The Impact of EMU on Europe and the Developing Countries
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The Role of National Central Banks and of Different Policy Cultures

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Abstract and Keywords

This chapter focuses on the role of central banks and differences in policy cultures. It analyses the trade-off between inflation and unemployment in a selection of industrialized countries. It examines the precise nature of the inflation–unemployment trade-off and contrasts a new 'enlightened' view of monetary policy with the older Phillips-curve short-term stimulus versus long-run inflation view.

Keywords: central banks, policy cultures, inflation, unemployment, Phillips curve

1. Introduction

The aim of this paper is to examine the role of central banks across countries by focusing on the differences in policy cultures. In fact, this is too broad an aim. To do full justice to this goal, one would need to carefully study the central banks or the mechanisms for setting monetary policy as well as provide details on the policy cultures in many countries, taking into account unique and country-specific circumstances.

Take one example: what is the role of the central bank in Russia? Answering this question alone would fill many pages. One would need to talk about the difficulty of raising taxes in transition countries and analyse to what extent inflation-based seigniorage is one of the key stable sources of government revenue. This would raise issues of international lending to Russia by institutions such as the IMF, which in turn raises issues of governmental

stability and even questions of nuclear control. And to describe the Russian 'policy culture' would be a daunting task, even when provided with a broad brush and ample canvas.

Take another example: what is the role of central banks in the newly industrialized countries of East Asia? That is, what is the role of central banks in countries such as South Korea, Indonesia, Hong Kong, or Singapore? Raising this question immediately brings to mind the 1997 Asian currency crisis, and the varying degrees to which central banks tried to defend or failed to defend a fixed exchange rate *vis-à-vis* the US dollar. One would then have to investigate the particular exchange rate regime in further detail. One would need to juxtapose the greater government control of Singapore with the laissez-faire approach in Hong Kong. One would need to talk about the exposure of firms to dollar-denominated debt, and examine the mechanism of the currency crisis in greater detail.

(p. 77) Finally, there are excellent surveys on e.g. the various degrees of central bank independence across countries and their determinants already, see e.g. Cukierman (1992) or Eijffinger and De Haan (1996). Excellent textbook treatments of the theory can be found in e.g. Cukierman (1992) and Walsh (1998). Extending the analysis of these authors to take into account, in addition, some 'culture variables' would be a daunting undertaking.

In sum, in order to make any progress on my task at hand, I need to narrow it down substantially. First, I shall concentrate the analysis on only a few countries. I select major industrialized countries as the focus of my analysis: this is partly driven by the availability of data, and partly driven by the desire to analyse a fairly homogeneous set of countries so as to make cross-country comparisons meaningful. Second, I shall focus on a single trade-off—the trade-off between inflation and unemployment—which is arguably at the heart of monetary policy making. It will turn out that this 'single' trade-off actually needs proper interpretation: this issue will be examined carefully.

Third, I will focus on empirically observed results and on an analytical theory rather than on a 'narrative' style or opinion surveys. Partly to motivate this restriction of attention, and partly because of the additional information, it is useful to discuss some survey results first, however. Tables 4.1–4.5 contain some results of the ISSP survey for five countries—Australia, Germany, Great Britain, Italy, and the United States.

Table 4.1.

Rank	1985		1990	
	Country	Per cent	Country	Per cent
1	Australia	58.3	Australia	61.8
2	USA	48.6	UK	56.7
3	Germany	39.4	USA	53.8
4	Italy	31.4	Germany	48.1
5	UK	30.4	Italy	31.6

Note: This table provides information on the ISSP survey results. Columns 2–5 are results in 1985 and 1990 in answer to the question 'If the government had to choose between keeping down inflation or keeping down unemployment to which do you think it should give highest priority?'. The fractions shown in columns 3 and 5 are the percentage of people who voted for 'Keeping down inflation' rather than 'Keeping down unemployment'. Data are available for five countries, which have been 'ranked' according to the percentage in favour of keeping down inflation. The results have been obtained from http://www.za.uni-koeln.de/data/en/issp/isspex.htm. The results here are for question V40 as part of ISSP 85–90, ZA-No. 2240.

Table 4.2.

Rank	1985		1990	
	Country	Per cent	Country	Per cent
1	Germany	46.4	Germany	47.7
2	USA	36.9	USA	29.6
3	Italy	15.9	Italy	17.6
4	Australia	12.9	Australia	15.2
5	UK	4.8	UK	6.3

Note: This table provides results for the ISSP question V51, On the whole, do you think it should be or should not be the government's responsibility to provide the industry with the help it needs to grow'. The fractions shown in columns 3 and 5 are the percentage of people who voted for 'Probably should not be' or 'Definitely should not be' rather than 'Definitely should be' or 'Probably should be'. Data are available for five countries, which have been 'ranked' according to these percentages.

Table 4.1 directly concerns my focus question: should the government keep down inflation or rather should it keep down unemployment? As one can see, the Australians appear to be the most hawkish with regard to inflation, while the population in Germany of 1990 favours a priority for unemployment more than all the other countries except Italy. How can this result be explained, given the well-known fact that Germany has one of the lowest and most stable inflation rates in the industrialized **(p. 78)** world? I believe the explanation lies in the endogeneity of these opinions to economic circumstances: precisely because inflation is already low and stable in Germany, while unemployment rates have been creeping up, the urgency of combating unemployment is higher than the urgency of combating inflation. Nonetheless, it seems unlikely that Germany would be happy with double-digit inflation rates. Table 4.1 provides mixed results for another reason: the trade-off presupposed in the survey question of that table may actually not exist. Indeed, I will examine the precise nature of the inflation-unemployment trade-off in detail in the bulk of this paper, and contrast a new, 'enlightened' view of monetary policy with the older Phillips-curve short-term stimulus versus long-run inflation view.

With my focus on the inflation-unemployment trade-off, I would ideally like to also examine other policy determinants of unemployment (as well as inflation). The degree to which governments pursue growth-oriented policies, work-week reduction, work-provision programmes, aids to failing industries, or the extent to which they change unemployment benefits or more generally provide structural reforms of the labour market will undoubtedly have an influence on unemployment rates and thereby indirectly on monetary policy.

A detailed analysis is, again, beyond the scope of this paper. Table 4.2 shows that the German population more than any of the other five countries leans against the government providing growth support to its industries. One could interpret this as a laissez-faire stance: these results may come about because Germans really do favour a free-market economy. It is more likely, though, that most Germans hold a 'socialist' prejudice against profit-seeking enterprises: so, rather than favouring a free-market economy, they are likely to favour heavy interference, taxation, and work regulation by the government. Some supporting evidence comes from examining Tables 4.3, 4.4, and 4.5. According to Table 4.3, Germans are not particularly against the government supporting declining industries, if that saves jobs. According to Table 4.4, it is the US-Americans who are most against the government

financing projects to **(p. 79)** create new jobs.[1] And Australians are most adamant against the reduction of the work week according to Table 4.5.

Table 4.3.

Rank	**1985**		**1990**	
	Country	**Per cent**	**Country**	**Per cent**
1	Australia	29.7	Australia	32.3
2	UK	29.2	UK	20.7
3	Germany	27.7	USA	19.6
4	USA	26.7	Germany	19.1
5	Italy	12.5	Italy	11.0

Note: This table provides results for the ISSP question V30, ‘Should the ; government provide support for declining industries to protect jobs’. The fractions shown in columns 3 and 5 are the percentage of people who voted for ‘Against’ or ‘Strongly against’ rather than ‘Strongly in favour of, ‘In favour of, or ‘Neither in favour nor against’. Data are available for five countries, which have been ‘ranked’ according to these percentages.

Table 4.4.

Rank	**1985**		**1990**	
	Country	**Per cent**	**Country**	**Per cent**
1	USA	30.9	USA	30.1
2	Germany	28.6	Australia	29.8
3	Australia	22.7	Germany	26.7
4	UK	11.7	UK	17.0
5	Italy	9.2	Italy	9.7

Note: This table provides results for the ISSP question V27, ‘Should the government finance projects to create new jobs?’ The fractions shown in columns 3 and 5 are the percentage of people who voted for ‘Neither in favour nor against’, ‘Against’, or ‘Strongly against’ rather than ‘Strongly in favour of or ‘In favour of. Data are available for five countries, which have been ‘ranked’ according to these percentages.

In sum, even these short tables, which list results for only five countries, are hard to interpret: additional information and interpretation is needed to come to meaningful conclusions. In principle, one could pursue this route further. While Collins and Giavazzi (1993) have successfully done this for questions regarding the attitude towards inflation and fixed exchange rates, this route may instead turn out to be a thorny path with results open to much debate for the question at hand.

(p. 80)
Table 4.5

Rank	**1985**		**1990**	
	Country	**Per cent**	**Country**	**Per cent**
1	Australia	54.3	Australia	59.9
2	USA	46.7	USA	41.0
3	Germany	29.7	UK	29.5
4	UK	27.3	Germany	24.8
5	Italy	16.7	Italy	23.6

Note: This table provides results for the ISSP question V31, ‘Should the government reduce the working week to create more jobs?’. The fractions shown in columns 3 and 5 are the percentage of people who voted for ‘Against’ or ‘Strongly against’ rather than ‘Strongly in favour of, ‘In favour of, or ‘Neither in favour nor against’. Data are available for five countries, which have been ‘ranked’ according to these percentages.

Instead, it is perhaps more elegant and more immediate to directly examine the *outcome* of the political process, and to examine the features of historical unemployment rates and inflation rates in a number of countries. Presumably, institutions have been designed so as to serve some public interest: it should therefore be possible to read the preferences by the voting public off policy outcomes rather than survey statistics. I will turn to such an investigation of the data in Section 2. In Section 3, I will provide a theoretical investigation, providing an underpinning and interpretation for the approach chosen in Section 2 and providing an analysis as to how much democracy central banks need, when both the public and the parliamentarians hold an ‘enlightened’ view of monetary policy. Section 4 contains a discussion of the results in this chapter: in particular, I shall discuss where the analysis should or could be deepened in future research. Section 5 concludes. I will argue that enlightened politicians (even if they are somewhat short-sighted) can

and perhaps should be given greater control of monetary policy, i.e. of the speed at which monetary policy should react to inflationary developments, while politicians with a Phillips-curve perspective should not. This speed of adjustment is the key parameter of choice in monetary policy, and one on which reasonable people can disagree depending on their preferences.

