YOUR WORDS ARE IN MY WALLET! THE IMPACT OF EU SUMMITS ON THE EURO-DOLLAR EXCHANGE RATE

By

Christian H. Fahrholz Gerald Schneider

Lehrstuhl für Internationale Politik
Fachbereich Politik- und Verwaltungswissenschaft
Universität of Konstanz
Fach D 86
78457 Konstanz
Germany
christian.fahrholz@uni-konstanz.de gerald.schneider@uni-konstanz.de

American Consortium on European Union Studies (ACES)
EU Center of Excellence Washington, D.C.

ACES Cases, No. 2006.1

Stephen J. Silvia, American University, editor

Christian Fahrholz is Research Associate, Department of Politics and Management, University of Konstanz, Germany; and **Gerald Schneider** is Professor, Department of Politics and Management, University of Konstanz, Germany.

Copies of the case can be downloaded free of charge, and information on other cases in this series can be found, at the ACES website: www.american.edu/aces/cases.htm

Abstract

The introduction of the euro as legal tender in most member states of the European Union (EU) has further stimulated financial market integration in Europe and beyond. Yet, political manoeuvres have shaped – and sometimes threatened – this process. In this paper, we examine how the summit meetings of the European Union and events that are often considered to be ineffectual have influenced the ups and downs in the euro-dollar exchange rate. Using daily data, we show, with the help of a standard tool in financial econometrics, a GARCH model that summits decrease rather than increase the volatility of this series. Further event studies demonstrate that, while some summits have improved the standing of the European currency, the haggling over the Maastricht criteria at the Feira meeting has hurt the euro.

ssilvia 12/21/06 1:04 AM
Formatted: Line spacing: double

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

1. Introduction

Political decisions made at the European Union (EU) level are widely perceived to be of little lasting importance. The European Council regularly gets together to tackle the organization's most pressing problems, and these meetings are especially considered to be a waste of time and money. In order to save their reputation and to avoid upsetting the markets, the prime ministers of the EU member states often resort to vague diplomatic language, when summits end in failure and stalemate (e.g. Schneider and Cederman 1994). If, by contrast, the member states unexpectedly achieve a significant compromise in a disputed area, meetings typically end in verbose press conferences during which the heads of state and government frequently try to reap as much as possible from the collective glory.

ssilvia 12/21/06 1:04 AM
Deleted:

In light of this contrasting behaviour, we cannot assume that European summit meetings affect the economy in a regular way. Given that, we know that some summit meetings have indeed generated serious effects on the economy; however, we do not know which meeting outcomes produce economically relevant effects or whether they influence, systematically, European markets. This paper tries to overcome this gap and explores how summits affect the expectations and uncertainty characterizing the financial community. In particular, we examine how EU summits have affected the euro-dollar exchange rate. In doing so, we contribute to the recently evolving literature on politics and financial markets (e.g. Schneider and Tröger 2006, Guidolin and LaFerrera 2005, Bernhard and Leblang 2002, Freeman et al. 2000).

Hence, this paper attempts to clarify whether changes in euro-dollar exchange-rate investment returns could be better understood by incorporating the dynamics of the political environment. In doing so, we investigate whether members of the European Monetary Union (EMU) lack the willingness to adhere to the European integration process and how this may affect the valuation

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

of the euro. We conduct a two-step empirical analysis: First, using daily data and with the help of a general autoregressive conditional heteroskedasticity (GARCH) model, we demonstrate which kind of political events exert particular influence on the volatility of the euro-dollar exchange rates. In parallel, the analysis sheds some light on the potential impact that corresponding political events may have on average exchange-rate returns. Second, we highlight the effect of single political events on the level of returns for the euro with the help of an events-related study. To do this, we consider twenty-seven European Council meetings within the former EU-15 during the years 1999-2005.

The analysis yields interesting results regarding how the financial markets reacted to these meetings during the days that followed each event. What we see is that financial markets do take notice of European summits and their outcomes. For example, discernable but unanticipated conflict within the European Council triggers periods of volatile exchange- rate movements. Furthermore, apparent disputes among European heads of government give rise to doubts about the continuation of European political and economic integration, resulting in exchange-rate depreciation. Accordingly, our analysis disproves public dismissals concerning European summits as venues for "empty talk." In this regard, financial investors seem to act more "European" than the ordinary public of national EU-member states.

The remainder of this paper is structured as follows: The following section reviews the relevant literature. Section 3 sets forth the theoretical model of our study, which aims to determine the impact of political events on the euro's valuation. The research design and the subsequent empirical analysis are covered in section 4. Finally, section 5 concludes this paper and points to areas where further research would be warranted.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

2 Survey of the literature

ssilvia 12/21/06 1:04 AM
Deleted:

ssilvia 12/21/06 1:04 AM
Deleted:

Models of exchange-rate behaviour essentially rely on several statistical indicators – that is, macroeconomic variables such as money supply, output level, and the current account, among others. This field of research has also developed to make allowances for the role played by information availability (see below). Foreign exchange markets are considered efficient if markets reflect all available information. Hence, only new information can alter prices. This "efficient-market" hypothesis implies that the forward rate should be a perfect predictor of the future spot exchange rate (see Fama 1970, Fama and Miller 1972). However, it is generally acknowledged that the forward exchange rate does not operate as predicted by the efficient-market hypothesis, but that a "forward exchange rate bias" prevails. Such market inefficiency can result, for instance, from investors' expectation errors or a time-varying risk premium attached to foreign-exchange rates (Froot and Frankel 1989, Fama 1984). The latter may be induced by political uncertainty – precisely the topic of our present inquiry. Political uncertainty may, accordingly, negatively affect levels and volatility of the euro-dollar exchange rate.

