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Golnaz B. Motie

Joshua C. Hall

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Golnaz B. Motie
Gordon Ford College of Business
Western Kentucky University
Bowling Green, KY 42101

Joshua Hall
John Chambers College of Business and Economics
West Virginia University
Morgantown, WV 25606
joshua.hall@mail.wvu.edu

Abstract

Policymakers often want to achieve low inflation to avoid the low economic growth associated with high inflation. Reducing inflation through monetary policy (disinflation) is not costless as it can coincide with higher unemployment rates and reduced output. In this paper we use sacrifice ratios to calculate the cost of disinflation during the 1990s for 40 countries. We then study whether transparency and democratic accountability of monetary institutions reduces disinflation costs. Our empirical results suggest that more transparent central banks seem to face higher disinflation costs. This result could be because more transparent central banks have lower initial inflation rates during their disinflation episodes. Therefore, reducing inflation even further is more costly to them. We find no significant relationship between independence of central banks and the disinflation costs they faced during 1990s.

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Introduction

Central banks have private information about economic conditions but they have incomplete control of macroeconomics outcomes. These two elements create moral hazard as central banks can easily blame unexpected economic shocks for any unforeseeable increase in the inflation rate. Transparency can reduce those risks as it makes central banks accountable to elected politicians (Stasavage, 2003). Transparency itself can result in lower inflation as well as lower output costs of disinflation (Chortareas et al., 2002b; 2003).

Transparency, however, is related to independence. Some studies argue that independent central banks can achieve lower inflation rates with no costs to their real economies. Alesina and Summers (1993), for example, find that while central bank independence aids price stability there is no correlation between growth, unemployment and real interest rates. Other scholars argue that if central banks are not held accountable for their actions they might become too conservative and focused on lowering inflation at the expense of output or unemployment. Debelle and Fischer (1995), for example, conclude that if central banks are not held accountable for their actions there is a good chance that they might become too conservative. Ultimately, this is an empirical question related to the effect of central bank transparency and independence on the costs of disinflation.

In this paper, we empirically study whether central bank transparency and independence reduces disinflation costs. We start by using sacrifice ratios to calculate the cost of disinflation during the 1990s for 40 countries. Our empirical results suggest that central banks that are more transparent have higher disinflation costs. This result could be because central banks that are more transparent have lower initial inflation rates during their disinflation episodes. Therefore, reducing inflation even further is more costly to them. We find no significant relationship between independence of central banks and disinflation costs during our period of analysis.

A Transparency Model

This section presents the model used by Stasavage (2003) to clarify how central bank transparency can lower disinflation costs. In this model the policymaker's loss function is a quadratic function in both output and inflation:

$$\boldsymbol{L = \frac{1}{2}\pi^2 + \frac{1}{2}b\left(y - (y^* + k)\right)^2} \qquad \textbf{(1)}$$

where b is a positive constant that shows the weight placed on stabilizing output relative to stabilizing inflation. The inflation target (preferred rate of inflation) is normalized to

zero and preferred output is $y^* + k$, where y^* is potential output and k is a positive constant.

The standard expectations-augmented supply curve for the economy can be explained as follows:

$$\boldsymbol{y = y^* + \pi - \pi^e} \quad (2)$$

where output depends on potential output and the difference between actual inflation π and expected inflation π^e.

Finally, the actual inflation rate depends on rate of money growth chosen by the policymaker (m) and an exogenous shock to money demand (v) as the following equation shows:

$$\boldsymbol{\pi = m + v} \quad (3)$$

The shock can be decomposed into a forecastable component f and an unforecastable component e (equation 4).

$$\boldsymbol{v = f + e} \quad (4)$$

Following Stasavage (2003), we assume f and e are normally distributed, uncorrelated and have mean zero.

In order to find the equilibrium outcome of a one-shot version of this monetary policy game we first set up the following sequence of moves:

1. The public fixes expected inflation π^e.
2. The policymaker produces a forecast f of the money demand shock v. If the policymaker is transparent, they reveal this forecast to the public.
3. The policymaker chooses the rate of money growth m.
4. The money demand shock v is realized.

In a one-shot game it does not make a difference whether the policymaker reveals their forecast or not, mainly because the public has already picked its expected inflation in stage one. In a repeated version of the game, however, forecast publication plays an important role. In one-shot game once the public fixes its expectation, the policymaker has an incentive to choose a positive inflation rate in order to achieve output above its potential level. The problem arises because the public will be expecting that move. Therefore, the average equilibrium rate of inflation will be bk, and the average equilibrium rate of output will be y^* (given that f and e are mean zero).

