise and compare the findings from only one CFF survey with these from various sales forecasting surveys, the studies above show both similarities and differences between the findings of sales forecasting surveys and these of CFF surveys. Beyond detecting these similarities and differences, the paper also contributes to the literature significantly in filling the gap in this field.

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[42] Watson (1996)
[43] Fildes & Hastings (1994)
[44] Watson (1996)
[45] Pohlman et al. (1988)

3. EVALUATION OF THE EXPERT OPINIONS

3.1. Information about the Experts' Companies

The experts' companies differed in their ages, the number of bank accounts they use in their operations, the industry in which they operate, the number of branches and the number of operating division, which can be thought to be some of the important characteristics that may affect the type of forecasting practices of companies. Even though it is not an exact measure when taken into account alone, the number of bank accounts (a firm uses) can normally be taken as an important indicator of the volume (and/or mobility) of the CFs in a company when they are taken together with the other factors (e.g. the size of companies or the operating area). The volume of CFs are likely to differ from one company to another within the same or across industries.

Table 1: Some of the descriptive characteristics of the companies

Industries	Companies in Sectors	Age (Years)	Number of		
			Bank Accounts	Branches	Operating Divisions
Banking	1	50-Over	-	101-More	11-More
Insurance	1	11-20	2-5	-	8-10
Marketing Support	1	50-Over	20	1-5	2-3
Pharmaceuticals	1	5-10	11	21-100	11-More
Real Estate	1	11-20	6-10	6-10	8-10
	2		2-5	-	1
Science & Technology	1	3-4	2-5	1-5	2-3
	2				1
Support Services	1	11-20	2-5	1-5	4-7
Telecommunications	1	50-Over	51-More	101-More	8-10

The number of branches that companies have may refer to both the size of companies and the volume (and/or mobility) of CFs from and/or to companies. The companies in the telecommunications and banking sectors have naturally more branches than do companies in other sectors and the number of branches differ among companies (and industries). Thefore, the complexity of CFs depend on the number of brances, which, in turn, depends on the nature of the company's business.

The number of operating divisions, sub-units, or sub-companies of a parent company may be another factor that affects the flow of cash (e.g. because of increase in the volume of the business and the flow of cash between operating divisions and/or sub-units, etc) and is also an indicator of the size of companies. It is likely that the CFFAs (and/or needs) differ depending on the size. As a general picture, the companies in the pharmaceuticals, telecommuncations, and banking sectors had the highest number of branches, operating divisions (and/or sub-units), and bank accounts compared to other companies. The other companies look more

similar in terms of branches, operating divisions, and bank accounts. The next section explains CFF practices in the experts' companies.

3.1.1. Cash Flow Forecasting

Cash Management Position and Responsibility for CFF

The importance given to cash management can be in part gauged if they require a separate cash management position and the value granted to it. Only 3 of the six companies had positions dedicated to cash management, which were from pharmaceuticals, telecommuncations, and banking industries, the companies with the largest number of bank accounts, branches, and operating divisions. In such complex companies, the cash management function can be expected to be more demanding and the need for a specific cash management position unavoidable.

The existence and level of managerial responsibility for CFF signal its importance to the organisation. The success of the forecasting activities is greatly affected by how it is managed. For instance, Pohlman et al.[46] reported that the presence of a party within the organisation responsible for co-ordinating the firms' CFF processes was positively related with the application of company-wide procedures. The replies from the experts reveal the presence and handling of forecasting task by individual forecasters in 5 out of 6 companies and by a forecasting group in one of the companies. All the companies responded assigned *somebody to forecast* their cash flows, which is an important finding of the study.