One drawback found in the voluminous literature on exchange-rate movements is, in our view, its narrow focus on economic variables. This suggests that the effect of political decision-making on market expectations, and thus on exchange-rate behaviour, is effectively disregarded. That market agents form their expectations regarding exchange rates not only from economic fundamentals, but also from political events is recognized, but this added element is rarely studied formally. Among scholars, Bachman (1992) was probably the first to conduct econometric analyses, linking the impact of elections on selected exchange rates, e.g., currencies of the United States, United Kingdom, France and Canada. Freeman et al. (2000) and, in addition, Hays et al. (2000) inquire into the effects of uncertainty about electoral outcomes and exchange-rate policy shifts, particularly from a theoretical point of view.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

Further empirical research on the impact of elections and politically induced business cycles on exchange-rate behaviour often emphasizes the partisanship of the incumbent government: Forecasts of short-term exchange-rate behaviour regarding the US-dollar, British pound and German mark by Blomberg and Hess (1997) rely on political variables which capture party-, election- and candidate-specific characteristics. Lobo and Tufte (1998) also investigate the impact of partisanship on the volatility of the US-dollar exchange rate against Japanese Yen, British Pound, German Mark and Canadian dollar. In a similar way, Keef and Roush (2003) analyse the effects of political administration effects on New Zealand's currency, whereas Siokis and Kapopoulos (2003) focus on the politically induced movements of the Greek drachma. Bernhard and Leblang (2004) and Leblang and Bernhard (2006) also test the effects of electoral change and opinion poll results on selected European exchange rates. The study of Kugler and Weder (2005) covers the impact of rare events such as the Tschernobyl nuclear accident and the Iraqi invasion of Kuwait on returns for the Swiss Franc.

Pantzalis, Strangeland, and Turtle (2000) analyze the influence of uncertainty surrounding elections on the value of securities. Perry and Robertson (1998), Herron (2000), McGillivray (2003), and Vuchelen (2003) test the impact of political events on financial- market behaviour. Studies that explore events beyond those related to elections and politically induced business-cycle changes are rare. Notable exceptions include, for instance, Schneider and Tröger (2006) and Guidolin and La Ferrara (2005), who investigate the interrelationship of violent conflicts and stock market behaviour. As another example, Kaminsky and Schmukler (1999) study the impact of international agreements concerning debt restructuring on excessive volatility in Asian stock markets during the Asian crisis from1997-98. Voth (2004) considers the impact of institutional fragility and tumultuous politics of the interwar period on stock markets.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

3 Theoretical model

This section lays the theoretical foundations for the empirical analysis that follows. We establish a link between politics and the formation of foreign-exchange markets from the viewpoint of financial-market theory. More precisely, we model for possible consequences of political events, particularly the outcomes of various European summits, on euro-dollar exchange rates.

ssilvia 12/21/06 1:04 AM
Deleted:

When studying the interaction of political events and foreign-exchange markets, it is quite useful to refer to currencies as "asset prices." A foreign-exchange rate not only reflects macroeconomic fundamentals and microeconomic risks, but also depends on expectations of future policies that may affect economic performance. The asset-price definition has been adopted by portfolio-balanced approaches (see especially Frenkel and Mussa, 1980, 1985). The paper considers the exchange rate as one of the prices that equilibrate markets for financial assets. Spot exchange rates behave as asset prices. Accordingly, returns follow a random walk because investors form rational expectations concerning European governments their political course of action and, ultimately, the prospects of European integration (cf. Freeman et al. 2000). This suggests that exchange-rate movements can occur as a result of new information produced by political events. The asset-price definition of exchange rates fits perfectly into our analysis because it evidences links between political and market equilibria, i.e. political events and foreign exchange markets.

The explicit modelling of international financial investor behaviour in order to explain exchange-rate dynamics – i.e. whether portfolio balancing accounts for exchange-rate changes (Hau and Rey 2004) – has recently gained more attention in literature. When dealing with exchange rates as asset prices, while stressing exchange-rate returns, we enter a new field of research that investigates the interlinkage of risky assets and exchange-rate dynamics (Capiello and De Santis

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

2005; Pavlova and Rigobon 2003; Brandt et al. 2001). In this respect, our analysis takes into account the impact of both equity and bond returns on the euro-dollar exchange rate. Such an approach allows the use of daily data which would be impossible were we considering, for instance, the influence that inflation and productivity differentials exert on exchange rates. Therefore, this "portfolio approach" fits perfectly with our purpose, that is, measuring the influence that particular categories of political events exert on the euro-dollar exchange rate.

In general, political events may affect foreign exchange markets in two ways. First, an event can trigger a de- or re-evaluation. Second, a political event can set off periods of higher volatility and also end them. A major problem encountered when determining influence is that markets seem to update and process political events at specific times in different ways. Mosley (2004), for instance, observes that in mature economies investors assess only macroeconomic fundamentals. However, the findings of Prast and de Vor (2005) suggest that this applies first and foremost to the US-economy; the case for economies within the euro area, even for those countries considered mature, is different. This observation suggests that markets and politics do not always seem to interact predictably across currencies.

ssilvia 12/21/06 1:14 AM
Deleted: :

ssilvia 12/21/06 1:14 AM
Deleted: ;

ssilvia 12/21/06 1:14 AM
Deleted: s

Uncertainty regarding the future political course of European integration may translate into the economic sphere: a loss of momentum in the process of European political integration may foreshadow stalemate of further European economic and financial integration. This, in turn, would negatively affect the prospects of future economic performance within Europe, particularly where it concerns returns on stock investments. At the same time, international investors may generally demand a higher risk premium on European securities, especially bonds, because perceived setbacks in the European integration process could lead to unexpected changes member-state economic policies, some of which could be detrimental to financial markets.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

By contrast, sending a signal that the European integration process will continue would help anchor market expectations. In other words, political events may either support or counter international investors' expectations regarding the progress of European integration. The euro will adapt, accordingly. We conjecture that European summits, in particular, are suitable yardsticks by which to measure the willingness of EU member states to adhere to the European integration process.

