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Respondent Dynamics within the

NZIER Survey of Business Opinion:

An Introductory Perspective

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Abstract

This paper considers respondent dynamics within the NZIER quarterly survey of business opinion. The paper concentrates mainly on the potential usefulness of matched and individual survey responses with particular reference to business confidence. The main framework is a three-by-three matrix of responses by firms who have participated in adjacent surveys. This framework provides information on the dynamics (flows) of business opinion as opposed to the usual published information on end-of-period net balances (stocks). The paper highlights the volatility of business opinion with respect to both economy-wide and own-outlook. Almost half the firms replying to adjacent surveys, for example, changed their outlook between quarters regarding business confidence, output and profitability.

Keywords

JEL Classification

Acknowledgements

1. Introduction

The responses of firms to the business outlook question is almost invariably the most widely reported 'headline statistic' from business surveys. New Zealand is no exception. In the September 2000 issue of the New Zealand Institute of Economic Research's *Quarterly Survey of Business Opinion*, for example, 12 percent of respondents replying to the question on the general business situation thought the New Zealand economy would improve during the next six months, 32 percent thought it would stay the same while 56 percent thought it would deteriorate, giving a net balance ('improve' minus 'deteriorate') of -44 percent. The outlook for the September quarter was almost unchanged from the June quarter's net balance outlook of -42 percent. This negligible change in the net balance generated headlines such as 'business confidence deteriorates' and 'business confidence continues to lose ground'.

Does the negligible change in outlook between June and September 2000 mean that few firms changed their opinion or that many firms changed their opinion, but the net effects cancelled out? What is the outcome for other variables in the survey? These questions cannot be answered using end-of-period aggregates. They could, however, be answered if the June and September responses of firms could matched and the number of firms in each of nine categories determined. It turns out that 47 percent of matched firms changed their economy-wide outlook between June and September 2000. These surprisingly large dynamics, or gross flows, are not disclosed in the 'up', 'same' and 'down' totals used to calculate net balances. Exploring these dynamics could give insights into such issues as the determinants and impact of business confidence, the microeconomic relationships between, say, prices and sales and in identifying leading indicators and turning points.

In addition to the information content from grouping matched responses, further sources of dynamic content within NZIER surveys include the individual responses of firms to survey questions. There are some interesting possibilities from this micro data. Does a firm systematically over or under-predict outcomes such as sales, profitability and prices and what are the consequences, if any, of these errors? Are expectations rational? How has the firm responded to shocks and how do their responses compare with similar firms? How successful is the firm at predicting turning points in the economy and could the firm be characterised as generally optimistic or pessimistic?

Many of these questions have been studied extensively using the NZIER database, particularly by researchers at Victoria University of Wellington. (A very selective list of this work includes Balcombe 1996, Buckle and Carlson 2000a,b, Buckle and Meads 1991, Jackson 1996, Jackson and Bollard 1992). Despite this impressive output, one area has been relatively neglected, namely, the study of business confidence dynamics. This paper is an introductory perspective to a project which attempts to remedy this omission. Section 2 outlines briefly the scope of the business survey used in this project. Section 3 presents a dynamic framework for analysing matched responses to the NZIER's qualitative questions. Sections 4 introduces the idea of flow rates while Section 5 concludes the paper and indicates the scope of ongoing work.

2. NZIER Survey of Business Opinion

Since 1961, the New Zealand Institute Economic Research (NZIER) has conducted a quarterly survey of business opinion of firms in the manufacturing, building, merchant and service sectors. Primary industries, utilities and general government services are omitted. The survey is sent to chief executives or their nominees. Table 1 lists the survey questions common to the four sectors. It shows that all questions, but one, relate to the microeconomic experiences and outlook of firms. The remaining (macroeconomic) question relates to the economy-wide outlook of firms. Most of the questions ask respondents to reply 'up', 'down' or 'the same'. The Institute converts these qualitative responses into a quantitative measure using equation 1, usually known as Theil's net balance statistic (N), where U, D and S represent the number of respondents replying up, down or the same, respectively, and NA means 'not applicable':

$$N = \left(\frac{U - D}{U + D + S - NA} \right) \%$$

(1)

Theil's net balance statistic is used frequently in business opinion surveys. Although qualitative business questions can be answered relatively quickly, and the aggregate responses easily calculated and published promptly, there are a number of problems and issues. For excellent analyses, see Ronning (1990) and Zimmerman (1997).

