

Your words are in my purse! The impact of EU summits on Euro-Dollar exchange rate

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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 thus 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.

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1 Introduction

A widespread perception of the European Union (EU) boils down to the reproach that political decisions made at the European level are no matter of great moment. The meetings of the European Council, which regularly gets together to tackle the organizations' most pressing problems, 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 diplomatic hot air in case the summit ended 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.

In light of this contrasting behaviour, we cannot assume that European summit meetings affect the economy in a regular way. We know, however, against this backdrop that some summit meetings have indeed had a serious effect on the economy. We do, however, not know which meetings are economically relevant and whether we can say anything systematic about effects of European Council meetings on European markets. This paper tries to overcome this gap and studies systematically how summits affect the expectations and the uncertainty of the financial community. We particularly 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 clarifies whether changes in returns on investments in Euro-Dollar exchange rates could be better understood by incorporating the dynamics of the political environment. In doing so, we investigate whether a noticeable lack of national EMU-members' willingness to adhere to the European integration process affect the formation of the Euro. We conduct a two-step empirical analysis: First, using daily data we demonstrate with the help of a general autoregressive conditional heteroskedasticity (GARCH) model, which kind of political events particularly exert influence on the volatility of the Euro-Dollar exchange rates. At the same time, this portion of the analysis sheds some light on the potential impact that corresponding political events may have on the mean of 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 event study. In doing so, we consider twenty-seven European Council meetings within the former EU-15 during the years 1999-2005.

The analysis yields interesting results regarding the market appraisal of this political event category noticeable in surrounding trading days. In reference to the common single

currency financial markets do take notice of European summits whereas discernable but unanticipated conflict within the European Council triggers periods of volatile exchange rate movements. Furthermore, apparent dispute among European head of governments give rise to doubts about the continuation of European political and economic integration and thus result in exchange rate depreciation. Accordingly, our analysis disproves public reservations concerning European summits as pure chatterboxes. In this regard, financial investors seem to act more 'European' than the public in national EU-members.

The remainder of this paper is structured as follows: The following section takes stock of the relevant literature. Section three sets forth the theoretical model of our study on the impact of political events on the Euro. The research design and the subsequent empirical analysis are subject to section four, whereas the final section concludes and points to further research.

2 Survey of the literature

Models of exchange-rate behaviour rely basically on the formation of economic quantities – i.e. macroeconomic variables such as money supply, output level, current account etc. This strand of research has been also amended in terms of making allowance for the role of information arrival (see below). Foreign exchange markets are efficient if markets contain 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). 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 pertains, for instance, to investors' expectational errors or a time-varying risk premium on foreign exchange (Froot and Frankel 1989, Fama 1984). The latter may be induced by political uncertainty which is particularly subject to our analysis. Political uncertainty may accordingly have a bearing on levels and volatility of the Euro-Dollar exchange rate.

A drawback of the voluminous literature on exchange-rate movements is, in our view, its narrow focus on economic variables. This is to say that the effect of political decision-making on market expectations and, thus, on the exchange-rate behaviour are disregarded. It is indeed recognized, but rarely studied that market agents form their expectations regarding exchange rates not only from economic fundamentals, but also from political events. Bachman (1992) has probably been the first to run econometric analyses on the impact of elections on selected

exchange rates, i.e. currencies of the United States, United Kingdom, France and Canada. Freeman et al. (2000) as well as Hays et al. (2000) inquire into the effects of uncertainty about electoral outcomes and policy shifts on exchange rates particularly from a theoretical point of view.

Further empirical research on the impact of elections and political business cycles respectively on exchange-rate behaviour often emphasizes the partisanship of the incumbent government: Forecasts of short-term exchange-rate behaviour of 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 and political business cycles 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 political administration effects in New Zealand's exchange rate, 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 polls on selected European exchange rates. The study of Kugler and Weder (2005), however, allows for the impact of rare events such as the Tschernobyl nuclear accident and the Iraqi invasion of Kuwait on the returns for the Swiss Franc.