A frequently researched issue in the related literature regards political uncertainty in foreign-exchange markets stemming from national elections and their longer-term aftermath (Bernhard and Leblang 2002). Even in cases of highly predictable electoral outcomes, uncertainty about policy implementation may persist (see, for instance, Fowler 2006). Although European policy positions among leading parties within EMU member states are rarely clear-cut, election-related policy changes can exacerbate uncertainty about the progress of European integration. *E*lections are not the only source of unpredictability*, however*. Financial investors may not fully comprehend European decision-making processes. Policy outcomes at the European level result from a complex interplay of policy formation between domestic and intergovernmental arenas. Economic agents have difficulties anticipating outcomes that ultimately arise from such multi-tiered negotiations. Hence, international financial investors may view bargaining outcomes at the intergovernmental level as "more" new information with regard to the prospects for future European integration. Investor calculus may be consequently altered.

ssilvia 12/21/06 1:15 AM
Deleted: But e

The following section presents the research design for further empirical analysis of changes in volatility and levels of returns on the euro-dollar exchange rates.

ssilvia 12/21/06 1:05 AM
Deleted:

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

4 Empirical analysis

In the following paragraphs, we first introduce the GARCH modelling approach and event-data study methodology. Second, we define the exogenous variables, which include economic indicators and a dummy variable for European Council meetings. Third, we test, empirically, the impact of the latter on investment returns for euro assets.

ssilvia 12/21/06 1:05 AM
Deleted:

4.1 Research Design

This paper combines two analytical approaches: 1) the general autoregressive conditional heteroskedasticity (GARCH) regression model and 2) "event-study" methodology. Our aim is to detect effects of the political event category on both the mean and volatility of (abnormal) returns of the euro-dollar exchange rate. The dependent variable "euro-dollar exchange rate" is expressed in US-dollar, indicating how many US-Dollars one gets in exchange for one euro. All financial time series data are logarithmic. Hence, differencing of logarithmic time-series evades the problem of unreasonable negative returns, that is, losses higher than 100%. Furthermore, correspondingly continuous returns may be summed to generate cumulative abnormal returns. The use of first-differenced and logarithmic data is commonly applied in financial time-series analysis.

The GARCH technique is a standard tool in econometric finance and is frequently applied in modelling exchange-rate movements. We use this methodology to measure the mean and volatility of exchange-rate returns. A "family" of GARCH models evolved out of the seminal contributions from Bollerslev (1986) and Engle (1982). These econometric techniques account for "volatility clustering," an almost ubiquitous phenomenon in high-frequency financial time series. The phenomenon describes conditional heteroskedasticity, i.e. that volatility – here, the variance in exchange-rate movements – comes in clusters where tranquil periods are interspersed

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

with volatile periods. Such conditional heteroskedasticity models imply that variance is not constant but time-dependent. This violates one of the key Gauss-Markov assumptions requisite for ordinary least square (OLS) regressions. A non-corrected OLS would convey a false sense of precision, as the standard errors are too narrow; hence, the null hypothesis would be rejected too often.

The standard specification is a GARCH (1,1) model, for which the best predictor of the variance from one period to the next (essentially) constitutes a weighted average of the long-run (unconditional) variance, the variance predicted for the present period, and the new information – i.e. the occurrence of a political event – in terms of the recent squared residuals (Engle 2001). The first number in parentheses is the GARCH term, which represents the number of moving average lags, i.e. the lagged forecasted variance, in the regression. The second number depicts the ARCH term, which refers to previous random errors in terms of the number of lagged squared residuals in the regression. Such a regression model provides the framework for modelling time-varying volatility in political-event studies. In the context of our study, this means that a political event in the present period may amplify the impact of other events in future periods.

The second methodology, the event study, helps us to investigate abnormal exchange-rate returns. In general, event studies aim to measure investor reactions to specific incidences that are of particular research interest. According to the asset price definition (see above), investments in the euro reflect the entire discounted value of future cash flows. Thus, from the viewpoint of financial investors, the future of European integration may influence both the political and economic well-being of Europe. Hence, exchange-rate reactions may be traced back to particular political events that affect the process of European integration. Usually, asset prices change

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

continuously over time. However, event studies attempt to disentangle event-related price movements from general market fluctuations. Returns on exchange rates respond to the arrival of new information as highlighted by other real asset price shifts. Therefore, the event-study methodology requires the estimation of a baseline economic indicator or a market model.

In line with the "portfolio approach" to modelling exchange-rate returns described above, all regressions include "fundamentals," (i.e. other relevant markets) as regressors. As is the case for financial investments, real assets are of particular interest. Therefore, the baseline economic model, to which our exogenous political variable 'European summit' is added, makes an allowance for the impact of both US and European returns on stocks and bonds. From a finance perspective, long-term interest rates are risk-adjusted averages of expected future short rates, whereas stock markets capture alternative investment opportunities. We deploy interest rates for US-treasury bonds (10-year maturity) [*BOND*]. As regards stock markets, the empirical analysis considers the (first-lagged) Dow Jones Index [*USSTOCK*] and the EuroStoxx 50 [*EURSTOCK*].[1]

Bond values depict the long-term prospects for economic growth so that an increase in US-bond returns implies a decline in the euro-dollar exchange rate. Furthermore, the analysis takes into account the 10-year interest rate differential between 10-year German bonds and US Treasury Bonds. The former conventionally provides the benchmark bond within Europe.

As international financial activities are still mainly invoiced in US Dollars, an increase in US stock returns offers a risk-free enhanced exchange-rate return, hence bringing about euro depreciation. At the same time, an increase in European stock returns heightens the foreign-

[1] The resulting preliminary regression analysis comprising both several robust OLS (not reported) and GARCH models demonstrates that a best-fit model comprises these economic data. In addition, the resulting time series are only weakly correlated. Financial data are provided by Thomson Financial Datastream.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

exchange risk exposure of global US-dollar denominated portfolios. In order to reduce this exchange risk exposure, international investors may shift portfolios towards US assets (Hau and Rey 2004). Accordingly, we expect a decline of the euro-dollar exchange rate – i.e. an appreciation of the US-dollar – in the course of expected higher earnings for European firms listed on the stock market.

This baseline economic model implicitly accounts for the influence of relevant US political news on stock and bond assets as well as for the impact of decisions and announcements (for example) made by the European Central Bank (ECB) on the euro-dollar exchange rate. A possible limitation of our rather simplified "portfolio approach" is that the considered returns capture several "micro risks," including default risks and liquidity risks. Caveats also apply due to the limited availability of relevant data such as trading volumes. Hence, the empirical results have to be interpreted with caution.

