Carlo Rosa

The Financial Market Effect of FOMC Minutes

- There is a vast array of evidence on the financial market effect of monetary news released on Federal Open Market Committee (FOMC) meeting days.

- Yet little is known about the real-time response of U.S. asset prices to the information contained in the FOMC minutes.

- This article uses a novel data set to examine the effect of the FOMC minutes release on U.S. asset prices.

- The release is shown to significantly affect the volatility of U.S. asset prices and their trading volume, with the magnitude of the effects economically and statistically significant.

- The asset price response to the FOMC minutes has declined since 2008, suggesting greater transparency by the Committee.

1. Introduction

Many studies have examined the influence of the Federal Reserve's unanticipated target rate decisions on U.S. asset prices.[1] A recent strand of literature has also looked at the asset price response to the Federal Open Market Committee (FOMC) statements.[2] Despite the vast and growing empirical evidence on the financial market effect of monetary news released on FOMC meeting days, little is known about the real-time response of U.S. asset prices to the information originating from central bank minutes. This article fills the gap by using a novel, high-frequency data set to broaden the understanding.

Central bank communication has become increasingly transparent over the past decade. This is important not only for reasons of democratic legitimacy and accountability but also for monetary policy to be most effective (Woodford 2005). Central banks use many communication channels, including media statements, press conferences, speeches, reports, and minutes. This article contrasts the effect of FOMC statement releases with that of FOMC minutes releases. These two releases differ mainly in the amount and timeliness of

[1] See, for example, Kuttner (2001), Rigobon and Sack (2004), Bernanke and Kuttner (2005), Fleming and Piazzesi (2005), Faust et al. (2007), and the references therein.

[2] See, for instance, Gurkaynak, Sack, and Swanson (2005) and Rosa (2011a, 2011b).

Carlo Rosa is an economist in the Federal Reserve Bank of New York's Markets Group.

carlo.rosa@ny.frb.org

their information. FOMC statements explain the rationale for the policy action and convey the outlook for the future monetary policy stance. FOMC minutes provide more detailed information on the range of Committee members' views on the appropriate policy stance, on the U.S. economic outlook, and on the near-term monetary policy inclination. The statement is released at the moment of the target rate decision, whereas the minutes come out three weeks after the FOMC meets. The extent to which market participants may scrutinize the FOMC minutes to gain information beyond what is contained in the statement is a question to be answered empirically.

The article's main findings can be summarized as follows. First, I examine the financial market effect of the release of FOMC minutes on U.S. asset prices (Treasury rates, stock prices, and U.S. dollar exchange rates) using a high-frequency, event-study analysis. The use of intraday data allows for better isolation of the response of asset prices to the minutes release, since no other economic news is systematically released within such a narrow (five-minute) window around the monetary announcement. The release of the minutes is shown to induce "higher than normal" volatility across different asset classes. For instance, the volatility of two-year Treasury yields is roughly three times larger on event days than during a period free of such an event. This finding suggests that the FOMC minutes provide market-relevant information and is consistent with the results of Boukus and Rosenberg (2006) showing that the themes of the FOMC minutes are correlated with current and future economic conditions.[3]

Second, to gauge the importance of the minutes' release, I compare the increase in the variance of U.S. asset prices attributed to the minutes with the response brought about by the release of the FOMC balance-of-risk statement, the nonfarm payroll macroeconomic announcement, and the Institute for Supply Management (ISM) manufacturing index (a purchasing survey of the U.S. manufacturing sector). The financial market effect of the FOMC minutes is similar to that of the ISM manufacturing index, although smaller than the market effect induced by the FOMC statement and nonfarm payrolls, often referred to as the "king" of announcements by market participants (Andersen and Bollerslev 1998).

Third, I document that the asset price response to the minutes has declined in the recent period. One potential interpretation of this finding is that the statement has become more informative and that the FOMC has put more effort into greater transparency by releasing information in a timelier manner.

Finally, the robustness of the above results is examined along several dimensions. For instance, I carry out the analysis using trading volumes, redo the computations on a different subsample, and perform a comparative exercise by looking at the financial market effect of the release of the Bank of England minutes. This sensitivity analysis corroborates the core finding that central bank minutes contain market-relevant information, especially for fixed-income securities.

The rest of the article is organized as follows. Section 2 describes the data set. In section 3, I discuss the empirical results of the asset price reaction to the release of FOMC minutes. The robustness of the results is examined in section 4, followed by a conclusion in section 5.

2. DATA

The high-frequency data on U.S. asset prices I use consist of quotes measured at five-minute intervals of on-the-run two- and ten-year Treasury yields, futures prices on the S&P 500 stock index, and the U.S. dollar exchange rate against the euro, Swiss franc, and Japanese yen, covering the period January 2005 to March 2011. Prior to 2005, the FOMC minutes were released only after the next meeting had finished, rendering them largely of historical interest. The sample ends in March 2011 to exclude the period when the FOMC started to release the Summary of Economic Projections and to hold a press conference immediately after its meeting. Midpoints of bid/ask quotes or indicative quotes, observed at the end of each five-minute interval, are used to generate the series of (equally spaced) five-minute continuously compounded asset price returns.[4] The Treasury bond yields are provided by Tradeweb and are based on indicative prices, rather than transaction prices.[5] Hence, there are no associated volume data available. The S&P 500 futures data refer to the E-Mini S&P, a stock market index futures contract traded on the Chicago Mercantile Exchange's Globex electronic trading platform, and consist of both prices and trading volumes. A continuous series is constructed by considering the front-month contract, and rolling over to the next contract on expiration date. Foreign exchange data are provided by EBS (Electronic Broking System, now part of ICAP) and include trading volume in the global interdealer

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[3] Similarly, Apel and Blix Grimaldi (2012) show that the sentiment of the Sveriges Riksbank minutes is useful in predicting the bank's future policy rate decisions.

[4] For instance, Bandi and Russell (2008) argue that five-minute returns provide a reasonable balance between sampling too frequently (and confounding price reactions with market microstructure noise, such as the bid-ask bounce, staleness, price discreteness, and the clustering of quotes) and sampling too infrequently (and blurring price reactions to news).

[5] Although the use of market data may be preferred, the existing literature on exchange rates (for example, Phylaktis and Chen [2009] and Danielsson and Payne [2002]) has documented that indicative data bear no qualitative difference from data on transaction quotes. Hence, it is extremely unlikely that the results of this study are driven by the use of indicative quotes.

Summary Statistics

	Two-Year Treasury	Ten-Year Treasury	S&P 500	Euro/U.S. Dollar	Swiss Franc/ U.S. Dollar	Japanese Yen/U.S. Dollar
Mean	0	0	0	0	0	0
Median	0	0	0	0	0	0
Maximum	0.21	0.18	4.32	1.57	2.32	2.5
Minimum	-0.44	-0.31	-2.95	-1.19	-2.27	-2.77
Standard deviation	0.01	0	0.09	0.04	0.05	0.05
Skewness	-2.14	-2.63	0.61	0.12	0.35	0.08
Kurtosis	253	221	74	47	78	122
Jarque-Bera *p*-value	0	0	0	0	0	0
Observations	221,729	287,575	406,727	452,549	447,342	450,427

Source: Author's calculations.

