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

Bernd Hayo
Boris Hofmann

MONETARY POLICY REACTION FUNCTIONS: ECB VERSUS BUNDESBANK

Working Paper

B 24
2003

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.: +49-228-73-9218
Fax: +49-228-73-1809
http: //www.zei.de

Monetary Policy Reaction Functions:
ECB versus Bundesbank

Bernd Hayo* (University of Bonn and University of Duisburg-Essen)

and

Boris Hofmann** (University of Bonn)

Abstract

We estimate monetary policy reaction functions for the Bundesbank (1979:4-1998:12) and the European Central Bank (1999:1-2003:7). The Bundesbank regime can be characterised, both before and after German reunification, by an inflation weight of 1.2 and an output weight of 0.4. The estimates for the ECB are 1.2, and 1, respectively. Thus, the ECB, while reacting similarly to expected inflation, puts significantly more weight on stabilising the business cycle than the Bundesbank did.

JEL: E5

Keywords: Taylor rule, monetary policy, ECB, Bundesbank

Correspondence:

* *Corresponding author*: Department of Economics (FB 5), University of Duisburg-Essen, D-45117 Essen, Germany.
Phone: +49-(0)201-183-3010 Fax: +49-(0)201-183-3974
Email: bhayo@vwl.uni-essen.de

** ZEI, University of Bonn, Walter-Flex-Str. 3, D-53113 Bonn, Germany.
Phone: +49-(0)228-73-1732 Fax: +49-(0)228-73-1809
Email: bhofmann@uni-bonn.de

Thanks to Jürgen von Hagen for helpful comments. The usual disclaimer applies.

1. Introduction

In recent years, virtually all central banks in the industrialised countries have conducted monetary policy through market-orientated instruments designed to influence short-term interest rates (Borio 1997). Interest rate setting is commonly described in terms of the reaction to deviations of inflation and output from their targets (Taylor 1993). Gerlach and Schnabel (2000) estimate a Taylor rule for the euro area for the period 1990-1998 using synthetic euro area data[1]. They find that monetary policy can be well explained in terms of such a Taylor rule. Now that almost five years have passed since the start of EMU, enough observations have become available to perform a first assessment of the ECB's conduct of monetary policy using an empirically estimated Taylor rule.

The ECB was explicitly designed after the German Bundesbank in the Treaty of Maastricht. One may conjecture that if two institutions are based upon similar design features, in particular central bank independence and a policy focus on price stability, their interest rate setting rules may look alike, although the challenges facing the ECB may be different to those facing the Bundesbank in the past. In addition, formulating monetary policy as a compromise between the representatives of various countries could also result in a different interest rate behaviour. Thus, it will be interesting to compare estimated Taylor rules for the Bundesbank (see Clarida et al. 1998 and Bundesbank 1999) and the ECB.

Based on these considerations, the present paper estimates Taylor rules for both the ECB and the Bundesbank. For Germany, we use monthly data from the formation of the EMS onwards (1979:4 – 1998:12), explicitly taking into account the period after German unification (1990:8 – 1998:12). For the ECB, data from 1999:1 to 2003:7 is employed. It is then tested whether the ECB is behaving similarly to the Bundesbank with respect to interest rate setting.

2. Econometric Methodology

In the estimations of the Taylor rules, we follow Clarida et al. (1998).[2] Short-term nominal interest rates are modelled as a function of deviations of output from its trend and of inflation from its (constant) target. We assume that the central banks are forward looking and react to the expected one-year ahead inflation rate and the current output gap.[3] Finally, we allow for

---

[1] Other studies estimating Taylor rules for the euro area based on synthetic euro area data are Mihov (2001), Doménech et al. (2002), Clausen and Hayo (2002), and Gerdesmeier and Roffia (2003).

[2] The utilised data are: Interest rate: Day-to-day rate, Output: Industrial production, Inflation: CPI growth rate. Data sources are IFS for Germany and the ECB web site. The output gap has been constructed using a Hodrick-Prescott filter. The typical endpoint problem of the filter is not an issue here, as both in the Bundesbank and in the EMU estimation we have at least 10 months of output gap data that do not enter the estimation process.

[3] Note that the output gap of the current period is not exactly known at the time of monetary policy decision making.

interest rate smoothing by including a lagged interest rate term in the Taylor rule specification[4]. Given these considerations, we estimate the following Taylor rule:

(1) $r_t = \rho\, r_{t-1} + (1\text{-}\rho)\, \alpha + (1\text{-}\rho)\, \beta\, \pi_{t+12} + (1\text{-}\rho)\, \gamma\, y_t + \varepsilon_t$,

with: r = nominal short-term interest rate, π = inflation rate, y = output gap, ρ = degree of interest rates smoothing, α = long-term equilibrium of nominal interest rate, β = inflation weight, γ = output weight, ε = error term.