2. Phillips Curves, Nairus, and the Taylor Menu: An Empirical Overview

Is there a trade-off between unemployment and inflation, what is its nature, and where have individual countries chosen their position in the past? This is the question we turn to in this section. I shall first discuss the presence or non-presence of 'mean' trade-offs before turning to volatility trade-offs: the latter are the focus of attention in the 'enlightened' view of monetary policy described in Section 3.

(p. 81)

Table 4.6. R^2 as well as NAIRU estimates

Country	***R²*, Phillips curve**	***R²*, NAIRU curve**	**NAIRU**
EU15	28.68	20.94	7.42
Major Seven	19.56	25.11	5.74
W. Germany	42.23	21.94	4.77
France	41.05	8.08	6.71
Italy	24.44	6.24	8.60
Netherlands	28.53	3.74	4.96
Belgium	6.75	9.16	7.62
UK	29.72	14.33	7.48
Ireland	5.88	4.19	9.67
Spain	31.55	14.15	13.48
USA	1.04	32.88	6.32
Japan	48.19	4.56	2.23
Sweden	41.71	5.46	3.34
Finland	41.38	6.70	6.51

Throughout, I use quarterly OECD data from 1970 to 1997 (inclusive) for a number of countries as well as for the group of seven and the EU15 countries. The individual series are for the CPI[2] and the unemployment rate.[3]

2.1. Mean Trade-offs

Is there a trade-off between the mean unemployment rate and the mean inflation rate? Many students of macroeconomics may recall the famous Phillips curve and therefore be tempted to answer with ‘yes’. A closer look at the data reveals that the answer is more complicated.

Figure 4.1 shows the Phillips curve for the United States, plotting yearly inflation rates over unemployment rates. As one can see, the Phillips curve looks more like a cloud rather than a systematic relationship. A simple regression of inflation on a constant and the unemployment rate can show this more formally: the R^2 of that regression is less than 2 per cent, see Table 4.6.

(p. 82)

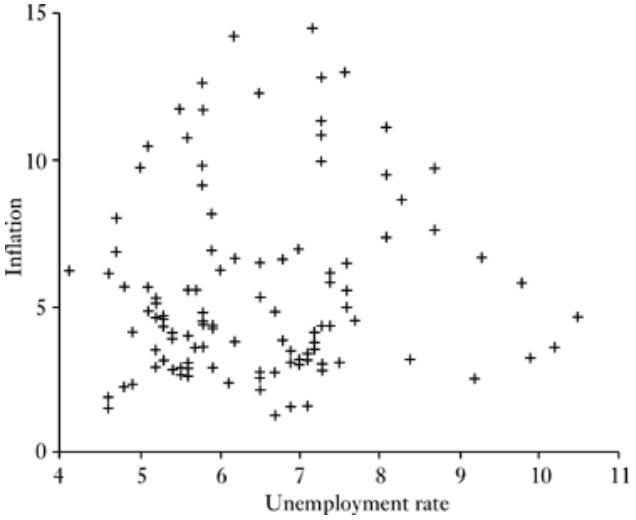

Figure 4.1 *Phillips curve for the USA*

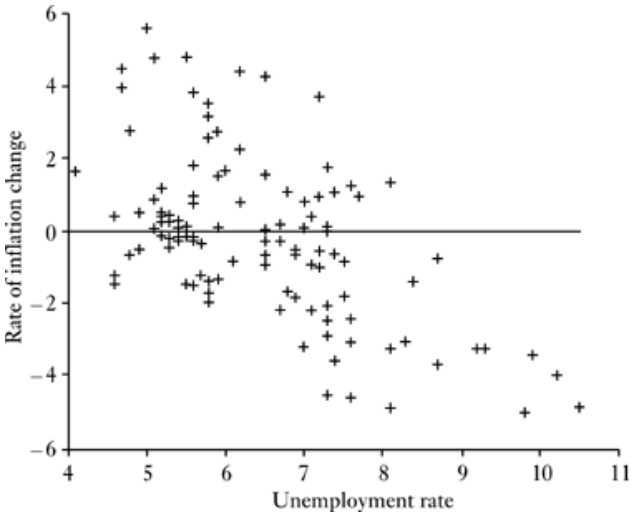

Figure 4.2 *NAIRU curve for the USA*

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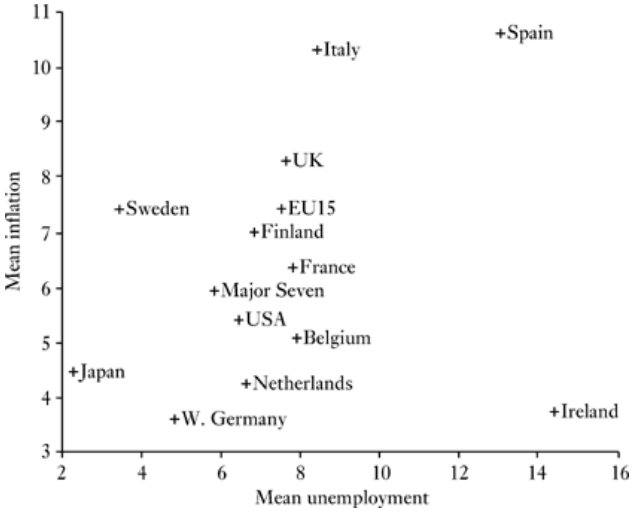

Figure 4.3 *Phillips-curve trade-offs, means*

One needs to do something with the data before finding a trade-off between means. While one can use more sophisticated time series techniques such as vector autoregressions, a simpler and economically meaningful procedure is to plot the change of inflation rates against unemployment; see Staiger *et al*. (1997). Figure 4.2 shows the result for US data. A negative trade-off is now clearly visible: indeed, the R^2 is now almost 33 per cent. Calculating the zero of the fitted regression line provides an estimate of the NAIRU, the non-accelerating inflation rate of unemployment. For the US, one obtains an estimate of 6.3 per cent this way.[4]

Unfortunately, the US provides an exception rather than a rule. It turns out that for most other countries in our sample, and also for the EU 15 countries taken as a whole, a Phillips curve of inflation over unemployment provides a better fit than a 'NAIRU curve' of the change of inflation over unemployment. The details as well as the estimated NAIRUs can be found in Table 4.6.

Given these mixed results, I shall proceed with both a 'Phillips-curve' perspective, focusing on the level of inflation, as well as a 'NAIRU-curve' perspective, focusing on the change in the inflation rate, for all what follows, providing two sets of parallel results.

For example, Fig. 4.3 and 4.4 provide a cross-country study of the sample mean inflation rate (resp. the sample mean of the change in the inflation rate) versus the sample mean unemployment rate. Taken as a cross section in this way, there is no particularly visible trade-off: most likely, country-specific effects swamp any trade-off which may otherwise be visible here. The numerical values for these means can be found in columns 2 and 3 of Table 4.7 for the 'Phillips-curve' perspective and Table 4.11 for the 'NAIRU-curve' perspective.

(p. 84)

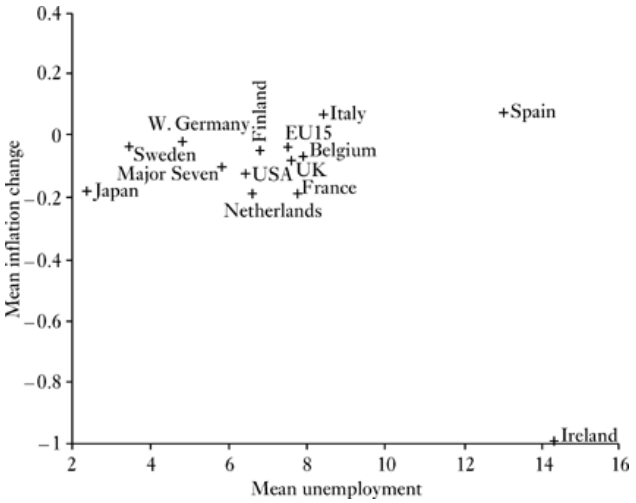

Figure 4.4 *NAIRU trade-offs, means*

Table 4.7. Means and standard deviations for unemployment and inflation rates, taking a 'Phillips-curve' perspective

Country	$\overline{\mu}$	$\overline{\pi}$	σ_{μ}	σ_{μ}

EU15	7.525	7.469	2.998	3.721
Major Seven	5.863	5.963	1.391	3.330
W. Germany	4.833	3.598	2.515	1.929
France	7.798	6.387	3.368	4.141
Italy	8.448	10.312	2.079	5.774
Netherlands	6.629	4.260	3.035	2.970
Belgium	7.928	5.090	3.178	3.257
UK	7.616	8.328	2.939	5.730
Ireland	14.371	3.740	2.169	2.586
Spain	13.015	10.655	7.554	5.609
USA	6.446	5.423	1.306	3.114
Japan	2.301	4.461	0.580	5.071
Sweden	3.458	7.444	2.569	3.237
Finland	6.821	7.021	5.168	4.789

2.2. Volatility Trade-offs

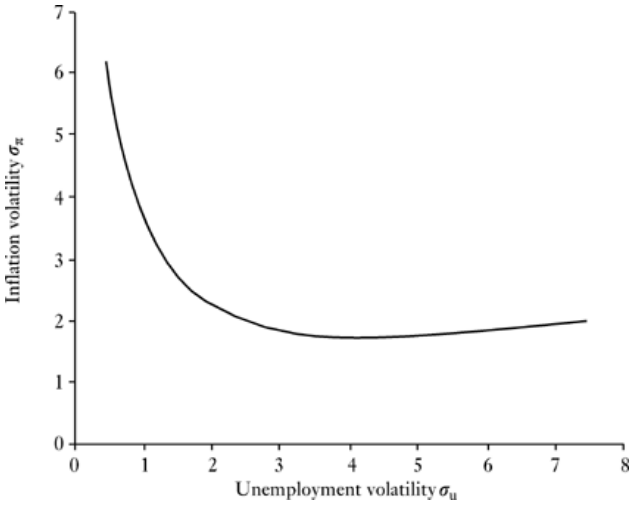

Figure 4.5 *A theoretical Taylor menu*

The traditional Phillips-curve trade-off between inflation and unemployment has lost its appeal to monetary policy makers: even if it is there, it should not be exploited. **(p. 85)** Section 3 discusses this in further detail, and

also outlines the reason and a theory to focus on a different, 'enlightened' perspective instead. This perspective focuses on a trade-off between the volatilities of inflation and unemployment. Figure 4.5 shows this trade-off as it emerges from the theory[5] in Section 3. I will call this trade-off between these two volatilities a 'Taylor menu', because, to my knowledge, it was exhibited for the first time by John Taylor in a contribution to a book edited by Solow and Taylor (1998), although it may have appeared elsewhere earlier: it certainly is an idea particularly closely associated with John Taylor. The theory in Section 3 indeed suggests that a policy maker can choose a point on this curve as if it was a 'menu': within a certain range, inflation volatility falls as unemployment volatility rises. Note that the curve in Fig. 4.5 eventually slopes up again, i.e., for sufficiently high unemployment volatilities, the inflation volatility *rises* with higher unemployment volatilities. Since these volatilities are presumably undesirable, it would be rather foolish for a policy maker to find itself on this upward sloping branch. The particular numerical values of Fig. 4.5 should not be interpreted literally: they are meant to be suggestive only. The actually feasible trade-off depends on some underlying parameters which I have made no effort at calibrating or estimating. It would be good for future research to cast more light on the quantitative magnitudes at stake: indeed, there is a large literature on the quantitative effects of monetary policy which could be utilized to that end.

