Impact of European and American Business Cycle News on Euronext Trading

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ABSTRACT

This paper investigates the impact of surprises from European and US news announcements on the returns of the Pan-European Euronext market. We use four Business Cycle indicators, GDP, industrial production, retails sales, and unemployment to examine how a surprise affects the returns of the 250 largest stocks on Euronext. We find that the European surprises have no impact on the market but that surprises on all of the US business cycle indicators affect Euronext returns, with a stronger effect for GDP. These results hold independent of market conditions.

JEL classification: G14

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I.   INTRODUCTION

In this paper, we examine the impact of macroeconomic news announcements on Euronext. We investigate newly-available intra-day data to determine what kind of economic news announcements affects trading. This question is an appealing one that has led to many empirical studies on equity, bond and foreign exchange markets. Chen et al. (1986) find that industrial production, changes in the risk premium and the yields curve are significant factors in explaining expected stock returns. Cutler et al. (1989) confirm the difficulty involved in explaining more than half of stock returns variation by public news. They find a significant correlation between industrial production growth and real stock returns over the period 1926-1986. However, their results provide no evidence for the impact of inflation, money supply, and long-term interest rates on returns. Ehrmann and Fratzscher (2004) analyze the effects of US monetary policy on stock markets and show that a tightening of 50 basis points in interest rates reduces the S&P 500 index by about 3%. Boyd et al. (2005) find a positive influence of an announcement of rising unemployment on stocks during economic expansion and a negative influence during economic contraction.

On stock markets, the literature has met many difficulties to detect relevant relationships between price variation and public information. In contrast, empirical examinations of bonds and foreign markets have shown that the price movements are strongly related to the arrival of information releases. Balduzzi et al. (2001) study the response of Treasury bills, notes and bonds in the interdealer broker market to 26 economic news announcements. Most of the announcements have a significant impact on the price that occurs within one minute after the release. Andersen et al. (2003) examine real-time exchange rates quotations of US dollar spot versus Mark, Pound, Yen, Swiss Franc and the Euro. They find that price jumps are linked to economic news with a greater impact from bad news than good news.

Most of the existing research on equity markets has conducted event studies to analyze how markets react to macroeconomic news announcements. The difficulty of such methodologies to detect significant impact of economic news on stock markets seems to be related to the choice of frequency observations. Returns are computed on a monthly or daily returns basis and do not allow for the capture of the immediate response of the arrival of news announcements. The empirical methodology used in this paper is an intra-day event study that relates in an econometric model stocks returns and trading activity to the size of economic announcement surprises. It differs from previous literature on equity markets by using high-frequency data in order to characterize intra-day reactions to economic news. Moreover, we examine not only the price response to public information release but also the reaction of trading volume. Finally, we investigate only macroeconomic news items because their timing is perfectly known with no risk of private information conveyed before the official date. The effects of European and American macroeconomic announcements are both analyzed. We use European macroeconomic announcements as a benchmark in order to compare the magnitude of the trading response to US news relative to European news.

The rest of the paper is organized as follows. Section II describes the data. Section III presents the methodology used to estimate the US and European business cycle impact and provides the results performed on the pan-European market. Section IV investigates the robustness of the previous results by discriminating the reactions of

the market within different market conditions. Section V is a brief discussion of our results.

II.   THE DATA

A.   The Dataset

The data was provided by Euronext, the first pan-European market for equities and derivatives. Our data spans a two and a half years period, from January 4, 2002 to August 31, 2004. The dataset is constructed by continuously recording transactions over five-minute intervals for the 250 individual stocks included in the Euronext 100 and Next 150 indices. The components of the Euronext 100 index are the 100 largest and most liquid stocks traded on Euronext and the constituents of the Next 150 Index are the 150 next largest stocks, representing the mid-cap stocks. Historical data on 15 stocks quoted on the Portuguese Exchange are not available. These 250 stocks represent 86 % of the total market capitalisation over the period analysed. Each month, we use more than 5 million observations to construct a sample with the following data for each 5-minute interval of the trading days: transaction prices, volume, number of trades and time of execution.

