Bernoth, Kerstin; von Hagen, Jürgen

Working Paper

The performance of the Euribor futures market: Effficiency and the impact of ECB policy announcements

ZEI working paper, No. B 27-2003

Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn

Working Paper

Kerstin Bernoth, Jürgen von Hagen

The Performance of the Euribor Futures Market: Efficiency and the Impact of ECB Policy Announcements

B 27
2003

International Finance 7:1, 2004: pp. 1–24

The Euribor Futures Market: Efficiency and the Impact of ECB Policy Announcements*

Kerstin Bernoth† and Jürgen von Hagen‡

†*ZEI-Center for European Integration Studies and* ‡*University of Bonn, Indiana University, and CEPR.*

Abstract

For an effective and smooth monetary policy, it is important that interest rate expectations are in line with central bank policy intentions. The predictability of money market interest rates is, therefore, an indicator of transparency and clarity in the communication of monetary policy and of the effectiveness of monetary policy implementation.

In this paper, we analyse three aspects of the predictability of money market rates in the European Monetary Union (EMU). The first is the efficiency of the three-month Euribor interest rate futures markets. The second aspect is the effect of ECB policy announcements on the volatility of Euribor futures rates, and the third aspect is the effect of ECB policy announcements on the prediction error contained in Euribor futures rates. We find that the new Euro money markets were able to predict short-term rates well. Our results suggest that the ECB communication of monetary policy has worked well during the first years of EMU and that the predictability of ECB policy decisions seems to have improved over

*The authors thank Kenneth Kuttner and the participants at the Workshop on 'Monetary Policy and the Money Market' held at the Federal Reserve Bank of New York, Casper de Vries, Erik Theissen, and an anonymous referee for helpful comments.

time. ECB Council decisions still cause some surprises, but their effect on volatility is small.

I. Introduction

Short-term money market rates play a key role in the European Central Bank's (ECB) conduct of monetary policy. Since current money market rates are determined by the markets' expectations about future policy rates, it is important for an effective and smooth monetary policy that interest rate expectations are in line with central bank policy intentions (Poole and Rasche 2000). The predictability of money market interest rates is, therefore, an indicator of transparency and clarity in the communication of monetary policy and of the effectiveness of monetary policy implementation.

The predictability of money market rates has recently been investigated by a number of empirical studies. One approach starts from the rational expectations' hypothesis of the term structure of interest rates, which holds that money market rates of longer maturities should be unbiased and efficient predictors of future short-term rates. Using US data, Mankiw and Miron (1986), Rudebusch (1995), Balduzzi et al. (1997), Favero and Mosca (2001) test this hypothesis for various interest rates and analyse whether the term structure serves as a predictor of Federal Reserve funds target changes. The general finding is that the process of Federal Reserve policy moves is not well anticipated by the market, but Favero and Mosca (2001) conclude that uncertainty about monetary policy has been reduced from 1994 onwards.

Another approach is based on an application of the efficient market hypothesis (EMH) (Fama 1970) to the market for interest rate futures. Efficiency of this market would indicate that market participants are able, on average, to predict future spot rates correctly. This would point to a well-functioning communications policy of the central bank regarding its intended interest rate policy. Cole et al. (1991), Cole and Reichenstein (1994) and Krueger and Kuttner (1996) test for the efficiency of different short-term interest rate futures markets. Their empirical results generally support the EMH.

A third approach focuses on the effects of monetary policy announcements. If markets are efficient, a systematic response of asset prices or interest rates to central bank policy announcements would indicate that these announcements cause market participants to revise their expectations; that is, that they contain some 'news'. Depending on the size of revisions, this could imply that the central bank did not fully succeed in a smooth management of information regarding its monetary policy. Cook and Hahn (1989), Roley and Sellon (1998), Thornton (1998), Bomfim and Reinhart

(2000), Poole and Rasche (2000), Bomfim (2003), Rigobon and Sack (2001) and Kuttner (2001) find that monetary policy announcements by the Federal Reserve do have significant effects on short-term interest rates and stock prices.

This general approach has recently also been applied to the new Euro money market. The first paper to do this, Hartmann et al. (2001), uses intraday overnight interbank rates from voice brokers and electronic trading in five euro-area countries to estimate the prediction error of money market operators around ECB monetary policy decisions. Another paper, by Gaspar et al. (2002), examines the effect of ECB policy on the level and volatility of the daily overnight interbank rate (EONIA) using a GARCH model. Both papers conclude that market participants were able to predict ECB monetary policy decisions relatively well. In contrast, the pamphlet by Ross (2002) – applying different approaches to the euro area, the USA and the UK – argues that the ECB is less predictable than the Federal Reserve or the Bank of England.

In this paper, we add a new perspective to this debate. We analyse three aspects of the predictability of money market rates in the new market environment of the European Monetary Union (EMU). The first is the efficiency of the Euribor interest rate futures markets. We focus on the three-month Euribor future, which is the most actively traded interest rate derivative in the European money market. The second aspect is the effect of ECB policy announcements on the volatility of Euribor futures rates. The third aspect is the effect of ECB policy announcements on the prediction error contained in Euribor futures rates. A systematic decrease in the absolute prediction error would indicate that the announcement released by the ECB on a Governing Council day contains new information and, therefore, improves the markets' ability to predict future spot rates. This, too, would imply less successful information management by the ECB.

The Euribor market is of special interest, because it is a new market that emerged only with the start of EMU in 1999.[1] Our paper is the first to analyse the performance of futures rates in this market. Given the small number of futures contracts traded since its start, we use an efficiency test based on a panel-data approach instead of the conventional time-series approach. By using data since trading in Euribor futures first began in December 1998, we can check whether the markets' ability to predict ECB interest rate decisions has improved over the first years of EMU, and how the ECB's information management has developed over time.

[1]For characterizations of the euro money market see Hartmann et al. (2001), and Ewerhart et al. (2003).

The main results of this paper can be summarized as follows. First, we find that Euribor futures rates are indeed unbiased predictors of future spot rates. Furthermore, futures rates with forecast horizons up to four months are also (weakly) informationally efficient. This suggests that ECB policy decisions have, on average, been predictable and that, considering the fact that it is a new central bank operating in a new monetary environment, the ECB's information policy has worked surprisingly well.

Second, we find that the volatility of futures rates is significantly higher on days when the ECB Governing Council met than on non-Council days. At a closer look, however, it seems that market participants anticipated the majority of the ECB's policy decisions correctly. Only a few Council decisions seem to have taken the market by surprise. Third, we find that ECB policy announcements have no systematic effect on the absolute size of the prediction error contained in Euribor futures rates. These results corroborate our conclusion that, with few exceptions, the ECB's information policy has contributed to a smooth operation of monetary policy.

The paper proceeds as follows. Section II develops our test of market efficiency and presents the results. Section III presents our analysis of the effects of ECB policy announcements on Euribor futures rates. Section IV concludes.

II. Efficiency of the Euribor Futures Market

A. Testing Money Market Efficiency: A Panel Approach

Let r_t be the spot interest rate on a three-month interbank deposit at time t and $f_{i,t}$ the futures rate at time $t–i$ for a futures contract expiring at time t that has the same deposit as its underlying asset. Assuming that investors are risk neutral, arbitrage requires that the futures rate $f_{i,t}$ be equal to the spot rate r_t expected at time $t–i$, $E_{t-i}\ (r_t)$, where $E_{t-i}\ (\cdot)$ is the conditional expectation given all information available to market participants at time $t–i$. The EMH holds that market participants incorporate all relevant and available information in the determination of futures rates, and that, therefore, any difference between the spot rate, r_t, and the futures rate, $f_{i,t}$, is unpredictable given all information available at time $t–i$. Thus, $r_t = f_{i,t} + \varepsilon_{t,i}$ with $E_{t-i}\ (\varepsilon_{t,i}) = 0$.

The standard way of testing for the unbiasedness and efficiency of interest rate futures markets in the literature is to run a time-series regression of the following type:[2]

$$r_t = \alpha_i + \beta_i f_{i,t} + \gamma_i X_{i,t} + \varepsilon_{i,t} \tag{1}$$

[2]Compare, for example,. Cole et al. (1991), Krehbiel and Adkins (1994), Cole and Reichenstein (1994), Krueger and Kuttner (1996) and Cuthbertson (1996).

with $t = 1,\ldots,T$. α_i can be interpreted as a risk premium, X_{it} is a column vector of variables contained in the set of information available to the market at time $t–i$, and γ_i is a corresponding row vector. Based on equation (1), unbiasedness and efficiency requires that $\alpha_i = \beta_i - 1 = \gamma_i = 0$ and that the expectation error, $\varepsilon_{i,t}$, is serially uncorrelated.

In this standard test, the forecast horizon, i, is fixed and the data are non-overlapping, that is the distance between any two observations r_t and r_{t-1} is at least of length i. The test thus uses one futures rate quoted before the settlement day for each futures contract. This requires a sufficiently large number of contracts observed in the market. For the Euribor market, this approach is not practicable, simply because not enough contracts have been traded since the market started in December 1998. In view of this, we propose a test based on a panel approach similar to Dunis and Keller (1995), who perform an efficiency test for different currency option markets. The panel approach exploits the fact that futures rates are quoted on a daily basis, so that, for a contract expiring at time t, multiple futures rates with different times to expiration can be observed.

Let T be the number of contracts included in the sample and N the number of futures rates observed for each contract. For each contract $t = 1,\ldots,T$, we observe one spot rate, r_t, on the settlement day, and N futures rates, $f_{i,t}$, $i = 1,\ldots,N$. Thus, we build a panel forming N groups of futures rates with the same forecast horizon i, where each group contains T observations. The panel estimator used below takes the forecast horizon i as the cross-section and the settlement date as the time-series dimension. A necessary condition for this approach to be feasible is the poolability of futures rates with different forecast horizons, i.e., $\beta_i = \beta$, and $\gamma_i = \gamma$ for all $i = 1,\ldots,N$ (Baltagi 1995). If poolability holds, equation (1) can be rewritten as

$$r_t = \alpha_i + \beta f_{i,t} + \gamma X_{i,t} + \varepsilon_{i,t} \tag{2}$$

with $t = 1,\ldots,T$; $i = 1,\ldots,N$. The panel set-up thus gives us NT observations to test for market efficiency. Note that the panel allows for risk premia, α_i, to vary with the length of the forecast horizon, as suggested by Fama (1984). The null hypothesis of efficiency and unbiasedness is then expressed by the condition that $\alpha_i = \beta - 1 = \gamma = 0$ for all i, and that the expectation error $\varepsilon_{i,t}$ is serially uncorrelated.

Let $\Omega_{i,t}$ and $\Omega_{j,t}$ be the information sets underlying the forecasts of the spot market rate r_t embedded in two different futures rates, $f_{i,t}$ and $f_{j,t}$, with $0 < j < i \leq N$. Our panel structure implies that $\Omega_{i,t}$ is contained in $\Omega_{j,t}$, $\Omega_{i,t} \subset \Omega_{j,t}$, and, therefore, the error terms $\varepsilon_{i,t}$ and $\varepsilon_{j,t}$ are correlated. Furthermore, the variance of $\varepsilon_{j,t}$ can be expected to be smaller than the variance of $\varepsilon_{i,t}$. To account for this, we use an OLS estimator with panel-corrected standard errors proposed by Beck and Katz (1995), which corrects for heteroskedasticity, contemporaneous correlation across groups and, if necessary, serial correlation.

B. Data

A Euribor future is a futures contract with a Euribor deposit as the underlying asset. Since 1 January 1999, the Euribor has been used as the European money market reference rate for the unsecured market. One-month and three-month Euribor futures have been traded on the derivatives market since December 1998. According to information from the LIFFE (London International Financial Futures and Options Exchange), the three-month Euribor futures contract currently accounts for over 99% of the euro denominated short-term interest rate derivatives market. During the third quarter of 2003, 34.6 million Euribor futures contracts were traded, an increase of 16% compared to the equivalent period the year before.

