Monetary Policy and European Unemployment

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Abstract

In the long history of rising and persistent unemployment in Europe almost all institutions – employment protection legislation, unions, wages, wage structure, unemployment insurance, etc. - have been alleged and found guilty to have caused this tragic development at some point in time. Later welfare state institutions in interaction with external shocks have been identified as more plausible causes for rising equilibrium unemployment in Europe. Monetary policy has managed to be regarded as innocent. Based on the assertion of neutrality of monetary policy in the medium and long run, the search for causes of European unemployment has shielded away from the policy of central banks. But actually the institutional setup regarding monetary policy is very different between the FED and the Bundesbank (ECB). We argue that the interaction of negative external shocks and tight monetary policies may have been the major – although probably not the only - cause of unemployment in Europe remaining at ever higher levels each recession. We identify the monetary policy of the Bundesbank as asymmetrical in the sense that the Bank did not actively fight recessions, but that it dampened recovery periods. Less constraints on growth would have kept German unemployment at low levels.

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(Production; Employment; Unemployment; Monetary Policy; Central Banks and Their Policies)

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1. Introduction: Unemployment and Inflation in Europe

The late James Tobin classified Milton Friedman's 1967 presidential address to the American Economic Association (Friedman 1968) as "… very likely the most influential article ever published in an economics journal. Its influence reached way beyond the profession – for example to European and Japanese central banks and to *The Economist* and other opinion leaders." (Tobin 1995: 40) Indeed, the "natural rate of unemployment hypothesis" (NRU) shifted the views on economic policy substantially and directed policy away from macroeconomics to the reform of institutional arrangements in order to change incentives and equilibrium unemployment. "The 'natural rate of unemployment,' in other words, is the level of unemployment that would be ground out of the Walrasian system of general equilibrium equations, provided that there is imbedded in them the actual structural characteristics of the labor and commodity markets are imbedded in the model, including market imperfections, stochastic variability in demand and supplies, the cost of gathering information about job vacancies and labor availabilities, the cost of mobility, and so on." (Friedman 1968: 8)

Friedman claimed that stagflation in the 1970s is clear evidence that monetary policy cannot be used to stimulate growth or to reduce unemployment. "Output is a real magnitude, not a monetary magnitude." (Friedman, 2006: 4) Thus, monetary policy is innocent, it does not affect growth and unemployment directly but only indirectly through its effects on expectations. In the words of Central Bankers: "Other than by maintaining price stability and thereby reaping its benefits in terms of economic performance there is no trade-off at longer horizons between inflation, on the one hand, and economic growth or employment, on the other hand, that can be exploited by monetary policy makers." (Issing 2000: 4). This led to a broad consensus that the only appropriate objective of monetary policy is the maintenance of price stability, full stop. To reduce unemployment it would need structural reforms, was the economic policy message loudly trumpeted and heard.

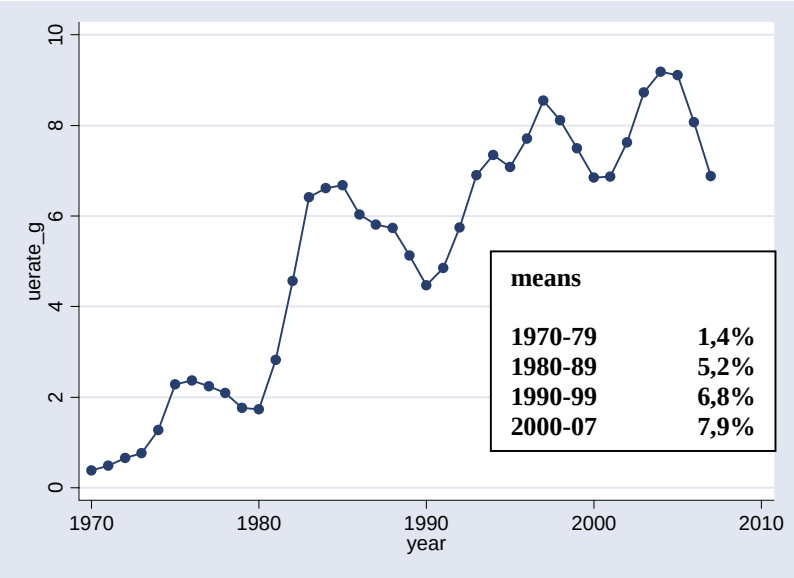
However, Europe's unemployment trend (see Figures 1.1 and 1.2) is hardly consistent with one specific "natural rate of unemployment" since unemployment rose with every

recession and remained at levels substantially above the pre-recession rates. “The only interpretation of this experience that is consistent with the accelerationist (the Friedman/ Phelps model, RS/ RS) model is that the neutral[2] rate of unemployment must have gone from around three percent to something of 10 percent in much of Europe, without doubt a bit higher in some countries and a bit lower in others. This rather remarkable hypothesis seems to have been accepted without a qualm.”(Solow 1998: 9) Indeed, the analysis of European unemployment trends has been dominated by hypotheses claiming rising equilibrium unemployment (rising NAIRUs) caused by European labor market institutions, standing alone or in interaction with external shocks (Blanchard/ Wolfers 2000). If monetary policy is included in the analysis at all, it is used as a “control” or only as a short-run disturbance (Nickell et al. 2005) very much in line with the neutrality of money hypothesis (see also Karanassou/ Sala/ Snower 2003, 2007a, 2007b for a discussion).

The difference in welfare state arrangements in the US and Europe together with stable unemployment in the US and the upward trend in unemployment in Europe has been widely used as support for the deregulation of European labor markets and reductions of the welfare state program (see for a prototype paper: Siebert 1997 and for evidence against the ‘consensus’: Glyn/ Howell/ Schmitt 2006, Baker/ Glyn/ Howell/ Schmitt 2005). Surprisingly little attention was given to macroeconomic institutions although substantial differences between the US and Europe exist here as well and which could have been used to investigate differences in labor market performance. Also the role of monetary policy changed substantially after 1973 when the Bretton Woods system of fixed exchange rates was substituted by flexible exchange rates. The impact of flexible exchange rates on trade, raising the risk for international transactions, has been widely recognized but very little attention has been given to the fundamentally different role that monetary policy has in a flexible exchange rate system compared to that in a fixed exchange rate system.

[2] Solow refers to the “natural” rate of unemployment as the “neutral” rate of unemployment because “natural” is a misnomer since the level of unemployment, neutral to inflation, is influenced by institutions rather than naturally given. We use “natural”, “neutral”, “NAIRU” and “equilibrium rate of unemployment” as synonyms in this paper.

Figure 1.1: Unemployment trends in Germany[3]



Source: computations based on OECD Economic Outlook database.

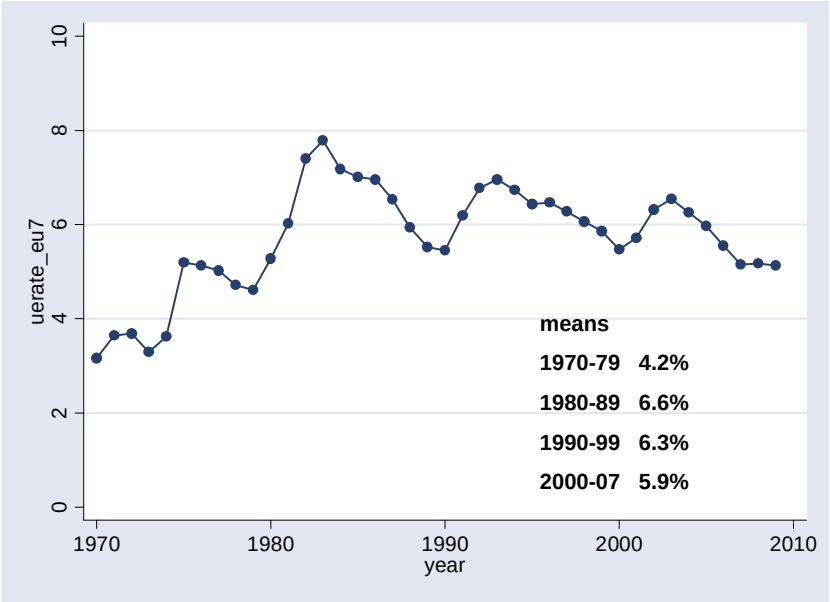
[3] Fitzenberger, Franz and Bode (2007) estimate NAIRUs for Germany using expected inflation but receive results not deviating substantially from simple averages

	Mean unemployment rate	Fitzenberger/ Franz/ Bode estimates of NAIRUs
1970-1981	1.6	3.5 (1975-1981)
1982-1989	6.0	6.0
1990-1999	6.8	7.1
2000-	7.9	7.1

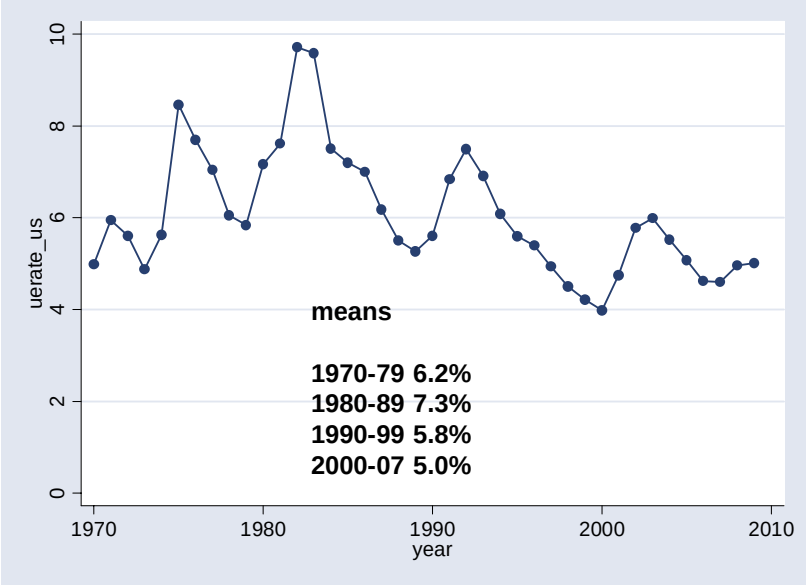
Source: based on OECD data and averages estimated on the basis of Fitzenberger/ Franz/ Bode (2007: 32) NAIRU compatible with 2% inflation.