One way that politicians can commit to a lower rate of inflation is by delegating monetary policy to an independent central banker, who has a lower value of b than the government. A second solution would be building reputation by committing to a lower inflation rate than bk.

Transparency is relevant where we have a repeated game. When a new government is trying to build a reputation there is uncertainty about whether they are committed to a low inflation rate. In this case the public knows the policymaker's loss function but they are

initially uncertain about whether the policymaker is committed to achieve a zero rate of inflation or whether they want to pursue the discretionary rate of inflation (bk), the same as what they would do if it was a one-shot game.

Following Stasavage (2003), we assume that the public starts with belief p, that the preferred inflation rate is zero, and belief $(1-p)$ that the preferred inflation rate is bk. Therefore, public expected inflation can be expressed as follows:

$$\boldsymbol{\pi^e = p(0) + (1-p)bk} \tag{5}$$

After observing inflation, the public will update its belief according to Bayes' rule, as noted in equation (6):

$$\boldsymbol{p_{t+1} = \frac{pPr(\pi|\bar{\pi}=0)}{pPr(\pi|\bar{\pi}=0)+(1-p)Pr(\pi|\bar{\pi}=bk)}} \tag{6}$$

where $\bar{\pi}$ represents the policymaker's intended rate of inflation and π represents the actual inflation outcome. When a policymaker is committed to $\bar{\pi} = 0$ then p will converge to 1 eventually. How fast the public updates its beliefs depends on how much information policymakers reveal. If all public members knew the policymaker's exact forecast, then they would perfectly observe the intended rate of inflation. Then, after one period, they would update their belief to either $p_{t+1} = 1$ or $p_{t+1} = 0$.

When the policymaker does not reveal all information, the public faces a more complicated problem. They update their belief by guessing whether the observed rate of inflation is drawn from a distribution with mean zero or whether it is drawn from a distribution with mean bk. The less information the public has the more it takes for them to update their initial belief. If we substitute equation 5 into equation 2 we will get equation 7 as follows:

$$\boldsymbol{y = y^* - (1-p)bk + e} \tag{7}$$

Equation (7) shows that if the policymaker is committed to achieving a zero inflation rate then at each period as p increases output will also increase. If transparency results in faster convergence to $p = 1$ then this means that transparency will be associated with higher levels of output. When the policymaker is trying to reduce inflation (disinflation cases), the existence of transparency could reduce the costs of disinflation.

Data and Calculation of Sacrifice Ratios

There are various definitions of transparency and independence measures in the literature. For example, Stasavage (2003) considers a central bank transparent if it publicly publishes its economic forecasts and discusses past forecast errors. He constructs a forecast transparency index by using the information gathered from a central bank survey conducted by Fry et al. (2000). Eijffinger and Geraats (2006) introduced a more comprehensive

transparency index where they consider political, economic, procedural, policy and operational transparency. Each area focuses on different aspect of monetary policy. Political transparency concentrates on openness about policy objectives, while economic transparency denotes openness about economic information such as data, policy models, and internal forecasts used by the central bank. Procedural transparency focuses on the way monetary policy decisions are made. Policy transparency relates to the prompt announcement of policy decisions and the explanation of the decisions and their implications. Finally, operational transparency is about how open the implementation of the central bank's decisions is to the public. Here we use *Forecast Transparency* created by Stasavage (2003) and *Transparency Index* by Dincer and Eichengreen (2014). We refer readers to those papers for a full description of their construction.

There are different levels of accountability that central bank officials face in different countries. Following Stasavage (2003), we use two dummy variables (*Report to Legislature* and *Override Possibility*) to capture those differences. Researchers have proposed various central bank independence indices (Grilli et al., 1991; Cukierman et al., 1992; Alesina and Summers, 1993; Dincer and Eichengreen, 2014). Here we use the I*ndependence Index* estimated by Dincer and Eichengreen (2014). They calculate their index for a large and comprehensive set of countries from 1998 until 2010. They augment the criteria of Cukierman et al. (1992) and add measures of limits on the reappointment of the CEO, measures of provisions affecting (re)appointment of other board members like those affecting the CEO, restrictions on government representation on the board, and intervention of the government in exchange rate policy formulation.