It is important that cash flows are forecast through well-defined procedures. This is likely to affect the accuracy of the forecasts. Pohlman et al.[47] referred to the issue that "…companies which follow a systematic approach in generating cash flow information achieved a higher level of accuracy." 5 of the 6 experts defined their forecasting procedures as 'formal'. The formalised procedures are mostly in the companies with the large number of operating divisions and branches. The finding is also supported by Pohlman et al.[48]

Type and Purpose of Forecasts Being Performed

The forecasting tradition and experience within the companies is relevant for how companies perform CFF. Where a well-established forecasting tradition exists in companies, it should be much easier for these companies to forecast their cash flows compared to those that lack of such a

[46] Pohlman et al. (1988)
[47] Pohlman et al. (1988)
[48] Pohlman et al. (1988)

tradition. Figure 1 shows that the majority of companies performed sales, cost, and revenue forecasts in addition to some other types of forecasts.

Figure 1: The type of forecasts that companies perform

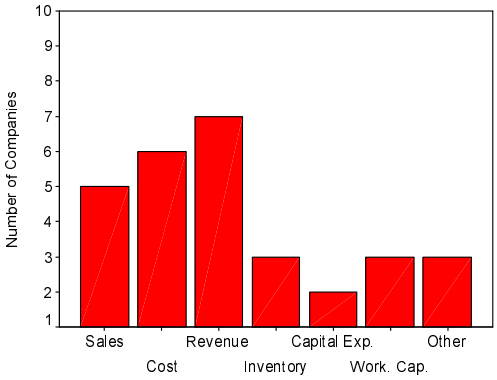
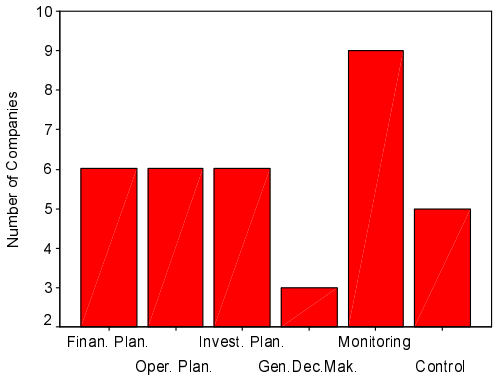


Figure 2: The purpose of cash flow forecasts



The purpose of cash forecasts has been examined to understand the nature of cash forecasting activities and its significance for these companies. The companies surveyed use their cash flow forecasts for monitoring (9), financial planning (6), operational planning (6), investment planning (6), control (5), and general decision-making (3) purposes (see Figure 2). These results are self-explanatory how functional cash forecasting is in companies and how helpful is the information provided by cash forecasts for company managers.

Types and Importance of Cash Flow Forecasts Being Performed

The experts' opinions provided further evidence as to the kinds of cash forecasts that are important for companies, presented in Table 2.

Table 2: Importance of cash flow forecasts

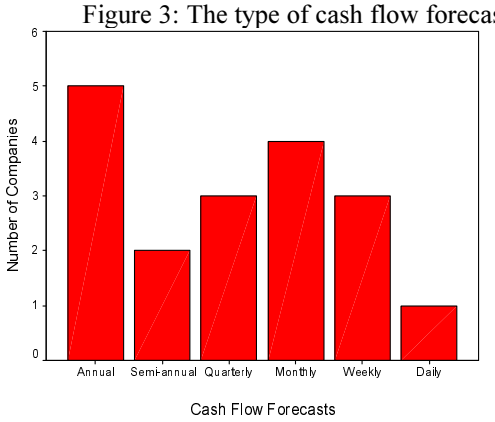
Forecast Type	Very/Ext. Import.	Slightly Import.	Not Import.	Total
Annual Fcsts	7	2	1	10
Semi-annual Fcsts	6	1	2	9
Quartly Fcsts	7	2		9
Monthly Fcsts				

Most of the experts considered that annual, semi-annual and quarterly forecasts are extremely or very important but not important for the company in the banking sector, which can normally expected that annual forecasts do not provide much benefit to banks because of the characteristics

of their operations. However, none of the experts gave any opinion about the importance of monthly cash forecasts.