Notes: The table reports summary statistics for the variables used in the econometric analysis. The sample period is January 2005 to March 2011, excluding all weekend days. The asset price return is either the five-minute change in the bond yields or the five-minute percentage change in the stock price or the U.S. dollar exchange rate pairs.

spot market (see Chaboud et al. [2004] for a detailed description of the data).[6] As noted by Chaboud, Chernenko, and Wright (2008), EBS and Reuters are two electronic broking systems used globally for interdealer spot trading. Trading in the euro-dollar and dollar-yen currency pairs is concentrated primarily on EBS.

The table, which presents a selection of descriptive statistics for all variables used in this study, reveals that the mean and median of the five-minute bond yield changes and stock and exchange rate returns are very close to zero. All returns are approximately symmetric and all display excess kurtosis. The Jarque-Bera statistics strongly reject the null hypothesis that returns are normally distributed.

3. Results

A model testing for the financial market effect of central bank minutes would ideally identify the surprise component of their content. Unfortunately, there are no direct measures of market expectations about the information contained in the FOMC minutes. Hence, to get around the difficulties of quantifying the surprise component, I follow the methodology of Kohn and Sack (2004) and look at whether, and to what extent, the volatility of asset prices is higher on release days compared with nonevent days. The idea is that as long as the

content of the minutes is not always completely anticipated, the release of the minutes causes market participants to revise their expectations, and this should be reflected in higher volatility of asset prices compared with a period free of such an event. Since asset price volatility may be time-varying, it is important to properly control for both intraday and day-of-the-week effects when gauging whether the release of the minutes induces elevated price fluctuations. To that end, Chart 1 displays 1) the standard deviation of the five-minute returns on release days and 2) the standard deviation of the five-minute returns on the same weekdays (of the previous and following week of the release day of the FOMC minutes) and hours, but on nonannouncement days.[7] The vertical line is shown at the release time of the FOMC minutes, that is, 2 p.m. ET. The dark and white squares denote significance of the differences at the two-sided 1 and 5 percent levels, respectively. Since asset price returns are not normally distributed, I use the test statistic proposed by Levene (1960) to test the null hypothesis of equal variances in each subgroup. Fifty sets of FOMC minutes were published between January

[6] The foreign exchange trading volume data are proprietary; to preserve data confidentiality, I report only relative volumes expressed in ratio form, rather than as actual amounts of base currency.

[7] More specifically, for both announcement and nonannouncement days the standard deviation is defined as $\sqrt{\sum_{t=1}^{T}(r_t - \bar{r})^2/(T-1)}$, where r_t is the five-minute return, T is the number of observations in the sample, and $\bar{r}$ is the sample mean. As a robustness check, I also consider the squared root of the mean of squared returns, that is, $\sqrt{\sum_{t=1}^{T}r_t^2/(T-1)}$; the results (available upon request) remain extremely similar. To compute "normal" U.S. asset price volatilities, that is, the volatility that would be expected to prevail on control (or nonevent) days, as a further robustness check I also use the previous and following day of the release day of the FOMC minutes. It is reassuring that the results reported in Chart 1 continue to hold.

Chart 1

The Volatility of Asset Prices around FOMC Minutes Releases
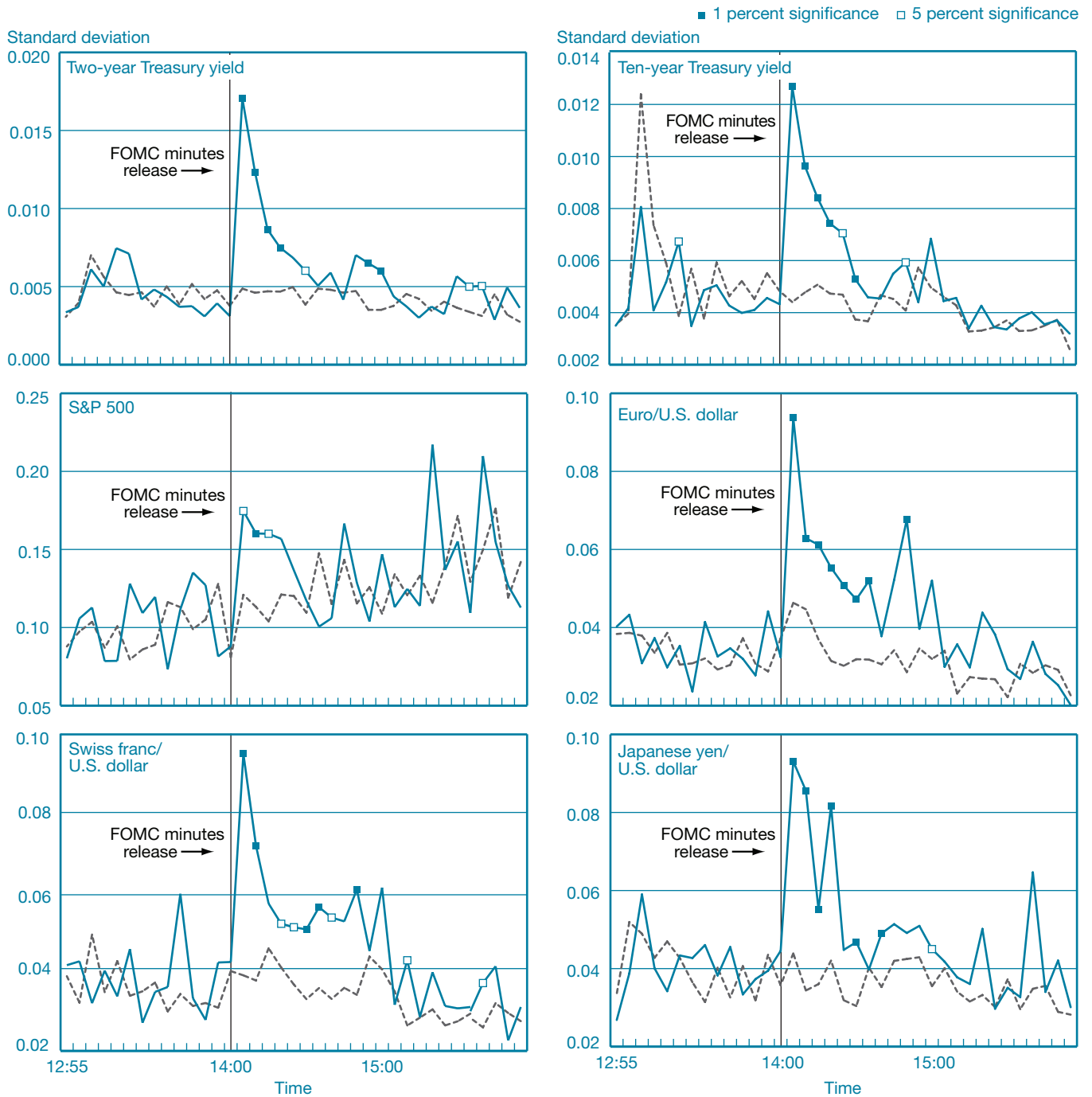
■ 1 percent significance   □ 5 percent significance

Source: Author's calculations.