A major problem when working with forward-looking and current variables is that they may be correlated with the error term, leading to biased estimates of the coefficients of interest. Therefore, these variables must be instrumented. In addition, the error term may experience non-normality, autocorrelation and heteroscedasticity, causing problems with respect to statistical inference. It is now common to use the General Method of Moments (GMM) estimator, as it accounts for endogeneity biases as well as non-spherical errors. The GMM estimator possesses excellent asymptotic properties, but may perform poorly in small samples (see the special issue of the *Journal of Economics and Business Statistics* 1996). Traditional instrumental variable estimators, which are special cases of the GMM estimator (Hayashi 2000), are more efficient, provided the necessary restrictions are fulfilled. In small samples, efficiency is of particular importance, and it therefore appears to be advisable to rely on a traditional instrumental variable estimator whenever possible.

Another general estimation problem is the choice of instruments. In time-series econometrics, it is easy to find instruments that fulfil the orthogonality conditions between regressors and error term. Typically, this assumption is tested using a test of the validity of over-identifying restrictions when there are more instruments than estimated coefficients (see Davidson and McKinnon 1993).

The use of weak instruments, i.e. instruments that do not contribute much to explaining the instrumented variable, can lead to substantial biases in both estimators and test statistics even in large samples (see, e.g., Hahn and Hausman 2003, Stock et al. 2002). Stock and Yogo (2003) propose a test of weak instruments based on the F-test value of the first stage regression in a two-stage least squares procedure. This test does not, however, solve the question of how to choose *specific* instruments, for example, which lags of a variable.

We address the instrument selection problem by adopting a recently developed automatic model selection algorithm called GETS (see Hendry and Krolzig 1999). GETS starts from a

---

[4]Recent evidence shows that the explicit modelling of a lagged interest rate term is preferable to an autoregressive errors specification (Castelnuovo 2003).

general model and removes redundant instruments. While doing so, it searches all possible paths of the testing-down process and reports the most parsimonious model that does not violate a reduction test. Thus, the strongest instruments will be selected from a given choice of variables and their lags. This does not remove all arbitrariness, as, for instance, the researcher still needs to choose the potential instrumental variables and their maximum lag length, but it appears to be superior to the ad hoc methods typically employed in empirical research.

3. Empirical Estimation

Starting with the *Bundesbank*, instruments are being selected using the GETS reduction algorithm at a nominal 5% significance level based on a general model containing six lags of the potential instruments.[5] The Stock and Yogo (2003) test shows no indication of problems with regard to biases in the estimators. It is possible to reject the null hypothesis that the nominally sized test statistics at 5% significance level exceed an actual level of 15%. In contrast, there is evidence that the Clarida et al (1998) specification suffers from problems with weak instruments.[6]

Employing these instruments in traditional instrumental variable estimation leads to residuals that exhibit severe problems of non-normality, autocorrelation and heteroscedasticity. Since at least the non-normality problems are not easily corrected, we choose GMM as the appropriate estimation technique. An important event in recent German history is unification, with German Monetary Union (GMU) taking place on 1 July 1990. We split our sample at that date to see whether it has a noticeable impact on the German reaction function (see Table 1).[7]

A comparison of the two columns referring to the Bundesbank shows that the estimates are similar. The lagged interest rate has exactly the same coefficient and the inflation coefficients are very close. Some differences occur for the output gap coefficient, which are not statistically significant when taking into account estimation uncertainty surrounding both coefficients ($F(1, 231) = 1.89$).

Comparing these value to the ones Clarida et al. (1998) obtained for the period 1979:4 to 1993:12 shows only slight differences ($\beta = 1.31$, $\gamma = 0.25$). However, estimating the Clarida et

---

[5] The resulting instrument set is: interest rate (lags: 1, 2, 3), inflation (lag: 6), growth rate of the effective real exchange rate (lags: 1, 4), output gap (lags: 1, 2, 3, 6), the growth rate of the oil price index in DM (lags: 1, 6), and the monthly growth rate of the money aggregate M3 (lag: 2).

[6] In their basic specification, Clarida et al. (1998) use 48 instruments (p. 1045, Table 1). In the first-stage regression for the inflation rate the Stock and Yogo-test can barely reject the hypothesis of a bias of 10% of the OLS bias and cannot reject the Null that the nominally sized test statistics of a 5% level does not exceed a level of 15%.

[7] One could estimate a Taylor rule from 1979:4 to 2003:7 using German data and then test for a break in 1999:1. This would not take into account, however, that the ECB uses aggregate European variables in its rule.

al. baseline model for the post-GMU period gives a coefficient of 0.74 for the inflation weight and 0.48 for the output gap. The drop of the coefficient on inflation below unity may be one indication of the weak instrument problem in their specification. As round summary values for the Bundesbank covering both periods, we propose a weight on inflation of 1.2 and an output weight of 0.4. These restrictions cannot be rejected using either pre- or post German Monetary Union data.[8]

Table 1: Estimates of reaction functions for the Bundesbank and the ECB

Variables	Bundesbank 79:4-90:6	Bundesbank 90:8-98:12	ECB 99:1-02:7
Interest rate$_{t-1}$ (ρ)	0.92**	0.92**	0.86**
	(0.018)	(0.015)	(0.033)
Inflation$_{t+12}$ (β)	1.21**	1.25**	1.12*
	(0.244)	(0.162)	(0.505)
Output gap$_t$ (γ)	0.43**	0.32**	1.03**
	(0.137)	(0.045)	(0.194)
Constant (α)	3.64**	2.56**	1.38
	(0.670)	(0.353)	(1.132)
No. of Observations	135	101	43
σ	0.372	0.154	0.157
R^2	0.976	0.996	0.966
Over-identifying restrictions test	$Chi^2(13) = 8.53$	$Chi^2(13) = 8.25$	$Chi^2(25) = 31.2$

