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**Insights into Business Confidence
from Firm-Level Panel Data**

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Abstract

Business confidence announcements attract widespread attention, yet relatively little is known about the series itself. What, for example, does an improvement or deterioration in business confidence mean? We consider this question using a panel of firm-level responses to a business opinion survey that includes a question on business confidence. We relate the confidence responses of the firms to microeconomic and macroeconomic variables that have a direct interpretation and, as a result, determine the variables that firms associate with business confidence. Our analysis of firm-level data reveals that what firms associate with business confidence changes over time and means different things to different firms. Consequently, it is not immediately apparent what a change in business confidence actually means.

Keywords

business confidence
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E32

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INTRODUCTION

Business opinion announcements invariably attract widespread media, forecaster and policymaker interest. The business confidence response attracts particular interest due primarily to its apparent relationship with near-term economic activity, especially cyclical turning points. (See, for example, Santero and Westerlund 1996). Media releases accompanying the publication of opinion surveys usually have a commentary on the possible reasons for a change in business confidence. Explanations include growth and inflation prospects, interest and exchange rate movements, labour market conditions, budget and trade balances, political considerations (such as proximity to an election) and specific world events. The list is endless. These explanations, however, are merely stories. We actually know very little about the underlying associations with business confidence let alone its determinants. This is surprising, perhaps, given the attention that business confidence receives in analysis, forecasting and policymaking.

In this paper, we establish some stylised facts about business confidence by focusing on business confidence associations using panel data from a long-established business survey. Although our data relate to a small open economy (New Zealand), the similarity of many surveys of business opinion means that our approach could be applied readily to other surveys. The next section considers a representative business survey. This is followed by an outline of polychoric correlation and the correlation of business confidence across firms, time and in aggregate, respectively. Our findings and conclusions are in the final sections.

A REPRESENTATIVE BUSINESS SURVEY

Table I illustrates, in summary form, a representative survey of business opinion. Apart from the initial information on each firm's characteristics, the survey requests mainly qualitative answers - up/same/down - to a range of questions. Typically, in these surveys, the responses to each question are *aggregated* and published as a net balance statistic, that is, the percentage of respondents replying 'up' less those replying 'down'. In this paper, we examine the *firm-level* responses underlying the net balance or aggregate statistic. We wish to compare and contrast the correlations obtained when analysing disaggregated, firm-level, data with those obtained when analysing net balance data. Analysing firm-level data is one of the few ways to discover what firms really mean by 'business confidence' because their associations with confidence are determined without the application of aggregation and quantification methods, such as the net balance statistic. (See Mitchell *et al.* 2002, 2005).

Table I. A Representative Survey of Business Opinion

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1. How many **employees** are covered by this return?
 2. Which **sector** is covered by this return?
 3. Which **district** does this return primarily relate?
 4. Do you expect the **general business situation** during the next six months to improve, stay the same or deteriorate?
 5. Is finding **staff** you want today, compared with three months ago, easier, the same or harder?
 6. What **single factor**, if any, is most limiting your ability to increase your production or activity? Select from: orders/sales, material/components, finance, labour, capacity, other.
 7. Do you expect **new investment approvals** (next 12 months compared with the last 12 months) to be greater, the same or less?
 8. **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* regarding:
 - Numbers Employed
 - Overtime Worked
 - Labour Turnover
 - Average Cost
 - Selling Prices
 - Profitability
 - Output
-

Source: New Zealand Institute of Economic Research (NZIER).

All questions - but one - in Table I relate to each respondent's microeconomic experiences and outlook regarding profitability, output, employment, investment intentions, costs, prices and related variables. The remaining question [Question 4] seeks each respondent's overall macroeconomic outlook and asks: 'Do you expect the general business situation during the next six months to improve, stay the same or deteriorate?' The main aim of our paper is to find the associations that respondents have in mind when answering this question. Our main analytical tool is polychoric correlation.

POLYCHORIC CORRELATION

If we had quantitative data on business confidence, and the other survey questions in Table I, the Pearson correlation coefficient would measure the strength of the (linear) relationship between confidence and the other survey questions. Since Pearson correlations assume, in principle, that the variables are continuous and measured at an interval level, their application to qualitative survey data is questionable conceptually

because such data are discrete and measured at an ordinal level. Pearson correlation, then, has been shown to deliver biased and misleading inference for ordinal variables. (See Mislevy 1986 and Coenders *et al.* 1997). We therefore use polychoric and polyserial correlation, rather than Pearson correlation. A possible alternative is to consider measures of association based on the analysis of contingency tables that account explicitly for the ordered and categorical nature of the responses. (See, for example, Goodman and Kruskal 1963).

The idea behind polychoric correlation is that the bivariate relationship between two variables is characterised by two jointly distributed latent variables that trigger categorical responses as they cross certain thresholds. It seems plausible to assume, then, that underlying each respondent's qualitative responses are quantitative views about their own activity and economy-wide activity.