Notes: The chart plots the standard deviation of five-minute asset price returns around the FOMC minutes (solid line) and on control days (the same weekdays and hours of the previous and following weeks of the FOMC minutes release day; dashed line). The sample period is January 2005 to March 2011. The interval spans from one hour before to two hours after the event time. The vertical line signifies the release time of the FOMC minutes, 2 p.m. ET. Levene (1960) statistics are employed to test the null hypothesis of equal variances in each subgroup. Dark and white squares denote significance of the differences at the two-sided 1 and 5 percent level, respectively.

2005 and March 2011.[8] The release of the minutes induces significantly "higher than normal" volatility on asset prices, especially at the time of the release, and up to roughly one hour after the announcement. For instance, the volatility of two-year Treasury yields suddenly jumps at the time of the release—it is roughly three times larger on event days compared with a period free of such an event, and it remains significantly higher until around 3 p.m. ET. Treasuries, especially at shorter maturities, are the most affected asset class, closely followed by U.S. dollar exchange rates, whereas the response of stock prices is less pronounced, though still significantly higher than it is on nonevent days, and shorter-lived.[9]

This finding indicates that FOMC minutes provide market-relevant information that is incorporated into asset prices. To gauge the order of magnitude of these effects, I compare the increase in the volatility of U.S. asset prices attributed to the minutes with that induced by the release of the FOMC balance-of-risk statement, the nonfarm payroll macroeconomic announcements (one of the most closely followed announcements by the financial press), and the ISM manufacturing index. Panel A of Chart 2 shows that the FOMC statement exerts an economically large and highly significant effect on asset prices. For instance, the ten-year rate, S&P 500 stock prices, and the euro-dollar exchange rate are at least eight times more volatile on event days compared with nonevent days. The least affected asset price is the Japanese yen, but that is still four times as volatile as it is on normal days. The absorption of news is also more prolonged, taking roughly one hour and thirty minutes, compared with the time associated with the release of the FOMC minutes. As documented by Rosa (2011a), for U.S. stock and volatility indexes (the Dow Jones Industrial Average, NASDAQ 100, S&P 500, and VIX), after the initial effect the market will seek its new equilibrium, taking into account the additional information generated by the stock price changes following the FOMC announcements and the subsequent commentaries on the Federal Reserve's decisions provided in real time by financial analysts. Therefore, although the FOMC monetary news affects asset prices immediately, the market dynamics toward its new equilibrium are protracted and extend well beyond the initial effect. Consistent with the findings of Fleming and Remolona (1999) and Balduzzi, Elton, and Green (2001), I show in panel B of Chart 2 that nonfarm payrolls exert a similar effect on the release of

FOMC statements and a much larger effect than does the response of asset prices to the release of FOMC minutes.[10] The response of ten-year Treasury rates and S&P 500 stock prices to nonfarm payrolls is smaller than the response induced by the FOMC statement, whereas the U.S. dollar exchange rates are more sensitive to nonfarm payrolls than to monetary news. To better assess the economic importance of the financial market effect of the release of the FOMC minutes, in panel C of Chart 2 I show that the release of the ISM manufacturing index induces "higher-than-normal" volatility that has roughly the same order of magnitude as the "excess" volatility induced by the minutes.[11] For instance, at the news release time (2 p.m. for the minutes and 10 a.m. for the ISM manufacturing index), the volatility of the two-year Treasury yield equals 0.016 (1.6 basis points) for both releases, compared with a "normal" volatility of 0.004.

I also investigate whether the informational content of the FOMC minutes has changed over time by splitting the sample into two subsamples. Chart 3 displays 1) the standard deviation of the five-minute returns on release days and 2) the standard deviation of the five-minute returns on the same weekdays (of the previous and following week of the release day of the minutes) and hours, but on nonannouncement days, for two samples: January 2005-December 2007 in panel A and January 2008-March 2011 in panel B. The chart documents that the overall level of volatility on nonevent days has increased during the financial crisis, especially for stock prices. Moreover, the level of asset price volatility on release days has become more similar to the level of volatility on control days for 2008-11 compared with 2005-07. One potential interpretation of this finding is that FOMC communication before the release of the minutes has become more informative, possibly indicating that the Committee has achieved greater transparency by releasing news in a more timely manner. A complementary interpretation is that the sensitivity of asset prices and, in particular, of interest rates, to news diminishes when short-term rates hit the zero lower bound. The evidence provided by Swanson and Williams (2012), however, rejects this hypothesis.

[8] The release dates can be found on the Federal Reserve Board's website, and are known to market participants well in advance.

[9] Since writing this article, I have become aware of a very recent and somewhat related work by Jubinski and Tomljanovich (forthcoming) that looks at the intraday response of individual equity prices to FOMC minutes for a short, precrisis sample period (2006-07) using a GARCH model.

[10] The set of nonannouncement days for the nonfarm payroll release is defined as follows. First, I run the Bloomberg function "ECO United States," which provides time series data for all U.S. macroeconomic news stored by Bloomberg. Next, I select the same weekdays of the previous and following week of the release day of nonfarm payrolls. Finally, I define as nonannouncement days the subset of days that do not feature any 8.30 a.m. ET macroeconomic news releases.