B.   Business Cycles

The data on European and American economic announcements are from Bloomberg which provides a calendar of economic releases and access to key economic indicators published by various government agencies of countries around the world. The business cycle indicators we used are similar to Avouyi-Dovi and Matheron (2003) who relied on four variables to define the business cycle: GDP, Industrial Production, Retail Trade and Unemployment rate. These economic figures are announced monthly except for the GDP which is released quarterly. To increase the number of observations for GDP, we use monthly revisions, i.e. advance, preliminary and final, knowing that the first release has much better leading indicator properties for the European and American economies than the last revision.

A summary of the eight European and American economic news announcements that we consider are provided in Table 1. It presents for the period January 4, 2002 to August 31, 2004 the list of announcements, the reporting agency, the time at which the announcement is released, the frequency of announced figures, the total number of observations in our sample and the day of the week in which announcements occurred. All European and US announcement times and dates are known in advance and awaited by market participants. The majority of release falls on Tuesdays for European announcements and on Fridays for US announcements.

Table 1
Public information [a,b,c]

European News Announcements (January 2002 - August 2004)

Announcements	Time	Frequency	Reporting Agency	Day of the week					Obs.
				Mo	Tu	We	Th	Fr	
1 GDP	12:00 a.m.	Quarterly	Eurostat		5	3	16	4	28
2 Industrial Production	11:00 a.m.	Monthly	Eurostat	5	11	6	7	3	32
3 Retail Trade	11:00 a.m.	Monthly	Eurostat	4	6	7	5	1	23
4 Unemployment Rate	11:00 a.m.	Monthly	Eurostat	1	20	5	3	1	30

American News Announcements (January 2002 - August 2004)

Announcements	Time	Frequency	Reporting Agency	Day of the week					Obs.
				Mo	Tu	We	Th	Fr	
1 GDP	2:30 p.m.	Quarterly	Bureau of Economic Analysis		3	2	15	12	32
2 Industrial Production	2:15 p.m.	Monthly	Federal Reserve Board	2	8	4	4	14	32
3 Retail Trade	2:30 p.m.	Monthly	Bureau of the Census	1	5	7	12	7	32
4 Unemployment Rate	2:30 p.m.	Monthly	Bureau of Labor Statistics		1		1	30	32

[a] This table reports 8 macroeconomic news announcements studied over the period January 4, 2002 to August 31, 2004. Statistics include the Paris time of announcement, frequency, the agency in charge of the computation and release and the day of the week in which announcements are published.

[b] Missing observations for European announcements : for the GDP, one missing observation on May 30, 2002 and 3 observations have no Bloomberg survey (February 7, 2002, September 6, 2002 and April 10, 2003), for the Retail Trade, 6 missing observations (January 31, 2002, April 30, 2002, May 28, 2002, October 31, 2002, April 29, 2003 and June 4, 2004) and 3 observations have no Bloomberg survey (May 1, 2002, September 02, 2002 and March 5, 2004), for Unemployment rate, 1 missing observation on April 30, 2002 and 1 observation with no survey on September 04, 2002.

[c] Eurostat (ES), European Commission (EC), Bureau of Economic Analysis (BEA), Bureau of Labor Statistics (BLS), Bureau of the Census (BC), Federal Reserve Board (FRB), Conference Board (CB), Institute for Supply Management (ISM)

We follow Andersen et al. (2003) to define news as the difference between the announced value of the economic indicator ($A_{k,t}$) and its expected value given by the median of the Bloomberg survey ($B_{k,t}$). Therefore, our news variable is in fact a measure of the surprise generated by the announcement. Every week, Bloomberg collects money market managers' expectations for economic series scheduled to be announced the next month and reports the median forecast from the survey. The survey responses vary depending on the number of forecasts available from participating firms. Because units of measurement differ across economic variables, we use standardized news associated with indicator k at time t:

$$S_{k,t} = \frac{A_{k,t} - B_{k,t}}{\hat{\sigma}_k}$$

where $\hat{\sigma}_k$ is the standard deviation of $A_{k,t} - B_{k,t}$. This standardized measure of surprises facilitates comparisons between the four business cycle indicators used in this study.

