How Are Inflation Targets Set?*

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ABSTRACT

This paper aims to contribute to better understanding on how inflation targets are set. For this reason, we first gather evidence from official central bank publications on how inflation targets are set and second; we estimate the determinants of the level of inflation target in 19 inflation targeting countries using unbalanced panel interval regressions (to deal with the issue that targets are typically set as a range rather than as a point). Inflation targets are found to reflect macroeconomic fundamentals. Higher level as well as higher variability of inflation are associated with higher target. The setting of inflation target is also found to have an important international dimension, as higher world inflation is positively correlated with inflation targets. Rapidly growing countries exhibit higher inflation targets. Our results also suggest that larger width of inflation target is set in more volatile macroeconomic environment. We find that central bank credibility is negatively associated to the level of inflation target, suggesting that less credible central banks are likely to recognize the risks related to anchoring inflation expectations at low levels. On the other hand, government party orientation does not matter even in less independent central banks.

Keywords: inflation targeting, central bank, inflation, credibility, independence.
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1 Introduction

Monetary policy transparency has increased substantially over the course of last 10 to 20 years and communication policies of central banks have changed dramatically (Blinder et al., 2009, Crowe and Meade, 2008, Dincer and Eichengreen, 2010). While some central banks did not announce even the changes in their monetary policy rate back in 1980s, now they provide detailed information about the monetary policy conduct and find transparency as important factor for building central bank credibility in order to manage inflation expectations more effectively (van der Cruijsen and Demertzis, 2007).

More than 20 countries adopted inflation targeting regime in the 1990s and 2000s. A characteristic feature of this monetary policy regime is an explicit numerical target for inflation, as well as a major role for inflation forecast in monetary policy conduct due to lags in monetary transmission and a high degree of accountability and transparency (Svensson, 2007; for a recent survey on inflation targeting, see Walsh, 2009). Nevertheless, as we find, the amount of information that the central banks provide about how they set one of their most important policy variables – the inflation target – varies considerably. While some central banks provide very detailed statements, others do not give *any* explanation about the process of inflation target setting and merely state the numerical target.

Economic models consider inflation targets as exogenous factor, but inflation targets differ from country to country. While Reserve Bank of Australia specifies their inflation target between 2-3%, Bank of England defines its target as 2% with +/- 1 percentage point tolerance band and the Bank of Thailand targets inflation between 0-3.5%. In addition, there are countries that implemented inflation targeting regime as a disinflation strategy. For example, Central Bank of Brazil adopted this regime in 1999 with the target of 8% with +/- 2 percentage point tolerance interval and decreased the target step by step to 4.5% (with +/- 2 percentage point tolerance interval). Similarly, Bank of Israel started with 14-15% target in 1992 and then decided on a downward path for inflation targets at the end with a 1-3% inflation target.

We aim to bridge the gap in literature and analyze which factors matter for the apparent heterogeneity in terms of inflation target setting. We first provide an extensive search in central bank official documents in order to shed light on which factors are deemed crucial by central bankers in their considerations about inflation target. Next, we construct an empirical model to investigate the determinants of inflation targets as well as the width of inflation target. While the

official central banks documents provide a useful guidance on which factors are likely to influence the inflation target setting, we also aim to investigate whether there are some additional, predominantly institutional, factors that matter for the process of setting the target. For example, whether central banks that are viewed as less credible feature higher inflation target in order to decrease the risk that they will not be able to meet the target, as they manage inflation expectations less effectively or whether central bank independence matters in the process of inflation target setting.

Anticipating our results, we find that not only macroeconomic fundamentals are important for the level of inflation targets, but some institutional characteristics matter as well. Notably, the results stress importance of central bank credibility in delivering low inflation (see Blinder, 2000, for supportive evidence based on surveys): we find credibility to be negatively associated to the level of inflation target. On the other hand, government party orientation is not found to matter even in less independent central banks. This likely reflects the fact that inflation targeters typically exhibit a high degree of independence already before the adoption of inflation targeting regime and sufficient degree of independence is viewed as one of the pre-conditions for successful adoption of inflation targeting (Amato and Gerlach, 2002). Finally, our results also suggest that central banks set larger width of inflation target in a more volatile macroeconomic environment.