Figure 1.2: Unemployment trends in Europe (EU7) and the US

EU7



USA



Source: computations based on OECD Economic Outlook database.

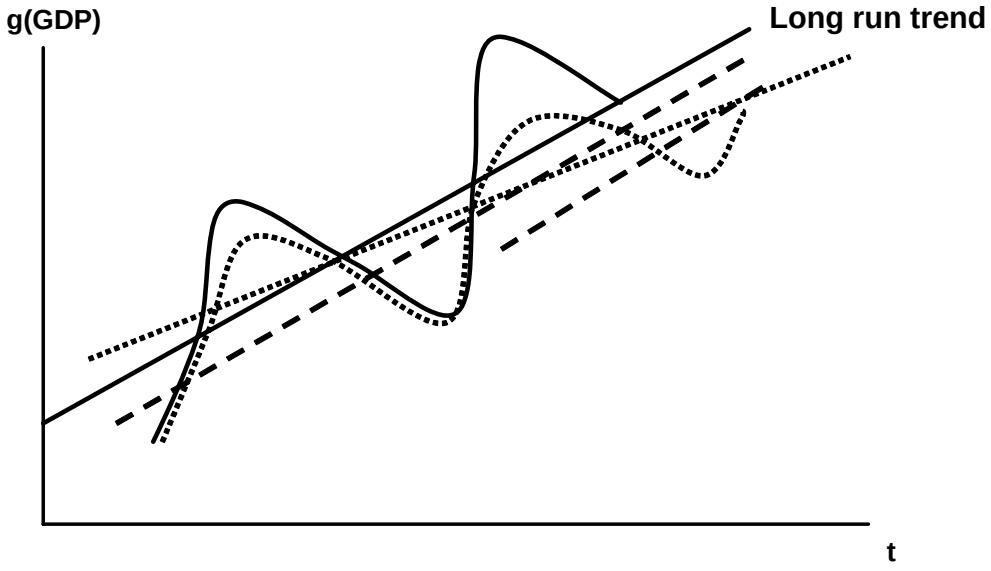
The "interaction of shocks and institutions hypothesis" (Blanchard/ Wolfers 2000) argues that welfare state institutions slowed growth after the economy was hit by negative external shocks, leaving the economy having not fully recovered to the initial growth path. Thus, the economy remained with higher levels of unemployment. Surely this hypothesis fits the rise of European unemployment and the long-run decline in growth rates after 1970 and it is certainly more plausible than the hypothesis blaming welfare-state institutions alone. However, this pattern is also consistent with an asymmetric monetary policy overemphasizing price stability and thus precautionary dampening growth in the recovery period. According to the dominant and widely accepted view, monetary policy is neutral in long-run and does not affect real output or the growth path. "Potential oriented" monetary policy will reduce the fluctuations around the trend but not the trend itself (as illustrated by the straight lines around the linear trend in Figure 1.3). Hence, potential oriented policy contributes to the stability of expectations, which can only be beneficial for the economy. How do we evaluate price stability if monetary policy is not neutral? Once one accepts real effects of monetary policy, as many recent studies suggest, a restrictive monetary policy will reduce growth and will not allow the economy to return to its initial growth path, especially if it is asymmetric, i.e., overly concerned with price stability and fears that expansionary periods create price pressure, but which puts only marginal attention to unused capacity. If, in addition, investment depends on expected growth as many studies evidenced (Carpenter et al. 1994, Solow 2007, 2008), an asymmetric monetary policy will also reduce investment and thus potential output. Hysteresis in labor markets may cause similar effects with respect to labor inputs[4].

Figure 1.3 illustrates the impact of slow growth in upswings either caused by welfare state institutions (Blanchard/ Wolfers 2000) or asymmetric monetary policy. The most popular view of tight monetary policy under the (long-run) neutrality of money hypothesis is that the volatility is reduced but that the growth path is unaffected. However, with asymmetric monetary policy the recoveries are slowed but recessions are

[4] Blanchflower (2007) finds that inflation reduces well being but that unemployment has much stronger negative effects. See also Keynes (1924, Chapter 1), Blinder (1992)

not fully counteracted. We define asymmetric monetary policy as not (not fully) accommodating upswings and only reluctantly reacting to downswings. Asymmetric monetary policy in interaction with negative external shocks may be working in the following way: (1) a negative external shock pushes the economy into a recession which is not (fully) counteracted by monetary policy, (2) the upswing is not fully accommodated because the central bank fears inflationary pressure, (3) as a result the economy will not swing back to the initial growth path but remains below, (4) with the next downswing the process will be reiterated, (5) in consequence asymmetric monetary policy will lower the long-run growth trend. All the ingredients needed to establish such a scenario are negative demand shocks and asymmetric policy reaction functions of central banks.

Figure 1.3: Business cycles and long-run growth trends



This paper first discusses the neutrality of monetary policy hypothesis and then analyzes the yardsticks for policy evaluations, potential output (growth) and "NAIRUs". We describe some important institutional changes, with respect to monetary policy in section

four and analyze the asymmetry of the monetary policy of the Bundesbank in section 5. The last section concludes.

2. Is Monetary Policy Neutral?

Can monetary policy affect the real variables, such as output and employment, by changing the rate of growth of the stock of money? It appears to be a consensus in the literature that monetary disturbance can have an impact on the course of the real economy in the short run, but in the long run, money is neutral and has effects only on prices (de Grauwe/ Costa Storti 2007, 2008). There are no gains to be exploited from monetary expansion in the medium or long run (Issing 2000). Theoretically, due to short-run wage or price rigidities, changes in the money supply might induce a short-run tradeoff between inflation and unemployment. (See e.g., Fischer 1977, Taylor 1980a, Rotemberg 1982, Akerlof/ Yellen 1985, Mankiw 1985, Blanchard/ Kiyotaki 1987). Alternatively, some economists explore another approach – real rigidities, to explain the non-neutralities of money (Solow 1985, Ball/ Romer 1990).

Applying vector autoregressions (VARs), Bernanke and Gertler (1995) generate a dynamic response of real GDP to a monetary policy shock (in their case, an unexpected tightening of monetary policy). They show that the effect of a rise of the funds rate on real GDP dies out in 48 months. Using similar methodology (VAR), Bernanke and Mihov (1998) find that the impulse response function does not dampen to zero even after 10 years.[5] Annika Alexius and Bertil Holmlund (2007) – also applying VARs - find that

[5] Mankiw (2001: C48) classifies the finding of non-neutrality by Bernanke and Mihov (1998) "surprising", because the "the paper purports to provide evidence for the opposite conclusion – long-run monetary neutrality". Mankiw stresses the fact that standard errors rise with the time horizon and that therefore the estimated impact should become statistically insignificant if one looks out far enough. "But if one does not approach the data with a prior view favouring long-run neutrality, one would not leave the data with that posterior. The data's best guess is that monetary shocks leave permanent scars on the economy." (Mankiw 2001: C48).
How strong the belief in the neutrality assumption can affect the lead to a superficial empirics, may be demonstrated by Neumann's statement (Neumann 1998: 314/315) who regards the comparison of inflation rates and growth rates as sufficient evidence for the neutrality of money assertion.

monetary shocks can have very long-run effects on unemployment in Sweden.[6] Also Dennis Snower together with different coauthors (see references) uses "chain reaction theory" and argues that monetary policy affects the real economy. In his paper on output and price stability, John Taylor (1980b) argues that contracting theories, i.e., contracts lasting for some period, predict a tradeoff between output and price stability. Whether the expectation channel or the contract channel is the dominating mechanism affects the persistence of inflation (Taylor 1979). Hysteresis theories of unemployment, of course, predict long lasting effects even of otherwise short run impacts of monetary policy (see Ball 1997). Romer and Romer (1994) conclude in their empirical analysis of every US business cycle since 1950 that monetary policies acted early to counter recessions. Blinder/ Yellen (2002) and Blinder/ Reis (2005) give monetary policy credit for the long US growth period in the 1990s.

In their meta analysis of 86 studies, Paul de Grauwe and Claudia Costa Storti (2007, 2008) find that monetary policy affects the real economy also in the long run (which is 5 years in the de Grauwe/ Costa Storti paper). Also, other evidence from recent research is not friendly to the hypothesis of the neutrality of money (e.g., Romer/ Romer 1994, Tobin 1995, Ball 1994, 1997, Mishkin/ Posen 1997, Bernanke/ Mihov 1998, Ball/ Mankiw/ Nordhaus 1999, Möller 2000, Karanassou/ Sala/ Snower 2003, 2007a, 2007b, Alexius/ Holmlund 2007, Solow 2007, 2008). Paul de Grauwe and Claudia Costa Storti (2007, 2008) summarize the results of their meta study on the impact of monetary policy on the real economy as follows: There is a wide variation in the reported short and long run output effects of monetary policies, which is in part due to different econometric techniques. Studies using structural VARs often impose the restriction that the long-run output effect of monetary policy is zero, but this restriction is based on the assumption of monetarism and real business cycle theory that money is neutral in the long run. "Put differently, in those econometric studies that do not impose long-run neutrality, the long-run neutrality of money is rejected." (de Grauwe/ Costa Storti 2007: 75) De Grauwe and

[6] Comparing the Swedish with US economy, they find unemployment effects to last a bit longer in Sweden, which is consistent with the view that unemployment adjustments are slower in more regulated labor markets (see Alexius/ Holmlund 2007). De Grauwe and Costa Storti, however, do not find differences between the US and Europe with respect to the effects of monetary shocks on the real economy.

Costa Storti also conclude that output effects are particularly strong in low inflation countries, like the US or Europe.

