Clausen, Volker; Hayo, Bernd

Working Paper
Asymmetric monetary policy effects in EMU

ZEI working paper, No. B 04-2002

Provided in Cooperation with:
ZEI - Center for European Integration Studies, University of Bonn

Suggested Citation: Clausen, Volker; Hayo, Bernd (2002) : Asymmetric monetary policy effects in EMU, ZEI working paper, No. B 04-2002, ZEI, Bonn

This Version is available at:
http://hdl.handle.net/10419/39616

Terms of use:
Documents in EconStor may be saved and copied for your personal and scholarly purposes.
You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.
If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.
Volker Clausen and Bernd Hayo

Asymmetric Monetary Policy Effects in EMU
Asymmetric Monetary Policy Effects in EMU

*Volker Clausen and **Bernd Hayo

* University of Essen and Indiana University, Bloomington
** University of Essen, ZEI, University of Bonn, and Georgetown University

March 2002

Volker Clausen
Department of Economics (FB 5)
University of Essen
D-45117 Essen
Germany
Tel: +49-201-183-3655
Fax: +49-201-183-3974
Email: vclausen@vwl.uni-essen.de

Bernd Hayo
Department of Economics (FB 5)
University of Essen
D-45117 Essen
Germany
Tel: +49-201-183-3010
Fax: +49-201-183-3974
Email: bhayo@vwl.uni-essen.de

Thanks to Mat Canzoneri, Jürgen von Hagen, Matthias Brückner and participants of a research seminar at the University of Bonn for helpful comments. Obviously, we are responsible for all remaining shortcomings.
Asymmetric Monetary Policy Effects in EMU

Abstract

This paper uses a semi-structural dynamic modelling approach to investigate asymmetric monetary transmission in Europe. A system of equations containing reaction functions for monetary policy, output and inflation equations is simultaneously estimated for France, Germany, and Italy. Extensive cross equation tests show that relatively large differences in simulated impulse responses are still consistent with the notion that the transmission mechanism is homogeneous across the three major EMU countries. However, monetary policy impulses show a relatively stronger effect on the output gap in Italy and Germany. Out-of-sample tests do not find a structural break in the transmission mechanisms prior to EMU.

JEL classification: E52, F41

Keywords: European Monetary Union, Monetary Policy, Semi-structural modelling
1. Introduction

The creation of the European Monetary Union (EMU) raises the question whether the common monetary policy has the same impact in all member countries. Differences in the transmission mechanisms in Europe imply that uniform policy impulses by the European Central Bank (ECB) lead to asymmetric business cycles across the EMU. These result in adjustment problems and may create tensions in the decision-making process of the ECB (see, e.g., Aksoy et al., 2002).

Prior to EMU, there has been a considerable convergence in the cyclical behaviour of the EMU member countries (ECB, 1999). Furthermore, after the establishment of EMU some further convergence in transmission mechanisms is expected to take place (Clausen, 2001). Nevertheless, some differences in transmission patterns are likely to persist (Cecchetti, 1999; Mojon, 2000). Furthermore, recent differences in growth rates across the EMU as well as the prospect of EU enlargement to Eastern Europe with countries having very different transmission profiles keep the interest in asymmetric monetary transmission in Europe.

Reflecting the importance for ECB policy-making, numerous studies deal with this issue. A considerable part of the early empirical evidence has been surveyed by Dornbusch et al. (1998) and Guiso et al. (1999). Dornbusch et al. define three basic requirements for empirical studies related to the pre-EMU period in order to provide valuable information on monetary transmission after the formation of EMU. First, the direct impact from a change in interest rates on output and prices has to be separable from the indirect impact via exchange rates. This exchange rate channel has to be decomposable into an intra-EMU and an extra-EMU channel, since the former disappeared with the establishment of EMU. Otherwise, asymmetries in policy transmission might be identified that basically result from intra-European exchange rate changes. Second, in order to model the common monetary policy in Europe the empirical set-up has to allow for a simultaneous change of monetary policy in all EMU countries. Third, the empirical approach has to provide information on the statistical significance of asymmetries in the transmission mechanism. As both surveys illustrate, numerous previous studies on asymmetric monetary transmission in Europe fail to meet these requirements. Even the recent study by Angeloni et al. (2002) does not contain statistical tests of differences in estimated coefficients or simulated impulse responses.

A fourth condition can be added. The creation of EMU and the corresponding change in the policy regime may result in a structural break in the transmission mechanisms in Europe. Some authors believe that financial market efficiency suggests a rapid adjustment of the behaviour of economic agents after entering the new monetary regime (see Arnold and de Vries, 2000). Consequently, analyses using pre-EMU data provide very limited information for the ECB. While we expect some convergence in transmission mechanisms across the EMU, these adjustments are likely to take place
gradually (see Hayo, 1999 or Clausen, 2001). In this case, historical data and related empirical studies provide useful information about the transmission mechanism after the formation of EMU.

2. Methodology and data

This paper uses a semi-structural dynamic modelling approach for assessing the degree of asymmetric monetary transmission in Europe. This approach avoids problems related to constructing conclusive statistical cross-country tests that are a typical weakness of VAR studies (such as in Clements et al., 2001, Ehrmann, 2000, Peersman and Smets, 2001). In most studies, statistical problems as evident in more structural approaches (see Dornbusch et al., 1998 or Peersman and Smets, 1999) can be addressed by providing a consistent but more flexible dynamic modelling framework that is a reasonably accurate reflection of the data generating process (see Hendry, 1995).

Our empirical design draws upon recent developments in macro-econometric modelling: Central bank behaviour is modelled using reaction functions in the spirit of Taylor (1993) where interest rate setting responds to the output gap and to inflation. This approach receives considerable empirical support not only in the US (e.g. Rudebusch and Svensson, 1999) but also in the euro area (Peersman and Smets, 1999; Gerlach and Schnabel, 2000). The specification of the transmission mechanism of monetary policy draws upon Rudebusch and Svensson (1999). An output gap equation models the demand side and an inflation equation represents the supply side in the respective economies. The output gap is driven by interest rates, exchange rate developments, and foreign lagged output gaps. Inflation is governed by the current output gap and lagged inflation.