The set of exogenous political variables, which are added to the baseline economic model, includes the dummies for the political events of interest, i.e. European summits [*SUMM*]. As discussed in the previous section, we first check whether such events affect the level of exchange-rate returns. Second, we must determine whether the occurrence of these political events increases volatility by enhancing perceived political uncertainty. In addition, we will use an event study to examine the impact of each meeting of the European Council on (abnormal) returns accruing to euro-currency assets. When examining the financial community's reaction to political decisions taken at European summits, we distinguish between integrative and disintegrative events. The former refers to unexpected settlements of conflicts within the EU, whereas the latter depicts outcomes that produce a detrimental effect on international financial investors' expectations.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

With regard to political events, we encounter the problem that they at times occur on non-trading days, particularly weekends or holidays. Two general approaches can be adopted to surmount linkage problems associated with event dates and effects on the currency markets. First, we can interpolate financial time-series data in order to obtain values for non-trading days. In doing so, however, we would pollute the variation in our financial times-series data. Hence, we opt for the second approach, which entails shifting the political event to the following trading day. For example, we treat a European Council meeting that takes place on Saturday and Sunday as if it occurred on Monday. The newly created 3-day-event "window," with one pre- and one post-event day, would then typically comprise Friday, Monday and Tuesday. With such a spread, we tend to form a more appropriate impression of financial market reactions to particular kinds of events.

ssilvia 12/21/06 1:16 AM
Deleted:

4.2 Diagnostic Tests

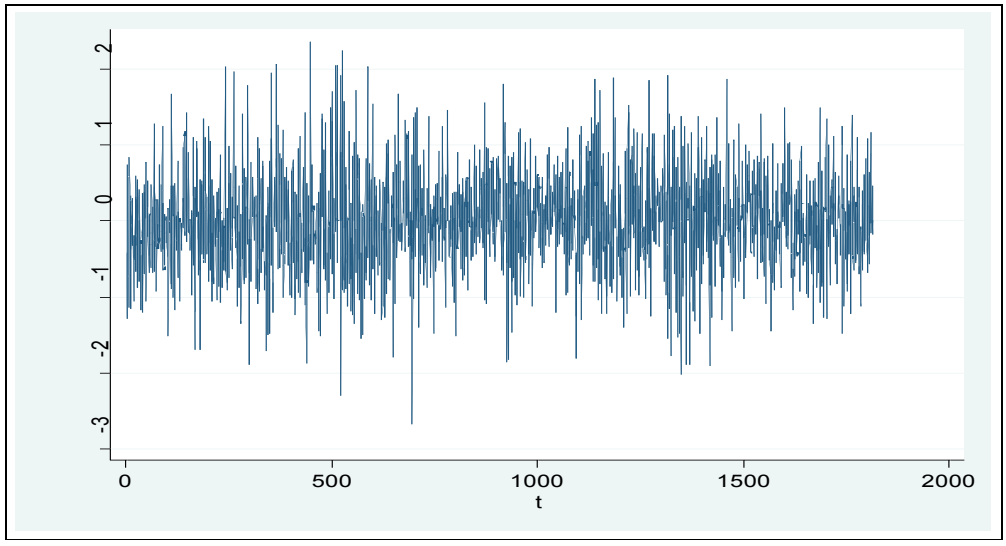
This study aims to estimate the effects of three particular types of political events on daily investment returns associated with the euro. "Unit roots" comprise a frequently encountered problem with high-frequency time-series analyses. "Unit roots" refer to "non-stationarity" in time-series analyses, i.e. when mean and variance are not time-independent. In this case, past effects are appropriate predictors of present effects. Hence, yesterday's – even logarithmic – level of the euro-dollar exchange rate almost perfectly explains today's euro level. Using a differenced – i.e. 'integrated' – time-series analysis may resolve the problem of non-stationarity. We iteratively test the null hypothesis of non-stationarity, using decreasing numbers, with a maximum of five lags. At the same time, we allow for trend and drift components, as well as for a suppressed constant in the exchange-rate time series. In accordance with the Akaike Information Criterion (AIC), we choose an appropriate model that reveals stationarity in time-

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

series analyses: Both the augmented Dickey-Fuller (ADF) test, as well as the non-parametric Phillips-Perron (PP) test, clearly show that the null hypothesis of a unit root from the logarithmic exchange-rate time series cannot be rejected, but that the time series integrated of order one I is stationary without a constant at the 1% significance level (not reported). However, first-differencing renders the daily logarithmic data stationary.[2]

Overall, 1812 observations remain after first-differencing logarithmic euro-dollar exchange rates and after reassigning political events to trading days as well as subsequently eliminating non-trading days. Figure 1 portrays all euro-dollar exchange-rate returns. Visual inspection of these returns indicates that there is considerable volatility throughout the entire sample, whereas a series of higher peaks pointing to periods of jittery foreign-exchange markets – possibly due to increased political uncertainty relating to relevant political events – are hardly visible.

Figure 1, Daily Exchange-Rate Return, 1999-2005



[2] Henceforth, we simply speak of "returns" to imply first-differenced logarithmic values except when otherwise stated.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

The preliminary summary statistics (Table 1) show that the returns for euro-dollar exchange-rate investments are not excessively skewed or characterised by excess kurtosis. However, the Jarque-Bera χ^2-test statistic of 29.59 indicates that the null hypothesis testing normal distribution cannot be accepted at any conventional significance level; hence, the returns are not normally distributed. The Ljung-Box (LB) test statistic for serial correlation of error terms is highly significant. The same applies to the Lagrange multiplier tests in the form of a LB^2-test, which reveals that there is autocorrelation among squared residuals, indicating ARCH-effects, i.e. conditional heteroskedasticity. Accordingly, error terms are time-dependent; thus the "noise" is still saturated with information for further inference.

Table 1. Diagnostic Tests

	Δln €/$
Minimum	-2.67
Maximum	2.36
Mean	.0007
Variance	.6543
Skewness	.0772
Excess Kurtosis	.6064
LB(1)	8.479***
$LB^2(6)$	11.838*
$LB^2(10)$	25.006***
Jarque-Bera	29.59***

*Notes: Exchange rates are first-differenced logarithms multiplied by 100, i.e. percentage points of (continuous) returns. LB(i) represents the χ^2-distributed Ljung-Box Q-statistics under the null hypothesis of no serial correlation. The $LB^2(i)$ tests for serial correlation of the squared residuals out to lag i. *, **, *** denote significance at 10%, 5%, and 1% levels.*

This preliminary summary statistic gives rise to a GARCH analysis that accounts for the prevailing autoregressive conditional heteroskedasticity among returns for euro-dollar exchange-rate investments. Most notably, the empirical test helps to detect abnormal returns as well as volatility effects linked to particular types of political events. The following analysis ultimately

ssilvia 12/21/06 1:09 AM
Formatted: Line spacing: double

ssilvia 12/21/06 1:06 AM
Deleted: Table 1: Diagnostic tests

ssilvia 12/21/06 1:06 AM
Formatted: Line spacing: 1.5 lines

ssilvia 12/21/06 1:06 AM
Formatted: English (US)