Researchers have studied the trade-off between inflation and output (or unemployment) using the Philips curve since the 1950s. Okun (1978) and Gordon and King (1982) used an augmented estimated Phillips curve to calculate the sacrifice ratio for the United States. Ball (1994) points out the shortcomings of their methods as they constrain the output-inflation trade-off the same during disinflation and during inflationary periods, or during temporary fluctuations in demand. Because of this shortcoming of the Phillips Curve approach, most researchers have used versions of Ball (1994)'s method. He proposed a new method in which he specifies disinflation periods and calculates sacrifice ratios associated with those episodes. To calculate sacrifice ratio from output gap we follow Ball (1994)'s method. He first defines disinflation episodes and finds out how inflation trend and output gap changed over that period. The sacrifice ratio is then calculated when the change in output gap is in the numerator and change in inflation is in the denominator.

Anderson and Wascher (1999) calculate sacrifice ratios using both output and unemployment data. They conclude that sacrifice ratios calculated using unemployment data are different from those calculated using output data. We, therefore, calculate sacrifice ratio using unemployment data as well. Following Zhang (2005), we calculate the unemployment loss as the difference between the actual unemployment rate and the natural rate of unemployment during the disinflation episodes. The sacrifice ratio is then the unemployment loss over the change in inflation during the disinflation episode.

We use percentage change of quarterly *CPI* (Consumer prices-All items) for 40 countries from the OECD. We then identified disinflation periods following the method of Ball (1994). The inflation trend for each year is calculated as an average of the inflation rate for eight quarters (four quarters of that year and two quarters before and two quarter after that year). We then identified the peaks (troughs) when the trend inflation at period *t*

is higher (lower) than the trend inflation at period *t-1* and *t+1*. The difference between peaks and troughs will give us the change in inflation for that episode. A disinflation episode is defined when the trend inflation falls at least 1.5 percentage points. Following Stasavage (2003), we consider the most recent disinflation episode in the 1990s. The only exceptions are when disinflation episodes run through 2000s (e.g. Mexico, Hungary, Chile) or when the data was only available for 2000s (e.g. Estonia).

We use *Real GDP* (Constant 2005 US$) annual data from World Bank as actual output. Again, following the Ball (1994) method, we calculate the output gap as follows. First, we took the log of actual output and then assumed that output is at its potential when inflation is at its peak and one year after its trough. The output trend is the fitted line that connects these two points and output gap is the difference between the fitted line and log output.

For *Unemployment* we use annual unemployment rate data from the OECD's *Economic Outlook*. For countries with missing data we substituted data from the World Bank's *World Development Indicators*. The only exceptions were Poland and Slovenia where World Bank did not have unemployment data for the disinflation periods. For Poland, we took the average of their monthly unemployment rate data from the Central Statistical Office of Poland. For Slovenia, we were not able to find reliable data for unemployment at 1989 (the start of their disinflation episode) so there is no sacrifice ratio for Slovenia using the unemployment method.

The *sacrifice ratio for output gap* is calculated as cumulative change in the output gap over the change in the inflation during the disinflation episode. The *sacrifice ratio for unemployment* is calculated using Zhang's (2005) method. He made two assumptions about the natural rate of unemployment. First, he assumed that the unemployment rate is at the natural level at the start of a disinflation episode (inflation peak). Secondly, he assumed that the natural level of unemployment is constant through each disinflation episode. The difference between the actual unemployment rate and the natural rate of unemployment is the employment loss caused by the disinflationary episode. The sacrifice ratio is then the employment loss over the change in inflation during the disinflation episode.

Initial inflation rate is the inflation rate at the peak of each disinflation episode. The *speed of disinflation* is the total change from peak to trough divided by the length of the episode. *Openness* is defined as imports divided by GDP. We use the ratio published by World Bank for each country and take the average of the data from 1990 until 2000.

We calculate sacrifice ratios using both output gap and unemployment data. Disinflation episodes are identified based on the Ball (1994) method in both cases. For the output gap sacrifice ratio, we follow Ball (1994) for annual data and for unemployment we follow Zhang (2005). Table 1 shows the sacrifice ratios calculated using these two methods.

Based on theory we expect disinflation to be costly in terms of output and unemployment. Our results confirm that for countries that have relatively low initial inflation rates. Countries with high initial inflation rates, however, seem to bear no cost or very little cost of disinflation. Hofstetter (2008) also found that during 1990s Latin American countries faced negative disinflation costs. He explained his puzzling results by various factors such as capital inflows to the region during 1990s, unique inflation history of the region and structural reforms.