Our analysis focuses on France, Germany and Italy as the most important EMU member countries, which together account for almost three quarters of aggregate European output. The overall system consists therefore of nine equations. The model is estimated using the technique of full-information maximum likelihood (FIML). The system context allows for extensive tests of cross equation hypotheses. The semi-structural dynamic modelling approach employed in this paper to assess the effects of monetary policy differs from VAR models in several respects. First, as a result of the large number of variables we do not treat all variables as endogenous. Second, we do not include all variables in all equations to achieve identification. Third, we do not impose the same lag length for each variable in each equation due to limited degrees of freedom. Fourth, testing coefficient estimates is statistically possible and makes economic sense.

The quarterly data start in 1979 – introduction of the European Monetary System (EMS) – and end before the establishment of EMU in 1998. We use the money market rate, seasonally adjusted quarterly data for real GDP, and consumer prices from the IMF International Financial Statistics.
database (March 2001 CD-Rom). The disaggregated exchange rate variables are taken from Deutsche Bundesbank (1998). The exchange rate variable is exactly decomposed into the effective exchange rate vis-à-vis the members of EMU and the rest of the world (excluding other EU members).\(^1\)

In order to derive the output gap, we apply a Hodrick-Prescott filter to the GDP series to extract a trend from the data. This trend is subtracted from the original GDP series, divided by the trend estimate and multiplied by 100 in order to convert values to percent. Inflation is the rate of change of the consumer price index with respect to the previous quarter. The exchange rate variables are expressed in natural logarithms and computed as moving averages over the last four quarters in order to dampen the impact of temporary fluctuations in the exchange rate. Unit root tests (not shown) find short-term interest rates, output gaps, inflation rates and the effective exchange rates to be stationary. In the estimation, the econometric model is therefore treated as stationary.

3. **Estimating monetary policy effects**

The interpretation of the estimation results and the tests for the statistical significance of asymmetries require the underlying system to pass standard diagnostic tests. Initial estimations of the full system showed problems with outliers causing non-normality of the residuals. The inclusion of several impulse dummies related to the reunification of Germany and to realignments in the EMS removed these problems. Insignificant lags in the interest rate and inflation equations were removed based on a consistent testing-down procedure at a 5% significance level. To control for possible data mining and to check whether a structural break occurred prior to the establishment of EMU, we performed out-of-sample evaluations of our model. Despite the limitations in the degrees of freedom, we reserved eight quarters for Chow-tests for structural stability. Since we use lagged variables, the model is estimated over the period 1980:1 to 1996:4.

<table>
<thead>
<tr>
<th></th>
<th>AR(2)-test</th>
<th>Normality</th>
<th>Chow1-test</th>
<th>Chow2-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vector statistics</td>
<td>F(162,276)=1.23</td>
<td>Chi(^2)(18)=22.08</td>
<td>F(72,58)=1.51</td>
<td>F(72,58)=1.22</td>
</tr>
</tbody>
</table>

**Notes:** * and ** indicate statistical significance at a level of 5% and 1%, respectively. Chow1-test is the standard Chow-test. Chow2-test takes parameter uncertainty into account. AR(2)-test is an LM-test for autocorrelation containing two lags.

\(^1\) EMU refers to the three largest countries, France, Germany, and Italy. Our treatment of the exchange rate channel is superior to previous studies. Traditionally, the exchange rate channel is modelled asymmetrically using only the DM-Dollar exchange rate for Germany and the bilateral exchange rates with the DM for the other European countries (see e.g. Dornbusch et al., 1998).
Table 1 displays standard diagnostic statistics for the baseline nine-equation system. These tests do not show any problems of misspecification. There is no evidence of autocorrelation or non-normality of the residuals. The out-of-sample Chow tests do not indicate instability of the estimates. Hence, the model does not experience a major structural break prior to EMU.

In order to address possible violations of the homoscedasticity assumption, heteroscedasticity-consistent standard errors (White, 1980) have been computed. In general, these do not indicate any problems, and, in view of the known small-sample problems of the White-estimates, we generally continue to use normal standard errors in our interpretation of the results.

Whereas the complete system is estimated simultaneously, we present the actual results for output gaps, interest rates, and inflation rates in three groups in order to facilitate the cross-country comparison. Table 2 contains the estimates for the output gaps.

### Table 2: FIML-system: Output gap equations

<table>
<thead>
<tr>
<th></th>
<th>France Coeff.</th>
<th>S.E.</th>
<th>Germany Coeff.</th>
<th>S.E.</th>
<th>Italy Coeff.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FInt$_{t-1}$</td>
<td>0.044</td>
<td>0.048</td>
<td>GInt$_{t-1}$</td>
<td>-0.384$^*$</td>
<td>0.206</td>
<td></td>
</tr>
<tr>
<td>FInt$_{t-2}$</td>
<td>-0.141$^*$</td>
<td>0.064</td>
<td>GInt$_{t-2}$</td>
<td>0.480</td>
<td>0.299</td>
<td></td>
</tr>
<tr>
<td>FInt$_{t-3}$</td>
<td>0.101</td>
<td>0.064</td>
<td>GInt$_{t-3}$</td>
<td>-0.173</td>
<td>0.258</td>
<td></td>
</tr>
<tr>
<td>FInt$_{t-4}$</td>
<td>-0.056</td>
<td>0.048</td>
<td>GInt$_{t-4}$</td>
<td>-0.136</td>
<td>0.168</td>
<td></td>
</tr>
<tr>
<td>FGap$_{t-1}$</td>
<td>0.630$^{**}$</td>
<td>0.116</td>
<td>FGap$_{t-1}$</td>
<td>-0.433$^*$</td>
<td>0.232</td>
<td></td>
</tr>
<tr>
<td>FGap$_{t-2}$</td>
<td>0.125</td>
<td>0.114</td>
<td>FGap$_{t-2}$</td>
<td>0.421$^*$</td>
<td>0.215</td>
<td></td>
</tr>
<tr>
<td>GGap$_{t-1}$</td>
<td>0.001</td>
<td>0.060</td>
<td>GGap$_{t-1}$</td>
<td>0.542$^{**}$</td>
<td>0.116</td>
<td></td>
</tr>
<tr>
<td>GGap$_{t-2}$</td>
<td>-0.138$^*$</td>
<td>0.060</td>
<td>GGap$_{t-2}$</td>
<td>-0.013</td>
<td>0.111</td>
<td></td>
</tr>
<tr>
<td>IGap$_{t-1}$</td>
<td>0.308$^*$</td>
<td>0.121</td>
<td>IGap$_{t-1}$</td>
<td>0.257</td>
<td>0.230</td>
<td></td>
</tr>
<tr>
<td>IGap$_{t-2}$</td>
<td>-0.110</td>
<td>0.114</td>
<td>IGap$_{t-2}$</td>
<td>-0.548$^*$</td>
<td>0.219</td>
<td></td>
</tr>
<tr>
<td>FEMU$_{t-2}$</td>
<td>-34.40$^{**}$</td>
<td>7.964</td>
<td>GEMU$_{t-2}$</td>
<td>1.685</td>
<td>0.412</td>
<td></td>
</tr>
<tr>
<td>FEMU$_{t-3}$</td>
<td>37.16$^{**}$</td>
<td>8.029</td>
<td>GEMU$_{t-3}$</td>
<td>-16.59</td>
<td>13.04</td>
<td></td>
</tr>
<tr>
<td>FROW$_{t-2}$</td>
<td>-8.216</td>
<td>11.82</td>
<td>GROW$_{t-2}$</td>
<td>21.95</td>
<td>13.27</td>
<td></td>
</tr>
<tr>
<td>FROW$_{t-3}$</td>
<td>3.665</td>
<td>11.41</td>
<td>GROW$_{t-3}$</td>
<td>-21.34</td>
<td>32.49</td>
<td></td>
</tr>
<tr>
<td>D90:1-93:1</td>
<td>12.68$^{**}$</td>
<td>31.96</td>
<td></td>
<td>1.42</td>
<td>0.797</td>
<td>0.474</td>
</tr>
</tbody>
</table>