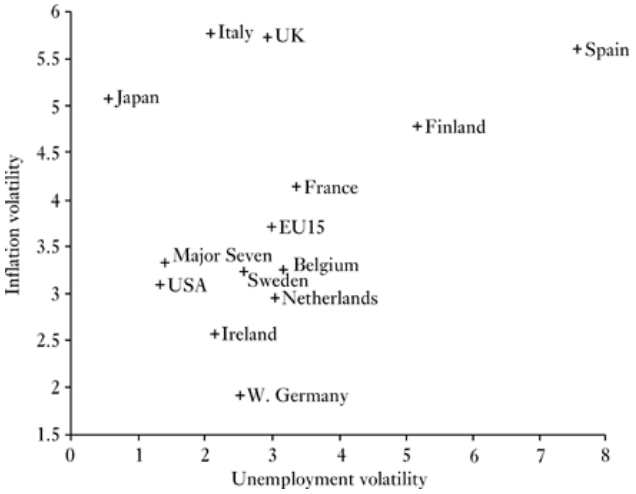

Figure 4.6 *Taylor menu, unfiltered volatilities*

(p. 86) Is there a Taylor menu in the data? I only provide a rather coarse cross-country look. The key question for me is how to calculate the volatilities. My first approach is to simply use the standard deviations of both the unemployment rate and the inflation rate, resulting in Fig. 4.6.

The numerical values for these unfiltered standard deviations σ are also in columns 4 and 5 of Table 4.7. If one could discard the data points for Finland and Spain, there indeed would be a trade-off not much unlike the trade-off seen in Fig. 4.5.1 do not want to push too hard here, though. Rather, I view Fig. 4.6 as providing an interesting summary information where countries have *chosen* to be, given their country-specific Taylor menu. That is Fig. 4.6 is the reflection in the data of differences in policy cultures. Some countries may favour low volatilities in unemployment, whereas other countries may favour low volatilities in inflation rates.

It is desirable to have a single number measuring this trade-off. I shall use the ratio of the standard deviations,

$$\omega_\sigma = \frac{\sigma_y}{\sigma_\pi},$$

for that. In Section 3, I will provide a further theoretical reason why this indicator is particularly interesting to look at, while I provide a further, critical discussion in Section 4. In any case, the values one obtains this way can be found in the second column of Table 4.9. Higher values for ω indicate a desire or a policy culture, which puts more emphasis on inflation stabilization rather than output stabilization. One can use the indicator ω_σ to 'rank' countries according to this trade-off: this ranking can be **(p. 87)** found in the second column of Table 4.10. Ignoring the outliers Spain and Finland of Fig. 4.6, one can see that the ranking list is led by Germany and the Netherlands, which are well known to be particularly hawkish on inflation. At the bottom of the list one can find Italy and Japan—again, this probably comes as no surprise. While Italy has experienced periods of rather high inflation rates (within this group of countries), Japan is quite a different case. Inflation rates in Japan have not been dramatic except for a short episode of above-20 per cent inflation at the beginning of our sample. However, their fluctuations have been larger than the corresponding unemployment fluctuations, because unemployment in Japan has traditionally always been very low and stable. While this may reflect institutional labour market features in Japan, one can reasonably debate whether these low and stable unemployment rates have been made feasible by an accommodating monetary policy in the first place: I want to put forth the proposition that this is indeed the case. In sum, it seems that ω_σ is a good measure of the 'inflation hawkishness' of a country.

It is important to emphasize that there is no value judgement implicit in our ranking. Indeed, the theory of Section 3 will show that different values for ω

result simply from differences in preferences. Put differently, the value for ω probably simply reflects a conscious policy choice from the Taylor menu, with different choices resulting from different but equally valid policy cultures and preferences. There certainly is no reason to lead one to interpret low ω values as some kind of policy failure at this point. One might have as easily flipped the ranking upside down: the important point here is just that this ranking (or its flipped version) provides a sorting mechanism for what countries have actually chosen to do.

Since this perspective on monetary policy is fairly new, it is worth investigating the calculation of the volatilities a bit more carefully. It is likely that the data on inflation and unemployment is driven by long-run movements which are beyond the control of monetary policy (and which are unmodelled in Section 3). For example, the expansion of the welfare state and the increasing regulation of labour markets is the probable cause for the secular increase of unemployment rates in most European countries. While monetary policy may have been the cause of short-run fluctuations in the unemployment rate, it should not be blamed for these long-run tendencies.[6]

It is therefore desirable to 'filter' the fluctuations in inflation and unemployment up front. I try out three different filtering techniques. For the first, I use a Hodrick-Prescott filter, which removes a smooth trend. I call the resulting statistics σ_u^{HP}, σ_π^{HP}, ω_{HP}. For the second, I use first differences of both inflation and unemployment, focusing on the high-frequency movements. I denote the resulting statistics as σ_u^{Δ}, σ_π^{Δ}, ω_{Δ}. As a final approach, I use the standard deviations of the residuals in a vector autoregression, using unemployment and inflation regressed on four lags of both and a constant. The statistics are σ_u^{VAR}, $\sigma_\pi^{\mathrm{VAR}}$, ω_{VAR}.

Table 4.8. Further volatility statistics for unemployment and inflation, applying either an HP filter, a first-difference operator, or estimating a VAR

Country	$\sigma_{\mu}^{\mathrm{HP}}$	$\sigma_{\mu}^{\mathrm{HP}}$	σ_{μ}^{Δ}	σ_{π}^{Δ}	$\sigma_{\mu}^{\mathrm{VAR}}$	$\sigma_{\pi}^{\mathrm{VAR}}$
EU15	0.469	1.319	0.201	0.668	0.126	0.504
Major Seven	0.455	1.576	0.197	0.713	0.138	0.494
W. Germany	0.713	0.870	0.334	0.499	0.265	0.412
France	0.409	1.322	0.211	0.694	0.173	0.523
Italy	0.425	2.394	0.356	1.445	0.335	1.161
Netherlands	0.721	1.066	0.403	0.612	0.351	0.502
Belgium	0.565	1.575	0.305	0.785	0.228	0.608
UK	0.864	2.947	0.345	1.639	0.178	1.221
Ireland	0.807	0.834	0.350	0.693	0.172	0.430
Spain	0.981	1.780	0.445	1.378	0.288	1.198
USA	0.771	1.693	0.354	0.765	0.225	0.560
Japan	0.141	2.610	0.101	1.453	0.095	1.148
Sweden	0.698	1.873	0.319	1.312	0.244	1.098
Finland	1.362	1.781	0.612	0.953	0.467	0.805

Table 4.9. Ratios $\omega = \sigma_{\mu}/\sigma_{\pi}$ calculated using the four different methods for calculating volatilities

Country	ω_{σ}	ω_{HP}	ω_{Δ}	ω_{VAR}
EU15	0.806	0.356	0.301	0.250
Major Seven	0.418	0.289	0.277	0.280
W. Germany	1.304	0.820	0.669	0.644
France	0.813	0.309	0.305	0.330
Italy	0.360	0.177	0.247	0.289
Netherlands	1.022	0.677	0.658	0.699
Belgium	0.976	0.359	0.388	0.375

UK	0.513	0.293	0.211	0.145
Ireland	0.839	0.968	0.505	0.400
Spain	1.347	0.551	0.323	0.241
USA	0.419	0.456	0.463	0.402
Japan	0.114	0.054	0.069	0.083
Sweden	0.794	0.373	0.243	0.223
Finland	1.079	0.765	0.642	0.580

The value for all these statistics can be found in Table 4.8 for the standard errors and in Table 4.9 for the ω-values. For the HP-filtered volatilities, the results have also been plotted in Fig. 4.7. A negative trade-off now appears to be visible. Again, one can **(p. 88)** use the ω's to 'rank' countries, giving rise to the remaining columns in Table 4.10. While there are some differences between these columns, it is remarkable that they all provide more or less the same picture, with the countries known to be inflation hawks at the top and the countries known to have been relatively more concerned about ouput stabilization at the bottom. Recall that this 'ranking' should not be misconstrued to imply a value judgement.