For each ordinal variable z , assume an underlying variable z^* . If z has three categories ($i=1,2,3$) corresponding to 'down/same/up', the relationship between z^* and z is given by:

$$\begin{aligned} z = i \text{ if } \mu_{i-1} < z^* < \mu_i \\ \text{where } -\infty = \mu_0 < \mu_1 < \mu_2 < \mu_3 = \infty \end{aligned} \quad (1)$$

where μ_i are thresholds. Assuming two z 's follow a standardised bivariate normal distribution, the polychoric correlation between the variables is then defined as the off-diagonal element from their covariance (correlation) matrix. The problem, solved by Olsson (1979), is to estimate the variance-covariance matrix from the assumed distribution simultaneously with the thresholds. This is achieved as follows. Let z_1 and z_2 denote two ordinal variables each with three categories. The probability distribution characterising them is summarised by a three-by-three contingency table with j,k -th element n_{jk} ($j=1,2,3$ and $k=1,2,3$) denoting the number of observations in that cell. The polychoric correlation coefficient ρ is then estimated by maximising the log-likelihood function:

$$\ln L = \sum_{j=1}^3 \sum_{k=1}^3 n_{jk} \ln \pi_{jk} \quad (2)$$

where π_{jk} is the probability of observing the j,k -th response and

$$\pi_{jk} = \int_{\mu_{j-1}^1}^{\mu_j^1} \int_{\mu_{k-1}^2}^{\mu_k^2} \Phi_2(u, v) du dv \quad (3)$$

where Φ_2 is the standardised bivariate normal density with correlation coefficient ρ , and μ_i^1 and μ_i^2 are the thresholds for variable z_1 and z_2 .

The assumption of a bivariate normal distribution for the underlying latent variables is testable via a likelihood ratio (LR) test. Asymptotic estimated standard errors for the polychoric correlation coefficient are derived from the Hessian matrix evaluated at the maximum. When one of the variables is discrete and the other continuous, maximum-likelihood can also be used to estimate the so-called polyserial correlation between the underlying continuous random variable and the observed continuous random variable. (See Olsson *et al.* 1982).

In theory, given our interest in correlation between more than two ordinal (and continuous) variables, the underlying distribution should be assumed multivariate normal, rather than bivariate normal. In practice, computation would be difficult since it involves numerical integration of potentially large dimensional integrals. Simulation methods that have not been used in this context might, in principle, help. The dimension of our task, however, is possibly too large with 19 discrete and 20 continuous variables. We therefore compute the multivariate correlation matrix on a pairwise basis. This means that the resulting correlation matrix need not be positive-definite. The correlation estimates, however, remain consistent.

Correlation across time and across firms

Our panel data set allows us to compute multivariate polychoric correlation matrices across time ($t=1, \dots, T$) and separately across firms ($i=1, \dots, N$). Expressed alternatively, the contingency table can be constructed across i and separately across t . This is important in detecting heterogeneity between firms and over time. Polyserial correlation can only be estimated across time as the macroeconomic variables exhibit no variation across firms.

Let \mathbf{z}_{it}^* be a vector denoting the 19 underlying (standardised normal) continuous random variables underlying the discrete survey responses for firm i at time t . The polychoric correlation matrix across time ($t=1, \dots, T$) is defined as:

$$\boldsymbol{\rho}_t = (1/N) \sum_{i=1}^N \mathbf{z}_{it}^* \mathbf{z}_{it}^{*'} \quad (4a)$$

Similarly, the polychoric correlation matrix across firms ($i=1, \dots, N$) is defined as:

$$\boldsymbol{\rho}_i = (1/T) \sum_{t=1}^T \mathbf{z}_{it}^* \mathbf{z}_{it}^{*'} \quad (4b)$$

where $\boldsymbol{\rho}_t$ and $\boldsymbol{\rho}_i$ serve as the basis for our analysis below. Our focus is on the ‘business confidence’ row in these matrices, that is, on the correlation of business confidence with the other survey questions in Table I and also with macroeconomic variables. To summarise the information in this row, which is particularly important when looking at

correlation across firms (since there are a large number of them), we report the mean correlation across firms or time. To indicate the degree of heterogeneity (variation about this mean) we also report the standard deviation of the correlation coefficients and statistics that summarise distributional properties.

CORRELATION OF BUSINESS CONFIDENCE ACROSS FIRMS: ρ_i

The New Zealand Institute of Economic Research (NZIER) has, since 1961, conducted a quarterly business survey of executives in the manufacturing, building, merchant and service sectors. The main exclusions are the agricultural, utility and government sectors. The published results are used widely in public and private sector forecasting, analysis, policymaking and research. (On the latter, see Buckle and Silverstone 2004). In this paper, we use, potentially, 48,000 responses from 2480 firms to the 86 quarterly surveys held between 1983:3 and 2004:4, inclusive. Table II shows the distribution of responses to these surveys. The mean response of 19 surveys per firm compares favourably with similar surveys.

Table II. Distribution of Responses to NZIER Quarterly Survey of Business Opinion, 1983-2004

Number of Surveys Answered	Number of Firms Responding	Percent of Total Firms Responding
1 to 9	1035	42
10 to 19	579	23
20 to 39	458	18
40 to 59	291	12
60 to 86	117	5
	2480 firms	100 percent

Source: NZIER.

To estimate ρ_i consistently requires sufficient time-series observations per firm. We therefore selected initially all firms who answered 20 or more surveys. This gave us 866 respondents or 35 percent of all available firms. We then calculated pairwise polychoric correlations between the responses each firm gave to the business outlook question and the responses these same firms gave to the up/same/down questions in Table I. For each firm we also calculated polyserial correlations between their business outlook response and a range of plausible macroeconomic variables. Our selection of macroeconomic variables was based largely on the assumption that respondents answer surveys quickly and with impressionistic macroeconomic information only. We therefore included headline variables (such as economic growth, unemployment,

inflation, interest and exchange rates), political and opinion variables (such as proximity to an election, government popularity and another confidence series) and activity indicators (such as the share price index and vehicle sales).