$^*$ The estimation and the statistical tests were performed with PC FIML 9.0. See Doornik and Hendry (1997) for a detailed description of the tests.
Notes: (*), *, ** indicate statistical significance at a level of 10%, 5% and 1%, respectively.

The labels F, G, and I represent France, Germany, and Italy, respectively. The short-term interest rate is denoted by $Int$, the output gap by $Gap$, the inflation rate by $Infl$, and the effective exchange rates by $EMU$ and $ROW$. For Germany, we included a dummy from 1990:1 to 1993:1 to account for the post-reunification period.

A priori, we expect negative signs for the impact of interest rates and exchange rates, while the sign for the lagged own and foreign output gaps are not determined. Output gaps are affected by two opposing influences. On the one hand, we expect a positive transmission of shocks via trade linkages. On the other hand, an interest rate response to a shock in one country affects another country with an opposite sign. Whether cyclical spill-overs across the EMU members turn out to be positive or negative thus depends on the relative strength of trade versus interest rate effects. Apart from that, symmetric (asymmetric) demand shocks may lead to positive (negative) signs of the foreign output gaps.

The interest rate variables are found to be significantly negative but at different lags. The own lagged output gaps are always significant and positive, with the strongest effect in France and considerably smaller but similar effects in Germany and Italy. The cross-country lagged output gaps are often insignificant, sometimes significant even with a wrong sign, which means that it is hard to detect empirically reliable output spill-over effects within the EMU. Thus, abstracting from the influence of symmetric or asymmetric demand shocks, trade effects and interest rate effects appear to be of broadly similar size. The exchange rate variables also display sign reversals at different lags.

Overall, we find statistically significant results for both lagged and foreign output gaps, interest rates and exchange rates in each national gap equation. From a technical point of view, the existence of significant lags at different lengths with opposite signs suggests unexplained dynamics being picked up by the lags. Deletion of one lag generally leads to a loss of significance of the other lag as well.

Table 3 presents the estimates of the interest rate reaction functions. We assume that the current output gap and the current inflation rate determine the level of the interest rate. We also allow for interest rate smoothing (up to lag four) and one outlier per equation. As an “anchor” interest rate, i.e., the rate prevailing when all other variables are equal to their target values, we include a constant term in the German equation. For the other countries, we do not include a constant term but instead the German interest rate. The underlying assumption is that due to the existence of the EMS, German interest rates affect other member’s interest rates. Robustness checks for France show that the impact of the contemporaneous German interest rate is significantly positive while an
additional constant term is not significant. The interest rate linkage with Germany is weaker in the case of Italy. This is unsurprising, given the fact that the Lira devalued several times over our sample period and the corresponding exchange rate band exceeded the one between the Franc and the DM.

### Table 3: FIML-system: Interest rate reaction functions

<table>
<thead>
<tr>
<th></th>
<th>France</th>
<th>Coeff.</th>
<th>S.E.</th>
<th>Germany</th>
<th>Coeff.</th>
<th>S.E.</th>
<th>Italy</th>
<th>Coeff.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FInt(_{t-1})</td>
<td>0.747**</td>
<td>0.072</td>
<td>GInt(_{t-1})</td>
<td>1.423**</td>
<td>0.091</td>
<td>IInt(_{t-1})</td>
<td>0.631**</td>
<td>0.068</td>
<td></td>
</tr>
<tr>
<td>FInt(_{t-4})</td>
<td>0.097(*)</td>
<td>0.049</td>
<td>GInt(_{t-2})</td>
<td>-0.537**</td>
<td>0.089</td>
<td>IInt(_{t-4})</td>
<td>0.238**</td>
<td>0.059</td>
<td></td>
</tr>
<tr>
<td>FGap(_t)</td>
<td>0.270*</td>
<td>0.104</td>
<td>GGap(_t)</td>
<td>0.056</td>
<td>0.060</td>
<td>IGap(_t)</td>
<td>0.851**</td>
<td>0.164</td>
<td></td>
</tr>
<tr>
<td>FInfl(_t)</td>
<td>0.355*</td>
<td>0.145</td>
<td>GInfl(_t)</td>
<td>0.330*</td>
<td>0.148</td>
<td>IInfl(_t)</td>
<td>0.697**</td>
<td>0.123</td>
<td></td>
</tr>
<tr>
<td>GInt(_t)</td>
<td>0.126*</td>
<td>0.054</td>
<td>Constant</td>
<td>0.458</td>
<td>0.175</td>
<td>GInt(_{t-4})</td>
<td>0.045</td>
<td>0.043</td>
<td></td>
</tr>
<tr>
<td>D81:2</td>
<td>4.085**</td>
<td>0.745</td>
<td>D91:1</td>
<td>1.160*</td>
<td>0.504</td>
<td>D92:3</td>
<td>3.090**</td>
<td>0.651</td>
<td></td>
</tr>
<tr>
<td>Ï</td>
<td>0.779</td>
<td>0.431</td>
<td>0.829</td>
<td>0.431</td>
<td>0.829</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (*), *, ** indicate statistical significance at a level of 10%, 5% and 1%, respectively.