Unknown
Field Code Changed

ssilvia 12/21/06 1:06 AM
Formatted: English (US)

ssilvia 12/21/06 1:09 AM
Formatted: Line spacing: double

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

ascertains the exchange-rate effects of policy outcomes following European summits. In doing so, we check whether this political event category explains variation in returns and volatility of euro-dollar exchange-rate movements.

ssilvia 12/21/06 1:09 AM
Deleted:

4.3 Empirical Tests

In this section, we first conduct several GARCH regressions and discuss the results. In other words, we clarify the influence that both disintegrative/integrative and overall summit outcomes

ssilvia 12/21/06 1:16 AM
Deleted: e

exert on the mean and volatility of euro-dollar exchange-rate returns. Then, concerning level effects and abnormal returns, we rely on the event study methodology in order to single out the impact of any one political event. The empirical analysis utilizes a 3- to 7-day event window. We discard options for larger event windows for two reasons. First, we can hardly conceive of an investor calculus that overemphasizes the importance of political events in terms of watching political action. Second, the larger the event window, the higher the probability that unobserved events will blur the effects under study. This results because our regression models wrongly estimates actual returns at about 0.62 percentage points on average (not reported). Given that the range of returns roughly lies between -2.7% to 2.4%, our score is prone to estimation errors in the case of overly stretched event windows.

In particular, the GARCH regression model attempts to reveal potential volatility effects of political events. In doing so, we aim to capture the political uncertainty that may be linked to statements or policy outcomes issuing from European Council meetings. An altered assessment of political risks may be reflected in the conditional mean and variance of exchange-rate returns. As is the case with event data analysis in international politics, especially in the field of conflict research, the GARCH portion of our econometric analysis pays attention to a specific category of political events, i.e. European Council meetings.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

The analysis starts out by deploying a basic GARCH (1,1) specification but is later further refined. When studying the effects of political events on euro-dollar exchange-rate movements, we finally opt for using an autoregressive (AR) (1)-GARCH(1,1) model without a constant in the mean equation, as this model exhibits the best AIC value. Modelling the mean by such an AR pattern is frequently applied in financial applications (Wilfing 2001:21). While suppressing the regression constant in a market model of (real) returns on stock and bond market assets would be rather inappropriate, we can justify using this technique to model exchange-rate returns: The constant would depict an average investment return in terms of euro-dollar currency assets. However, exchange rates are prices that do not pertain to any immediate surplus value in terms of real production, i.e. there is no interest earned that is subject to market appraisal as is the case with securities.[3] Hence, suppressing the constant seems to be admissible from a theoretical point of view.

The mean specification of the GARCH-regression refers to a simple model for the behaviour of our daily exchange-rate returns

$$r_t = r_{t-1} + \mathbf{X}_t + \varepsilon_t, \quad \varepsilon_t \sim N(0, \sigma^2_t),$$

where r_{t-1} is the autoregressive term AR(1) of the euro exchange rate vis-à-vis the US-dollar at time $t-1$; $\mathbf{X}_t$ is a set of exogenous variables including, for instance, our dummies for European Council meetings thought to influence exchange-rate returns; and ε_t is a normally distributed error term with mean zero and unit variance. As GARCH regression models account for time-

ssilvia 12/21/06 1:10 AM
Formatted: Line spacing: double

[3] In addition, currency investments reflect international financial investors' hedging behaviour by taking into account the foreign exchange-rate risk exposure of their portfolios and security investments.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

varying variance, σ_t^2, of the error term, the following variance equation completes our AR(1)-GARCH(1,1) model: $\sigma_t^2 = \omega + \alpha\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2 + \ddot{a}\mathbf{Z}_t$,

where ω is the long-term mean of the variance; and α and β (respectively) represent the relative influence exerted on present variance by (1) news encapsulated in past errors, ε_{t-1}^2, and (2) the forecasted variance from the prior period, σ_{t-1}^2. Finally, $\ddot{a}\mathbf{Z}_t$ represents another set of exogenous variables weighted by a coefficient vector, $\ddot{a}$, which, we argue, are relevant in explaining some of the volatility characterizing exchange-rate returns.

Table 2 displays the regression results for four models, A–D, which relate to a 3-day event window, comprising one pre-event day and one post-event day.[4] Model A consists of the vanilla GARCH(1,1) model according to which all independent economic variables in the mean equation are highly significant. As expected, higher returns on US-bonds [*BOND*] breed lower returns on euro investments as a result of rising demand for US-Dollars. At the same time, higher (lagged) US stock returns [*USSTOCK*] result in an appreciation of the euro currency, whereas higher returns on European stocks [*EURSTOCK*] cause a drop in the euro-dollar exchange rate. In line with the findings of the new literature on portfolio balancing and exchange-rate movements (see above), these reactions to changes in stock returns may be traced back to international investors' behaviour, i.e. the restructuring of their portfolios' exchange-rate risk exposure (especially, Hau and Rey 2004). Last but not least, the significant constant in the mean equation of the vanilla GARCH(1,1) indicates that the average return on euro-currency asset investment (from the onset

[4] We also consider two 4-day event windows with two pre-event days and one post-event day (2-1 window) and vice versa (1-2 window). Moreover, we modelled a 5-day event window with two pre- and post-event days (2-2 window). First regressions have pointed to a relatively high importance of post-event days. For that reason, we also model 5- to 7-day event windows with an increasing number of post-event days. The results for all these windows are not displayed in order to conserve space. However, the p-values for our political event coefficient seem to increase with the number of days included within the event window, i.e. there is a diminishing level of significance.

ssilvia 12/21/06 1:19 AM
Deleted:

Unknown
Deleted:

ssilvia 12/21/06 1:19 AM
Deleted:

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

of EMU in 1999 until the end of 2005) reached, roughly, a meagre 0.04%.

We suppress the constant in the second economic baseline model that comprises an autoregressive dependent variable on the right hand side of the mean equation (model B in Table 2). Previous regression results for our economic variables are confirmed. Simultaneously, the significant AR(1)-term indicates that a positive change in exchange-rate returns in a prior period – i.e. a revaluation of the euro relative to the US-dollar – implies a decrease in abnormal returns indicated in the subsequent period.