The full list of macroeconomic variables is defined in the data appendix. The list is largely uncontroversial and self-explanatory. Some comment, however, is appropriate regarding the inclusion of the business confidence series published by the National Bank of New Zealand. This variable - 'Bank Confidence' - is included because the National Bank survey is conducted monthly, whereas the NZIER survey is conducted quarterly. In principle, respondents to the NZIER survey could have knowledge of the National Bank confidence result up to three times before answering the NZIER survey question on confidence. Rational expectations and strategic complementarity suggest that information from one confidence survey could influence respondents to another survey. (See, for example, Matsusaka and Sbordone 1995 and Thomas 1999).

Table III shows the results of firm-by-firm polychoric and polyserial correlations. Overall, the strongest own-level correlations with business confidence are with expected output (0.48) and profits (0.43) and, at the macro-level, with both the NZIER and National Bank business confidence series (0.54 and 0.48, respectively). These correlations are not especially high. They are followed by a weaker group that includes, at the own-level, expected overtime (0.30), employment (0.27), investment in plant (0.29) and buildings (0.23) and previous output (0.25) and profit (0.24). At the macro level, the unemployment rate (0.28), expected inflation (-0.24) and government popularity (-0.22) are relatively important. For some variables, for example, prices and the difficulty of finding skilled and unskilled labour, the mean correlations are not significantly different from zero. When the number of surveys answered is extended either backwards (to firms who answered 15 or more surveys) or forwards (to firms who answered 70 or more surveys) the results are not significantly different from those in Table III.

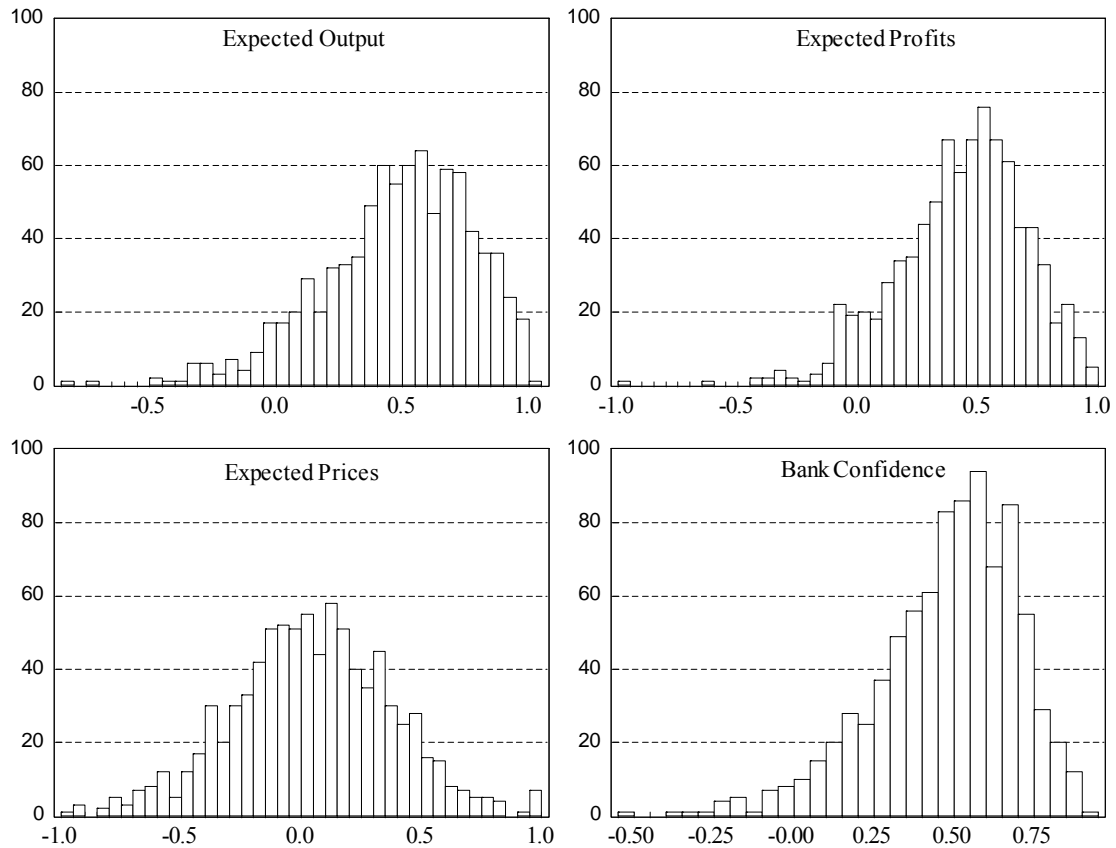
The relatively wide dispersion around the means in Table III implies that variables associated strongly with confidence for some firms are only weakly associated for others. In short, examining means alone disguises the heterogeneity of responses. Expected output, for example, has a mean correlation with confidence of 0.48 across all 866 firms, but a range from -0.80 to 1.00, a standard deviation of 0.30 and a skewness (asymmetry) of -0.71. A histogram of expected output, and other selected variables, is illustrated in Figure 1. These charts show that the frequency distributions of expected output, profits and bank confidence are skewed to the left (that is, they are asymmetrical about their means with a long left tail) compared to expected prices with virtually no skewness. For the former group of variables, this skewness is sufficient to reject normality using Jarque-Bera (JBera) normality tests.