The three-month Euribor future is a commitment to engage in a three month loan or deposit of a face value of 1000,000 Euros. There are four delivery dates during a year, namely the third Wednesday of March, June, September and December. The last trading day of each futures contract is two trading days prior to the relevant settlement day. Futures prices are quoted on a daily basis and the interest rate contracted equals 100 less the futures price.

The data used in this study are provided by LIFFE.[3] Our sample contains daily closing rates of the 19 three-month Euribor futures contracts that settled between March 1999 and September 2003, i.e. $t = 1, \ldots, 19$. We use all futures rates with forecast horizons of up to six months for each futures contract, i.e. $i = 1, \ldots, 183$. After accounting for weekends, this yields a total of 131 cross-sections with 19 observations each. The first futures rate in our data sample was priced on 15 December 1998 and the last on 15 September 2003. A Chow test does not reject the null hypothesis of poolability. This means that the panel approach is feasible given our data.[4]

Figures 1–6 plot the futures rates and the corresponding spot interest rates with different forecast horizons.[5] Financial markets over-predict future spot rates, when the futures rate is above the corresponding spot rate, and they

[3]Data available at http://www.liffe-style.com.

[4]The results are available from the authors on request.

[5]Note that all futures rates of a futures contract predict the same spot rate realized at the third Wednesday of the relevant month (March, June, September, December); hence the figure shows the spot rate moving in steps and the futures rates fluctuating around it.

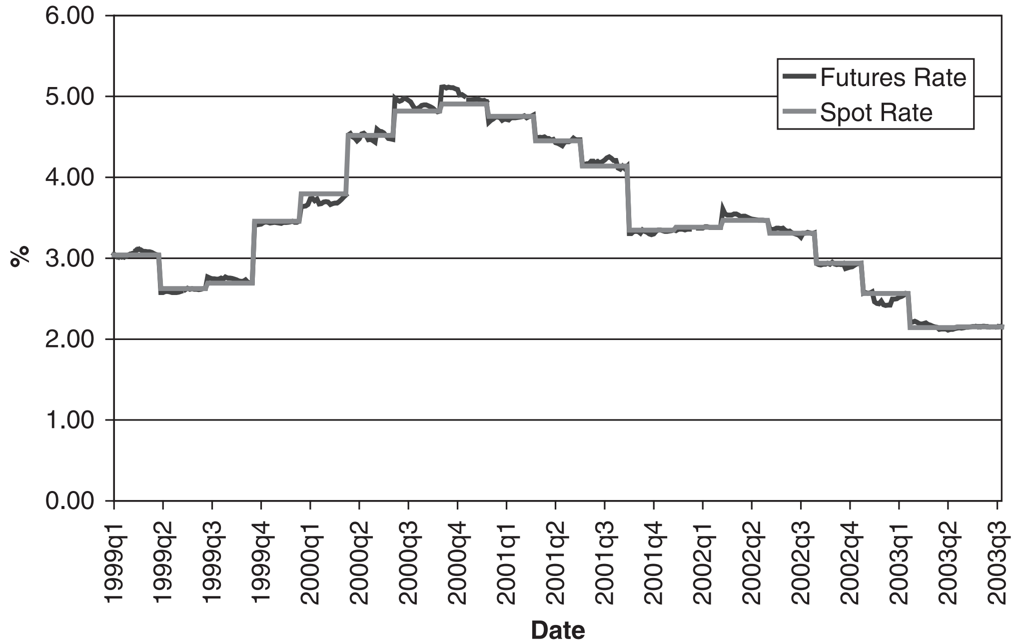

Figure 1: Futures Rates with Forecast Horizon of 1–31 days

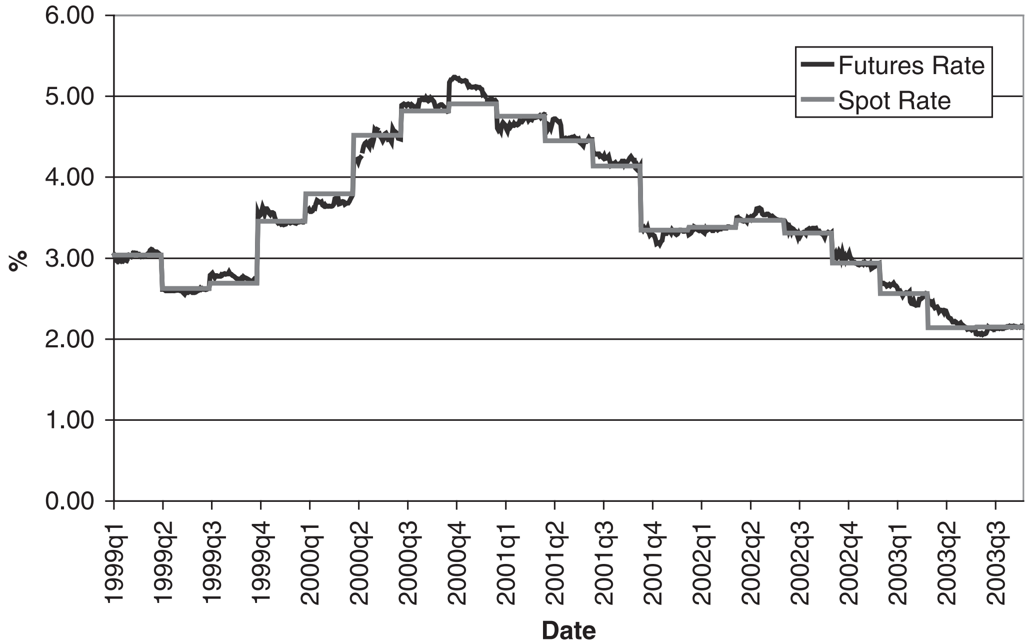

Figure 2: Futures Rates with Forecast Horizon of 1–61 days

under-predict future spot rates, when the futures rate is below that. The figures show that the Euribor futures rates are generally close to the corresponding spot rates, especially when their settlement dates approach. A comparison between Figure 1 and Figure 6 shows that, unsurprisingly, the ability of futures rates to predict spot interest rates decreases with the length

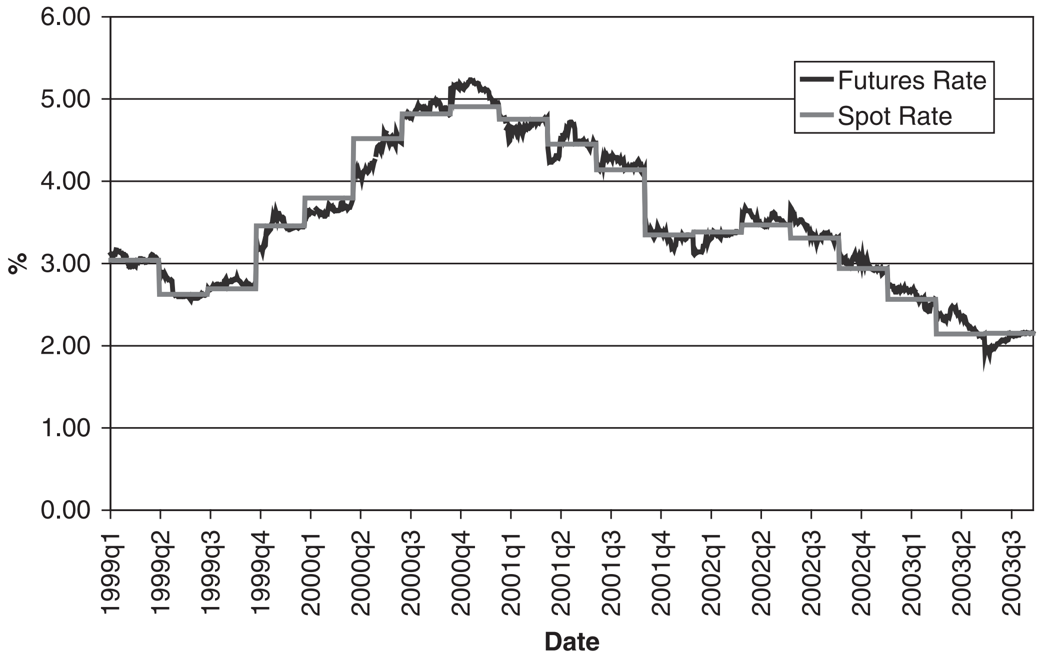

Figure 3: Futures Rates with Forecast Horizon of 1–91 days

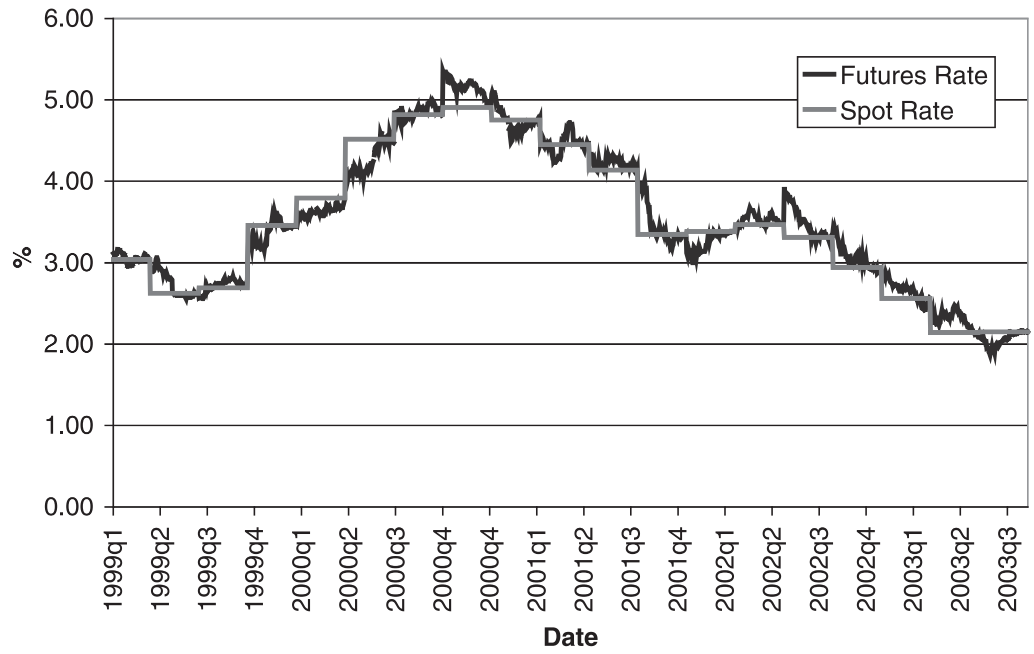

Figure 4: Futures Rates with Forecast Horizon of 1–122 days

of the forecast horizon. The figures suggest that markets tend to under-predict interest rates in times, when spot rates follow an upward trend, and they tend to over-predict interest rates, when there is a downward trend of spot interest rates. For example, Figure 6 shows that the Euribor futures rates of the June 2002 and September 2002 contracts contained positive prediction