The paper is organized as follows. Section 2 provides a detailed overview on what central banks say about inflation target setting. Section 3 describes the data and empirical methodology. We present our results in section 4. Concluding remarks are provided in section 5. Appendix with additional descriptive statistics follows.

2 What Do Central Banks Say about Inflation Targets?

This section presents a brief survey of central bank official publications related to the setting of inflation target. The amount of information that central banks provide in this respect varies bank by bank. Some banks explain the process how they set the target in a detail. On the other hand, other central banks in our sample remain largely silent on this issue and merely state the numerical target without any further comments.[1] Table 1 presents the information on which authority is responsible for inflation target setting as well as information on the factors that central banks find important for setting the inflation target. We can see that although the degree of goal independence of central banks varies across the banks the target is predominantly set by

[1] At the beginning of 2010, we plan to send the short questionnaire including this paper to all central banks in our sample to verify the information provided in this section.

the central bank and government jointly. Next, central bank frequently state that past domestic inflation as well as economic growth matter in the considerations how to set the target. Several central banks mention more specific factors such as price convergence or zero interest rate bound. The detailed information on what central banks state about inflation target setting is provided below.

Table 1: Inflation Target Setting and Its Determinants

Country	Who sets the target?	The Determinants of inflation targets
Australia	Central bank and government jointly	Business cycle fluctuations
Brazil	Central bank and government jointly	n.a.
Canada	Central bank and government jointly	Costs of inflation, Measurement error, Wage rigidities, Zero interest rate bound
Chile	Central bank	Deflation risk
Colombia	n.a.	n.a.
Czech Republic	Central bank	Past inflation, Inflation expectations, Price convergence, Wage rigidities, Zero interest rate bound, measurement error
Finland	Central bank and government jointly	n.a.
Israel	Government	Measurement error, Wage and price rigidities, Zero interest rate bound
Mexico	Central bank and government jointly	n.a.
New Zealand	Central bank and government jointly	Past Inflation, Foreign Inflation, Target Expectations
Peru	Central bank and government jointly	n.a.
Poland	Central bank and government jointly	Economic growth, Maastricht inflation criterion for euro adoption
South Africa	n.a.	n.a.
South Korea	Central bank and government jointly	Past Inflation, Economic Fundamentals, Monetary Policy Flexibility
Spain	Central bank and government jointly	n.a.
Sweden	Central bank	Past Inflation, Costs of Inflation, Risks of Deflation, Measurement Error
Switzerland	Central bank	Measurement Error
Thailand	n.a.	Foreign Inflation
United Kingdom	Government	Sustainable growth

Source: The column 'Who sets the target?' is based on Mahadeva and Sterne (2000) and Baltensperger et al. (2007). The column 'The Determinants of inflation targets' is based on various central bank official publications and web pages.

Bank of Canada

The bank notes that inflation is typically not targeted close to zero for three main reasons: "*(i) the measurement error embedded in existing price indexes; (ii) the labour market consequences of the presence of downward nominal wage rigidities; and (iii) the problems posed by the constraint that nominal interest rates cannot go below zero.*" (see http://www.bankofcanada.ca/en/press/background_nov06.pdf).

Bank of England

The bank states that the inflation target is chosen to be consistent with economic stability and growth: "*the role of price stability in achieving economic stability more generally, and in providing the right conditions for sustainable growth in output and employment.*"
(see http://www.bankofengland.co.uk/monetarypolicy/framework.htm).

Bank of Israel

The banks gives several arguments how the target is chosen: "*the aberration in measuring inflation that stems from not taking into account the improvement in quality of goods; a positive inflation reduces the risk of being constrained by the zero bound on nominal interest rates; a small inflation rate is the oil in the wheels of the relative price system—when there is a general upward trend in prices it is easier to change relative prices of goods by raising prices by more or less than the general rate of inflation*". Next, it is also noted that: "*When both prices and wages are sticky downwards, lowering a relative price could be delayed and thus cause distortion in the allocation of resources. We have no basis to think that in Israel one of these factors is any different from that in other developed countries*" (see Bank of Israel, 2007, page 19).