Pantzalis et al. (2000) also provide an analysis on the influence of uncertainty surrounding elections on securities. Perry and Robertson (1998), Herron (2000), McGillivray (2003), and Vuchelen (2003) also test the impact of political events on financial market behaviour. Beyond electoral events and towards other political business cycle related issues political event studies are rare. Notable exceptions are, for instance, Schneider and Tröger (2006) and Guidolin and La Ferrara (2005) who investigate the interrelationship of violent conflicts and stock market behaviour. Moreover, Kaminsky and Schmukler (1999) study the impact of international agreements concerning debt restructuring on excessive volatility in Asian stock markets in the course of the Asian crisis 1997-1998. Voth (2003) considers the impact of institutional fragility and tumultuous politics of the interwar period on stock markets. However, we concentrate on the influence that both categorical and single political events exert on foreign-exchange markets, i.e. the Euro-Dollar exchange rates.

3 Theoretical model

This section expounds the theoretical foundations for the subsequent empirical analysis. We establish a link between politics and the formation of foreign exchange markets from the

viewpoint of financial market theory. More precisely, we set forth the possible impact of political events, particularly European summits, on Euro-Dollar exchange rates.

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 is not only reflecting macroeconomic fundamentals and microeconomic risks, but is also dependent upon expectations of future politics as various policies may affect economic performance. The asset price definition refers to the strand of portfolio-balanced approaches (see especially Frenkel and Mussa, 1980, 1985). The exchange rate is considered here one of the prices that equilibrate markets for financial assets. Spot exchange rates behave as asset prices. According returns follow a random walk because investors' form rational expectations concerning European governments political course of action and, thus, the prospects of European integration (cf. Freeman et al. 2000). Accordingly, exchange-rate movements are due to new information such as political events. The asset price definition of exchange rates fits perfectly into a political-economic analysis because it evidently links 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 putting emphasis on a notion of exchange-rate returns, we refer to this new strand of research that investigates the interlinkage of risky assets –as is the case also with stock and bond returns – and exchange rate dynamics (Capiello and de Santis 2005; Pavlova and Rigobon 2003; further 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 approach allows for using daily data which would be impossible in the case of considering, for instance, the influence that inflation and productivity differentials exert on exchange rates. Therefore, this 'portfolio approach' fits perfectly to our purposes, i.e. 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 revaluation; second, a political event can set off periods of higher volatility and also end the same. A major problem in this context 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, whereas the case for even mature economies within the

Euro area is different. This is to say that markets and politics still do not seem to be playing well together. In turn, political events may considerably affect foreign exchange markets, i.e. the Euro-Dollar exchange rates.

Uncertainty regarding the future political course of European integration may translate into the economic sphere. The reason is that losing momentum in the process of European political integration may foreshadow a stalemate of further European economic and financial integration. This, in turn, would negatively affect the prospects of future economic performance within Europe, i.e. particularly returns on stock investments. At the same time, international investors may generally demand a higher risk premium on European securities, especially on bonds, because perceived setbacks in the European integration process possibly give rise to unexpected national attempts in economic policy making or any other kind of national initiative which may thwart financial community's expectations.

Signalling continuation of the European integration process would provide an anchor to market agents' expectations. Particular political events on the European as well as national level may highlight governments' willingness to adhere to the process of European integration. Those events may either buttress or set back international investors' expectations regarding progress in European integration. The Euro will then adapt to altering investors' expectations about the future course of European integration. We conjecture that especially European summits are suitable yardsticks of EU-members' instantaneous willingness to adhere to the European integration process.

A frequently rehearsed issue in the related literature is political uncertainty in foreign exchange markets in the course of national elections that may stretch out far beyond the pre-election period (Bernhard and Leblang 2002). Even in cases of highly predictable electoral outcomes there may still be uncertainty about policy implementation (for instance, Fowler 2006). Though there are rarely clear-cut European policy positions among leading parties within national EMU-member countries, potential policy changes in the course of elections can induce uncertainty about the progress of European integration. Yet, regarding the financial market effects of European summits international financial investors may not easily comprehend the equilibrating process of European decision-making. Policy outcomes on the European intergovernmental level are a result of a complex interplay of policy formation in the domestic arena and intergovernmental negotiations. In this respect, the analysis contents itself with the (intergovernmentalist) view that governments constitute the pivotal elements at the interface between the formation of the national political system and the European level. Economic agents face difficulties in anticipating such European negotiations. Hence, bargaining outcomes on the intergovernmental level may convey 'more' new information

from the viewpoint of international financial investors. Accordingly, meetings on the European level entangled with the prospects for future European integration may considerably affect investor calculus.

