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CONNECTING MICRO AND MACRO: THE IMPACT OF MACROECONOMIC NEWS ON MANAGEMENT FORECASTING

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Abstract

This paper explores the relationship between macroeconomic news and management forecast in the context of macro-accounting. Based on quarterly financial data from the COMPUSTAT database and macro forecasts from the website of the Philadelphia Fed, the study finds a positive relationship between the extent to which a company's earnings move in concert with GDP and the likelihood of issuing management forecasts. These findings contribute to the literature on macro-accounting by showing how companies are not isolated from macroeconomic conditions. The results suggest that companies whose earnings show more correlation with macroeconomics are more likely to offer management forecasts, as managers can blame the wrong forecast of macro news rather than firm-specific forecasts. The analysis also identifies bellwether firms that have high macroeconomic information content or are connected to many other firms in the economy. The study concludes that the industries that are most closely correlated with GDP are those in the aircraft sector, while tobacco products have the highest average coefficient, followed by beer and liquor, non-metallic, aircraft and petroleum, and natural gas sectors.

INTRODUCTION

Companies do not operate in isolation with the macroeconomic conditions, but instead, they are closely related to the macroeconomy. On the one hand, countless companies consist of the macroeconomy. On the other hand, every single company is also substantially influenced by the macroeconomy. For example, the change in the interest rate and credit market tightness can affect a company's financing conditions significantly. The increases in oil prices can adversely affect airline companies' costs and profits, while the increase in oil prices is good news to the oil companies.

Notwithstanding its importance, macro-accounting, which explores the relationship between Micro (corporate earnings, etc.) and Macro (e.g., recessions, interest rates, energy prices, GDP, inflation, business cycle, etc.) are underexplored area in the capital market research (e.g., Abdulrazaq & Shetty, 2020; Aramonte, 2014; Bidabad,

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2019; Carabias & Jose, 2018; Collins & Nguyen 2022; Konchitchki, 2011; Konchitchki 2014a; 2014b; Lamont & Stein, 2006; Li, Richardson, & Tuna, 2014). Although this strand of literature is proliferating in the past decade, there seems to be a gap between macro news and management forecast. More specifically, do companies whose earnings move more with macroeconomy more likely or less likely to offer management forecasts? The explanation is that, if a firm's earnings move in concert with GDP, then a larger proportion of the firm's earnings can be explained by the macro factor. Thus, the cost of missing management forecasts is lower as managers could blame this to the wrong forecasts of macro news, instead of firmspecific forecasts.

This paper makes contributions to the literature in the following aspects. First, this paper contributes to the burgeoning literature on macro-accounting by showing a significantly positive relationship between the extent to which a company's earnings move in concert with GDP and the likelihood of issuing management forecasts. Moreover, on top of R-square, which has been used in the literature on macro-accounting, this paper suggests that the p-value and coefficients from the regressions of firms' earnings on macro factors are valuable information in identifying bellwether firms (firms with high macroeconomic information content or firms connected to many other firms in the economy).

LITERATURE REVEIW

The Literature on Macro-Accounting

Macro-accounting is an important but underexplored area in the accounting literature. Inspiringly, the past decade witnessed the burgeoning growth of macro-accounting research conducted by finance and accounting scholars. One on hand, one strand of literature investigates the effects of micro-level corporate outcomes on the macroeconomy. Anilowski, Feng, and Skinner (2007) show that, aggregate management forecast, particularly the relative levels of quarterly downward guidance, is associated with market returns. More directly, Konchitchki and Patatoukas (2014a) find that, accounting earnings aggregated across companies are a leading indicator of future GDP growth. This information is not used and processed even for professional macroeconomic forecasters when predicting the economic activity in the macro level. Similarly, Konchitchki and Patatoukas (2014b) show that financial statement analysis of company profitability drivers applied at the aggregate level has predictive power for forecasting real economic activity. More specifically, accounting profitability data aggregated across the one hundred largest firms have predictive content for subsequent real GDP growth.

