Inflation Targeting Matters: Evidence From OECD Economies' Sacrifice Ratios.[*]

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Abstract

Using data from OECD economies we show inflation targeters suffered smaller output losses during disinflations when compared to non-targeters. We also study why some countries choose to inflation target while others do not and find that higher average inflation and smaller debt levels render the adoption of the regime more likely. Applying Heckman's procedure to control for selection bias does not alter the link between inflation targeting and less costly disinflations.

JEL: E42; E52.

Key Words: Inflation Targeting; Sacrifice Ratio; Selection Bias.

1 Introduction

In the last fifteen years many countries adopted formal inflation targeting (IT) regimes in order to attain - or lock in - price stability. However, in spite of its growing popularity among policy makers and academics alike, there is scant evidence lending credence to IT's alleged benefits. Ball and Sheridan (2003), for instance, showed that whether a OECD country inflation targets or not doesn't seem to make any difference in terms of various economic indicators such as

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average inflation, inflation volatility, interest rate volatility and growth volatility[1]. The title of their paper is indeed provocative: "Does Inflation Targeting Matter?". Here, we present new cross-country evidence suggesting it does. We show that OECD countries using IT suffered smaller output losses during disinflationary periods. This result remains even after controlling for possible selection bias.

It is commonly argued that enhanced communication and accountability of the central bank under IT, coupled with explicit (firing the central banker) or implicit (damaging personal reputation) costs for missing the target should make the announced inflation objective more credible and hence disinflations less costly. In accordance with a simple augmented Phillips curve, if expected inflation converges to the actual inflation more rapidly in IT countries, mean output losses should be smaller in this group. In this paper, we use data from 61 disinflations in OECD economies to evaluate the validity of this claim. We assess whether sacrifice ratios - loss of output to trend divided by the fall in inflation - in targeting countries are lower than in non-targeting ones after controlling for nominal rigidity, velocity of the disinflationary process, public indebtedness and a measure of monetary policy transparency.

However, since the decision to become an inflation targeter is probably endogenous, simple OLS estimations may be plagued with selection bias. To address this potential problem we first estimate a probit model where the dependent variable is an inflation targeter dummy and the regressors are past average inflation and public debt. Based on its results, we compute for each country in our sample an inverted Mill 's ratio and add it to our basic regression. This Heckman two-stage procedure yields a more reliable estimate of the relationship between the IT dummy and sacrifice ratios.

Summing up our results, we find that: (i) countries with higher average past inflation and lower debt levels are more likely to adopt IT, and (ii) inflation targeters do experience less acute output losses during disinflations even after controlling for self-selection. Importantly, this second result is not only statistically but also economically significant.

The rest of the paper is structured as follows: section 2 briefly revises the literature on the determinants of the sacrifice ratio, section 3 presents OLS results linking IT to sacrifice ratios, in section 4 we estimate a probit model in order to determine what variables increase

[1] Nevertheless, Gonçalves and Salles (forthcoming) study a sample of developing economies and show that both inflation and growth volatity decreased more substantially in the targeter group.

the likelihood a country will end up as an inflation targeter; in section 5 we apply Heckman's procedure to assess if our results in section 3 are due to selection bias and section 6 briefly concludes.

2 Literature

Empirical work has shown that disinflating is no free-lunch and usually involves important short run output losses which, in turn, are politically costly and can act as a deterrent to the achievement of low inflation. It is hence clearly relevant to understand what determines the so-called "sacrifice ratio" (accumulated loss in output during disinflations divided by the overall fall in inflation) and, in particular, to assess whether it varies across different monetary regimes.

Beginning with Ball (1994), empirical research on this topic has shown that the degree of nominal rigidity and the velocity of the disinflationary process are important covariates in regressions where the dependent variable is the sacrifice ratio. Inflation at the beginning of the disinflationary period is usually employed as a proxy for nominal rigidity: since nominal contracts tend to be shorter the higher the inflation rate, the initial level of inflation is expected to be negatively correlated with the sacrifice ratio. The velocity of the disinflationary process has in principle a dubious effect on the sacrifice ratio. Whereas Sargent (1983) argues that rapid disinflations signal a strong commitment and hence lead to rapid expectations convergence and smaller output losses, Taylor (1983) emphasizes that the presence of pervasive nominal rigidities makes gradualism a less costly option. In Ball's (1994) regressions, both initial inflation and velocity are negatively correlated with the sacrifice ratio.

