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Abstract

In this paper, we investigate the effects of euro area and US macroeconomic news on financial markets in the Czech Republic, Hungary, and Poland (CEEC-3) from 1999 to 2006. Using a GARCH model, we examine the impact of news on daily returns of three-month interest rates, stock market indices, exchange rates versus the euro, and the US dollar. First, both US and European macroeconomic news has a significant impact on CEEC-3 financial markets. Second, the process of European integration is accompanied by an increasing importance of euro area news relative to US news. Third, there are country-specific differences: for example, the Czech stock market is relatively more affected by foreign news since the Copenhagen Summit in December 2002. In general, our results support the hypothesis of a deepening euro area influence on the CEEC-3 over time and a corresponding reduction in the relative importance of US shocks.

I. Introduction

Prior to being allowed to join the European Union (EU), potential member states must comply with the *acquis communautaire*, the set of EU treaties currently in force. This institutional convergence (inter alia the right to freely move labour, capital, and goods) is accompanied by increasing real and financial integration of the member states.[1] Therefore, when analysing the impact of global financial market news on new member states, we would expect news originating from the EU, and especially the euro area, to play an increasing role in absolute terms as well as in comparison to the United States (US). We focus our analysis on the Czech Republic, Hungary, and Poland (CEEC-3), which joined the EU in 2004 and have the largest European emerging financial markets as measured by liquidity and market capitalisation (EBRD).

Empirical data suggest that the CEEC-3's economic and financial integration with the euro area continues apace. Apart from the EU being the CEEC-3's most prominent trading partner (with a share of 78 % of total trade in 1999 and 2006), its trade share with the US is also declining (from 3.6 % in 1999 to 1.8 % in 2006). Moreover, the CEEC-3's financial integration, (measured as the sum of assets and liabilities versus the rest of the world in relation to GDP) generally increased since 1999.[2] This general trend is accompanied by an increasing importance of EU portfolio investments, both in absolute terms and relative to the US.[3] Based on these developments, we hypothesise that euro area news should become increasingly more important to CEEC-3 countries than news from the US.

We test this hypothesis and study the reaction of CEEC-3 financial markets to macroeconomic shocks originating from the EU and the US over time. Three main research questions are addressed: (1) Does foreign macroeconomic news have a significant impact on CEEC-3 financial markets between 1999 and 2006? (2) Is the process of European integration accompanied by an increased importance of euro area shocks? To answer this question, we divide our sample in two subsamples, using the Copenhagen Summit (12–13 December 2002) as a

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[1] For instance, Büttner and Hayo (2010) show that European integration is associated with higher stock market correlations.

[2] Based on calculations of the international investment position, which includes portfolio investment, foreign direct investment, other investment (including general government investment, monetary authorities, and banks), and central bank reserves. Sources: Czech National Bank (CNB), Hungarian National Bank (MNB), and National Bank of Poland (NBP), Eurostat.

[3] Source: The annual Coordinated Portfolio Investment Survey (CPIS) by the IMF.

breakpoint.[4] (3) Are there noteworthy differences in the reactions on the Czech, Hungarian, and Polish markets that relate to country-specific characteristics?

The remainder of the paper is organised as follows. Section II provides a brief overview of the existing literature and our contribution to it. Section III describes the data and the econometric methodology. We discuss our results in Section IV. Section V concludes.

II.   Related Literature and Our Contribution

Several recent studies focus on the reaction of financial markets to macroeconomic news from mature economies. Balduzzi et al. (2001) investigate the effects of scheduled macroeconomic announcements on prices, trading volume, and bid-ask spreads in the US government bond market. They find that several types of news releases have a significant impact on the price of at least one maturity. Nikkinen et al. (2006) test the impact of US macroeconomic news announcements on 35 stock markets. They find that mature financial markets are closely integrated regarding their reaction to US macroeconomic shocks. In contrast, Latin American and transition economies (including the CEEC-3, Russia, and Slovakia) are not affected by US news.

Andritzky et al. (2007) study the effect of both local and US macroeconomic announcements on the bond spreads of several emerging markets. They discover that domestic news has a limited impact, whereas changes in US interest rates exert a significant influence. Nikkinen and Sahlström (2004) investigate the influence of domestic and US macroeconomic news on German and Finnish stock markets. They find that domestic news has no effect, whereas the US employment report and the days of Federal Open Market Committee meetings have a significant impact on implied volatilities. Andersen et al. (2007) investigate how US, German, and British stock, bond, and foreign exchange markets respond to real-time US macroeconomic news. They report that news produces conditional mean jumps. Moreover, equity markets react differently to news depending on the stage of the business cycle. Albuquerque and Vega (2008) study the effect of news concerning fundamentals (macro and earning news) on the correlation of US and Portuguese stock market returns using a GARCH model. They discover an asymmetric effect of news released in a large economy versus that originating from a small economy.

Hanousek et al. (2009) look at how stock prices in the Czech Republic, Hungary, and Poland react to US and euro area macroeconomic news. They study intraday data covering the

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[4] During the Copenhagen Summit, the EU-15 made a decision in favour of enlarging its membership. Thus, in terms of political integration of the CEEC-3, this Summit marks an important turning point.

period from mid-2003 until 2006 and categorise macroeconomic shocks into positive and negative ones without distinguishing between types of announcements. They find spill-over effects of past S&P 500 and DAX 30 returns to emerging markets. The effects are strongest for the Hungarian stock market, followed by the ones in Poland and the Czech Republic. Moreover, they discover an impact of EU news on the Hungarian and—to a lesser extent—Polish stock market. Equity prices in the Czech Republic are mainly affected by US news. In a follow-up study, Hanousek and Kočenda (2009) investigate the impact of individual US and Euro area macroeconomic shocks on CEEC-3 intraday stock market returns and volatility. They find that monetary news, irrespective of origin, has virtually no influence, whereas US price indicator announcements, EU real macroeconomic and confidence news significantly affect CEEC-3 stock markets.

Thus, there is a fair amount of evidence that foreign news matters for emerging financial markets. However, only two studies focus on the CEEC-3 and on both US *and* euro area news (Hanousek et al., 2009; Hanousek and Kočenda, 2009). Our study extends the literature in at least four directions. First, we assess the dynamic influence of European integration on financial markets by investigating the responsiveness of CEEC-3 financial markets to EU and US news *before* and *after* the EU's Copenhagen decision on enlargement. Second, while the other studies focus on the effects of news on one market, we use daily returns in *four* CEEC-3 financial markets: three-month interest rates, exchange rates versus the US dollar, exchange rates versus the euro, and the main stock price indices. Third, we distinguish between different types of news from the EU and the US, which, so far, has only been applied to CEEC-3 stock markets by Hanousek and Kočenda (2009). Fourth, we consider a two-day window, which allows studying whether the observed news effects show some persistency over time and helps resolve remaining timing issues of US news in money and foreign exchange markets.

The CEEC-3 are special insofar as they are transition economies at different stages of real and nominal convergence vis-à-vis the EU; they have different monetary and currency regimes; and they are moving toward euro adoption. We identify four plausible channels through which foreign macroeconomic shocks could be transmitted to financial markets. The first channel is based on an enlarged real economic integration via trade relations. Fidrmuc and Korhonen (2006) document the degree of business cycle integration between the euro area and the CEEC-3. The second channel is driven by monetary policy and has two foundations: (1) central banks must consider the possibility that inflationary tendencies will be imported from their main trading

partners, particularly if they start pegging their exchange rates against the euro; and (2) with euro adoption approaching, central banks in these countries are bound to follow ECB monetary policy more closely. The third channel for the transmission of macroeconomic shocks is driven by increased business activity by foreign (often European) banks in the CEEC-3. Finally, the fourth channel is financial market integration as such, which is accompanied by higher capital mobility, but also carries the risk of contagion from shocks in other markets. In general, the transmission strength of shocks increases as financial market integration deepens. We thus expect euro area news to have a bigger—and growing—impact over time on financial markets in the CEEC-3 than news originating from the US.

