Economics Bulletin

Volume 34, Issue 4

Stock Prices, the Business Cycle and Contingent Change: Evidence from Bloomberg News Market Wraps

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Abstract

This study provides evidence that stock market participants revise their forecasting strategies in response to macroeconomic news contingent on the state of the economy. This study utilizes Mangee (2011)'s novel dataset based on textual information contained in Bloomberg News's end-of-the-day stock market reports. A key finding is that macroeconomic news is reported to impact stock prices with a positive relation on some days and a negative one on others. The Bloomberg data show that, on average, economic considerations matter positively for stock prices during both expansions and contractions, but the degree to which macroeconomic news matters negatively rises dramatically during expansions. However, the Bloomberg data suggests that the connection between macroeconomic news and stock prices is much more unstable than what has been previously reported. In particular, the qualitative impact of economic considerations is not constant across expansionary periods. Furthermore, net market psychology associated with economic considerations is found to decline sharply leading up to and during sustained economic contractions. The results are consistent with theoretical accounts of asset price fluctuations which recognize that market participants imperfection of knowledge underpins the temporal indeterminacy of fundamentals-based relations.

I am grateful to Josh Stillwagon and Peter Sullivan for providing helpful comments and suggestions on previous versions of the paper.
Citation: Nicholas Mangee, (2014) "Stock Prices, the Business Cycle and Contingent Change: Evidence from Bloomberg News Market Wraps", *Economics Bulletin*, Vol. 34 No. 4 pp. 2165-2178.
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Submitted: September 24, 2014. **Published:** October 24, 2014.

1. Introduction

I examine the degree to which stock market participants revise their forecasting strategies in response to macroeconomic news and whether these revisions are contingent on the state of the business cycle. Utilizing a novel dataset developed by Mangee (2011) based on textual information contained in *Bloomberg News*'s equity market wraps, I find that on some days market participants interpret macroeconomic news as sharing a positive relationship with stock prices while on other days news is interpreted negatively.[1] Similar to other studies, I find that, while economic considerations, on average, share a positive qualitative impact on stock prices, the degree to which they are reported to matter with a negative relation increases during expansionary periods of the business cycle (Pearce and Roley 1985, McQueen and Roley 1993, Boyd *et al.* 2005 and Anderson *et al.* 2007).

However, contrary to related studies, the *Bloomberg* data suggests that the connection between macroeconomic news and stock prices is much more unstable than what has been previously reported. A key finding is that the qualitative impact of economic considerations is not constant across expansionary periods. Preliminary diagnostic difference-in-means tests support these results. Further evidence suggests that individuals rationalize movements in economy-wide factors in terms of future firm earnings and real discount rates and that relation-weights attached to both channels vary with the state of the economy, a finding consistent with the implications of the present value model based on the Contingent Expectations Hypothesis (CEH) (Frydman and Goldberg 2014a).

Moreover, results indicate that the influence of psychological factors, such as optimism, fear and panic, as they relate to individuals' interpretations of economic considerations' impacts on stock prices, also depend on the state of the business cycle. In particular, the frequency of interaction between net market psychology and economic considerations tends to decline leading up to and during contractionary periods. However, this relationship, too, is found to be rather unstable.

This study makes a contribution to the work investigating temporal instability between macroeconomic factors and stock prices and may prove useful for assessing the empirical relevance of competing theoretical accounts of asset price fluctuations. What's more, results reported here may help

[1]I am grateful to *Bloomberg L.P.* for graciously making their market reports available for this research.

guide other studies investigating which economic indicators merit the most attention of market participants and which experience varying qualitative relations with stock prices over the business cycle.

The paper is organized as follows. Section 2 describes the *Bloomberg* data and measurement. Section 3 reports results while Section 4 provides concluding remarks.