Table 1- Sacrifice Ratios using output gap and unemployment data

Country	Disinflation Episode	Change in inflation	Initial inflation	Sacrifice Ratio Output gap	Sacrifice Ratio Unemployment
Australia	1995-1998	3.1	3.7	0.2	-0.3
Austria	1992-1998	3.0	3.8	1.6	0.9
Belgium	1990-1995	1.6	3.4	0.7	3.5
Brazil	1993-1998	2035.1	2038.8	-0.004	0.003
Canada	1990-1994	4.2	5.3	1.4	2.5
Chile	1990-2004	22.3	23.9	-1.5	0.3
China	1994-1999	22.5	21.6	-0.3	0.1
Czech Republic	1997-2000	6.2	9.7	0.4	1.6
Denmark	1988-1993	2.9	4.4	1.5	4.1
Estonia	2001-2003	3.3	5.2	-0.03	-1.5
Finland	1989-1996	5.8	6.4	4.2	10.7
France	1990-1994	1.6	3.3	0.8	3.8
Germany	1992-1996	3.4	4.9	0.5	2.1
Greece	1991-2000	16.7	19.7	1.1	1.1
Hungary	1995-2003	20.3	25.6	0.5	-1.2
Iceland	1988-1995	21.9	23.4	0.4	0.8
India	1998-2000	6.8	9.9	-0.2	0.1
Indonesia	1998-2000	36.3	41.8	0.03	0.04
Ireland	1989-1993	1.7	3.6	-1.1	-2.3
Israel	1994-2000	10.2	11.9	-0.5	0.1
Italy	1995-1998	3.0	4.8	0.04	0.1
Japan	1990-1995	3.1	3.1	0.04	0.7
Korea	1997-2000	3.2	5.6	2.0	3.2
Luxemburg	1992-1996	1.9	3.2	0.2	2.2
Mexico	1996-2006	31.0	34.7	-0.2	-0.7
Netherlands	1991-1996	1.3	3.2	3.1	4.3
New Zealand	1995-1999	2.3	3.0	-0.1	0.9
Norway	1987-1994	6.4	8.2	1.8	3.3
Poland	1990-1999	401.7	410.3	0.1	0.2
Portugal	1990-1999	10.8	13.2	1.2	0.7
Russia	1993-1997	543.2	560.3	0.02	0.03
Slovak Republic	1993-1997	10.9	17.2	-0.2	0.1
Slovenia	1989-1999	1149.1	1156.2	0.04	-
South Africa	1991-2000	10.0	15.1	1.1	-1.1
Spain	1990-1998	4.7	6.7	2.6	6.8
Sweden	1990-1998	9.3	9.5	2.2	6.3
Switzerland	1991-1998	5.3	5.6	1.1	2.4
Turkey	1994-1996	14.8	94.8	-0.8	-0.2
United Kingdom	1991-1994	4.8	7.1	0.4	0.7
United States	1990-1994	2.4	5.1	1.1	2.1

Determinants of sacrifice ratio

In this section we empirically investigate the effect of transparency and independence of central banks on sacrifice ratios. In addition to transparency and independence related variables we also consider other determinants of sacrifice ratio mentioned in the literature

such as initial inflation, speed of disinflation, length of disinflation episodes and openness of the economy.

Ball (1994) found that initial inflation levels have weak negative effects on sacrifice ratios. Zhang (2005) reported a negative and significant relationship between log of initial inflation and sacrifice ratios. We find that the log of initial inflation almost in all of our regressions have a negative and statistically significant effect on sacrifice ratios, in line with Zhang's (2005) conclusion that the relationship between initial inflation and sacrifice ratio seems to be non-linear.[1] However, when the log of initial inflation is included in the regressions along with transparency and independence indexes, there is no significant effect on either of the sacrifice ratios (output gap or unemployment), although the coefficients remain negative. The correlation coefficient between log of initial inflation and transparency index is -0.64, which could explain why as soon as we add transparency index into the equation log of initial inflation loses its significance.

Speed of disinflation is another determinant of sacrifice ratios. We follow Ball (1994) and calculate the speed of disinflation as the total change from peak to trough over the length of the disinflation episode. When we regress sacrifice ratios only on speed of disinflation, it has a negative and significant coefficient. However, when we regress sacrifice ratio on speed of disinflation as well as log of initial inflation the coefficient for speed of inflation changes sign but remain significant, while the coefficient of log of inflation remain negative and maintain its significance. This could be due to multicollinearity between speed of inflation and log of initial inflation (correlation coefficient is 0.74). As a result, we only include the log of initial inflation in our regressions.