III. Data and Econometric Methodology

In this section, we first briefly explain the financial market data used in this survey. Second, we highlight some key points relevant for the construction of news. Third, we describe our two-step modelling approach.

<u>Financial Market Data</u>

Table A.1 in the Appendix presents descriptive statistics for the financial market variables, expressed as daily returns. Interest rates are employed in first differences, whereas exchange rates and stock price indices are first transformed using logarithms before taking differences, which implies that they can be interpreted as growth rates. After splitting the sample at the date of the Copenhagen summit in 2002,[5] we have two subsamples of 898 and 938 daily observations, respectively, over the period 1999 to 2006. The data are adjusted to account for different time zones. All financial market series display excess kurtosis and a few show pronounced skewness, indications of nonnormal distributions and the presence of ARCH.

The mean of the three-month interest rate change is negative in the first subsample for all three countries. In the second subsample, this negative trend is weaker, reflecting the slower speed of convergence of CEEC-3 interest rates with euro area/US levels at the end of the observation period. Standard deviations of daily returns decline in the Czech Republic and Poland and increase in Hungary. The latter effect might be related to the uncertainty of

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[5] Regarding our sample breakpoint, the Copenhagen Summit, we conducted an extensive grid-based search to check whether market participants anticipated the sample break. However, estimating other subsamples does not change the outcome. Thus, there was no specific breakpoint after which the agents in all three countries abruptly changed their behaviour, but the Copenhagen Summit appears to be the most obvious choice, generating almost equal-sized subsamples.

Hungarian monetary policy, foreign exchange rate objectives, and ambiguous central bank communication throughout 2003, leading to a currency crisis in that country and large swings in the interest rate. Daily returns on CEEC-3 stock markets generally increase and standard deviations decrease. The former outcome might be due to foreign capital inflows; the latter may reflect a deepening of the markets.[6]

CEEC-3 currencies tend to appreciate against the euro and the US dollar.[7] We observe a declining volatility for the Czech Republic and (at least for the exchange rate versus the euro) for Poland, whereas volatility is increasing in Hungary. However, note the difference in average volatility: over the first period, it is the lowest for both currencies in Hungary, while over the second period it is lowest in the Czech Republic.[8] Generally, the exchange rates versus the euro seem less volatile than those versus the US dollar. This observation can be linked to the CEEC-3 exchange rate regimes, which are geared toward the euro.[9]

Macroeconomic News

According to the efficient market hypothesis, only new information should affect market prices. The news (or surprise) component of macroeconomic announcements is captured using the absolute deviations of actual (usually preliminary) publications of statistical offices and central banks from consensus forecasts published by Bloomberg. In line with Hanousek and Kočenda (2009), we use nonaggregated euro area and US macroeconomic news, which allows distinguishing between the factors causing financial market reactions.

Also included are monetary policy decisions on interest rates in the CEEC-3, as well as by the ECB and the Fed (see Table A.2). Table A.3 provides an overview of the macroeconomic

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[6] Turnover in the Warsaw and Budapest stock exchanges roughly tripled from 2002 to 2005 (to 24.1 and 19.4 billion euro, respectively) and increased almost sevenfold in the Prague stock exchange (to 34.9 billion euro). Source: National Bank of Poland (2005).
We also examine the data for correlation shifts in money and stock markets. For this purpose we estimate multivariate GARCH models and obtain dynamic conditional correlations (Engle, 2002). The money market returns are nearly uncorrelated with their European and US counterparts over the whole sample. The stock markets returns are more correlated with the Euro Stoxx 50 returns than with the S&P 500 returns, but there are no obvious trends in the stock market correlations. Mean correlations are as follows: 0.4 (PX 50 vs. Euro Stoxx 50), 0.39 (BUX vs. Euro Stoxx 50), 0.44 (WIG 20 vs. Euro Stoxx 50); 0.21 (PX 50 vs. S&P 500), 0.25 (BUX vs. S&P 500), 0.21 (WIG 20 vs. S&P 500).
[7] The only exception is the Hungarian forint, which appreciated by 11% versus the dollar but lost 1% against the euro over the observation period. The Czech koruna (Polish zloty) gained 24%/35% (5%/17%) against the euro/dollar.
[8] Kočenda and Valachy (2006) find that exchange rate volatility increased in the Visegrad countries (Czech Republic, Slovakia, Poland, and Hungary) after the introduction of a floating exchange rate regime.
[9] The Czech Republic has a managed float without explicit target rates, but with the aim of reducing volatility. Hungary had a 100% ERM II style peg versus the euro (until the end of 1999: basket with 30% US dollar and 70% ECU). The Polish zloty floated freely (until mid-April 2000: basket with 45% US dollar and 55% euro). Source: Cuaresma and Wójcik (2006).

variables used in our model. Since we focus on macroeconomic shocks, we generally cannot use the euro area announcements, as these are based on an aggregation of nonsynchronously published national data. Instead, we employ German macroeconomic news (because it is the largest EU economy), except in the case of the business climate indicator and consumer confidence, where appropriate European values are available. We cover major nominal indicators (consumer price index, producer price index) and real indicators (gross domestic product, retail sales, industrial production, trade balance, unemployment rate), as well as forward-looking indicators (such as consumer confidence, business climate, IFO index, ISM index). In total, we utilise two European indicators, eight German indicators, and nine US indicators.[10]

Econometric Methodology

Our modelling approach consists of two steps. In a first step, we model the data generating process using a control model comprising only financial market variables. As the financial market series feature excess kurtosis and preliminary OLS regressions reveal ARCH effects, we employ GARCH models, which are sufficient to remove the ARCH components in the residuals (Engle, 1982). Econometrically, we start with a general GARCH(1,1) specification (Bollerslev, 1986):

$$(1)\ returns_t = \gamma + \sum_{r=1}^{6} returns_{t-r}\ \delta_r + \sum_{r=1}^{6} control\ variables_{t-r}\ \zeta_r + day\ of\ the\ week_t\ \eta$$
$$+\ ID\ \theta +\ \mu_t$$

$$\mu_t = \varepsilon_t h_t^{1/2}$$
$$h_t = \alpha_0 + \alpha_1 \mu_{t-1}^2 + \beta_1 h_{t-1}$$

where α_0, α_1, β_1, μ, γ, δ, ζ, η, θ, and ν are parameters or vectors of parameters and $\varepsilon_t|\Gamma_{t-1} = t(\nu)$; with Γ_{t-1} capturing all information up to t–1, and t(ν) a t-distribution with ν degrees of freedom. Equation (1) is an autoregressive-distributed lag model with six lags. The vector of control variables consists of daily returns on the respective asset's counterpart in the CEEC-3 as well as in the euro area and the US, the particular country's money and stock returns, and foreign exchange rate movements against the dollar and the euro. We also use dummy variables to

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[10] We checked whether the inclusion of local news would have changed our results by testing for correlations between local and international news using a news sample from Büttner and Hayo (2008). However, since most of these new items are virtually orthogonal to our EU and US news variables, we do not expect our results to suffer from an omitted variable bias due to the exclusion of domestic news.

control for day of the week effects, with Monday as the reference day. Contemporaneous financial control variables are omitted to avoid simultaneity problems. To incorporate the impact of extraordinary events, we include impulse dummies (ID) for 9/11 and the first trading day after the Copenhagen Summit. Student-t distributed errors (Bollerslev, 1987) are assumed; these provide a better approximation to residuals that are not normally distributed.