On the other hand, the second strand of literature investigates the channels from macroeconomy to companies' outcomes (Micro). Li et al. (2014) document that combining firm-level country exposures and country-level performance forecasts generates superior forecasts for firm fundamentals and future stock returns. For example, Apple sells many products, say iPhone, to China. Combining the information from the Chinese macroeconomy can help forecast Apple's future earnings. Konchitchki (2011) finds that, as another important macro factor, inflation effects that are not recognized in financial statements under the current nominal reporting regime have substantial implications for the companies' future cash flows and stock valuation. Konchitchki, Luo, Ma, and, Wu (2016) find that, compared to low-earning downside risk firms, higher-earnings downside risk firms experience more negative operating performance over the subsequent period and are more sensitive to downward macroeconomic states.

Some research on macro-accounting investigates the forecasting behavior by analysts and managers. Hutton, Lee, and Shu (2012) examine the relative accuracy of management and analyst forecasts of annual EPS. They document those financial analysts provide more accurate earnings forecasts than management when a company's fortunes move in concert with macroeconomic factors while management's information advantage resides at the firm level. Hugon, Kumar, and Lin (2016) find that analysts underreact to macroeconomic news. Analysts

employed in firms with an active macroeconomist react much less. Tseng (2016) explores the management forecasting behavior of bellwether firms (firms with high macroeconomic information content or firms connected to many other firms in the economy) and non-bellwether firms. The finding is that, on average, bellwether firms issue regular management forecasts less frequently than non-bellwether firms.

Literature on Management Forecast and the Disclosure of Bad News versus Good News

The analytical literature in accounting (e.g., Dye 1985; Dye 1986; Jung & Kwon, 1988), which strives to explain why the unraveling results do not exist in reality, usually yields equilibrium of a "threshold strategy". Companies only disclose news above an endogenous threshold and withhold news below. That said, the management in a firm disclosure good news and withhold bad news. This is inconsistent with some empirical results. Skinner (1994) proposes that the securities laws operate to impose an asymmetric loss function on managers due to the litigation risk, and as a result, managers have incentives to preempt large negative (but not positive) earnings surprises by voluntarily disclosing that bad information early.

On the contrary, Kothari, Shu, and Wysocki (2009) investigate whether managers delay disclosing bad news versus good news. If managers accumulate and withhold bad news up to a certain cutoff while revealing good news to investors immediately, then the negative stock market reaction to bad news disclosures would be greater than the magnitude of the positive stock price reaction to good news disclosures. They find that managers delay the disclosure of bad news to investors. Kothari et al. (2009) bring up some challenges and opportunities to the literature.

HYPOTHESES DEVELOPMENT

First, this paper explores the relationship between the extent to which companies' earnings move with the macroeconomy (the R-square, coefficient, and p-value from the regression of firms' earnings on macroeconomic factors like GDP) and the likelihood of issuing management forecast. The story and explanations are that, if a firm's earnings move in concert with GDP, then the cost of missing management forecasts is lower as managers could blame this to the wrong forecasts of macro news, instead of firm-specific forecasts.

As a result, I propose the following hypothesis:

H_1: The likelihood of issuing a management forecast in increasing in the extent to which its earnings move with the macro factors (macro economy).

DATA

The quarterly financial data is collected from the COMPUSTAT database. The management forecast data are from First Call. The sample period starts from 1999 since there are only a few observations prior to 1999. The sample ends in 2009 for some reasons. First, the periods after the financial crisis and the pandemic are excluded. Second, these are the periods when the data from First Call is available. The data on the macro forecast is from the website of the Philadelphia Fed. They offer yearly and quarterly forecasts for major economic variables, such as GDP and inflation.

EMPIRICAL DESIGN AND PRELIMINARY RESULTS

Hutton, Lee, and Shu (2012) regress a firm's prior twelve quarters' earnings on the macro-factor (GDP etc.) and use the Rsquare as the proxy for the extent to which a company's earnings move in concert with the macroeconomy. This is innovative in the literature. In this paper, I compute some measures for the extent to which a company's earnings move in concert with the macro-economic factors (macroeconomy) following Hutton, Lee, and Shu (2012). R-square from the time-series regression may have been criticized in the literature on econometrics due to the issue of spurious regressions and other issues. Also, R-square is not indicative of cyclicality as it is always positive. A cyclical firm can have the same R-square as a firm of counter-cyclicality.