2. Data and Measurement

This study utilizes Mangee's (2011) novel textual dataset based on information contained in *Bloomberg News'*s end-of-the-day equity market reports.[2] In generating the market wraps, *Bloomberg* journalists track and report on stock market price movements throughout the day; when macroeconomic news releases or policy decisions in Washington, D.C. become known, they and everyone else can see the market react. As news unfolds, journalists are conducting interviews with equity fund managers and other professionals who disclose their views on which factors they deem responsible for broader market movements.[3] At the conclusion of each trading day, a wrap is produced summarizing the key factors underpinning the Standard & Poor's (S&P) 500 and other major U.S. index's price behavior throughout the day.

Mangee's (2011) data offer several advantages over other approaches investigating the connection between macroeconomic news and stock prices. Studies incorporating formal econometric analysis must infer causal relations from the data. In doing so, many researchers focus on the impact of a fixed set of macroeocnomic news releases on stock prices using expectations from survey data (Anderson *et al.* 2007, Bartolini *et al.* 2008). Textual-based studies also must determine the set of relevant information *a priori* usually by relying on a content-analysis program from counts of positive and negative words appearing in daily news accounts (Tetlock 2007, Davis *et al.* 2006, Tetlock *et al.* 2008, Feldman *et al.* 2010 and Loughran and McDonald 2011) or by examining phrase-level patterns (Boudoukh *et al.* 2012). Mangee (2011) addresses this problem by manually reading *Bloomberg* wraps and tracking

[2]See Mangee (2011) for a detailed description of the data and measurement methodology. See Frydman *et al.* (2014a,b) for companion papers employing the *Bloomberg* data. See Frydman and Goldberg (2011) for preliminary results from the dataset.

[3]*Bloomberg News* has formal arrangements with over 100 professional participants in conducting its interviews.

only those factors that are reported to be a main driver of market prices on a given day. Mangee's (2011) data, therefore, provide a richer representation of causal stock price processes while allowing for the union of much broader information sets that market participants may rely on in forecasting future returns and risk. For example, forecasts of economic indicators as well as revisions to advanced estimates - two types of macroeconomic news reports by which information on fundamentals may be transmitted to individuals - are able to be picked up by the *Bloomberg* wraps.

A key feature of the data is its ability to deal with temporal instability underpinning stock price-relations. Many studies ignore structural change altogether. Those that don't typically follow a determinate regime-switching or learning-based framework in modeling change.[4] Mangee's (2011) data deal with this challenge by not specifying in advance the information sets utilized by market participants, their interpreted impacts on stock prices, or how the composition of relevant factors may evolve over time. As such, different economic considerations are allowed to matter in different ways during different time periods. As we will see, this feature of the data enables one to examine whether news concerning economic factors matter in ways that are qualitatively dependent on the state of the business cycle. In fact, evidence presented here suggests that determinate accounts are likely understating the degree of temporal instability underpinning stock price-relations.

Mangee's data consist of the frequencies with which identified factors were mentioned in 4,206 daily wraps from January 4, 1993 (inception of the *Bloomberg* data) through December 31, 2009. To quantify the information contained in the market wraps, Mangee (2011) records a "1" for those factors, whether fundamental, psychological, or technical, which are mentioned as a key driver of the stock market price over the trading day; all other factors are recorded with a "0".[5] Additionally, factors denoted with a "1" are given a (+/-) value corresponding to the reported qualitative impact that the factor shares with the stock price given the "market's" expectation.[6]

Interestingly, *Bloomberg*'s wraps show that psychological factors are quite

[4]For regime-switching models and learning-based approaches see, for example, Hamilton (2014) and Pastor and Veronesi (2009), respectively.

[5]See Mangee (2011), Frydman and Goldberg (2011), and Frydman *et al.* (2014a) for lists of disaggregated considerations within each category.

[6]*Bloomberg* wraps typically include forecast data on macroeconomic news releases from *Bloomberg*, *Thompson* and other survey-based research institutions. See Mangee (2011) for qualitative criteria incorporating expectations data.

important for stock price fluctuations, but in a way that is consistent with models based on CEH which allow for myriad probability distributions governing participants' forecasts of future returns and risk. As we will see, psychological considerations often merit the attention of market participants in helping them interpret trends in the broader economy. Results shed light on the innate interaction between psychology and economic behavior and how interconnectivity between the two may be contingent on varying states of the business cycle.