Notes: * (**) indicates significance at a 5% (1%) level. Bundesbank estimates based on GMM. ECB estimates based on a traditional instrumental variable method. Standard errors for coefficient estimates are computed using the procedure by Newey and West (1987). The R^2 is based on the short-run dynamic model. Diagnostic tests for the instrumental variable estimation of the ECB reaction function: Jarque-Bera normality test: $Chi^2(2) = 0.65$, LM autocorrelation test: $Chi^2(2) = 2.35$, ARCH test: $Chi^2(1) = 0.68$, White-heteroscedasticity test with cross-products: $Chi^2(9) = 20.3$**, RESET(1) test: F(1, 37) = 1.11.

For the *ECB reaction function*, the data are from January 1999 to July 2003.[9] Again we select instruments based on the GETS algorithm.[10] Applying the Stock and Yogo (2003) test, we can reject the hypotheses that the biases in the estimators are larger than 10% and that the nominally sized test statistics at 5% exceed an actual level of 25%. This time we find there are

[8] Test results for the pre-GMU period: inflation coefficient against 1.2: F(1, 131) = 0.002, output coefficient against 0.4: F(1, 131) = 0.05, and joint: F(2, 131) = 0.03. Post-GMU period: inflation coefficient against 1.2: F(1, 97) = 0.09, output coefficient against 0.4: F(1, 97) = 2.88, and joint: F(2, 97) = 2.42.

[9] Given that we employ a one-year ahead inflation rate, the actual estimation period ends in July 2002.

[10] The resulting instrument set is: interest rate (lags: 1,2,4,6), inflation (lag: 1,3,5), growth rate of the effective real exchange rate (lags: 1,2,3,4,6), output gap (lags: 1,2,3,4,5,6), the growth rate of the oil price index in EUR (lags: 1,2,3,4,5), and the monthly growth rate of the money aggregate M3MA (lag: 2,3,4).

few problems with employing traditional instrumental variable techniques.[11] In the notes below Table 1, a battery of diagnostic tests are listed that show no problems except for evidence of heteroscedasticity. To avoid invalid inference, we employ, as in our estimates for Germany, robust standard errors.[12]

Regarding the actual estimates, we first note that the inflation coefficient is above unity. Second, it is quite close to the estimates we obtained for the Bundesbank. Statistically testing the ECB coefficient on inflation against 1.2, we cannot reject the hypothesis of equality (F(1,39) = 0.03). On the other hand, the output weight estimated for the ECB is more than twice as large as the one found for the Bundesbank. Testing the ECB coefficient against 0.4 leads to a rejection of the hypothesis of equal size (F(1,39) = 10.5**).[13] This test does not take into account that there is uncertainty in the estimation of the German coefficient. Taking this uncertainty into account still leads to the conclusion that the ECB output coefficient is significantly larger than the one for the Bundesbank.[14]

Conclusion

We estimate reaction functions for both the Bundesbank (1979:4 – 1998:12) and the European Central Bank (1999:1 – 2003:7) following the specification suggested by Clarida et al. (1998). We find that the Bundesbank reaction function can be characterised by an inflation weight of 1.2 and an output gap weight of 0.4 before and after German reunification. For the ECB we obtain a similar estimate of the inflation rate, and a unit coefficient on the output response, which is significantly higher. Thus, while the ECB reacts similar to the Bundesbank when it comes to inflation deviations, it shows a much stronger response to output deviations.

Given the similar institutional design, a stronger response of the ECB to the output gap may reflect different preferences of the ECB compared to the Bundesbank or the new economic and political environment the ECB operates in.[15] Of course, whether these differences are temporary or permanent remains to be seen.

---

[11] There is an outlier in September 2001, the time of the terrorist attack on New York, which we include in the list of instruments. Including the dummy in the reaction function itself leaves the other estimators almost unchanged.

[12] Normal standard errors are: ρ (0.038), β (0.730), γ (0.232), and α (1.62).

[13] Eliminating the constant from the ECB equation raises the coefficient on inflation to 1.7 and makes it significant at a 1% level, while the output gap coefficient remains basically unchanged. However, from the point of view of both economic theory and history, it is implausible to have a zero long-run nominal interest rate.

[14] Testing the ECB output coefficient against the pre-GMU coefficient leads to a t-test value of 2.53. This is significant at the 5% level when performing a two-sided test and significant at a 1% level for a one-sided test. Against the post-GMU coefficient the value of the t-test is 3.57, which is significant at a 1% level.

[15] The coefficients in the Taylor rule depend upon policy preferences, economic structure, and shocks. In general it is impossible to identify the policy preferences from the estimated parameters of the reaction function. Cecchetti and Ehrmann (1999) discuss how to recover policy preferences from Taylor rule estimates under very restrictive assumptions.