This may potentially impose some problems since it cannot identify good news versus bad news. As a result, in addition to R-square, I also use the coefficient and p-value from the regression as the proxy for the extent to which a company's earnings move in concert with the macroeconomy. GDP as the macroeconomics factor is employed in this paper.

Table 1 shows the average R-square from the regressions of firms' earnings on GDP by Fame-French 48 industries. As can be seen, companies in the aircraft industry move closest with GPD, with an R-square of about 0.30, followed by Beer& Liquor, banking, defense, wholesale and other industries.

Table 1. The average R-square by Fame-French 48 industry

Ranking	Fama-French industry	Industry code	Mean R-square
1	aircraft	24	0.3012556
2	Beer & Liquor	4	0.2511141
3	banking	44	0.2484389
4	defense	26	0.227442
5	wholesale	41	0.2120578
6	healthcare	11	0.2095403
7	shipbuilding railroad equipment	25	0.2033175
8	trading	47	0.199396
9	transportation	40	0.1969498
10	machinery	21	0.1966589
11	pharmaceutical products	13	0.1950035
12	Candy & Soda	3	0.193786
13	retail	42	0.1935173
14	measuring and control equipment	37	0.1924808
15	Tobacco Products	5	0.1907311
16	medical equipment	12	0.1895167
17	Food Products	2	0.1887463
18	insurance	45	0.186447
19	coal	29	0.18147
20	rubber and plastic products	15	0.1798
21	Consumer Goods	9	0.1753511
22	electrical equipment	22	0.1726865
23	business services	34	0.1697722
24	Apparel	10	0.1693929
25	shipping containers	39	0.1668832
26	computers	35	0.1646735
27	restaurant, hotel and motels	43	0.164098
28	construction-materials	17	0.1542101
29	automobiles and trucks	23	0.1535727
30	Agriculture	1	0.1532414
31	personal services	33	0.1514442
32	utilities	31	0.1479127
33	communication	32	0.1470079

34	chemicals	14	0.1469718
35	textiles	16	0.14417
36	non-metallic and industrial metal mining	28	0.1416645
37	fabricated products	20	0.1414122
38	construction	18	0.1413866
39	steel works-etc.	19	0.1360593
40	almost nothing	48	0.1359694
41	electronic equipment	36	0.1359015
42	petroleum and natural gas	30	0.1351935
43	Recreation	6	0.1277031
44	business supplies	38	0.1225458
45	Entertainment	7	0.1096659
46	Printing and Publishing	8	0.0980873
47	real estate	46	0.0958468
48	precious metals	27	0.07903

R-square measures the proportion of variation in firms' earnings that can be explained by the variation in GDP. To shed some light on the economic significance, I report the mean coefficient from regressions of firms' earnings on GDPs in the following table 2. Consistent with the previous conjecture, firms in most industries are cyclical. I find that only nine are counter-cyclical out of all the forty-eight industries according to the classification of Fama-French. More importantly, the average coefficients in these night industries are relatively small in magnitude (absolute values are all smaller than 0.001), which verifies the advantages of using oil prices to identify good news versus bad news on macro factors. In addition, the tobacco products industry has the highest average coefficient, i.e., 0.0381, followed by Beer& Liquor, non-metallic, aircraft, petroleum, natural gas, etc.