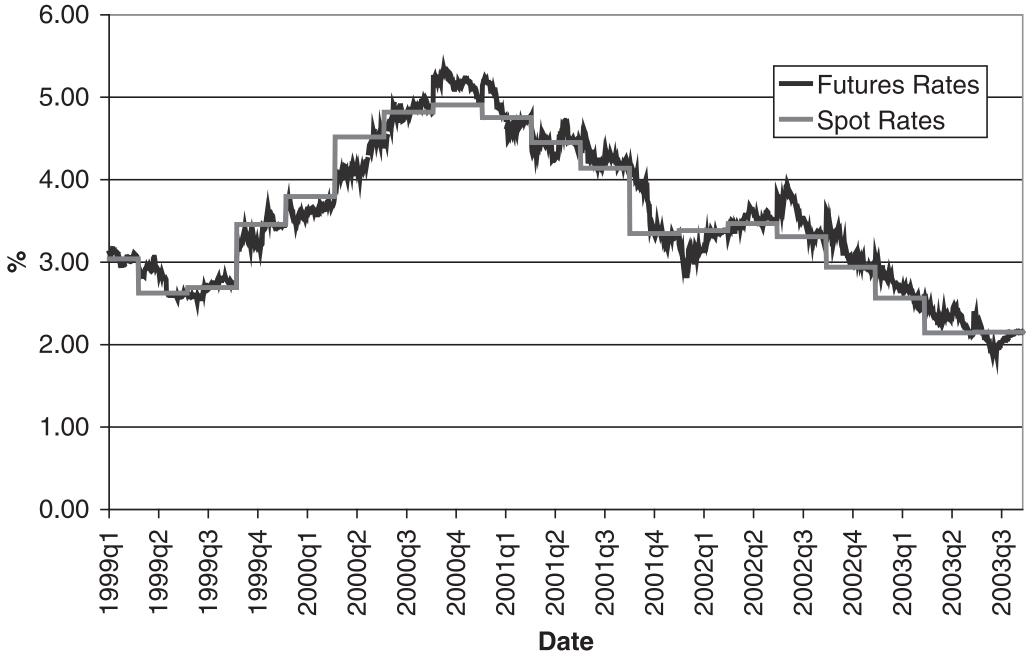

Figure 5: Futures Rates with Forecast Horizon of 1–153 days

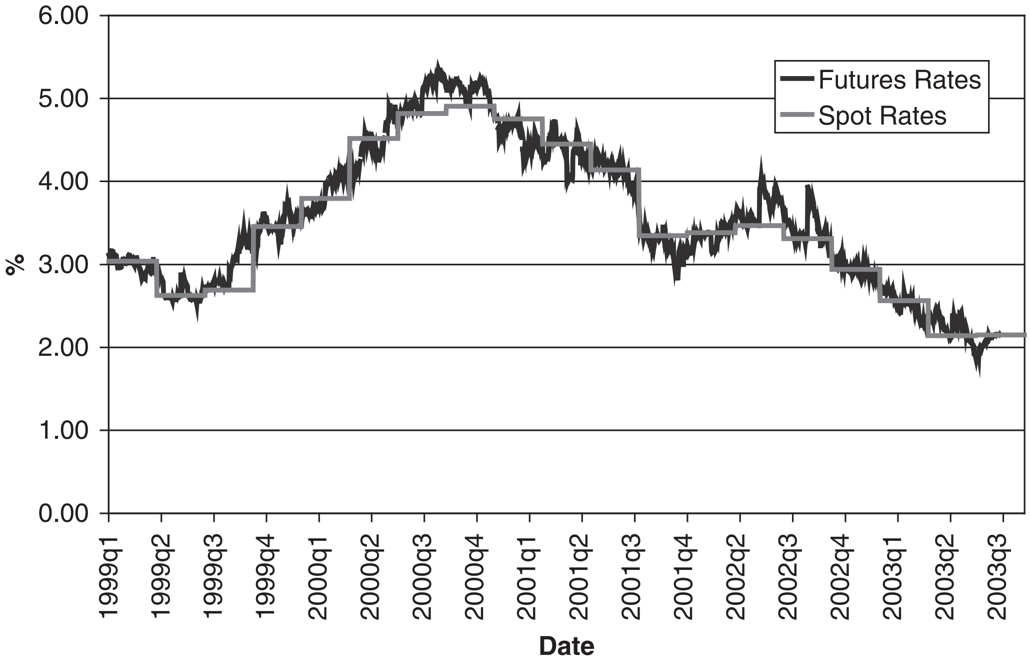

Figure 6: Futures Rates with Forecast Horizon of 1–183 days

errors of almost 50 basis points. Thus, market participants expected a rise of the Euribor interest rate, which actually did not happen. Contrarily, the futures rates of the March 2002 contract under-predicted future spot rates by around 50 basis points. Market participants apparently expected a continuation of the downward trend of Euribor interest rates, but actual spot rates slightly increased.

C. Results

It is plausible that the markets' forecasting ability diminishes as the time to expiration of the futures rates i increases.[6] Therefore, the results of the efficiency and unbiasedness tests may depend on the length of the forecast period. In view of this, we perform our tests for forecasting horizons of increasing length: one month ($i = 1,\ldots,31$), two months ($i = 1,\ldots,61$), three months ($i = 1,\ldots,91$), four months ($i = 1,\ldots,122$), five months ($i = 1,\ldots,153$) and finally six months ($i = 1,\ldots,183$). We focus on weak-form efficiency, i.e., the information set used for the forecasts consists of past spot and futures rates. Thus, the vector $X_{i,t}$ in equation (2) includes the variables r_{t-1}, $f_{i,t-1}$ and the forecast innovation $f_{i,t} - f_{i-1,t}$.[7]

Detailed results are presented in Tables A2 to A7 in the Appendix. They are summarized in Table 1.[8] In all regressions, the constant α turns out to be insignificant and the β coefficient is not significantly different from 1. Accordingly, Euribor futures rates are unbiased predictors of future spot rates. Futures rates with forecast horizons of less than four months fulfil the conditions for informational efficiency, i.e. the coefficients on past spot and futures rates are insignificant and the error terms show no serial correlation. In contrast, for futures rates with longer forecast horizons, past spot and futures rates are insignificant, but the error process exhibits significant first order serial correlation.[9] Thus, in these cases, we accept unbiasedness but reject efficiency.

[6]Figure A1 in the Appendix shows the root mean squared error in dependence of the days to maturity, and confirms this presumption. The increasing graph shows that the predictive accuracy diminishes as the contract horizon is extended.

[7]Since the forecast errors of $f_{i-1,t}$ and $f_{i,t}$ overlap, the only new information for the investor between these two days is the innovation or the difference between these two futures rates.

[8]A detailed description of the test we performed to investigate the structure of the error covariance matrix is listed in Table A1 in the Appendix.

[9]Since our sample extends over the millennium change, we also tested for an increase in the risk premium for the March 2000 contract by including a Y2K dummy in our regressions. This dummy takes the value of one for market days between 13 September 1999 and 7 January 2000, and zero otherwise. The Y2K dummy turns out to be insignificant in all regressions. So, the considerably increased intraday volatility and transaction costs documented by Hartmann et al. (2001) for the euro overnight market during the Y2K changeover week did not seem to impair, in any significant fashion, the ability of the money market to predict short-term rates.

Table 1: Summary of Results of Efficiency Tests with Overlapping Data

Forecast Horizon	Information Set $X_{i,t}$	**Unbiasedness** $\alpha = \beta - 1 = 0$	**Efficiency** $\alpha = \beta - 1 = \gamma = 0$	$\rho = 0$
1–31 days	–	A[1)]	A	a[2)]
	r_{t-1}	A	A	a
	$f_{i,t-1}$	A	A	a
	$f_{i,t} - f_{i-1,t}$	A	A	a
1–61 days	–	A	A	a
	r_{t-1}	A	A	a
	$f_{i,t-1}$	A	A	a
	$f_{i,t} - f_{i-1,t}$	A	A	a
1–91 days	–	A	A	a
	r_{t-1}	A	A	a
	$f_{i,t-1}$	A	A	a
	$f_{i,t} - f_{i-1,t}$	A	A	a
1–122 days	–	A	A	a
	r_{t-1}	A	A	a
	$f_{i,t-1}$	A	A	a
	$f_{i,t} - f_{i-1,t}$	A	A	a
1–153 days	–	A	A	R[3)]
	r_{t-1}	A	A	R
	$f_{i,t-1}$	A	A	R
	$f_{i,t} - f_{i-1,t}$	A	A	R
1–183 days	–	A	A	R
	r_{t-1}	A	A	R
	$f_{i,t-1}$	A	A	R
	$f_{i,t} - f_{i-1,t}$	A	A	R

Notes: [1)]F-Test accepted at a significance level of 10%. [2)]LM-Test accepted at a significance level of 10%. [3)]LM-Test rejected at a significance level of 5%.

To summarize, the results indicate that financial markets were, on average, able to predict Euribor futures rates during the first years of EMU.

III. The Impact of Monetary Policy Announcements

A. Volatility of Euribor Futures Rates

As pointed out by Poole and Rasche (2000), the EMH implies that futures rates should react to the announcement of monetary policy decisions, if and only if these announcements contain some news about future money market rates. This suggests that one can use the effect of such announcements on the volatility of futures rates as a measure for the quality of the central bank's information management. If the volatility of futures rates is systematically larger on days when monetary policy decisions are announced than otherwise, then these announcements typically carry significant news or lead to a new interpretation of the central bank's intentions by the markets. Testing for announcement effects on volatility is, therefore, a check on the quality of the central bank's information management.

During our sample period, 92 meetings of the ECB Governing Council occurred, including 16 at which central bank interest rates were changed; see Table 2. The ECB Governing Council usually met on the first and the third Thursday of a month. Only six Council meetings took place on Wednesdays,[10] and one, the meeting of 17 September 2001, on a Monday. In November 2001 the Governing Council announced that – as a rule – it would assess its monetary policy stance only in the first meeting of the month. Accordingly, since then it has not changed interest rates on any of the second meetings during any month.

Table 2: ECB Interest Rate Changes between November 1999 and September 2003

Decisions on	Deposit rate (%)	MRO rate (%)	Marg. lending rate (%)
21 Jan 99	2.00	3.00	4.00
8 Apr 99	1.50	2.50	3.50
4 Nov 99	2.00	3.00	4.00
3 Feb 00	2.25	3.25	4.25
16 Mar 00	2.50	3.50	4.50
27 Apr 00	2.75	3.75	4.75
8 Jun 00	3.25	4.25	5.25
31 Aug 00	3.50	4.50	5.50
5 Oct 00	3.75	4.75	5.75
10 May 01	3.50	4.50	5.50
30 Aug 01	3.25	4.25	5.25
17 Sep 01	2.75	3.75	4.75
8 Nov 01	2.25	3.25	4.25
5 Dec 02	1.75	2.75	3.75
6 Mar 02	1.50	2.50	3.50
5 Jun 03	1.00	2.00	3.00

Notes: MRO = main refinancing operation
The interest rate change at the 4 January 1999 meeting is not included in this table, because it was already decided in December 1998
Source: ECB

[10] They were the meetings on 2 June 1999, 15 December 1999, 5 January 2000, 21 June 2000, 11 April 2001 and 23 May 2001.

We measure volatility in terms of the absolute change in the futures rate between two trading days multiplied by 100, $\sigma_t = 100\ |f_{i,t-}\ f_{i-1,t}|$. To avoid double counting of ECB Council meetings, we restrict the analysis to the closing rates of all nearby three-month Euribor futures between 1 January 1999 and 15 September 2003. Thus, we consider futures rates with forecast horizons of one to 91 days.

As a first step, we regress the volatility on a constant and four week-day dummies to check for any week-day effect that might be caused by the money market's microstructure. As before, we employ a panel estimator correcting for serial correlation and heterogeneity across groups.[11] The results are shown in Table 3. They indicate a significant Thursday effect, in line with earlier findings by Hartmann et al. (2001). In the first half of the sample, this Thursday effect was more than twice the size estimated in the second half of the sample period.[12]

Figure 7 depicts the volatility of futures rates on Governing Council days. Meetings at which the ECB Council changed its policy rates are highlighted. On 38 out of 92 Governing Council days (41% of all Council meetings), the announcement effect was small, causing a volatility of less than 1.72 basis points, which is the average volatility on all days plus two standard deviations of 0.10 basis points (compare Table 3). These policy decisions apparently incorporated only little new information. On 29 meetings (32% of all Council meetings), the volatility exceeded 3.04 basis points, twice the average volatility on all days.