Table III. Firm-by-Firm Polychoric and Polyserial Correlations 1983-2004
Business Confidence with Own and Macro Variables, 866 Firms

	Mean	Max	Min	SD	Skew	Kosis	JBera	Prob
Own Variables								
<i>Expected Outcomes</i>								
Output	0.48	1.00	-0.80	0.30	-0.71	3.53	81.23	0.00
Profit	0.43	1.00	-1.00	0.27	-0.61	3.87	81.72	0.00
Prices	0.04	0.99	-0.98	0.33	-0.05	3.13	1.02	0.60
Costs	-0.13	0.98	-1.00	0.30	0.05	3.00	0.39	0.82
Employment	0.27	1.00	-1.00	0.31	-0.43	3.68	43.41	0.00
Overtime	0.30	1.00	-1.00	0.30	-0.33	3.41	19.98	0.00
Labour turnover	0.08	1.00	-0.98	0.35	-0.01	3.60	12.22	0.00
Skilled labour	-0.02	1.00	-1.00	0.33	0.00	3.42	6.33	0.04
Unskilled labour	-0.04	0.97	-1.00	0.34	-0.16	3.02	3.36	0.19
Investment in buildings	0.23	1.00	-0.99	0.33	-0.21	3.21	7.00	0.03
Investment in plant	0.29	1.00	-0.75	0.29	-0.23	3.09	8.30	0.02
Limiting factor	-0.09	1.00	-1.00	0.39	0.17	3.42	9.88	0.01
<i>Experienced Outcomes</i>								
Output	0.25	0.99	-0.99	0.30	-0.23	3.01	7.70	0.02
Profit	0.24	1.00	-0.82	0.28	-0.21	3.06	6.54	0.04
Costs	-0.15	0.98	-1.00	0.30	0.02	3.48	8.21	0.02
Prices	-0.03	0.99	-0.99	0.33	0.09	3.33	5.16	0.08
Employment	0.12	1.00	-1.00	0.30	-0.22	3.25	9.23	0.01
Overtime	0.14	1.00	0.99	0.31	-0.16	3.64	17.22	0.00
Labour turnover	0.01	0.98	-1.00	0.31	0.22	3.89	34.75	0.00
Macro Variables								
GDP growth rate	0.03	0.81	-0.66	0.26	0.06	2.79	2.02	0.36
GDP growth rate lag (-1)	0.13	0.82	-0.57	0.25	-0.04	2.67	4.10	0.13
GDP growth rate lead (+1)	-0.06	0.76	-0.80	0.27	0.15	2.87	3.97	0.14
Inflation rate	-0.21	0.67	-0.85	0.26	0.30	3.09	13.41	0.00
Inflation rate lag (-1)	-0.19	0.75	-0.84	0.27	0.37	3.20	21.00	0.00
Inflation rate lead (+1)	-0.24	0.66	-0.86	0.26	0.26	3.14	10.70	0.00
Unemployment rate	0.28	0.86	-0.64	0.27	-0.55	3.22	44.89	0.00
Discomfort index	-0.01	0.96	-0.84	0.32	0.13	2.62	7.72	0.02
Capacity utilisation	0.02	0.83	-0.70	0.28	0.02	2.66	4.33	0.11
Sales constraint	-0.03	0.75	-0.94	0.28	-0.07	2.71	3.80	0.15
Vehicle growth rate	0.16	0.77	-0.54	0.21	-0.14	3.08	3.07	0.22
Mortgage interest rate	-0.21	0.80	-0.90	0.27	0.22	2.94	7.05	0.03
Real interest rate	0.02	0.79	-0.80	0.25	-0.15	2.88	3.80	0.15
Nominal exchange rate	-0.17	0.62	-0.95	0.26	0.20	3.24	7.64	0.02
Real exchange rate	-0.19	0.66	-0.93	0.26	0.22	3.17	8.25	0.02
Share price index	-0.13	0.82	-0.88	0.26	0.25	3.27	11.60	0.00
NZIER confidence	0.54	0.95	-0.32	0.20	-0.86	4.02	142.7	0.00
Bank confidence	0.48	0.91	-0.53	0.22	-0.87	4.00	145.4	0.00
Government popularity	-0.22	0.50	-0.85	0.23	0.44	3.13	28.10	0.00
Election proximity	-0.07	0.96	-1.00	0.29	0.07	3.88	29.22	0.00

Sources: See Data Appendix.

Figure 1. Histograms of Selected Firm-by-Firm Polychoric Correlations
Number of Firms



We have two further perspectives on heterogeneity. The first involves separating respondent firms into three groups corresponding to those who answer ‘improve’, ‘stay-the-same’ or ‘deteriorate’ to the business confidence question [Question 4] in Table I. The net balance responses of these three groups to selected own-variables are then calculated and compared. There were, for example, a total of 12,577 ‘improve’ responses between 1983 and 2004. The firms in this group had a net balance on expected own output of 56 percent whereas the ‘deteriorate’ group (11,677 responses) had a net balance of -27 percent. Similarly, as Table IV shows, firms who were optimistic about the economy-wide outlook were also optimistic about their own profitability, employment, overtime and plant and investment intentions, and conversely for pessimistic firms. There is, for example, an 83-point difference between expected own-output of optimistic and pessimistic firms.