We estimate baseline specifications without target rate changes and macroeconomic news. In a consistent general-to-specific testing-down approach, we exclude all insignificant variables at the 1% significance level to obtain parsimonious financial control models. As the financial market control variables are almost uncorrelated with the news variables, this approach simplifies the model without generating biased estimates. Tables A.4 to A.7 in the Appendix reveal that (weak) efficiency is violated in all financial markets, except for the Czech money market, as past values of the dependent variables and/or other financial control variables help predict today's values of the dependent variable. In the interest of brevity, we do not describe the financial control variables in detail but at least one result is noteworthy: the impact of past Euro Stoxx returns is always negative in all stock markets, whereas the impact of past S&P 500 returns is consistently positive. This is indicative of portfolio diversification between euro area and CEEC-3 markets, as well as positive spill-over effects from US markets. Our observations contradict findings from Hanousek et al. (2009) who find positive spillover effects from DAX returns to CEEC-3 stock markets. However, these differences in results might be due to the fact that they use intraday data whereas we employ daily data.

In a second step, we add our variables of interest. German, European, and US macroeconomic news (19 variables) enter the equations on the day they occur and on the next day. In addition, target rate changes by the respective local central bank, ECB, and the Fed (i.e., three additional indicators for interest rate setting) are also included. It turns out that markets do not always react on the same day news is published; often, significant movement occurs the next day. We statistically test whether the sum of the news coefficients is significantly different from zero at the 1% significance level over two trading days. By testing over a two-day window, we concentrate on economically relevant cases that exert a lasting effect on financial markets and also account for timing issues that cannot be fully resolved through the coding of the variables. The combination of a 1% significance level and a two-day window results in a much tougher test than is normally applied in the literature analysing news effects.

IV.   Impact of News on Returns

In the following tables, we present the significant variables for each of the financial markets using the approach explained in the previous section. The discussion of the results is focussed on those news categories that are jointly significant over two business days (results shaded in grey).

Impact on Money Markets

Table 1 provides an overview of the news variables that exert a significant impact in Czech, Hungarian, and Polish money markets. Except for a response to target rate changes, money markets do not react to many macroeconomic shocks from Europe or the United States. In the case of Poland, there is only one significant reaction over the two-day window. The number of significant indicators is nearly the same before and after the sample break. In addition, no one source of news (euro area or US) dominates. Target rate changes by the CNB and the MNB move their countries' rates in the same direction, which is not surprising, as money market rates are closely linked to the main refinancing rate. Investors appear to move capital out of the Czech Republic (Hungary) after good German trade balance news (positive US ISM news).[11] Also, US target rate hikes lower Hungarian money market rates in the second subsample.

Impact on Stock Markets

Table 2 provides an overview of the news variables that significantly affect the Czech PX 50, the Hungarian BUX, and the Polish WIG 20. The Czech and Polish market reacts more sensitively to macroeconomic shocks after the Copenhagen Summit and the BUX shows fewer effects. The PX 50 and WIG 20, in particular, respond more to German and European news, whereas the influence of US news is declining over time. In the post-Copenhagen subsample, Czech stock market returns are lowered by EU Business Climate Index news and German retail sales news. This evidence of portfolio diversification is in line with Hanousek et al. (2009), who find negative returns after positive EU news. The Budapest stock exchange reacts negatively to German retails sales news in the first subsample. In contrast, the same category of US news raises returns of the BUX. The WIG 20 is only affected by German industrial production news, which causes higher returns in the second subsample.

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[11] The following section discusses positive macroeconomic shocks, i.e., actual figures are above expected values. In the case of negative shocks and news, the effects are in the opposite direction.

Table 1: Results on Money Markets

	CZ 3M				HU 3M				PL 3M			
	Pre-Copenh.		Post-Copenh.		Pre-Copenh.		Post-Copenh.		Pre-Copenh.		Post-Copenh.	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
National TR	**0.3712**	**0.00**	**0.1188**	**0.00**	**0.0538**	**0.00**	**0.1930**	**0.00**	**0.0580**	**0.01**	0.1086	0.07
National TR lag	**0.0164**	**0.00**	0.0047	0.69	–0.0046	0.63	–0.0138	0.61	–0.0260	0.76	–0.0105	0.35
EU TR	0.0021	0.38	–0.0016	0.63	0.0085	0.62	–0.0493	0.05	–0.0032	0.62	0.0090	0.33
EU TR lag	–0.0041	0.80	0.0320	0.61	0.0030	0.50	0.0012	0.97	0.0323	0.29	0.0262	0.19
US TR	0.0013	0.43	–0.0014	0.69	0.0091	0.15	–0.0858	0.01	0.0106	0.74	–0.0129	0.37
US TR lag	0.0006	0.53	0.0055	0.31	–0.0004	0.93	–0.0364	0.02	–0.0080	0.87	–0.0202	0.30
EU BCI	0.0007	0.88	0.0026	0.79	0.0488	0.04	–0.0518	0.06	**0.2149**	**0.00**	0.0157	0.65
EU BCI lag	–0.0025	0.81	–0.0006	0.89	–0.0199	0.02	0.0397	0.12	–0.0528	0.57	0.0311	0.19
EU CC	0.0000	0.94	0.0008	0.45	**–0.0041**	**0.00**	0.0013	0.72	0.0035	0.43	–0.0045	0.21
EU CC lag	–0.0003	0.56	–0.0006	0.26	0.0012	0.31	–0.0032	0.28	–0.0020	0.55	0.0055	0.08
German CPI	0.0252	0.07	0.0020	0.44	–0.0014	0.90	0.0502	0.49	0.0212	0.39	–0.0045	0.78
German CPI lag	–0.0010	0.66	–0.0010	0.58	0.0039	0.83	–0.0050	0.73	–0.0009	0.98	0.0122	0.55
German GDP	–0.0147	0.61	0.0002	0.89	–0.0184	0.23	–0.0292	0.12	–0.0156	0.44	0.0364	0.07
German GDP	0.0030	0.64	0.0109	0.30	–0.0075	0.64	0.0156	0.58	0.0140	0.58	0.0190	0.72
German IFO	–0.0002	0.55	0.0001	0.48	–0.0013	0.34	–0.0004	0.87	0.0042	0.17	0.0010	0.48
German IFO lag	–0.0003	0.59	0.0001	0.79	–0.0006	0.58	–0.0001	0.94	0.0002	0.99	0.0020	0.66
German IP	0.0000	0.90	0.0001	0.79	0.0005	0.61	0.0042	0.29	–0.0056	0.20	–0.0027	0.15
German IP lag	–0.0006	0.29	0.0001	0.53	0.0009	0.63	0.0006	0.82	0.0011	0.48	0.0002	0.88
German PPI	0.0012	0.86	–0.0004	0.82	–0.0020	0.58	0.0182	0.25	0.0165	0.46	0.0026	0.84
German PPI lag	0.0013	0.42	0.0008	0.61	0.0035	0.43	–0.0028	0.99	0.0200	0.09	–0.0072	0.43
German RET	–0.0002	0.43	–0.0002	0.56	0.0002	0.82	0.0021	0.39	–0.0016	0.50	–0.0008	0.55
German RET lag	0.0003	0.47	0.0000	0.95	–0.0003	0.61	–0.0003	0.90	0.0041	0.03	0.0019	0.36
German TB	**0.0432**	**0.00**	0.0008	0.81	0.0065	0.84	–0.0032	0.94	0.0606	0.02	0.0160	0.55
German TB lag	0.0012	0.64	–0.0011	0.66	–0.0209	0.47	0.0122	0.29	–0.0358	0.18	0.0155	0.45
German UR	–0.0018	0.63	–0.0048	0.53	–0.0092	0.42	–0.0096	0.58	–0.0536	0.24	–0.0307	0.14
German UR lag	0.0044	0.35	0.0012	0.71	–0.0086	0.39	–0.0275	0.18	–0.0147	0.67	0.0500	0.03
US CC	–0.0003	0.44	0.0000	0.81	0.0001	0.67	–0.0005	0.44	–0.0005	0.87	0.0003	0.58
US CC lag	0.0001	0.49	0.0001	0.47	0.0004	0.04	0.0010	0.11	0.0023	0.31	0.0005	0.64
US CPI	0.0008	0.58	–0.0013	0.83	–0.0118	0.52	–0.0122	0.71	–0.0192	0.55	0.0035	0.89
US CPI lag	0.0003	0.86	0.0018	0.65	–0.0123	0.29	0.0373	0.69	0.0058	0.89	–0.0157	0.60
US GDP	–0.0040	0.38	0.0001	0.88	–0.0012	0.91	0.0052	0.92	–0.0670	0.11	–0.0066	0.43
US GDP lag	0.0021	0.60	–0.0001	0.84	–0.0102	0.21	–0.0132	0.75	0.0100	0.82	0.0127	0.13
US IP	–0.0007	0.63	–0.0032	0.25	0.0031	0.65	–0.0021	0.87	0.0122	0.67	–0.0033	0.77
US IP lag	–0.0001	0.94	–0.0004	0.77	**–0.0182**	**0.00**	–0.0006	0.98	0.0166	0.66	0.0167	0.07
US ISM	0.0000	0.95	0.0000	0.98	0.0015	0.11	–0.0001	0.93	**0.0054**	**0.00**	**0.0036**	**0.00**
US ISM lag	0.0009	0.53	0.0004	0.44	–0.0008	0.33	0.0014	0.31	0.0026	0.37	–0.0020	0.02
US PPI	0.0014	0.53	–0.0016	0.49	0.0020	0.58	–0.0044	0.77	–0.0133	0.47	–0.0022	0.63
US PPI lag	0.0007	0.45	–0.0001	0.94	0.0003	0.93	0.0006	0.88	–0.0246	0.46	0.0041	0.22
US RET	0.0009	0.57	–0.0012	0.51	–0.0010	0.49	0.0004	0.94	–0.0083	0.38	0.0050	0.44
US RET lag	0.0002	0.65	0.0003	0.64	–0.0006	0.82	0.0016	0.73	0.0219	0.72	–0.0023	0.61
US TB	0.0178	0.52	0.0004	0.98	–0.0706	0.49	0.3012	0.07	0.1130	0.93	0.1191	0.38
US TB lag	0.0173	0.55	0.0082	0.79	–0.3499	0.06	–0.2634	0.44	–0.5752	0.37	–0.0024	0.98
US UR	0.0066	0.51	–0.0016	0.48	0.0342	0.07	0.0448	0.45	0.0233	0.52	–0.0235	0.06
US UR lag	–0.0065	0.07	–0.0007	0.80	0.0046	0.56	0.0236	0.35	0.0049	0.83	0.0325	0.09