Table 3: Day-Average Volatilities with Corrections for Heteroskedasticity

	$\lvert f_{i,t} - f_{i-1,t}\rvert$		
	March 99–Sep 03	March 99–June 01	Sep 01–Sep 03
const.	1.52 [0.00]	1.47 [0.00]	1.57 [0.00]
Tuesday	0.12 [0.51]	0.22 [0.37]	0.02 [0.95]
Wednesday	0.26 [0.17]	0.46 [0.13]	0.03 [0.87]
Thursday	0.81 [0.00]	1.12 [0.02]	0.47 [0.02]
Friday	0.24 [0.12]	0.37 [0.10]	0.11 [0.50]
R^2	0.02	0.02	0.01
Obs.	1185	615	570

Notes: *P*-Values are reported in squared brackets. Volatilities are multiplied by 100 to express basis points.

[11]Group-wise heterogeneity is suggested by the 'Samuelson effect' which holds that the volatility of asset prices increases with decreasing maturity *i*; see Samuelson (1965).

[12]A coefficient test rejects at a 5% significance level the null-hypothesis that the Thursday effect is the same in both sub-samples.

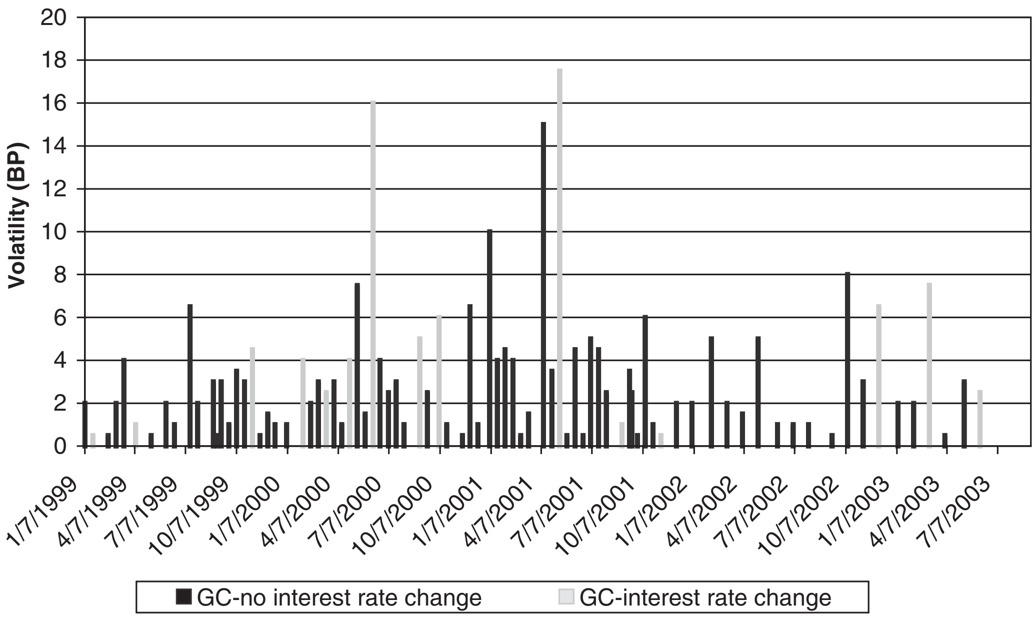

Figure 7: Volatility of Futures Rates at Governing Council Meetings

Figure 7 shows that there are only four days with a volatility of more than 10 basis points: 8 June 2000, 4 January 2001, 11 April 2001 and 10 May 2001. Half of these are days on which the ECB announced an interest rate change. Obviously, markets were to some extent surprised by these policy decisions. We do not observe similarly large volatilities after May 2001, indicating that the ECB's communication policy managed to avoid large surprises in the second half of the sample.

On 11 May 2000, the Governing Council decided not to change its monetary policy, but nevertheless Euribor futures rates decreased by almost 8 basis points. A month later, on 8 June 2000, the Governing Council announced a rate cut of 50 basis points, and Euribor futures rates decreased by another 16 basis points. Thus, market participants apparently expected correctly an interest rate cut, but they were surprised by the size of the policy change. The high volatility on 4 January 2001 is probably the reaction to the Federal Reserve funds rate cut of 50 basis points the day before. Financial markets expected the ECB to follow the Federal Reserve's lead and, therefore, the Euribor futures rate fell by 10 basis points. On 11 April 2001, the ECB announced it would hold interest rates constant and futures rates reacted with a rate jump upwards of 15 basis points. At the Council meeting one month later, the ECB decided to cut interest rates by 25 basis points, and financial markets reacted with a downward correction of futures rates by more than 18 basis points. This volatility pattern indicates that market participants correctly expected the direction of interest rate changes intended by the ECB, but there was uncertainty about the timing. Thus, the markets misinterpreted the ECB's inaction at the first Council meeting as a signal that rates would not be changed for a while, hence they were surprised by the subsequent move.

The upper panel of Table 4 presents the results of regressing the volatility of Euribor futures rates on a constant and three dummies: the Thursday dummy, one dummy for all Council meetings and one for Council meetings with announced interest rate changes. The Thursday dummy is now insignificant. This suggests that the apparent Thursday effect in Table 3 relates to the Governing Council meetings.

In the lower panel of Table 4, we drop the Thursday dummy. Between 1999 and 2003 the volatility of Euribor futures on Governing Council meeting days exceeded the volatility on other days by 0.8 basis points. This effect is significant at the 10% level over the entire sample. On Governing Council days with announced monetary policy changes, Euribor futures rates are the most volatile. During the first two years of EMU, the extra volatility was 3.93 basis points and significant at the 1% level. In contrast, between September 2001 and September 2003, the extra volatility was only one basis point and it was not statistically significant anymore.

The empirical results thus indicate that, during the first two years of EMU, some decisions of the ECB Council were not fully anticipated by market participants. Even in the first two years, however, the impact of policy announcements on the volatility of futures rates was small compared to the typical size of changes in central bank interest rates, which is 25 or 50 basis points. This suggests that the economic importance of the announcement effect was limited. With our new methodology based on euro money market

Table 4: Effects of Monetary Policy Decisions on Volatility

	$\lvert f_{i,t} - f_{i-1,t} \rvert$		
	March 99–Sep 03	March 99–June 01	Sep 01–Sep 03
const.	1.67 [0.00]	1.73 [0.00]	1.61 [0.00]
Thursday	0.31 [0.16]	0.38 [0.36]	0.24 [0.20]
GC Days	0.56 [0.08]	0.50 [0.33]	0.57 [0.19]
GC with Int. Rate Change	2.74 [0.00]	3.88 [0.00]	1.03 [0.20]
R^2	0.04	0.06	0.02
const.	1.72 [0.00]	1.79 [0.00]	1.65 [0.00]
GC Days	0.80 [0.08]	0.78 [0.06]	0.78 [0.07]
GC with Int. Rate Change	2.75 [0.00]	3.93 [0.00]	0.99 [0.22]
R^2	0.04	0.06	0.02
Obs.	1185	615	570

Notes: *P*-Values are reported in squared brackets. Volatilities are multiplied by 100 to express basis points.

futures, we therefore confirm some of the general results of earlier papers referred to in the introduction.

B. Announcement Effects on Prediction Errors

A decline in the absolute prediction error between two trading days, $100(|r_t - f_{i,t}| - |r_t - f_{i-1,t}|)$, indicates that the predictability of future spot rates improved due to market developments on that day. In connection with announcements of ECB monetary policy decisions,[13] this would suggest that the announcement improved the markets' ability to predict future spot rates.

Figure 8 shows the changes of the absolute prediction error on Governing Council and non-Council days. There are six outliers, i.e., changes of at least ten basis points in absolute values. Four of these signal a large improvement in interest rate predictability. Three of the six outliers are observed on Governing Council days, two of them (the Council meetings on 11 April 2001 and on 10 May 2001) show a decrease and one (the Council meeting on 4

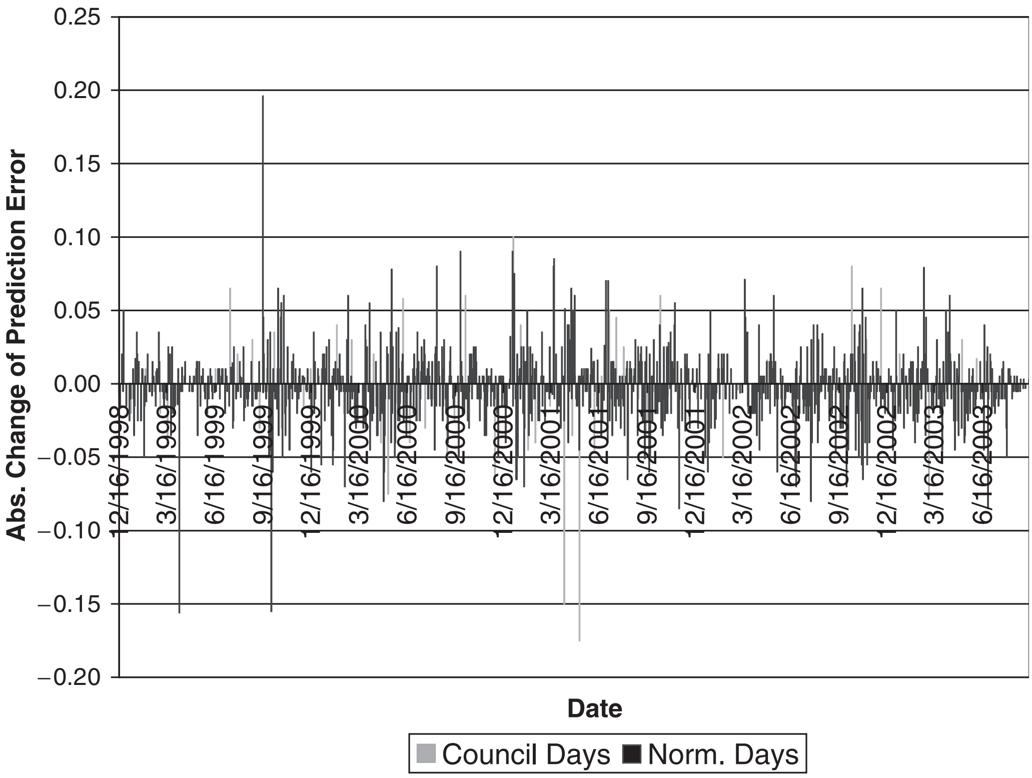

Figure 8: Total Change of the Prediction Error of Euribor Futures

[13]We also regressed the absolute change of the futures rates' prediction error on weekday dummies. The results show no systematic effects. The estimation results are available from the authors on request.

January 2001) an increase in the prediction error. In general, positive and negative changes occur with similar frequencies. Thus, the graphical analysis suggests that the information released on Governing Council meetings did not systematically improve the markets' ability to forecast interest rates.

A regression of the changes in absolute prediction errors on a constant and dummies for Council days and Council days with interest rate changes confirms that impression. We use again an OLS estimation approach with panel-corrected standard errors to capture cross-sectional heteroskedasticity and correlation. Table 5 shows that the coefficients on both dummies are statistically not significant. ECB policy announcements did not systematically help market participants to improve their interest rate forecasts.

Table 5: Effects of Monetary Policy Announcements on Day-Prediction Error

	$\lvert r_t - f_{i,t}\rvert - \lvert r_t - f_{i-1,t}\rvert$		
	March 99–Sep 03	March 99–June 01	Sep 01–Sep 03
const.	− 0.26 [0.00]	− 0.18 [0.02]	− 0.34 [0.00]
GC Days	− 0.01 [0.98]	− 0.57 [0.28]	0.90 [0.13]
GC with Int. Rate Change	− 0.99 [0.29]	− 0.98 [0.48]	− 1.11 [0.38]
R^2	0.04	0.06	0.02
Obs.	1185	615	570

Notes: *P*-Values are reported in squared brackets. Volatilities are multiplied by 100 to express basis points.

IV. Conclusion

In this paper, we analyse three aspects of the predictability of money market rates in the EMU. The first is the efficiency of the three-month Euribor interest rate futures markets. The estimation results show that Euribor futures rates with a forecast horizon of up to four months are unbiased and informationally efficient predictors of future spot rates.