We also considered change in inflation (from peak to trough) during disinflation period and length of disinflation period as explanatory variables. When we regress the sacrifice ratio on log of initial inflation and change in inflation, they both have significant coefficients with negative and positive signs respectively. When we add the transparency index, the coefficient is no longer significant. The length of disinflation period was not significant in any cases.

Following Ball (1994), we consider openness of the economy as an explanatory variable. The idea is that in a more open economy when there is a monetary contraction, exchange rate appreciation has a larger effect on the price level. Therefore, inflation falls more and sacrifice ratio becomes smaller. For both sacrifice ratios that we calculated the coefficients of openness are negative but not statistically significant. We therefore did not include this variable in the final regressions.

Table 2 reports our empirical results about sacrifice ratio (output gap) and its determinants. We use the same institutional measures used by Stasavage (2003). Columns (1), (2) and (3) show the results of regressing sacrifice ratio on each of forecast transparency, override possibility and report to legislature, respectively, as well as log of initial inflation and a constant. In Column (4) we regress sacrifice ratio on forecast transparency, override possibility, report to legislature, log of initial inflation and a constant. In all four columns coefficients of log of initial inflation have negative signs and statistically significant.

[1] We also tried linear, quadratic and cubic form but log of initial inflation had the best fit.

Table 2- Sacrifice Ratio (Output Gap) and Stasavage (2003) institutional measures

	Dependent Variable: Sacrifice Ratio (Output gap)			
	(1)	(2)	(3)	(4)
Forecast transparency	-0.171			-0.133
	(0.108)			(0.132)
Override possibility		-0.837*		-0.701
		(0.461)		(0.497)
Report to legislature			0.117	0.259
			(0.389)	(0.441)
Log of initial inflation	-0.379**	-0.349**	-0.311*	-0.376**
	(0.154)	(0.156)	(0.156)	(0.151)
Constant	2.093***	1.761***	1.412***	1.967***
	(0.559)	(0.512)	(0.406)	(0.467)
N	31	31	31	31
R^2	0.116	0.157	0.073	0.182

1- Heteroskedastic consistent standard errors in parentheses, *, **, and *** indicate significance at the 10%, 5% and 1% levels respectively.

2- The number of observations dropped to 31 as (Stasavage, 2003) institutional measures only cover 31 countries out of the 40 countries included in the study.

Forecast transparency's coefficients in both column (1) and (4) have a negative sign as expected but are not statistically significant. Override possibility has a negative sign and is significant in 10% level in column (2) but when it is included along with other variables it is no longer significant but it maintains its negative sign. Report to Legislature in column (3) and (4) has positive signs, but is not statistically significant. Stasavage's (2003) results show that forecast transparency has a negative and significant effect on sacrifice ratios but his results did not provide strong evidence about the significance of override possibility and report to legislature on sacrifice ratios.

Table 3- Sacrifice Ratio (Output Gap) and Transparency and Independence Indices

	Dependent Variable: Sacrifice Ratio (Output gap)					
	(1)	(2)	(3)	(4)	(5)	(6)
Transparency	0.151***			0.108*		0.103**
Index	(0.004)			(0.069)		(0.050)
Independence		0.747			0.723	0.464
Index		(706)			(0.693)	(0.519)
Log of initial			-0.218***	-0.107	-0.235***	-0.112
inflation			(0.070)	(0.145)	(0.084)	(0.282)
Constant	-0.376	0.200	1.198***	0.191	0.805**	-0.061
	(0.136)	(0.352)	(0.310)	(0.699)	(0.375)	(0.913)
N	40	37	40	40	37	37
R^2	0.122	0.029	0.100	0.136	0.117	0.144

1- Heteroskedastic consistent standard errors in parentheses, *, **, and *** indicate significance at the 10%, 5% and 1% levels respectively.

2- Independence index for three countries (Brazil, Denmark and Switzerland) are missing that is why N reduces to 37 whenever Independence Index is included.

We now replace Stasavage (2003)'s institutional measures with the transparency index and independence index estimated by Dincer and Eichengreen (2014). Table 3 shows these results. The transparency index in column (1) is significant but has the wrong sign. In columns (4) and (6) when we include the transparency index along with other variables it remains statistically significant but still has the wrong sign. We expect to see negative sign for transparency index indicating that the more transparent central banks face lower sacrifice ratios. The independence index is not significant in any of the regressions. Again, the limited number of countries for which we have data, combined with the high correlation (-0.64) between the log of initial inflation and the transparency index, might be the reason why the coefficient for log of initial inflation loses its significant when transparency index is included.