In contrast to the opinions about the importance of monthly forecasts above, Figure 3 shows that 4 of the 6 companies performing monthly cash forecasts. Half of the 6 companies perform weekly and a single company performs daily forecasts. At least 4 of the 6 companies perform one form of short-term forecast. This clearly signals the importance of short-term cash flow forecasts for the experts' companies.

Figure 3: The type of cash flow forecasts being performed



Authority That Establishes Cash Flow Forecasting Methods

The survey findings show that cash forecasting is widespread in the surveyed companies. It is a matter of interest to establish who determines the forecasting methods used. In 3 of the 5 companies, the forecasting methods are determined either by a forecaster or a forecasting group. In 2 companies the senior management and, in one company, consultants are the decision-makers.

It is also a matter of interest whether the authorities that determine the choice of forecasting methods and that use them are same. While in 6 companies forecasting methods are used by either individual forecasters or forecasting groups, in 2 of them they are used by specific departments. Additionally, in 4 of the companies the senior management uses (or are involved in using) the forecasting methods in addition to the specialist forecasters. The experts stated that the managers, at senior or department level, were closely involved in using forecasting methods. These findings show that the authorities determining the choice of method and those putting it into practice are mostly the same.

Factors in Forecasting Method Selection

Forecast method selection decision is an important process. The experts thought that the problem characteristics (7), accuracy (7), ease of use (6), data requirements (6), and data patterns (5) were extremely or very important factors in method selection, where the numbers in the parantheses reflect the number of experts (out of 10) who share the idea. Additionally, the users' technical ability (4) and time horizon to forecast (4) are also in the important category together with forecasting method characteristics (4). No aditional factors were identified as important.

Data Availability

Technical forecasting processes are mostly based on historical data. The availability of a well designed data base in companies should be an important factor for successful forecasting applications. Fildes & Hastings[49] reported that the forecasters mainly complained about insufficiency of data for sales forecasting applications. Watson[50] also reported that data were not available for subsequent uses in the case companies she surveyed. However, in this study 9 of the companies had a well designed data base for short-term cash forecasts and 8 companies had such databases for other type of forecasts they perform. Expert replies in this case can be taken as evidence of how well developed the forecasting infrastructures were in these companies. It is, perhaps, due to the case that the companies implemented new IT structures and organised databases in recent years so that they have more organised and accessible data sources. There are also financial audit requirements.

3.1.2. Features of Cash Flows in Companies

Number of Cash Flow Transactions

The characteristics of cash flows are important factors that affect CFF in companies.[51] The experts' replies showed that they were more knowledgeable about cash inflows in their companies than they were about cash outflows. Of the 6 experts who gave information, 5 of the companies performed more than 50 cash flow transactions per day, 3 of which were more than 1000 transactions. Also, the only company that gave information about its cash outflow had more than 1000 transactions. The results imply that most of the companies studied experienced more than 50 cash flow transactions per day on average. The importance given to CFF seems closely related to the number of cash flow transaction in companies.

Volatility and Predictability of Cash Flows

One of the main difficulties in forecasting cash flows is the uncertainty in some of the cash flows. While some type of cash flows are known in advance (e.g. tax payments, wages, debt payments), other type of cash flows (e.g. daily, weekly, or monthly sales, collections, and ordinary payments) are more uncertain. The main focus of CFF is the uncertainty in the second type of cash flows. That is why the relative weight of this type of cash flows within the total is a point of concern from the forecasting point of view. 5 of the 6 experts thought that the second type of (non-major) cash flow items was very important within the total cash flows of their companies