Notes: Bold coefficients are significant at the 1% level. Coefficients which are jointly significant over two business days are shaded in grey. TR = Target Rate Changes, BCI = Business Climate Index, CC = Consumer Confidence, CPI = Consumer Price Index, GDP = Gross Domestic Product, IFO = IFO Index, IP = Industrial Production, PPI = Producer Price Index, RET = Retail Sales, TB = Trade Balance, UR = Unemployment Rate, ISM = ISM Index.

Table 2: Results for Stock Markets

	PX 50				BUX				WIG 20			
	Pre–Copenh.		Post–Copenh.		Pre–Copenh.		Post–Copenh.		Pre–Copenh.		Post–Copenh.	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
National TR	–0.0118	0.19	–0.0014	0.84	0.0007	0.92	**–0.0048**	**0.00**	0.0043	0.31	–0.0105	0.16
National TR lag	–0.0058	0.41	–0.0001	0.99	–0.0002	0.96	**0.0076**	**0.00**	0.0030	0.30	–0.0013	0.79
EU TR	0.0209	0.07	–0.0141	0.19	0.0093	0.47	0.0097	0.73	–0.0029	0.76	–0.0095	0.50
EU TR lag	–0.0090	0.53	**0.0259**	**0.00**	–0.0012	0.92	0.0347	0.37	–0.0124	0.36	0.0124	0.28
US TR	0.0042	0.55	–0.0005	0.93	0.0098	0.34	0.0132	0.19	0.0054	0.58	0.0031	0.75
US TR lag	–0.0014	0.89	0.0025	0.74	0.0012	0.87	0.0207	0.08	–0.0038	0.66	0.0044	0.63
EU BCI	0.0000	1.00	–0.0323	0.01	0.0085	0.57	–0.0039	0.72	0.0210	0.18	0.0022	0.83
EU BCI lag	–0.0354	0.01	–0.0229	0.05	–0.0358	0.02	–0.0029	0.80	–0.0321	0.11	0.0083	0.35
EU CC	–0.0001	0.96	0.0013	0.50	0.0005	0.73	0.0000	0.99	–0.0025	0.08	0.0024	0.33
EU CC lag	–0.0015	0.40	0.0011	0.48	0.0024	0.11	0.0026	0.08	–0.0001	0.97	0.0010	0.63
German CPI	–0.0011	0.93	0.0039	0.58	–0.0022	0.90	–0.0057	0.67	0.0061	0.81	–0.0110	0.44
German CPI lag	–0.0032	0.92	0.0135	0.03	0.0086	0.51	0.0218	0.05	0.0130	0.46	0.0139	0.24
German GDP	0.0025	0.94	–0.0124	0.30	0.0365	0.38	–0.0030	0.86	–0.0145	0.53	–0.0097	0.18
German GDP	–0.0157	0.78	–0.0076	0.42	–0.0048	0.93	–0.0100	0.64	0.0066	0.73	0.0024	0.91
German IFO	–0.0018	0.37	**–0.0030**	**0.00**	–0.0014	0.35	–0.0018	0.16	0.0003	0.87	–0.0008	0.63
German IFO lag	–0.0017	0.40	–0.0001	0.86	–0.0027	0.12	0.0008	0.58	–0.0036	0.13	–0.0002	0.90
German IP	0.0004	0.78	0.0010	0.40	0.0019	0.19	0.0017	0.17	0.0045	0.05	**0.0039**	**0.00**
German IP lag	0.0003	0.81	0.0019	0.08	0.0010	0.50	–0.0008	0.54	0.0014	0.47	0.0016	0.31
German PPI	–0.0090	0.31	0.0115	0.10	–0.0007	0.91	0.0057	0.31	–0.0006	0.94	0.0047	0.40
German PPI lag	0.0090	0.28	0.0039	0.56	–0.0018	0.79	0.0096	0.11	0.0050	0.52	0.0054	0.34
German RET	–0.0019	0.15	**–0.0020**	**0.01**	**–0.0023**	**0.00**	0.0002	0.84	0.0007	0.58	–0.0015	0.29
German RET lag	–0.0004	0.77	–0.0009	0.13	–0.0012	0.17	–0.0004	0.70	–0.0023	0.03	–0.0001	0.90
German TB	0.0378	0.23	–0.0056	0.66	0.0091	0.72	–0.0051	0.75	0.0130	0.76	–0.0453	0.01
German TB lag	0.0094	0.75	0.0080	0.47	0.0060	0.83	–0.0375	0.13	0.0267	0.43	–0.0135	0.44
German UR	0.0142	0.53	–0.0111	0.41	–0.0393	0.05	–0.0044	0.83	–0.0271	0.38	0.0015	0.95
German UR lag	0.0174	0.64	–0.0132	0.14	0.0162	0.48	0.0022	0.91	–0.0327	0.35	–0.0255	0.13
US CC	0.0003	0.13	0.0004	0.15	0.0001	0.75	0.0005	0.15	–0.0002	0.81	0.0000	0.97
US CC lag	–0.0001	0.62	–0.0003	0.31	–0.0004	0.32	–0.0002	0.67	0.0004	0.13	–0.0002	0.59
US CPI	–0.0105	0.59	0.0244	0.02	–0.0292	0.11	–0.0071	0.54	–0.0194	0.28	0.0083	0.48
US CPI lag	–0.0071	0.66	0.0077	0.35	–0.0041	0.81	0.0059	0.58	0.0128	0.52	–0.0034	0.75
US GDP	0.0064	0.70	–0.0040	0.40	0.0053	0.73	–0.0120	0.14	0.0018	0.90	**–0.0120**	**0.01**
US GDP lag	–0.0111	0.52	**0.0095**	**0.00**	–0.0136	0.31	0.0021	0.63	**–0.0392**	**0.00**	0.0051	0.33
US IP	–0.0070	0.36	0.0076	0.14	0.0027	0.70	0.0036	0.65	–0.0056	0.57	0.0026	0.63
US IP lag	–0.0076	0.44	0.0003	0.96	–0.0087	0.19	–0.0066	0.29	–0.0015	0.86	–0.0091	0.15
US ISM	–0.0026	0.10	–0.0001	0.84	–0.0007	0.57	0.0004	0.72	–0.0005	0.65	0.0015	0.21
US ISM lag	0.0016	0.10	0.0004	0.47	0.0012	0.07	0.0003	0.81	**0.0029**	**0.00**	0.0004	0.70
US PPI	–0.0077	0.21	0.0009	0.74	–0.0071	0.26	–0.0028	0.31	–0.0147	0.04	–0.0028	0.45
US PPI lag	–0.0027	0.63	–0.0010	0.62	0.0010	0.86	0.0015	0.64	–0.0007	0.92	–0.0025	0.51
US RET	**0.0031**	**0.00**	–0.0030	0.16	**0.0050**	**0.00**	0.0032	0.46	**0.0065**	**0.00**	0.0044	0.15
US RET lag	–0.0009	0.41	–0.0039	0.15	0.0015	0.11	0.0003	0.93	–0.0015	0.24	–0.0022	0.49
US TB	–0.0313	0.81	0.0515	0.22	0.1617	0.24	–0.0011	0.99	0.0754	0.66	–0.0631	0.19
US TB lag	–0.0122	0.88	0.0440	0.48	–0.1540	0.30	–0.1009	0.12	–0.2270	0.25	0.0190	0.70
US UR	0.0137	0.45	0.0035	0.73	0.0115	0.25	0.0078	0.70	–0.0023	0.81	–0.0094	0.59
US UR lag	0.0251	0.04	–0.0018	0.86	0.0335	0.04	–0.0023	0.89	0.0075	0.62	–0.0463	0.01