(p. 89)

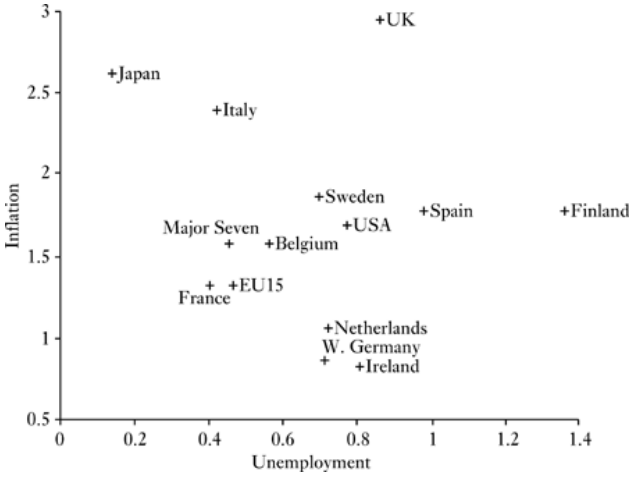

Figure 4.7 *Taylor menu, HP-filtered volatilities*

Table 4.10. Countries 'ranked' according to their value of $\omega = \sigma_\mu/\sigma_\pi$ using the four different methods for calculating volatilities

Rank	ω_σ	ω_{HP}	ω	ω_{VAR}
1	Spain	Ireland	W. Germany	Netherlands
2	W. Germany	W. Germany	Netherlands	W. Germany
3	Finland	Finland	Finland	Finland
4	Netherlands	Netherlands	Ireland	USA
5	Belgium	Spain	USA	Ireland
6	Ireland	USA	Belgium	Belgium
7	France	Sweden	Spain	France
8	EU15	Belgium	France	Italy
9	Sweden	EU15	EU15	Major Seven
10	UK	France	Major Seven	EU15
11	USA	UK	Italy	Spain
12	Major Seven	Major Seven	Sweden	Sweden
13	Italy	Italy	UK	UK
14	Japan	Japan	Japan	Japan

Note: The highest 'rank' is given to countries with the lowest value of ω, i.e. to the country which values a low volatility of inflation comparatively more than a low volatility of unemployment.

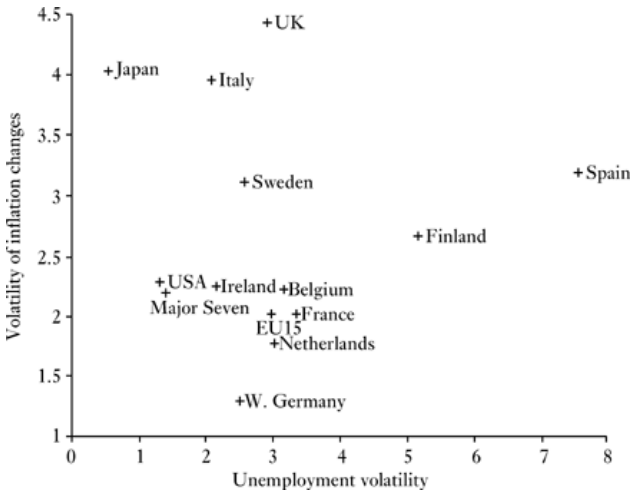

Figure 4.8 *'NAIRU' trade-off, unfiltered volatilities*

One can do the same for a ‘NAIRU’ perspective, replacing inflation by its first difference in the entire analysis above. The trade-off for the simple, unfiltered volatilities **(p. 90)** across countries can be seen in Fig. 4.8. The statistics for all four ways of calculating the volatilities are given in Tables 4.11 and 4.12, the resulting ω-values are in Table 4.13, and the resulting ‘rankings’ are in Table 4.14.

What I found most surprising is that all columns in both ranking Tables 4.10 and 4.14 provide roughly the same picture: inflation-hawkish countries tend to be at the top, whereas countries which have not cared that much for inflation stabilization appear near the bottom (including Japan, as discussed above). I propose to the reader that ω is a surprisingly good measure of inflation hawkishness or of the differences in policy cultures, pretty much regardless of how the volatilities of inflation and unemployment are measured.

As I have repeatedly emphasized, ω should be viewed as a reflection of taste differences rather than a measure of ‘good’ versus ‘bad’ policy. This then raises the question of how a particular ω is chosen in a country. Put differently, in the game between the public, the parliament, and monetary policy, how can the public ensure that monetary policy is chosen ‘optimally’ from its perspective? This is the question to which I now turn.

3. How Much Democracy Does a Central Bank Need?

3.1. The Enlightened View of Monetary Policy

In this section, I wish to describe a more formal model of the democratic interaction between a central bank, politicians pressuring the central bank and the public at large.

Table 4.11. Means and standard deviations for unemployment and rates of inflation changes, taking a ‘NAIRU’ perspective

Country	$\bar{u}$	$\overline{\Delta\pi}$	σ_u	$\sigma_{\Delta\pi}$
EU15	7.525	– 0.034	2.998	2.020
Major Seven	5.863	–0.100	1.391	2.195
W. Germany	4.833	–0.015	2.515	1.286
France	7.798	–0.185	3.368	2.017

Italy	8.448	0.073	2.079	3.971
Netherlands	6.629	–0.188	3.035	1.768
Belgium	7.928	– 0.065	3.178	2.223
UK	7.616	– 0.080	2.939	4.441
Ireland	14.371	–0.991	2.169	2.237
Spain	13.015	0.074	7.554	3.199
USA	6.446	–0.122	1.306	2.278
Japan	2.342	–0.180	0.550	4.041
Sweden	3.458	– 0.034	2.569	3.119
Finland	6.821	– 0.042	5.168	2.677

Table 4.12 Further volatility statistics for unemployment and inflation changes (‘NAIRU perspective’), applying either an HP filter, a first-difference operator, or estimating a VAR

Country	σ_u^{HP}	$\sigma_{\Delta\pi}^{\mathrm{HP}}$	σ_u^{Δ}	$\sigma_{\Delta\pi}^{\Delta}$	σ_u^{VAR}	$\sigma_{\Delta\pi}^{\mathrm{VAR}}$
EU15	0.469	1.677	0.201	1.000	0.129	0.731
Major Seven	0.455	1.928	0.197	1.062	0.139	0.727
W. Germany	0.713	0.969	0.334	0.772	0.264	0.651
France	0.409	1.707	0.211	1.093	0.175	0.771
Italy	0.425	3.556	0.356	2.466	0.332	1.783
Netherlands	0.721	1.531	0.403	1.075	0.358	0.831
Belgium	0.565	1.880	0.305	1.229	0.231	0.920
UK	0.864	4.068	0.345	2.663	0.178	1.805
Ireland	0.807	1.489	0.350	1.469	0.184	0.803
Spain	0.981	2.749	0.445	2.278	0.288	1.570
USA	0.771	2.007	0.354	1.112	0.237	0.823
Japan	0.143	3.697	0.102	2.359	0.093	1.687
Sweden	0.698	2.877	0.319	2.251	0.244	1.451

Finland	1.362	2.166	0.612	1.423	0.471	1.216

(p. 91) The most obvious example I have in mind is the European Central Bank. This institution has been forged out of the monetary union of several formerly independent central banks, and it has the difficult task of finding a common monetary policy. The literature has often emphasized the difficulty of tailoring a common monetary policy to the varying business cycle conditions in the member countries of the monetary union. Here, instead, I wish to focus on the difficulty of executing a monetary policy in the interest of the public at large.

(p. 92)

Table 4.13. Ratios $\omega = \sigma_{\mu}/\sigma_{\Delta\pi}$ calculated using the four different methods for calculating volatilities

Country	ω_{σ}	ω_{HP}	ω_{Δ}	ω_{VAR}
EU15	1.484	0.280	0.201	0.177
Major Seven	0.634	0.236	0.186	0.191
W. Germany	1.956	0.736	0.432	0.406
France	1.669	0.239	0.193	0.227
Italy	0.523	0.119	0.145	0.186
Netherlands	1.716	0.471	0.375	0.431
Belgium	1.429	0.300	0.248	0.251
UK	0.662	0.212	0.130	0.099
Ireland	0.970	0.542	0.238	0.230
Spain	2.361	0.357	0.195	0.184
USA	0.573	0.384	0.319	0.288
Japan	0.136	0.039	0.043	0.055
Sweden	0.824	0.243	0.142	0.168
Finland	1.930	0.629	0.430	0.387

Table 4.14. Countries ‘ranked’ according to their value of $\omega = \omega_{\mu}/\omega_{\Delta\pi}$ (‘NAIRU perspective’), using the four different methods for calculating volatilities

Rank	ω_{σ}	ω_{HP}	ω_{Δ}	ω_{VAR}
1	Spain	W. Germany	W. Germany	Netherlands
2	W. Germany	Finland	Finland	W. Germany
3	Finland	Ireland	Netherlands	Finland
4	Netherlands	Netherlands	USA	USA
5	France	USA	Belgium	Belgium
6	EU15	Spain	Ireland	Ireland
7	Belgium	Belgium	EU15	France
8	Ireland	EU15	Spain	Major Seven
9	Sweden	Sweden	France	Italy
10	UK	France	Major Seven	Spain
11	Major Seven	Major Seven	Italy	EU15
12	USA	UK	Sweden	Sweden
13	Italy	Italy	UK	UK
14	Japan	Japan	Japan	Japan

Note: The highest 'rank' is given to countries with the lowest value of ω, i.e. to the country which values a low volatility of inflation comparatively more than a low volatility of unemployment.

Ultimately, a central bank is an institution created by the constitutional process itself. In the same way, it can be dissolved. In a democracy, it is therefore unavoidable to ultimately see its raison d'etre in its service of the public interest. It is reasonable to assume that national central banks have been created and run with this objective in mind. And it is interesting to ask how much exposure central banks need to the **(p. 93)** democratic process itself. For the European Central Bank in particular, this question is of great practical interest. It is not obvious how the individual preferences of the member countries of the monetary union can and will be reflected by the policy choices of the ECB.

To analyse this issue further, I need a 'laboratory country', i.e. I need a theoretical model. I envision some country or monetary area, populated by agents with an 'enlightened' view of monetary policy, which holds that the trade-off for monetary policy is not between a current stimulus and more

inflation later, but rather a trade-off between the overall volatility of inflation and the volatility of output.

I shall say more about this ‘enlightened view’ in a moment, but it is useful to first contrast it with an older kind of thinking. The old, outdated view of monetary policy was one of a conflict between a short-run temptation and a long-run cost. The short-run temptation was to temporarily increase output by, say, lowering interest rates. The long-run cost was the resulting inflation. Kydland and Prescott (1977) have pointed out in their celebrated analysis that this conflict leads to a perennial conflict, a perennial ‘time inconsistency’, of optimal plans: while it is better to commit beforehand not to yield to the temptation of temporarily increasing output, the temptation to break this commitment *ex post* is great. One way to get around this problem is to create independent central banks and appoint ‘conservative’ (Rogoff) central bankers to its helm. So, while the trade-off between a short-run stimulus and long-run inflation exists, the analysis by Kydland and Prescott (1977) shows that there is no point in trying to exploit it systematically.