Table 1. NZIER Quarterly Survey of Business Opinion Questionnaire
Questions Common to Manufacturers, Builders, Merchants and Services
(Percentage of 779 replies to Survey No.158, September 2000)

1. How many **employees** are covered by this return?

1-20	21-50	51-100	101-200	201-500	Over 500
27	14	9	9	26	16

2. Which **district** does this return primarily relate?

Auckland Northland	Waikato Bay of Plenty	Hawke's Bay East Cape	Taranaki Wanganui
30	7	3	4

Wellington Manawatu Wairarapa	Nelson West Coast	Canterbury Marlborough	Otago Southland	Spread Over New Zealand
12	2	12	6	24

3. Do you expect the **general business situation** in New Zealand during the next six months to:

Improve	Same	Deteriorate	N/A
12	32	56	0

4. Finding the **staff** you want today compared with three months ago is:

	Easier	Same	Harder	N/A
(a) Skilled; Specialist	6	47	41	6
(b) Unskilled; Semi-skilled	10	68	12	10

5. What **single factor**, if any, is most limiting your ability to increase your production or activity:

Orders/ Sales	Materials/ Components	Finance	Labour	Capacity	Other
69	2	7	6	9	8

6. Do you expect **new investment approvals** (next 12 months compared with last 12 months) to be:

	Greater	Same	Less	N/A
(a) On Buildings	14	37	32	17
(b) On Plant and Machinery	22	42	31	5

7. **Past and future trends.** Excluding seasonal variations, what has been your firm's experience during the *past three months* and what changes do you expect in your firm during the *next three months* in respect of:

	Experienced change **past** three months					Expected change **next** three months				
	Up	Same	Down	N/A		Up	Same	Down	N/A	
(a)	19	56	24	0	Numbers Employed	18	60	21	1	(h)
(b)	13	51	25	11	Overtime Worked	13	52	25	10	(i)
(c)	15	70	10	5	Labour Turnover	11	70	14	5	(j)
(d)	51	42	6	1	Average Cost	60	31	8	1	(k)
(e)	38	48	12	2	Selling Prices	49	40	9	2	(l)
(f)	16	39	44	1	Profitability	18	41	40	1	(m)
(g)	23	45	31	1	Output/Sales	30	44	25	1	(n)

Note: N/A means 'not applicable'.
Source: NZIER Quarterly Survey of Business Opinion (158) September 2000.

3. Business Opinion Flows: A Dynamic Framework

Firms participating in adjacent NZIER surveys generate one of nine possible outcomes, or flows, when they answer trichotomous questions. Table 2 is a matrix of these outcomes using the responses to the economy-wide outlook (business confidence) question as an example. They are also illustrated in Figure 1. The notation *UD, UU* etc indicates the direction of change in the matched responses of firms. *UD*, for example, is an abbreviation for $U_{-1} \rightarrow D$. It indicates the number of firms who have changed their response to a particular question from 'up' in the previous quarter to 'down' in the current quarter. The same reasoning applies to the remaining entries. Three states in Table 2 reflect an unchanged response between quarters, namely 'up-up' (*UU*), 'down-down' (*DD*) or 'the same' (*SS*). Six flows reflect changes between these states, for example, from 'up-to-down' (*UD*). At any given time, though, each firm has just one opinion on each of the 19 trichotomous questions in the survey: up (*U*), stay the same (*S*) or down (*D*). The sum of the *U, S* and *D* columns in Table 2 are the respective totals for the current quarter, while the sum of the rows are the totals for the previous quarter.

Table 2. Matrix of Gross Business Confidence Flows in New Zealand
Number of Matched Responses between June 2000 and September 2000

| Confidence Status in Previous (June) Quarter	Confidence Status in Current (September) Quarter			
	Up	Same	Down	Row Totals
Up (Improve)	22 (*UU*)	26 (*US*)	11 (*UD*)	59 (*U$_{-1}$*)
Same	23 (*SU*)	75 (*SS*)	94 (*SD*)	192 (*S$_{-1}$*)
Down (Deteriorate)	19 (*DU*)	74 (*DS*)	187 (*DD*)	280 (*D$_{-1}$*)
Column Totals	64 (*U*)	175 (*S*)	292 (*D*)	531

Note: The 531 matched responses represent 69 percent of the total responses to the June 2000 *Survey* (776 replies) and 68 percent of the total responses to the September 2000 *Survey* (779 replies).
Source: NZIER *Quarterly Survey of Business Opinion* (157) June 2000 and (158) September 2000.