Dolado et al. argue that the relationship between the first differences of inflation and the output gaps is linear in the US but not in Europe (Dolado et al. 2003: 12). When actual output is above potential output, strong upward price pressure occurs in Europe whereas downward price pressure is limited when actual output falls below potential output. In the US, on the contrary, the Dolado et al. analysis suggests that upward and downward price effects of deviations from potential output are symmetric. This result is consistent with strong downward wage rigidity in Europe. Accordingly, European central banks should be cautious whenever actual output is above potential output.

Contrary to the Dolado et al. result, de Grauwe and Costa Storti find that the output and price effects of monetary policies in the US and in the Eurozone countries are not significantly different. "There is a popular view according to which monetary policies in the Eurozone are ineffective in boosting output because supply rigidities quickly lead to higher inflation while in the US monetary policies are capable of boosting output without strong inflationary effects. The existing econometric estimates of the output and price effects of monetary policies in the US and the Eurozone countries do not allow us to draw such a conclusion. Since the effectiveness of monetary policies very much depends on the nature of price and wage rigidities, these results suggest that the US and the Eurozone are less different in terms of wage and price rigidities than is commonly thought." (de Grauwe/ Costa Storti 2007: 76).

Figure 2.1 shows the relationship between changes in inflation (vertical: first differences of consumer price inflation) and deviations of actual from potential output in the US and Germany in the period 1975 to 1998[7] on the basis of OECD (Economic Outlook Database). Regressions of the first difference of inflation rates on deviations of actual from potential output support the Dolado et al. finding of a linear relationship for the US but show that the non-linear relationship for the Euro area emphasized in Dolado et al.

[7] Later we analyze the Bundesbank policy which explains the choice of the period. See below.

does not hold for Germany[8]. We find a linear relationship also for Germany. In addition, the coefficient is much lower in Germany than in the US (see Table 2.1).

Table 2.1: Estimated relations between first differences in inflation rates and deviations of actual from potential output. (1975-1998)

country	constant	(y-y*)	$(y-y^*)^2$
USA	0.080 (1.17)	0.179 (4.82)	0.000 (0.04)
Germany	-0.075 (-1.10)	0.075 (3.08)	0.005 (0.55)

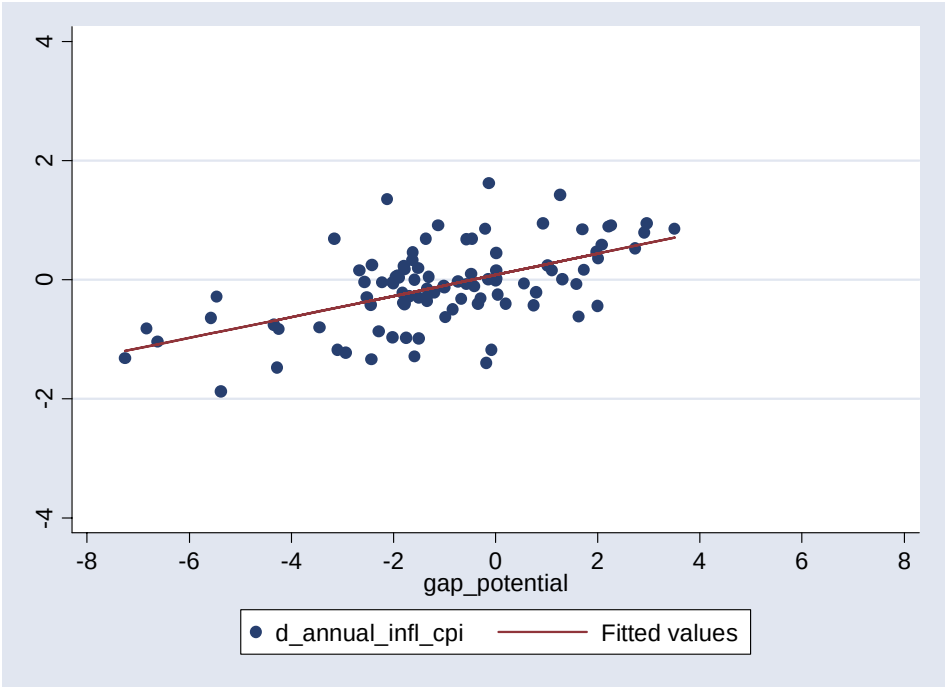
Note: t-values in parenthesis
y = actual output
y* = potential output (from OECD)
Period: 1975 first quarter to 1998 fourth quarter
Source: calculations are based on OECD Economic Outlook data.

A lower coefficient for the deviation of actual from potential output in the regressions above means that prices react only weakly. However, given that the relationship seems to be linear, weak price reactions go in both directions, downward pressure is weak but so is upward pressure. A weak response to a negative gap is consistent with wages (prices) being inflexible downwards but wages (prices) in Germany are also inflexible upwards. There are two sides of the "wage flexibility coin" as discussed in Bell and Freeman (1985). We conclude that, at least for Germany, the constraints for monetary policy stemming from labor market rigidities as argued in Dolado et al. (2003) for the Euro area did not exist for the Bundesbank, which is consistent with the de Grauwe/ Costa Storti finding cited above (see also Schettkat 1992).

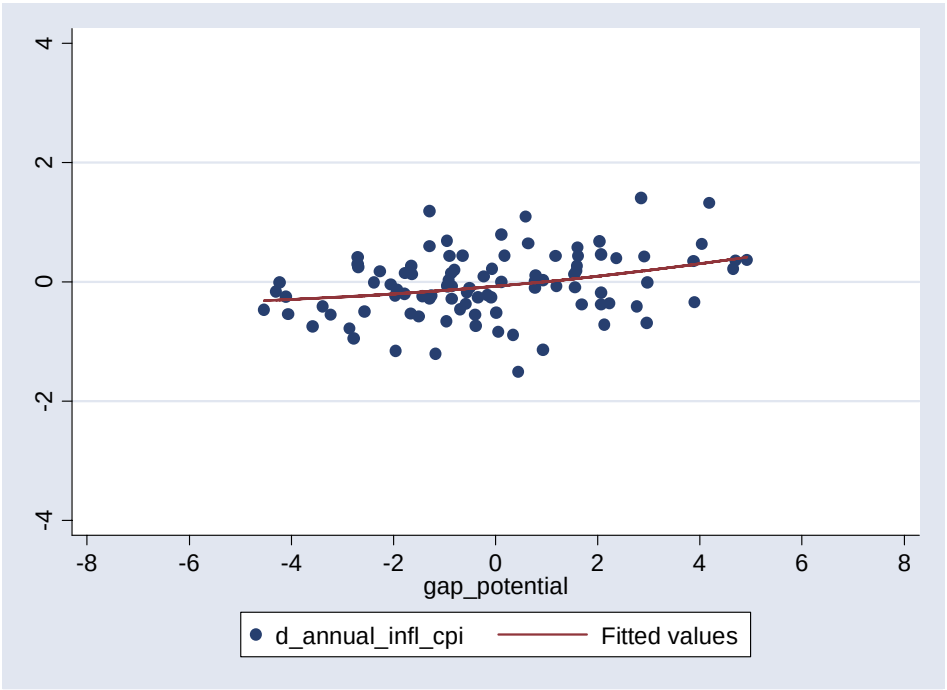
[8] Using the GDP deflators and different output gaps, we could not establish consistent evidence of a non-linear relation for the Germany economy.

Figure 2.1: Changes in inflation rates and deviations from potential output, USA and Germany (1975-1998)

US



Germany



Source: Calculations based on OECD Economic Outlook data.

Cukierman (2004) argues that political pressure or loss aversion (Kahneman/ Tversky 1982) create inflationary bias in monetary policy, especially when low rates of inflation are already achieved, central banks may put more emphasis on output and thus create an inflationary bias. In their empirical work, Cukierman/ Muscatelli (2002) find for the period 1979 to 2000 with an interest reaction function equivalent to ours, that there is evidence supporting the Fed's preference for expansions (especially after 1985, the post-Volcker period when inflation was lower) but not for Germany. They explain their result – compatible with ours although Cukierman/ Muscatelli include the years 1999, 2000 when the ECB was responsible for monetary policy in their analysis – with the strong emphasis given to price stability by the Bundesbank.

"In particular our finding that the long-run neutrality of money has a weak empirical basis calls into question the use of models whose central theoretical building block is the long-run neutrality of money. These models are now used for policy purposes and they have led to the widespread view among policymakers that monetary policy should only be used to stabilize the price level and should not be employed for other purposes. It should be clear, however, that these conclusions have more to do with theoretical convictions about how the world should work, than with hard empirical evidence of how the world actually works." (de Grauwe/Costa Storti 2007: 76/77)

3. Neutral Output and NAIRUs

Whatever the wording - "full employment", "natural unemployment", "equilibrium unemployment", "neutral unemployment", "equilibrium output" "potential output", "natural growth", "natural employment" - it seems to be generally accepted among economists that resources may be overused and that this may create inflationary pressure.[9] However, since the "potential" (to use a shortcut for the different wordings) cannot be observed directly but needs to be estimated, the measurement (in a theoretical sense as well as with respect to econometric methods) is under debate[10]. When do economies depart from the natural rate of unemployment (from full employment)?

The late James Tobin (1995: 33) emphasizes that for Friedman and Lucas the departure from "full employment" describes an equilibrium (market clearing) which thus can be changed only through adjustments of the structures, i.e., the institutional framework. Reducing unemployment requires a shift of the equilibrium. For Keynes and Keynesians, unemployment (deviations from full employment) is not the result of market clearing but on the contrary a non-clearing phenomenon[11] - a slow adjustment phenomenon. Take the extreme assumption that "markets are always cleared". Under this assumption the economy always operates at full employment and the "potential" can actually be observed because it is always equal to actual output. Introducing some stochastic disturbances but quick adjustments preserves the core of the story. Once slow adjustments are allowed for, it is less clear what "full employment" or "potential output" actually is. For sure, it is not always the observed output or employment, but more often economies will deviate from full employment.

[9] In the economic policy debate, usually NAIRUs (or natural rates) and/or potential output are used as proxies for equilibrium. Which one is used is largely a matter of taste because both are close relatives although not identical twins. Blinder/ Reis (2005), for example, analyze the Greenspan legend in terms of NAIRUs.