Regarding the other core variables in the reaction function, we obtain for France significant effects for the output gap and the inflation rate. The Italian reaction function looks similar but shows a larger influence of output and inflation. In Germany, the output gap does not have a significant influence on interest rates, while the coefficient on inflation is relatively large. In addition, a significant dummy in the German equation relates to the reunification. The dummy variables for France and Italy capture the October 1981 realignment of the Franc and the EMS crisis in 1992, respectively. These events turned out to be insignificant in the German reaction function. This can be interpreted as further evidence of German dominance in the EMS (see, e.g., Wyplosz, 1989, von Hagen and Fratianni, 1990).

Table 4 presents the estimates for the inflation equations. In all countries, the output gap has a significant impact on inflation. In France, it is slightly above the 10%-significance level but considerably lower when heteroscedasticity corrected standard errors are used (p-value: 0.079). The inflation dynamics are remarkably homogeneous with significant and similar coefficients occurring at the same lag length (except the third lag in the Italian equation). Several impulse dummies in the French inflation equation capture outliers. All dummies can be related to devaluations toward the
DM within the EMS. In the case of Germany, we need one dummy to capture reunification. Overall, the inflation processes are similar across countries.

Table 4: FIML-system: Inflation rate equations

<table>
<thead>
<tr>
<th></th>
<th>Coeff.</th>
<th>S.E.</th>
<th></th>
<th>Coeff.</th>
<th>S.E.</th>
<th></th>
<th>Coeff.</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FInfl_{t-1}</td>
<td>0.486**</td>
<td>0.064</td>
<td>Ginfl_{t-1}</td>
<td>0.385**</td>
<td>0.073</td>
<td>IInfl_{t-1}</td>
<td>0.327**</td>
<td>0.077</td>
</tr>
<tr>
<td>FInfl_{t-4}</td>
<td>0.427**</td>
<td>0.058</td>
<td>Ginfl_{t-4}</td>
<td>0.454**</td>
<td>0.070</td>
<td>IInfl_{t-4}</td>
<td>0.400**</td>
<td>0.083</td>
</tr>
<tr>
<td>FGap_{t}</td>
<td>0.056</td>
<td>0.037</td>
<td>Ggap_{t}</td>
<td>0.215**</td>
<td>0.060</td>
<td>IGap_{t}</td>
<td>0.179*</td>
<td>0.071</td>
</tr>
<tr>
<td>D81:3</td>
<td>1.335**</td>
<td>0.267</td>
<td>D91:1</td>
<td>-2.426**</td>
<td>0.425</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D82:3</td>
<td>-2.228**</td>
<td>0.270</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D87:1</td>
<td>0.816**</td>
<td>0.260</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ø</td>
<td>0.296</td>
<td>0.573</td>
<td></td>
<td>0.487</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (*), *, ** indicate statistical significance at a level of 10%, 5% and 1%, respectively.

Employing our baseline model, we can illustrate the nature of spill-over effects in the EMS by simulating an asymmetric economic shock. We use the German reunification as an example. We assume that this event raised the German output gap by about 1.5 percentage points due to government transfer programs and higher consumption in East Germany. At the same time, the inflation rate increased by about 2 percentage points. Implementing these two shocks simultaneously in our model generates the impulse responses displayed in figure 1. We observe an initial increase in the German interest rates by about 1.5 percentage points. The output gap falls after the initial positive impulse of 1.5 percentage points until it reaches a minimum after three years. German interest rates start falling again and output recovers such that the output gap reaches its starting value after about five years. German inflation decreases cyclically after the initial shock until it reaches its original value after approximately four years.

In the other countries, the subsequent developments are primarily governed by the national reaction functions. The difference between the tight connection of the Franc with the DM and the much weaker link of the Lira is pronounced. The French interest rate development follows Germany’s lead relatively closely. In Italy, the direct impact of the German interest rate hike only occurs at the

---

3 The French Franc was devalued against the DM on 5 October 1981 by 8.8%, 14 June 1982 by 10.6%, and 12 January 1987 by 3%.
4 We checked the robustness of our results by adding oil prices expressed in national currency to the inflation equations. We found the corresponding elasticities to be statistically significant, but quantitatively unimportant. Our above conclusions remain intact. In the following, we continue to refer to the more parsimonious specification due to limits in the degrees of freedom.
fourth lag and with a quantitatively much smaller impact. The macroeconomic development in Italy is therefore basically a response to the cyclical spill-over from Germany and France. Since these two countries exert a negative influence, at least after the primary positive impulse from Germany is over, the Italian output gap deteriorates. Then, both France and Italy’s output gaps fluctuate around zero until they converge back to the starting values. In Germany, the response is somewhat faster. These fluctuations are also transmitted to inflation in France and Italy. Here, a deflationary period is followed by an inflationary period, analogous with the output gap cycle. In Germany, we find again that the adjustment back to equilibrium is much more rapid.

**Figure 1: Simulating the effects of German reunification**

To summarise, German reunification caused real costs for France and Italy in terms of cyclical variations of output and inflation. Both countries experience a contractionary and deflationary impact. While this result is not very surprising for France due to interest rate interaction, we find that the outcome is not very different for Italy, which does not follow German interest rates closely.

---

5 Recalculating the impulse responses after eliminating this link leaves the picture almost unchanged.
Note that our results differ from estimates by the Deutsche Bundesbank, where – based on a different methodology – the positive trade effect overcompensated the interest rate effect (see Deutsche Bundesbank, 1992).

The observed differences in the adjustment patterns in Europe result as a combination of asymmetric shocks, different interest rate responses by the central banks, and asymmetries in the transmission profiles in the three countries. Furthermore, they may not be statistically significant. We need to test for asymmetric monetary transmission in Europe.