III.   MEASURING IMPACT OF WUROPEAN AND AMERICAN BUSINESS CYCLE ON EURONEXT TRADING

A.   Methodology

The objective of this research is to measure the impact of news announcements surprises on leading trading indicators on the Euronext market. We use an event study methodology based on high-frequency data to analyze the trading response to business cycle information. We postulate a linear structure to model the relationship between returns and the standardized surprises:

$$R_t = \beta_0 + \sum_{i=1}^{3} \beta_{i,k} R_{t-i} + \sum_{k=1}^{k} \beta_k S_{k,t} + \varepsilon_t$$

where R_t is the return of a portfolio of 250 stocks including the Euronext 100 and Next 150 indices. R_t is a 15 minutes return calculated as the log-difference of the prices 10 minutes after and 5 minutes before the announcement at time t. According to the Schwarz and Akaike criteria, we used 3 lagged values of the 15 minutes returns in our econometric model. The beta coefficients capture the sensitivity of the return to a specific surprise $S_{k,t}$.

B.   Results

We find that American news releases have a significant impact on Euronext returns at the time of the announcement, while European releases do not affect trading. Price variations following US GDP and US Industrial Production have the most impact (respectively 0.0011 and 0.00053). Surprises on US Retail Trade and Unemployment have a lesser effect while statistically significant. However, we were surprised to find that none of the European business cycle news announcements have an impact on the Pan-European market. These results are summarized in Table 2.

Table 2
Impact of European and American business cycle on returns[a]

| | European Announcement | | | | American Announcement | | | |
| | | Surprise | | | | Surprise | | |
Announcements	Std. Error	Coef.	t-stat.	R²	Std. Error	Coef.	t-stat.	R²
1 General effect	6,872E-05	-2,217E-05	-0,323	0,159	1,190E-04	0,00064***	5,397	0,225
2 GDP	1,419E-04	-5,502E-05	-0,388	0,262	1,509E-04	0,0011***	7,329	0,690
3 Industrial Production	1,303E-04	1,143E-04	0,877	0,364	1,298E-04	0,00053***	4,101	0,568
4 Retail Trade	1,436E-04	-6,133E-05	-0,427	0,167	1,930E-04	0,000345*	1,803	0,236
5 Unemployment Rate	1,709E-04	2,906E-05	0,170	0,241	3,956E-04	0,00072*	1,829	0,205

[a] This table reports the standard error ($\hat{\sigma}_k$) of all surprises for an announcement k, the surprise coefficient (β_k), the t-statistic and the R² of the regression. The period of analysis is January 4, 2002 to August 31, 2004.
*, ** and *** indicate significance at the 0.1, 0.05 and 0.01 levels, respectively.

The absence of market reaction around European news announcements seems to reflect a lack of immediate informational content of these main macroeconomic figures. Two possible explanations are that information has been perfectly anticipated by the market at the time of the release or that market participants need times to interpret the news and therefore delay their portfolio adjustments.

The analysis of the distribution of non-standardized European surprises shows that in 37 % of the cases we have no surprise that the released numbers match the expectations. This number falls to 17 % for the US announcements. To test the hypothesis that there is no informational content in the European announcement, we repeat our analysis with only the cases in which the surprise is different from zero. The results of the regression confirm with the lack of market impact from European news releases, even when there is an unanticipated part in the announcement. To allow for a longer time for market participant to react to the news, we extended the time over which the returns are computed to 30 minutes (5 minutes before the announcement to 25 minutes after). The beta coefficient associated to the surprise remains non significant for each of the European news investigated.

We extend our analysis to test if this lack of impact of European news on prices also applies to the trading activity. We use three market indicators to assess the intensity of trading: the value of the transactions ($TAEUR_t$), the number of transactions ($TANUM_t$) and the transaction volume ($TASH_t$). We estimate the following three models which have a structure similar to that used for returns:

$$\Delta TAEUR_t = \beta_0 + \sum_{i=1}^{3}\beta_{i,k}\Delta TAEUR_{t-i} + \sum_{k=1}^{K}\beta_k S_{k,t} + \varepsilon_t$$

$$\Delta TANUM_t = \beta_0 + \sum_{i=1}^{3}\beta_{i,k}\Delta TANUM_{t-i} + \sum_{k=1}^{K}\beta_k S_{k,t} + \varepsilon_t$$

$$\Delta TASH_t = \beta_0 + \sum_{i=1}^{3}\beta_{i,k}\Delta TASH_{t-i} + \sum_{k=1}^{K}\beta_k S_{k,t} + \varepsilon_t$$

where

$$\Delta TAEUR_t = TAEUR_{+10kt} - TAEUR_{-5kt}$$
$$\Delta TANUM_t = TANUM_{+10kt} - TANUM_{-5kt}$$
$$\Delta TASH_t = TASH_{+10kt} - TASH_{-5kt}$$