Notes: Bold coefficients are significant at the 1% level. Coefficients which are jointly significant over two business days are shaded in grey. TR = Target Rate Changes, BCI = Business Climate Index, CC = Consumer Confidence, CPI = Consumer Price Index, GDP = Gross Domestic Product, IFO = IFO Index, IP = Industrial Production, PPI = Producer Price Index, RET = Retail Sales, TB = Trade Balance, UR = Unemployment Rate, ISM = ISM Index.

Impact on Foreign Exchange Rates against the Euro[12]

Table 3 provides an overview of the impact of news variables on the exchange rates of the Czech koruna, the Hungarian forint, and the Polish zloty against the euro. US indicators no longer matter after the Copenhagen Summit, while European and German news remain significant. The koruna and the zloty react less sensitively to foreign news than does the forint. Both currencies only react to EU or US news before the Copenhagen Summit: an unexpected increase in German unemployment leads to an appreciation of the koruna against the euro and positive US retail sales as well as positive IFO news causes a depreciation of the zloty.[13] The Hungarian forint appreciates in the first subsample after news of a surprising increase in the German GDP. A better than expected German trade balance strengthens the euro, as does German retail sales news. Positive European consumer confidence news appreciates the forint. In general, the forint reacts to the same number of shocks in both subsamples, as EU consumer confidence news strengthens this currency after the Copenhagen Summit.

Impact on Foreign Exchange Rates with the US Dollar

Table 4 provides an overview of the impact of news variables on the exchange rates of the Czech koruna, the Hungarian forint, and the Polish zloty against the US dollar. The exchange rates against the dollar are moved over two trading days only by US news. However, US indicators exert no significant impact after 2002. US target rate hikes strengthen the dollar against the koruna and the zloty. This same pattern emerges for real macroeconomic news from the US, as ISM Index news trigger an appreciation of the dollar against the forint.

Cross-Country Differences in the Results

Comparing all markets, Hungarian and Polish assets react to fewer macroeconomic shocks after the Copenhagen Summit, whereas Czech assets become more sensitive. Regarding the source of the news, the impact of US shocks in the latter period in basically zero in Hungary and Poland, while the impact of euro area news remains roughly the same. In the Czech Republic, the influence of euro area news increases after 2002. These findings support the hypotheses of stronger financial integration with the euro area and diminishing US influence.

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[12] Note that exchange rates are in price notation.
[13] Note that 'positive' unemployment news implies higher than expected unemployment.