The second aspect is the impact of the ECB's monetary policy decisions on the volatility of the Euribor futures rates. The efficient market hypothesis (EMH) implies that futures rates only change between two days when new information comes on the market. The volatility of the futures rates at Governing Council meetings can therefore be used as a measure of surprise caused by the central bank's policy decision. Estimation results show that, during the first five years of EMU, the average volatility of the Euribor futures rates on Governing Council days was significantly larger than on non-Council days, and most of that extra volatility came from Governing Council meetings at which interest rate changes were adopted. During the first two years, the volatility of futures rates after policy actions was about three times as large as during the subsequent two years of EMU. A closer look at the futures rate changes at Governing Council days shows that a majority of ECB policy decisions were anticipated correctly by the markets, and only a few constituted an economically significant surprise. We do not explore in greater depth, however, what could have led European central bankers to surprise markets at those instances. This could be usefully done in future research.

The third aspect is the impact of Governing Council meetings on the change in the absolute prediction error of the Euribor futures rates. Our analysis suggests that the information released on Governing Council days did not systematically improve the markets' ability to forecast interest rates.

The predictability of short-term money market rates is an indicator of monetary policy transparency and the effectiveness of the central bank's information policy. Our empirical results suggest that participants in the new euro money markets were able to predict short-term rates well. Moreover, the predictability of ECB policy decisions seems to have further improved during the first years of EMU. ECB Council decisions still cause some surprises, but their effect on volatility is small. In sum, the ECB's information management in this new environment has been met with considerable success.

Kerstin Bernoth and Jürgen von Hagen
ZEI-Center for European Integration Studies
Walter-Flex Str. 3
53113 Bonn
Germany
kerstin.bernoth@wiwi.uni-bonn.de
vonhagen@uni-bonn.de

References

Balduzzi, P., G. Bertola and S. Foresi (1997), 'A Model of Target Changes and the Term Structure of Interest Rates', *Journal of Monetary Economics*, 39, 223–49.

Baltagi, B. (1995), *Econometric Analysis of Panel Data*. New York: John Wiley and Sons.

Beck, N., and J. N. Katz (1995), 'What to do (and not to do) with Times-Series-Cross-Section Data', *American Political Science Review*, 89, 634–47.

Bomfim, A. N. (2003), 'Pre-announcement Effects, News Effects, and Volatility: Monetary Policy and the Stock Market', *Journal of Banking and Finance*, 27, 133–51.

Bomfim, A. N., and V. R. Reinhart (2000), 'Making News: Financial Market Effects of Federal Reserve Disclosure Practices', Financial and Economics Discussion Series No. 14.

Cole, S., and W. Reichenstein (1994), 'Forecasting Interest Rates with Eurodollar Futures Rates', *The Journal of Futures Markets*, 14, 37–50.

Cole, S., M. Impson and W. Reichenstein (1991), 'Do Treasury Bill Futures Rates Satisfy Rational Expectation Properties?', *The Journal of Futures Markets*, 11, 591–601.

Cook, T., and T. Hahn (1989), 'The Effect of Changes in the Federal Funds Rate Target on Market Interest Rates in the 1970s', *Journal of Monetary Economics*, 24, 331–51.

Cuthbertson, K. (1996), *Quantitative Financial Economics: Stocks, Bonds and Foreign Exchange*. New York: Wiley and Sons.

Dunis, C., and A. Keller (1995), 'Efficiency Tests with Overlapping Data: An Application to the Currency Options Market', *The European Journal of Finance*, 1, 345–66.

Ewerhart, C., N. Cassola, S. Ejerskov and N. Valla (2003), 'The Euro Money Market: Stylized Facts and Open Questions.', Mimeo, European Central Bank, Frankfurt.

Fama, E. (1970), 'Efficient Capital Markets: A Review of Theory and Empirical Work', *Journal of Finance*, 25, 383–417.

Fama, E. (1984), 'The Information in the Term Structure', *Journal of Financial Economics*, 13, 509–28.

Favero, C. A., and F. Mosca (2001), 'Uncertainty on Monetary Policy and the Expectations Model of the Term Structure of Interest Rates', *Economics Letters*, 71, 369–75.

Gaspar, V., G. Perez-Quirós and J. Sicilia (2002), 'The Monetary Policy Decisions of the ECB and the Money Market', in Market Functioning and Central Bank Policy, *BIS Papers*, 12, 402–11.

Hartmann, P., M. Manna and A. Manzanares (2001), 'The Microstructure of the Euro Money Market', *Journal of International Money and Finance*, 20, 895–948.

Krehbiel, T., and L. Adkins (1994), 'Interest Rate Futures: Evidence on Forecast Power, Expected Premiums, and the Unbiased Expectations Hypothesis', *The Journal of Futures Markets*, 14, 531–43.

Krueger, J. T., and K. Kuttner (1996), 'The Fed Funds Rate as a Predictor of Federal Reserve Policy', *The Journal of Futures Markets*, 16, 865–79.

Kuttner, K. (2001), 'Monetary Policy Surprises and Interest Rates: Evidence from the Fed Funds Futures Market', *Journal of Monetary Economics*, 47, 523–44.

Mankiw, N. G., and J. A. Miron (1986), 'The Changing Behavior of the Term Structure of Interest Rates', *The Quarterly Journal of Economics*, 101, 211–28.

Poole, W., and R. Rasche (2000), 'Perfecting the Market Knowledge of Monetary Policy', Federal Reserve Bank of St Louis, Working Paper No. 2000-010A.

Rigobon, R., and B. Sack (2001), 'Measuring the Reaction of Monetary Policy to the Stock Market', NBER Working Paper No. 8350.

Roley, V. V., and G. H. Sellon (1998), 'Market Reaction to Monetary Policy Non-announcements', Federal Reserve Bank of Kansas City Working Paper No. 98-06.

Ross, K. (2002), 'Market Predictability of ECB Monetary Policy Decisions: A Comparative Examination', IMF Working Paper No. 02/233, December.

Rudebusch, G. D. (1995), 'Federal Reserve Interest Rate Targeting, Rational Expectations, and the Term Structure', *Journal of Monetary Economics*, 24, 245–74.

Samuelson, P. A. (1965), 'Proof that Properly Anticipated Prices Fluctuate Randomly', *Industrial Management Review*, 6, 41–63.

Thornton, D. (1998), 'Tests of the Market's Reaction to Federal Funds Rate Target Changes', Federal Reserve Bank of St. Louis, *Review*, 25–36.

Appendix

Table A1 shows the test results of the structure of the error term matrix. A Chow test does not reject the non-existence of individual effects. This shows that risk premia do not vary with the length of the forecast horizon i of futures rates, $\alpha_i = \alpha_j$ for $i \neq j$.

A Lagrange Multiplier (LM) test rejects the null hypothesis of a common variance across panels at every reasonable significance level. Accordingly, the variance of the error process differs depending on the days to maturity i.

A White test rejects the null hypothesis of homoskedasticity across time t for all panel regressions and futures rates with different forecasting horizons.

The results of a Breusch Pagan LM test show that we can reject, at every significance level, the null-hypothesis of no cross-sectional correlation. That means that if a futures rate has a positive prediction error i days before contract maturity, it is likely that the futures rate will show a similar prediction error j days before maturity, where $j = [i - n, i+n]$ and n denotes a sufficiently small time distance to this specific day.

The LM test results show that we cannot reject the null hypothesis of no serial correlation in the regressions with futures rates with a forecast horizon of up to four months.

Table A1: Test Results

Forecast Horizon	$X_{i,t}$	Indiv. Effects H$_0$: $\alpha_i = \alpha$	Heterosk. across i H$_0$: $\sigma_{ij} = \sigma$	Contemp. Correl. H$_0$: $\sigma_{ij} = 0$	Serial Correl. H$_0$: $\rho = 0$
1–31 days	–	0.92	0.00	0.00	0.49
	r_{t-1}	0.76	0.00	0.00	0.36
	$f_{i,t-1}$	0.77	0.00	0.00	0.63
	$(f_{i,t} - f_{i\text{-}1,t})$	0.92	0.00	0.00	0.50
1–61 days	–	0.97	0.00	0.00	0.52
	r_{t-1}	0.89	0.00	0.00	0.95
	$f_{i,t-1}$	0.82	0.00	0.00	0.63
	$(f_{i,t} - f_{i\text{-}1,t})$	0.95	0.00	0.00	0.31
1–91 days	–	1.00	0.00	0.00	0.69
	r_{t-1}	1.00	0.00	0.00	0.89
	$f_{i,t-1}$	1.00	0.00	0.00	0.74
	$(f_{i,t} - f_{i\text{-}1,t})$	1.00	0.00	0.00	0.82
1–122 days	–	0.93	0.00	0.00	0.16
	r_{t-1}	0.92	0.00	0.00	0.32
	$f_{i,t-1}$	1.00	0.00	0.00	0.42
	$(f_{i,t} - f_{i\text{-}1,t})$	0.92	0.00	0.00	0.20
1–153 days	–	0.59	0.00	0.00	0.00
	r_{t-1}	0.65	0.00	0.00	0.00
	$f_{i,t-1}$	1.00	0.00	0.00	0.01
	$(f_{i,t} - f_{i\text{-}1,t})$	0.57	0.00	0.00	0.00
1–183 days	–	0.91	0.00	0.00	0.00
	r_{t-1}	0.99	0.00	0.00	0.00
	$f_{i,t-1}$	1.00	0.00	0.00	0.00
	$(f_{i,t} - f_{i\text{-}1,t})$	0.90	0.00	0.00	0.00

Figures in *P*-values

Table A2: Estimation Results for Euribor Futures Rates with 1-Month Forecast Horizon

	Independent Variables					Statistics				Coefficient test			
Equ.	α	β	r_{t-1}	$f_{i,t-1}$	$f_{i,t} - f_{i-1,t}$	R^2	RMSE	NT	AR1	α	β	$\gamma_{1,2,3}$	*F*-test
(3)	**0.07**	**0.98**				1.00		393	0.49	0.09	0.06		0.15
	0.09	0.00											
(4)	**0.06**	**0.97**	**0.01**			1.00		372	0.36	0.17	0.22	0.66	0.27
	0.17	0.00	0.66										
(5)	**0.07**	**0.97**		**0.01**		1.00		366	0.63	0.14	0.26	0.76	0.29
	0.14	0.00		0.76									
(6)	**0.07**	**0.98**			**0.15**	1.00		389	0.50	0.10	0.07	0.22	0.16
	0.10	0.00			0.22								

Notes: Standard errors in parentheses; R^2 is the proportion of the total variation in $r_{i,t}$ explained by the regression; RMSE denotes the root mean squared error; NT is the number of observations; AR1 gives the *P*-values of a LM test for first-order autocorrelation; the individual coefficient tests are simple linear tests of coefficient restictions against the null hypothesis where $\alpha = 0$, $\beta = 1$, $\gamma_{1,2,3} = 0$; test results in *P*-values.