No data are perfect, but the *Bloomberg News* wraps provide a rather unique source of information about the dynamics underpinning the relationship between macroeconomic news and stock price fluctuations.

3. Results

3.1 Importance of Economic Considerations

Table I presents frequencies with which fundamental, psychological, and technical considerations were reported by *Bloomberg* journalists as driving daily stock market prices. The 1^{st} column lists the categories within each type of consideration. The 2^{nd} and 3^{rd} columns report the proportion of trading days and overall mentions that a factor mattered for stock prices, respectively, while the last column presents the proportion of mentions that a fundamental factor was reported to share a positive qualitative relationship with stock prices.

The results from Table I make a strong case for macroeconomic considerations' key role in driving stock price fluctuations. News on broad economic activity constituted the largest fraction of total mentions of fundamental considerations (tied with earnings at 17.2%) and was second, only to earnings, as a proportion of total trading days (35%). As mentioned in the introduction, the directional impact of economic activity on stock prices was not constant over the data sample: 69% of the time *Bloomberg* journalists reported a positive stock price-relationship. Table II presents the decomposition of economic considerations' importance for stock price fluctuations and their reported qualitative impacts on stock prices. To be sure, macroeconomic news reports are released at various frequencies, but this ranking, though purely descriptive statistically, may be useful in at least two distinct ways.[7]

[7]Although macroeconomic news has a routine frequency of release, many data series

Table I: Factor Frequencies (%)*

Factor	trading days[a]	mentions[b]	positive impact[c]
Fundamentals	99.4	-	-
Earnings	43	17.2	99.5
Economy	35	17.2	69.2
Company variables	23	9.6	-
Sales	23	7.8	91.3
Oil	20	8.2	45.4
Interest rates	17	7.1	1.9
ROW	14	3.4	-
Benchmark valuation	12	5.4	5.7
Government	12	5.8	-
Central Bank	10	4.0	-
Housing	8	3.1	-
Inflation	7	2.7	1.8
Currency markets	6	2.5	66.2
Financial institutions	6	2.7	-
Geopolitical issues	2	2.7	-
Trade	1	0.6	-
Psychological	55	-	-
Psychology w/ fundamentals	54	98.5	-
Pure psychology	1	1.5	-
Technical	6	-	-
momentum	2	43.1	-
non-momentum	5	57.0	-

Notes: * The frequencies reported are based on *Bloomberg News* equity market reports; *a* : the proportion of trading days that a factor mattered over the entire sample (4,206 days); *b* : mentions of a fundamental consideration as a proportion of total mentions of fundamental considerations (10,386); *c* : the proportion of mentions for which the qualitative impact of a factor was reported as positive over the whole sample; ROW, rest of world; a dash (-) implies that uniform qualitative relations are intractable due to the composition of factors within the category.

First, results from Table II may provide guidance when considering model specification and causal relationships for future related studies. Of the economic considerations mentioned in the *Bloomberg* wraps, consumer spending (16.42%), manufacturing orders (13.91%), and GDP (13.46%) were reported to matter the most. Nearly 28% of total economic mentions can be attributed to the collective impact of consumer spending, consumer confidence and personal income. Another quarter of the economic considerations related to the labor market: employment, jobless claims, and unemployment rate combined for 22.2% of total economic mentions.

Second, the table offers insight into which macroeconomic news may be interpreted by investors as sharing indeterminate qualitative impacts with stock prices during different periods of time. While the majority of disaggregated economic considerations were reported, on average, to share a positive relation with prices, several factors displayed a relatively high degree of negative qualitative impacts: GDP, retail sales, unemployment rate and, in particular, payroll employment, mattered positively for stock prices 71.5%, 71.8%, 72.4% and 35.8% of mentions, respectively.