[49] Fildes & Hastings (1994)
[50] Watson (1996)
[51] Cihat Polat, **Cash Flow Management and Forecasting of Short-Term Cash Flows In A Bank: Issues In Forecasting Method Selection**, Unpublished PhD Thesis, Lancaster University, Management Science Department, November 2001, pp. 123-190

regardless of their sector excluding the company in the marketing support services. In terms of relative volatility of cash inflows and outflows, again, the majority of the experts (5 of the 6) reported that their cash inflows were more volatile than were their cash outflows. With respect to the uncertainty of their cash inflows and outflows, it appears that the industry in which companies operate plays an important role. While half of the 6 experts described their both cash inflows and outflows slightly uncertain, the others described their cash inflows slightly uncertain but cash outflows or both cash inflows and outflows highly uncertain. There is typically a relationship between uncertainty and predictability. Based on the results above, 4 of the 6 experts, not surprisingly, reported that cash outflows were more predictable than were cash inflows and the other 2 experts reported that they were equally predictable. None of the experts said that cash inflows were relatively more predictable.

Calender Effects in Cash Flows

Some fluctuations in cash flows due to the existence of calendar effects can be expected in many industries. In modelling cash flows, the existence of calendar effect is considered to be highly important. Table 3 shows that the companies in the telecommunications and the banking sector were the most subject to calender effects in their cash flows. The cash flows of other two companies were not affected in the same degree.

Table 3: Calendar effects in short-term cash flows

		Calender Effect							Total
		DOW	Wkend	BankHol	DOM	WOM	MOQ	MOY	
Sector	Science & Technolog				1	1			1
	Telecommunications	1	1	1	1	1	1	1	1
	Banking	1	1	1		1			1
	Support Services				1				1
Total		2	2	2	3	3	1	1	4

It is also point of interest which of these calendar effects on cash flows were more *unpredictable* for these companies. It appears that calander effects differed based on the sector; however, in 3 of the 5 companies (in the telecommunications, banking and real estate sectors) the week of month effect and in 2 of the 5 companies the month of quarter effect on cash flows were more unpredictable. In one of the companies (in the science and technology sector) the day of week effect, and in the banking sector company the effect of the bank holiday was more unpredicatable. This highlights that there may be different type of cash flow modelling requirements based on the sector in which a company operates.

3.1.3. Short-term Cash Flow Forecasting

This section discusses some more specific issues ranging from forecast preparation to method evaluation for short-term[52] cash flow forecasts.

Involvement in Forecast Preparation

In companies forecasting is an interdepartmental function[53] and forecast preparation may sometimes require involvement and contribution of other departments in terms of data, expert opinion, etc. Both Fildes & Hastings[54] and Watson[55] pointed out the significance of the flow of information between the departments and the importance of communication between the forecast users and forecast producers. The preparation of short-term forecasts may naturally require a collective work of and/or the involvement of other departments and managerial units in a company. The study also investigated the contributions of each of the accounting, finance, marketing, production and operations departments, and top-level management in the experts' companies. The involvement of various departments is presented in Table 5 in detail. Even though it is difficult to draw very certain conclusions, the table give some clear clues about the participation of various departments. For instance, data preparation was done mostly by finance and production and operations department, draft forecast preparation by finance department, forecast inspection by top-level management and finance department, and forecast approval by finance department in the experts' companies. In general, as finance and operations and finance departments were involved in almost all stages of CFF, top-level management was, as could be expected, involved mostly in forecast inspection. In spite of the difficulty in generalising these results, the participation of accounting and marketing departments in forecasting procedures is surprisingly relatively at minimum levels and that of production and operations department seems to be unexpectedly high compared to accounting and marketing departments. In other sectors the picture may change considerably.

With respect to the importance given to CFFs by senior management, surprisingly most of the experts abstained from giving opinion about it. However, in contrast to the findings of Watson,[56] as seen in the

[52] The term "short-term" may naturally mean different things for the companies in different industries. According to 4 experts from the companies in science and technology, pharmaceuticals, telecommunications, and banking sectors it refers to a time frame of a month or less and to 2 experts from the real estate and support services, it refers to 3 months period *in the context of CFF*. These answers provide support for our definition of 'short-term' within the context of this study and it can be used as a standard term in the context of CFF.