The results are presented in Table 3. They confirm the results from the analysis on returns, and show no abnormal trading patterns following European news releases. None of the European business cycle indicators affect the intensity of trading activities. Furthermore, we found little evidence of a relationship between trading activity and the size of the American surprises, even for news that significantly affect stock prices. Only surprises on US GDP triggered an increase in the number and the value of transactions on Euronext. These results are consistent with those of Balduzzi et al. (2001) who did not find any significant effect of surprises on volume in spite of a strong impact on returns. They explain this lack of relationship with the fact that an increase in trading volume is the consequence of disagreements on prices between market participants, but that the magnitude of a surprise itself has no impact on the disagreement.

Table 3
Impact of European and American business cycle on trading activity[a]

Turnover

Announcements	European Announcement Surprise				American Announcement Surprise			
	Std. Error	Coef.	t-stat.	R²	Std. Error	Coef.	t-stat.	R²
1 General effect	3 214 622	534 095	0,17	0,12	2 322 562	1 735 132	0,75	0,39
2 GDP	15 090 420	1 748 204	0,12	0,17	4 213 145	7 568 803*	1,80	0,39
3 Industrial Production	2 568 470	- 1 394 827	- 0,54	0,47	2 411 686	196 399	0,08	0,93
4 Retail Trade	1 281 860	41 032	0,03	0,36	2 331 958	- 330 054	- 0,14	0,01
5 Unemployment Rate	2 226 341	2 692 051	1,21	0,80	6 669 380	4 935 700	0,74	0,11

Number of trades

Announcements	European Announcement Surprise				American Announcement Surprise			
	Std. Error	Coef.	t-stat.	R²	Std. Error	Coef.	t-stat.	R²
1 General effect	37,08	12,99	0,35	0,33	67,86	2,29	0,03	0,01
2 GDP	76,28	101,24	1,33	0,58	133,89	202,08*	1,82	0,09
3 Industrial Production	74,86	- 7,28	- 0,10	0,71	90,32	- 119,78	- 1,33	0,33
4 Retail Trade	73,06	- 54,39	- 0,74	0,23	82,28	- 1,33	- 0,32	0,09
5 Unemployment Rate	49,03	81,85	1,67	0,27	201,14	153,14	0,76	0,04

Trading volume

Announcements	European Announcement Surprise				American Announcement Surprise			
	Std. Error	Coef.	t-stat.	R²	Std. Error	Coef.	t-stat.	R²
1 General effect	76 872	35 703	0,46	0,40	112 337	189	0,00	0,24
2 GDP	283 279	140 935	0,50	0,47	193 059	203 788	1,06	0,15
3 Industrial Production	151 941	42 637	0,28	0,32	122 804	- 207 150	- 1,69	0,85
4 Retail Trade	106 269	123 830	1,17	0,67	106 636	19 452	0,18	0,28
5 Unemployment Rate	90 888	121 639	1,34	0,70	357 334	346 522	0,97	0,08

[a] This table reports the standard error ($\hat{\sigma}_k$) of all surprises for an announcement k, the surprise coefficient (β_k), the t-statistic and the R² of the regression. The period of analysis is January 4, 2002 to August 31, 2004. [*], [**] and [***] indicate significance at the 0.1, 0.05 and 0.01 levels, respectively.

The European market is sensitive to American business cycle announcements but seems unaffected by European releases. This phenomenon could be explained by the timing of the European announcements which are released at 11:00 a.m. or 12:00 p.m., a time at which trading activity is notoriously low as widely reported in the microstructure literature and described as the U curve. The US GDP, released at the end of the month, appears to provide a significant informational content to the market. Investors seem to infer a trend for the subsequent months. If they take into account the timing of the information announcements to rebalance their positions, investors wait for a confirmation or invalidation of their expectations with the publications in the following weeks of the numbers on US Unemployment and Industrial Production. Another conjecture is that in Europe, only domestic economic data may provide a substantial informational content for which surprises would have a significant effect on returns.