Using these two variables as basic regressors, subsequent studies have focused on the role of central bank independence. Given more independent central banks are supposedly more shielded against politicians seeking short run political benefits from monetary policy, one would expect a negative association between the degree of independence and sacrifice ratios after controlling for nominal rigidity and velocity. But, somewhat surprisingly, Posen (1995) and Debelle and Fisher (1995) - using different proxies for CB independence and different samples - both find that more independent central banks are associated with *higher* sacrifice ratios.

More related to our paper is Bernanke *et alli* (1999) finding of no credibility bonus coming from the adoption of IT. They run a standard "Ball regression" and with the estimated coefficients in hands, project what should have been the expected out-of-the-sample sacrifice ratios for targeting and non-targeting countries in future actual disinflations. For three out of the four inflation targeters in their sample, the actual sacrifice ratio in the first disinflation episode after adoption is *greater* than the number projected using the coefficients of their estimated Ball's regression (and the actual realization of initial inflation and velocity). They thus go on to conclude that: "Disinflation under inflation targeting - *or at least the first disinflation under targeting* - does not appear to be less costly than it would have been absent inflation targeting".

We see, however, two problems with this conclusion. First, their exercise says only that the *first* disinflation under the new regime was not less costly than expected[2]. Secondly, the sample they study is very small: they use data from 9 developed economies and identify only 25 disinflation episodes, which raises serious robustness doubts.

In sum, the empirical literature so far has not corroborated the alleged benefits of IT, at least for the case of developed economies.

3 Sacrifice Ratio and Inflation Targeting in OECD

We collect quarterly data on real GDP, consumer price inflation, and public debt for all 30 OECD economies and seek for disinflationary episodes during two different subperiods: 1990/2006 (sample a) and 1980/2006 (sample b)[3]. The option to run a robustness check restricting the sample period comes from the fact that full-fledged IT regimes began to be implemented in the 90's.

Identification of disinflation episodes follows exactly the same criterion employed by Ball (1994), Posen (1995) and Bernanke *et alli* (1999): we construct a 9-quarter moving average trend for inflation and consider declines from "peak" to "trough" greater than 2 percentage points as disinflation episodes. Peaks are points where the moving average is bigger than both the previous and subsequent four quarters and, likewise, troughs are points where the moving

[2] Bernanke *et alli* (1999) claim the system is unlikely to yield concrete benefits shortly after its adoption. They argue it may take some time before the private sector: (a) is fully aware of its features and, (b) deems it credible.

[3] GDP and inflation data come from the IFS. Data on public debt comes from the OECD database.

average is smaller than both the previous and subsequent four quarters. As in Ball (1994), we discarded the cases where initial inflation was above 20%. Finally, disinflationary processes are labelled as under IT only if at the beginning of the disinflation IT was already in place for at least two quarters[4]. This assumption is in accordance with the view - put forth by Bernanke *et alli* (1999) - that it takes some time for a new monetary system to build credibility.

As table 1 shows, after applying this criterion we end up with 58 disinflations in OECD economies after 1980 (and 36 when we use data only from 1990 onwards)[5].

The output cost of disinflation is also measured as in Ball (1994). We consider that output is at potential when the disinflation begins and assume it is back to potential four quarters after the end of the episode. The output cost is measured by accumulating the deviation of actual GDP (in logs) from the output trend (the line uniting GDP at the peak and GDP four quarters after the trough). Finally, the sacrifice ratio index (sr) is simply this number divided by the total inflation decline.

The average sacrifice ratio we find in our sample is considerable: approximately 5.6% of GDP relative to trend for each point of inflation decline[6]. But as chart 1 below suggests, this number hides the fact that disinflations under IT were much less costly than average.

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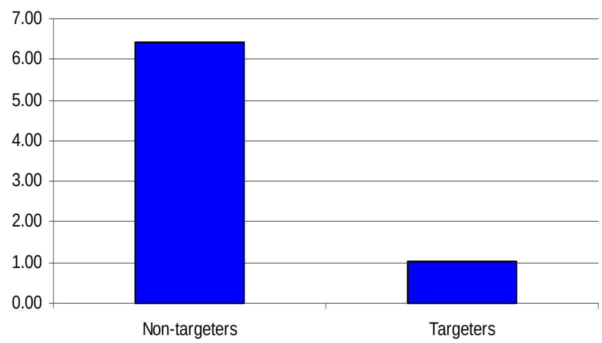
[4] The IT adoption dates come from Corbo and Schmidt-Hebbel (2000) and Fraga, Goldfajn and Minella (2003).