[11] Strictly speaking, since the ISM index and the minutes are released at different times, given the intraday volatility pattern displayed by asset prices (as documented, for instance, in Andersen and Bollerslev [1997, 1998]), it is not possible to compare their financial market effects.
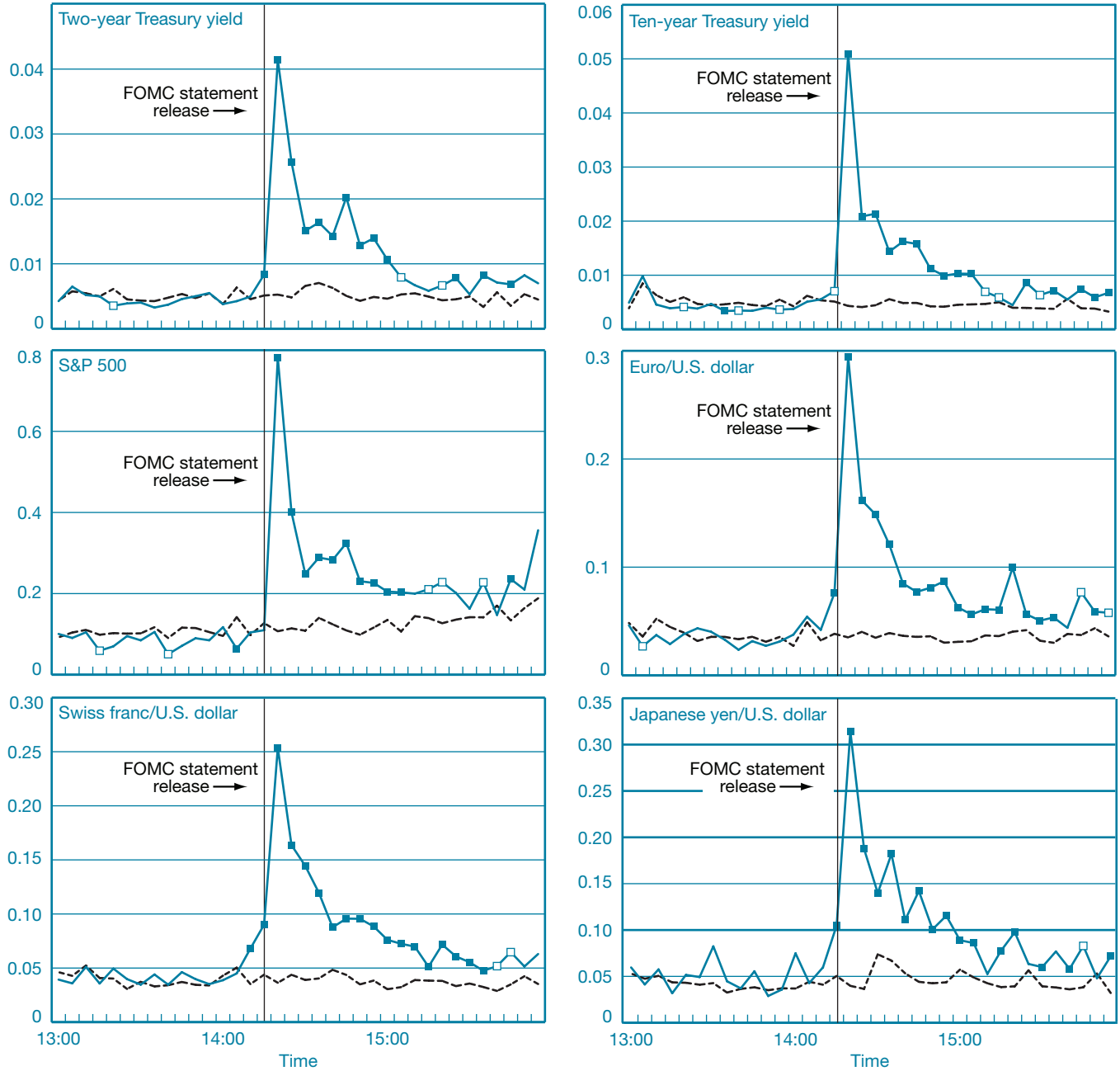
CHART 2
The Volatility of Asset Prices around FOMC Statement, Nonfarm Payrolls, and ISM Manufacturing
Index Releases

Source: Author's calculations.

Notes: The chart plots the standard deviation of the five-minute asset price returns around the news release (solid line) and on control days (the same weekdays and hours of the previous and following weeks of the event day; dashed line). The sample period is January 2005 to March 2011. The interval spans from one hour before to two hours after the event time. The vertical line signifies the release time of the FOMC statement (see Rosa [2012] for the exact time stamps of the FOMC meetings) in panel A, nonfarm payrolls (8:30 a.m. ET) in panel B, and ISM manufacturing index (10:00 a.m. ET) in panel C. Levene (1960) statistics are employed to test the null hypothesis of equal variances in each subgroup. Dark and white squares denote significance of the differences at the two-sided 1 and 5 percent level, respectively.

Chart 2 (continued)
The Volatility of Asset Prices around FOMC Statement, Nonfarm Payrolls, and ISM Manufacturing Index Releases

Panel B: Nonfarm Payrolls

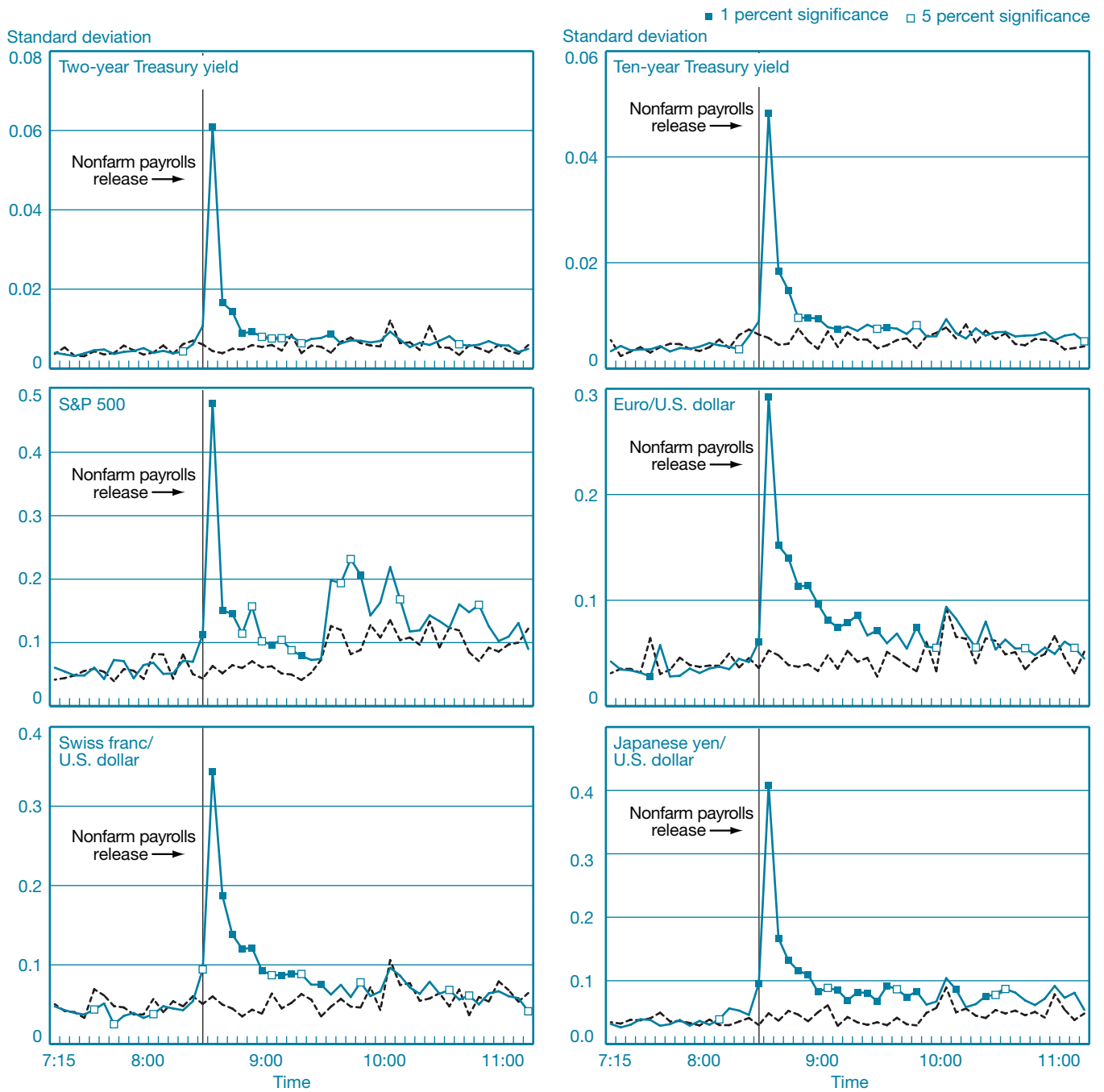■ 1 percent significance   □ 5 percent significance