4. Testing for asymmetric transmission

We use Wald-statistics to test for the existence of asymmetric transmission in the econometric system. Our dynamic model allows us to test for asymmetries at different time horizons. We restrict our attention to the effects after one quarter, one year and in the long-run. We acknowledge that our model is not specifically designed for the analysis of impact or long-run effects. For the former, data at a higher frequency are needed, while for the latter one ought to incorporate long-run relationships. Table 5 presents the respective coefficients and test results regarding the significance of interest rate variables in the output gaps. This is done country by country as well as jointly.

Table 5: Testing for interest rate effects on output gaps

<table>
<thead>
<tr>
<th></th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
<th>Joint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact effect</td>
<td>0.04</td>
<td>-0.38**</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>One-year effect</td>
<td>-0.05*</td>
<td>-0.21*</td>
<td>-0.17**</td>
<td>Chi²(3) = 4.6</td>
</tr>
<tr>
<td></td>
<td>Chi²(1) = 4.4</td>
<td>Chi²(1) = 5.5</td>
<td>Chi²(1) = 27.2</td>
<td>Chi²(3) = 35.5**</td>
</tr>
<tr>
<td>Long-run effect</td>
<td>-0.21</td>
<td>-0.45*</td>
<td>-0.33**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chi²(1) = 2.58</td>
<td>Chi²(1) = 3.69</td>
<td>Chi²(1) = 17.2</td>
<td>Chi²(3) = 23.3**</td>
</tr>
</tbody>
</table>

The impact effect is insignificant in France and Italy, while Germany shows a significant and strong negative effect. Testing all three coefficients jointly against zero leads to a non-significant outcome. The picture changes already at the one-year horizon. Now we obtain significant test results at the individual and the joint level. The tests concerning the long-run effect requires non-linear restrictions. Although the statistical significance declines in all countries, for example, the p-value in France is 0.108, the interest rate shock is found to have negative long-run effects. Monetary policy is not neutral in the long-run. This may result from the fact that our model does not really capture a “true” long-run. Taken together, these results suggest that the ECB can rely on an
effective interest rate channel in all three countries and in the euro area as a whole. The exchange
rate channel of monetary policy transmission does not seem to play a critical role (see also Angeloni
et al., 2002). This holds in particular in the medium term, which is the most relevant one for
practical policy purposes.

Table 6 investigates the degree of asymmetry in the interest rate channel across the three EMU
member countries. Looking at the impact effect, the difference in the policy impact between France
and Italy is not significant ($\chi^2(1) = 0.20$). The German impact effect, which is known from table 5
to be negative, differs significantly from Italy and almost significantly from France (p-value: 0.11).
In conclusion, the impact effect of ECB policy in Germany is significantly stronger than in the other
two countries.

Table 6: Testing for asymmetric interest rate effects on output gaps

<table>
<thead>
<tr>
<th></th>
<th>Fra versus Ger</th>
<th>Fra versus Ita</th>
<th>Ger versus Ita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact</td>
<td>$\chi^2(1) = 2.50$</td>
<td>$\chi^2(1) = 0.20$</td>
<td>$\chi^2(1) = 3.0^{(*)}$</td>
</tr>
<tr>
<td>One year</td>
<td>$\chi^2(1) = 2.98^{(*)}$</td>
<td>$\chi^2(1) = 8.97^{**}$</td>
<td>$\chi^2(1) = 0.17$</td>
</tr>
<tr>
<td>Long-run</td>
<td>$\chi^2(1) = 0.79$</td>
<td>$\chi^2(1) = 0.56$</td>
<td>$\chi^2(1) = 0.24$</td>
</tr>
<tr>
<td>Long-run with bilateral spill-overs</td>
<td>$\chi^2(1) = 1.47$</td>
<td>$\chi^2(1) = 0.56$</td>
<td>$\chi^2(1) = 0.01$</td>
</tr>
</tbody>
</table>

After one year, the cumulative influence of interest rate coefficients in the French output gap
deviates significantly from the one in Germany. In conjunction with the results in table 5, the effect
in France is found to be significantly smaller. The difference is, in the statistical sense, even more
significant in the comparison between France and Italy despite the fact that the difference between
the actual estimates is smaller than in the comparison of France and Germany. There is no
significant difference between Germany and Italy. Overall, monetary policy effects at the one-year
horizon are similar in Germany and Italy, while the effects in France are smaller in absolute terms.
The differences in the long-run effects are not significant.

These tests do not consider output spill-over effects within Europe. In each country, foreign output
gap variables entered the respective national gap equation (see table 2). Hence, changes in the
output gap in one country following a monetary policy shock are transmitted to the other countries
via the respective gap terms in the foreign output equations. We take these spill-over effects into
account in our analysis of the long-run effect. Again, we find no significant differences among EMU member countries.\(^6\)

Moving to the determinants of interest rate policy, we initially look at the short-run importance of the output gap and inflation in the reaction functions and test for differences in their importance. Again, this is done within and across countries. Table 7 presents the results for the within country tests. The first line gives the ratio between the two coefficients. The second line lists the results of our tests against unity, which means equal weights of both policy goals in the reaction function. The test statistics are insignificant in France and Italy. However, in Germany the difference is significant (p-value: 0.115) indicating that in Germany fighting inflation is more important in interest rate setting than the output gap. This result differs from outcomes of single-equation studies on reactions functions, e.g. Clarida et al. (1998).

Table 7: Testing restrictions on short-run reaction functions within countries

<table>
<thead>
<tr>
<th></th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gap/inflation weight ratio</td>
<td>0.76</td>
<td>0.17</td>
<td>1.22</td>
</tr>
<tr>
<td>Testing ratio against unity</td>
<td>(\text{Chi}^2(1)=0.31)</td>
<td>(\text{Chi}^2(1)=15.0^{**})</td>
<td>(\text{Chi}^2(1)=0.49)</td>
</tr>
</tbody>
</table>

Tests for asymmetries across countries may refer to the absolute or to the relative weighting of policy goals. The absolute weights are interesting because they determine the size of the interest rate responses to movements in the output gap and inflation. The relative weights of policy goals are important because they provide information how central banks are likely to react in the presence of supply shocks. Table 8 contains the outcome of the short-run tests across countries. Regarding the absolute weight of the output gap, the tests show significant differences for all country pairs. As known from table 3, the Italian weight on the output gap is the largest, followed by France and Germany. For inflation, we find France and Germany to have similar absolute values, both being larger than in Italy. Tests of asymmetric relative weights of the output gap and inflation are insignificant for France and Germany as well as for France and Italy. However, the Null that the relative weights in Germany and Italy are equal can be rejected at the 1% level. To summarise, according to the short-

\(^6\) For this reason, impulse responses based on VAR models investigating only national policy impulses without international output repercussions may be very misleading. The inclusion of output spill-overs in our model tends to dampen differences in output developments. Thus, investigating asymmetric monetary transmission in a system context is likely to lead to smaller differences in output developments than single-country studies.
run coefficients, Germany places the most emphasis on inflation, followed by France and with Italy at the end of the spectrum.