[5] Many commentators argue that the Bundesbank actions under money targeting were very similar to what one would expect under IT and hence we classify Germany as a targeting country. See for instance, Mishkin (1998) and Von Hagen (1999).

[6] This figure is in line with Ball's numbers.

Chart 1: Average sacrifice ratios (%) in targeting and non-targeting economies



To find out how much of this difference in sacrifice ratios is due IT itself - and not to differences in other controls - we estimate the following basic regression using simple OLS:

$$sr = c + \alpha.\pi_0 + \beta.\frac{1}{d} + \theta.b + \gamma.IT + \eta.Transp + \varepsilon \tag{1}$$

Where:

sr is the sacrifice ratio; c is a constant; π_0 is initial inflation, d is number of quarters under disinflation; b is the average central government debt to GDP during the disinflationary episode; $Transp$ is a monetary policy transparency index[7]; IT equals 1 if the country inflation targets and 0 otherwise and ε is an error term[8].

Although Ball (1994) does not include public debt in his regressions, we do so here since we find reasonable to conjecture that more indebted countries face greater difficulties in convincing the private sector about its commitment towards low inflation. The transparency index was also absent in Ball's paper, but subsequent work (see Stasavage (2003)) found transparency to be negatively correlated with the sacrifice ratio and hence we include it in our regressions[9].

[7] The index we employ is the one computed by Stasavage (2003) who in turn use the results of Fry et al (2000).

[8] If instead of using $1/d$ as our velocity measure, we employ $\frac{\Delta\pi}{d}$, we reach very similar results. We prefer, however, the first measure since the second induces a "spurious " correlation between velocity and the sacrifice ratio.

[9] We thank an anonymous referee for this suggestion.

First we run a standard Ball regression in which the sacrifice ratio is assumed to be a function of initial inflation and velocity only. In this base line regression, initial inflation and velocity are statistically significant. Higher initial inflation leads to smaller sacrifice ratios as expected and so does velocity.

Then, in order to investigate whether IT matters we add to this base line specification a dummy variable equal to 1 if the disinflation occurred under IT, and 0 otherwise. In table 2 below we present our results. The IT dummy is highly significant and negatively correlated with the sacrifice ratio both in model 1 (including transparency) and in model 2 (including debt). All else equal, a disinflation under IT is much milder than average. Judging by the size of the point estimate, a targeter saves around 7% in output losses (relative to a non-targeter) for each percentage point of inflation decline. In addition, the initial inflation coefficient remains negative and highly statistically significant after including the dummy (although velocity loses significancy). In model 1, we find the transparency to be statistically insignificant. In model 2, public debt is positively associated with the sacrifice ratio but not statistically significant also. Importantly, after adding the dummy variable to the basic Ball's regression, the adjusted R^2 increases approximately 50%.

Table 2: OLS Results

	Ball's Regression		Model 1		Model 2	
Regressor	Sample a	Sample b	Sample a	Sample b	Sample a	Sample b
C	13.12 (4,76)	11.74 (5,55)	13.21 (3,24)	11.85 (4,37)	9.43 (1,81)	9.59 (3,43)
Initial Inflation	-0.46 (-3,10)	-0.44 (-3,67)	-0.60 (-3,30)	-0.55 (-4,01)	-0.54 (-2,99)	-0.55 (-4,25)
Velocity	-41.74 (-1,94)	-33.06 (-2,36)	-40.62 (-1,69)	-30.80 (-1,87)	-30.32 (-1,28)	-27.92 (-1,60)
Debt/GDP	-	-	-	-	0.05 (0,97)	0.04 (1,08)
Transparency			0.64 (1,07)	0.46 (1,31)	0.67 (1,10)	0.55 (1,64)
IT Dummy	-	-	-8.22 (-4,62)	-7.30 (-4,46)	-6.88 (-3,50)	-6.54 (-4,26)
Adj. R^2	0.25	0.27	0.37	0.36	0.39	0.39

White Heteroskedasticity - Consistent Standard Erros & Covariance
t - statistics in parenthesis.

In sum, our OLS estimates suggest that IT is correlated with smaller output losses during disinflations. But because the adoption of IT is not random, it may be that countries choosing to become inflation targeters also display other unobservable structural features leading to smaller sacrifice ratios. If this is the case, our estimated γ will be biased. In next section we thus ask what leads a country to adopt IT and then use the results to re-estimate equation (1) using Heckman's two step procedure.