It is fascinating how deeply this ‘academic’ argument has meanwhile been understood by the public at large, how deeply it has sunk in. While there still is the occasional politician or rare economist, who tries to push central banks into these short-run vs long-run conflicts, most others now fairly clearly understand the necessity of a commitment to a stable monetary policy environment and to avoid short-run temptations by design. There are a number of supporting pieces of evidence: I shall describe only a few:

1. The European Central Bank was built with remarkable independence and with a remarkable single-minded focus on price stability per design. This institution was not created by central bankers (although they surely were heavily consulted): it was created by elected politicians. The simplest explanation for this remarkable feat is that the Kydland-Prescott analysis has won the intellectual debates. One may ascribe this to the German public which needed to be convinced to give up its beloved mark for the new currency. But then, the German public must have strong beliefs, that a highly independent Bundesbank, committed to low inflation, has served them well: this is nothing but the Kydland-Prescott point! One may ascribe this to the Bundesbank pressuring the politicians. But then, pressure with what? If a version of the Kydland-Prescott analysis was not on the minds of the politicians, what were they afraid of? Furthermore, it was the politicians signing

the treaty: pointing to the Bundesbank pressure was likely only a convenient scapegoat to do what the smart politicians always knew was right anyhow.

(p. 94) 2. Alan Blinder, who served as a Vice Chairman of the Federal Reserve Bank for a number of years, has described his experience there; see Blinder (1997, 1998). While widely regarded as a Keynesian, he nonetheless says clearly that the trade-off that 'so worried Kydland and Prescott' is not a policy issue at the Federal Reserve Bank: central bankers are simply not tempted to exploit these short-run trade-offs. Why shouldn't they be? Simple: the Kydland-Prescott analysis has sunk in. Proposing to exploit such a trade-off exposes the proposer as a person uninformed about the intellectual progress which has been achieved in the last 25 years.

3. Over the last decade, politicians have practically stopped asking their central banks to lower interest rates more than they normally would anyhow, in order to stimulate the economy. There are exceptions, of course. Oskar Lafontaine was Finance Minister of the new social democratic government of Germany, starting in 1998. He repeatedly called upon the Bundesbank to lower interest rates in order to stimulate the economy, thereby ignoring, at least in rhetoric, the Kydland-Prescott analysis. While this may not have been the only cause, he eventually resigned. He claimed that the Bundesbank followed his demand, as they indeed lowered interest rates only shortly afterwards. However, this move was widely seen as part of the systematic and predictable response of the Bundesbank to economic circumstances rather than a surprise stimulus based on a short-horizon analysis: the interest rate drop was part of the rule, and not a discretionary exception to it. Financial markets and the public apparently understood this, whereas Oskar Lafontaine apparently did not; see Lafontaine (1999).

4. The United States has experienced an unprecedented decade of prosperity in the 1990s, which has been achieved in an environment of low inflation. This stable-price growth is the opposite of stagflation, which was experienced by so many countries in the 1970s. Phil Gramm, Republican Senator of Texas and the Chairman of the Senate's Banking Committee, therefore declared on 26 January 2000: 'If you were forced to narrow down the credit for the golden age that we find ourselves living in, I think there are many people who would be due credit, and there are more who would claim credit. But of those who are in a position of

> authority, I think your [i.e. Alan Greenspan's] name would have to be at the top of the list'. Alan Greenspan at age 73 was therefore recommended for an unprecedented fourth term at the helm of the Federal Reserve System. The Kydland-Prescott analysis shows that his accomplishment of low inflation in a well-functioning economy required not yielding to the temptation of short-run discretionary stimuli. Greenspan didn't, the US economy prospered, and politicians and the public alike liked what they saw.

In sum, while the formal details of the Kydland-Prescott analysis may not be known to many, the essence of its logic is, and is furthermore convincing for many people. Some may argue that I am overly optimistic here. Certainly, this logic does not always appear to be as sharply present as it should be and can easily be forgotten: it is the task of economists and central bankers to constantly remind the people of it and to emphasize its importance. But while adhering to this logic is not something one should too readily count on in every circumstance or for the future, it nonetheless describes the current consensus view of the public surprisingly well, in particular by comparing **(p. 95)** it to the debates of the 1970s. Likewise, whatever their rhetoric, when smart politicians are nowadays forced to make a choice, they rarely will choose in favour of permitting discretionary short-run stimuli at the pain of long-run inflation.

Instead, the discussion has been elevated to a much more subtle choice, 'enlightened' by Kydland and Prescott's analysis, focusing on a different trade-off: suppose that inflationary pressures have been forming and it is time for the central bank to do something about them. How fast should they react? Should they take a very gradual approach, avoiding sizeable burdens on the productive activities of the economy, but thereby risking a prolonged period of inflation? Or should they rush to extinguish any inflationary fires as soon as they appear, even if that means to push the economy into a recession? In summary, how should the volatility of inflation be balanced against the volatility of output?

This is, indeed, a real choice, and reasonable people who fully agree with Kydland and Prescott to the need of rule-based monetary policy can reasonably differ on their assessment of this balance. There is, in essence, a menu of inflation volatilities versus output volatilities out there, from which the public and/or the policy maker can pick. This is the 'Taylor menu', already introduced above. And I shall refer to this view of the monetary policy trade-offs as the 'enlightened view of monetary policy'.

3.2. A Model of the Problem of an Enlightened Central Banker

A small formal model may help to make this more precise. Let me start by modelling the policy choices of a single agent (think: the head of the central bank), who cares about the deviations π_t of inflation at date t from some long-run target and the deviations y_t from, say, full-capacity output at date t according to the quadratic utilities

$$u_t = -\frac{\pi_t^2}{2} - \lambda\frac{y_t^2}{2}$$

for some $\lambda \geq 0$. One can read $-y_t$ as the 'output gap', which I will use below. Equivalently, one can substitute 'unemployment rate' for 'output gap'.

Obviously, the 'output gap', which we shall focus on in the theory, is not the same as the unemployment rate, which we focused on in the empirical section. Relating the two is an intricate matter, which one could pursue further in refining the analysis here. However, providing a further, detailed discussion of this distinction, and a more careful treatment of the output gap in the empirical section above (together with a discussion of the identification choices one would need to make to measure the output gap) would distract too much from the key points raised here and extend the analysis too far.

Since inflation and the evolution of economic activity are dynamic processes, I shall sum the discounted utilities to obtain a measure of overall utility,

$$U = -E\left[\sum_{t=0}^{\infty}\beta^t\left(\frac{\pi_t^2}{2} + \lambda\frac{y_t^2}{2}\right)\right].$$

Soon, I shall describe the conflict between keeping down fluctuations in π_t and fluctuations in y_t, but it is already helpful to examine the particular functional form **(p. 96)** for U. Suppose that my agent could somehow reduce both inflationary variance as well as output variance to zero: the overall utility U would then achieve its global maximum. This agent will not be tempted to change inflation to gain some additional output: the linear output term which would give rise to such an 'inflationary bias' is simply missing from my specification. In other words, U reflects the enlightened view of monetary policy described above. The parameter λ is a taste parameter. Different people may have different taste parameters λ, and can therefore

have different views or where to choose on the volatility-trade-off Taylor menu.

As for the dynamics of output, inflation as well as interest rates, I shall take a simple model of the variety which has become recently popular in academic as well as practical monetary policy circles. Except for some minor differences, this model has been taken practically verbatim from Svensson (1997) and, subsequently, Orphanides and Wieland (2000): I do not claim any originality at this point. Other related and prior sources are e.g. Furher and Moore (1995) or Woodford (1999). While this model is only a crude substitute for modelling the precise way in which money and monetary policy interacts with economic activity, it shall suffice for my 'laboratory country' purpose of gaining some intuitive insights. More precisely, suppose that

$$a = \frac{1}{2}\left(-1 + \sqrt{1 - \frac{4q}{p^2}}\right) \to 0$$

(1)

$$\frac{\partial \omega^{-1}}{\partial \lambda} = \frac{1}{a\beta\phi\gamma}(1 - \eta(a;\lambda)),$$

(2)

where ε_t and v_t are mean-zero shocks, and where 0≤ϕ # 1, γ#0, $\mathrm{Var}\left[\varepsilon_t\right] \equiv \sigma_\epsilon^2$, $\mathrm{Var}\left[v_t\right] \equiv \sigma_v^2$, 0≤ψ # 1 and ρ # 0 are parameters. I suppose that the central bank controls the short-term nominal interest rates r_t. The second equation implies that an increase in the nominal interest rates will lower output, *ceteris paribus*. The first equation says that lower output will *ceteris paribus* lead to lower inflation. According to this model, the central bank finds itself in the need of a pact with the devil: it can influence inflation only indirectly by influencing the (negative of the) output gap y_t—it does not control inflation directly. I suppose that future inflation is influenced by the current output gap. Thus, monetary policy has a more immediate effect on output rather than prices, a view which is perfectly consistent with the consensus view of research on the effects of monetary policy; see Christiano *et al*. (1997). Inflation and output are both affected by a shock. I shall assume that the central bank

can observe both shocks ε_t and v_t before setting its interest rate r_t. I finally suppose that the agent starts period 0 with some current inflation π_0 at hand and some last-period output gap y_{-1}.

I can formulate the problem of the agent in summary by the Bellman dynamic programming equation

$$\eta(a;\lambda) = \frac{\partial a/\partial \lambda}{a/\lambda}$$

(3)

(p. 97) What I am looking for in particular is the optimal monetary policy rule,

$r_t = f(\pi_t, y_{t-1}, v_t)$,

telling the central bank how to pick interest rates r_t given current inflation rates π_t, last-periods (negative of the) output gap y_{t-1}, and the current output shock v_t.

Proposition 1. *There is a solution to the Bellman dynamic programming equation, given by*

$$V_\omega(\pi, y) = -a(\omega)\frac{\pi^2}{2} - \frac{\beta}{1-\beta}\frac{a(\omega)}{2}\sigma_{\epsilon^2},$$

(4)

where

$$a(\omega) = \frac{1+\lambda\omega^2}{1-\beta(\phi-\gamma\omega)^2}.$$

and where

$$\sigma_\pi^2 = \frac{\sigma_\epsilon^2}{1-(\phi-\gamma\omega)^2}.$$

with

$$\omega = \frac{\sigma_y}{\sigma_\pi}.$$

This proposition can be proven by the method of ‘guess and verify’. More precisely, substitute the form (4) into the right-hand side of Bellman’s equation (3). Take first-order conditions and calculate the envelope conditions. After some tedious calculations, the result above obtains. Alternatively, check Svensson (1997) or Orphanides and Wieland (2000), who also derive practically the same result.