Table IV. Own and Economy-wide Outlook of Firms 1983-2004
Net Balances

Economy-wide Outlook				
Own Outlook regarding Expected	Improve (12,577 replies)	Stay the Same (23,104 replies)	Deteriorate (11,677 replies)	Points Difference
Output	56 %	16 %	- 27 %	83
Profitability	36 %	2 %	- 39 %	75
Selling prices	21 %	19 %	16 %	5
Average costs	16 %	24 %	36 %	20
Employment	16 %	-1 %	- 25 %	41
Overtime	5 %	-13 %	-37 %	42
Labour turnover	8 %	-10 %	-15 %	23
Skilled labour	12 %	8 %	13 %	1
Unskilled labour	-18 %	-22 %	-18 %	0
Buildings investment	4 %	-12 %	- 33 %	37
Plant investment	24 %	2 %	-24 %	48

Source: NZIER.

A further perspective on heterogeneity is illustrated in Table V which shows individual correlations for six firms. These six firms - two each from Manufacturing, Merchants and Services - have each answered 81 of the 85 surveys held between 1983 and 2004. Regarding own-variables, the expected strength of the associations between confidence and output, profit and employment emerge for most firms. The previous quarter's experience with profit also has a relatively strong association for all six firms. Regarding the macro variables, the unemployment rate (with a positive sign), expected inflation, real exchange rate, government popularity and the two confidence series, especially, have reasonably strong associations for most firms. Once again, though, what is a strong association with confidence for one firm is often a weak or non-existent association for another.

Table V. Polychoric and Polyserial Correlations for Six Firms 1983-2004
Business Confidence with Own and Macro Variables, 81 Replies Each

	Manufacturing		Merchants		Services	
	Firm A	Firm B	Firm C	Firm D	Firm E	Firm F
Own Variables						
<i>Expected Outcomes</i>						
Output	0.83	0.44	0.32	0.59	0.63	0.86
Profit	0.71	0.30	0.48	0.36	0.45	0.71
Prices	0.70	-	-	-0.20	-	0.43
Costs	-	-0.38	-	-0.50	-0.25	0.44
Employment	0.76	0.29	0.17	0.35	-	0.83
Overtime	0.78	0.18	0.47	0.31	na	0.99
Labour turnover	0.46	-	0.30	0.65	0.18	0.61
Skilled labour	-0.44	0.27	0.16	-	-0.22	-0.42
Unskilled labour	-	-0.23	-	-	-	-0.59
Investment in buildings	0.51	na	-	-	0.46	0.61
Investment in plant	0.53	0.52	-	0.22	-	0.50
Limiting Factor	-0.27	-	-0.63	na	-0.53	-
<i>Experienced Outcomes</i>						
Output	0.47	0.20	-	-	0.38	0.71
Profit	0.52	0.40	0.39	0.41	0.51	0.49
Prices	0.33	0.21	-	-0.47	-	0.33
Costs	-	-0.38	-0.20	-0.42	-0.38	0.20
Employment	0.31	-	-	0.55	-0.13	0.31
Overtime	0.39	-	-	0.28	na	Na
Labour turnover	0.46	-0.13	-	-0.52	0.20	-0.40
Macro Variables						
GDP growth rate	0.23	-0.33	-0.16	-	-	-
GDP growth rate lag (-1)	0.37	-0.18	-	-	-	-
GDP growth rate lead (+1)	-	-0.44	-0.24	-	-	-
Inflation rate	-0.34	-0.20	-0.19	-0.50	-	0.30
Inflation rate lag (-1)	-0.28	-0.21	-0.17	-0.48	-	0.35
Inflation rate lead (+1)	-0.44	-0.20	-0.18	-0.54	-	0.20
Unemployment rate	0.42	0.59	0.40	0.60	-	-
Discomfort index	-0.21	-	-	-0.34	-	0.34
Capacity utilisation	0.21	-0.35	-	-	-	-
Sales constraint	-	0.29	0.19	0.16	-	-0.18
Vehicle growth rate	0.22	-	0.19	0.33	-	-
Mortgage interest rate	-0.35	-	-	-0.45	-	0.29
Real interest rate	-	0.25	0.24	0.22	-	-
Real exchange rate	-0.47	-0.27	-	-	-0.40	-0.36
Nominal exchange rate	-	-0.23	-	-0.32	-	0.17
Share price index	-0.43	-0.22	-0.36	-	-0.24	-0.22
NZIER confidence	0.73	0.75	0.56	0.78	0.38	0.30
Bank confidence	0.68	0.71	0.51	0.83	0.32	0.21
Government popularity	-0.44	-0.40	-0.38	-0.38	-	-
Election proximity	-	-0.46	-0.22	-	-	-

Note: A dash (-) indicates that the correlation was $|0.15|$ or less and (na) indicates not applicable.

Sources: See Data Appendix.