Table 4 shows the results of regressions using the unemployment based sacrifice ratios and Stasavage (2003) institutional measures. The only significant explanatory variable in all the regressions is log of initial inflation. The coefficients for forecast transparency, override possibility and report to legislature have negative signs in column (1)-(3) but they are not significant. Report to Legislature in column (4) is still not significant but it changes sign.

Table 4- Sacrifice Ratio (unemployment) and Stasavage (2003) institutional measures

	Dependent Variable: Sacrifice Ratio (Unemployment)			
	(1)	(2)	(3)	(4)
Forecast transparency	-0.299			-0.228
	(0.252)			(0.308)
Override possibility		-1.161		-0.916
		(0.798)		(0.888)
Report to legislature			-0.140	0.095
			(0.786)	(0.931)
Log of initial inflation	-0.870***	-0.807**	-0.773**	-0.873***
	(0.298)	(0.319)	(0.306)	(0.312)
Constant	4.488***	3.813***	3.573***	4.444***
	(1.281)	(1.059)	(0.858)	(1.178)
N	31	31	31	31
R^2	0.111	0.117	0.084	0.131

1- Heteroskedastic consistent standard errors in parentheses, *, **, and *** indicate significance at the 10%, 5% and 1% levels respectively.

2- The number of observations dropped to 31 as (Stasavage, 2003) institutional measures only cover 31 countries out of the 40 countries included in my study.

Table 5 shows our results when we replace Stasavage (2003)'s institutional measures with the transparency and independence indices. While the transparency index is significant in column (1), (4) and (6) its coefficients still have positive signs. The independence index in column (2) is significant but when other explanatory variables add to the regression it is no longer significant although it keeps its positive sign. Its positive sign seems to be in line with Debelle & Fischer (1995)'s conclusion that if central banks are not held accountable for their actions, they might become too conservative and disregard the short-term trade-off between inflation and output. Coefficients of log of initial inflation in column (3) and (5) are negative and significant. In column (6) when all other

explanatory variables are also included, it is no longer significant but still has a negative sign.

Table 5- Sacrifice Ratio (Unemployment) and Transparency and Independence Indices

	Dependent Variable: Sacrifice Ratio (Unemployment)					
	(1)	(2)	(3)	(4)	(5)	(6)
Transparency Index	0.367*** (0.002)			0.303** (0.049)		0.292** (0.048)
Independence Index		2.772* (1.564)			2.452 (1.506)	1.856 (0.229)
Log of initial inflation			-0.527*** (0.161)	-0.168 (0.389)	-0.539*** (0.189)	-0.114 (0.695)
Constant	-0.968* (0.086)	-0.081 (0.678)	2.799*** (0.703)	-0.124 (0.926)	1.38* (0.742)	-1.310 (0.442)
N	39	36	39	39	36	36
R^2	0.147	0.080	0.097	0.153	0.150	0.192

1- Heteroskedastic consistent standard errors in parentheses, *, **, and *** indicate significance at the 10%, 5% and 1% levels respectively.
2- We could not find unemployment rate for Slovenia in 1989. Therefore, we could not calculate sacrifice ratio for Slovenia. That is why N drops to 39. In addition, Independence index for three countries (Brazil, Denmark and Switzerland) are missing that is why N reduces to 36 whenever Independence Index is included.

Conclusion

This paper studies the effect of central banks transparency and accountability levels on the cost of disinflation. To capture the cost of disinflation we followed Ball (1994) and Zhang (2005) to calculate sacrifice ratios based on output gap and unemployment, respectively. We then use forecast transparency, override possibility and report to legislature data provided by Stasavage (2003) to investigate whether they affected the cost of disinflation for 40 OECD countries during 1990s. our results show no evidence that central banks with more transparent forecasts, or more override possibility from the government, or the ones that have to report to legislature face lower sacrifice ratio.

However, when we use more comprehensive estimates for transparency index it seems that more transparent central banks face higher disinflation costs. It might be because the more transparent central banks have a lower initial inflation rate to begin with. Therefore, reducing the inflation rate further is very costly for them compared to countries that begin with double digit inflation rates. We find no evidence that there is significant relationship between central bank independence and sacrifice ratio.

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