[53] see Fildes & Hastings (1994)

[54] Fildes & Hastings (1994)

[55] Watson (1996)

[56] Watson (1996)

replies above, senior management was closely involved both *in the selection* and *use* of forecasting methods and in the *short-term CFF procedures*. This can easily be linked to the significance of cash management for top-level managers.

Table 5: Involvement of departments in short-term cash forecasting procedures

	Data Preparation	Draft Forecast Preparation	Forecast Inspection	Forecast Approval	No Involvement	No. of Companies
Top Level Management	1	-	3	1	1	5
Accounting Department	2	1	1	-	2	5
Finance Department	3	3	2	2	2	5
Production and Operations Department	3	1	1	1	2	5
Marketing Department	2	-	-	-	3	5

With respect to the background of short-term CFF in the experts' companies, the replies showed that CFF practices were relatively new compared to the age of companies. They went back only 2 years (in the telecommunications company), to a maximum of 10 years (in the support services company). This information is potentially important in the sense that either the companies have only recently figured out the importance of short-term CFFs in the recent years or the importance of them has increased in recent years.

Statistical Techniques in Use and Evaluation of Forecasting Methods

It is surprising that the experts also did not give much information about what type of formal techniques they used for short-term CFFs. In two of the (3) companies judgemental techniques were used and in one company (in the banking sector) its approach was based on removing the seasonal effects from the data, which looks more informal or closer to judgement when thought of the size of daily cash flows in the bank. In fact, it is difficult to interpret the experts' attitude to this issue in that they did not give much information whether their methods were statistical or judgmental.

In another aspect of the investigation was the evaluation of the forecasting techniques. Of the 4 experts, all agreed on the extreme or high importance of timeliness of forecasts and credibility of forecasting method, with 3 did for each of time spent for forecasts, ease of interpretation of method, consistency of forecasts, and accuracy of forecasts. Cost of forecasts was thought to be slightly important. In general all of these factors were found important, exception being the ease of use of forecasting method. No experts added to this list.

These findings mostly agree with those of the previous forecasting surveys, which reported that accuracy was the major criterion used to

evaluate forecasting techniques.[57,58,59] Mentzer & Cox[60] also added the 'low cost', 'ease of use,' and 'credibility' of methods as secondary criteria; while the experts thought that 'credibility' was extremely important, they did not say anything about 'ease of use'.

In the experts' evaluation and description of their existing CFF techniques, of 4 experts responded, all or the majority totally agreed or agreed that their short-term CFF techniques were not too costly, were flexible and utilised, had automated data input, successfully detected the patterns in the data, and were not too complex. 3 of the experts, however, were neutral that their forecasting techniques produced accurate results. It was surprising that 2 experts disagreed only with the adaptability of their techniques among 11 criteria determined but these results may derive from the self-selected nature of the sample.

Forecasting Accuracy and Satisfaction

The variation between the actual and forecast values is an important factor that shows the accuracy and the success of forecasting applications. The variation normally differs from one company to the other in different sectors. Of course, this is not the only reason for the differences in the variation. Many factors (e.g. poor modelling, forecaster's ability, data structure) may also affect the results.

Table 6: Existing and satisfactory accuracy levels

		Satisfactory Accuracy Level			Total
		5% or Lower	6% - 10%	16% - 25%	
Existing Accuracy Level[a]	5% or Lower	1			1
	6% - 10%	2	3		5
	16% - 25%		1	1	2
Total		3	4	1	8

a. Expressed in terms of variation between actual and forecast values

The existing and satisfactory accuracy levels for the experts are given in Table 6 in a cross-tabulated form. The results imply that the experts appreciated the importance of the accuracy of CFFs. They also show that majority of (5) of the 8 experts were already satisfied with their forecast results. While 6 of the companies took corrective action in different regularity, 2 never did it.