CORRELATION OF BUSINESS CONFIDENCE ACROSS TIME: ρ_t

Using the full sample of 2,480 firms, Table VI shows the summary results of survey-by-survey polychoric correlations between business confidence and 19 survey variables from Table I. Several features emerge. First - and as expected - the results are similar to the firm-by-firm outcomes. The strongest correlations are those with expected output, profit, overtime and employment, although just two correlations (those with expected output and profit) are higher than 0.40. Secondly, confidence has, in all cases, a stronger correlation with future-quarter outcomes than with previous-quarter outcomes. Thirdly, as the maximum and minimums show, the survey-by-survey correlations with business confidence range widely for every variable.

Table VI. Survey-by-Survey Polychoric Correlations 1983-2004
Business Confidence with Other Survey Variables

	Mean	Max	Min	SD	Skew	Kosis	J-Bera	Prob
<i>Expected Outcomes</i>								
Output	0.47	0.63	0.31	0.06	-0.01	3.56	1.14	0.57
Profit	0.41	0.55	0.30	0.06	0.22	2.73	1.00	0.61
Prices	0.10	0.23	-0.05	0.07	0.03	2.37	1.43	0.49
Costs	-0.09	0.06	-0.29	0.06	-0.39	3.70	3.97	0.14
Employment	0.27	0.43	0.12	0.07	0.03	2.84	0.10	0.95
Overtime	0.28	0.45	0.08	0.07	0.03	3.16	0.10	0.95
Labour turnover	0.04	0.37	-0.18	0.08	0.47	7.32	70.07	0.00
Skilled labour	-0.02	0.19	-0.19	0.07	0.03	3.75	2.05	0.36
Unskilled labour	-0.03	0.16	-0.21	0.07	0.05	3.07	0.05	0.97
Investment in plant	0.23	0.39	0.06	0.07	-0.30	2.62	1.78	0.41
Investment buildings	0.20	0.37	-0.01	0.08	-0.32	2.64	1.91	0.38
Limiting factor	-0.11	0.17	-0.33	0.08	0.46	4.00	6.58	0.04
<i>Experienced Outcomes</i>								
Output	0.22	0.37	-0.04	0.09	-0.37	2.95	1.97	0.37
Profit	0.22	0.40	-0.02	0.08	-0.35	3.35	2.19	0.33
Prices	0.05	0.18	-0.11	0.06	-0.19	2.75	0.71	0.70
Costs	-0.07	0.05	-0.31	0.07	-0.48	3.59	4.49	0.11
Employment	0.10	0.23	-0.10	0.06	-0.35	3.03	1.80	0.41
Overtime	0.12	0.29	-0.10	0.08	-0.39	3.34	2.63	0.27
Labour turnover	0.02	0.20	-0.17	0.06	-0.13	3.85	2.84	0.24

Source: NZIER.

Fourthly, as Figure 2 illustrates for selected variables, the across-time correlations display volatility, abrupt changes and, for at least one variable, volatility about a trend. Take expected output. The correlation with business confidence has ranged from 0.31 to 0.63 and the series has trended downwards. Expected employment, on the other hand, is cyclical and characterised by some abrupt changes. Some of the volatility could be explained partly by the threshold nature of responses to qualitative questions. This point is highlighted in Table VII which shows that, on average, around 50 percent of matched respondents (the off-diagonal proportion) changed their opinion between quarters regarding own-output from, say, ‘up’ in the previous quarter to ‘down’ in the current quarter. (A similar outcome occurs with business confidence and other own-variables). Seasonal variations apart, this own-output volatility is significantly greater than the underlying official statistics on actual output. (See Silverstone 2000 for further detail on these dynamics).

Figure 2. Survey-by-Survey Polychoric Correlations 1983-2004
Business Confidence with Selected Variables