3.2 The Business Cycle and Contingent Change

Table I shows that economic considerations mattered for investors on 35% of total trading days and 17.2% of total mentions of fundamentals. Overall frequencies, however, may mask the importance of economic activity during certain sub-periods of the data. Figure 1 plots the frequency of economic considerations as a proportion of total trading days per month.[8] A striking feature of the graph is the degree of variation over the sample: economic considerations mattered upwards to 41% of trading days in 1995, then less than 25% of the time from 1998-2001, increased to over 40% from 2002-04 only to eclipse 50% of monthly trading days after the Great Recession's end in June 2009.

Figure 1 shows a substantial amount of inter (expansions versus contractions) and intra (expansion versus expansion) -cycle variation. The graph suggests a mean shift in the degree of macroeconomic news' influence on stock

have releases of both revised and annual comprehensive estimates. GDP reports, for instance, are quarterly in frequency, but the 2^{nd} and 3^{rd} estimates are released each month after the end of the reporting quarter along with 1^{st}, 2^{nd}, and 3^{rd} annual estimates and a comprehensive estimate.

[8]The figure plotted is the 12-month moving average.

Table II: Frequency of Disaggregated Economic Considerations*

	% mentions of economy[a]	positive impact[b]
Consumer Spending(M)	16.42	94.80
Manufacturing Orders(M)	13.91	64.62
GDP(Q)	13.46	71.51
Consumer Confidence(M)	10.85	86.51
Employment(M)	10.80	35.81
Retail Sales(M)	10.35	71.84
Jobless Claims(W)	7.58	85.43
Durable Good Orders(M)	4.82	77.08
Unemployment Rate(M)	3.82	72.37
Industrial Production(M)	2.56	78.00
ILEE(M)	2.11	90.48
Productivity(Q)	1.81	100
Construction(M)	.8	78.57
Personal Income(M)	.65	84.62
Nondurable good orders(M)	.05	0.00

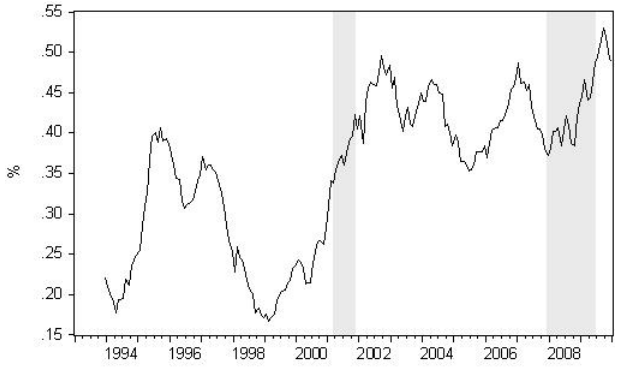
Notes: * The frequencies reported are based on *Bloomberg News* equity market reports; a : mentions of disaggregated factors as a proportion of total mentions of economic considerations; b : the proportion of mentions that a fundamental shared a positive qualitative relationship with stock prices; (W), (M), and (Q) denote weekly, monthly and quarterly release frequency, respectively.

prices after the 2001 recession. This leads to the question of whether significant differences of macroeconomic news' impact on stock prices exist across states of the business cycle. Table III reports that a preliminary diagnostic difference-in-means test rejects the null of equality of means across expansionary and contractionary periods with a t-statistic (p-value) of -2.907 (0.0063).[9] The 4^{th} column of Table III shows that the null hypothesis of equality across both expansionary periods, 1993:01-2001:02 and 2001:12-2007:11, can be rejected with a t-statistic (p-value) of -6.65 (0.000).

Table I shows that economic considerations were reported to share a positive qualitative relationship with stock prices for 69.2% of mentions. Figure 2 plots the proportion of mentions in which economic considerations were reported to share a positive relationship with stock prices per month. On average, economic considerations mattered positively for stocks only 44% of the time during the expansion of the 1990's, a result consistent with related studies (i.e. Boyd *et al.* 2005). However, the *Bloomberg* data reveal this relationship to be more unstable than previous findings would suggest: the

[9]The Satterthwaite-Welch test is employed which allows for unequal sample sizes and variances across sub-samples. Future research will explore business cycle dynamics using more sophisticated econometric techniques such as the CVAR approach.