CHART 2 (CONTINUED)
The Volatility of Asset Prices around FOMC Statement, Nonfarm Payrolls, and ISM Manufacturing Index Releases

Panel C: ISM Manufacturing Index

■ 1 percent significance □ 5 percent significance

Standard deviation

Two-year Treasury yield

ISM release ➡

Standard deviation

Ten-year Treasury yield

ISM release ➡

S&P 500

ISM release ➡

Euro/U.S. dollar

ISM release ➡

Swiss franc/U.S. dollar

ISM release ➡

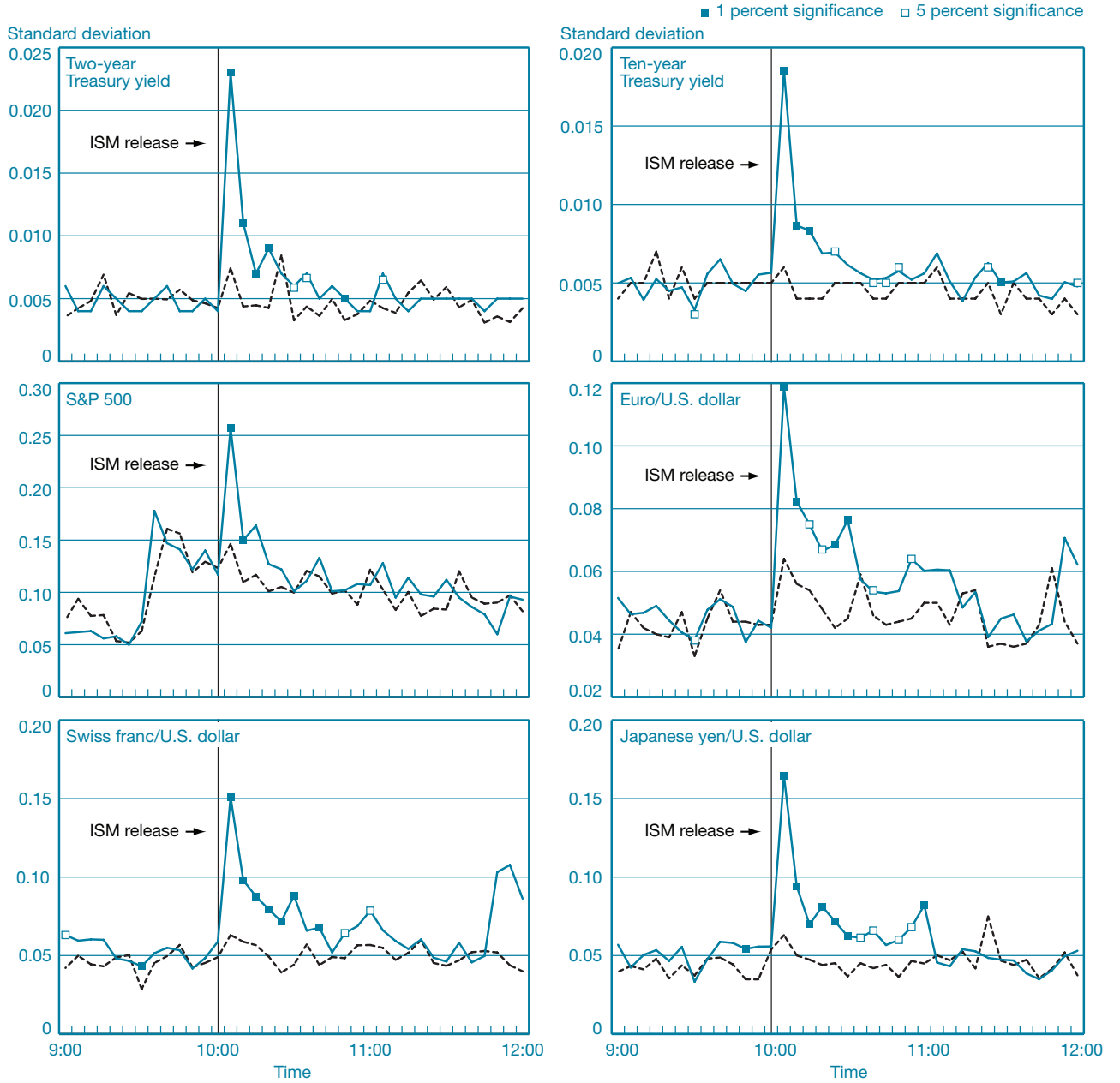Japanese yen/U.S. dollar
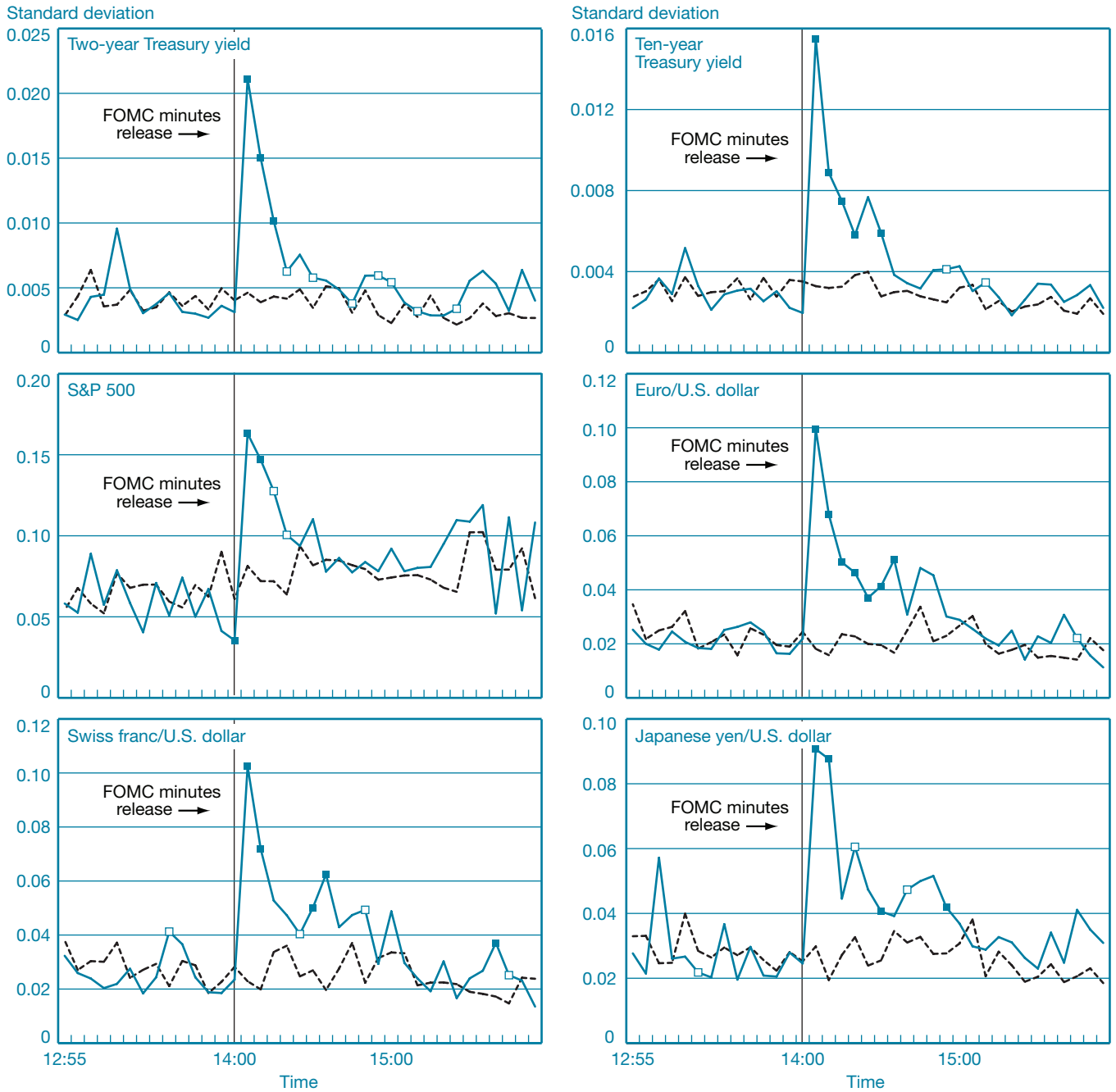
ISM release ➡