[10] For an overview, see Horn/ Logeay/ Tober 2007.

[11] Blinder and Solow (1973) point out, that under the assumption of equilibrium – as under the natural rate hypothesis – an expansionary policy would, of course, be a distortion. But equilibrium is assumed (Solow 2008).

Robert Solow (1998) writes that he prefers to use the term “neutral” rate of unemployment for the special state of the economy where supply and demand balance in the economy, he hesitates to call it “equilibrium rate” because that wording begs the question of the underlying equilibrium mechanism. What may lead to changes of the “neutral” rate? “The usual suspects include the demographic composition of the labor force, exogenously caused increases in food and energy prices, similar impulses from import prices, imposition or removal of formal or informal price controls, and still others. It takes more slack to keep inflation from accelerating when these external impulses are strong than when they are weak. The neutral rate might also respond to occasional well-defined changes in the environment of the labor market – like the scope, duration and generosity of unemployment insurance benefits; the strength and aggressiveness of trade unions; the presence or absence of restrictions on layoffs by employers - or to characteristics of product markets, like the intensity of international and domestic competition, thought this possibility is neglected.” (Solow 1998: 6)

Because natural rates and potential output cannot be observed but need to be estimated, the estimation procedure is crucial. Different methods have been used ranging from linear trends between two points in time, smoothing procedures of times series (filtering) to structural models. Simple trends seem inadequate but they provide actually estimates which are at least not totally out of range, especially if structural breaks in trends are allowed for. The pioneer of estimating potentials, Arthur Okun, used a simple linear trend between peaks to estimate potential output (see Okun 1970). The simplicity of the method is an obvious advantage, but it requires the peaks to result from policies allowing the potential to develop. A bit more complicated but still very modest with respect to data requirements are so called filter techniques, such as the widely used Hodrick-Prescott filter or the Kalman filter. All what is needed is the data series itself.

Using the data series itself and decomposing it in a trend and other components or simply smoothing it, of course, assumes that actual values fluctuate around the potential (or that actual unemployment fluctuates around “neutral” unemployment). If only short term deviations from the “neutral” or potential level exist, this method is probably sufficient.

The method, however, does not allow for prolonged periods of capacity underutilization (which may be due to labor or capital underutilization). That distinguishes smoothing methods from structural estimates using aggregate or disaggregated production functions. Therefore, the difference between methods is not only one of econometrics but fundamental: Smoothing of time series – filtering - assumes more or less quick adjustments if the economy deviates from the equilibrium whereas structural models are potentially immune against such a bias. Although theoretically preferable, structural models are facing data problems ranging from the availability of data to substantial measurement error and volatility of the data which often requires some smoothing of the series.

Differences between estimates of output potential are not only an academic debate, they influence but all areas of economic policy, monetary and fiscal policy as well as social, tax and labor market policies because they are at least one indicator directing policy reactions (see e.g. Hargreaves Heap 1980). An underestimated potential output may, for example, lead to a budget deficit identified as structural although it may in fact be not. An underestimated potential may lead to overly restrictive monetary policy driven by the fear of price pressures. Thus, being cautious against potential (or NAIRU) estimations may turn out to be very "beneficial as the Greenspan legend" suggests (Blinder/ Reis 2005).

How precise are different estimates? If they are in the end very close together, different methods do not matter much for practical policies. The Bundesbank published in 2003 a paper which propagates new Bundesbank estimates and provides a thoughtful discussion of the pros and cons of various estimation techniques (Deutsche Bundesbank 2003). The paper also provides an impression of differences in the estimated output gap for different estimation methods, which are astonishingly big. The gap between different methods can be as big as 6%pts and the conclusions drawn from these differences can differ substantially. For example, in the mid 1980s some methods would suggest over-utilization of capacity whereas others predict severe under-utilization. Or in practical terms: the upper bound estimates would make Central Bankers already nervous whereas the lower estimates will probably make them more relaxed.

Table 3.1: Output gaps (relative deviation of the actual from potential GDP) in Germany according to the Bundesbank

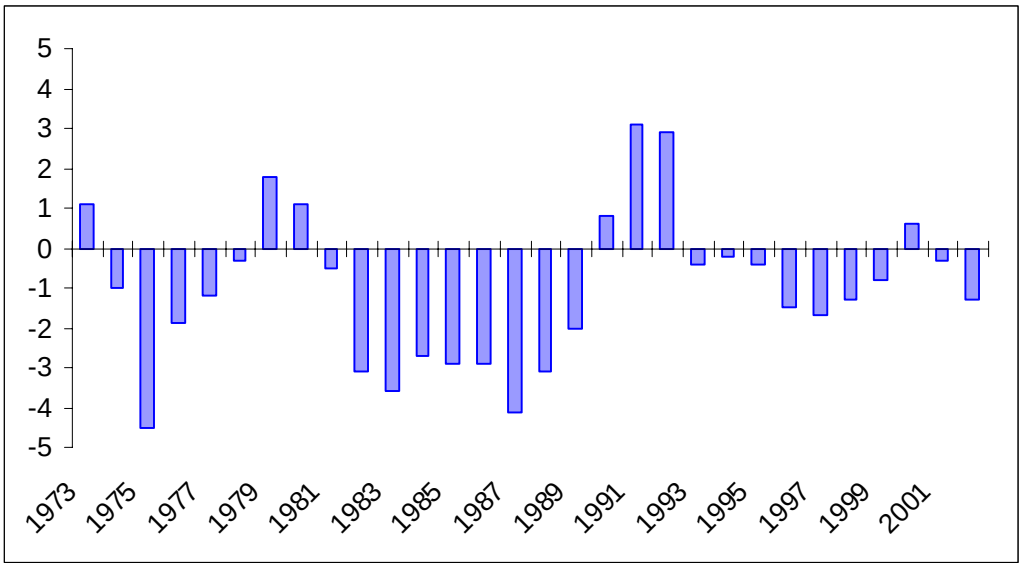
Year	linear trend	HP(100)	HP(6,25)	Band/Pass	capital stock	non-parametric	maximum-minimum
1973	1.2	1.6	1.4		4.6	1.1	3.5
1974	-0.7	0.1	0.1		0	-1	1.1
1975	-2.1	-2.1	-2.1		-1.1	-4.5	3.4
1976	-0.1	0	-0.3		0.4	-1.9	2.3
1977	0.9	1.1	0.1		0.9	-1.2	2.3
1978	2.1	2.1	0.9		1.7	-0.3	2.4
1979	2.6	3.3	1.8	1.3	1.9	1.8	2.0
1980	1.5	2.2	1	0.5	0.3	1.1	1.9
1981	-1.3	0.1	-0.6	-1.1	-2.5	-0.5	2.6
1982	-3.2	-2.2	-1.3	-1.7	-4.4	-3.1	3.1
1983	-3.3	-2.3	-0.6	-0.2	-4.3	-3.6	4.1
1984	-3	-1.9	0.2	1.1	-3.7	-2.7	4.8
1985	-2.9	-2	0.2	1.4	-3.3	-2.9	4.7
1986	-3.1	-2.7	-0.5	0.4	-3.2	-2.9	3.6
1987	-3	-3	-1.4	-0.8	-2.9	-4.1	3.3
1988	-1.9	-1.9	-1.1	-1.4	-1.2	-3.1	2.0
1989	1.8	-0.2	-0.5	-1.1	1	-2	3.8
1990	3.8	2.6	1.1	0.5	3.9	0.8	3.4
1991	5.6	3.8	2	1.4	5.6	3.1	4.2
1992	4.1	1.7	1.1	0.2	4	2.9	3.9
1993	2.4	0.5	-0.7	-1.1	1.5	-0.4	3.5
1994	2.1	0.6	-0.2	-0.1	1.1	-0.2	2.3
1995	1.2	0.3	-0.3	0	0.3	-0.4	1.6
1996	0.1	-0.4	-0.6	-0.2	-0.4	-1.5	1.6
1997	-0.4	-0.6	-0.8	-0.3	-0.5	-1.7	1.4
1998	-0.7	-0.2	-0.7	-0.4	-0.4	-1.3	1.1
1999	-0.5	0.8	-0.1	-0.1	-0.1	-0.8	1.6
2000	-1	0.7	0.2		0.2	0.6	1.7
2001	-2.8	-0.4	-0.9		-0.9	-0.3	2.5
2002	-3.8	-1.1	-1.6		-1.8	-1.3	2.7

Source: Deutsche Bundesbank 2003.

Astonishingly enough, the Bundesbank's estimates with the new (but also with the former) method suggest that the German economy was underutilizing its capacity over long periods. If the Bundesbank's re-estimation of the German production potential is close to the true potential, the recent economic history of Germany is characterized by an almost continuous underutilization of capacity (see Figure 3.1). In 7 out of 30 years

shown in Figure 3.1 the German economy was operating above its potential and in 16 years underutilization was at least 1% or more.

Figure 3.1: Output gap for Germany according to Bundesbank (2003)



Source: Deutsche Bundesbank 2003.

Also, the estimations of NAIRUs are suffering from great insecurity about the values. Analyzing US NAIRUs, Staiger et al. (1997) conclude: "However, the most striking feature of theses estimates is their lack of precision. For example, the 95% confidence interval for the current value of the NAIRU based on the GDP deflator is 4.3% to 7.3%. In fact, our 95% confidence intervals for the NAIRU are commonly so wide that the unemployment rate has only been below them for a few brief periods over the last 20 years." (Staiger et al. 1997: 34).[12]

[12] Staiger et al. (1997: 40), however, mention that the slope of the Phillips curve (the Phillips coefficient) seems to be quite stable but that the intercept with the x-axis is imprecisely estimated.