Equation 2, using the data in Table 2, shows that the net balance statistic (*N*) for the September quarter is -43 percent. This figure is the difference between the percentage of matched respondents who expect the economy to improve (12 percent) and the percentage who expect the economy to deteriorate (55 percent).

$$N = \left(\frac{(UU + SU + DU) - (UD + SD + DD)}{U + S + D - NA} \right)\%$$

$$= \left(\frac{(22 + 23 + 19) - (11 + 94 + 187)}{64 + 175 + 292} \right)\% \qquad (2)$$

$$= \left(\frac{U - D}{U + S + D} \right)\% = \left(\frac{64 - 292}{531} \right)\% = -43\%$$

Figure 1. Gross Business Confidence Flows in New Zealand
Number of Adjacent Responses between June and September 2000
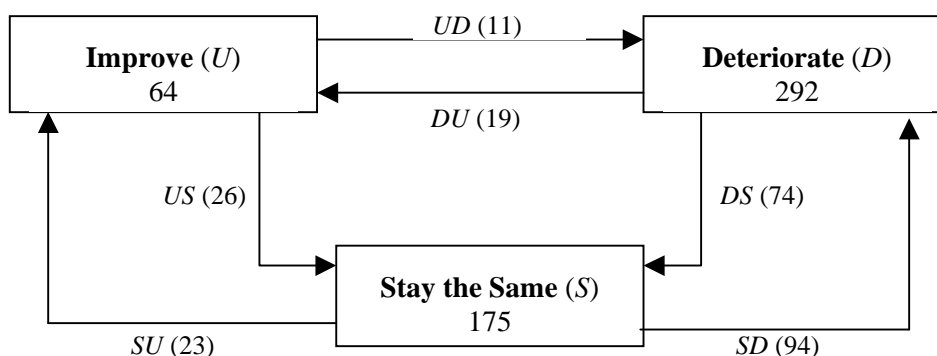
Source: Table 2.

The data in Table 2 (and Figure 1), it should be noted, record only the responses of those firms (531) who replied to both the June and September 2000 surveys. These matched responses are a subset of the total responses to the June and September surveys. In the full sample of 779 responses to the September survey, the net balance for business confidence is -44 percent. This is the figure published by the NZIER. The Institute also publishes the full sample equivalent of the *U, D* and *S* totals shown in Table 2. It does not, not, however, publish the nine dynamic components (the *UU* etc) behind the row and column totals of Table 2.

One of the main themes of this paper is that the dynamic components in Table 2 and Figure 1 give insights not only into business confidence but also into the other qualitative questions in Table 1. It will be recalled from the introduction to this paper, for example, that the net balance statistic for business confidence for September 2000 was almost unchanged from June's net balance. Table 2, however, shows that 47 percent of matched respondents changed their economy-wide outlook between June and September.

This surprisingly large opinion flow between quarterly surveys is the rule rather than the exception. It is not confined only to the economy-wide outlook of firms. Table 3 gives descriptive statistics for four own-variables (expected sales, prices, costs and profit) as well as business confidence. The output/sales figure of 47 percent implies that, on average, 47 percent of firms changed their own-sales outlook between quarters. The range and means for sales and the general business situation are fairly similar as are those for costs and prices.

Table 3. Percentage of Respondents who Changed their Business Opinion between Quarters
Selected Variables, March 1990 to September 2000

	Mean Quarterly Change (percent)	Range (percent)
Economy-wide Outlook		
General Business Situation	44	29-58
Own Outlook		
Output/Sales	47	38-57
Selling Prices	38	30-49
Average Costs	39	32-48
Profitability	47	42-53

Source: NZIER Quarterly Survey of Business Opinion 1990-2000 (118-158).

Are there any immediate explanations for this apparent volatility in quarterly responses? Figure 2 gives some insights. It shows the responses of Firm A to the qualitative questions in Table 1 (where 1, 0 and -1 mean up, same, down, respectively). Firm A was selected only because it replied to all 41 quarterly surveys between March 1990 and September 2000. It may or may not be representative.