Time

Time

CHART 3
The Volatility of Asset Prices around FOMC Minutes Releases: Subsamples

Panel A: January 2005 to December 2007 Subsample

■ 1 percent significance   □ 5 percent significance

Standard deviation

Two-year Treasury yield

FOMC minutes release →

Standard deviation

Ten-year Treasury yield

FOMC minutes release →

S&P 500

FOMC minutes release →

Euro/U.S. dollar

FOMC minutes release →

Swiss franc/U.S. dollar

FOMC minutes release →

Japanese yen/U.S. dollar

FOMC minutes release →

Time

Time

Source: Author's calculations.

Notes: The chart plots the standard deviation of five-minute asset price returns around the FOMC minutes release (solid line) and on control days (the same weekdays and hours of the previous and following weeks of the FOMC minutes release day; dashed line) for two subsamples: January 2005 to December 2007 in panel A and January 2008 to March 2011 in panel B. The interval spans from one hour before to two hours after the event time. The vertical line signifies the release time of the FOMC minutes, 2 p.m. ET. Levene (1960) statistics are employed to test the null hypothesis of equal variances in each subgroup. Dark and white squares denote significance of the differences at the two-sided 1 and 5 percent level, respectively.

Chart 3 (continued)
The Volatility of Asset Prices around FOMC Minutes Releases: Subsamples

Panel B: January 2008 to March 2011 Subsample
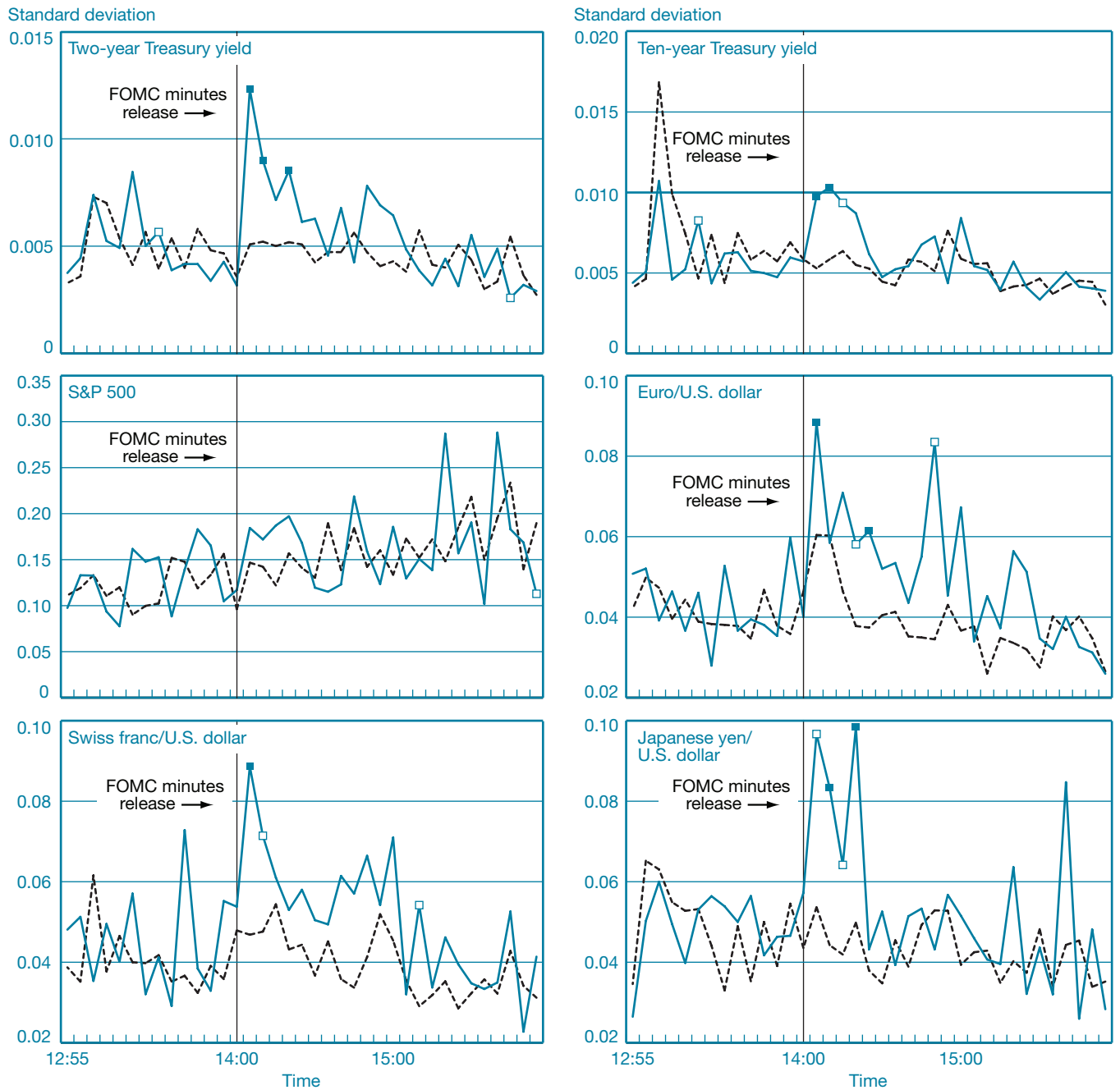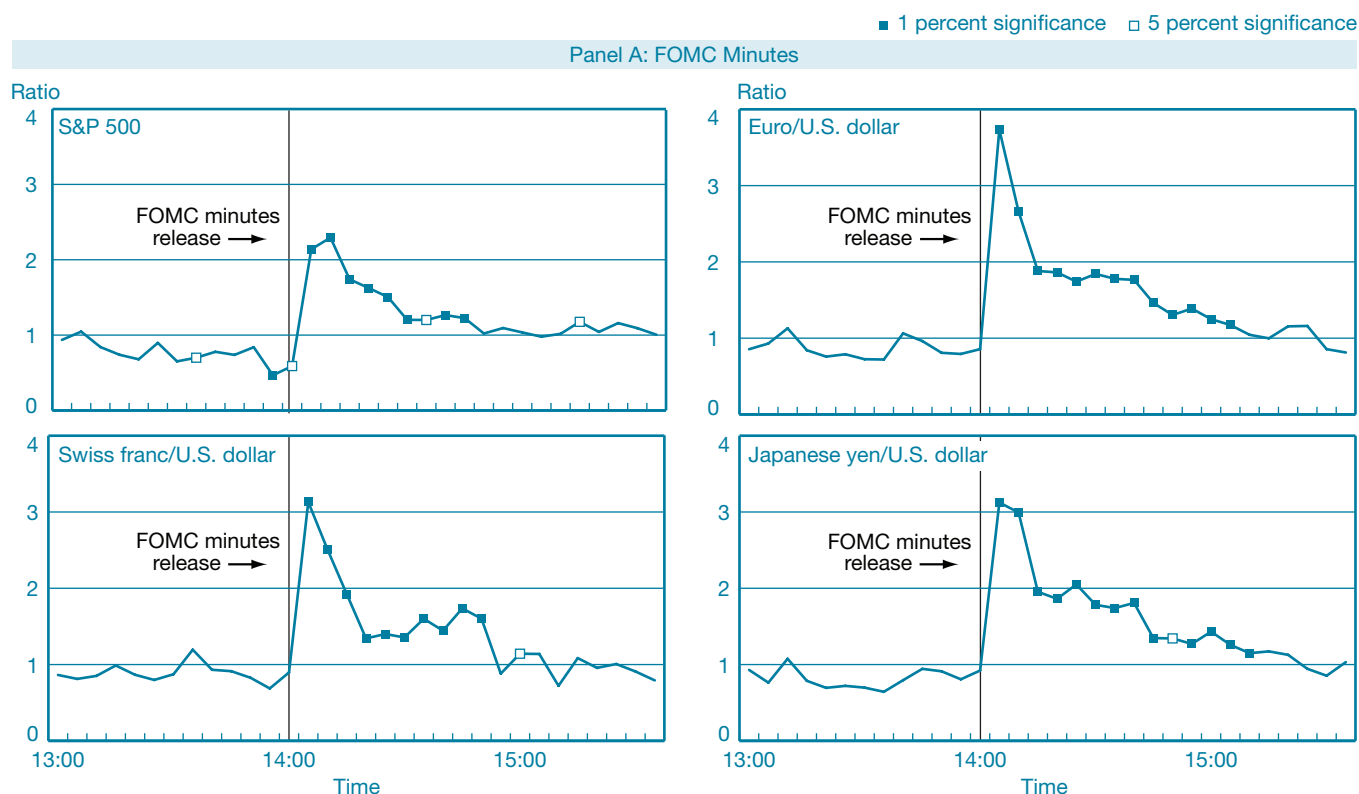
■ 1 percent significance □ 5 percent significance