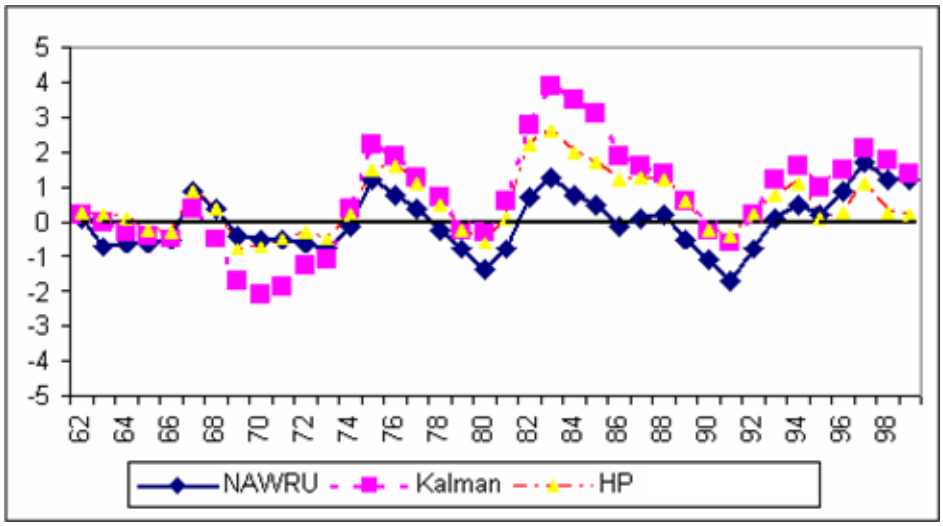
The OECD researchers Richardson et al. (2000) carefully analyzed different estimates of NAIRUs for OECED countries. The graph from Richardson et al. (2000: 16) for Germany shows the substantial deviations of NAIRUs estimated with Kalman and HP filters. HP filtered NAIRUs follow the actual unemployment series much closer than the smoother Kalman filtered NAIRUs. In the years with rising unemployment rates (since the mid 1970s) the distance between the actual unemployment rates and the NAIRU is almost ever bigger for the Kalman filtered NAIRUs than for the HP NAIRUS. In other words, the Kalman-NAIRUs would have shown a worse labor market disequilibrium, i.e., an under-use of resources. For example in 1982 actual unemployment (as derived from the graph) was 8%, the HP-NAIRU was 5.8% and the Kalman-NAIRU 4%. The unemployment gap –the underutilization of the labor force- would have been 2.2%pts for the HP-NAIRU, but 4%pts with the Kalman-NAIRU.

In addition, the confidence-band around the Kalman filtered NAIRU is according to OECD (Richardson et al. 2000: 67) about 0.7%pts in both directions (1 Standard error), i.e., for the example above, the unemployment gap in 1982 could be around 5%pts or two thirds of the actual unemployment rate. Using the Okun gap formula[13] this translates into a 10% to 12.5% loss in GDP! No peanuts: The difference between the unemployment gap estimates (HP versus Kalman filters) alone would result in a loss of GDP 4.5% (abstracting from possible measurement errors). Furthermore, Figure 3.2 indicates that except for the period 1968-1974, when unemployment did not show a severe upward trend, only in the years 1979, 1980, 1981 and 1990, 1991, 1992 the actual unemployment rate was roughly equal to the Kalman-NAIRU, i.e. in this years the unemployment gap displayed in Figure 3.2 was about zero. In all other years the unemployment is strongly positive implying that the potential for growth was severely underused in Germany. Thus, NAWRUs (the OECD's favorite for a long time) which followed the actual unemployment rate closely (see Figure 3.2) seem to have severely overestimated

[13] The Okun gap describes the difference between the actual and the "natural" unemployment rate as a function of the deviation of actual from potential GDP. Alternatively, the Okun gap is also estimated as the difference in unemployment rates as a function of GDP growth rates. We estimate that
1%pt. difference in the unemployment rate results in about 2.5% loss in GDP in Germany before 1989;
1%pt. difference in the unemployment rate results in about 2.0% loss in GDP in the US before 1989.

structural unemployment in Germany or in other words, these estimates may have caused an unnecessarily cautious monetary policy.

Figure 3.2: Unemployment gaps (actual unemployment rate minus NAIRU) for previous OECD estimates (NAWRUs) and HP and Kalman filtered NAIRUs, Germany



Source: based on data in Richardson et al. (2000): 62.

In the 1990s almost all US economists believed that the US NAIRU was about 6.5% and thus a fall of actual unemployment below the NAIRU should have alarmed central bankers, first of all, the president of the FED, Alan Greenspan. However, as we know now the US unemployment rate could fall as far as 4% without accelerating inflation but we only know because the FED allowed the unemployment rate to fall below the level so many believed would lead to accelerating inflation. Greenspan, a data miner, (see also Greenspan, 2007) concluded that US productivity must have risen and that therefore the growth potential was higher than commonly assumed. The Greenspan NAIRU estimates must have been substantially lower than the common belief of the NAIRU level. Blinder and Reis (2005) argue that sophisticated econometricians (Blinder/ Reis refer to Staiger et

al. 2001) were only years after the event able to trace the downward NAIRU-path Alan Greenspan must have identified in the mid 1990s.

Therefore, we should probably be very cautious before applying restrictive policies, which are extremely costly. “I want to argue that there can be an economically meaningful margin of uncertainty of the whereabouts of the neutral rate at any particular time, and, even further, that it may not be the sort of stable parameter that the underlying theory needs it to be.” (Solow 1998: 8)

4. Changes of Monetary Policy Institutions

According to the Bundesbank Act from 1957, the Bundesbank’s primary objective was “maintaining price stability” but that the bank should support the general economic policy of the Federal Government if possible. Although the Bundesbank was independent, however, fixed exchange rates under the Bretton Woods system were binding the Bank’s room for manoeuvre (see Mundell 1963) until 1973 when fixed exchange rates gave way to flexible exchange rates, which increased the degrees of freedom for monetary policy substantially. And the Bundesbank decided to use the new option to target price stability (Baltensperger 1998, von Hagen 1998)

Following a policy of price stability, the Bundesbank became de facto Europe’s central bank because some countries pegged their currencies directly to the DM and others were influenced by Bundesbank policies through the European Exchange Rate Mechanism (ERM, see Baltensperger 1998). The web page celebrating the 50th anniversary of the Bundesbank is headed by “Stable Money for Germany and Europe, 50 years of the Deutsche Bundesbank” (Deutsche Bundesbank 2008) indicating the central role of the Bundesbank in Europe and that the bank served as a blueprint for the ECB. Also, the former president of the Bank, Otmar Emminger, is cited with “price stability is not everything, but without price stability everything is nothing”. (Deutsche Bundesbank 2008). David Marsh (1992) titled his book on the Bundesbank “The Bank that rules

Europe". Therefore, the establishment of the ECB was seen by many European countries as a measure to regain influence on monetary policy (Wyplosz 2007, 2008).

The dominance of price stability has been carried over from the Bundesbank to the ECB and is in contrast to principles of the Federal Reserve System (FED). The FED has a "dual mandate" and is required to use monetary policy to achieve price stability, but also "to promote effectively the goals of maximum employment, and stable prices."[14] For the Bundesbank (and later, the ECB) price stability became priority and other considerations should only be pursued conditional on the achievement of price stability! The commonly used loss function[15] to analyze central bank policy:

$$L = (\pi - \pi^*)^2 + \lambda(y - y^*)^2 \qquad (1a)$$

or

$$L = (\pi - \pi^*)^2 + \lambda(u - u^*)^2 \qquad (1b)$$

Where π is inflation, π^* is targeted inflation, y is output, y* is target output (or potential output, equilibrium output, natural output), u is the unemployment rate, u^* is the NAIRU, λ is a parameter, which measures the policy importance the central bank gives to output (unemployment, respectively) deviations[16].

One may interpret the λ of the Bundesbank's (and the ECB's) mandate, as conditionally equal to zero (strict inflation targeting, Svensson 1997), i.e., if $(\pi - \pi^*)^2$ equals zero (or is very close to zero). For the FED's mandate λ is clearly greater than zero (flexible inflation targeting, Svensson 1997), but there is a debate whether λ greater than zero

[14] The FEDERAL RESERVE ACT (SECTION 2A – Monetary Policy Objectives) puts "employment" before "price stability": "The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates."

[15] For an early application of a loss function, see Fase/ den Butter 1977.

[16] The quadratic terms imply that deviations from the target in both directions are equally important, which may be questionable especially for output (see Blinder 2006).

reflects that output deviations as such are an argument in the FED's loss function or whether it is simply an indicator for forward-looking inflation. The late Milton Friedman commenting on the Taylor rule argued: "On this interpretation the Taylor rule is an attempt to specify the federal funds rate that will come closest to achieving the theoretically appropriate rate of monetary growth to achieve a constant rate of inflation. On these lines, the inclusion of the deviations in output from a target rate is not justified by a secondary objective of the Fed. It is rather to be justified by in the inadequacy of inflationary deviations alone to generate the appropriate fluctuations in money."(Friedman 2006: 4/5)

Shortly after the breakdown of the Bretton Woods system freed central banks from binding exchange rates, the Bundesbank adopted a policy of targeting monetary aggregates. As Table 4.1 shows, each year since 1975, the Bundesbank announced targets for the rate of increase first in the Central Bank Money (CBM), and then for M3 (from 1988). In practice, these targets had been quite flexible: they were often missed, especially when hitting monetary targets might conflict with the control of inflation (see von Hagen 1995, Bernanke and Mihov 1997). This practice made the Bundesbank's monetary targeting differ from a strictly monetarist doctrine. Instead, the Bundesbank viewed its monetary targets as a "nominal anchor" for monetary policy and as an instrument to implement its inflation objectives. Bernanke and Mishkin (1997:103) argue, "the Bundesbank's money growth targets are derived, using the quantity equation, to be consistent with an annual inflation target, given projections of the growth of potential output and of possible changes in the velocity of money." That is, the Bundesbank followed the quantity theory, so that the monetary growth target was derived according to the following formula $g_{M_t} = g_{Y_t^*} + g_{P_t} - E(g_{V_t})$, where g_{P_t} is the inflation rate. Its practice also evidenced that the Bundesbank conducted an inflation-focusing monetary policy although it was a self-described "monetary targeter". In Bernanke and Mishkin's terminology, the Bundesbank was a kind of "hybrid" inflation and monetary targeter. (See Bernanke/ Mishkin, 1997)

Applying a loss function to analyze the Bundesbank's policy we do not intend to argue that the Bundesbank applied an inflation-target rule in the strict sense, but we rather use it

as an instrument to detect possible asymmetries in monetary policy. Clearly, the Bundesbank argued that it followed a median or long term strategy of price stability.