There are a few things to notice. First, the decision rule for interest rates takes the form of a Taylor rule; see Taylor (1993). That is, interest rates are set to react linearly to the (deviation in) inflation and the output gap. A Taylor rule is not an exact description, though, but only holds on average, because the interest rate rule also reacts to contemporaneous news about output, i.e. it also reacts to v_t. The coefficients have the expected sign: interest rates should be raised if the output deviations (the negative of the output gap) are particularly large or inflation is particularly strong. This is good **(p. 98)** news: there is fairly convincing evidence that monetary policy in practice comes close to following a Taylor rule; see Clarida *et al*. (1998). Our model is certainly not unique in giving rise to a Taylor rule as the optimal (or nearly optimal) decision rule for a central bank: a survey of a variety of monetary models and their implications for Taylor rules is in Taylor (1999*a*,*b*).

Second, one can actually bypass interest rates r_t in the model above completely, and directly assume that the central bank controls y_t. Even ψ then does not matter anymore. One finds that

$y_t = -\omega\pi_t$.

From this, it follows that

$$U(\omega) = E[V_\omega(\pi, y)] = -b(\omega;\lambda)\frac{\sigma_\varepsilon^2}{2},$$

i.e. the ratios of the observed standard deviations of output and inflation yield the (negative of the) reaction coefficient of output to inflation. Indeed, this perspective was taken above, where I have taken the ratios of standard deviations as our measure of the emphasis on output stabilization: this procedure finds its theoretical justification here.

Given this model, one can therefore use data directly to determine the monetary policy rule and thus the underlying preference parameter λ, given the discount factor β and the feedback coefficients φ and γ. Figure 4.9 shows

the mapping from β into ω and Fig. 4.10 shows the mapping from β into α, using several different values for λ and **(p. 99)** fixing $\varphi = 0.9$, $\gamma = 1$. One can use these figures to reverse-engineer the preference parameters and the curvature parameter of the value function, given some observed volatility trade-off ω, assuming that ω has indeed been chosen to solve the optimization problem above.

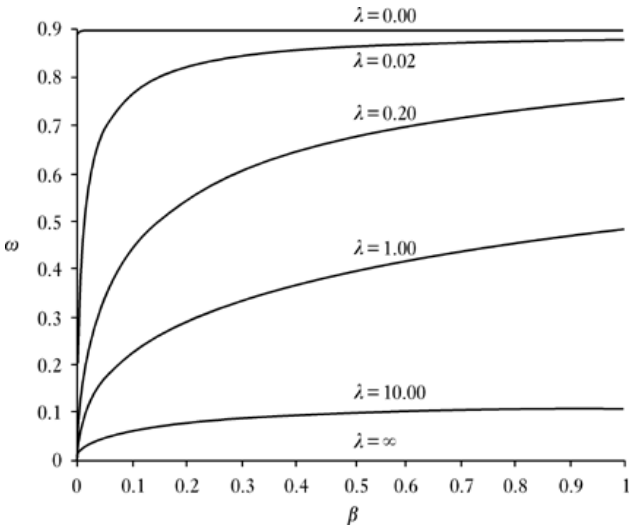

Figure 4.9 *Implied values for ω, varying λ and β*

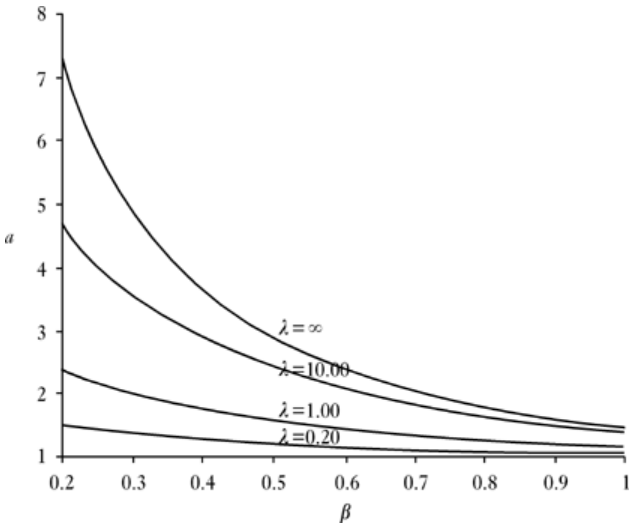

Figure 4.10 *Implied values for a, varying λ and β*

A few remarks about the solution are in order:

1. First, suppose that $\lambda \to 0$, i.e. that the agent puts negligible weight on output stabilization and essentially only cares about inflation volatility. One would then expect the agent to always fully offset any shocks to inflation, i.e. to pick $\omega \to \phi/\gamma$. Indeed, the algebra above bears this out. One obtains q = 0, $p = -1$, and thus a $= -p = 1$ and $\omega = \phi/\gamma$.
2. Next, consider the case where the agent only cares about output stabilization, $\lambda \to \infty$. In that case, one would expect $\omega \to 0$: shocks to inflation are never offset. The algebra above indeed yields this result, since

$$b(\omega;\lambda) = \frac{1}{1-\beta}\frac{1+\lambda\omega^2}{1-(\phi-\gamma\omega)^2}.$$

and hence $\omega \to 0$.
3. A similar result obtains if I assume the agent to be very impatient, $\beta \to 0$. In that case, he only cares about the present: since he can only affect output, but not inflation at present, he effectively only cares about output stabilization, and should set $\omega \to 0$. As above, the algebra also delivers this result.

(p. 100) These properties suggest that ω is a decreasing function of λ. Indeed,

$$P(\lambda > \bar{\lambda}) = \exp(-\alpha\bar{\lambda}).$$

where

$$\lambda_{\text{median}}(\alpha) = \frac{\log 2}{\alpha},$$

is the elasticity of a with respect to λ. If this elasticity is smaller then 1, then ω^{-1} is an increasing function of λ, and therefore ω itself is a decreasing function of λ. I have not attempted a formal proof that this elasticity is always bounded above by 1, although it seemed true in the numerical examples I considered. I shall therefore concentrate on this case in the future.

Below, I shall consider the situation in which monetary policy is not set with ω set to the optimal value given above, but somehow chosen differently. I can then calculate the implied value function or welfare of my agent in question.

Proposition 2. *The implied value function, when monetary policy is set using ω, is given by*

$$\omega = \nu\omega_{\mathrm{CB}} + (1-\nu)\omega_{\mathrm{P}},$$

where

$$\pi_t = \phi\pi_{t-1} + \gamma y_{t-1} + \epsilon_t,$$

The volatility of inflation is given by

$$y_t = \psi y_{t-1} - \rho r_t + \nu_t,$$

(5)

For the volatility of y and π, one has

$$V(\pi_t, y_{t-1}, \nu_t) = \max_{r_t}\left\{-\frac{\pi_t^2}{2} - \lambda\frac{y_t^2}{2} + \beta E[V(\pi_{t+1}, y_t, \nu_{t+1})]\right|$$
$$y_t = \psi y_{t-1} - \rho r_t + \nu_t,$$
$$\pi_{t+1} = \phi\pi_t + \gamma y_t + \epsilon_{t+1}\Big\}.$$

Furthermore, using unconditional expectations,

$$V(\pi_t, y_{t-1}) = -a\frac{\pi_t^2}{2} - c,$$
$$r_t = \frac{\psi}{\rho}y_{t-1} + \frac{\omega}{\rho}\pi_t + \frac{1}{\rho}\nu_t,$$

where

$$\omega = \frac{\beta\phi\gamma a}{\lambda + \beta\gamma^2 a},$$
$$c = \frac{\beta}{1-\beta}\frac{\sigma_\epsilon^2}{2}a,$$

(6)

(p. 101) Again this proposition can be shown in a straightforward manner by brute-force calculation. Note that v_t and its volatility play no role: the only thing that matters is the relationship between π and y, fixed by ω. The output shock v_t then only plays a role in the actual interest-rate rule,

implementing the particular choice for ω. For that reason, I have left ν away as an argument in the value function above.

Figures 4.11a and b show the values for $\alpha(\omega)$ and $b(\omega)$ as a function of ω (leaving away the tilde to save notation), using a variety of values for λ, fixing $\varphi = 0.9$, $\gamma=1$, $\beta = 0.9$. The smaller the $b(\omega)$, the better off the agent. The functions $\alpha(\omega)$ and $b(\omega)$ are hump-shaped: they are at or near[7] the minimum at the optimal ω and increase as ω is moved further away in any direction.

3.3. The Constitutional Choice

I am now ready to examine the issue of the constitutional design of a central bank, restricting attention to a very limited set of issues, though. I want to analyse the desired degree to which a central bank should be subject to the 'pressures' by elected politicians. That is, I want to know how much democracy a central bank needs.

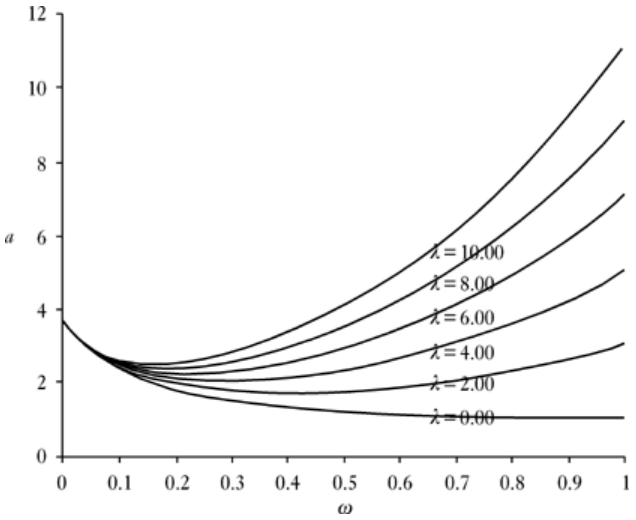

Figure 4.11a *Coefficient a in value function*

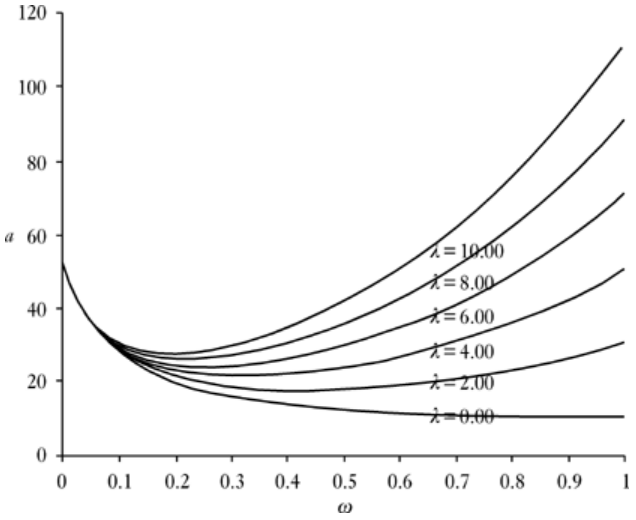

Figure 4.11b *Coefficient* b *in unconditional welfare function*

(p. 102) The main case I have in mind as an application of the analysis here is the European Central Bank. The preference differences below then might translate into preference differences across countries, although they might equally well reflect differences across age groups or income groups. Finally, there is nothing particularly 'European' in this analysis: it therefore makes sense to formulate it in general terms.