4 Probit results

In order to investigate self-selection into IT we run a probit model using data from the thirty OECD economies. Our "treated group" - the inflation targeters - is comprised of 17 countries[10], whereas our "control group", the non-targeters, is made up by the remaining 13 OECD economies[11]. The dependent variable is the probability that the country inflation targets. Our covariates are average past inflation and average debt to GDP ratio[12]. The *a priori* reasoning is that higher inflation levels should motivate a country to move to a formal IT regime in search for anti-inflation credibility. When it comes to debt, there are two opposite effects. On one hand, a highly indebted country should be wary of foregoing the possibility of inflating its way out by resorting to inflation tax revenues when necessary. On the other, enhanced credibility from IT could lead to lower risk premia and hence lower real interest rates, alleviating debt's burden. While the latter suggests a positive association between debt and the probability of becoming an inflation targeter, the former effect goes in opposite direction.

The past inflation and debt/GDP averages are calculated using the five-year period prior to the adoption of IT for those who eventually opted for the regime. For the non-targeters (our "control group"), we follow Ball and Sheridan (2004) suggestion and take as the "adoption year" (the same for all non-targeters) the average of the adoption dates in the targeters group,

[10] Australia, Canada, Czech Republic, Germany, Finland, Korea, New Zealand, Poland, Sweeden, UK, Iceland, Hungary, Mexico, Norway, Spain, Switzerland and Turkey.

[11] Austria, Belgium, Denmark, France, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, Portugal, Slovak Republic and United States.

[12] There is a vast literature studying what variables mostly affect the degree of central bank independence. Our choice to use past inflation and debt levels is based on that literature. See, for instance, Eijffinger and De Haan (1996)

namely 1997. Inflation is again the average variation in CPI obtained at IFS, while debt/GDP ratios (central government debt) come from the OECD database.

Since the dependent variable is binary, we estimate the following equation using a simple Probit technique.

$$P(y = 1 \mid \mathbf{x}) = \mathbf{\Phi}(\boldsymbol{\beta}_0 + \beta_1.x_1 + \beta_2.x_2) + \eta \tag{2}$$

Where, $x_1$is average inflation, x_2 is debt to GDP ratio and $\mathbf{\Phi}$ is the normal cumulative function, and η is an error term.

Table 3 below shows the results. Both inflation and average debt are statistically significant. As expected, higher past inflation rates increase the likelihood of adoption: an increase of one percentage point in inflation enhances the probability of adoption by 7 percentage points. The impact of public debt is negative: the greater the public debt, the smaller the chances a country will become an inflation targeter. Quantitatively, an one percentage point decline in debt to GDP increases the probability of adoption by the same amount[13].

This simple probit model seems to do a good job in explaining IT adoption: 15 of the 17 targeters display propensity scores above 0.5, and 11 of the 13 non-targeters have propensity scores below 0.5.

Table 3: Probit estimates

Regressor	Coef.	M. Effects	p-value
C	0.87 (1,32)		0.185
Inflation	0.19 (2,03)	0.07	0.042
Debt/GDP	-0.04 (-2,69)	-0.01	0.007
Observations	30	McFadden R^2	0.43

z - statistics in parenthesis.

[13] Marginal effects are calculated in the usual fashion: $\beta_i.\phi(\overline{x\beta}')$.

5 Controlling for selection bias

As mentioned earlier, if there are variables influencing both the decision to inflation target and the sacrifice ratio, our previous estimate of γ will be biased. To address this problem we aplly Heckman's two-stage procedure. Using the results from the previous section we construct for each country an inverted Mill's ratio, $\frac{\phi}{\mathbf{\Phi}}(\beta'\overline{\mathbf{x}})^{14}$, and add it to equation (1). We therefore re-estimate it with the following specification:

$$sr = c + \alpha.\pi_0 + \beta.\frac{1}{d} + \theta.b + \gamma.IT + \eta.Transp + \sigma\frac{\phi}{\mathbf{\Phi}}(\beta'\overline{\mathbf{x}}) + \varepsilon \tag{3}$$

The results presented in table 4 confirm our previous OLS findings. The insignificancy of the Mill's ratio is indicative of no selection bias. Moreover, the magnitude of the dummy coefficient (and in fact of all others) is little altered. In sum, the negative correlation between the IT dummy and our sacrifice ratio measure proved to be robust to selection bias.