Table 3: Results for Foreign Exchange Rates against the Euro

	CZK/EUR				HUF/EUR				PLN/EUR			
	Pre–Copenh.		Post–Copenh.		Pre–Copenh.		Post–Copenh.		Pre–Copenh.		Post–Copenh.	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
National TR	0.0001	0.99	–0.0008	0.84	0.0000	0.90	0.0018	0.27	0.0006	0.80	0.0010	0.85
National TR lag	0.0016	0.68	0.0005	0.88	–0.0001	0.39	–0.0009	0.57	0.0008	0.23	–0.0004	0.92
EU TR	0.0025	0.17	0.0011	0.74	**–0.0003**	**0.00**	–0.0053	0.48	0.0034	0.42	–0.0055	0.57
EU TR lag	–0.0036	0.08	0.0020	0.40	0.0000	0.99	–0.0029	0.67	–0.0080	0.13	0.0024	0.53
US TR	–0.0025	0.09	0.0010	0.65	–0.0001	0.67	–0.0090	0.04	0.0003	0.93	–0.0042	0.62
US TR lag	–0.0012	0.56	0.0018	0.50	0.0002	0.32	–0.0019	0.54	0.0034	0.50	0.0079	0.11
EU BCI	0.0014	0.62	–0.0035	0.28	**0.0097**	**0.01**	0.0013	0.77	0.0439	0.01	–0.0022	0.66
EU BCI lag	0.0018	0.58	–0.0050	0.07	0.0004	0.97	0.0014	0.59	–0.0031	0.87	–0.0026	0.63
EU CC	–0.0001	0.82	–0.0003	0.43	–0.0001	0.63	–0.0007	0.07	0.0000	0.96	–0.0005	0.59
EU CC lag	0.0003	0.55	0.0002	0.76	0.0001	0.51	–0.0008	0.08	0.0010	0.03	–0.0003	0.82
German CPI	0.0013	0.80	0.0036	0.29	–0.0001	0.84	0.0005	0.88	–0.0063	0.58	0.0036	0.47
German CPI lag	–0.0048	0.05	–0.0027	0.17	**–0.0005**	**0.00**	–0.0087	0.13	–0.0064	0.39	–0.0055	0.11
German GDP	–0.0069	0.15	–0.0015	0.72	0.0001	0.40	0.0023	0.47	0.0162	0.04	–0.0022	0.82
German GDP lag	0.0021	0.73	0.0062	0.13	**–0.0007**	**0.00**	**0.0048**	**0.00**	0.0066	0.53	0.0115	0.01
German IFO	**–0.0007**	**0.00**	–0.0005	0.33	0.0000	0.85	0.0001	0.71	0.0012	0.09	0.0009	0.21
German IFO lag	**0.0010**	**0.00**	0.0003	0.41	0.0000	0.94	0.0002	0.58	0.0009	0.18	**0.0015**	**0.01**
German IP	0.0002	0.21	0.0002	0.46	0.0000	0.46	–0.0003	0.20	0.0003	0.64	–0.0001	0.88
German IP lag	0.0000	0.82	0.0001	0.70	0.0000	0.67	–0.0002	0.42	0.0005	0.47	0.0011	0.10
German PPI	–0.0009	0.56	0.0008	0.81	0.0001	0.20	–0.0012	0.41	–0.0022	0.57	0.0020	0.45
German PPI lag	0.0008	0.58	–0.0029	0.10	0.0000	0.80	0.0008	0.76	0.0020	0.59	0.0000	1.00
German RET	–0.0003	0.13	0.0003	0.38	0.0000	0.27	0.0006	0.04	–0.0005	0.38	0.0003	0.54
German RET lag	0.0002	0.24	–0.0001	0.83	0.0000	0.77	0.0005	0.09	0.0011	0.01	0.0006	0.33
German TB	–0.0047	0.34	0.0026	0.59	0.0010	0.31	0.0035	0.45	0.0025	0.83	0.0049	0.61
German TB lag	0.0034	0.48	–0.0044	0.42	**0.0030**	**0.00**	0.0027	0.51	**–0.0293**	**0.00**	–0.0045	0.50
German UR	–0.0093	0.12	–0.0017	0.59	–0.0007	0.18	–0.0049	0.30	–0.0103	0.55	–0.0057	0.39
German UR lag	**–0.0150**	**0.00**	–0.0006	0.84	–0.0007	0.41	–0.0053	0.37	0.0016	0.86	–0.0022	0.73
US CC	0.0000	0.71	–0.0001	0.35	0.0000	0.64	0.0001	0.28	**–0.0003**	**0.01**	0.0002	0.19
US CC lag	0.0001	0.45	0.0000	0.85	0.0000	0.37	0.0000	0.99	–0.0003	0.25	0.0000	0.86
US CPI	0.0000	1.00	0.0010	0.79	0.0007	0.25	0.0011	0.79	–0.0008	0.89	–0.0064	0.15
US CPI lag	–0.0008	0.82	0.0029	0.46	–0.0003	0.77	0.0010	0.72	–0.0014	0.82	–0.0027	0.61
US GDP	–0.0022	0.80	**–0.0042**	**0.00**	0.0003	0.82	**–0.0025**	**0.00**	**0.0180**	**0.00**	–0.0089	0.04
US GDP lag	0.0018	0.89	0.0003	0.88	–0.0014	0.60	0.0008	0.37	–0.0039	0.60	**0.0050**	**0.01**
US IP	0.0010	0.43	0.0004	0.74	0.0000	0.86	0.0014	0.57	–0.0035	0.20	0.0000	0.99
US IP lag	0.0019	0.21	–0.0011	0.47	0.0006	0.10	0.0019	0.27	0.0027	0.38	–0.0002	0.93
US ISM	–0.0003	0.10	–0.0003	0.20	**–0.0001**	**0.00**	–0.0003	0.36	–0.0008	0.26	0.0002	0.61
US ISM lag	0.0000	0.97	–0.0001	0.43	0.0000	0.65	0.0002	0.35	–0.0011	0.02	0.0003	0.31
US PPI	0.0021	0.11	–0.0009	0.43	0.0002	0.32	–0.0014	0.05	0.0001	0.97	–0.0011	0.33
US PPI lag	–0.0013	0.03	–0.0003	0.71	0.0002	0.53	0.0000	0.98	–0.0017	0.47	0.0019	0.25
US RET	–0.0002	0.32	–0.0002	0.79	0.0000	0.77	0.0017	0.03	–0.0003	0.63	0.0003	0.81
US RET lag	0.0003	0.20	–0.0008	0.34	–0.0003	0.07	–0.0013	0.06	**0.0028**	**0.00**	–0.0020	0.17
US TB	–0.0392	0.24	0.0289	0.11	–0.0094	0.03	0.0312	0.35	–0.0306	0.68	0.0145	0.65
US TB lag	–0.0182	0.42	–0.0321	0.08	0.0034	0.16	–0.0120	0.49	0.0716	0.41	–0.0212	0.46
US UR	0.0019	0.29	–0.0014	0.77	0.0005	0.61	0.0019	0.68	0.0006	0.93	–0.0012	0.91
US UR lag	0.0034	0.13	–0.0001	0.96	0.0005	0.78	0.0004	0.91	0.0049	0.45	–0.0019	0.63

Notes: Bold coefficients are significant at the 1% level. Coefficients which are jointly significant over two business days are shaded in grey. TR = Target Rate Changes, BCI = Business Climate Index, CC = Consumer Confidence, CPI = Consumer Price Index, GDP = Gross Domestic Product, IFO = IFO Index, IP = Industrial Production, PPI = Producer Price Index, RET = Retail Sales, TB = Trade Balance, UR = Unemployment Rate, ISM = ISM Index.