The following section sets forth the research design for further empirical analysis of changes in volatility and levels of returns on the Euro-Dollar exchange rates.

4 Empirical analysis

In the subsequent paragraphs, we first introduce the methodologies of GARCH-modelling and event (data) study methodology. Second, we set forth the exogenous variables, i.e. the economic fundamentals and a dummy for European Council meetings. Third, we empirically test the impact of the latter on returns on investment into Euro assets.

4.1 Research Design

This paper combines two approaches, i.e. regression models of general autoregressive conditional heteroskedasticity (GARCH) and event study methodology. The reason is that we want to detect both noticeable effects of the political event category on 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, i.e. meaning how many US-Dollar one gets in exchange for a unit Euro. All financial time series are logarithmic. Hence, possibly required differencing of logarithmic time-series evades unreasonable negative returns, i.e. losses of higher than 100%. Furthermore, correspondingly continuous returns are applicable to summation in the form of generating cumulative abnormal returns. The use of first-differenced and logarithmic data is a commonly applied in financial time-series analysis.

Regarding the mean and volatility of exchange-rate returns we deploy a GARCH model – our first approach – which is a standard tool in econometric finance and frequently applied in modelling exchange rate movements. The corresponding family of GARCH models evolved out of the seminal contributions of Bollerslev (1986) and Engle (1982). These econometric techniques account for ‘volatility clustering’ which is almost ubiquitous 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 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 give 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 according to that the best predictor of the variance in the next period is – in brief – a weighted average of the long run (unconditional) variance, the variance predicted for the present period, and the new information – i.e. here, for instance, 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 forecasting variance, in the regression. The second number depicts the ARCH-term that refers to previous random errors in terms of the number of lagged squared residuals in the regression. Such regression model provides the framework of modelling time-varying volatility in political event studies. This means in our context that a political event in the present period may amplify the impact of other events in future periods.

As regards the second approach, abnormal returns and according level effects in exchange-rate returns are subject to an event study. In general, event studies aim at measuring investor reactions to specific incidences that are of particular research interest. According to the asset price definition (see above), an investment in the Euro currency reflects the entire discounted value of future cash flows. Thus, from the viewpoint of financial investors, the future of European integration may have a bearing on both political and economic prospects 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 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 in other real asset price shifts. Therefore, the event study methodology requires estimating a baseline economic fundamental or market model.

In line with the delineated ‘portfolio approach’ to modelling exchange-rate returns (see above), all regressions include ‘fundamentals’, i.e. other relevant markets as regressors. As is the case with financial investments, real assets are of particular interest. Therefore, the baseline economic model, to which our exogenous political variable ‘European summit’ is added, makes 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*].³

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 marks the benchmark bond within Europe.

As international financial activities are still mainly invoiced in US-Dollar, an increase in US stock returns offers an exchange-rate risk free excess return, hence bringing about an Euro depreciation. At the same time, an increase in European stock returns causes an increase in the foreign-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 stock listed firms.

This baseline economic model implicitly accounts for the influence that US relevant political news exert on stock and bond assets as well as, for instance, for the impact of decisions and announces in the realm of the European Central Bank (ECB) on the Euro-Dollar exchange rate. A possible limitation of our rather coarse-grained ‘portfolio approach’ is that the considered returns involve several micro risks such as, for instance, default risks and liquidity risks. A caveat applies due to the limited availability of relevant data such as, for instance, trading volumes. Hence, 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 have a bearing on the level of exchange-rate returns and second, whether the occurrence of these political events comes along with additional volatility in the course of perceived increasing political uncertainty. Moreover, we will examine each single European Council meeting’s impact on (abnormal) returns on Euro currency assets with the help of an event study. When examining the financial community’s reaction to political decisions taken at European summits we distinguish integrative and disintegrative events. The former point to unexpected settlements of conflictive European matters, whereas the latter depict outcomes that fall behind international financial investors’ expectations.