Figure 1: Frequency of Economic Considerations



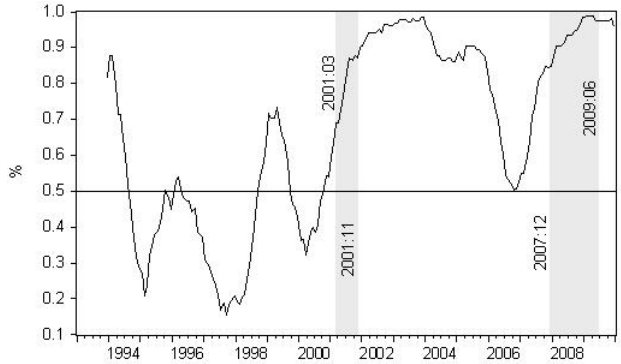
Notes: The series plotted is the frequency of economic considerations as a proportion of trading days per month (12-month moving average). Shaded regions denote recessions.

Table III: Economic Considerations Across the Business Cycle

			SW-test[a]	
Business Cycle	$\bar{x}$	σ	exp/con	exp9301/exp0107
Entire Sample				
1993:01-2009:12	.35	.16	-2.907***	-
			(0.006)	
Expansion				
1993:01-2001:02	.27	.07	-	-6.65***
2001:12-2007:11	.42	.04	-	(0.000)
Contraction				
2001:03-2001:11	.38	.03	-	-
2007:12-2009:06	.42	.03	-	-

Notes: a : SW stands for the Satterthwaite-Welch t-test of equality of means where $H_o : \overline{Y_{exp}} - \overline{Y_{con}} = 0$ where $\overline{Y}$ denotes the average mentions of economic considerations as a proportion of trading days per month; *exp* and *con* are expansion and contraction, respectively; *exp*9301 and *exp*0107 correspond to the expansionary periods of 1993:01-2001:02 and 2001:12-2007:11, respectively; $\bar{x}$ denotes mean; σ denotes standard deviation; the SW-test allows for unequal variance across subsamples.

Figure 2: Qualitative Impact of Economic Considerations



Notes: The series plotted is the proportion of mentions of economic consideration that were reported to share a positive qualitative relationship with stock prices. Shaded regions denote recessions.

second expansionary period of 2001:12-2007:11 shows a strong positive impact up to 2006 - averaging 84.1% over the period - when the proportion falls sharply down to 50% by 2006:11. Table IV shows a statistically significant difference-in-means of qualitative impacts between expansions and contractions as well as across both expansionary phases of the business cycle. Taken with the evidence reported above, the inability to fail to reject the null hypothesis of equality in means across and within stages of the business cycle provides evidence indicating that related studies may be understating the degree of temporal instability in stock price-relations.

A varying set of macroeconomic news matters in different ways during different time periods. This finding begs the question of whether the accompanying variables in participants information sets also wax and wane over time. The 4^{th} and 5^{th} columns in Table IV report which channel - cash flow (CF) or real discount factor (DF) - macroeconomic considerations are interpreted through, if reported, when qualitative signs change across different stages of the business cycle. For instance, when economic considerations mattered positively during the expansion of 1993:01-2001:02, 41% of those mentions were reported to give participants indications about future earnings prospects. Conversely, during the same expansion, 84% of the mentions of economic considerations mattering negatively with stock prices came through the real interest rate channel.[10]

[10]For instance, the following wrap excerpt from November 7, 2008 illustrates macroeconomic considerations' impact through the real interest rate channel, "U.S. stocks rose for the first time in three days as investors speculated the Federal Reserve will lower interest