**Table 8: Testing restrictions on short-run reaction functions across countries**

<table>
<thead>
<tr>
<th></th>
<th>Output Gap</th>
<th>Inflation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fra vs. Ger</td>
<td>Chi²(1)=3.2(*)</td>
<td>Fra vs. Ger</td>
</tr>
<tr>
<td>Fra vs. Ita</td>
<td>Chi²(1)=11.0**</td>
<td>Fra vs. Ita</td>
</tr>
<tr>
<td>Ger vs. Ita</td>
<td>Chi²(1)=20.8**</td>
<td>Ger vs. Ita</td>
</tr>
<tr>
<td>Chi²(1)=0.02</td>
<td>Chi²(1)=4.4*</td>
<td>Chi²(1)=3.6(*)</td>
</tr>
</tbody>
</table>

The focus on the short-run may be misleading because short-run coefficients mix optimal policy responses with respect to output gap and inflation with a parameter reflecting interest rate smoothing. Therefore, it is interesting to look at the long-run responses for the three countries. Table 9 provides static long-run solutions with respect to output gap, inflation and the nominal “anchor”. The nominal “anchor” gives the nominal interest rate when the actual output gap and inflation rate equal their target values. For France and Italy, these were derived by assuming that the target values in Germany are met.

**Table 9: Long-run reaction functions**

<table>
<thead>
<tr>
<th></th>
<th>Output gap</th>
<th>Inflation rate</th>
<th>Nominal “anchor”</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>1.73</td>
<td>2.28</td>
<td>3.26</td>
</tr>
<tr>
<td>Germany</td>
<td>0.49</td>
<td>2.89</td>
<td>4.02</td>
</tr>
<tr>
<td>Italy</td>
<td>2.46</td>
<td>2.02</td>
<td>0.48</td>
</tr>
</tbody>
</table>

Regarding the long-run coefficients, our test results across countries are similar to our short-run results and are therefore omitted. Germany places the highest emphasis on deviations from the inflation targets and the lowest emphasis on deviations from the output gap, with France in the

---

7 See, e.g., Judd and Rudebusch (1998). Note that the estimated policy weights can not be interpreted as a measure of policy preferences concerning output and inflation. The optimal policy response depends not only on policy preferences but also on the structure of the economy and the nature of shocks (see Clarida et al., 1999). Cecchetti and Ehrmann (1999) discuss in a simpler setting in reference to the Taylor rule how to trace policy preferences from macroeconomic outcomes.
middle and Italy at the other side of the spectrum. We conclude that the Bundesbank is the most “conservative” of the analysed central banks, followed by the Banque de France and the Banca d’Italia.

Finally, we test for asymmetries in the impact of the output gap on inflation (Table 10). The impact can be measured in the short-run and in the long-run. Testing all three short-run coefficients jointly, we find them to be significantly different from zero. Comparing France and Germany reveals that in Germany the output gap has a significantly larger influence on inflation. This difference is not significant, though, in the comparison between these two countries and Italy. When we impose all three equality restrictions simultaneously, the Null can only be rejected at the 10% level.

Table 10: Testing short-run restrictions on the output gap in the national inflation equations

<table>
<thead>
<tr>
<th>Joint zero restrictions</th>
<th>Fra vs. Ger</th>
<th>Fra vs. Ita</th>
<th>Ger vs. Ita</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\chi^2(3) = 41.4^{**}$</td>
<td>$\chi^2(1) = 5.4^{*}$</td>
<td>$\chi^2(1) = 2.8^{(*)}$</td>
<td>$\chi^2(1) = 0.1$</td>
</tr>
</tbody>
</table>

Table 11 gives long-run coefficients as well as significance tests. The long-run coefficients are generally larger than the short-run coefficients. The output gap has still the strongest influence on German inflation. However, France and Italy switched positions, with Italy showing the weakest long-run influence of the output gap on inflation. The long-run impact in France is not significant (p-value = 0.17) while Germany and Italy display significant long-run effects.

Table 11: Testing long-run restrictions on the output gap in the national inflation equations

<table>
<thead>
<tr>
<th>Joint zero restrictions</th>
<th>France</th>
<th>Germany</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-run coefficient</td>
<td>0.64</td>
<td>1.33</td>
<td>0.20</td>
</tr>
<tr>
<td>$\chi^2(3) = 7.0^{(*)}$</td>
<td>$\chi^2(1) = 1.9$</td>
<td>$\chi^2(1) = 3.5^{(*)}$</td>
<td>$\chi^2(1) = 3.8^{(*)}$</td>
</tr>
<tr>
<td>Asymmetric long-run effects</td>
<td>Fra vs. Ger</td>
<td>Fra vs. Ita</td>
<td>Ger vs. Ita</td>
</tr>
<tr>
<td>$\chi^2(1) = 0.74$</td>
<td>$\chi^2(1) = 1.81$</td>
<td>$\chi^2(1) = 0.28$</td>
<td></td>
</tr>
</tbody>
</table>

The latter tests involve the question whether there are long-run differences between the countries regarding the influence of the output gap on inflation. Here we do not encounter any significant

\footnote{Note that the long-run coefficient on the inflation rate is larger than unity in all three equations. This ensures that interest rate changes as a result of inflation rate deviations from target actually affect real interest rates in the right direction and that the system is dynamically stable.}
results and we have to conclude that in the long-run, inflation mechanisms in these countries are symmetric.