VI.   THE IMPACT OF THE AMERICAN BUSINESS CYCLE MODERATED BY THE MARKET ENVIRONMENT

A.   Methodology to Test the Impact of US News on Euronext under Market Conditions

In the previous section, we found that American economic surprises have a significant impact on the returns of the Euronext market. We will now examine these results in more details by looking at the results under different market conditions.

Our results support the claim that there is a strong impact of US business cycle news on the European market, independent of the market conditions in which the news were released. However, it is very possible that surprises affect returns only in specific market conditions, such as high volatility or bearish environments. In order to investigate this conjecture, we identified four criteria that may moderate the effect of surprises on returns: the current volatility of the market –high/low-, the market trend –bullish /bearish-, anticipation of the news –anticipated/not anticipated-, and the nature of the surprise –good/bad-.

To compute the market volatility, we designed a market index that merges the Euronext 100 and Next 150. Volatility is calculated as the standard deviation of this index over the last 20 trading days. We retained as high volatility market conditions the observations in our sample that were over the 10th percentile. Market trend is based on the 20-day moving average of our customized index. The market is bullish if that average is positive and bearish otherwise. An anticipated change is defined based on the Bloomberg consensus and the last published number. If the consensus is higher than or equal to the last published number (respectively lower than or equal to), and if the announcement for the current period is also higher than or equal to (respectively lower than or equal to) the consensus, then the change is considered to be anticipated. If the directions of these two indicators go in opposite directions, then the change is considered to be non-anticipated. We can summarize theses statements as follows:

$$\text{Sign}(B_{k,t} - A_{k,t-1}) = \text{Sign}(A_{k,t} - B_{k,t})$$

where $B_{k,t} - A_{k,t-1}$ is the difference between the Bloomberg Survey and the prior announcement, and $A_{k,t} - B_{k,t}$ is the difference between the released statistic and the anticipation as measured by the Bloomberg survey. We defined a good news as a positive surprise –announced number higher than expected- for three of the US business cycle indicators : GDP, Industrial Production and Retail Trade, and as negative surprise –announced number lower than expected- for the Unemployment announcement. The reverse is true for bad news.

Following the methodology of Ehrmann and Fratzsher (2004), we split our sample into two sub-samples $S_{1,t}$ and $S_{2,t}$ based on the four criteria presented above. We test the following model:

$$R_t = \beta_0 + \sum_{i=1}^{3} \beta_i R_{t-i} + \beta_1 S_{1,t} + \beta_2 S_{2,t} + \varepsilon_t$$

where $S_{1,t}$ represents respectively low volatility, bullish market, anticipated change, and good news; $S_{2,t}$ represents respectively high volatility, bearish market, non-anticipated change and bad news. We formulate the following four hypotheses:

- H1: The impact of an announcement will be more significant when market conditions are characterized by low volatility than when they are characterized by high volatility
- H2: The impact of an announcement will be more significant in a bearish market than in a bullish market.
- H3: The impact of an announcement will be more significant when the nature of the change was not anticipated than when it was anticipated.
- H4: The impact of an announcement will be more significant when it is a bad news than when it is a good news.

B.   Results

Overall, we find that the impact of US news announcements on European returns remains significant in all of our sub-samples reported in Table 4. In the case of a low volatility environment, the impact is weak (0.273) and significant only at the 10 % level, while in high volatility markets, the impact is highly significant and strong (0.481). This supports our first hypothesis. Volatility reflects some uncertainties in the market, and a surprise in the announcement adds to that uncertainty, probably triggering the need for rapid portfolio adjustments, and a strong effect on returns.