Clarida and Gertler (1997) point out that although the Bundesbank takes monetary targets as an intermediate goal, it depends on *short-term interest rates* as a monetary instrument to carry out monetary policy, as its counterpart in the US does. Using the monetary base as an intermediate target, Spahn (2006) formally derives the implicit inflation target. Clarida and Gertler (1997) also apply a modified Taylor rule to German data for the post-Bretton Woods era, as Taylor and many other scholars do with the Fed's monetary policy. They find that the monetary policy of the Bundesbank from 1975 to 1993 can well be captured by a modified Taylor rule. One of the important findings they make is that the interest rate responds asymmetrically to the inflation gap (see section 5). As the target inflation rates in Table 4.1 show, did the Bundesbank follow a more and more ambitious policy of very high price stability by establishing the later ECB target of less than 2% inflation in 1997.

Table 4.1: The Bundesbank's money growth and implicit inflation targets

	Money Growth		Inflation	
Year	Target	Actual	Implicit target	Actual
1975	8	10.1	4.5	5.6
1976	8	9.2	4.5	3.7
1977	8	9.0	4.0	3.3
1978	8	11.4	3.5	2.6
1979	6 - 9	6.1	3.0	5.4
1980	5 - 8	4.9	4.0	5.3
1981	4 - 7	3.5	3.5-4.0	6.7
1982	4 - 7	6.0	3.5	4.5
1983	4 - 7	7.0	3.5	2.6
1984	4 - 6	4.6	3.0	2.0
1985	3 - 5	4.5	2.5	1.6
1986	3.5 - 5.5	7.7	2.0	-1.0
1987	3 - 6	8.1	2.0	1.0
1988	3 - 6	6.7	2.0	1.9
1989	5	4.7	2.0	3.0
1990	4 - 6	5.6	2.0	2.7
1991	4 - 6	5.2	2.0	4.2
1992	3.5 - 5.5	9.4	2.0	3.7
1993	4.5 - 6.5	7.4	2.0	3.7
1994	4 - 6	5.7	2.0	2.5
1995	4 - 6	2.1	2.0	1.8
1996	4 - 7	8.0	2.0	1.5
1997	3.5 - 6.5	6.4	1.5 – 2.0	1.9
1998	3 - 6	4.9	1.5 – 2.0	0.9

Note: "Money" is central bank money at the 1974 reserve requirements for the period 1975 – 87, West German M3 for 1988 – 90, and German M3 since 1991. From 1975-1985, the inflation targets are announced "unavoidable rate of price increase", and since 1986, are announced the rate of being consistent with "price stability".
Source: Bernanke and Mihov (1997), Schächter (1999), Deutsche Bundesbank *Monthly Report* (1997, 1998).

5. Asymmetric Monetary Policy

Given the loss function as in equations 1a and 1b, the central bank may use its policy instrument, e.g., the short-run interest rate to minimize the deviation of the inflation and output from their targets respectively. In the light of this, John Taylor (1993) proposes a simple interest rate rule as a monetary policy rule:

$$i = r^* + \pi^e + \alpha(\pi - \pi^*) + \beta(y - y^*) \qquad (2)$$

where i is short-term interest rate, r^* is the real equilibrium interest rate, π^e is (expected) inflation rate and $(y-y^*)$ is the percentage deviation of the real output from its target. It says that the central bank should set the short-term interest rate in the consideration of variability of inflation and output.

Different from Clarida and Gertler's (1997) forward-looking specification, we use the Taylor's specification while allowing for interest rate smoothing by introducing two lags interest rate terms in the specification[17], to demonstrate how the Bundesbank carried out monetary polices for the period of 1975 to 1998. By using the Taylor's specification, we assume that the Bundesbank made monetary policy decisions based on the historical and current data that were available.

We run an OLS regression on the partial-adjustment monetary reaction function and get[18] for the period 1975 I to 1998 IV:

$$i_t = (0.11)[5.36 + 1.09(\pi_t - \pi_t^*) + 0.09(y_t - y_t^*)] + 1.41 i_{t-1} - 0.52 i_{t-2} + \varepsilon_t \qquad (3)$$

---

[17] Introducing two lags is sufficient to be able to reduce the serial correlation problem in the OLS residuals and it reflects the fact that central banks care about the financial market stability and thus hesitate to make overly abrupt changes in interest rates.

[18] The data are all on quarterly basis, starting with the first quarter of 1975 and ending on the fourth quarter of 1998. The overnight money market interest rate is used as the nominal interest rate i_t. The data source is the Bundesbank's Statistics on "Money Market Rates Reported by Frankfurt Banks/Overnight Money/Monthly Average (unit: % p.a.)". The original data are on a monthly basis. We transfer them into a quarterly basis by taking means over each quarter. The data source for real GDP is from the OECD Economic Outlook. West German data are used for 1975:1 – 1990:4, and German data are used since 1990:1. The real GDP trend is created with the Hodrick-Prescott filter (with lambda equal 1600). Then (y-y*) is calculated as percentage deviation of real GDP from its trend.
The German Consumer Price Index (CPI) is used to compute the inflation rate. The quarterly data for CPI are taken from OECD Economic Outlook: West German data for 1975:1 – 1991:1 with the base year 1991, and German data since 1991:1 with the base year 2000. The implicit inflation targets by the Bundesbank are used as our implicit inflation targets π^*, as shown in Table 1.

where the adjusted R-squared is 0.94, S.E. = 0.56, and DW = 2.21, the coefficient before the Taylor rule reaction function is 0.11 = (1 – 1.41 + 0.52), which captures the degree of interest rate adjustment.

The constant 5.36 can be interpreted as the equilibrium nominal interest rate for the period under study, close to the sample mean: 5.79. The key messages of this policy reaction function are:

(i) The Bundesbank was **proactive** towards controlling inflation: at the higher inflation pressure (say, 1%), it raised not only the nominal (by 109 bp) but also the real interest rate (9 bp) to fight against inflation;

(ii) The Bundesbank barely responded to the state of the real economy (the coefficient for the output gap is not significant);

(iii) Comparing equation (3) with the Taylor rule for the Fed[19] shows that the Fed responded to both the inflation deviation and the output gaps more strongly than the Bundesbank did, which is consistent with a long-run policy orientation of the Bundesbank.

The Bundesbank hardly taking the output gaps into consideration concerning the policy making is plausible since the output fluctuations do not enter the objective function of the Bundesbank directly. However, output itself is a factor in determining inflation. Output

[19] Taylor (1993) specifies a policy rule that fits the data pretty well for the United States for the period from 1987 to 1992:

$$i = 5 + \mathbf{1.5}(\pi-2) + 0.5(y-y^*),$$

where the inflation target is assumed to be 2 percent, i is the federal funds rate.
The key messages of this policy reaction function are:

(a) The Federal Reserve fine-tunes the economy (as shown by $0.5(y-y^*)$): at the economy sluggishness (say, 1% negative output gap), it lowers the interest rate (by 50 basis points on average) to stimulate consumption and investment, while at the possible overheat of the economy it raises the interest rate;

(b) The Federal Reserve is quite **proactive** towards controlling inflation (as shown by $\mathbf{1.5}(\pi-2)$): at the higher inflation expectation (say, 1%), it raises not only nominal (by 150 bp) but also real interest rate (50 bp) to fight against inflation.

fluctuations, esp. a large upside deviation of output from its trend, could power inflation pressure. Thus, the Bundebank might react asymmetrically to output fluctuations.

However, equation (3) describes the average over the full period. To further investigate asymmetric monetary policy, we split the sample in periods in which actual output is below potential output and another in which actual output is above potential output. We then re-estimate the monetary reaction function to allow the response to differ according to the state of the economy. We get:

for $(y - y^*)_t > 0$:

$$i_t = (0.13)[4.46 + 1.08(\pi_t - \pi_t^*) + 0.46(y_t - y_t^*)] + 1.31 i_{t-1} - 0.44 i_{t-2} + \varepsilon_t \qquad (4a)$$

for $(y - y^*)_t < 0$:

$$i_t = (0.13)[4.46 + 0.23(\pi_t - \pi_t^*) - 0.38(y_t - y_t^*)] + 1.31 i_{t-1} - 0.44 i_{t-2} + \varepsilon_t \qquad (4b)$$

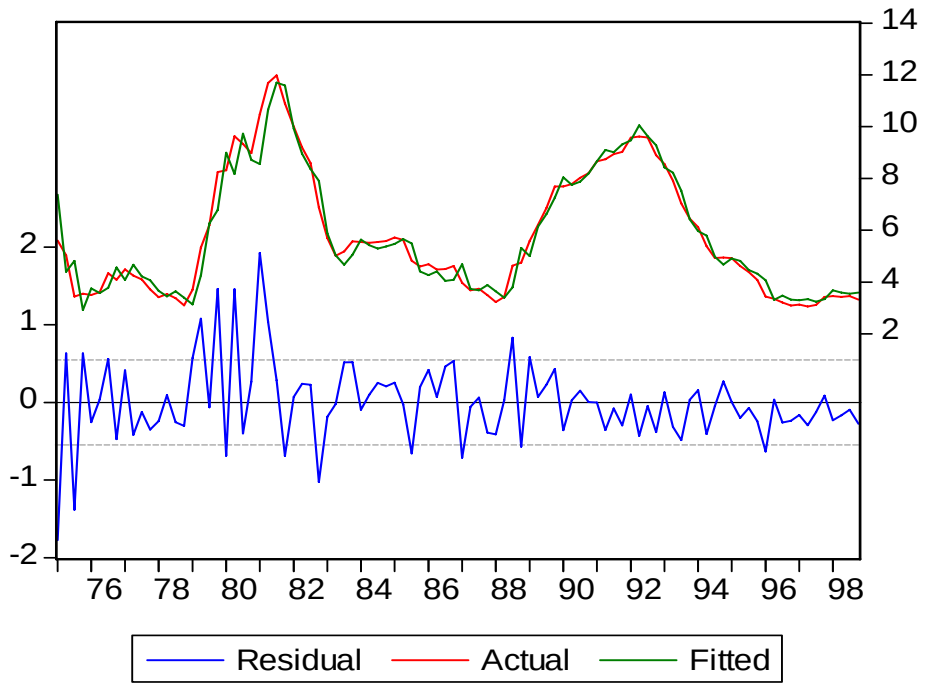
where the adjusted R-squared is 0.95, S.E. = 0.55, and DW = 2.12.