5. Conclusions

Two conclusions emerge from our study: first, relatively large differences in simulated impulse responses are still consistent with the view that the transmission mechanism is homogeneous across the EMU countries. Tests for the statistical significance of asymmetries reveal that differences in the estimated coefficients are often not statistically significant, especially over the long-run. At the same time, we find that the output response after a monetary shock in France is significantly smaller compared to Germany and Italy in the medium-run. Since the medium-run is most relevant for monetary policy transmission, we cannot reject the notion that a common impulse from the ECB will have different effects in EMU member countries. Further convergence may occur as a result of EMU membership (see Frankel and Rose, 1998) but if, when and how that comes about remains to be seen.

Second, our out-of-sample tests suggest that the transmission mechanisms in Europe did not experience a major structural break prior to the establishment of EMU. The finding is relevant for economic policy, as it suggests the absence of a strong convergence effect. This leaves two interpretations: either there was a sharp-structural break only after the establishment the EMU came about (see Arnold and de Vries, 2000 for such a conjecture), or there will be a more gradual adjustment to the new economic regime over time making it more difficult for stability tests to clearly detect a structural break at a point in time (see Hayo, 1999 for some arguments). In the latter case, historical data and related empirical studies continue to provide useful information for the ECB about the transmission mechanism after the establishment of EMU. An analysis of this question is on our agenda for further research.
References


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  Christian Volpe Martincus, Jennifer Pédussel Wu
B07-05  Economic Integration in a Multicone World?  Jürgen von Hagen, Valeriya Dinger

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 Multinominal Panel Analysis  Jürgen von Hagen, Jizhong Zhou
B31-04  Fear of Floating and Fear of Pegging: An Empirical Analysis 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
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
Transmission Channels of Business Cycles Synchronization in an Enlarged EMU

Iulia Traistaru

Foreign Exchange Regime, the Real Exchange Rate and Current Account Sustainability: The Case of Turkey

Sübidey Togan, Hasan Ersel


Harry P. Bowen, Jennifer Pédussel Wu

Do Economic Integration and Fiscal Competition Help to Explain Local Patterns?

Christian Volpe Martincus

Euro Adoption and Maastricht Criteria: Rules or Discretion?

Jiri Jonas

The Role of Electoral and Party Systems in the Development of Fiscal Institutions in the Central and Eastern European Countries

Sami Yläoutinen

Measuring and Explaining Levels of Regional Economic Integration

Jennifer Pédussel Wu

Economic Integration and Location of Manufacturing Activities: Evidence from MERCOSUR

Pablo Sanguinetti, Iulia Traistaru, Christian Volpe Martincus

Economic Integration and Industry Location in Transition Countries

Laura Resmini

Testing Creditor Moral Hazard in Sovereign Bond Markets: A Unified Theoretical Approach and Empirical Evidence

Ayse Y. Evrensel, Ali M. Kutan

European Integration, Productivity Growth and Real Convergence

Tanner M. Yigit, Ali M. Kutan

The Contribution of Income, Social Capital, and Institutions to Human Well-being in Africa

Mina Baliamoune-Lutz, Stefan H. Lutz

Rural Urban Inequality in Africa: A Panel Study of the Effects of Trade Liberalization and Financial Deepening

Mina Baliamoune-Lutz, Stefan H. Lutz

Money Rules for the Eurozone Candidate Countries

Lucjan T. Orlowski

Who is in Favor of Enlargement? Determinants of Support for EU Membership in the Candidate Countries’ Referenda

Orla Doyle, Jan Fidrmuc

Over- and Underbidding in Central Bank Open Market Operations Conducted as Fixed Rate Tender

Ulrich Bindseil

Total Factor Productivity and Economic Freedom Implications for EU Enlargement

Ronald L. Moomaw, Euy Seok Yang

Die neuen Schutzklauseln der Artikel 38 und 39 des Beitrittsvertrages: Schutz der alten Mitgliedstaaten vor Störungen durch die neuen Mitgliedstaaten

Martin Seidel

Macroeconomic Implications of Low Inflation in the Euro Area

Jürgen von Hagen, Boris Hofmann

The Effects of Transition and Political Instability on Foreign Direct Investment: Central Europe and the Balkans

Josef C. Brada, Ali M. Kutan, Tanner M. Yigit

The Performance of the Euribor Futures Market: Efficiency and the Impact of ECB Policy Announcements (Electronic Version of International Finance)

Kerstin Bernoth, Jürgen von Hagen

Souvereign Risk Premia in the European Government Bond Market (überarbeitete Version zum Herunterladen)

Kerstin Bernoth, Jürgen von Hagen, Ludger Schultekeht

How Flexible are Wages in EU Accession Countries?

Anna Iara, Iulia Traistaru

Monetary Policy Reaction Functions: ECB versus Bundesbank

Bernd Haya, Boris Hofmann

Economic Integration and Manufacturing Concentration Patterns: Evidence from Mercosur

Iulia Traistaru, Christian Volpe Martincus

Reformzwänge innerhalb der EU angesichts der Osterweiterung

Martin Seidel

Reputation Flows: Contractual Disputes and the Channels for Inter-Firm Communication

William Pyle

Urban Primacy, Gigantism, and International Trade: Evidence from Asia and the Americas

Ronald L. Moomaw, Mohammed A. Alwosabi

An Empirical Analysis of Competing Explanations of Urban Primacy Evidence from Asia and the Americas

Ronald L. Moomaw, Mohammed A. Alwosabi
East Germany: Transition with Unification, Experiments and Experiences
Jürgen von Hagen, Rolf R. Strauch, Guntram B. Wolff

Regional Specialization and Employment Dynamics in Transition Countries
Iulia Traistaru, Guntram B. Wolff

Specialization and Growth Patterns in Border Regions of Accession Countries
Laura Resmini

Regional Specialization and Concentration of Industrial Activity in Accession Countries
Iulia Traistaru, Peter Nijkamp, Simonetta Longhi

Does Broad Money Matter for Interest Rate Policy?
Matthias Brückner, Andreas Schaber

The Long and Short of It: Global Liberalization, Poverty and Inequality
Christian E. Weller, Adam Hersch

De Facto and Official Exchange Rate Regimes in Transition Economies
Jürgen von Hagen, Jizhong Zhou