Table A3: Estimation Results for Euribor Futures Rates with 2-Month Forecast Horizon

	Independent Variables					Statistics				Coefficient test			
Equ.	α	β	r_{t-1}	$f_{i,t-1}$	$f_{i,t}-f_{i-1,t}$	R^2	RMSE	NT	AR1	α	β	$\gamma_{1,2,3}$	*F*-test
(3)	**0.05**	**0.98**				0.99	0.10	806	0.52	0.45	0.28		0.27
	0.46	0.00											
(4)	**0.03**	**0.95**	**0.03**			0.99	0.10	763	0.95	0.71	0.29	0.51	0.40
	0.72	0.00	0.51										
(5)	**0.03**	**0.96**		**0.02**		0.99	0.10	752	0.63	0.69	0.34	0.58	0.43
	0.69	0.00		0.58									
(6)	**0.05**	**0.98**			**0.06**	0.99	0.10	798	0.31	0.46	0.28	0.68	0.39
	0.46	0.00			0.68								

See notes for Table A2

Table A4: Estimation Results for Euribor Futures Rates with 3-Month Forecast Horizon

	Independent Variables						Statistics				Coefficient test			
Equ.	α	β	r_{t-1}	$f_{i,t-1}$	$f_{i,t}-f_{i-1,t}$	Y2K	R^2	RMSE	NT	AR1	α	β	$\gamma_{1,2,3}$	*F*-test
(3)	**0.02**	**0.99**				**0.19**	0.98	0.13	1204	0.69	0.63	0.82		0.57
	0.82	0.00				0.27								
(4)	0.01	0.98	0.01			0.19	0.98	0.13	1143	0.89	0.89	0.71	0.85	0.78
	0.89	0	0.85			0.27								
(5)	**0.03**	**0.99**		**0.00**		**0.19**	0.98	0.13	1114	0.74	0.77	0.84	0.95	0.74
	0.77	0.00		0.95		0.28								
(6)	**0.02**	**0.99**			**−0.01**	**0.20**	0.98	0.13	1183	0.82	0.82	0.63	0.95	0.74
	0.82	0.00			0.95	0.26								

See notes for Table A2

Table A5: Estimation Results for Euribor Futures Rates with 4-Month Forecast Horizon

	Independent Variables						Statistics				Coefficient test			
Equ.	α	β	r_{t-1}	$f_{i,t-1}$	$f_{i,t}-f_{i-1,t}$	Y2K	R^2	RMSE	NT	AR1	α	β	$\gamma_{1,2,3}$	*F*-test
(3)	**0.05**	**0.98**				**0.25**	0.96	0.17	1579	0.16	0.67	0.43		0.29
	0.67	0.00				0.24								
(4)	**0.05**	**0.98**	**−0.01**			**0.25**	0.96	0.18	1518	0.32	0.69	0.80	0.92	0.48
	0.69	0.00	0.92			0.24								
(5)	**0.10**	**1.01**		**−0.04**		**0.23**	0.96	0.17	1465	0.42	0.40	0.89	0.49	0.39
	0.40	0.00		0.49		0.27								
(6)	**0.05**	**0.98**			**−0.05**	**0.25**	0.96	0.17	1555	0.20	0.67	0.43	0.75	0.45
	0.67	0.00			0.75	0.24								

See notes for Table A2

Table A6: Estimation Results for Euribor Futures Rates with 5-Month Forecast Horizon

	Independent Variables						Statistics				Coefficient test			
Equ.	α	β	r_{t-1}	$f_{i,t-1}$	$f_{i,t}-f_{i-1,t}$	Y2K	R^2	RMSE	NT	AR1	α	β	$\gamma_{1,2,3}$	F-test
(3)	**0.12**	**0.95**				**0.12**	0.92	0.21	1988	0.00	0.45	0.27		0.26
	0.45	0.00				0.62								
(4)	**0.10**	**0.92**	**0.03**			**0.12**	0.92	0.22	1927	0.00	0.58	0.40	0.74	0.45
	0.58	0.00	0.74			0.62								
(5)	**0.16**	**0.98**		**− 0.03**		**0.14**	0.93	0.21	1846	0.01	0.36	0.77	0.7	0.42
	0.36	0.00		0.70		0.56								
(6)	**0.12**	**0.95**			**− 0.11**	**0.12**	0.92	0.21	1960	0.00	0.45	0.27	0.51	0.39
	0.45	0.00			0.51	0.62								

See notes for Table A2

Table A7: Estimation Results for Euribor Futures Rates with 6-Month Forecast Horizon

	Independent Variables						Statistics				Coefficient test			
Equ.	α	β	r_{t-1}	$f_{i,t-1}$	$f_{i,t}-f_{i-1,t}$	Y2K	R^2	RMSE	NT	AR1	α	β	$\gamma_{1,2,3}$	F-test
(3)	**0.15**	**0.94**				**0.14**	0.88	0.25	2368	0.00	0.46	0.28		0.26
	0.46	0.00				0.59								
(4)	**0.10**	**0.82**	**0.13**			**0.12**	0.88	0.25	2307	0.00	0.68	0.12	0.31	0.29
	0.68	0.00	0.31			0.67								
(5)	**0.18**	**0.95**		**− 0.02**		**0.16**	0.89	0.25	2193	0.00	0.41	0.61	0.86	0.45
	0.41	0.00		0.86		0.54								
(6)	**0.15**	**0.94**			**− 0.10**	**0.15**	0.89	0.25	2313	0.00	0.46	0.27	0.57	0.41
	0.46	0.00			0.57	0.57								

See notes for Table A2

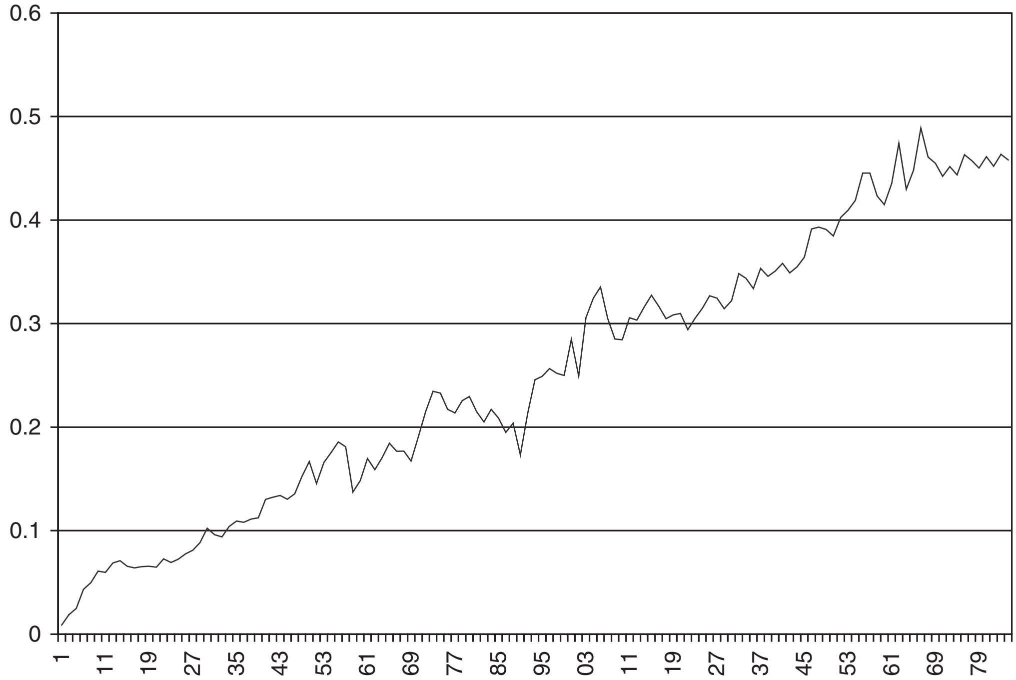

Figure A1: The Root Mean Squared Error of Euribor Futures from Spot Rates

2008		
B01-08	**Euro-Diplomatie durch gemeinsame „Wirtschaftsregierung“**	*Martin Seidel*
2007		
B03-07	**Löhne und Steuern im Systemwettbewerb der Mitgliedstaaten der Europäischen Union**	*Martin Seidel*
B02-07	**Konsolidierung und Reform der Europäischen Union**	*Martin Seidel*
B01-07	**The Ratification of European Treaties - Legal and Constitutional Basis of a European Referendum.**	*Martin Seidel*
2006		
B03-06	**Financial Frictions, Capital Reallocation, and Aggregate Fluctuations**	*Jürgen von Hagen, Haiping Zhang*
B02-06	**Financial Openness and Macroeconomic Volatility**	*Jürgen von Hagen, Haiping Zhang*
B01-06	**A Welfare Analysis of Capital Account Liberalization**	*Jürgen von Hagen, Haiping Zhang*
2005		
B11-05	**Das Kompetenz- und Entscheidungssystem des Vertrages von Rom im Wandel seiner Funktion und Verfassung**	*Martin Seidel*
B10-05	**Die Schutzklauseln der Beitrittsverträge**	*Martin Seidel*
B09-05	**Measuring Tax Burdens in Europe**	*Guntram B. Wolff*
B08-05	**Remittances as Investment in the Absence of Altruism**	*Gabriel González-König*
B07-05	**Economic Integration in a Multicone World?**	*Christian Volpe Martincus, Jennifer Pédussel Wu*
B06-05	**Banking Sector (Under?)Development in Central and Eastern Europe**	*Jürgen von Hagen, Valeriya Dinger*
B05-05	**Regulatory Standards Can Lead to Predation**	*Stefan Lutz*
B04-05	**Währungspolitik als Sozialpolitik**	*Martin Seidel*
B03-05	**Public Education in an Integrated Europe: Studying to Migrate and Teaching to Stay?**	*Panu Poutvaara*
B02-05	**Voice of the Diaspora: An Analysis of Migrant Voting Behavior**	*Jan Fidrmuc, Orla Doyle*
B01-05	**Macroeconomic Adjustment in the New EU Member States**	*Jürgen von Hagen, Iulia Traistaru*
2004		
B33-04	**The Effects of Transition and Political Instability On Foreign Direct Investment Inflows: Central Europe and the Balkans**	*Josef C. Brada, Ali M. Kutan, Taner M. Yigit*
B32-04	**The Choice of Exchange Rate Regimes in Developing Countries: A Mulitnominal Panal Analysis**	*Jürgen von Hagen, Jizhong Zhou*
B31-04	**Fear of Floating and Fear of Pegging: An Empirical Anaysis of De Facto Exchange Rate Regimes in Developing Countries**	*Jürgen von Hagen, Jizhong Zhou*
B30-04	**Der Vollzug von Gemeinschaftsrecht über die Mitgliedstaaten und seine Rolle für die EU und den Beitrittsprozess**	*Martin Seidel*
B29-04	**Deutschlands Wirtschaft, seine Schulden und die Unzulänglichkeiten der einheitlichen Geldpolitik im Eurosystem**	*Dieter Spethmann, Otto Steiger*
B28-04	**Fiscal Crises in U.S. Cities: Structural and Non-structural Causes**	*Guntram B. Wolff*
B27-04	**Firm Performance and Privatization in Ukraine**	*Galyna Grygorenko, Stefan Lutz*
B26-04	**Analyzing Trade Opening in Ukraine: Effects of a Customs Union with the EU**	*Oksana Harbuzyuk, Stefan Lutz*
B25-04	**Exchange Rate Risk and Convergence to the Euro**	*Lucjan T. Orlowski*
B24-04	**The Endogeneity of Money and the Eurosystem**	*Otto Steiger*
B23-04	**Which Lender of Last Resort for the Eurosystem?**	*Otto Steiger*
B22-04	**Non-Discretonary Monetary Policy: The Answer for Transition Economies?**	*Elham-Mafi Kreft, Steven F. Kreft*
B21-04	**The Effectiveness of Subsidies Revisited: Accounting for Wage and Employment Effects in Business R+D**	*Volker Reinthaler, Guntram B. Wolff*
B20-04	**Money Market Pressure and the Determinants of Banking Crises**	*Jürgen von Hagen, Tai-kuang Ho*
B19-04	**Die Stellung der Europäischen Zentralbank nach dem Verfassungsvertrag**	*Martin Seidel*