Factors That Affect Short-term Method Selection

With respect to the factors that were important in selecting short-term CFF methods, the experts thought that the accuracy, ease of use, data

[57] Watson (1996)
[58] Fildes & Hastings (1994)
[59] Mentzer & Cox (1984)
[60] Mentzer & Cox (1984)

requirements (and availability) of forecast methods, data patterns, and the user's technical ability were extremely or very important. The other factors such as problem characteristics, forecasting method characteristics, and time horizon seemed less important. On the other hand, the cost of forecasting techniques, the existing software and computer specifications seemed to be the least important factors for the method selection. In comparison of the factors with those that are important for general CFF method selection, already identified above, the same factors are, again, seen to be extremely or very important with a very slight change in order. The results imply that the experts consider the same factors for general and short-term CFF method selection.

Factors That Affect Short-term Forecast Accuracy

It has already been pointed out that the accuracy of cash flow forecasts was important for most of the experts' companies and some of the experts wanted to improve the accuracy of their forecasts. The experts thought that time horizon of forecasts, availability of organised databases, seasonality in the data, forecast level, and volume of cash flows were extremely or very important. They rated the size of the company, forecasting method, and the contribution of other departments to be important while the forecaster's educational background, data pre-processing, and sophistication of forecasting methods to be slightly important. On the other hand, the number of people that prepared forecasts, number of forecast methods employed, and the use of forecast combination, contrary to the forecasting literature,[61,62] were not important for forecasting accuracy.

Importance of Factors for Improved Forecasting

With respect to the factors that might be important for improving cash flow forecasts, the experts thought that greater support from the management was the most important factor, which added to Watson's[63] similar observation. In the same vein, Sanders & Mandrodt[64] reported that low organisational support was one of the major obstacles to the use of formal forecasting methods. The factors such as better quality data, more financial resources for forecasting, involvement of other departments, and employment of better forecasting techniques were also thought to be significant in some degree by, at least, half of the experts.

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[61] see S. Makridakis and M. Hibon, "The M3 Competition," **Int'l J. of Forecasting**, 16, 2000, pp. 451-476

[62] see R. T. Clemen, "Combining Forecasts: A Review and Annotated Bibliography," **Int'l J. of Forecasting**, 5, 1989, pp. 559-583

[63] Watson's (1996)

[64] N. R. Sanders and K. B. Manrodt, "Forecasting Practices in US Corporations: Survey Results," **Interfaces**, 24 (2), 1994, pp. 92-100

On the other hand, investment in IT, reported to be important in Fildes & Hastings[65] and better training of forecaster were considered to be slightly important in obtaining better forecasts. Although Fildes & Hastings reported that the linkages and the information flow between the departments and improved methods were important for better forecasting, the experts here were divided about the importance of the involvement of other departments in the forecasting processes. In contrast to Fildes & Hastings,[66] who reported that the respondents welcomed further advances and believed (66 %) that improved techniques contribute to improving forecasting, the employment of better forecasting techniques was seen to have any importance only by half of the experts. Surprisingly, following the academic literature was not seen to have any significance.

Data are also one of the core elements in the forecasting process. The first potential problem is the difficulty of obtaining data within the organisation, and this may be expected to affect the CFF activities in companies. Sanders & Manrodt[67] reported that better quality data were extremely or very important for improved forecasting; however, the lack of relevant data was one of the major obstacles to the use of formal forecasting techniques in US companies. As the experts from 3 of the 8 companies reported it to be difficult or fairly difficult,[68] half of the 8 companies thought it to be easy or fairly easy, which show that the difficulty of data collection again varies based on companies and, perhaps, the sectors.

3.1.4. Cash Flow Forecaster

The practice and the success of forecasting activities are likely to be affected by the forecasters themselves because the training received by the forecaster may limit the options and choices considered.[69] The study found that 4 of the experts had PhD degree, 5 of them had bachelor's degree and 1 had no degree. In terms of their fields, 7 of them from business, including accounting, economics, and operational research majors. The results revealed that most of the experts were highly educated in business, a result also found by Mentzer & Cox,[70] in contrast to the forecasters surveyed by Fildes & Hastings[71] and Watson,[72] who found forecasters with little knowledge.