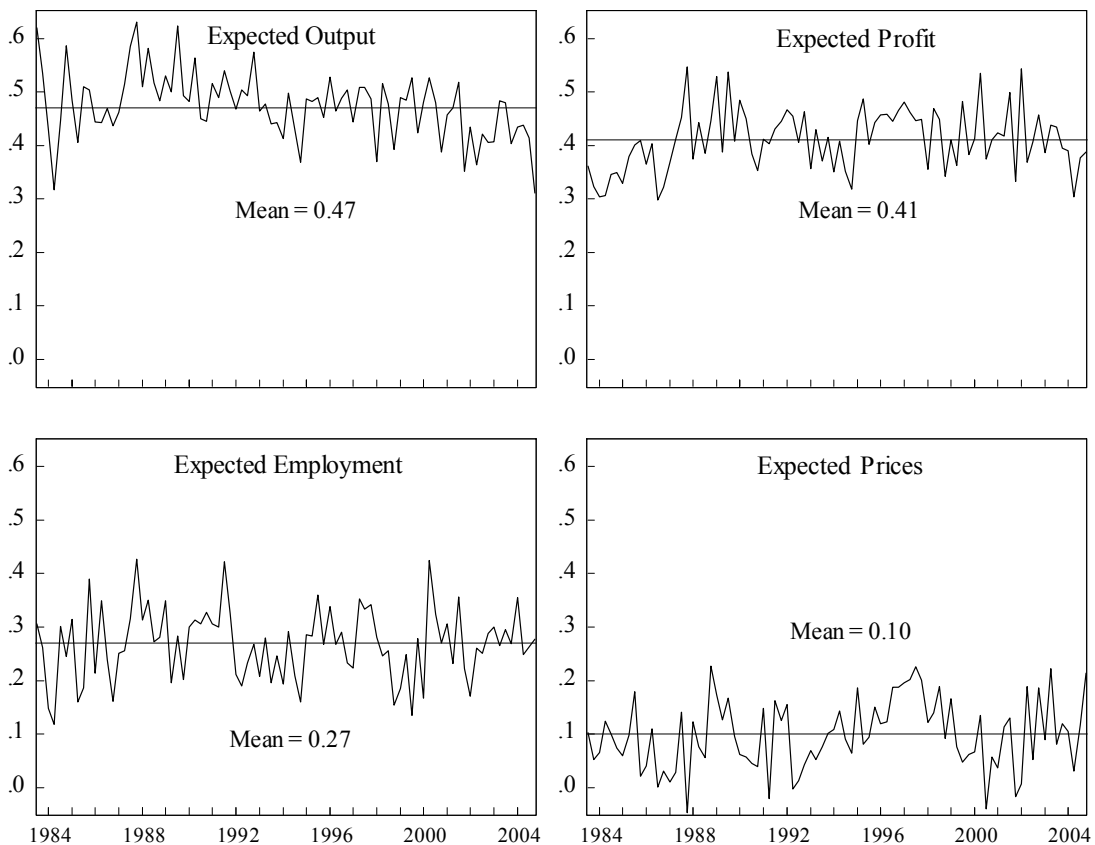


Table VII. Matrix of Expected Output Dynamics 1983-2004
Average Number of Quarterly Matched Responses

Expected Output in Previous Quarter	Expected Output in Current Quarter			Row Totals
	Up	Same	Down	
Up	76	46	16	138
Same	45	93	30	167
Down	16	28	31	75
Column Totals	137	168	76	380

Sources: NZIER and Silverstone (2000).

NET BALANCE CORRELATIONS

A further time series insight on business confidence is provided by the correlations between the confidence net balance and the net balances of the own-variables in Table I. The results, which also include the confidence net balance correlation with the macro variables, are shown in Table VIII. The own-correlations are especially strong with expected output (0.86), profitability (0.83), plant investment (0.65) and overtime (0.63). At the macro level, the correlation with Bank confidence (0.88) is especially noteworthy together with expected inflation (-0.48), government popularity (-0.41), the mortgage interest rate (-0.36) and the unemployment rate (0.51). The latter result appears perverse and contradicts the net balance own-correlation between confidence and numbers employed (0.45). The correlation of the confidence net balance with GDP growth (current and one-and-two-quarters ahead) at 0.04, 0.22 and 0.38, respectively, is consistent with the confidence question in Table 1 [Question 4] which asks respondents their outlook for the general business situation ‘during the next six months’. The overall association, though, is relatively weak.

The relatively high correlations of the *aggregate* confidence net balance statistic with the net balance statistics of many own-variables in Table VIII may be compared with the lower correlations in Table III using *firm-level* data. This outcome is a reminder that an analysis of the business confidence net balance statistic disguises or obscures considerable heterogeneity across firms regarding the meaning of ‘business confidence’. In addition, the method of aggregation and quantification applied to firm-level responses is likely to affect the outcome of the aggregated business confidence statistic. In a related study on UK survey data, Mitchell *et al.* (2005) concluded that if one is interested in constructing a forecast of, say, output growth, better forecasts than the net balance statistic can be obtained by aggregating in a manner that weights highly those firms whose responses are good indicators of output growth.

Table VIII. Net Balance Pearson Correlations 1983-2004
Business Confidence with Survey and Macro Variables

Own Variables	
<i>With Expected Outcomes</i>	
Output	0.86
Profitability	0.83
Selling Prices	-0.23
Average Costs	-0.41
Numbers Employed	0.45
Overtime Worked	0.63
Labour Turnover	0.29
Finding Skilled Labour	0.05
Finding Unskilled Labour	0.03
Investment in Buildings	0.45
Investment in Plant	0.65
<i>With Experienced Outcomes</i>	
Profitability	0.50
Output	0.49
Selling Prices	-0.35
Average Costs	-0.48
Numbers Employed	0.21
Overtime Worked	0.35
Labour Turnover	-0.01
Macro Variables	
GDP growth rate	0.04
GDP growth rate (+1)	0.22
GDP growth rate (+2)	0.38
Inflation rate	-0.42
Inflation rate (-1)	-0.48
Inflation rate (+1)	-0.38
Unemployment rate	0.51
Discomfort index	-0.24
Capacity utilisation	0.02
Sales constraint	0.03
Vehicle growth rate	0.27
Mortgage interest rate	-0.36
Real interest rate	0.18
Nominal exchange rate	-0.19
Real exchange rate	-0.24
Share price index	-0.17
Bank confidence	0.88
Government popularity	-0.41
Election proximity	-0.11

Sources: See Data Appendix.

FINDINGS

Commentaries on changes in business confidence are largely guesswork. In an attempt to reduce this guesswork, we have used a panel of firm-level responses to a typical business survey to find underlying associations with business confidence. What insights have we found?

Across Firms

Overall. The strongest associations with business confidence are with own expected output, profit, employment, overtime and investment in plant and, at the macro level, with the NZIER and National Bank business confidence series.

Heterogeneity. ‘Confidence’ means different things to different firms.

Own and confidence outlook. Firms who are optimistic about their own output, profit, employment and investment outlook also tend to be optimistic about the general business situation, and conversely for pessimistic firms.