B18-04	**Transmission Channels of Business Cycles Synchronization in an Enlarged EMU**	*Iulia Traistaru*
B17-04	**Foreign Exchange Regime, the Real Exchange Rate and Current Account Sustainability: The Case of Turkey**	*Sübidey Togan, Hasan Ersel*
B16-04	**Does It Matter Where Immigrants Work? Traded Goods, Non-traded Goods, and Sector Specific Employment**	*Harry P. Bowen, Jennifer Pédussel Wu*
B15-04	**Do Economic Integration and Fiscal Competition Help to Explain Local Patterns?**	*Christian Volpe Martincus*
B14-04	**Euro Adoption and Maastricht Criteria: Rules or Discretion?**	*Jiri Jonas*
B13-04	**The Role of Electoral and Party Systems in the Development of Fiscal Institutions in the Central and Eastern European Countries**	*Sami Yläoutinen*
B12-04	**Measuring and Explaining Levels of Regional Economic Integration**	*Jennifer Pédussel Wu*
B11-04	**Economic Integration and Location of Manufacturing Activities: Evidence from MERCOSUR**	*Pablo Sanguinetti, Iulia Traistaru, Christian Volpe Martincus*
B10-04	**Economic Integration and Industry Location in Transition Countries**	*Laura Resmini*
B09-04	**Testing Creditor Moral Hazard in Souvereign Bond Markets: A Unified Theoretical Approach and Empirical Evidence**	*Ayse Y. Evrensel, Ali M. Kutan*
B08-04	**European Integration, Productivity Growth and Real Convergence**	*Taner M. Yigit, Ali M. Kutan*
B07-04	**The Contribution of Income, Social Capital, and Institutions to Human Well-being in Africa**	*Mina Baliamoune-Lutz, Stefan H. Lutz*
B06-04	**Rural Urban Inequality in Africa: A Panel Study of the Effects of Trade Liberalization and Financial Deepening**	*Mina Baliamoune-Lutz, Stefan H. Lutz*
B05-04	**Money Rules for the Eurozone Candidate Countries**	*Lucjan T. Orlowski*
B04-04	**Who is in Favor of Enlargement? Determinants of Support for EU Membership in the Candidate Countries' Referenda**	*Orla Doyle, Jan Fidrmuc*
B03-04	**Over- and Underbidding in Central Bank Open Market Operations Conducted as Fixed Rate Tender**	*Ulrich Bindseil*
B02-04	**Total Factor Productivity and Economic Freedom Implications for EU Enlargement**	*Ronald L. Moomaw, Euy Seok Yang*
B01-04	**Die neuen Schutzklauseln der Artikel 38 und 39 des Beitrittsvertrages: Schutz der alten Mitgliedstaaten vor Störungen durch die neuen Mitgliedstaaten**	*Martin Seidel*
2003		
B29-03	**Macroeconomic Implications of Low Inflation in the Euro Area**	*Jürgen von Hagen, Boris Hofmann*
B28-03	**The Effects of Transition and Political Instability on Foreign Direct Investment: Central Europe and the Balkans**	*Josef C. Brada, Ali M. Kutan, Taner M. Yigit*
B27-03	**The Performance of the Euribor Futures Market: Efficiency and the Impact of ECB Policy Announcements (Electronic Version of International Finance)**	*Kerstin Bernoth, Juergen von Hagen*
B26-03	**Souvereign Risk Premia in the European Government Bond Market (überarbeitete Version zum Herunterladen)**	*Kerstin Bernoth, Juergen von Hagen, Ludger Schulknecht*
B25-03	**How Flexible are Wages in EU Accession Countries?**	*Anna Iara, Iulia Traistaru*
B24-03	**Monetary Policy Reaction Functions: ECB versus Bundesbank**	*Bernd Hayo, Boris Hofmann*
B23-03	**Economic Integration and Manufacturing Concentration Patterns: Evidence from Mercosur**	*Iulia Traistaru, Christian Volpe Martincus*
B22-03	**Reformzwänge innerhalb der EU angesichts der Osterweiterung**	*Martin Seidel*
B21-03	**Reputation Flows: Contractual Disputes and the Channels for Inter-Firm Communication**	*William Pyle*
B20-03	**Urban Primacy, Gigantism, and International Trade: Evidence from Asia and the Americas**	*Ronald L. Moomaw, Mohammed A. Alwosabi*
B19-03	**An Empirical Analysis of Competing Explanations of Urban Primacy Evidence from Asia and the Americas**	*Ronald L. Moomaw, Mohammed A. Alwosabi*

B18-03	**The Effects of Regional and Industry-Wide FDI Spillovers on Export of Ukrainian Firms**	*Stefan H. Lutz, Oleksandr Talavera, Sang-Min Park*
B17-03	**Determinants of Inter-Regional Migration in the Baltic States**	*Mihails Hazans*
B16-03	**South-East Europe: Economic Performance, Perspectives, and Policy Challenges**	*Iulia Traistaru, Jürgen von Hagen*
B15-03	**Employed and Unemployed Search: The Marginal Willingness to Pay for Attributes in Lithuania, the US and the Netherlands**	*Jos van Ommeren, Mihails Hazans*
B14-03	**FCIs and Economic Activity: Some International Evidence**	*Charles Goodhart, Boris Hofmann*
B13-03	**The IS Curve and the Transmission of Monetary Policy: Is there a Puzzle?**	*Charles Goodhart, Boris Hofmann*
B12-03	**What Makes Regions in Eastern Europe Catching Up? The Role of Foreign Investment, Human Resources, and Geography**	*Gabriele Tondl, Goran Vuksic*
B11-03	**Die Weisungs- und Herrschaftsmacht der Europäischen Zentralbank im europäischen System der Zentralbanken - eine rechtliche Analyse**	*Martin Seidel*
B10-03	**Foreign Direct Investment and Perceptions of Vulnerability to Foreign Exchange Crises: Evidence from Transition Economies**	*Josef C. Brada, Vladimír Tomsík*
B09-03	**The European Central Bank and the Eurosystem: An Analysis of the Missing Central Monetary Institution in European Monetary Union**	*Gunnar Heinsohn, Otto Steiger*
B08-03	**The Determination of Capital Controls: Which Role Do Exchange Rate Regimes Play?**	*Jürgen von Hagen, Jizhong Zhou*
B07-03	**Nach Nizza und Stockholm: Stand des Binnenmarktes und Prioritäten für die Zukunft**	*Martin Seidel*
B06-03	**Fiscal Discipline and Growth in Euroland. Experiences with the Stability and Growth Pact**	*Jürgen von Hagen*
B05-03	**Reconsidering the Evidence: Are Eurozone Business Cycles Converging?**	*Michael Massmann, James Mitchell*
B04-03	**Do Ukrainian Firms Benefit from FDI?**	*Stefan H. Lutz, Oleksandr Talavera*
B03-03	**Europäische Steuerkoordination und die Schweiz**	*Stefan H. Lutz*
B02-03	**Commuting in the Baltic States: Patterns, Determinants, and Gains**	*Mihails Hazans*
B01-03	**Die Wirtschafts- und Währungsunion im rechtlichen und politischen Gefüge der Europäischen Union**	*Martin Seidel*
2002		
B30-02	**An Adverse Selection Model of Optimal Unemployment Assurance**	*Marcus Hagedorn, Ashok Kaul, Tim Mennel*
B29B-02	**Trade Agreements as Self-protection**	*Jennifer Pédussel Wu*
B29A-02	**Growth and Business Cycles with Imperfect Credit Markets**	*Debajyoti Chakrabarty*
B28-02	**Inequality, Politics and Economic Growth**	*Debajyoti Chakrabarty*
B27-02	**Poverty Traps and Growth in a Model of Endogenous Time Preference**	*Debajyoti Chakrabarty*
B26-02	**Monetary Convergence and Risk Premiums in the EU Candidate Countries**	*Lucjan T. Orlowski*
B25-02	**Trade Policy: *Institutional* Vs. *Economic* Factors**	*Stefan Lutz*
B24-02	**The Effects of Quotas on Vertical Intra-industry Trade**	*Stefan Lutz*
B23-02	**Legal Aspects of European Economic and Monetary Union**	*Martin Seidel*
B22-02	**Der Staat als *Lender of Last Resort* - oder: Die Achillesverse des Eurosystems**	*Otto Steiger*
B21-02	**Nominal and Real Stochastic Convergence Within the Transition Economies and to the European Union: Evidence from Panel Data**	*Ali M. Kutan, Taner M. Yigit*
B20-02	**The Impact of News, Oil Prices, and International Spillovers on Russian Fincancial Markets**	*Bernd Hayo, Ali M. Kutan*

B19-02	**East Germany: Transition with Unification, Experiments and Experiences**	*Jürgen von Hagen, Rolf R. Strauch, Guntram B. Wolff*
B18-02	**Regional Specialization and Employment Dynamics in Transition Countries**	*Iulia Traistaru, Guntram B. Wolff*
B17-02	**Specialization and Growth Patterns in Border Regions of Accession Countries**	*Laura Resmini*
B16-02	**Regional Specialization and Concentration of Industrial Activity in Accession Countries**	*Iulia Traistaru, Peter Nijkamp, Simonetta Longhi*
B15-02	**Does Broad Money Matter for Interest Rate Policy?**	*Matthias Brückner, Andreas Schaber*
B14-02	**The Long and Short of It: Global Liberalization, Poverty and Inequality**	*Christian E. Weller, Adam Hersch*
B13-02	**De Facto and Official Exchange Rate Regimes in Transition Economies**	*Jürgen von Hagen, Jizhong Zhou*
B12-02	**Argentina: The Anatomy of A Crisis**	*Jiri Jonas*
B11-02	**The Eurosystem and the Art of Central Banking**	*Gunnar Heinsohn, Otto Steiger*
B10-02	**National Origins of European Law: Towards an Autonomous System of European Law?**	*Martin Seidel*
B09-02	**Monetary Policy in the Euro Area - Lessons from the First Years**	*Volker Clausen, Bernd Hayo*
B08-02	**Has the Link Between the Spot and Forward Exchange Rates Broken Down? Evidence From Rolling Cointegration Tests**	*Ali M. Kutan, Su Zhou*
B07-02	**Perspektiven der Erweiterung der Europäischen Union**	*Martin Seidel*
B06-02	**Is There Asymmetry in Forward Exchange Rate Bias? Multi-Country Evidence**	*Su Zhou, Ali M. Kutan*
B05-02	**Real and Monetary Convergence Within the European Union and Between the European Union and Candidate Countries: A Rolling Cointegration Approach**	*Josef C. Brada, Ali M. Kutan, Su Zhou*
B04-02	**Asymmetric Monetary Policy Effects in EMU**	*Volker Clausen, Bernd Hayo*
B03-02	**The Choice of Exchange Rate Regimes: An Empirical Analysis for Transition Economies**	*Jürgen von Hagen, Jizhong Zhou*
B02-02	**The Euro System and the Federal Reserve System Compared: Facts and Challenges**	*Karlheinz Ruckriegel, Franz Seitz*
B01-02	**Does Inflation Targeting Matter?**	*Manfred J. M. Neumann, Jürgen von Hagen*
2001		
B29-01	**Is Kazakhstan Vulnerable to the Dutch Disease?**	*Karlygash Kuralbayeva, Ali M. Kutan, Michael L. Wyzan*
B28-01	**Political Economy of the Nice Treaty: Rebalancing the EU Council. The Future of European Agricultural Policies**	*Deutsch-Französisches Wirtschaftspolitisches Forum*
B27-01	**Investor Panic, IMF Actions, and Emerging Stock Market Returns and Volatility: A Panel Investigation**	*Bernd Hayo, Ali M. Kutan*
B26-01	**Regional Effects of Terrorism on Tourism: Evidence from Three Mediterranean Countries**	*Konstantinos Drakos, Ali M. Kutan*
B25-01	**Monetary Convergence of the EU Candidates to the Euro: A Theoretical Framework and Policy Implications**	*Lucjan T. Orlowski*
B24-01	**Disintegration and Trade**	*Jarko and Jan Fidrmuc*
B23-01	**Migration and Adjustment to Shocks in Transition Economies**	*Jan Fidrmuc*
B22-01	**Strategic Delegation and International Capital Taxation**	*Matthias Brückner*
B21-01	**Balkan and Mediterranean Candidates for European Union Membership: The Convergence of Their Monetary Policy With That of the Europaen Central Bank**	*Josef C. Brada, Ali M. Kutan*
B20-01	**An Empirical Inquiry of the Efficiency of Intergovernmental Transfers for Water Projects Based on the WRDA Data**	*Anna Rubinchik-Pessach*
B19-01	**Detrending and the Money-Output Link: International Evidence**	*R.W. Hafer, Ali M. Kutan*