When actual output was above potential output, the Bundesbank acted precautious, deviating from the long orientation and raising the interest rate. When actual output was below potential output, the Bundesbank kept the long run orientation and did not lower the interest rate.[20] The regression results support our hypothesis that the Bundesbank

[20] The negative coefficient for (y-y*) is not significant in this regression. Otherwise it would indicate a pro-cyclical monetary policy, i.e., rising interest rates when the production potential is underused. We find this coefficient to be significant when we use GMM rather OLS. Other considerations (like exchange rate stabilization or an underestimation of the potential (see Figures 3.1 and 3.2) may justify that result, but otherwise a coefficient is difficult to rationalize.
However, we believe that OLS can be used in our analysis because no regressor is correlated with the error term and multicollinearity is limited.

responds to output gaps asymmetrically in different economic situations.[21] When positive output gaps enhance the fear of higher inflation, the Bundesbank reacted strongly by raising the interest rate, as evidenced by the larger coefficients for both inflation deviation and output gap. Thus, the Bank slowed economic expansions. However, in contrast, when the output gap is negative, the Bundesbank does not reduce the interest rate significantly, i.e., it does not counter recessions.

Figure 5.1: The actual, fitted interest rates (right scale) and regression residuals (left scale)



[21] Wald-test under the null hypothesis of equality of the coefficients for inflation deviations in 4(a) and 4(b):

Test Statistic	Value	df	Probability
F-statistic	1.259760	(1, 89)	0.2647
Chi-square	1.259760	1	0.2617

Wald-test under the null hypothesis of equality of the coefficients for output gaps in 4(a) and 4(b):

Test Statistic	Value	df	Probability
F-statistic	6.037756	(1, 89)	0.0159
Chi-square	6.037756	1	0.0140

Yet, the overall feature of regression (3) and (4) is its good fit – the adjusted R squared is high, 0.94 and 0.95, respectively. Figure 5.1 plots the actual interest rate, the fitted and the residuals from regression (5). The fitted follows the actual interest rate closely and the large part of residuals remain within the range of (-0.5, 0.5) standard deviations.

Table 5.1: Cumulative growth rates, 4 and 8 quarter after the trough*, Germany and the US

Trough		Cumulative growth rates (%)**		
Year	Quarter	After 4 quarters	After 8 quarters	Until next trough
			Germany	
1975	**II**	5.4	8.7	18.2 (19quarters)
1980	**IV**	1.1	.	1.5 (5 quarters)
1982	**III**	2.0	5.8	26.3 (29 quarters)
1992	**III**	0.0	2.4	4.5 (12 quarters)
1996	**I**	2.1	5.4	5.1 (11 quarters)
			USA	
1975	**I**	5.9	9.1	20.9 (20 quarters)
1980	**III**	4.3	.	4.3 (4 quarters)
1982	**III**	4.3	12.1	31.9 (32 quarters)
1991	**I**	2.6	5.8	33.6 (37 quarters)
2001	**III**	2.2	5.2	16.9 (until 2007 IV)

* A trough is defined as at least two consecutive quarters with negative growth in GDP.

**computed from the sum of log differences.

Source: Calculations are based on OECD Economic Outlook Database.

To investigate the impact of asymmetric monetary policy we display the cumulated growth rates in recoveries for Germany and the US in Table 5.1. The data show roughly similar rates for the 1975 recession but in the following years cumulated growth rates for Germany are substantially lower than the US rates, which is probably most severe in the recovery of the early 1990s (the recession was later in Germany than in the US), i.e., in a situation where growth was most needed just after German unification.

Table 5. 2: Cumulated growth of investment and consumption in three business cycles, Germany and USA

		investment			consumption					
					private			public		
		after … quarters			after … quarters			after … quarters		
Trough year	Quarter	4	8	12	4	8	12	4	8	12
					Germany					
1975	II	7.1	10.3	14.2	4.0	8.8	11.4	2.3	3.2	7.6
1982	III	4.2	5.9	6.3	1.8	4.9	7.1	-0.3	1.0	2.4
1992	III	1.6	3.4	-2.5	2.6	4.1	5.8	1.6	0.9	4.3
					USA					
1975	I	7.2	14.4	21.3	6.0	10.5	14.0	0.8	1.9	4.2
1982	III	11.4	25.3	30.8	6.5	11.1	16.9	3.9	4.6	10.8
1991	I	-1.2	4.6	11.7	2.4	5.5	9.5	0.3	1.0	0.6

Source: Computations are based on quarterly data from the OECD, economic outlook database. For the definition of the business cycle periods, see Table 5.1.

Table 5.2 displays cumulated growth rates for the business cycles in Germany and the US. For investment as well as consumption growth in the US is much stronger than in Germany. The biggest difference occurs in investment, where the US the differential after 12 quarters was as high as 24.5% in the 1982 recovery. Also private consumption grew at substantially higher rates in the US but with public consumption the picture is mixed. Investment is the classical textbook case for the illustration of monetary policy effects but a non accommodating monetary policy may also dampen investment through the expected lower demand growth.

Although the growth data in Table 5.1 and 5.2 confirm the differences between the Bundesbank and FED, it nevertheless underestimates the restrictiveness of the Bundesbank policy because Germany operated on substantially higher productivity growth rates than the US until the mid 1990s, i.e., higher productivity growth in Germany should have allowed for higher GDP growth in Germany without the fear of inflationary pressure. Support for more expansionary monetary policy should have been stronger and to promote employment, Germany actually needed higher growth than the US in recoveries.

To return to the initial growth path and initial employment levels, GDP growth needs to be higher than productivity growth. The differences of the GPD growth rates and the productivity growth rates (both in log differences) are shown in Figure 5.2 for 12 quarters after the trough for the 3 recoveries in Germany and the US. In every recovery, the US curve is clearly above the German curve and reaches substantial rates, which enabled the employment expansion in the US. In contrast, the German curve hardly moves above the line representing the zero difference. The cumulated difference of the GDP growth rate minus the productivity growth rates for 12 quarters after the trough was 0.4% for the 1975 recovery, 1.4% for the 1982 recovery and -0.6% for the 1993 recovery in Germany. This is in stark contrast to the US values, which are 9.7% for the 1975 recovery, 8.1% for the 1982 recovery and 3.5% for the 1991 recovery.

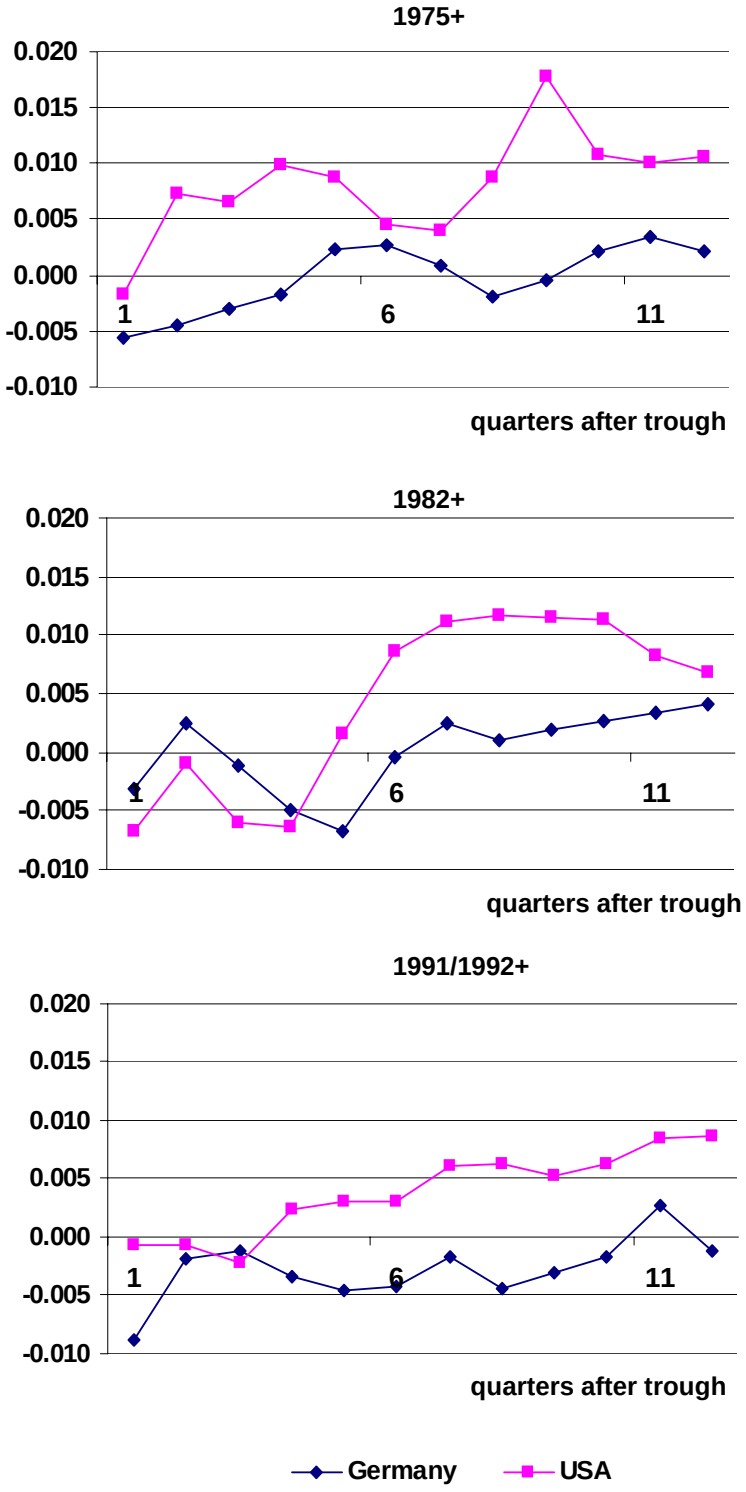
Given theses figures, it does not come as a surprise that German unemployment remained at ever higher levels after each recession. There was clearly much more room for economic expansion in recoveries but it was slowed by overly restrictive asymmetric monetary policy as our regressions suggest.