The overall impression from Figure 2 is one of substantial volatility for most of the variables describing Firm A's past experiences and expected changes. The most volatile series include the firm's opinion on the general business situation and its own past and future output, employment and profits. Firm A tends to over-estimate future output and future profit and to under-estimate future costs. With an appropriate analytical framework, the respondent dynamics of individual firms could be explored further. For example, could Firm A benefit from advice regarding the pattern of its responses? What are the consequences, if any, of systematic respondent errors? Do the pattern of responses differ between firms in the same industry and what are the consequences, if any?

Figure 2. NZIER Survey of Business Opinion 1990:1-2000:3
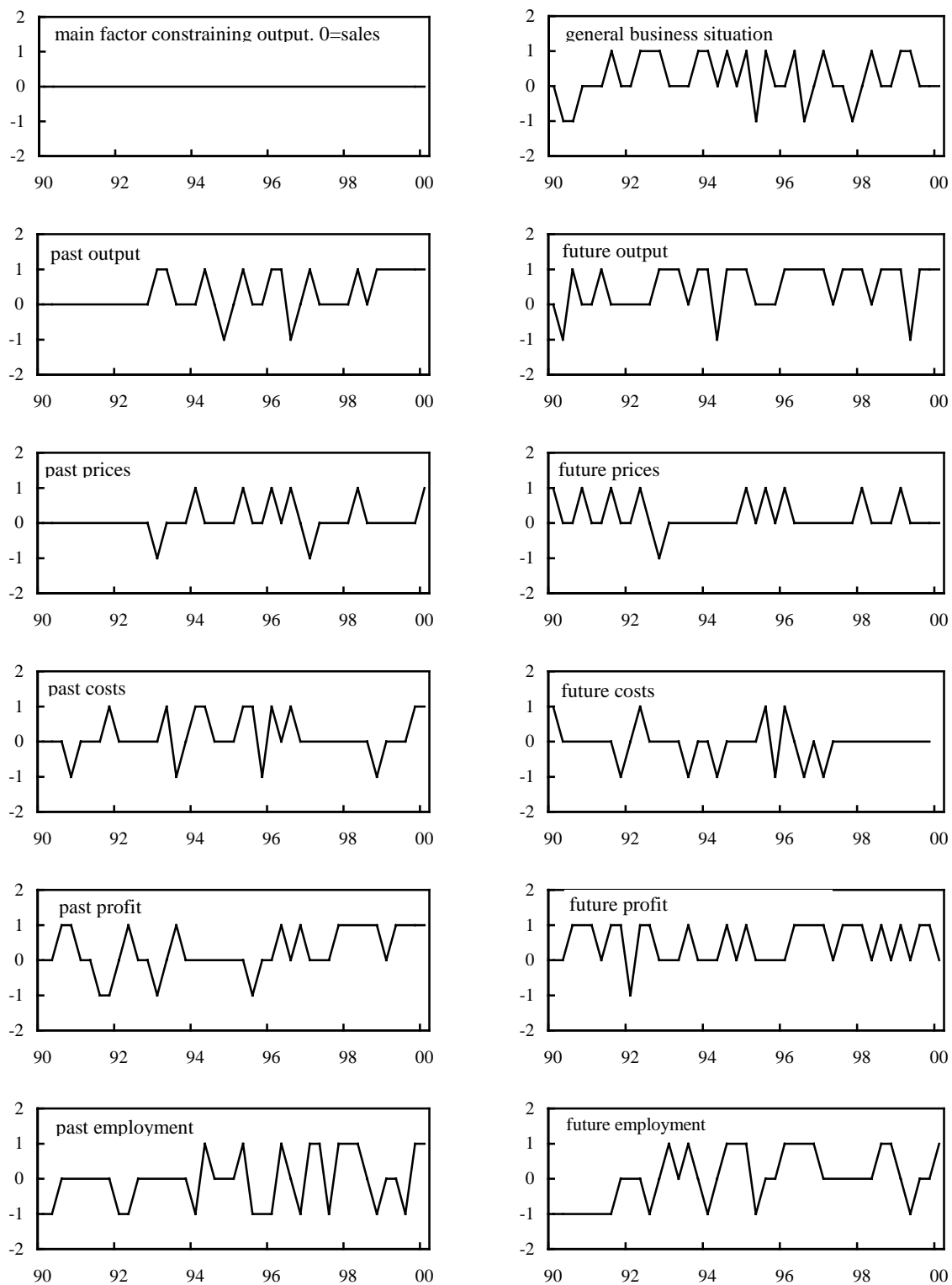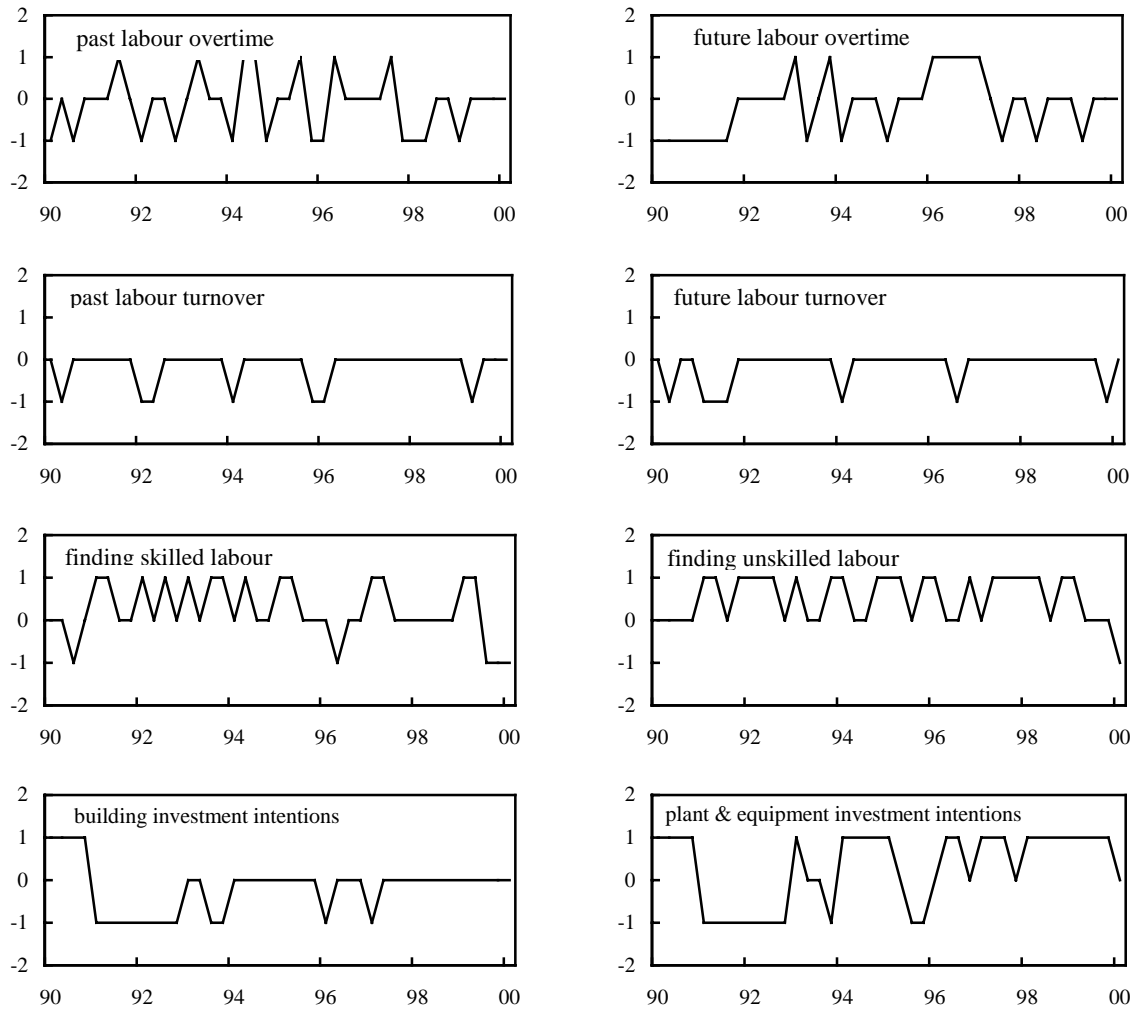Responses of Firm A

Figure 2 continues

Figure 2 continued

Source: NZIER *Quarterly Survey of Business Opinion.*

Seasonality and changes in the personnel answering successive surveys are possible explanations for respondent volatility. Another explanation is the 'threshold effect' or indifference interval: respondents have to decide what constitutes a change. If future output, for example, is expected to increase one percent over the next quarter, the respondent is likely to report 'the same' rather than 'increase'. What about a three percent increase or a five percent increase? Should the respondent wait another quarter to register a change which then appears as an abrupt entry in survey data but not in the firm's underlying continuous variable? This is an important issue when considering respondent dynamics.