Table 4: Heckman's results

	Model 1		Model 2	
Regressor	Sample a	Sample b	Sample a	Sample b
C	11.37 (2,32)	10.76 (3,63)	9.30 (1,77)	9.99 (3,27)
Initial Inflation	-0.53 (-2,62)	-0.53 (-3,95)	-0.58 (-2,69)	-0.57 (-4,17)
Velocity	-32.14 (-1,25)	-25.62 (-1,48)	-33.38 (-1,22)	-34.71 (-1,64)
Debt/GDP	-	-	0.07 (1,10)	0.06 (1,58)
Transparency	0.57 (0,99)	0.46 (1,35)	0.75 (1,16)	0.59 (1,65)
IT Dummy	-7.42 (-3,53)	-6.88 (-4,05)	-6.98 (-3,45)	-6.75 (-4,27)
Mills Ratio	1.07 (0,55)	0.58 (0,57)	-1.05 (-0,37)	-1.13 (-0,91)
Adj. R^2	0.36	0.35	0.37	0.39

White Heteroskedasticity - Consistent Standard Erros & Covariance
t - statistics in parenthesis.

6 Concluding remarks

In this paper we disputed the claim that IT does not matter for OECD countries. Specifically, we showed that inflation targeters were able to bring inflation down less costly. The effect of an IT dummy variable in a classic sacrifice ratio regression is not only statistically significant, but economically very important. Higher initial inflation and lower debt levels also render disinflations less costly. We also presented evidence from a probit model suggesting higher past inflation and lower debt levels increase the likelihood that a country chooses to inflation target. Finally, applying Heckman's procedure to investigate if the negative relationship between sacrifice ratios and IT is influenced by selection bias does not alter the results.

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Table 1: Disinflationary Episodes

Country	Episode	Initial Inflation	Duration	IT dummy	Debt/GDP	Mills Ratio	Sacrifice Ratio	Transparency	Adoption Date*
Australia	1990:1 - 1993:1	7.14	13.00	0.00	9.20	0.13	6.57	3	Apr - 1993
Australia	1995:3 - 1998:2	3.55	12.00	1.00	18.43	0.13	1.18	3	-
Austria	1993:1 - 1998:4	3.75	24.00	0.00	55.63	1.25	5.92	0	-
Belgium	1990:3 - 1998:4	3.43	34.00	0.00	111.38	3.52	21.18	2	-
Canada	1991:1 - 1994:1	4.80	13.00	0.00	54.19	0.82	11.30	4	Feb - 1991
Czech Republic	1998:1 - 2000:1	8.85	9.00	0.00	11.52	0.04	2.89	4	Jan - 1998
Czech Republic	2001:1 - 2003:2	4.25	10.00	1.00	16.87	0.04	3.53	4	-
Finland	1990:1 - 1993:2	6.21	14.00	0.00	27.98	0.29	16.67	2	Feb - 1993
Germany	1991:3 - 1996:2	4.57	14.00	1.00	20.85	0.44	-1.03	2	-
Hungary	1997:2 - 2001:2	19.17	17.00	0.00	57.80	0.18	-1.02	0	Jun - 2001
Hungary	2001:3 - 2003:1	8.13	7.00	0.00	54.27	0.18	-0.84	0	-
Iceland	2001:2 - 2003:3	6.16	10.00	0.00	36.49	0.95	8.25	-	Mar - 2001
Italy	1990:2 - 1994:1	6.43	16.00	0.00	102.76	2.95	16.65	4	-
Italy	1995:1 - 1998:3	4.69	15.00	0.00	111.59	2.95	2.38	4	-
Japan	1990:4 - 1995:3	3.11	20.00	0.00	54.60	1.82	2.39	3	-
Korea	1991:2 - 1993:2	8.81	9.00	0.00	11.86	0.15	0.07	2	Jan - 1998
Korea	1998:1 - 2000:1	5.40	9.00	0.00	16.38	0.15	12.06	2	-
Mexico	1992:1 - 1993:4	18.28	9.00	0.00	26.59	0.00	1.59	3	Jan - 1999
Mexico	1999:1 - 2005:1	15.64	25.00	0.00	23.54	0.00	0.69	3	-
Mexico	1997:4 - 1998:4	19.44	5.00	0.00	26.77	0.00	2.65	3	-
New Zealand	1990:1 - 1992:4	5.76	12.00	0.00	60.43	0.56	8.44	4	Mar - 1990
New Zealand	1995:4 - 1998:4	3.00	13.00	1.00	40.76	0.56	1.82	4	-
Norway	1990:1 - 1993:4	4.28	16.00	0.00	27.24	0.56	10.37	4	Mar - 2001
Poland	1996:3 - 1998:4	19.45	10.00	0.00	42.15	0.00	-0.99	0	Oct - 1998
Poland	1999:1 - 2003:2	9.60	18.00	0.00	39.51	0.00	-1.41	0	-
Portugal	1990:1 - 1999:1	12.95	37.00	0.00	56.91	1.04	7.30	4	-
Slovak Republic	1995:1 - 1997:1	11.11	9.00	0.00	19.56	0.21	-0.32	4	-
Slovak Republic	2000:3 - 2002:1	11.07	7.00	0.00	31.92	0.21	0.77	4	-
Slovak Republic	2003:4 - 2005:1	7.50	6.00	0.00	36.43	0.21	0.16	4	-
Spain	1994:4 - 1998:2	4.71	15.00	0.00	53.25	0.54	16.89	2	Nov - 1994
Sweden	1990:4 - 1992:4	9.53	9.00	0.00	47.43	0.59	5.62	4	Jan - 1993
Sweden	1993:1 - 1997:4	3.35	20.00	0.00	74.48	0.59	19.59	4	-
Switzerland	1991:1 - 1998:2	5.53	30.00	0.00	21.17	0.78	6.64	4	Jan - 2000
Turkey	2003:4 - 2005:1	18.72	6.00	1.00	73.33	0.00	-0.38	-	Jan - 2002
United Kingdom	1990:1 - 1992:4	8.64	12.00	0.00	32.98	0.47	5.39	4	Oct - 1992
United States	1990:2 - 1994:4	5.13	19.00	0.00	46.72	1.15	11.16	4	-