Standard deviation

Two-year Treasury yield

FOMC minutes release ➞

Standard deviation

Ten-year Treasury yield

FOMC minutes release ➞

S&P 500

FOMC minutes release ➞

Euro/U.S. dollar

FOMC minutes release ➞

Swiss franc/U.S. dollar

FOMC minutes release ➞

Japanese yen/ U.S. dollar

FOMC minutes release ➞

Time

Time

Chart 4
Trading Volumes around FOMC Minutes and Statement Releases

Panel A: FOMC Minutes

Ratio

S&P 500

FOMC minutes
release →

Ratio

Euro/U.S. dollar

FOMC minutes
release →

Swiss franc/U.S. dollar

FOMC minutes
release →

Japanese yen/U.S. dollar

FOMC minutes
release →

Time

Time

Source: Author's calculations.

Notes: The chart plots the median ratio between volumes around the FOMC minutes and statement releases and volumes on control days (the same weekdays and hours of the previous and following weeks of the event days). The sample period is January 2005 to March 2011. The interval spans from one hour before to two hours after the event time. The vertical line signifies the release time of the FOMC minutes, 2 p.m. ET, in panel A and of FOMC statements (see Rosa [2012] for the exact time stamps of the FOMC meetings) in panel B. The Wilcoxon signed ranks test (Newbold 1988) is employed to test the null hypothesis that the median ratio between five-minute volumes in the two subgroups equals 1. Dark and white squares denote significance of the differences at the two-sided 1 and 5 percent level, respectively.
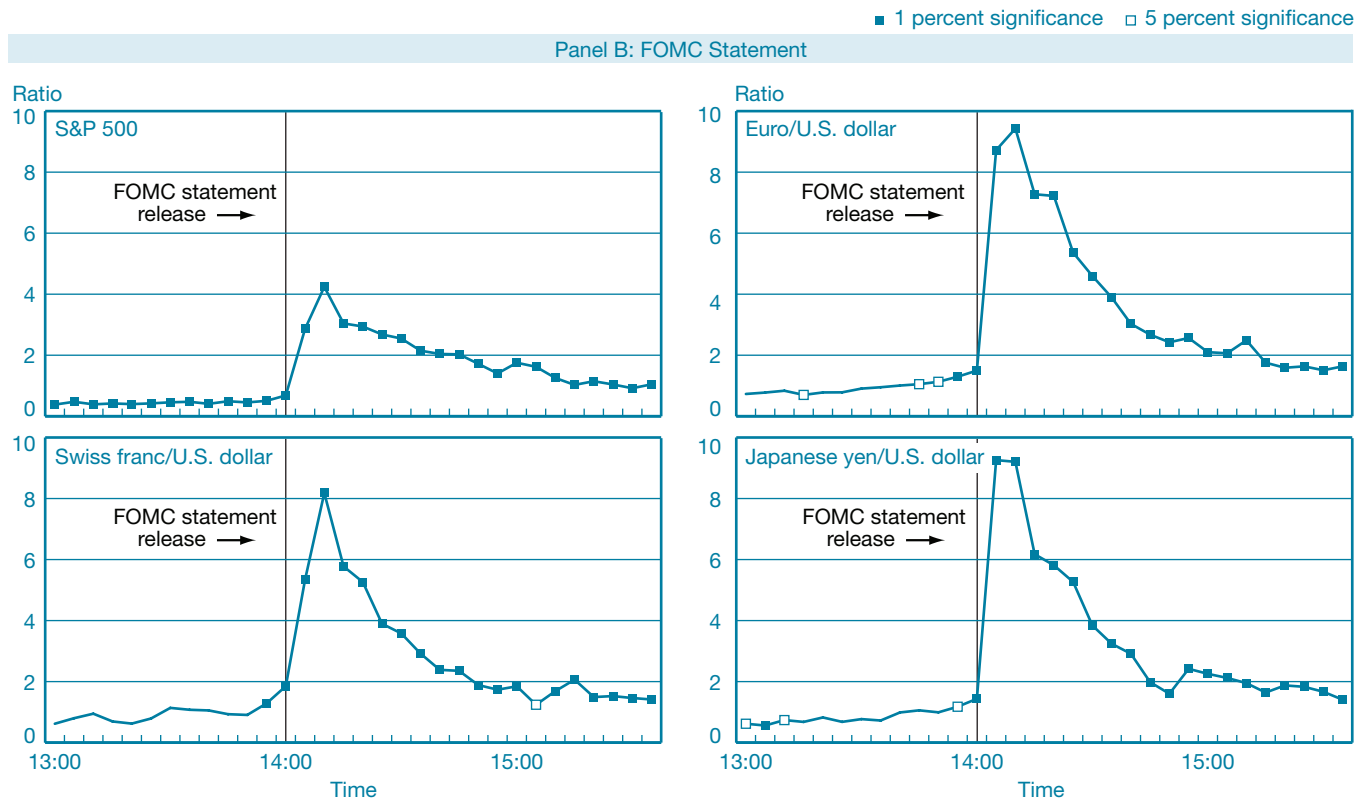
4. ROBUSTNESS CHECKS