B18-01	**Monetary Policy in Unknown Territory. The European Central Bank in the Early Years**	*Jürgen von Hagen, Matthias Brückner*
B17-01	**Executive Authority, the Personal Vote, and Budget Discipline in Latin American and Carribean Countries**	*Mark Hallerberg, Patrick Marier*
B16-01	**Sources of Inflation and Output Fluctuations in Poland and Hungary: Implications for Full Membership in the European Union**	*Selahattin Dibooglu, Ali M. Kutan*
B15-01	**Programs Without Alternative: Public Pensions in the OECD**	*Christian E. Weller*
B14-01	**Formal Fiscal Restraints and Budget Processes As Solutions to a Deficit and Spending Bias in Public Finances - U.S. Experience and Possible Lessons for EMU**	*Rolf R. Strauch, Jürgen von Hagen*
B13-01	**German Public Finances: Recent Experiences and Future Challenges**	*Jürgen von Hagen, Rolf R. Strauch*
B12-01	**The Impact of Eastern Enlargement On EU-Labour Markets. Pensions Reform Between Economic and Political Problems**	*Deutsch-Französisches Wirtschaftspolitisches Forum*
B11-01	**Inflationary Performance in a Monetary Union With Large Wage Setters**	*Lilia Cavallar*
B10-01	**Integration of the Baltic States into the EU and Institutions of Fiscal Convergence: A Critical Evaluation of Key Issues and Empirical Evidence**	*Ali M. Kutan, Niina Pautola-Mol*
B09-01	**Democracy in Transition Economies: Grease or Sand in the Wheels of Growth?**	*Jan Fidrmuc*
B08-01	**The Functioning of Economic Policy Coordination**	*Jürgen von Hagen, Susanne Mundschenk*
B07-01	**The Convergence of Monetary Policy Between Candidate Countries and the European Union**	*Josef C. Brada, Ali M. Kutan*
B06-01	**Opposites Attract: The Case of Greek and Turkish Financial Markets**	*Konstantinos Drakos, Ali M. Kutan*
B05-01	**Trade Rules and Global Governance: A Long Term Agenda. The Future of Banking.**	*Deutsch-Französisches Wirtschaftspolitisches Forum*
B04-01	**The Determination of Unemployment Benefits**	*Rafael di Tella, Robert J. MacCulloch*
B03-01	**Preferences Over Inflation and Unemployment: Evidence from Surveys of Happiness**	*Rafael di Tella, Robert J. MacCulloch, Andrew J. Oswald*
B02-01	**The Konstanz Seminar on Monetary Theory and Policy at Thirty**	*Michele Fratianni, Jürgen von Hagen*
B01-01	**Divided Boards: Partisanship Through Delegated Monetary Policy**	*Etienne Farvaque, Gael Lagadec*

2000

B20-00	**Breakin-up a Nation, From the Inside**	*Etienne Farvaque*
B19-00	**Income Dynamics and Stability in the Transition Process, general Reflections applied to the Czech Republic**	*Jens Hölscher*
B18-00	**Budget Processes: Theory and Experimental Evidence**	*Karl-Martin Ehrhart, Roy Gardner, Jürgen von Hagen, Claudia Keser*
B17-00	**Rückführung der Landwirtschaftspolitik in die Verantwortung der Mitgliedsstaaten? - Rechts- und Verfassungsfragen des Gemeinschaftsrechts**	*Martin Seidel*
B16-00	**The European Central Bank: Independence and Accountability**	*Christa Randzio-Plath, Tomasso Padoa-Schioppa*
B15-00	**Regional Risk Sharing and Redistribution in the German Federation**	*Jürgen von Hagen, Ralf Hepp*
B14-00	**Sources of Real Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary**	*Selahattin Dibooglu, Ali M. Kutan*
B13-00	**Back to the Future: The Growth Prospects of Transition Economies Reconsidered**	*Nauro F. Campos*

B12-00	**Rechtsetzung und Rechtsangleichung als Folge der Einheitlichen Europäischen Währung**	*Martin Seidel*
B11-00	**A Dynamic Approach to Inflation Targeting in Transition Economies**	*Lucjan T. Orlowski*
B10-00	**The Importance of Domestic Political Institutions: Why and How Belgium Qualified for EMU**	*Marc Hallerberg*
B09-00	**Rational Institutions Yield Hysteresis**	*Rafael Di Tella, Robert MacCulloch*
B08-00	**The Effectiveness of Self-Protection Policies for Safeguarding Emerging Market Economies from Crises**	*Kenneth Kletzer*
B07-00	**Financial Supervision and Policy Coordination in The EMU**	*Deutsch-Französisches Wirtschaftspolitisches Forum*
B06-00	**The Demand for Money in Austria**	*Bernd Hayo*
B05-00	**Liberalization, Democracy and Economic Performance during Transition**	*Jan Fidrmuc*
B04-00	**A New Political Culture in The EU - Democratic Accountability of the ECB**	*Christa Randzio-Plath*
B03-00	**Integration, Disintegration and Trade in Europe: Evolution of Trade Relations during the 1990's**	*Jarko Fidrmuc, Jan Fidrmuc*
B02-00	**Inflation Bias and Productivity Shocks in Transition Economies: The Case of the Czech Republic**	*Josef C. Barda, Arthur E. King, Ali M. Kutan*
B01-00	**Monetary Union and Fiscal Federalism**	*Kenneth Kletzer, Jürgen von Hagen*
1999		
B26-99	**Skills, Labour Costs, and Vertically Differentiated Industries: A General Equilibrium Analysis**	*Stefan Lutz, Alessandro Turrini*
B25-99	**Micro and Macro Determinants of Public Support for Market Reforms in Eastern Europe**	*Bernd Hayo*
B24-99	**What Makes a Revolution?**	*Robert MacCulloch*
B23-99	**Informal Family Insurance and the Design of the Welfare State**	*Rafael Di Tella, Robert MacCulloch*
B22-99	**Partisan Social Happiness**	*Rafael Di Tella, Robert MacCulloch*
B21-99	**The End of Moderate Inflation in Three Transition Economies?**	*Josef C. Brada, Ali M. Kutan*
B20-99	**Subnational Government Bailouts in Germany**	*Helmut Seitz*
B19-99	**The Evolution of Monetary Policy in Transition Economies**	*Ali M. Kutan, Josef C. Brada*
B18-99	**Why are Eastern Europe's Banks not failing when everybody else's are?**	*Christian E. Weller, Bernard Morzuch*
B17-99	**Stability of Monetary Unions: Lessons from the Break-Up of Czechoslovakia**	*Jan Fidrmuc, Julius Horvath and Jarko Fidrmuc*
B16-99	**Multinational Banks and Development Finance**	*Christian E.Weller and Mark J. Scher*
B15-99	**Financial Crises after Financial Liberalization: Exceptional Circumstances or Structural Weakness?**	*Christian E. Weller*
B14-99	**Industry Effects of Monetary Policy in Germany**	*Bernd Hayo and Birgit Uhlenbrock*
B13-99	**Fiancial Fragility or What Went Right and What Could Go Wrong in Central European Banking?**	*Christian E. Weller and Jürgen von Hagen*
B12 -99	**Size Distortions of Tests of the Null Hypothesis of Stationarity: Evidence and Implications for Applied Work**	*Mehmet Caner and Lutz Kilian*
B11-99	**Financial Supervision and Policy Coordination in the EMU**	*Deutsch-Französisches Wirtschaftspolitisches Forum*
B10-99	**Financial Liberalization, Multinational Banks and Credit Supply: The Case of Poland**	*Christian Weller*
B09-99	**Monetary Policy, Parameter Uncertainty and Optimal Learning**	*Volker Wieland*
B08-99	**The Connection between more Multinational Banks and less Real Credit in Transition Economies**	*Christian Weller*

B07-99	**Comovement and Catch-up in Productivity across Sectors: Evidence from the OECD**	*Christopher M. Cornwell and Jens-Uwe Wächter*
B06-99	**Productivity Convergence and Economic Growth: A Frontier Production Function Approach**	*Christopher M. Cornwell and Jens-Uwe Wächter*
B05-99	**Tumbling Giant: Germany's Experience with the Maastricht Fiscal Criteria**	*Jürgen von Hagen and Rolf Strauch*
B04-99	**The Finance-Investment Link in a Transition Economy: Evidence for Poland from Panel Data**	*Christian Weller*
B03-99	**The Macroeconomics of Happiness**	*Rafael Di Tella, Robert MacCulloch and Andrew J. Oswald*
B02-99	**The Consequences of Labour Market Flexibility: Panel Evidence Based on Survey Data**	*Rafael Di Tella and Robert MacCulloch*
B01-99	**The Excess Volatility of Foreign Exchange Rates: Statistical Puzzle or Theoretical Artifact?**	*Robert B.H. Hauswald*
1998		
B16-98	**Labour Market + Tax Policy in the EMU**	*Deutsch-Französisches Wirtschaftspolitisches Forum*
B15-98	**Can Taxing Foreign Competition Harm the Domestic Industry?**	*Stefan Lutz*
B14-98	**Free Trade and Arms Races: Some Thoughts Regarding EU-Russian Trade**	*Rafael Reuveny and John Maxwell*
B13-98	**Fiscal Policy and Intranational Risk-Sharing**	*Jürgen von Hagen*
B12-98	**Price Stability and Monetary Policy Effectiveness when Nominal Interest Rates are Bounded at Zero**	*Athanasios Orphanides and Volker Wieland*
B11A-98	**Die Bewertung der "dauerhaft tragbaren öffentlichen Finanzlage"der EU Mitgliedstaaten beim Übergang zur dritten Stufe der EWWU**	*Rolf Strauch*
B11-98	**Exchange Rate Regimes in the Transition Economies: Case Study of the Czech Republic: 1990-1997**	*Julius Horvath and Jiri Jonas*
B10-98	**Der Wettbewerb der Rechts- und politischen Systeme in der Europäischen Union**	*Martin Seidel*
B09-98	**U.S. Monetary Policy and Monetary Policy and the ESCB**	*Robert L. Hetzel*
B08-98	**Money-Output Granger Causality Revisited: An Empirical Analysis of EU Countries (überarbeitete Version zum Herunterladen)**	*Bernd Hayo*
B07-98	**Designing Voluntary Environmental Agreements in Europe: Some Lessons from the U.S. EPA's 33/50 Program**	*John W. Maxwell*
B06-98	**Monetary Union, Asymmetric Productivity Shocks and Fiscal Insurance: an Analytical Discussion of Welfare Issues**	*Kenneth Kletzer*
B05-98	**Estimating a European Demand for Money (überarbeitete Version zum Herunterladen)**	*Bernd Hayo*
B04-98	**The EMU's Exchange Rate Policy**	*Deutsch-Französisches Wirtschaftspolitisches Forum*
B03-98	**Central Bank Policy in a More Perfect Financial System**	*Jürgen von Hagen / Ingo Fender*
B02-98	**Trade with Low-Wage Countries and Wage Inequality**	*Jaleel Ahmad*
B01-98	**Budgeting Institutions for Aggregate Fiscal Discipline**	*Jürgen von Hagen*
1997		
B04-97	**Macroeconomic Stabilization with a Common Currency: Does European Monetary Unification Create a Need for Fiscal Insurance or Federalism?**	*Kenneth Kletzer*
B-03-97	**Liberalising European Markets for Energy and Telecommunications: Some Lessons from the US Electric Utility Industry**	*Tom Lyon / John Mayo*
B02-97	**Employment and EMU**	*Deutsch-Französisches Wirtschaftspolitisches Forum*
B01-97	**A Stability Pact for Europe**	*(a Forum organized by ZEI)*

ISSN 1436 - 6053

Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn

Walter-Flex-Strasse 3
D-53113 Bonn
Germany

Tel.: +49-228-73-1732
Fax: +49-228-73-1809
www.zei.de