I propose the following model. There are a large number of agents with different monetary policy preferences. I suppose that I can divide the population up into a large number of equally sized groups *i* of agents who have the same preferences (λ_i,β_i). For the numerical calculations below, it will be convenient to envision a continuum of groups, resulting in a probability distribution of (λ_i,β_i) as characterizing the population preference distribution.

There is a parliament. The parliament consists of a representative for each group, which I suppose is chosen for some other political reasons. I assume that parliamentary representatives are members of each group, except that they are more impatient than the members of the group they represent, with $\beta_i = \mu\beta_i$ for some $0 \leq \mu \leq 1$. One could make this more formal by envisioning some dynamic process of elections, and postulating that these representatives only care about what they can accomplish while in office, and that their chance at being re-elected is exogenously given by μ.

Finally, there is a central bank which is governed by a central bank governor with preferences (λ_{CB}, β_{CB}) For now, I shall assume that central bank governors are only available with these particular preferences, but I shall return to the question of 'choosing' (λ_{CB}, β_{CB}) below.

(p. 103) Choosing the feedback parameter ω is the question of contention. I suppose that ω is set according to a bargain between the central bank governor and the parliament. Let ω_P be the value for ω most preferred by the median representative in the parliament. Let ω_{CB} be the value for ω most preferred by the central bank governor. With bargaining, the parameter ω is ultimately set as

$$a = \frac{p}{2} + \sqrt{\left(\frac{p}{2}\right)^2 - q}$$

(7)

where ν reflects the 'bargaining power' of the central bank governor. A more appealing way to read this structure is that central bank governors are subject to various pressures by democratic institutions. In practice, central bank governors are accountable for their actions, i.e. they have to explain their choice for monetary policy to parliaments and ministries. These, in turn, may choose to replace the current governor, if he or she does not choose monetary policy appropriately, or impose various other contracts. One extreme situation is a completely independent central banker, who can allow himself to completely disregard the desires by the parliament and set ω to his most preferred value: this would correspond to $\nu = 1$. In the other extreme, the parliament retains complete control over monetary policy, with the central bank governor simply executing the mandated policy: this would correspond to $\nu = 0$. Put differently, ν measures the degree of independence or lack of immediate democratic control of the central bank.

The question of constitutional design is the choice of ν. That is, I suppose that initially, there is a vote by the public at large on the value of ν, decided by the median voter. Which value would the median voter choose, given that ω will ultimately be decided by the bargaining process between the central bank governor and an impatient parliament, and therefore by eqn. (7)?

I will not answer this question in general, but instead I will provide an answer only for some particular choices of the parameters, using numerical calculations. These calculations are meant to be illustrative of the effects which can happen.

First, suppose that the constitutional choice is a rather crude one, and that one can only decide to either have a completely independent central bank, $\nu = 0$, or a completely controlled central bank, $\nu = 1$. Suppose that $\varphi = 0.9$ and $\gamma = 1$. Suppose that $\beta_i \equiv \beta = 0.9$, i.e. that all agents are equally patient. Finally, suppose that λ is exponentially distributed on $[0; \infty]$ with some distribution parameter α,

$$p = \frac{\lambda\beta\phi^2 + \beta\gamma^2 - \lambda}{\beta\gamma^2},$$

$$q = -\frac{\lambda}{\beta\gamma^2}.$$

With these parameters, ω is strictly decreasing[8] in λ regardless of the discount factor β. The value ω_P preferred by the median voter in the parliament will therefore be chosen by the representative with the median value for λ,

$$\omega_\sigma = \frac{\sigma_y}{\sigma_\pi},$$

(p. 104) Recall that the discount factor for the parliamentarians is given by $\mu\beta$. Finally, I suppose that the central banker is extremely conservative, and only cares about stabilizing inflation, $\lambda_{CB} = 0$, so that $\omega_{CB} = \Phi/\gamma$.

Suppose now, that some values for a and μ are given. With that and with λ_{median}, calculate ω_P. To figure out whether an agent with a preference weight λ on output stabilization would vote in favour of or against an independent central bank, $\nu = 0$, I need to find out whether he would prefer $\omega = \omega_P$ or $\omega = \omega_{CB}$. With Proposition 2 above the agent will prefer an independent central bank iff $b(\omega_P;\lambda) \# b(\omega_P;\lambda)$. The parameter choices are such[9] that $b(\omega_{CB};\lambda)$ is increasing in λ and $b(\omega^P;\lambda)$ is decreasing in λ. There will therefore be a cutoff value $\lambda_c(\alpha;\mu)$, so that agents with $\lambda \# \lambda_c(\alpha;\mu)$ will be in favour of an independent central bank and agents with $\lambda \# \lambda_c(\alpha;\mu)$ will be in favour of a central bank controlled by a democratically elected parliament.

This, in turn, translates into vote proportions: the fraction of the population in favour of an independent central bank is given by

$$\xi(\alpha;\mu) = 1 - \exp(-\alpha\lambda_c(\alpha;\mu)).$$

An independent central bank is favoured by a majority iff $\lambda_c(\alpha;\mu) \# \lambda_{median}(\alpha)$. This will therefore be the case iff the median voter prefers an independent central bank. I believe this to be a rather generic insight of this model, although, as repeatedly emphasized, it has only been checked for the numerical values (and the particular distributional assumptions) chosen here.

Figure 4.12 shows the fraction $\xi(\alpha;\mu)$ of the population in favour of an independent central bank, as I vary a and μ. The effects of varying μ are obvious: for low values of μ, the public rather trusts the central bank than the politicians to choose wisely: the politicians are too impatient. For larger values of μ, the public views itself better off with the politicians though. In fact, for the parameter values chosen here, the public will always be in favour of having monetary policy run by the parliament, if $\mu \# 0.6$, say. This strikes me as an interesting result: even when politicians only give a slightly better chance than 50–50 to be re-elected, the public would nonetheless prefer monetary policy to be run by them than a very conservative central banker. The reason that this result runs opposite to the usual conclusion in the literature is that everybody is assumed to have an enlightened view of monetary policy. Put differently, it is okay to entrust monetary policy to politicians, as long as they are aware that there is no point in trading off short-run output gains against long-run inflation, but rather only want to choose the 'right' variability of output versus the variability of inflation. Can politicians be that enlightened, wise and restrainted? The answer to this key question determines whether politicians should be allowed some control of monetary policy or not.

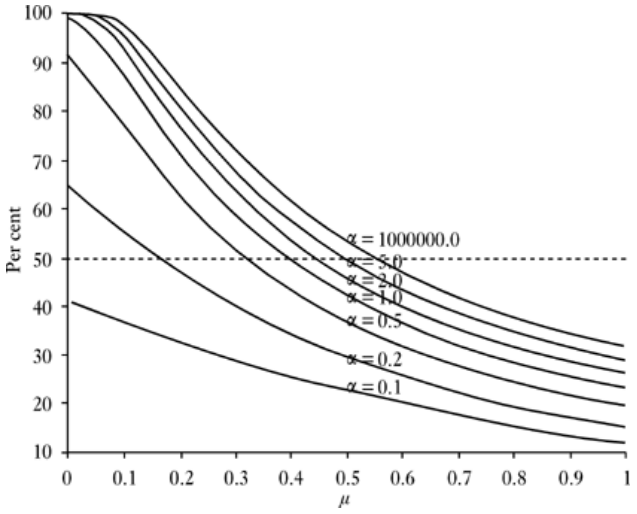

Figure 4.12 *Votes for an independent central bank*

Likewise, the effect of varying α is easy to understand. As α is decreased, the population shifts its preferences towards higher weights on output stabilization, away from the 'inflation stabilization only' preferences of my assumed central bank. So, one **(p. 105)** would expect this to result in increasing the preference towards running affairs by the parliament rather than the central bank. The figures show that this is indeed the case.[10]

Next, I can look at a more finely attuned constitutional choice, and suppose that the negotiating weight ν can be chosen to be any number. Figure 4.13 contains the answer. The logic here is similar to the logic in Fig. 4.12. Again, lower values for μ and higher values for a result in higher negotiating weights for the central bank. It is interesting that the negotiating weight does not approach unity as $\mu \rightarrow$; 0: even if politicians only care about the 'here and now', the public would want to give it some weight in deciding on the course of monetary policy.

A final remark and a warning are in order. The remark is that the decision — monetary policy run by the central bank governor or monetary policy run by politicians—has an easy solution in the extreme cases, where either the preference of the central bank governor coincides with the preferences of the median voter (in which case the median voter would like to have monetary policy run entirely by the central bank) or if $\mu = 1$, so that the preferences of the politicians concide with those of the voters (in which case the median voter would want monetary policy to be run by the politicians).