Table 4: Results for Foreign Exchange Rates Against the US Dollar

	CZK/USD Pre–Copenh.		CZK/USD Post–Copenh.		HUF/USD Pre–Copenh.		HUF/USD Post–Copenh.		PLN/USD Pre–Copenh.		PLN/USD Pre–Copenh.	
	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p	Coeff.	p
National TR	−0.0006	0.85	0.0098	0.32	−0.0029	0.24	0.0018	0.43	0.0010	0.54	0.0094	0.08
National TR lag	−0.0006	0.85	0.0007	0.93	0.0008	0.62	0.0011	0.62	0.0025	0.10	−0.0038	0.44
EU TR	0.0028	0.38	0.0125	0.54	0.0000	1.00	−0.0083	0.62	−0.0020	0.55	0.0051	0.72
EU TR lag	−0.0046	0.39	0.0072	0.66	0.0004	0.91	0.0077	0.32	−0.0065	0.23	0.0004	0.97
US TR	0.0055	0.05	0.0008	0.91	0.0113	0.02	−0.0117	0.05	0.0082	0.03	−0.0170	0.03
US TR lag	0.0058	0.01	0.0064	0.34	0.0016	0.71	0.0024	0.70	0.0052	0.12	0.0100	0.18
EU BCI	**−0.0281**	**0.01**	−0.0112	0.44	−0.0119	0.55	−0.0144	0.12	0.0201	0.10	−0.0129	0.13
EU BCI lag	0.0101	0.46	−0.0115	0.12	0.0028	0.84	−0.0065	0.31	−0.0002	0.98	−0.0117	0.05
EU CC	0.0006	0.40	−0.0017	0.36	−0.0011	0.21	−0.0010	0.50	−0.0010	0.29	−0.0011	0.48
EU CC lag	−0.0004	0.66	−0.0015	0.22	−0.0007	0.37	−0.0024	0.01	0.0001	0.91	−0.0023	0.05
German CPI	0.0021	0.79	0.0004	0.96	−0.0056	0.55	0.0023	0.69	−0.0035	0.60	0.0009	0.90
German CPI lag	0.0017	0.84	−0.0065	0.17	−0.0041	0.41	−0.0128	0.07	−0.0085	0.17	−0.0080	0.31
German GDP	0.0044	0.56	0.0008	0.83	−0.0097	0.17	0.0042	0.37	−0.0027	0.86	0.0017	0.85
German GDP lag	0.0147	0.14	0.0215	0.03	−0.0107	0.12	0.0190	0.03	−0.0102	0.60	0.0184	0.03
German IFO	0.0001	0.87	−0.0014	0.26	−0.0014	0.21	−0.0007	0.38	−0.0006	0.36	−0.0004	0.66
German IFO lag	**−0.0024**	**0.00**	0.0002	0.76	−0.0015	0.02	0.0004	0.71	−0.0010	0.02	0.0016	0.08
German IP	−0.0005	0.36	−0.0002	0.71	0.0005	0.30	−0.0010	0.35	0.0013	0.11	−0.0008	0.34
German IP lag	0.0000	0.95	−0.0002	0.83	−0.0003	0.59	−0.0007	0.59	−0.0005	0.55	0.0006	0.59
German PPI	0.0027	0.64	0.0010	0.80	0.0060	0.13	0.0025	0.54	0.0046	0.06	0.0029	0.38
German PPI lag	0.0033	0.24	−0.0038	0.68	−0.0002	0.96	0.0014	0.82	0.0029	0.33	−0.0011	0.88
German RET	−0.0003	0.37	0.0002	0.86	0.0000	0.95	−0.0003	0.72	−0.0004	0.41	0.0001	0.89
German RET lag	0.0002	0.66	0.0006	0.57	0.0001	0.84	0.0009	0.29	0.0002	0.50	0.0009	0.30
German TB	−0.0011	0.91	−0.0086	0.39	−0.0043	0.59	0.0026	0.76	0.0002	0.99	−0.0049	0.66
German TB lag	0.0030	0.77	0.0093	0.51	0.0143	0.10	0.0147	0.17	−0.0142	0.13	0.0141	0.20
German UR	−0.0005	0.96	−0.0060	0.61	0.0077	0.35	0.0002	0.99	−0.0007	0.95	−0.0093	0.43
German UR lag	−0.0132	0.11	0.0111	0.42	0.0016	0.83	−0.0037	0.82	0.0147	0.02	0.0072	0.67
US CC	0.0000	0.85	−0.0001	0.74	0.0001	0.39	0.0001	0.77	−0.0001	0.36	0.0002	0.42
US CC lag	0.0003	0.08	−0.0004	0.22	**0.0003**	**0.00**	−0.0001	0.73	0.0002	0.10	−0.0004	0.15
US CPI	−0.0008	0.91	0.0028	0.69	0.0000	1.00	0.0068	0.38	0.0004	0.97	0.0003	0.97
US CPI lag	−0.0073	0.40	0.0090	0.22	−0.0034	0.45	0.0117	0.10	−0.0077	0.23	0.0065	0.37
US GDP	−0.0018	0.90	0.0046	0.10	−0.0117	0.05	0.0000	0.99	0.0016	0.78	−0.0062	0.38
US GDP lag	0.0061	0.66	−0.0028	0.65	0.0013	0.79	0.0025	0.54	0.0040	0.57	0.0094	0.05
US IP	**0.0096**	**0.01**	0.0038	0.13	0.0009	0.81	0.0058	0.10	−0.0051	0.15	0.0051	0.17
US IP lag	−0.0012	0.69	0.0001	0.98	−0.0015	0.69	0.0015	0.73	−0.0031	0.34	0.0006	0.86
US ISM	0.0003	0.62	0.0004	0.52	**0.0013**	**0.00**	0.0015	0.04	0.0003	0.57	0.0009	0.03
US ISM lag	0.0011	0.04	−0.0005	0.39	0.0003	0.51	−0.0001	0.84	−0.0008	0.16	−0.0001	0.84
US PPI	0.0025	0.18	−0.0036	0.17	−0.0002	0.92	−0.0024	0.22	−0.0010	0.64	−0.0019	0.19
US PPI lag	−0.0011	0.70	0.0003	0.90	−0.0024	0.35	0.0013	0.52	−0.0043	0.04	0.0020	0.26
US RET	**0.0015**	**0.00**	0.0008	0.71	0.0018	0.55	0.0003	0.89	0.0005	0.69	−0.0001	0.98
US RET lag	0.0001	0.93	0.0002	0.92	0.0006	0.42	0.0026	0.12	**0.0020**	**0.00**	0.0001	0.97
US TB	−0.0018	0.98	0.1248	0.03	0.0736	0.11	0.0945	0.09	−0.0267	0.46	0.0805	0.15
US TB lag	−0.0043	0.94	−0.0648	0.14	−0.0626	0.54	−0.0134	0.76	0.0073	0.84	−0.0175	0.72
US UR	−0.0008	0.90	−0.0033	0.78	−0.0073	0.20	−0.0100	0.46	−0.0080	0.10	−0.0012	0.91
US UR lag	0.0044	0.26	−0.0021	0.80	0.0037	0.50	0.0055	0.54	0.0046	0.37	0.0080	0.37

Notes: Bold coefficients are significant at the 1% level. Coefficients which are jointly significant over two business days are shaded in grey. TR = Target Rate Changes, BCI = Business Climate Index, CC = Consumer Confidence, CPI = Consumer Price Index, GDP = Gross Domestic Product, IFO = IFO Index, IP = Industrial Production, PPI = Producer Price Index, RET = Retail Sales, TB = Trade Balance, UR = Unemployment Rate, ISM = ISM Index.

V. Conclusions

In this paper, we study the effects of euro area and US macroeconomic news on financial markets in the Czech Republic, Hungary, and Poland from 1999 to 2006. Additionally, we assess target rate changes by the CEEC-3 central banks, the ECB, and the Fed. Using GARCH models, we examine the impact of news on daily returns in three-month interest rates, stock market indices, exchange rates versus the euro, and exchange rates versus the US dollar. We test whether the cumulative impact of news is significant over a two-day trading window at a one percent significance level to account for timing issues and to ensure economic relevance. Three research questions received particular attention.

(1) Does foreign macroeconomic news have a significant impact on CEEC-3 financial markets between 1999 and 2006? All of the 12 markets that we study are affected by foreign news, typically by a combination of European and US shocks.

(2) Is the process of European integration accompanied by an increased importance of euro area shocks? After the Copenhagen Summit, US news has a significant impact in only one of the financial markets—the Hungarian money market (see Tables 1–4). At the same time, the influence of European news slightly increases over this period. Therefore, we have evidence for a growing importance of EU news over time in comparison to US news.

(3) Are there noteworthy differences in the reactions on the Czech, Hungarian, and Polish markets that relate to country-specific characteristics? Czech markets (particularly the stock exchange) show a relatively stronger reaction to macroeconomic shocks after the Copenhagen Summit than they did before the Summit. We interpret this as evidence that the convergence process toward the EU is more advanced in the Czech Republic compared to the other two economies. Concerning the origin of shocks, euro area news dominates US news across all Czech markets and for both periods. In contrast, Hungarian and Polish assets are affected by a larger number of macroeconomic shocks before the Copenhagen Summit than after. It is likely that these countries' domestic problems, such as the Hungarian currency crisis and twin deficit, dominated foreign news in both countries during the second period. Consistent with this view, Büttner and Hayo (2008) find Polish and Hungarian markets to be heavily affected by domestic events. Still, the significance of US news is declining in both countries, whereas the impact of European shocks is fairly constant. In general, our results support the hypothesis of a deepening euro area influence on the CEEC-3 over time and a corresponding reduction in the importance of US shocks.