References

Clarida, R., J. Gali, and M. Gertler (1998), Monetary policy rules in practice, *European Economic Review* 42, 1033-1067.

Borio, C.E.V. (1997), The implementation of monetary policy in industrial countries: A survey, *BIS Economic Papers* No. 47, July.

Castelnuovo, E. (2003), Taylor rules, omitted variables, and interest rate smoothing in the US, *Economics Letters* 81, 55-59.

Cecchetti, S. G. and M. Ehrmann (1999), Does Inflation Targeting Increase Output Volatility, *NBER Working Paper* No. 7426, December.

Clausen, V. and B. Hayo (2002), Monetary policy in the euro area – Lessons from the first years, *ZEI Working Paper* No 02/09, University of Bonn.

Davidson, R. and J.G. MacKinnon (1993), *Estimation and Inference in Econometrics*, New York: Oxford University Press.

Deutsche Bundesbank (1999), Taylor interest rate and monetary conditions index, *Monthly Report*, April, 47-63.

Doménech, R., M. Ledo, and D. Taguas (2002), Some new results on interest rate rules in EMU and in the US, *Journal of Economics and Business* 54, 431-446.

Gerdesmeier, D. and B. Roffia (2003), Empirical estimates of reaction functions for the euro area, *ECB Working Paper No 206*, European Central Bank.

Gerlach, S. and G. Schnabel (2000), The Taylor rule and interest rates in the EMU area, *Economics Letters* 67, 165-171.

Hahn, J. and J. Hausman (2003), Weak instruments: diagnosis and cures in empirical econometrics, *American Economic Review* 93, 118-125.

Hayashi, F. (2000), *Econometrics*, Princeton: Princeton University Press.

Hendry, D.F. and H.-M. Krolzig (1999), Improving on 'Data mining reconsidered' by K.D. Hoover and S.J. Perez, *Econometrics Journal* 2, 202-219.

Mihov, I. (2001), Monetary policy implementation and transmission in the European Monetary Union, *Economic Policy* 16, 369-406.

Newey, W.K. and K.D. West (1987), A simple, positive semi-definite, heteroscedasticity and autocorrelation consistent covariance matrix, *Econometrica* 55, 703-708.

Stock, J.H. and M. Yogo (2003), Testing for weak instruments in linear IV regression, *mimeo*, Department of Economics, Harvard University.

Stock, J.H., J.H. Wright, and M. Yogo (2002), A survey of weak instruments and weak identification in generalized method of moments, *Journal of Business & Economic Statistics* 20, 518-529.

Taylor, J. (1993), Discretion versus Policy Rules in Practice, *Carnegie-Rochester Conference Series on Public Policy* 39, 195-214.