Table 4
The Impact of the American economic cycle moderated by the market environment

| Announcements | US Business Cycle Surprise | | | | |
| | Unstandardized Coefficients | | Standardized Coefficients | | |
	Std. Error	Coef.	Beta	t-stat.	R²
1 General effect	9,292E-05	0,00056***	0,473***	6,019	0,285
6. Low volatility (<10 percentile)	2,204E-04	0,0002*	0,273*	1,003	0,373
7. High Volatility (>10 percentile)	1,025E-04	0,00058***	0,481***	5,707	0,289
8. Bullish Market	1,234E-04	0,00046***	0,412***	3,771	0,284
9. Bearish Market	1,349E-04	0,0006***	0,495***	4,461	0,351
2. Anticpated Change	1,161E-04	0,00065***	0,499***	5,618	0,387
3. Non anticipated change	1,530E-04	0,0004**	0,435**	2,649	0,275
4. Good News	1,870E-04	0,0005***	0,375***	2,695	0,214
5. Bad News	1,268E-04	0,00045***	0,431***	3,534	0,276

[a] This table reports the standard error ($\hat{\sigma}_k$) of all surprises for an announcement k, the surprise coefficient (β_k), the t-statistic and the R² of the regression. The period of analysis is January 4, 2002 to August 31, 2004. *, ** and *** indicate significance at the 0.1, 0.05 and 0.01 levels, respectively.

The impact of announcements is significant in both bullish and bearish markets, with a stronger effect in bearish environments (0.495 vs. 0.412). This result is consistent with hypothesis 2. In bearish markets, investors tend to be more reactive to market news as the perception of risk is exacerbated, and the nature of the positions held in such markets are more volatile in nature. The anticipation of the news is also a factor that impacts returns, with a stronger effect when the news is anticipated (0.499 vs. 0.435). This is contrary to our third hypothesis. One potential explanation is that the confirmation of expectations consolidates investors, and encourages them to pursue their strategy and to react swiftly to the surprise. Another way to explain this result is that our measure of anticipation is not truly capturing expectations. Finally, our results confirm the widely documented observations that market participants react more strongly to bad news than to good news (0.431 vs. 0.375 in our study), which supports our fourth hypothesis.

V.   CONCLUSION

We examine in this paper the impact of European and American business cycle on Euronext trading. Based on intra-day data, we found that returns react immediately to American news releases, while European releases do not affect trading. US GDP and US Industrial Production trigger the strongest reaction on the market. The lack of impact of European news on prices also applies to the trading activity. Our results support the claim that there is a strong impact of US business cycle news on the European market. We checked the robustness of our result by testing the informational impact under different market conditions. The European market is more sensitive to US news announcements in bearish and highly volatile environments. Bad news trigger over-reactions compared to good news and anticipated news have a stronger effect on market returns than non-anticipated news.

REFERENCES

Andersen, T., T. Bollerslev, F. Diebold, and C. Vega, 2003, "Micro Effects of Macro Announcements: Real-Time Price Discovery in Foreign Exchange." *American Economic Review*, 93: 1: 38-62.

Avouyi-Dovi, S., and J. Matheron, 2003, "Interactions between Business Cycles, Stock Market Cycles and Interest Rates: the Stylized Facts." *Financial Stability Review,* Banque de France: n° 3.

Balduzzi, P., E. Elton, and T. Green, 2001, "Economic News and Bond Prices: Evidence from the US Treasury Market." *Journal of Financial and Quantitative Analysis*, 36: 523-543.

Benos, A., and M. Rockinger, 2000, "Market Response to Earnings Announcements and Interim Reports: An Analysis of SBF 120 Companies." *Annales d'Economie et de Statistique*, 60: 151-176.

Boyd, J., R. Jagannathan, and J. Hu, 2005, "The Stock Market's Reaction to Unemployment News: Why Bad News Is Usually Good for Stocks." *Journal of Finance*, 60: 2: 649-672.

Chen, N., R. Roll, and S. Ross, 1986, "Economic Forces and the Stock Market." *Journal of Business*, 59: 383-403.

Cutler, D., J. Poterba, and L. Summers, 1989, "What Moves Stock Prices." *Journal of Portfolio Management*, 15: 4-12.

Ehrmann, M., and M. Fratzscher, 2004, "Taking stock: Monetary Policy Transmission to Equity Markets." *Journal of Money, Credit and Banking*, 36: 4: 719-737.

Fleming, M., and E. Remolona, 1999, "Price Formation and Liquidity in the US Treasury Market: The Response to Public Information." *Journal of Finance,* 54: 1901-1915.

Malliaropulos, D., 1998, "Excess Stock Returns and News: Evidence from European Markets." *European Financial Management*, 4: 29-46.