Table 2. The average coefficient (slope b) by Fame-French 48 industry

French Industry	Industry code	Mean_Coefficent
Tobacco Products	5	0.038117
Beer & Liquor	4	0.02485
Non-Metalic And Industrial Metal Mining	28	0.021574
Aircraft	24	0.014796
Petroleum And Natural Gas	30	0.014331
Candy & Soda	3	0.0131
Automobiles And Trucks	23	0.012162
Communication	32	0.011224
Defense	26	0.00897
Consumer Goods	9	0.008141
Electronic Equipment	36	0.007443
Insurance	45	0.007301
Chemicals	14	0.006545
Pharmaceutical Products	13	0.004819

Retail	42	0.004638
Food Products	2	0.00433
Banking	44	0.004262
Shipbuilding Railroad Equipment	25	0.004212
Machinery	21	0.004126
Measuring And Control Equipment	37	0.003945
Almost Nothing	48	0.00376
Apparel	10	0.003209
Shipping Containers	39	0.003196
Transportation	40	0.002975
Agriculture	1	0.002909
Business Services	34	0.0026
Trading	47	0.002367
Computers	35	0.002365
Utilities	31	0.002303
Restaurant, Hotel And Motels	43	0.002097
Real Estate	46	0.001993
Business Supplies	38	0.001807
Medical Equipment	12	0.001574
Wholesale	41	0.001511
Healthcare	11	0.001455
Entertainment	7	0.00092
Electrical Equipment	22	0.000868
Rubber And Plastic Products	15	0.000168
Construction-Materials	17	0.000124
Personal Services	33	-0.00026
Construction	18	-0.00058
Printing **And** Publishing	8	-0.00082
Textiles	16	-0.00142
Fabricated Products	20	-0.00154
Steel Works-Etc.	19	-0.00246
Recreation	6	-0.00254
Precious Metals	27	-0.00279
Coal	29	-0.00521

Does the extent to which a company's earnings move in concert with the macroeconomy affect its decision to issue management forecasts? In the part of hypotheses development, the story is that, if a firm's earnings move in concert with GDP, then the cost of missing management forecasts is lower as managers could blame this to the wrong forecasts of macro news, instead of firm-specific forecasts. As a result, management in a firm is more likely to issue management forecasts. The preliminary results are provided in the following table 3. More specifically, table 3 presents the mean R-Square for samples with and without quarterly management forecasts.

The average R-square for samples with management forecast is 0.222, while that of samples without management forecasts is 0.175. The t-statistics for the t-test is -49.747, which is statistically significant in the 1% level. This result suggests that companies that issue management forecasts move more in concert with the GDP.

On top of the R-square, the following Table 4 reports the mean absolute value of coefficients from regressions of companies' earnings on GDP for the sample with and without management forecasts as well. Similar to the results in Table 3, the average absolute value of coefficients (b_abs) is larger for companies issuing management forecasts (0.012131) than samples without management forecasts (0.0085854). The difference using the t-test is still significant at the 1% level. In Table 5, I report the average value of coefficients (rather than the absolute value of coefficients) and find similar results.

Table 3. Mean R-Square for (quarterly) management forecast and no management forecast sample

Sample	**Mean**	**Number of Observations**
No Management Forecast Sample	0.1750607	674175
With Management Forecast Sample	0.2223695	80667
Difference	0.0473088***	
	(t=-49.7472, p<0.01)	
Full Sample	0.1801481	754928

(. ***, **, and * indicates significant level at the 1%,5%, and 10% levels, respectively.)

Table 4. Mean coefficient b_abs for (quarterly) management forecast and no management forecast sample

Sample	**Mean**	**Number of Observations**
No Management Forecast Sample	0.0085854	674175
With Management Forecast Sample	0.012131	80667
Difference	0.0089643	754928
	t = -19.7613	
Full Sample	0.0035456	

(. ***, **, and * indicates significant level at the 1%,5%, and 10% levels, respectively.)

Table 5. Mean coefficient b for (quarterly) management forecast and no management forecast sample

Sample	Mean	Number of Observations
No Management Forecast Sample	0.0037389	674175

With Management Forecast Sample	0.0089342	80667
Difference	0.004294***	
	(t = -28.5496)	
Full Sample	0.0051953	

(. ***, **, and * indicates significant level at the 1%,5%, and 10% levels, respectively.)