In respect of political events, we encounter the problem that political events most often occur on non-trading days particularly weekends or holidays. There are two general

³ The according 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 according time series are only weakly correlated. Financial data are provided by Thomson Financial Datastream.

approaches to surmount assignment problems of event effects on trading and exchange-rate return means and volatility respectively: First, one may interpolate financial time series in order to obtain values for non-trading days. In doing so, however, we would rather improperly pollute the variation in our financial times series. Hence, we opt for the second approach, i.e. to shift the political event on to the next following trading day. For example, we treat a European Council meeting that takes place on Saturday and Sunday as if it will occur on Monday. The according 3-day event window with one pre- and one post-event day would comprise the last preceding trading day – usually a Friday – as well as the succeeding trading day – usually Tuesday. This way we get a more appropriate impression of financial market reactions to particular kind of events.

4.2 Diagnostic Tests

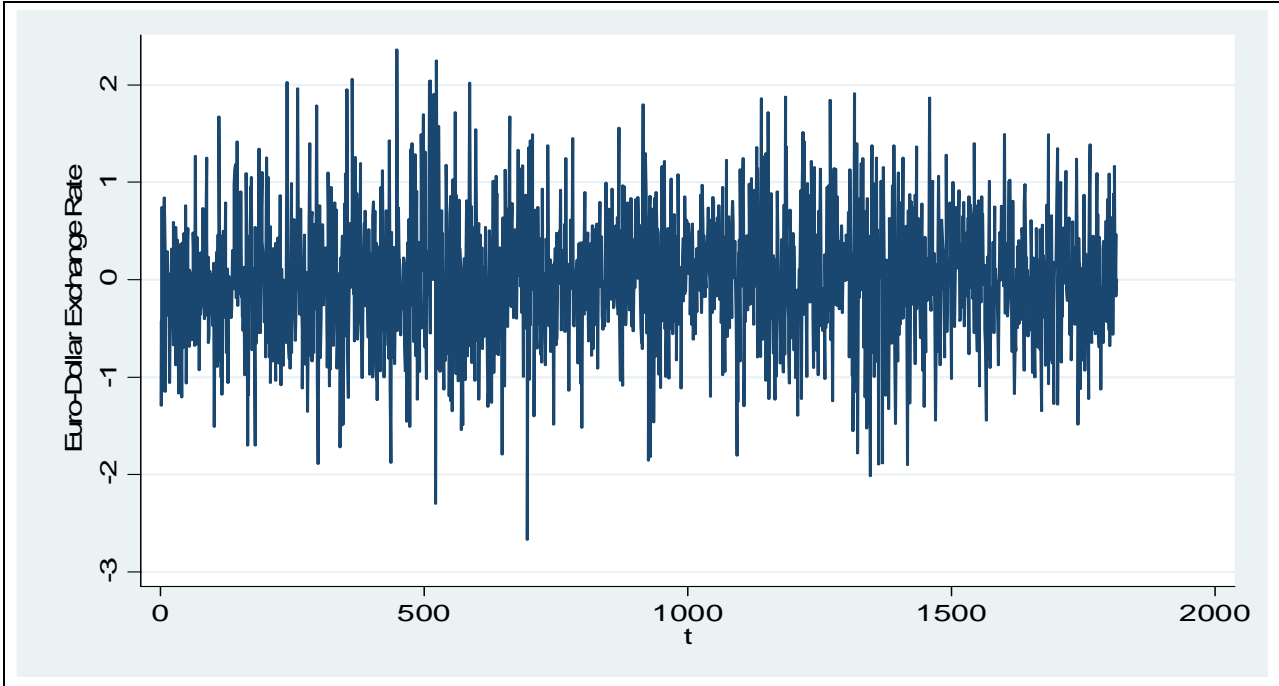
The study aims at estimating the effects of three particular types of political events on daily returns from investing into the Euro currency. A frequently encountered problem with such high-frequency time-series analysis are unit roots. The latter refer to non-stationarity in time series, i.e. when mean and variance are not time independent such that past realizations are appropriate predictors of present realizations. Hence, yesterday's – even logarithmic – level of the Euro-Dollar exchange rate almost perfectly explains today's Euro level. Using differenced – i.e. 'integrated' – time series may resolve the problem of non-stationarity. We iteratively test down the null of non-stationarity with decreasing numbers of a maximum of five lags. At the same time, we allow for trend and drift components respectively as well as for a suppressed constant in the exchange rate time series. In accordance with the Akaike Information Criterion (AIC) we choose the appropriate model that reveals stationarity in time series: Both the augmented Dickey-Fuller (ADF) test as well as the non-parametric Phillips-Perron (PP) test clearly show that the null of a unit root in the logarithmic exchange-rate time series cannot be rejected, but that the time series integrated of order one $I(1)$ is stationary without a constant at the 1%-significance level (not reported). However, first-differencing makes the daily logarithmic data stationary.⁴