To test the robustness of the baseline results of the previous section, I also carry out the analysis using trading volumes for the S&P 500 stock index and U.S. dollar exchange rates, I redo the computations on a different subsample, and I look at the financial market effect of the release of the Bank of England minutes.

First, paralleling my earlier analysis on realized volatility, I examine the relationship between trading volumes and the arrival of news. To adjust for trend growth in trading volumes, and to avoid overweighting the most recent years, for each release day of the FOMC minutes I compute the ratio between 1) the five-minute volumes on release days and the average of 2) the five-minute volumes on the same weekdays (of the previous and following week of the release day of the FOMC

minutes) and hours, but on nonannouncement days. Then I test the null hypothesis that the median ratio equals 1, that is, that the trading activity is the same on days of FOMC minutes releases and nonevent days. The Wilcoxon signed ranks test (see Newbold [1988]) is employed to account for the possibility that the ratio is not normally distributed. Since the existing literature documents a positive contemporaneous relation between volume and volatility (see Karpoff [1987] and more recently Giot, Laurent, and Petitjean [2010] for detailed surveys), I expect that volumes will also respond to the release of the FOMC minutes and statements.[12] Panel A of Chart 4 shows that trading activity is lower than normal before the

[12] For brevity, and because the results are very similar to those on volatility, I provide in a separate appendix (available on request) charts on trading activity around the release of nonfarm payrolls compared with nonevent days.

CHART 4 (CONTINUED)
Trading Volumes around FOMC Minutes and Statement Releases

■ 1 percent significance   □ 5 percent significance

Panel B: FOMC Statement

release of the minutes, jumps at the time of the release, and then gradually returns to its normal level. The response is most pronounced for the euro (four times as large as on nonevent days) and least pronounced for the S&P 500 (twice as large), with the Swiss franc and Japanese yen lying in the middle (three times). Panel B indicates that trading activity around the release of the FOMC statement strongly and significantly increases for all assets, especially for the euro and yen (around ten times, compared with nonevent days).[13] The effect on volumes is persistent, and lasts at least one hour and thirty minutes after the event. Of note, the volume on the S&P 500 is especially low before the release time, suggesting highly significant *intraday* preannouncement effects in the stock market. In other words, stock traders restrain from transacting before the news release, and wait for resolution of the uncertainty

regarding its outcome.[14] In summary, trading volumes respond similarly to volatility, with both stock prices and U.S. dollar exchange rates strongly affected by this monetary news.

Second, I examine whether the asset price response depends on the length of the FOMC meeting, namely, whether it is a one- or two-day event. Two-day meetings usually provide more time to discuss special topics. I find that the significant increase in volatility is not related to the type of FOMC meeting (results available upon request).

Finally, to show whether the results of increased volatility and volume on release days of FOMC minutes hold for other central banks, I examine the financial market effect of the Bank of England official communication. I look at two types of communication: the minutes of the Monetary Policy Committee (MPC) meetings and the Inflation Report. Since November 1998, the minutes have been published at 9:30 a.m.

[13] This finding is in line with the intraday results of Fleming and Remolona (1999) for the Treasury market and Fleming and Krishnan (2012) for the Treasury inflation-protected securities market. Fischer and Ranaldo (2011) show that daily global currency volumes increase on FOMC meeting days.

[14] This result is consistent with the "calm-before-the-storm" effect documented in Jones, Lamont, and Lumsdaine (1998) for macroeconomic news and Bomfim (2003) for FOMC target rate decisions.

London time on the Wednesday of the second week after the meetings take place; before that date, the Bank of England minutes were released after the following MPC meeting. The minutes provide information on the MPC's assessment of the economic outlook and risks, as well as on each Committee member's voting record and assessment of the future monetary policy stance. The Inflation Report is a quarterly publication containing the MPC's projections for output growth and inflation, presented in so-called "fan charts," as well as a detailed analysis of the economic outlook and risks. The report is released at 10:30 a.m. London time and is accompanied by a press conference. Overall, 147 minutes and 49 Inflation Reports have been published between January 1999 and March 2011. Consistent with the existing literature, I expect that U.K. assets react to Bank of England official communication.[15] Estimation results (available upon request) show that the volatilities of both five- and ten-year U.K. gilts are roughly twice as large at the release time of the minutes compared with nonevent days, and they remain larger than normal for around one hour after the event. Also, the British pound exchange rates (against the euro, U.S. dollar, and Japanese yen) significantly respond to the release of the minutes, whereas the volatility of the FTSE 100 is more muted and not significantly different from volatility during "normal" times. The volatility pattern around the release of the Inflation Report is similar to the pattern displayed around the release of the minutes. The major difference is that the Inflation Report has a stronger immediate effect on asset prices compared with the effect of the minutes. For instance, the volatility of the British pound exchange rate is roughly four times volatility on nonevent days. In summary, the empirical evidence supports the hypothesis that the Bank of England minutes and Inflation Report convey valuable information to investors, with the strongest effect on interest rates and exchange rates.

5. Conclusion

The high-frequency reaction of asset prices to news announcements represents a simple and precise tool for assessing how information is impounded into security prices. This article examines whether, and to what extent, the FOMC minutes contain market-relevant information by looking at asset price volatility and trading volume in a narrow window around the release of the minutes. The results show that the release significantly affects both the volatility of U.S. asset prices and their trading volume. The magnitude of these effects is similar to the financial market effect of a macroeconomic release such as the ISM manufacturing index, but is smaller than the market effect induced by the release of the FOMC statement and nonfarm payrolls. The asset price response to the minutes, however, has declined since 2008, suggesting the greater transparency of the FOMC.

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[15] Gerlach-Kristen (2004) documents that the MPC's voting record contained in the minutes helps predict the future Bank of England policy rate changes. Reeves and Sawicki (2007) investigate the effect of Bank of England communication between 1997 and 2004, and show that the minutes and the Inflation Report significantly affect daily U.K. short-term interest rates.

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