Respondent dynamics can also give important insights into controversial issues such as the relationship between the macroeconomic outlook of firms and it own outlook. As a basic illustration of the sort of issues that can be raised, consider the following question: Do firms with an optimistic-pessimistic-no change economy-wide outlook have a similarly optimistic-pessimistic-no change stance with respect to their own outlook?

In Table 4, the 'Macro Outlook' row classifies all 768 firms who responded to the September 2000 NZIER survey into three groups: those firms who expect the general business situation to improve (up), stay the same (same) or deteriorate (down). The 'Micro Outlook' column lists the responses of these firms to seven own-variables. Some interesting outcomes occur. With respect to output, for example, for every 100 firms who were optimistic about the economy, 63 percent were, on average, optimistic about their own output prospects, 30 percent expected their situation to remain the same, while just 5 percent were pessimistic, giving a net balance of 58 percent. On the other hand, firms pessimistic about their own output prospects were also, on balance, pessimistic about the overall general business situation. The net balance on output for this group was -18 percent. A similar trend emerges, perhaps not surprisingly, with regard to profitability and numbers employed. Analytically, this information could be used to model the determinants of business confidence.

Table 4. The Macro and Micro Outlook of Firms September 2000
Summary of 768 Economy-wide Responses, Percent

| | **Next Three Months** | | | | | | | | | | | |
| **Macro Outlook** → | Up (99 firms) | | | | Same (250 firms) | | | | Down (419 firms) | | | |
Micro Outlook ↓	*U*	*S*	*D*	*Net*	*U*	*S*	*D*	*Net*	*U*	*S*	*D*	*Net*
Output/Sales/Volume	63	30	5	*58*	33	55	11	*22*	20	41	38	*-18*
Profitability	32	46	20	*12*	18	53	27	*-9*	12	33	55	*-43*
Average Selling Prices	40	52	6	*34*	44	51	5	*39*	51	34	12	*39*
Average Costs	48	46	4	*44*	55	39	5	*50*	63	26	10	*53*
Numbers Employed	35	55	11	*24*	21	66	12	*-9*	12	60	28	*-16*
Overtime Worked	26	49	18	*9*	14	61	14	*0*	8	45	33	*-28*
Labour Turnover	11	66	18	*-8*	5	81	9	*-4*	12	65	17	*-6*

Notes: U, S, D and *Net* are the percentage of respondents replying 'up', 'same', 'down' and 'net balance', respectively. Some rows do not sum to 100 because 'not applicable' (*NA*) responses have been omitted. *Net* is calculated from the equation $[(U\text{-}D)/(U\text{+}S\text{+}D\text{-}NA)]100$.
Source: NZIER *Quarterly Survey of Business Opinion* (158) September 2000.

4. Business Opinion Flow Rates

By definition, the quarterly change in the 'up', 'same' and 'down' outcomes is the difference between inflows and outflows to these states. In Table 2, for example, the total number of firms expecting the general business situation to improve between June and September 2000 increased by 5 from 59 to 64 firms. This net flow (U-U_{-1}) is the outcome of two gross changes: 42 inflows into 'optimism' (SU +DU) and 37 outflows (US +UD). Assuming a first-order Markov process of behavioural response, these flows levels can be used to calculate flow rates or transitions. In a first-order Markov process, the probability of an individual firm's response to survey questions depends only on the firm's immediately preceding responses to those questions. The flow rate from optimism to pessimism (ud), for example, is the average probability of a firm moving from optimism in the previous period to pessimism in the current period. It is calculated as the ratio of the flow from optimism to pessimism (UD) to total optimism in the previous period (DU+DS+DD) or D_{-1}. That is, ud (and similarly for the remaining flows in Table 5) is calculated as:

$$ud = \left(\frac{UD}{UU + US + UD} \right)\% = \left(\frac{UD}{U_{-1}} \right)\% = \left(\frac{11}{59} \right)\% = 19\% \tag{3}$$