Table 2, Summary Statistics

ssilvia 12/21/06 1:08 AM
Deleted: Table 2: Summary statistics

Mean Equation				
Coefficient	Model A	Model B	Model C	Model D
AR(1)		-.062*** (.023)	-.062*** (.023)	-.059*** (.023)
BOND	-.092*** (.013)	-.094*** (.013)	-.094*** (.013)	-.094*** (.013)
USSTOCK	.092*** (.013)	.093*** (.013)	.093*** (.013)	.092*** (.013)
EURSTOCK	-.083*** (.010)	-.082*** (.010)	-.082*** (.010)	-.083*** (.011)
SUMM (1-1)			.030 (.062)	
Constant	.001 (.709)			
Variance Equation				
ω	.001* (.003)	.004 (.003)	.004 (.003)	.006* (.003)
α	.025*** (.007)	.019*** (.007)	.019*** (.007)	.019*** (.007)
β	.960*** (.013)	.971*** (.012)	.971*** (.012)	.967*** (.013)
SUMM (1-1)				-.023** (.011)
AIC	1.869	1.861	1.862	1.860

*Notes: Standard errors in parentheses. The signs *, **, *** denote significance at 10%, 5%, and 1% levels, respectively. Number of observations, n=1812.*

ssilvia 12/21/06 1:12 AM
Formatted: Line spacing: double

Again, such reactions may be attributed to portfolio-balancing effects due to altering foreign-

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

exchange risk exposure, which stems from the dominant role played by the US-dollar in international finance.

Regarding the variance equation, both model A and B produce a negligible GARCH-constant ω and persistent shocks in euro-dollar exchange-rate returns. The small ARCH error coefficient α -- the first term in the GARCH(1,1) model – implies that volatility indicators are not highly "spiked." This observation suggests that "new information" would produce intensive repercussions on the conditional variance. In fact, the large GARCH lag coefficient β – the second term in the GARCH(1,1)-model – demonstrates that shocks to conditional variance take a long time to die out, i.e. volatility is "persistent." A persistent effect of "new information" on daily returns is rather commonly observed in exchange-rate series studies (Bernhard and Leblang 2006:14f.). Since the sum of the coefficients $\alpha + \beta < 1$, the process is mean-reverting, and an unconditional variance, σ_t^2, is generated.[5] In addition, these results can be interpreted as a sign of estimate robustness: sums greater than one would point to non-linearities in investor reactions, i.e. altering patterns of variance factors. Altering patterns of variance would require the application of a Markov switching model (cf. Wilfing 2001:23). With regard to the vanilla GARCH(1,1) model A, the smaller AIC reveals that the more sophisticated economic baseline model B -- AR(1)-GARCH(1,1) -- improves the overall performance of the regression.

The political variable [*SUMM*], representing European Council meetings, is added to the set of economic variables in model C and D (see Table 2). According to model C, this category of political events is completely insignificant and does not explain any changes in the mean of exchange-rate returns. However, the coefficient for European summits shows that *SUMM* exerts significant influence on the volatility of euro-dollar exchange-rate returns in model D (see table

[5] Rolling GARCH-regressions for model A highlight that these coefficients are stable (not reported).

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

2). According to our analysis, the volatility of exchange-rate returns slightly decreases – though we expected a surge – following European intergovernmental meetings by about 0.02 percentage points. We also find significance at the 5%-level for variables incorporating a 1-2 and a 2-2 event window, and significance at the 10% level for a 2-1 event window. (Larger event windows do not suggest significant influence of European summits, measured at conventional confidence levels.) At present, we cannot fully explain the drop in exchange-rate volatility following intergovernmental meetings. However, we suggest that the reduction in excess variance might be attributed to a wait-and-see attitude of international investors.[6]

Table 3. Diagnostics for Standardized Residuals

Tests	Δln €/$
LB(1)	.005
$LB^2(6)$	.018
$LB^2(10)$	.003
Jarque-Bera	21.718***

*Notes: LB(i) represents the χ^2-distributed Ljung-Box Q-statistics under the null hypothesis indicating no serial correlation. The $LB^2(i)$ tests for serial correlation of the squared residuals out to lag i. The sign *** denotes significance at the 10% level.*

ssilvia 12/21/06 1:08 AM
Deleted: Table 3: Diagnostics for standardized residuals

ssilvia 12/21/06 1:08 AM
Formatted: English (US)

ssilvia 12/21/06 1:08 AM
Formatted: Caption, Keep with next

Unknown
Field Code Changed

New Media Center 1/22/07 3:39 PM
Deleted: *3*

ssilvia 12/21/06 1:08 AM
Formatted: English (US)

ssilvia 12/21/06 1:08 AM
Formatted: English (US)

Post-estimation diagnostic tests demonstrate that the standardized residuals do not suffer from further serial correlation and heteroskedasticity (see Table 3). The LB test statistics for both residuals and squared residuals are not significant at any confidence level, conventionally measured. Hence, we might conclude that the error terms generated after applying the GARCH regression model are independently and identically distributed as well as mean zero and variance one series. However, the Jarque-Bera test of 21.781 indicates that the GARCH regression does not completely ensure that the residual distribution is normally distributed. Model E represents an

ssilvia 12/21/06 1:12 AM
Formatted: Line spacing: double

[6] Data on order flows would possibly shed more light on investor behaviour; However, this is a topic for future research.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

improved estimate compared with the Jarque-Bera test statistic in Table 1.[7]

In sum, our AR(1)-GARCH(1,1) specification is robust and an appropriate model properly coping with volatility effects by correcting for autoregressive conditional heteroskedasticity. Hence, the coefficients represent rather unbiased estimators. The coefficient for [*SUMM*], (intergovernmental meetings at the European level), captures the effects of policy discussions surrounding European integration; these events are shown to significantly affect the volatility of the euro. Further investigation into the influence of particular political events may help provide further insights regarding mean and abnormal level effects.

In the following paragraphs, we turn to the event study part of the empirical analysis. By doing so, we check whether European Council meetings affect the euro-dollar exchange rate. Our event study makes use of the aforementioned event window sizes.