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 rather much volatility throughout the entire sample, whereas a series of higher peaks pointing to periods of jittery foreign exchange

⁴ Henceforth, we simply speak of 'returns' implying first-differenced logarithmic values except when otherwise expressively stated.

markets – possibly due to increased political uncertainty in the course of relevant political events – are hardly visible.

Figure 1: Daily exchange rate returns 1999-2005



The preliminary summary statistics (Table 1) shows 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 of normal distribution cannot be maintained at any conventional significance level, hence, the returns are not normally distributed. The Ljung-Box (LB) test statistic for serial correlation in 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 in squared residuals indicating ARCH-effects, i.e. conditional heteroskedasticity. Accordingly, error terms are time dependent and thus the noise is still soaked up with information for further inference.

Table 1: Diagnostic tests

	$\Delta \ln \text{€}/\text{\$}$
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 of no serial correlation. The LB²(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 in returns on Euro-Dollar exchange rate investments. Most notably, the according empirical testing helps to detect abnormal returns as well as volatility effects in the course of particular types of political events. The following analysis ultimately ascertains the exchange-rate effects of European summits. In doing so, we check whether this political event category explains variation in returns and volatility of Euro-Dollar exchange rate movements.

4.3 Empirical Tests

In this section, we first conduct several GARCH regressions and discuss the according results. This is to say that we clarify the influence that both desintegrative/integrative and overall summit outcomes exert on the mean and volatility of Euro-Dollar exchange rate returns. Second, concerning level effects and abnormal returns respectively, we rely on the event study methodology carving out each single political event's impact. The empirical analysis utilizes a 3-day up to a 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 notoriously watching political action. Second, the larger the event window the higher the probability that unobserved events blur the effects of interest. This applies mainly because our regression models misestimates actual returns at

about 0.62 percentage points on average (not reported). Given that the range of returns lies about in between -2.7% to 2.4% our score is not impressive but prone to estimation errors in the case of overly stretched event windows.

The GARCH regression particularly attempts to reveal potential volatility effects of political events. In doing so, we aim at capturing the political uncertainty that may accompany European Council meetings. Altering 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.

The analysis starts out by deploying a ‘vanilla’ GARCH(1,1) specification but is further refined. When studying the effects of political events on Euro-Dollar exchange-rate movements we finally opt for using an 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 autoregressive (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 such way of modelling is tenable in regard to exchange-rate returns: The constant would depict an average return on investments into 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 earning subject to market appraisal as is the case with securities.⁵ 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

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

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 a GARCH-regression accounts for a time varying variance σ_t^2 of the error term, the following variance equation completes our

⁵ In addition, currency investments rather reflect international financial investors’ hedging behaviour in terms of taking into account the foreign exchange rate risk exposure of their portfolios and securities respectively.

AR(1)-GARCH(1,1) model:

$$\sigma_t^2 = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2 + \delta \mathbf{Z}_t$$

where ω is the long term mean of the variance, α and β beta are the relative shares of influence that news encapsulated in past errors ε_{t-1}^2 and the forecasted variance from the prior period σ_{t-1}^2 respectively exert on present variance. At the same time, $\delta \mathbf{Z}_t$ is another set of possibly relevant exogenous variables weighted with a coefficient vector δ explaining some of the volatility in exchange-rate returns.