Table 5. Matrix of Gross Business Confidence Transitions in New Zealand
Percentage of Matched Responses between June 2000 and September 2000

Confidence Status in June Quarter	Confidence Status in September Quarter			
	Up	Same	Down	Row Totals
Up$_{-1}$	37 (*uu*)	44 (*us*)	19 (*ud*)	100
Same$_{-1}$	12 (*su*)	39 (*ss*)	49 (*sd*)	100
Down$_{-1}$	7 (*du*)	26 (*ds*)	67 (*dd*)	100

Source: Table 2 and Equation 3.

The main diagonal in Table 5 shows the percentage of respondents in each group with an unchanged outlook between June and September 2000. The off-diagonal elements represent a change in outlook. In June 2000, for example, for every 100 respondents who thought the economy would stay the same, 39 percent held the same view in September 2000, 12 percent thought the economy would improve while 49 percent thought it would deteriorate.

Figure 3 is a quarter-by-quarter representation of the nine elements in Table 3 from 1983 to 2000. Several descriptive insights into New Zealand's confidence outlook are highlighted in these charts. Consider, first, the main diagonals, which represent an unchanged outlook between adjacent quarters. The category for 'same' (*ss*) has fluctuated relatively little over the period. With some exceptions, 55 percent of respondents, on average, reported 'same' in adjacent quarters. On the other hand, the percentage of respondents reporting 'improve' in adjacent quarters (*uu*) has fluctuated considerably, from around 15 percent on occasions to 80 percent. Secondly, abrupt changes have occurred, suggesting, perhaps, that quarterly information may be a poor guide to underlying developments. Thirdly, seasonality may be present in the data.

Figure 3-type charts can be prepared for all 19 trichotomous variables in Table 1. What, analytically, though, can one actually do with the dynamic data on these variables when they are converted to opinion flows (Table 2) or flow rates (Table 5)? One possibility is to use multinomial logistic regression analysis to explain these variables in terms of inflows and outflows. With Figure 1 in mind, consider business confidence as an illustration. At the end of each period, business confidence is, in effect, a stock variable calculated, following equation 1, as $[(U\text{-}D)/(U+S+D)]100$. As a stock variable, it is the outcome of two series: inflows and outflows. The task then becomes one of modelling each flow. Hopefully, the outcome is a better understanding of the determinants of the each variable than would be achieved by modelling the stock series alone. The process is analogous to the now well-established modelling of employment, unemployment and not-in-the labour force in terms of gross flows using survey data. (For New Zealand illustrations see, for example, Silverstone and Gorbey 1995 and Chapple, Harris and Silverstone 1996).

5. Conclusions

This paper has been an introductory perspective on respondent dynamics within the NZIER's *Quarterly Survey of Business Opinion*. It has concentrated mainly on the potential usefulness of matched and individual responses to give insights into business behaviour. The focus of subsequent work will include (a) the application of gross flows modelling to a range of variables in the *Survey,* especially business confidence, and (b) the search for information content from individual firm responses. The project will also study several methodological issues involving business survey data such as qualitative-to-quantitative conversion and bias.