ZEI Papers

ZEI Policy Paper B97-01	A Stability Pact for Europe (a Forum organized by ZEI)
ZEI Policy Paper B97-02	Employment and EMU (Deutsch-Französisches Wirtschaftspolitisches Forum/ Forum Economique Franco-Allemand)
ZEI Policy Paper B97-03	Liberalising European Markets for Energy and Telecommunications: Some Lessons from the US Electric Utility Industry (Tom Lyon and John Mayo)
ZEI Policy Paper B97-04	Macroeconomic Stabilization with a Common Currency: Does European Monetary Unification Create a Need for Fiscal Insurance or Federalism? (Kenneth Kletzer)
ZEI Policy Paper B98-01	Budgeting Institutions for Aggregate Fiscal Discipline (Jürgen von Hagen)
ZEI Policy Paper B98-02	Trade with Low-Wage Countries and Wage Inequality (Jaleel Ahmad)
ZEI Policy Paper B98-03	Central Bank Policy in a More Perfect Financial System (Jürgen von Hagen and Ingo Fender)
ZEI Policy Paper B98-04	The EMU\`s Exchange Rate Policy (Deutsch-Französisches Wirtschaftspolitisches Forum/ Forum Economique Franco-Allemand)
ZEI Policy Paper B98-05	Estimating a European Demand for Money (Bernd Hayo)
ZEI Policy Paper B98-06	Monetary Union, Asymmetric Productivity Shocks and Fiscal Insurance: an Analytical Discussion of Welfare Issues (Kenneth M. Kletzer)
ZEI Policy Paper B98-07	Designing Voluntary Environmental Agreements in Europe: Some Lessons from the U.S. EPA\`s 33/50 Program (John W. Maxwell)
ZEI Working Paper B98-08	Money-Output Granger Causality Revisited: An Empirical Analysis of EU Countries (Bernd Hayo)
ZEI Working Paper B98-09	US Monetary Policy AND Monetary Policy and the ESCB (Robert L. Hetzel)
ZEI Policy Paper B98-10	Der Wettbewerb der Rechts- und politischen Systeme in der Europäischen Union (Martin Seidel)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper B98-11	Exchange Rate Regimes in the Transition Economies: Case Study of the Czech Republic: 1990-1997 (Julius Horvath)
ZEI Policy Paper B98-11A	Die Bewertung der „ dauerhaft tragbaren öffentlichen Finanzlage“ der EU Mitgliedstaaten beim Übergang zur dritten Stufe der EWWU (Rolf Strauch)
ZEI Working Paper B98-12	Price Stability and Monetary Policy Effectiveness when Nominal Interest Rates are Bounded at Zero (Athanasios Orphanides and Volker Wieland)
ZEI Working Paper B98-13	Fiscal Policy and Intranational Risk-Sharing (Jürgen von Hagen)
ZEI Working Paper B98-14	Free Trade and Arms Races: Some Thoughts Regarding EU-Russian Trade (Rafael Reuveny and John Maxwell)
ZEI Working Paper B98-15	Can Taxing Foreign Competition Harm the Domestic Industry? (Stefan Lutz)
ZEI Policy Paper B98-16	Labour Market & Tax Policy in the EMU (Deutsch-Französisches Wirtschaftspolitisches Forum/ Forum Economique Franco-Allemand)
ZEI Working Paper B99-01	The Excess Volatility of Foreign Exchange Rates: Statistical Puzzle or Theoretical Artifact? (Robert B.H. Hauswald)
ZEI Working Paper B99-02	The Consequences of Labour Market Flexibility: Panel Evidence Based on Survey Data (Rafael Di Tella and Robert MacCulloch)
ZEI Working Paper B99-03	The Macroeconomics of Happiness (Rafael Di Tella, Robert MacCulloch and Andrew J. Oswald)
ZEI Working Paper B99-04	The Finance-Investment Link in a Transition Economy: Evidence for Poland from Panel Data (Christian Weller)
ZEI Working Paper B99-05	Tumbling Giant: Germany`s Experience with the Maastricht Fiscal Criteria (Jürgen von Hagen and Rolf Strauch)
ZEI Working Paper B99-06	Productivity Convergence and Economic Growth: A Frontier Production Function Approach (Christopher M. Cornwell and Jens-Uwe Wächter)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper B99-07	Comovement and Catch-up in Productivity Across Sectors: Evidence from the OECD (Christopher M. Cornwell and Jens-Uwe Wächter)
ZEI Working Paper B99-08	The Connection Between More Multinational Banks and Less Real Credit in Transition Economies (Christian Weller)
ZEI Working Paper B99-09	Monetary Policy, Parameter Uncertainty and Optimal Learning (Volker Wieland)
ZEI Working Paper B99-10	Financial Liberalization, Multinational Banks and Credit Supply: the Case of Poland (Christian Weller)
ZEI Policy Paper B99-11	Financial Supervision and Policy Coordination in the EMU (Deutsch-Französisches Wirtschaftspolitisches Forum / Forum Economique Franco-Allemand)
ZEI Working Paper B99-12	Size Distortions of Tests of the Null Hypothesis of Stationarity: Evidence and Implications for Applied Work (Mehmet Caner and Lutz Kilian)
ZEI Working Paper B99-13	Financial Fragility or What Went Right and What Could Go Wrong in Central European Banking? (Christian E. Weller and Jürgen von Hagen)