Table 2 displays the regression results for four models A–D for the case of a 3-day event window comprising one pre-event day and one post-event day.⁶ 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 investments into Euros due to accordingly rising demands 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 recent 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 returns on investing into Euro currency assets from the onset of EMU until the end of 2005 was about 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 the prior period – i.e. a revaluation of the Euro relative to the US-Dollar – implies a decrease in present abnormal returns.

⁶ 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 relative high importance of post-event days. For that reason, we also reckon another 5- up 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 reduce 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.

Table 2: Summary statistic

Mean Equation				
Coefficient	Model A	Model B	Model C	Model D
AR(1)		-.062*** (.023)	-.062*** (.023)	-.059*** (.023)
<i>BOND</i>	-.092*** (.013)	-.094*** (.013)	-.094*** (.013)	-.094*** (.013)
<i>USSTOCK</i>	.092*** (.013)	.093*** (.013)	.093*** (.013)	.092*** (.013)
<i>EURSTOCK</i>	-.083*** (.010)	-.082*** (.010)	-.082*** (.010)	-.083*** (.011)
<i>SUMM (1-1)</i>			.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)
<i>SUMM (1-1)</i>				-.023** (.011)
AIC	1.869	1.861	1.862	1.860

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

Again, such reactions may be referred to portfolio balancing effects due to altering foreign-exchange risk exposures with respect to the dominant role of the US-Dollar in international finance.

As regards the variance equation both model A and B point to a rather ignorable GARCH-constant ω and very persistent shocks in Euro-Dollar exchange-rate returns: The small ARCH error coefficient α – pertaining to the first term in the GARCH(1,1)-model – implies that volatility reactions are not very ‘spiky’, i.e. that there would occur intensive repercussions of news on the conditional variance. To the contrary, the large GARCH lag coefficient β – referring to 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’. Such phenomenon of persistence in daily returns in the course of information arrival is rather common in exchange-rate series (Bernhard and Leblang 2006: 14f.). Since the sum of the coefficients $\alpha + \beta < 1$, the process is mean-reverting and, thus, there exists an unconditional

variance σ_t^2 .⁷ In addition, this can be interpreted as a sign for robustness of the estimates: Sums greater one would point to non-linearities in investor reactions, i.e. altering patterns of variance factors. The latter would rather require the application of a Markov switching model (cf. Wilfing 2001: 23). Relative to the vanilla GARCH(1,1) model A, the smaller AIC reveals that the more sophisticated economic baseline model B of an 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 do 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 2): According to our analysis, the volatility of exchange-rate returns slightly decreases – though we expected a surge – in surroundings of European intergovernmental meetings by about 0.02 percentage points. We also find significance at the 5%-level for a 1-2 and a 2-2 event window as well as for 2-1 window at the 10%-level. However, larger event windows do not point to influence of European summits at any conventional levels. For the time being, we cannot fully explain this drop in volatility. However, we suggest that the reduction in excess variance can be traced back to a wait-and-see attitude of international investors.⁸

Table 3: Diagnostics for standardized residuals

Tests	$\Delta \ln \text{€}/\text{\$}$
LB(1)	.005
LB ² (6)	.018
LB ² (10)	.003
Jarque-Bera	21.718***

*Notes: Again, LB(i) represents the χ^2 -distributed Ljung-Box Q-statistics under the null of no serial correlation. The LB²(i) tests for serial correlation of the squared residuals out to lag i. *** denotes significance at 10% level.*

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 conventional level. Hence, we might

⁷ Rolling GARCH-regressions for model A highlight that these coefficients are stable (not reported).

⁸ Data on order flows would possibly shed some more light on investor behaviour. However, this is dedicated to future research.

conclude that the error terms after GARCH-regression 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 relieve the residual distribution from non-normality. However, model E represents an improved estimate when compared with the respective Jarque-Bera test statistic in table 1.⁹

Summarily, our robust AR(1)-GARCH(1,1) specification is an appropriate model properly coping with volatility effects in terms of correcting for autoregressive conditional heteroskedasticity. Hence, the coefficients are rather unbiased estimators. According to the coefficient for *[SUMM]*, intergovernmental meetings on the European level, at which the ‘stops and goes’ of future European political and economic integration are deliberated, significantly affect the volatility of the Euro. Further investigations of each single political event’s influence may help to detect more insights particularly regarding mean and abnormal level effects respectively.