Confidence may be contagious. Repeated confidence announcements, such as the monthly National Bank confidence report, may influence respondents to the NZIER’s quarterly survey.

Firms are forward-looking. Firms typically give relatively more weight to next quarter’s outlook for, say, output, profit and employment, rather than the previous quarter’s experience with these and other survey variables.

Across Time

Volatility. The aggregate, survey-by-survey correlations that firms have with business confidence (for example, with output, employment and profit) can change abruptly between surveys from relatively high to relative low values.

Some net balance correlations are high. At the aggregated (net balance) level, the correlations of expected output, profit, investment and overtime net balances with the confidence net balance are relatively high. This may be contrasted sharply with the heterogeneity of firm-by-firm correlations.

CONCLUSIONS

Our descriptive analysis of firm-level data has revealed that what firms associate with business confidence (i) means different things to different firms and (ii) changes over time. As a result, it is not immediately apparent what a rise or a fall in business confidence actually means. This conclusion may explain the many stories told about business confidence in the media and by forecasters and policymakers. It is not that all these stories are wrong; more that they are all right. Business confidence does not mean one thing.

If a forecast of GDP growth is the main information we actually want to extract from business confidence data, our paper suggests that an inspection of the net confidence balance may not be the best way to proceed. Responses should instead be related directly at the individual level to the variable of interest. In this way, a clearer interpretation can be given to the signal extracted from the business confidence data. In addition, those firms whose responses provide a good signal can be given a higher weight in the forecast than those firms whose responses are only weakly related to the variable of interest. The considerable heterogeneity we have found across firms - in terms of what they mean by business confidence - suggests that filtering out those firms whose responses are orthogonal to the variable of interest will deliver a stronger signal than the net balance statistic which treats all firms equally or, perhaps, weights them according to their size. (See Mitchell *et al.* 2002, 2005 for a method of extracting a quantitative signal about GDP growth from panel data on business confidence).

Many economists are wary of the information content of business surveys. (See, for example, Bertrand and Mullainathan 2001). Others, for example, Blinder (1991) and Hall *et al.* (2000), believe that surveying firms provides useful insights into business behaviour. As a result, better forecasting and policy outcomes could emerge. Our paper has used a survey of business opinion to identify associations with business confidence. Ongoing work includes further disaggregation of the panel by employment and sector, locating 'good signalling' firms, detecting the probability of sentiment-switching, empirical modelling of the determinants of business confidence and the construction of quantitative forecasts from qualitative disaggregated survey data.

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DATA APPENDIX

NZIER Business Confidence (and similarly for all up/same/down variables in Table I). Their's net balance statistic (*NB*), or diffusion index, for qualitative to quantitative conversion. Specifically,

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

where *U*, *D* and *S* represent the number of respondents replying 'up', 'down', 'same' and 'not applicable' or 'no answer', respectively.

Source: NZIER Quarterly Survey of Business Opinion.

Bank Confidence

National Bank Business Confidence, quarterly average of monthly net balances, percent.

Source: 1988:1-2004:4 National Bank; 1983:1-1987:4 interpolated by authors.

Capacity Utilisation

Median measure of ability of manufacturers and builders to increase production from existing plant and equipment without raising unit costs.

Source: NZIER [QSBO]

Discomfort Index

Average of current quarter sum of inflation rate and unemployment rate.

Source: Statistics New Zealand [CPIQ.SE9A (inflation)] and [HLFQ.S1F3S (unemployment)]

Election Proximity

Election dummy = 1 in election quarter and quarter on each side, otherwise = 0.

GDP Growth Rate

Real GDP, volume method, seasonally adjusted, index (1987=100) percentage change.

Source: Statistics New Zealand [SNBQ.S2SZT (to 1987)] and [SNCQ.S1RB01S]

Government Popularity

Popularity of governing party, percent.

Sources: Jack Vowles (University of Auckland) and TV One Colmar-Brunton Poll.

Inflation Rate

Consumers Price Index, all groups, percentage change.

Source: Statistics New Zealand [CPIQ.SE9A]

Mortgage Interest Rate

First Mortgage Interest Rate, variable rate, percent.

Source: Statistics New Zealand [RBNU.UR_IRFMH]

Real Inflation Rate

Mortgage interest rate minus Inflation rate

Sources: Statistics New Zealand [RBNU.UR_IRFMH (interest)] and [CPIQ.SE9A (inflation)].

Real Exchange Rate

Real Effective Exchange Rate Index (2000=100)

Source: OECD Main Economic Indicators [NZL.CCRET01.IXOB]

Sales Constraint

Percentage of QSBO respondents reporting sales as the single most important factor constraining output.

Source: NZIER [QSBO]

Stock Exchange Capital Index

Stock Exchange, Share Price Index (2000=1000), quarterly average of monthly data.

Source: OECD Main Economic Indicators [NZL.SPASTT01.IXOL]

Trade Weighted Exchange Rate

Nominal trade weighted exchange rate index (June 1979=100)

Source: Statistic New Zealand [RBNM.UR_FXMA_TWI]

Unemployment Rate

Unemployment Rate, total, seasonally adjusted, percent.

Source: Statistics New Zealand [HLFQ.S1F3S]

Vehicle Growth Rate

Total new commercial vehicle registrations, number, percentage change.

Source: Statistics New Zealand [TPM.S22PZ]