The conclusion from Figure 5.2 clearly is that a more dynamic economic recovery in Germany would have raised output and thus reduced the unemployment rates substantially. The cumulated differences in growth over there business cycles between the US and Germany [(US growth - US TFP)-(German growth - German TFP)] are 9.4%

(1975+), 6.1% (1981+) and 4.1% (1991/1992+). Using Okun's law these differences would have reduced the unemployment rates by 3.7%pts, 2.7%pts, 1.6%pts, i.e., rising unemployment in the 1970s would have roughly been prevented and participation (less early retirement, higher female labor force participation) could have been higher. Even some working hours reductions, which were introduced in the 1980s motivated by employment considerations, would probably have been unnecessary (the Figure 5.3).

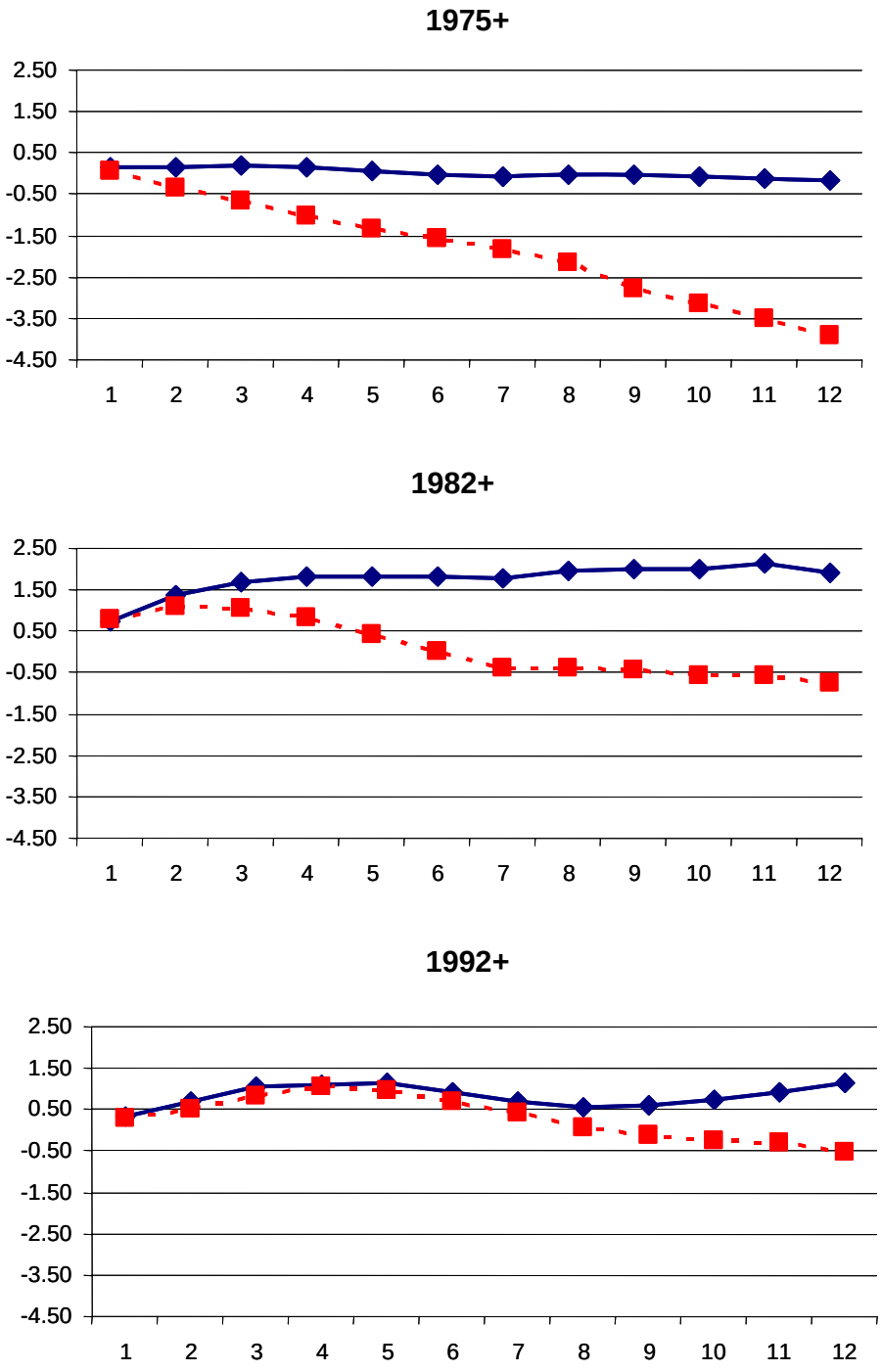
Economic growth is the "deus ex machina" of unemployment if structural features do not prevent the employed to become unemployed. The German economy underwent structural changes at least as strong as the US economy and flow based analysis shows that the dynamics in the German labor market were high. In addition, duration analysis of unemployment and vacancies suggests that German unemployment was more a job-deficit than a rigidity phenomenon (Schettkat 1992). Cross country evidence causes doubt on the "institutional rigidity story" as well (Glyn/ Howell/ Schmitt 2006) and institutional change in Germany cannot explain the rise in unemployment (Carlin/ Soskice 2007, 2008).

Figure 5.2: Three business cycles in Germany and the US, GDP growth minus TFP growth



Source: Computations are based on quarterly data from the OECD, economic outlook database. For the definition of the business cycle periods, see Table 5.1.

Figure 5.3: Unemployment recovery in Germany in three business cycles [actual (diamonds) and hypothetical changes (squares) against trough]



Note: Hypothetical changes are derived from growth gaps of Germany against the US applying Okun's law, i.e., every 2.5%pt GDP growth equals 1%pt unemployment, see footnote 13.
Source: Computations are based on quarterly data from the OECD Economic Outlook database. For the definition of the business cycle periods, see Table 5.1.

6. Conclusions

This paper establishes evidence that the German economy was, with the exception of a few years, operating continuously below its potential since the early 1970s, which is in stark contrast to the US economy. In the US, growth rates were clearly higher after recessions, both in absolute terms and relative to the growth of the potential. We emphasized the measurement problems related to the estimation of potential output but the patterns seem to be very stable and different methods applied show consistent results: Germany could have been more prosperous if the potential had been fully used.

Is the relative underperformance of the German economy related to monetary policy or did other variables cause the underperformance? We show that the Bundesbank applied an asymmetric interest reaction function, i.e., the bank emphasized price stability and thus reacted strongly to rising inflation – which is the basis of the widely celebrated Bundesbank legend - and raised interest when potential output was reached or passed. But the Bundesbank did not react as strongly when actual output was falling short of potential output. It is sufficient that monetary policy affects the real economy in the short run to establish the link between asymmetric monetary policy reaction and the growth path of the economy. If economic growth after a recession is dampened, the economy cannot return to the initial growth path and this way, the long-run growth trend will be reduced as well.

But could the Bundesbank have done better? Was it the over-commitment to price stability in the bank's objective function or was the information at the time when decisions had to be made, just not sufficient to draw different conclusions? This issue is discussed in the "real time" literature, where it is argued that the US inflation of the 1970s was the result of an overestimated potential because the productivity slowdown was not recognized at that time (Orphanides 2001). Clearly, if the estimates of the potential are biased, policies based on these estimates may be biased, but the bias can go in both directions and although inflation may be harming the economy, so does underused capacity and unemployment (Hargreaves Heap 1980). The decision probably which side one weights more has to be made. If one assumes neutrality or long-run

neutrality of monetary policy, the decision is easily made: pushing for high price stability is not very costly. If however, monetary policy has not only short-run but even long-run effects – as endogenous investments or hysteresis processes suggest - overly emphasizing price stability is extremely costly for society as the Okun's law suggests.

Monetary policy is not the only macro policy and the Bundesbank may not be responsible for the entire underperformance of the German economy. Aside from monetary policy, fiscal policy is surely important as well – with the ECB fiscal policy should have gained importance if it were not restricted by the "Maastricht criteria" (Allsopp/ Vines 2005).
Dolado et al. (2003) argue that rigid European labor markets did not allow the central banks in Europe to follow a more "flexible inflation targeting" as the FED did because wage rigidities in Europe would have caused inflationary pressure in expansionary periods. However, as the OECD (2004) states, microeconometric studies comparing the US with European economies (e.g., OECD cites Nickell/ Bell 1995, Card et al. 1996, Krueger/ Pischke 1997, Freeman/ Schettkat 2000) fail to establish evidence for the wage-rigidity hypothesis. And wage flexibility also has two sides and coordinated market economies (Hall/ Soskice 2001) seem to create stronger wage restraint in expansionary periods than "liberal market economies". Empirical evidence for Germany in comparison to the US seems not to support the labor market rigidity hypothesis (Schettkat 1992, Carlin/ Soskice 2007, 2008).

True, unemployment turned into long-term unemployment and got more and more concentrated among the low skilled. But what caused this structuring of unemployment? Once path dependence is allowed for (through sorting, skill depreciation and other mechanisms) unemployment may be difficult to reduce after high unemployment has persisted for a certain period. This process, however, is not an argument against a more expansionary policy but it is in favor of it because inactivity will cause high, long-lasting costs (Stiglitz 1997). A policy less constraining economic growth in recoveries could have brought German unemployment rates back to pre-recession levels and prevented the structuring of unemployment.

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