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

Regressions generate residuals that are interpreted as abnormal returns possibly caused by the political events of interest. In order to unravel politically induced abnormal returns it is a convention to cumulate abnormal returns over a predefined event window. Inaccuracies in 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 error proneness as well as the detected persistence of volatility give rise to including just a very few days within an event window.

The politically induced abnormal returns are calculated with the help of predicted returns based on regressions of returns in an estimation window. Such window comprises intervals of days in 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 here in politically induced abnormal returns. The null hypothesis is that there are no significant cumulative abnormal returns during the event window. A t-test finally indicates whether the null can be rejected or not. If we can reject the null at least at the 5% significance level, then the particular political event does exert influence on the returns on investments into the Euro currency.

⁹ Our regressions also account for a t-distribution in standardized residuals without changing the coefficient values (not reported).

A clue of our analysis is the use of a specific estimation window: Because of multiple political events in 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 whenever only a few events are considered, which are out of the concerned time period for the estimation window. However, our sample is interspersed with more or less regular European Council meetings twice a year. We accordingly define intervals of estimation periods which start ten days after and another ten days before an event period surrounding the European Council meetings.

Subtracting predicted residuals after the estimation window regression from actual residuals in the sample breeds the politically induced abnormal returns that of special interest to our research. The regression results for cumulative abnormal returns (CARs) are summarized in table 4. The latter reports all European Council meetings and their CARs including the level of significance (5% and higher). In addition, the results are distinguished for four event window each time with one pre-event day and 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, 19.-20.06.2000	-2.02	-2.22	-	-	Relaxing banking security
Copenhagen, 12.-13.12.2002	1.91	-	-	-	Europe agrees on candidate countries accession
Brussels, 12.-13.12.2003	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 in 1999-2005. Interestingly, there are a few European summits which exert significant influence on cumulative abnormal returns. Contrary to our GARCH regressions this portion of the empirical analysis finds some evidence for level or mean effects of a few European Council meetings on Euro-Dollar exchange rates returns. Again, it becomes evident that especially smaller event windows point to significant effects and that stretching event windows undermines significance. The event

study demonstrates that the European summits of Feira, Copenhagen and also two further meetings in Brussels affected Euro-Dollar exchange rates. Both the summits in Feira 2000 and in Brussels 2005 have been accompanied by a drop in exchange-rate returns, whereas the Copenhagen 2002 and Brussels 2003 meetings have brought about some positive excess returns for the case of the 1-1 event windows. Further content analyses would shed more light on the possible reasons why single this particular political events affected the Euro-Dollar exchange rate. At least, the event study buttresses previous results regarding the importance of European summits for investor calculus.

5 Conclusion

Financial markets such as foreign-exchange markets provide an interesting research field for political scientist who want to inquire the relevance of particular categories of political events. Theoretical discussion has emphasized the impact of new information arrival on exchange rates. The latter are considered as asset prices which also respond to political news that affect future returns on other assets. Financial markets are sensitive to events that may exert influence on future prospects for economic growth. This generally also applies to key policy decisions on the European level. We demonstrate that European Council meetings that have a bearing on the long-run perspective of the entwined economic and political European integration explain some of the volatility and level effects in returns on investment into the Euro currency.

The political variables as well as economic fundamentals representing stock and bond asset returns in investor portfolios adequately capture volatility in Euro-Dollar exchange rate movements in an AR(1)-GARCH model. We further extended the event study methodology to capture event specific investor reactions. This kind of events seems to provoke abnormal returns on Euro-Dollar exchange rate investments, too.

Summarily, a robust result of our analysis is that European Council meetings trigger political uncertainty that gains particular attention in foreign-exchange markets. Isolated intergovernmental meetings of EU-members do affect international financial investors' behaviour as becomes apparent in terms of ensuing abnormal returns. Overall, we find some empirical evidence that agreements taken at European Council meetings exert considerable influence on the Euro value. Hence, public reservations regarding the political relevance of European summits may have to be revised in the course of continuing European integration.

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