The study also attempted to learn how knowledgeable the experts were about neural networks, a relatively new modelling tool. The majority of the 9 experts had no knowledge at all of neural networks, while 3 experts had

[65] Fildes & Hastings (1994)
[66] Fildes & Hastings (1994)
[67] Sanders & Manrodt (1994)
[68] Fildes & Hastings (1994)
[69] Fildes & Hastings (1994)
[70] Mentzer & Cox (1984)
[71] Fildes & Hastings (1994)
[72] Watson (1996)

heard of them but did not know much about. In only one of the science and technology companies they were being used but not for forecasting purposes.

4. SUMMARY, CONCLUSION, AND FUTURE RESEARCH

The paper has discussed the findings of expert opinions on short-term CFF practices in a limited number of British companies. The study has shown that CFF procedures are viewed as quite sensitive and many companies were unwilling to reveal information about their cash flows, even though the study did not attempt to obtaining any information that is of sensitive nature.

The study first summarised some of the main findings of the earlier survey studies of forecasting in order to give idea about the background of forecasting applications in companies and to provide the opportunity to catch any common findings from these, if exist, and to compare them with those of the current study. The second part of the paper presented the results of an analysis of the expert opinions on short-term CFF issues and discussed them. The analysis has shown a set of important findings, which as follows:

1) There is a well-established forecasting infrastructure and forecasting tradition in the experts' companies. Especially the larger sized companies have standard CFF procedures, in addition to having specific cash manager position.

2) For most of the experts, in contrast to the findings of previous surveys of (mostly sales) forecasting practices in companies, short-term CFFs are very important, a result also supported by Pohlman et al.[73] Most of the expert companies performed at least one type of short-term CFF. However, further studies with larger samples are needed to draw more conclusive results.

3) In terms of cash flow components, cash outflows are easier to predict than cash inflows, the latter being more volatile in the majority of the companies.

4) Most of the experts are satisfied with their existing forecast methods, even though short-term CFF was seen as a difficult process. However, little was discovered about the type of formal techniques they used.

5) Finance departments of the companies have greater influence in all aspects of the forecasting procedures (including in data preparation, draft-forecast preparation, forecast inspection, and forecast approval). Also, in many of the companies surveyed, senior

[73] Pohlman et al. (1988)

management is closely involved both in determining and using CFF techniques.

6) The factors in forecast method selection varies being the problem characteristics, accuracy, data requirement, ease of use, and data patterns among the most important ones in addition to the user's technical ability, time horizon to forecast, and forecasting method's characteristics, which are also important but to some extent.

7) Most of the experts had a high level of education in a business-related field. However, most of the experts do not follow the forecasting literature and they do not think that the literature is important in making better forecasts, which is an important point that should be considered by the forecasting researchers.

In spite of the difficulties in working with experts, the study has achieved a considerable success in obtaining the general frame of, specifically short-term cash flow, forecasting practices and in determining the nature of forecasting applications from many aspects in the experts' companies. The study filled some of the gap in the CFF field. It also provided many findings that support the previous general and specific purpose survey studies besides the specific findings of CFF practices. These findings and the importance given to short-term CFF in the experts' companies have shown that it is worthwhile to make more comprehensive survey studies of short-term CFF with larger samples in order to understand the different aspects of the issue in more detail. In respect to the implications of the study for Turkish companies, the results can be expected to apply them only in part. In order to explore the forecasting applications from various dimensions, organising a new study for Turkish companies could be helpful. It would be notable to learn about the approaches of Turkish companies to CFF issue, the value given to CFF activities, their perspective in a separate, inflationary, and a developing economy, and the techniques used, etc. The future research should focus on all these issues, and the findings should be matched with those from the earlier studies.

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