ZEI Working Paper B99-14	Industry Effects of Monetary Policy in Germany (Bernd Hayo and Birgit Uhlenbrock)
ZEI Working Paper B99-15	Financial Crises after Financial Liberalization: Exceptional Circumstances or Structural Weakness? (Christian E. Weller)
ZEI Working Paper B99-16	Multinational Banks and Development Finance (Christian E. Weller and Mark J. Scher)
ZEI Working Paper B99-17	Stability of Monetary Unions: Lessons from the Break-up of Czechoslovakia (Jan Fidrmuc, Julius Horvath and Jarko Fidrmuc)
ZEI Working Paper B99-18	Why are Eastern Europe`s Banks not failing when everybody else`s are? (Christian E. Weller and Bernard Morzuch)
ZEI Working Paper B99-19	The Evolution of Monetary Policy in Transition Economies (Ali M. Kutan and Josef C. Brada)
ZEI Working Paper B99-20	Subnational Government Bailouts in Germany (Helmut Seitz)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper B99-21	The End of Moderate Inflation in Three Transition Economies? (Josef C. Brada and Ali M. Kutan)
ZEI Working Paper B99-22	Partisan Social Happiness (Rafael Di Tella and Robert MacCulloch)
ZEI Working Paper B99-23	Informal Family Insurance and the Design of the Welfare State (Rafael Di Tella and Robert MacCulloch)
ZEI Working Paper B99-24	What Makes a Revolution? (Robert MacCulloch)
ZEI Working Paper B99-25	Micro and Macro Determinants of Public Support for Market Reforms in Eastern Europe (Bernd Hayo)
ZEI Working Paper B99-26	Skills, Labour Costs, and Vertically Differentiated Industries: a General Equilibrium Analysis (Stefan Lutz and Alessandro Turrini)
ZEI Working Paper B00-01	Monetary Union and Fiscal Federalism (Kenneth Kletzer and Jürgen von Hagen)
ZEI Working Paper B00-02	Inflation Bias and Productivity Shocks in Transition Economies: The Case of the Czech Republic (Josef C. Brada, Arthur E. King and Ali M. Kutan)
ZEI Working Paper B00-03	Integration, Disintegration and Trade in Europe: Evolution of Trade Relations During the 1990`s (Jarko Fidrmuc and Jan Fidrmuc)
ZEI Policy Paper B00-04	A New Political Culture in the EU – Democratic Accountability of the ECB (Christa Randzio-Plath)
ZEI Working Paper B00-05	Liberalization, Democracy and Economic Performance during Transition (Jan Fidrmuc)
ZEI Working Paper B00-06	The Demand for Money in Austria (Bernd Hayo)
ZEI Policy Paper B00-07	EMU and Economic Growth in Europe (Deutsch-Französisches Wirtschaftspolitisches Forum / Forum Economique Franco-Allemand)
ZEI Working Paper B00-08	The Effectiveness of Self-Protection Policies for Safeguarding Emerging Market Economies from Crises (Kenneth Kletzer)
ZEI Working Paper B00-09	Rational Institutions Yield Hysteresis (Rafael Di Tella and Robert MacCulloch)
ZEI Working Paper B00-10	The Importance of Domestic Political Institutions: Why and How Belgium and Italy qualified for EMU (Mark Hallerberg)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper B00-11	A Dynamic Approach to Inflation Targeting in Transition Economies (Lucjan T. Orlowski)
ZEI Policy Paper B00-12	Rechtsetzung und Rechtsangleichung als Folge der einheitlichen europäischen Währung (Martin Seidel)
ZEI Working Paper B00-13	Back to the Future: The Growth Prospects of Transition Economies Reconsidered (Nauro F. Campos)
ZEI Working Paper B00-14	Sources of Real Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary (Selahattin Dibooglu and Ali M. Kutan)
ZEI Working Paper B00-15	Regional Risksharing and Redistribution in the German Federation (Jürgen von Hagen and Ralf Hepp)
ZEI Policy Paper B00-16	The European Central Bank: Independence and Accountability (Christa Randzio-Plath and Tomasso Padoa-Schioppa)
ZEI Policy Paper B00-17	Rückführung der Landwirtschaftspolitik in die Verantwortung der Mitgliedsstaaten? – Rechts- und Verfassungsfragen des Gemeinschaftsrechts (Martin Seidel)
ZEI Working Paper B00-18	Budget Processes: Theory and Experimental Evidence (Karl-Martin Ehrhart, Roy Gardner, Jürgen v. Hagen and Claudia Keser)
ZEI Working Paper B00-19	Income Dynamics and Stability in the Transition Process – General Reflections applied to the Czech Republic (Jens Hölscher)
ZEI Working Paper B00-20	Breaking-Up a Nation, from the Inside (Etienne Farvaque)
ZEI Working Paper B01-01	Divided Boards: Partisanship through Delegated Monetary Policy (Etienne Farvaque, Gaël Lagadec)
ZEI Working Paper B01-02	The Konstanz Seminar on Monetary Theory and Policy at Thirty (Michele Fratianni, Jürgen von Hagen)
ZEI Working Paper B01-03	Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness (Rafael di Tella, Robert J. MacCulloch and Andrew J. Oswald)
ZEI Working Paper B01-04	The Determination of Umemployment Benefits (Rafael di Tella and Robert J. MacCulloch)