Figure 3. Business Confidence Flow Rates in New Zealand 1983-2000
Percent, December Years
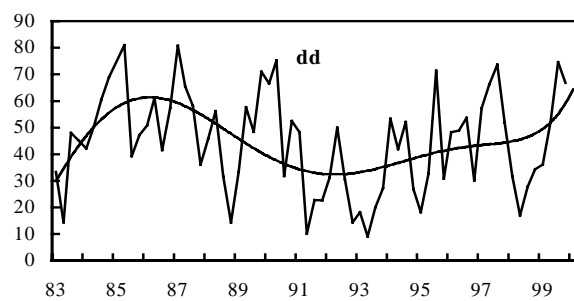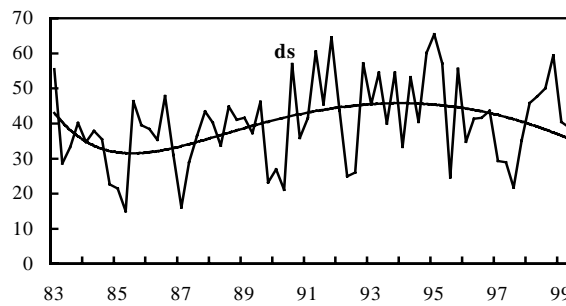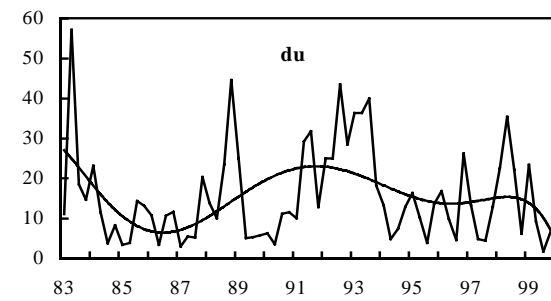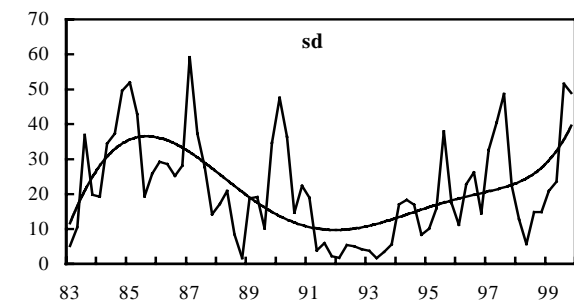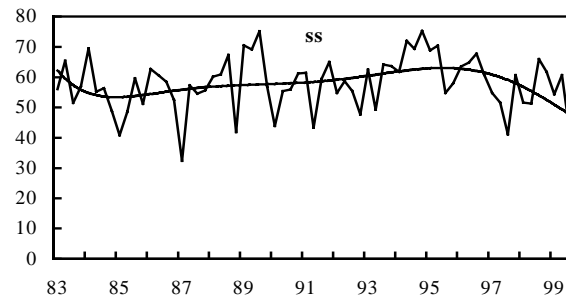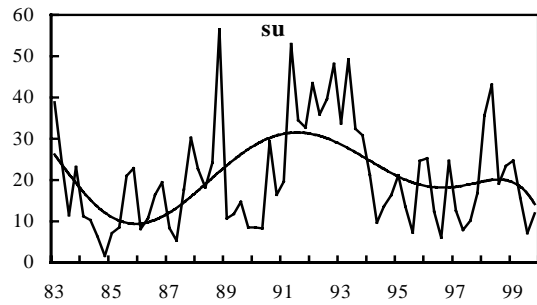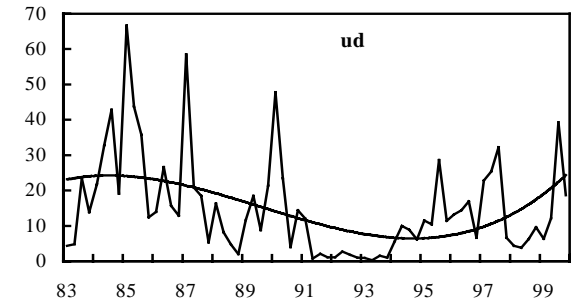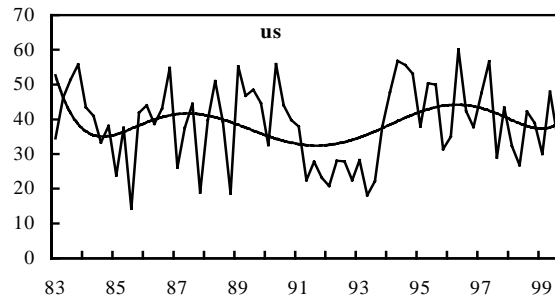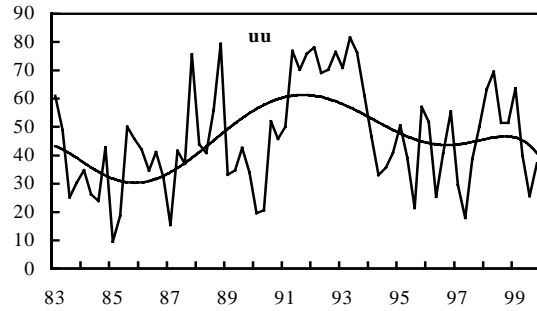
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