Table IV: Qualitative Impact of Economic Considerations on Stock Price

					SW-test[a]	
Business Cycle	$\bar{x}$	σ	CF^b	DF^c	exp/con	exp9301/exp0107
Entire Sample						
1993:01-2009:12	.78	.34	.28	.85	9.95***	-
					0.000	-
Expansion						
1993:01-2001:02	.47	.34	.41	.84	-	8.49***
2001:12-2007:11	.84	.21	.23	.95	-	0.000
Contraction						
2001:03-2001:11	.91	.13	.40	.60	-	-
2007:12-2009:06	.97	.06	.16	.33	-	-

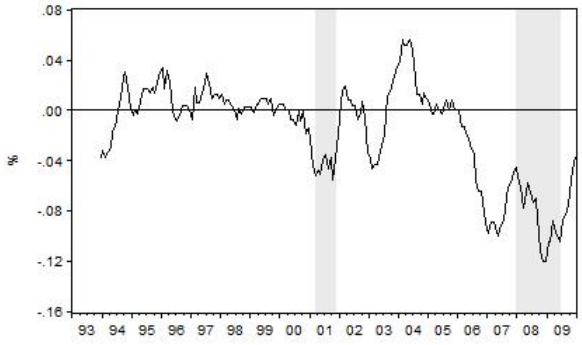
Notes: a : SW denotes the Satterthwaite-Welch t-test of equality of means where $H_o : \overline{Y^+_{exp9301}} - \overline{Y^+_{exp0107}} = 0$ where Y^+ denotes the proportion of mentions in which economic considerations shared a positive qualitative relationship with stock prices; *exp*9301 and *exp*0107 correspond to the expansionary periods of 1993:01-2001:02 and 2001:12-2007:11, respectively; $\bar{x}$ denotes mean; σ denotes standard deviation. The SW-test allows for unequal variance across subsamples.

Table I shows that over 98% of all psychological considerations deemed relevant for market participants mattered in relation to interpretation of trends in fundamentals. Though not reported here, macroeconomic considerations constituted roughly 27% of mentions of psychological considerations reported to matter in conjunction with one of the fundamental categories presented in Table I, ranking thord behind company earnings/revenue (52%) and interest rates (29%). Figure 3 plots the interaction between net market psychology and economic considerations as a proportion of trading days per month.[11] One immediate observation of Figure 3 is the striking decrease in the series during both the contraction of 2001 and 2007-09. In both instances, the data series rebound immediately following recession's end. Such tendencies, however, are found to be rather unstable: the impact of economic and net psychological considerations decreases sharply in 2003 and again during

rates after unemployment surged,.. "It's definitely to the point where bad news is good news," said Robert Morgan, equity strategist for Clermont Wealth Strategies, which oversees $4 billion in Lancaster, Pennsylvania. 'Investors are starting to realize this can't go on forever."'

[11]Net market psychology is generated by subtracting the monthly frequency of economic considerations with positive psychology from that with negative psychology. Positive (negative) psychology events occur when when psychology in connection with a fundamental is reported to drive the market and the stock price increases (decreases).

Figure 3: Economic Considerations and Net Psychology



Notes: The series plotted is the proportion of trading days per month that economic considerations mattered with psychology positively minus that which mattered with psychology negatively. The shaded regions denote recessions.

the build-up to the Great Recession in 2006-07.

4. Conclusion

This study uses information contained in *Bloomberg News*'s equity market reports to assess the degree to which market participants revise their forecasting strategies in response to macroeconomic news and whether revisions depend on varying states of the business cycle. Evidence suggests that investors interpret macroeconomic news with a positive stock price-relation on average, but that the degree of negative qualitative impacts rises during expansions. However, the reported directional relation varies across expansions, suggesting that the degree of inter-temporal indeterminacy may be much greater that previously reported. Results are consistent with theoretical accounts of asset price relations, such as models based on Imperfect Knowledge Economics (Frydman and Goldberg, 2014a,b), which do not determine in advance the model specification and probability distributions underpinning price-processes over time.

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