You can download these papers at the ZEI web site www.zei.de

ZEI-Policy Paper B01-05	Trade Rules and Global Governance: A Long Term Agenda / The Future of Banking (Deutsch-Französisches Wirtschaftspolitisches Forum/ Forum Economique Franco-Allemand)
ZEI Working Paper B01-06	Opposites Attract: The Case of Greek and Turkish Financial Markets (Konstantinos Drakos and Ali M. Kutan)
ZEI Working Paper B01-07	The Convergence of Monetary Policy between Candidate Countries and the European Union (Josef C. Brada and Ali M. Kutan)
ZEI Working Paper B01-08	The Functioning of Economic Policy Coordination (Jürgen von Hagen and Susanne Mundschenk)
ZEI Working Paper B01-09	Democracy in Transition Economies: Grease or Sand in the Wheels of Growth? (Jan Fidrmuc)
ZEI Working Paper B01-10	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 and Niina Pautola-Mol)
ZEI Working Paper B01-11	Inflationary Performance in a Monetary Union with Large Wage Setters (Lilia Cavallari)
ZEI Policy Paper B01-12	The Impact of Eastern Enlargement on EU-Labour Markets / Pensions Reform Between Economic and Political Problems (Deutsch-Französisches Wirtschaftspolitisches Forum/Forum Economique Franco-Allemand)
ZEI Working Paper B01-13	German Public Finances: Recent Experiences and Future Challenges (Jürgen von Hagen und Rolf R. Strauch)
ZEI Working Paper B01-14	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 Strauch and Jürgen von Hagen)
ZEI Working Paper B01-15	Programs without Alternative: Public Pensions in the OECD (Christian E. Weller)
ZEI Working Paper B01-16	Sources of Inflation and Output Fluctuations in Poland and Hungary: Implications for Full Membership in the European Union (Selahattin Dibooglu and Ali M. Kutan)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper B01-17	Executive Authority, the Personal Vote, and Budget Discipline in Latin American and Carribean Countries (Mark Hallerberg and Patrick Marier)
ZEI Working Paper B01-18	Monetary Policy in Unknown Territory The European Central Bank in the Early Years (Jürgen von Hagen and Matthias Brückner)
ZEI Working Paper B01-19	Detrending and the Money-Output Link: International Evidence (R.W. Hafer and Ali M. Kutan)
ZEI Working Paper B01-20	An Empirical Inquiry of the Efficiency of Intergovernmental Transfers for Water Projects based on the WRDA Data (Anna Rubinchik-Pessach)
ZEI Working Paper B01-21	Balkan and Mediterranean Candidates for European Union Membership: The Convergence of their Monetary Policy with that of the European Central Bank (Josef C. Brada and Ali M. Kutan)
ZEI Working Paper B01-22	Strategic Delegation and International Capital Taxation (Matthias Brückner)
ZEI Working Paper B01-23	Migration and Adjustment to Shocks in Transition Economies (Jan Fidrmuc)
ZEI Working Paper B01-24	Disintegration and Trade (Jarko and Jan Fidrmuc)
ZEI Working Paper B01-25	Monetary Convergence of the EU Candidates to the Euro: A Theoretical Framework and Policy Implications (Lucjan T. Orlowski)
ZEI Working Paper B01-26	Regional Effects of Terrorism on Tourism: Evidence from Three Mediterranean Countries (Konstantinos Drakos and Ali M. Kutan)
ZEI Working Paper B01-27	Investor Panic, IMF Actions, and Emerging Stock Market Returns and Volatility: A Panel Investigation (Bernd Hayo and Ali M. Kutan)
ZEI Policy Paper B01-28	Political Economy of the Nice Treaty: Rebalancing the EU Council / The Future of European Agricultural Policies (Forum Economique Franco-Allemand / Deutsch-Französisches Wirtschafts-politisches Forum)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper 01-29	Is Kazakhstan vulnerable to the Dutch Disease? (Karlygash Karalbayeva, Ali M. Kutan and Michael L. Wyzan)
ZEI Working Paper B02-01	Does Inflation Targeting Matter? (Manfred J.M. Neumann and Jürgen von Hagen)
ZEI Working Paper B02-02	The Euro System and the Federal Reserve System Compared: Facts and Challenges (Karlheinz Ruckriegel and Franz Seitz)
ZEI Working Paper B02-03	The Choice of Exchange Rate Systems: An Empirical Analysis for Transition Economies (Jürgen von Hagen and Jizhong Zhou)
ZEI Working Paper B02-04	Asymmetric Monetary Policy Effects in EMU (Volker Clausen and Bernd Hayo)
ZEI Working Paper B02-05	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 and Su Zhou)
ZEI Working Paper B02-06	Is there Asymmetry in Forward Exchange Rate Bias? Multi-Country Evidence (Su Zhou and Ali M. Kutan)
ZEI Working Paper B02-07	Perspektiven der Erweiterung der Europäischen Union (Martin Seidel)
ZEI Working Paper B02-08	Has the Link between the Spot and Forward Exchange Rates Broken Down? Evidence from Rolling Cointegration Tests (Ali M. Kutan and Su Zhou)
ZEI Working Paper B02-09	Monetary Policy in the Euro Area – Lessons from the First Years (Volker Clausen and Bernd Hayo)
ZEI Policy Paper B02-10	National Origins of European Law: Towards an Autonomous System of European Law? (Martin Seidel)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper B02-11	The Eurosystem and the Art of Central Banking (Gunnar Heinsohn and Otto Steiger)
ZEI Working Paper B02-12	Argentina: The Anatomy of a Crisis (Jiri Jonas)
ZEI Working Paper B02-13	De Facto and Official Exchange Rate Regimes in Transition Economies (Jürgen von Hagen and Jizhong Zhou)
ZEI Working Paper B02-14	The Long and Short of It: Global Liberalization, Poverty and Inequality (Christian E. Weller and Adam Hersh)
ZEI Working Paper B02-15	Does Broad Money Matter for Interest Rate Policy? (Matthias Brückner and Andreas Schabert)
ZEI Working Paper B02-16	Regional Specialization and Concentration of Industrial Activity in Accession Countries (Iulia Traistaru, Peter Nijkamp and Simonetta Longhi)
ZEI Working Paper B02-17	Specialization and Growth Patterns in Border Regions of Accession Countries (Laura Resmini)
ZEI Working Paper B02-18	Regional Specialization and Employment Dynamics in Transition Countries (Iulia Traistaru and Guntram B. Wolff)
ZEI Working Paper B02-19	East Germany: Transition with Unification, Experiments and Experiences (Jürgen von Hagen, Rolf R. Strauch and Guntram B. Wolff)
ZEI Working Paper B02-20	The Impact of News, Oil Prices, and International Spillovers on Russian Financial Markets (Bernd Hayo and Ali M. Kutan)
ZEI Working Paper B02-21	Nominal and Real Stochastic Convergence within the Transition Economies and to the European Union: Evidence from Panel Data (Ali M. Kutan and Taner M. Yigit)
ZEI Working Paper B02-22	Der Staat als „Lender of Last Resort“ – oder: Die Achillesferse des Eurosystems (Otto Steiger)
ZEI Policy Paper B02-23	Legal Aspects of European Economic and Monetary Union (Martin Seidel)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper B02-24	The Effects of Quotas on Vertical Intra-Industry Trade (Stefan Lutz)
ZEI Working Paper B02-25	Trade Policy: „Institutional“ vs. „Economic“ Factors (Stefan Lutz)
ZEI Working Paper B02-26	Monetary Convergence and Risk Premiums in the EU Candidate Countries (Lucjan T. Orlowski)
ZEI Working Paper B02-27	Poverty Traps and Growth in a Model of Endogenous Time Preference (Debajyoti Chakrabarty)
ZEI Working Paper B02-28	Inequality, Politics and Economic Growth (Debajyoti Chakrabarty)
ZEI Working Paper B02-29A	Growth and Business Cycles with Imperfect Credit Markets (Debajyoti Chakrabarty)
ZEI Working Paper B02-29B	Trade Agreements as Self-Protection (Jennifer Pédussel Wu)
ZEI Working Paper B02-30	An Adverse Selection Model of Optimal Unemployment Insurance (Marcus Hagedorn, Shok Kaul and Tim Mennel)
ZEI Working Paper B03-01	Die Wirtschafts- und Währungsunion im rechtlichen und politischen Gefüge der Europäischen Union (Martin Seidel)
ZEI Working Paper B03-02	Commuting in the Baltic States: Patterns, Determinants, and Gains (Mihails Hazans)
ZEI Working Paper B03-03	Europäische Steuerkoordination und die Schweiz (Stefan H Lutz)
ZEI Working Paper B03-04	Do Ukrainian Firms Benefit from FDI? (Stefan H Lutz and Oleksandr Talavera)
ZEI Working Paper B03-05	Reconsidering the evidence: are Eurozone business cycles converging? (Michael Massmann and James Mitchell)
ZEI Working Paper B03-06	Fiscal Discipline and Growth in Euroland Experiences with the Stability and Growth Pact (Jürgen von Hagen)