Regressions generate residuals, interpreted as abnormal returns, which may possibly be attributed to the political events of interest. In order to unravel these potential effects on abnormal returns, abnormal returns are conventionally cumulated over a predefined event window. Inaccuracies that result from assigning political events that occur on weekends or holidays to particular trading days demand the use of an event window larger than a single day. However, the aforementioned tendency for error, as well as the detected persistence of volatility effects, suggest that the event window should be limited to no more than a few days.

The abnormal returns, attributed to political events, are calculated with the help of predicted returns, which are generated from regressions of returns within an estimation window. Such a

[7] Our regressions also account for a t-distribution of standardized residuals with unchanging coefficient values (not reported).

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

window comprises intervals of days during which no particular event of interest takes place. A sufficiently large estimation window prepares the ground for predicting residuals within the event window. These returns are then subtracted from actual residuals resulting from abnormal returns linked to political events. The null hypothesis establishes that there are no significant cumulative abnormal returns during the event window. A t-test finally indicates whether the null hypothesis can be rejected or not. If we can reject the null hypothesis, at least at the 5% significance level, then we can assume that the particular political event influences investment returns for the euro currency.

Our analysis depends on the use of a specific estimation window. Because of multiple political events that take place during our euro-dollar exchange-rate series, it is hardly possible to find a sufficiently large estimation window that is not interspersed with some kind of a political event, i.e. a European Council meeting. Conventional event studies rely on continuous periods forming an estimation window, sometimes comprising up to 100 weeks before the onset of an event (Guidolin and La Ferrara 2005). This procedure is appropriate for events that take place outside the time period indicated for the estimation window. However, our sample covers European Council meetings, which take place fairly regularly, or twice a year. Accordingly, we define intervals of estimation periods as starting ten days prior to and another ten days following a European Council meeting.

Subtracting predicted residuals from actual residuals generated from the regression produces the abnormal returns that are linked to the political events of special interest to our research. The regression results for cumulative abnormal returns (CARs) are summarized in Table 4. The table reports all European Council meetings and CARs, which are significant at the level of 5%, or higher. In addition, the results are categorized into four separate event windows: from one pre-

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

event day to an increasing number of post-event days. The inclusion of more than one single pre-event day does not contribute to significant abnormal returns (not reported).

Table 4: Cumulative abnormal returns

	1-1 event window	1-2 event window	1-3 event window	1-4 event window	Issues at stake
Feira, 6/19-20/2000	-2.02	-2.22	-	-	Relax rules governing banking security
Copenhagen, 12/12-13/2002	1.91	-	-	-	Agreement on candidate countries accession
Brussels, 12/12.-132003	0.80	1.13	1.27	-	Delay of "dismal" EU decision-making rules (constitutional draft)
Brussels, 22.-23.03.2005	-1.31	-	-	-	Change to fiscal rules, i.e. deteriorating the stability pact

Notes: Table displays cumulative abnormal returns significant at least at the 5% level

Table 4 surveys all twenty-seven European Council meetings that took place between 1999-2005. Interestingly, a few European summits exert significant influence on cumulative abnormal returns. Contrary to results generated from our GARCH regressions, this portion of the empirical analysis evidences level or mean effects on euro-dollar exchange-rate returns. This result tends to underscore the finding that smaller event windows generate significant effects, while stretching event windows undermines significance. The event study demonstrates that the European summits in Feira, Copenhagen and two further meetings in Brussels affected euro-dollar exchange rates. The summits in Feira (2000) and in Brussels (2005) were followed by a drop in exchange-rate returns, whereas the meetings in Copenhagen (2002) and Brussels (2003) correlate with positive excess returns for the case of the 1-1 event window. Further content analyses could shed more light on why these particular political events affected the euro-dollar exchange rate. The event study, at a minimum, lends support to previous results suggesting an importance of European summit outcomes for investor calculus.

ssilvia 12/21/06 1:13 AM
Formatted: Line spacing: double

ssilvia 12/21/06 1:20 AM
Deleted: also

ssilvia 12/21/06 1:13 AM
Deleted:

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

5 Conclusion

Financial markets, such as foreign-exchange markets, provide an interesting research field for political scientists, who want to explore the relevance of political events for market evaluations. Theoretical discussions have emphasized the impact of new (policy-related) information on exchange rates. Exchange rates are considered to be asset prices, which also respond to political news that, in turn, affect future returns on other assets. Financial markets are sensitive to events that may influence future prospects for economic growth. This observation generally applies to key policy decisions made at the European level, as well. In this paper, we have demonstrated that decisions reached about prospects for economic and political integration during European Council meetings explain some of the volatility and level effects on euro-currency investment returns.

ssilvia 12/21/06 1:13 AM
Deleted:

Variables measuring political events, as well as economic indicators representing stock and bond asset returns, adequately capture volatility in euro-dollar exchange-rate movements in the AR(1)-GARCH model delineated in this paper. We further extended the event study methodology to capture event-specific investor reactions. Events studied in this paper also seem to produce abnormal returns for euro-dollar exchange-rate investments.

In conclusion, the analysis is robust and suggests that European Council meetings trigger political uncertainty, which translates into changed evaluations of foreign-exchange markets. Isolated intergovernmental meetings among EU member-states do affect the behaviour of international financial investors, as revealed by the consequent generation of abnormal returns. Overall, we find empirical evidence to suggest that agreements made at European Council meetings exert considerable influence on the euro value. Hence, public reservations regarding the economic and political relevance of European summits may have to be reconsidered in the course

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

of continuing European integration.

ssilvia 12/21/06 1:13 AM
Deleted:

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

References

Bachman, Daniel. 1992. "The effect of political risk on the forward exchange bias: the case of elections." *Journal of International Money and Finance*, 11:2, pp. 208-19.

Bernhard, William and David Leblang. 2002. "Democratic Processes and Political Risk: Evidence from Foreign Exchange Markets." Urbana, IL and Boulder, CO: University of Illinois at Urbana-Champaign and University of Colorado-Boulder, mimeo.

Bernhard, William and David Leblang. 2004. "Polls and Pounds: Exchange Rate Volatility and Domestic Political Competition in Britain." Urbana, IL: University of Illinois, mimeo.

Blomberg, S. Brock and Gregory D. Hess. 1997. "Politics and exchange rates forecasts." *Journal of International Economics*, 43:1-2, pp. 189-205.

Bollerslev, Tim. 1986. "Generalised Autoregressive Conditional Heteroskedasticity" *Journal of Econometrics,* 31, pp. 307-27.