Country	Episode	Initial Inflation	Duration	IT dummy	Debt/GDP	Mills Ratio	Sacrifice Ratio	Transparency	Adoption Date*
Australia	1982:3 - 1984:4	10.74	10.00	0.00	8.06	0.13	4.65	3	Apr - 1993
Austria	1981:2 - 1987:2	6.57	25.00	0.00	35.09	0.13	3.93	0	-
Belgium	1982:3 - 1987:3	8.31	21.00	0.00	92.44	1.25	4.57	2	-
Canada	1981:3 - 1985:3	11.68	17.00	0.00	33.43	0.82	5.08	4	Feb - 1991
Denmark	1980:4 - 1986:4	12.02	25.00	0.00	59.35	2.13	3.51	0	-
Finland	1981:2 - 1987:1	11.75	24.00	0.00	13.33	0.29	3.35	2	Feb - 1993
France	1981:2 - 1987:2	13.54	25.00	0.00	19.62	0.94	1.28	0	-
Greece	1987:1 - 1988:4	19.09	8.00	0.00	-	1.79	1.96	0	-
Italy	1981:1 - 1987:4	19.99	28.00	0.00	70.85	2.95	3.43	4	-
Japan	1980:4 - 1984:1	6.22	14.00	0.00	43.05	1.82	3.42	3	-
Korea	1981:3 - 1984:3	19.30	13.00	0.00	19.80	0.15	-1.56	2	Jan - 1998
Netherlands	1981:2 - 1987:2	6.74	25.00	0.00	44.84	1.44	5.34	4	-
New Zealand	1980:4 - 1984:1	14.64	8.00	0.00	59.37	0.56	-0.47	4	Mar - 1990
New Zealand	1986:3 - 1992:4	15.36	30.00	0.00	63.51	0.56	2.87	4	-
Norway	1981:3 - 1985:2	12.66	16.00	0.00	23.95	0.56	5.80	4	Mar - 2001
Norway	1987:3 - 1993:4	8.07	26.00	0.00	26.48	0.56	9.19	4	-
Portugal	1985:3 - 1987:4	18.86	10.00	0.00	54.39	1.04	-0.96	4	-
Spain	1980:1 - 1988:1	15.52	33.00	0.00	29.71	0.54	7.80	2	Nov - 1994
Sweden	1980:4 - 1987:1	12.51	26.00	0.00	53.05	0.59	3.99	4	Jan - 1993
Switzerland	1982:1 - 1987:1	5.93	21.00	0.00	14.94	0.78	5.04	4	Jan - 2000
United Kingdom	1980:3 - 1984:1	15.70	15.00	0.00	45.53	0.56	2.72	4	Oct - 1992
United States	1980:3 - 1984:1	12.27	15.00	0.00	28.73	0.56	3.16	4	-

* Source: Fraga, Goldfajn and Minella (2003), Corbo and Schmidt-Hebbel (2000)