Argentina: The Anatomy of A Crisis
Jiri Jonas

The Eurosystem and the Art of Central Banking
Gunnar Heinsohn, Otto Steiger

National Origins of European Law: Towards an Autonomous System of European Law?
Martin Seidel

Monetary Policy in the Euro Area - Lessons from the First Years
Volker Clausen, Bernd Hayo

Has the Link Between the Spot and Forward Exchange Rates Broken Down? Evidence From Rolling Cointegration Tests
Ali M. Kutan, Su Zhou

Perspectives der Erweiterung der Europäischen Union
Martin Seidel

Is There Asymmetry in Forward Exchange Rate Bias? Multi-Country Evidence
Su Zhou, Ali M. Kutan

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

Asymmetric Monetary Policy Effects in EMU
Volker Clausen, Bernd Hayo

The Choice of Exchange Rate Regimes: An Empirical Analysis for Transition Economies
Jürgen von Hagen, Jizhong Zhou

The Euro System and the Federal Reserve System Compared: Facts and Challenges
Karlheinz Ruckriegel, Franz Seitz

Does Inflation Targeting Matter?
Manfred J. M. Neumann, Jürgen von Hagen

2001

Is Kazakhstan Vulnerable to the Dutch Disease?
Karlygash Kuralbayeva, Ali M. Kutan, Michael L. Wyzan

Political Economy of the Nice Treaty: Rebalancing the EU Council. The Future of European Agricultural Policies
Deutsch-Französisches Wirtschaftspolitisches Forum

Investor Panic, IMF Actions, and Emerging Stock Market Returns and Volatility: A Panel Investigation
Bernd Hayo, Ali M. Kutan

Regional Effects of Terrorism on Tourism: Evidence from Three Mediterranean Countries
Konstantinos Drakos, Ali M. Kutan

Monetary Convergence of the EU Candidates to the Euro: A Theoretical Framework and Policy Implications
Lucjan T. Orlowski

Disintegration and Trade
Jarko and Jan Fidrmuc

Migration and Adjustment to Shocks in Transition Economies
Jan Fidrmuc

Strategic Delegation and International Capital Taxation
Matthias Brückner

Balkan and Mediterranean Candidates for European Union Membership: The Convergence of Their Monetary Policy With That of the Europan Central Bank
Josef C. Brada, Ali M. Kutan

An Empirical Inquiry of the Efficiency of Intergovernmental Transfers for Water Projects Based on the WRDA Data
Anna Rubinchik-Pessach

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. Maccloch

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, Martin Seidel

B17-00 Rückführung der Landwirtschaftspolitik in die Verantwortung der Mitgliedsstaaten? - Rechts- und Verfassungsfragen des Gemeinschaftsrechts
Christa Randzio-Plath, Tomasso Padoa-Schioppa

B16-00 The European Central Bank: Independence and Accountability
Jürgen von Hagen, Rafi Hepp

B15-00 Regional Risk Sharing and Redistribution in the German Federation
Selahattin Dibooglu, Ali M. Kutan

B14-00 Sources of Real Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary
Nauro F. Campos

B13-00 Back to the Future: The Growth Prospects of Transition Economies Reconsidered
Rechtsetzung und Rechtsangleichung als Folge der Einheitlichen Europäischen Währung

Martin Seidel

A Dynamic Approach to Inflation Targeting in Transition Economies

Lucjan T. Orlowski

The Importance of Domestic Political Institutions: Why and How Belgium Qualified for EMU

Marc Hallerberg

Rational Institutions Yield Hysteresis

Rafael Di Tella, Robert MacCulloch

The Effectiveness of Self-Protection Policies for Safeguarding Emerging Market Economies from Crises

Kenneth Kletzer

Financial Supervision and Policy Coordination in The EMU

Deutsch-Französisches Wirtschaftspolitisches Forum

The Demand for Money in Austria

Bernd Hayo

Liberalization, Democracy and Economic Performance during Transition

Jan Fidrmuc

A New Political Culture in The EU - Democratic Accountability of the ECB

Christa Randzio-Plath

Integration, Disintegration and Trade in Europe: Evolution of Trade Relations during the 1990’s

Jarko Fidrmuc, Jan Fidrmuc

Inflation Bias and Productivity Shocks in Transition Economies: The Case of the Czech Republic

Josef C. Brada, Arthur E. King, Ali M. Kutan

Monetary Union and Fiscal Federalism

Kenneth Kletzer, Jürgen von Hagen

Skills, Labour Costs, and Vertically Differentiated Industries: A General Equilibrium Analysis

Stefan Lutz, Alessandro Turrini

Micro and Macro Determinants of Public Support for Market Reforms in Eastern Europe

Bernd Hayo

What Makes a Revolution?

Robert MacCulloch

Informal Family Insurance and the Design of the Welfare State

Rafael Di Tella, Robert MacCulloch

Partisan Social Happiness

Rafael Di Tella, Robert MacCulloch

The End of Moderate Inflation in Three Transition Economies?

Josef C. Brada, Ali M. Kutan

Subnational Government Bailouts in Germany

Helmut Seitz

The Evolution of Monetary Policy in Transition Economies

Ali M. Kutan, Josef C. Brada

Why are Eastern Europe’s Banks not failing when everybody else’s are?

Christian E. Weller, Bernard Morzuch

Stability of Monetary Unions: Lessons from the Break-Up of Czechoslovakia

Jan Fidrmuc, Julius Horvath and Jarko Fidrmuc

Multinational Banks and Development Finance

Christian E. Weller and Mark J. Scher

Financial Crises after Financial Liberalization: Exceptional Circumstances or Structural Weakness?

Christian E. Weller

Industry Effects of Monetary Policy in Germany

Bernd Hayo and Birgit Uhlenbrock

Financial Fragility or What Went Right and What Could Go Wrong in Central European Banking?

Christian E. Weller and Jürgen von Hagen

Size Distortions of Tests of the Null Hypothesis of Stationarity: Evidence and Implications for Applied Work

Mehmet Caner and Lutz Kilian

Financial Supervision and Policy Coordination in the EMU

Deutsch-Französisches Wirtschaftspolitisches Forum

Financial Liberalization, Multinational Banks and Credit Supply: The Case of Poland

Christian Weller

Monetary Policy, Parameter Uncertainty and Optimal Learning

Volker Wieland

The Connection between more Multinational Banks and less Real Credit in Transition Economies

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