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Appendix

Table A.1: Descriptive Statistics for Money, Stock, and Foreign Exchange Markets

	CZ 3M (I)	CZ 3M (II)	HU 3M (I)	HU 3M (II)	PL 3M (I)	PL 3M (II)
Observations	898	938	898	938	898	938
Mean	-0.0067	0	-0.0084	-0.0007	-0.0096	-0.0028
Standard Deviation	0.0369	0.0211	0.0762	0.1737	0.1475	0.0386
Skewness	-3.99	-2.85	-3.98	4.27	-2.98	1.68
Excess Kurtosis	39.77	64.18	63.96	87.82	50.64	27.32
Minimum	-0.44	-0.25	-0.93	-1.6	-2.09	-0.24
Maximum	0.25	0.23	0.75	2.46	0.80	0.44
	PX 50 (I)	**PX 50 (II)**	**BUX (I)**	**BUX (II)**	**WIG 20 (I)**	**WIG 20 (II)**
Observations	898	938	898	938	898	938
Mean	0.0001	0.0013	0.0002	0.0012	-0.0001	0.0011
Standard Deviation	0.0151	0.0118	0.0172	0.0139	0.0191	0.0139
Skewness	-0.0989	-0.581	0.0386	-0.2519	-0.1544	0.0055
Excess Kurtosis	1.34	10.35	3.73	1.28	1.8	1.85
Minimum	-0.0781	-0.0938	-0.103	-0.0626	-0.0971	-0.0642
Maximum	0.0582	0.0956	0.0933	0.0487	0.0625	0.0652
	CZK/EUR (I)	**CZK/EUR (II)**	**HUF/EUR (I)**	**HUF/EUR (II)**	**PLN/EUR (I)**	**PLN/EUR (II)**
Observations	898	938	898	938	898	938
Mean	-0.0001	-0.0001	-0.0001	0.0001	0	0
Standard Deviation	0.0042	0.0032	0.004	0.0056	0.0084	0.0057
Skewness	0.3989	-0.11	2.3032	1.4501	0.7715	0.2881
Excess Kurtosis	6.90	2.21	29.60	11.42	8.35	1.63
Minimum	-0.0248	-0.0164	-0.0206	-0.0249	-0.0553	-0.0207
Maximum	0.0310	0.0130	0.0409	0.0464	0.0609	0.0281
	CZK/USD (I)	**CZK/USD (II)**	**HUF/USD (I)**	**HUF/USD (II)**	**PLN/USD (I)**	**PLN/USD (II)**
Observations	898	938	898	938	898	938
Mean	0	-0.0004	0.0001	-0.0002	0.0001	-0.0003
Standard Deviation	0.0077	0.0069	0.0072	0.0086	0.0075	0.0078
Skewness	-0.0768	0.0484	-0.0525	0.4419	0.7525	0.0884
Excess Kurtosis	2.00	0.66	1.72	2.59	9.60	0.87
Minimum	-0.0401	-0.0263	-0.0279	-0.0404	-0.0477	-0.0297
Maximum	0.0377	0.0294	0.0415	0.0509	0.0624	0.0323

Table A.2: Number of Target Rate Decisions

	Overall	1999–12/12/2002	13/12/2002–2006
Ceska Narodni Banka	30	19	11
Magyar Nemzeti Bank	45	18	27
Narodowy Bank Polski	32	17	15
European Central Bank	21	13	8
Federal Reserve Bank	36	18	18

Table A.3: Number of Macro Surprises

	Overall	1999–12/12/2002	13/12/2002–2006
European Union			
Business Climate Indicator	49	10	39
Consumer Confidence	43	18	25
Germany			
Gross Domestic Product	24	12	12
Industrial Production	90	43	47
Trade Balance	95	48	47
IFO Business Climate Index	92	44	48
Retail Sales	87	42	45
Unemployment Rate	53	23	30
Consumer Price Index	63	28	35
Producer Price Index	81	40	41
United States			
Gross Domestic Product	26	15	11
Industrial Production	85	41	44
Trade Balance	93	46	47
ISM Index	93	47	46
Consumer Confidence	96	48	48
Retail Sales	83	38	45
Unemployment Rate	67	35	32
Consumer Price Index	65	31	34
Producer Price Index	85	40	45

Table A.4: Financial Control Models for Money Markets

	CZ 3M		HU 3M		PL 3M	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Constant Term			−0.0013	0.16	−0.0017	0.00
HU 3M 1st lag			0.2084	0.00		
PL 3M 1st lag					0.0802	0.00
PL 3M 2nd lag					0.0588	0.00
Exclusion Restriction	$\text{Chi}^2(54) = 17.2$		$\text{Chi}^2(51) = 50.4$		$\text{Chi}^2(50) = 48.7$	

Notes: Standard errors are heteroscedasticity-consistent. The last line shows the Chi^2-statistic for the exclusion test.

Table A.5: Financial Control Models for Stock Markets

	PX 50		BUX		WIG 20	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Constant Term	0.0013	0.00	0.0010	0.00		
Euro Stoxx 50 1st lag	−0.1123	0.00	−0.1386	0.00	−0.1448	0.00
Euro Stoxx 50 3rd lag	−0.0583	0.01				
S&P 500 1st lag	0.2829	0.00	0.3839	0.00	0.3885	0.00
S&P 500 3rd lag	0.0976	0.00				
Exclusion Restriction	$\text{Chi}^2(49) = 73.2$		$\text{Chi}^2(50) = 57.9$		$\text{Chi}^2(51) = 67.8$	

Notes: Standard errors are heteroscedasticity-consistent. The last line shows the Chi^2-statistic for the exclusion test.

Table A.6: Financial Control Models for Foreign Exchange Rates Against the Euro

	CZK/EUR		HUF/EUR		PLN/EUR	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Constant Term	−0.0002	0.01	0.0001	0.00	−0.0003	0.02
Thursday			0.0002	0.00		
BUX 3rd lag			−0.0022	0.01		
WIG 20 1st lag					−0.0290	0.00
PLN/EUR 1st lag	0.0418	0.00			−0.1586	0.00
PLN/EUR 2nd lag					−0.0593	0.01
PLN/USD 1st lag					0.0790	0.00
Exclusion Restriction	$\text{Chi}^2(40) = 47.9$		$\text{Chi}^2(38) = 60.3$		$\text{Chi}^2(36) = 55.4$	

Notes: Standard errors are heteroscedasticity-consistent. The last line shows the Chi^2-statistic for the exclusion test.

Table A.7: Financial Control Models for Foreign Exchange Rates Against the US Dollar

	CZK/USD		HUF/USD		PLN/USD	
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
CZ 3M 6th lag	−0.0126	0.00				
HU 3M 1st lag			−0.0062	0.00		
CZK/USD 1st lag	−0.1755	0.00			0.1074	0.00
HUF/USD 1st lag	0.3869	0.00				
HUF/USD 2nd lag	0.0624	0.02				
Exclusion Restriction	$\text{Chi}^2(37) = 55.9$		$\text{Chi}^2(40) = 55.6$		$\text{Chi}^2(40) = 61.5$	

Notes: Standard errors are heteroscedasticity-consistent. The last line shows the Chi^2-statistic for the exclusion test.