You can download these papers at the ZEI web site www.zei.de

ZEI Policy Paper B03-07	Nach Nizza und Stockholm: Stand des Binnenmarktes und Prioritäten für die Zukunft (Martin Seidel)
ZEI Working Paper B03-08	The Determination of Capital Controls: Which Role Do Exchange Rate Regimes Play? (Jürgen von Hagen and Jizhong Zhou)
ZEI Working Paper B03-09	The European Central Bank and the Eurosystem: An Analysis of the Missing Central Monetary Institution in European Monetary Union (Gunnar Heinsohn and Otto Steiger)
ZEI Working Paper B03-10	Foreign Direct Investment and Perceptions of Vulnerability to Foreign Exchange Crises: Evidence from Transition Economies (Josef C. Brada and Vladimír Tomsík)
ZEI Policy Paper B03-11	Die Weisungs- und Herrschaftsmacht der Europäischen Zentralbank im Europäischen System der Zentralbanken – eine rechtliche Analyse (Martin Seidel)
ZEI Working Paper B03-12	What makes regions in Eastern Europe catching up? The role of foreign investment, human resources and geography (Gabriele Tondl and Goran Vuksic)
ZEI Working Paper B03-13	The IS Curve and the Transmission of Monetary Policy: Is there a Puzzle? (Charles Goodhart and Boris Hofmann)
ZEI Working Paper B03-14	FCIs and Economic Activity: Some International Evidence (Charles Goodhart and Boris Hofmann)
ZEI Working Paper B03-15	Employed and unemployed search: the marginal willingness to pay for attributes in Lithuania, the US and the Netherlands (Jos van Ommeren and Mihails Hazans)
ZEI Working Paper B03-16	South-East Europe: Economic Performance, Perspectives and Policy Challenges (Iulia Traistaru and Jürgen von Hagen)

You can download these papers at the ZEI web site www.zei.de

ZEI Working Paper B03-17	Determinants of inter-regional migration in the baltic countries (Mihails Hazans)
ZEI Working Paper B03-18	The Effects of Regional and Industry-Wide FDI Spillovers on Export of Ukrainian Firms (Stefan H. Lutz, Oleksandr Talavera and Sang-Min Park)
ZEI Working Paper B03-19	An Empirical Analysis of Competing Explanations of Urban Primacy. Evidence from Asia and the Americas (Ronald L. Moomaw and Mohammed A. Alwosabi)
ZEI Working Paper B03-20	Urban Primacy, Gigantism, and International Trade: Evidence from Asia and the Americas (Ronald L. Moomaw and Mohammed A. Alwosabe)
ZEI Working Paper B03-21	Reputation Flows: Contractual Disputes and the Channels for Inter-firm Communication (William Pyle)
ZEI Policy Paper B03-22	Reformzwänge innerhalb der EU angesichts der Osterweiterung (Martin Seidel)
ZEI Working Paper B03-23	Economic Integration and Manufacturing Concentration Patterns: Evidence from Mercosur (Iulia Traistaru and Christian Volpe Martincus)
ZEI Working Paper B03-24	Monetary Policy Reaction Functions: ECB versus Bundesbank (Bernd Hayo and Boris Hofmann)

You can download these papers at the ZEI web site www.zei.de