Brandt, Michael W., John H. Cochrane, and Pedro Santa-Clara. 2001. "International Risk Sharings is better than you think (or Exchange Rates are much too smooth)." NBER Working Paper No. 8404.

Capiello, Lorenzo, and Roberto A. De Santis. 2005. "Explaining Exchange Rate Dynamics: The Uncovered Equity Return Parity." ECB Working Paper, No. 529.

Engle, Robert. 2001. "Garch 101: The Use of Arch/Garch Models in Applied Econometrics." *Journal of Economic Perspectives* 15:4, pp. 157-68.

Engle, Robert. 1982. "Autoregressive Conditional Heteroskedasticity with Estimates of the Variance of U.K. Inflation." *Econometrica* 50:987-1008.

Fama, Eugene. 1984. "Forward and Spot Exchange Rates." *Journal of Monetary Economics*, 14, pp. 319-38.

Fama, Eugene. 1970. "Efficient Capital Markets: A Review of Theory and Empirical Work." *Journal of Finance*, 25:2, pp. 383-417.

Fama, Eugene F. and Merton H. Miller. 1972. *The Theory of Finance*. Hinsdale, IL: Dryden.

Fowler, James. 2006. "Elections and Markets: The Effect of Partisanship, Policy Risk, and Electoral Margins on the Economy." *Journal of Politics*, 68:1, pp. 89-103.

Freeman, John R., Jude C. Hays, and Helmut Stix. 2000. "Democracy and Markets: The Case of Exchange Rates." *American Journal of Political Science*, 44:3, pp. 449-68.

Frenkel, Jacob A. and Michael L. Mussa. 1985. "Asset Markets, Exchange Rates, and the Balance of Payments," in *Handbook of International Economics*. Ronald W. Jones and Peter B. Kenen eds. Amsterdam: North-Holland, pp. 679-747.

Frenkel, Jacob A. and Michael L. Mussa. 1980. "The Efficiency of Foreign Exchange Markets and Measures of Turbulence." *American Economic Review*, 70:2, pp. 374-81.

Froot, Kenneth A. and Jeffrey A. Frankel. 1989. "Forward Discount Bias: Is It an Exchange Risk Premium?" *The Quarterly Journal of Economics*, 104:1, pp. 139-61.

Guidolin, Massimo and Eliana La Ferrara. 2005. "The Economic Effects of Violent Conflict: Evidence from Asset Market Reactions." St. Louis, MO: Federal Reserve Bank of St. Louis and Bocconi: University of Bocconi, mimeo.

Hau, Harald, and Hélène Rey. 2004. "Can Portfolio Rebalancing Explain the Dynamics of Equity Returns, Equity Flows, and Exchange Rates?" NBER Working Paper No. 10476.

Hays, Jude, Helmut Stix, and John R. Freeman. 2000. "The Electoral Information Hypothesis Revisited." Ann Arbor, MI: University of Michigan. Paper prepared for Presentation at the Conference on "Globalization and Democracy", University of Minnesota, May 26-27, 2000.

Herron, Michael C. 2000. "Estimating the Economic Impact of Political Party Competition in the 1992 British Election." *American Journal of Political Science*, 44:2, pp. 326-37.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*

Kaminski, Graciela L. and Sergio L. Schmukler. 1999. "What triggers market jitters? A chronicle of the Asian crisis." *Journal of International Money and Finance*, 18, pp. 537-60.
Keef, Stephen P. and Melvin L. Roush. 2003. "Political administration effects and day-of-the-week effects in New Zealand's foreign exchange rate." *Applied Financial Economics*, 13, pp. 401-12.
Kugler, Peter and Beatrice Weder. 2005. "Why are Returns on Swiss Franc Assets so Low? Rare Events May Solve the Puzzle." CEPR Discussion Paper, No. 5181.
Leblang, David A. and William Bernhard. 2006. "Parliamentary Politics and Foreign Exchange Markets: The World According to GARCH." forthcoming in *Internatonal Studies Quarterly.*
Lobo, Bento J. and David Tufte. 1998. "Exchange Rate Volatility: Does Politics Matter?" *Journal of Macroeconomics*, 20:2, pp. 351-65.
McGillivray, Fiona. 2003. "Redistributive Politics and Stock Price Dispersion." *British Journal of Political Science* 33, pp. 367-95.
Mosley, Lancy. 2004. "Government-Financial Market Relations After EMU: New Currency, New Constraints?" *European Union Politics*, 5:2, pp. 181-209.
Pantzalis, Christos, David A. Stangeland, and Harry J. Turtle. 2000. "Political elections and the resolution of uncertainty: The international evidence." *Journal of Banking and Finance*, 24:10, pp. 1575-604.
Pavlova, Anna and Roberto Rigobon. 2003. "Asset Prices and Exchange Rates." NBER Working Paper, No. 9834.
Perry, Robert L. and John D. Robertson. 1998. "Political Markets, Bond Markets, and the Effects of Uncertainty: A Cross-National Analysis." *International Studies Quarterly*, 42:1, pp. 131-60.
Prast, Henriëtte M. and Marc P.H. de Vor. 2005. "Investor reactions to news: a cognitive dissonance analysis of the euro-dollar exchange rate." *European Journal of Political Economy,* 21:1, pp. 115-41.
Schneider, Gerald and Vera E. Tröger. 2006. "The Winners and Losers of War: Stock Market Effects of Armed Conflict, 1990-2000." *Journal of Conflict Resolution*.
Siokis, Fotios and Panayotis Kapopoulos. 2003. "Electoral management, political risk and exchange rate dynamics: the Greek experience." *Applied Financial Economics*, 13:4, pp. 279-85.
Voth, Hans-Joachim. 2003. "Stock Price Volatility and Political Uncertainty: Evidence from the Interwar Period." Paper presented at the AFA 2003 Washington, DC Meetings. Barcelona: Universitat Pompeu Fabra, mimeo.
Vuchelen, Jef. 2003. "Electoral Systems and the Effects of Political Events on the Stock Market: The Belgian Case." *Economics and Politics,* 15:1, pp. 85-102.
Wilfing, Bernd. 2001. "Since when have FOREX markets incorporated EMU into currency pricing? Evidence from four exchange rate series." HWWA Discussion Paper, No. 118.

New Media Center 1/22/07 3:39 PM
Deleted: *Fahrholz/Schneider*