To further investigate the relationship between the extents to which a company's earnings move in concert with the macro economy, I provide the results from Probit regression in Table 6. The following regression is run for the full samples, including samples with and without quarterly management forecasts,

$$Probi(MF_{it} = 1) = \beta_0 + \beta_1 * Synchronization_{it} + controls + FEs + \epsilon_{it} \quad (1)$$

Where MF_{it} is a dummy variable which equals to one if the company issues management forecast in the specific quarter and zero otherwise. Following, Feng and Koch (2010), the control variables include size, meet, or beat management forecast in the prior periods, a standard deviation of daily stock returns, dispersion of analyst forecast, etc. $Synchronization_{it}$ can be either the RSquare or absolute value of coefficients (b_abs) from the firm-level regressions of firms' earnings on GDP. I include both R-Square and an absolute value of coefficients simultaneously. Z-statistics are computed using clustered standard errors at the firm level. As shown from Table 6, there is a significantly positive relationship between the extent to which a company's earnings move in concert with GDP and the likelihood of issuing management forecasts. The z-statistic is 10.77 for R Square and 5.04 for b_abs; both are statistically significant at the 1% level. Of course, there may be some endogeneity concerns. For example, omitted variables may lead to the documented positive association. Size may be a potential omitted variable. Management in larger firms are more likely to issue to issue management forecasts. Also, larger firms' GDP may be affected by the macro factor like GDP more.

Table 6. Probit Regression

R_Square	**0.434*** **
z-statistic	(10.77)
b_abs	0.503***
z-statistic	(5.04)
intercept	-1.333***
z-statistic	(-26.48)

(Table 6 includes all the sample with and without management forecasts with the total number of observations of 754,842. ***, **, and * indicates significant level at the 1%,5%, and 10% levels, respectively.)

CONCLUSION AND FUTURE WORK

The macro-economy substantially influences a company's earnings. This paper investigates this interesting but underexplored area. This paper contributes to the burgeoning literature on macro-accounting by showing that there is a significantly positive relationship between the extent to which a company's earnings move in concert with GDP and the likelihood of issuing management forecasts. Also, on top of R-square, which has been commonly used in the literature on macro-accounting, this paper shows that, the coefficient and p-value from the regressions of firms' earnings on macro factors helps identify bellwether firms. For future work, I expect to see if the data would support the following hypotheses. Companies may revise their management forecasts in response in response to bad news less time and to a less extent than to good news on macro forecasts. This would have some asset pricing implications. When macro news comes out, portfolios formed on the extent to which their

earnings move with macro economy can generate significant positive returns in the future. For example, when oil price decreases, which is considered good news to airline companies but bad news to oil companies, buying stocks of airline companies and selling stocks of oil companies can generate positive returns. The explanation may be that management underreacts to bad news but not good news. This can also potentially shed some light on the debate in the literature on whether companies withhold bad news or good news (e.g., Skinner, 1994). More importantly, future work may try to give more direct evidence that management withholds bad news but not good news, rather than the association analysis from the stock market reactions. Another promising area is to explore if management revise and update their management forecasts in response to changes in the forecast on macro index like GDP and inflation. Particularly, the companies with earnings moving closer with the macro economy (more cyclical or counter-cyclical firms) revise their forecast more. On top of revising management forecasts, management may also change real decisions in response to the changes in the forecasts of macroeconomics news. For instance, firms may decide to hold more cash and cut research and development (R&D) expenses in response to the forecast of lower GDP growth rate and tightening financing conditions, like the channel in Bates et al. (2009) and Goodman et al. (2014). This real effect may be more pronounced for firms with earnings moving more closely with macroeconomics activity. It may be interesting to document that the cyclical and counter-cyclical firms response very differently to the same changes in the forecasts of macro-economic news. For instance, if the forecast on oil price for the next few years increases, this is good news to oil companies like Exxon Mobil. On the contrary, this is bad news for airline companies (say, American Airlines, or United Airlines) as their costs would increase significantly and they may cut expenses and hold more cash.

Some caveats are in order. This paper has not thoroughly addressed the endogeneity concerns due to omitted correlated variables, reverse causality, self-selection issues etc. The future work along this line of research may try to mitigate the endogeneity issue. This would provide more convincing results to the literature.

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