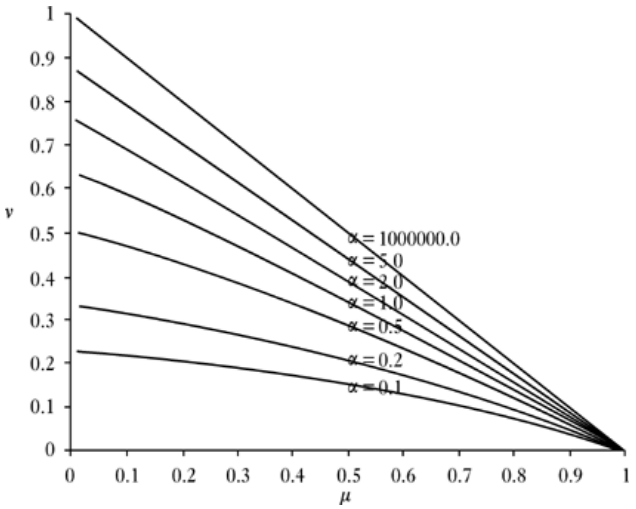

Figure 4.13 *Negotiation weight for the central bank*

The warning is this. The analysis suggests that with an enlightened public, enlightened central bankers and, in particular, enlightened politicians, it may be quite alright to give substantial weight in monetary policy decision making to politicians **(p. 106)** rather than central bankers. However, politicians might generally not be quite as enlightened as assumed in this model. Furthermore, the parameter values are suggestive rather than carefully estimated or calibrated. A richer model which also allows for the old-view short-run temptations and whose parameters are carefully matched to the data, would be called for to analyse this issue more carefully. With that caveat in mind, I find it intriguing that a greater dose of democracy for monetary policy might not be such a bad idea after all.

4. Discussion

I have painted a picture with a broad brush on a large canvas: I am perfectly willing to concede that some finer details—and perhaps they are important details?— have been neglected. Let me mention a few.

First, the indicator ω is obviously crude. Inflation is not under the control of the central bank, as Blinder (1997, 1998) has stressed: instead, the links between monetary policy instruments and inflation is a tenuous and ever-changing one. A large part of the activity of the sizeable research staff at central banks is devoted to watching and analysing these links! This is perhaps less of a problem for our framework: in fact, the theory postulates that these autonomous shocks to inflation are the driving force of our analysis.

More importantly, much of the variability of output is probably not related to monetary policy at all. Cochrane (1994) has shown that no more than 20 per cent of **(p. 107)** output variation can be explained by monetary policy shocks. Cochrane's conclusion is the subject of some debate (see e.g. Faust 1998; Uhlig 1998), but does enjoy a fairly broad support in the research community. Is this a problem for the proposed indicator ω? And, if so, how could one take account of that?

In order to analyse this issue, one needs to take a closer look. First, according to our theory, there are no monetary policy shocks at all: instead, interest rates are set as a deterministic function of current inflation, last-periods output gap, and current output shocks. Applying standard VAR techniques in this economy to, say, a three-variable VAR in inflation, the output gap and interest rates, and correctly identifying the shocks would show that monetary policy shocks explain zero per cent of the output

variation, which is perfectly in line with Cochrane's (1994) observation. The influence of monetary policy in our model is thus a subtler one, and lies in the systematic part of the monetary policy rule. Shifting the focus of attention away from monetary policy shocks and to this systematic part of the monetary policy rule in understanding the role of monetary policy for output fluctuations is a recent advance in the literature on monetary policy and has been stressed e.g. by Rotemberg and Woodford (1997). My analysis is following the spirit of theirs.

Nonetheless, it is unlikely that the systematic part of monetary policy could so perfectly offset inflation and output shocks as postulated here. This is likely to explain a sizeable part of the cross-country variation in our indicator ω: the special situation of Finland during 1991 and 1992 provides an interesting case, for example. Therefore, to fully understand and analyse the volatility trade-offs faced by a central bank, one needs to distinguish between the part of output and inflation volatility which is subject to change versus not subject to change, if the systematic part of monetary policy is varied. This, in turn, requires a full-fledged dynamic general equilibrium analysis of the economy, and an econometric methodology which allows the identification of the parts in question, given such a theoretical analysis. One then needs to apply this framework to each country in question and trace out the frontier of possibilities, preferably analysing them in terms of welfare of individual agents rather than the derivative concepts of volatilities in output and inflation. It is fair to say that the literature is still embarrassingly far from having developed convincing models with a broad consensual support, which would permit such an analysis. Attempting such an analysis here would be far beyond the scope of this chapter. But it is clear where one needs to go. This chapter and the proposed indicator ω are meant to be a simple step in that direction.

The model of democratic control can be extended in various ways. The choice of an exponential distribution is convenient, but perhaps not the most interesting one: varying a results in predictable mean shifts with predictable results. What about distributions, where the mean does not shift, but only the variance, say? And what about further extensions of the model? How, for example, would the results change if the population represents a mix of enlightened and non-enlightened voters? What if the population consists of different countries or regions, subject to region-specific or country-specific shocks? What if the preference distribution changes as one goes from region to region or country to country? There are intriguing possibilities for extending the analysis, which future research will hopefully explore.

(p. 108) 5. Conclusions

In this chapter, I have investigated the role of national central banks and of different policy cultures, concentrating the focus on the question of the trade-off between unemployment and inflation in a selection of industrialized countries. The traditional literature has emphasized the trade-off between the level of inflation versus the level of the unemployment rate in the Phillips-curve perspective or the change in the inflation rates versus the level of the unemployment rate in the 'NAIRU' perspective. Kydland and Prescott (1977) have shown in their seminal contribution that these trade-offs, even if present, should not be exploited: the result will only be higher inflation (or an acceleration of inflation) without any systematic change in unemployment rates. This conclusion is now so firmly embedded in the minds of central bankers and the enlightened public, that battles along those lines have become rather harmless rarities, and are only fought by politicians with long-outdated views. The last one was the fight in 1998 between the German Finance Minister Lafontaine, arguing for lowering interest rates based on a Phillips-curve view, and the Bundesbank, insisting on maintaining its excellent reputation instead. The battle was decisively won by the Bundesbank: Lafontaine eventually felt compelled to resign from all his political function; see Lafontaine (1999).

The modern, 'enlightened' point of view of monetary policy instead emphasizes a trade-off between the long-run volatility of inflation and the long-run volatility of unemployment. According to this 'enlightened' view, there is a 'Taylor menu', from which policy makers can choose. Different choices reflect differences in policy culture, interpreted as differences in the weight attached to output stabilization *vis-à-vis* inflation stabilization. I have provided an empirical cross-country analysis of the choices individual countries have made along this Taylor menu. I have introduced the ratio ω of the volatility in unemployment rates to the volatility in inflation rates as a single indicator to measure the stance of a country. A high value for ω indicates an inflation-hawkish country—examples are Germany and the Netherlands—whereas a low value of ω indicates a country which values unemployment stabilization over inflation stabilization—Italy and Japan are two examples, although for different reasons. It turns out that an ordering of countries based on ω can be established, which is fairly robust to the exact way of how the inflation volatilities and output volatilities are measured. I propose that ω is a sensible measure of the cultural differences between countries along this key dimension of monetary policy.

The indicator ω is in turn related to the speed at which monetary policy reacts to inflationary developments. This speed therefore is the key parameter of choice in monetary policy, and one on which reasonable people can disagree depending on their preferences. I have investigated how the value for this speed parameter ω, which is preferred by an enlightened voting public, can be implemented by monetary policy through the appropriate design of the institutions. I have shown that it may be reasonable to give more democratic control of monetary policy back to (impatient) parliamentarians, as long as they are not too impatient and as long as it can be assured that they hold and follow an 'enlightened' view of monetary policy rather than cling to the **(p. 109)** outdated Lafontaine-style perspective of an exploitable Phillips-curve (or NAIRU-curve) trade-off see Lafontaine (1999).

We therefore cautiously propose that the issue of democratic control of monetary policy should be reopened to debate. While completely independent central banking was surely a necessity in the past, this concept may now likewise become a relic of the past as the 'enlightened' view gradually takes hold, provided the public and the parliamentarians indeed increasingly understand the value of not yielding to short-run temptations. The issue to be voted upon would be ω, the speed at which to adjust to inflationary developments. The question of increasing democratic control should become of particular interest for the European Central Bank in the future, as it will be particularly hard for the ECB to aggregate diverse national preferences with regard to monetary policy, but it will also be relevant everywhere else, as central banks increasingly view themselves as institutions designed by the constitutional process to serve the public interest.

The most obvious danger in this proposal is the risk that the 'enlightened' consensus is too tenuous or too fragile, and that it may be dangerous to build institutions of democratic control by relying on a firmly established 'enlightened' view. Certainly, economists and central bankers alike should never cease in their efforts of reminding the public and the politicians of the compelling logic of this view. The meta-agenda of this chapter is to do precisely that.

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Notes:

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(1) As an economist, the low percentages of people who are not in favour of the government financing projects to create jobs is quite alarming: apparently the public trust in markets is quite low and the public desire for the government to intervene and to provide jobs directly or indirectly is quite high. It seems likely to me that the budgetary consequences of a government providing jobs are ill-understood by the public. While this is an issue of grave importance, this is not the place to discuss it further.

(2) Codes 0044619H, 0244619H, 0744619H, 1244612H, 1244619H, 1344619J, 1444619H, 1644619H, 1844619H, 2244619H, 2444619H, 2644619H, 2844619H, 3044619H, 3244619H, 3444619H, 4244619H, 4244619J, 4344619H, 4444619H, 4644619H, 4644619J, 5444619H, 5844619H, 5944619H, 6044619H, 6444619H, 6644619H, 6844619H, 7044619H, 7244619H, 7744612H, 7744619H, 8144611H, containing some additional countries beyond the ones studied here.

(3) Codes 004295A3, 014295A3, 024295A3, 074295A3, 124295A3, 144295A3, 164295A3, 184295A3, 224295A3, 264295A3, 284295A3, 324295A3, 424295A3, 464295A3, 594295A3, 604295A3, 644295A3, containing some additional countries beyond the ones studied here.

(4) For a more detailed treatment, see again Staiger *et al*. (1997).

(5) The parameters used are ø = 0.99, $\gamma = 0.4$, and $\sigma_u^2 = 3$.

(6) Here, I ignore the issue of hysteresis.

(7) The function $b(\omega)$ does not reach its minimum at the same point as the function $\alpha(\acute{\omega})$.

(8) This was checked numerically only.

(9) Again, this has only been checked numerically. Furthermore, this may be a general property of this model, although I have not checked that.

(10) I am grateful to Patrick Honohan for pointing this out to me.