Bank of Korea

Bank of Korea states that : "*In setting the inflation target itself at the range of 3.0± 0.5%, the Bank aims to reflect the appropriate rate of inflation consistent with Korean economic fundamentals and to allow itself flexibility in conducting monetary policy to deal with short-term economic fluctuations.*" (http://www.bok.or.kr/broadcast.action?menuNaviId=631). This suggest that inflation as well as the degree of economic activity has come into considerations when setting the inflation target.

Bank of Poland

The bank states in the document on their monetary policy strategy that the target is chosen to be consistent with economic growth as well as with Maastricht inflation criterion for euro adoption: "*the above-defined continuous inflation target is consistent with strong economic growth. At the same time, the*

predefined inflation target comes close to the expected reference value for the inflation criterion" (Bank of Poland, 2003).

Bank of Thailand

Bank of Thailand states that "*The MPC considers the 0 - 3.5 per cent target range for core inflation to be appropriate for the Thai economy, while at the same time providing sufficient flexibility for economic growth*". Bank of Thailand also explains explicitly the width of the target: "*The target band width of 3.5 per cent will help cushion temporary economic shocks and minimize the need for the MPC to adjust monetary policy frequently, thereby reducing short-term interest rate volatility and promoting financial stability.*" (see http://www.bot.or.th/ENGLISH/MONETARYPOLICY/TARGET/Pages/Target.aspx). This suggests that the degree of economic activity may potentially act as a determinant of inflation target. As concerns the determinants of target band width, the volatility of macroeconomic environment is likely to be positively associated with the width.

Central Bank of Chile

The bank notes that the inflation target is set in order to aviod the risk of deflation: " *The Central Bank of Chile does not aim for an inflation level below the specified range because of the risk of disinflation, which could be very costly in terms of employment and production*" (see http://www.bcentral.cl/eng/about/functions/05.htm).

Czech National Bank

The Czech National Bank provides an extensive explanation about how the target is set. The Bank has revised the target several times from its introduction in 1998 in order to support the desinflation process (Holub and Hurnik, 2008). Initially, the CNB states: ``*The long-term inflation target must be consistent with the strategy for our integration into European institutions, and above all with the demands of EU and EMU accession*`` and ``*the rate of progress towards price and monetary stability and the anticipated time horizon for achieving this must take into account necessary structural adaptations, particularly the adjustment of relative prices.*" (CNB, 1999). Current and expected inflation as well as general macroeconomic environment are mentioned as determinants: ``*The inflation target for 2001 reflects the low inflation level achieved so far and expresses the monetary policy intention to maintain this low level in the next period. The target level is in line with the predictions for inflation factors in 2001 and conforms with the inflation expectations of economic agents. The forecasts also indicate that this inflation target is consistent with the expected favourable characteristics of the Czech macroeconomic environment.*" (CNB, 2000). Next, price convergence towards the euro area is noted as a reason for higher inflation target, as compared to

the definition of price stability of the European Central Bank: ``*The suggested headline inflation target is in line with the CNB Monetary Strategy. ... The proposed trajectory for the inflation target can meanwhile be expected to leave sufficient room for price adjustment in connection with EU convergence.*" (CNB, 2001). Similarly, : ``*This small inflation differential reflects the long-term real convergence of the Czech economy towards the euro area average.*" (CNB, 2004). More recently, statistical overvaluation in measuring inflation, wage rigidity and zero nominal interest rate bound are explicitly mentioned as factors taken into account: ``*The inflation target ... also conforms to the limitations stemming from statistical overvaluation in measuring inflation. The target takes into account also the zero nominal interest rate bound and the potential downward inflexibility of wages.*" Finally, the target for 2010 onwards is set to 2% with 1% tolerance band. The determinants mentioned are the same as in previous cases: ``*the need to keep open a positive inflation differential as one of the channels for raising the Czech price level to the level of the advanced countries will gradually subside.*" (CNB, 2007).

Reserve Bank of Australia

In a series of statements on the conduct of monetary policy, it is noted that the bank's formulation of inflation target: " *allows for the natural short-run variation in inflation over the cycle while preserving a clearly identifiable performance benchmark over time* ".
(http://www.rba.gov.au/MonetaryPolicy/statement_conduct_mp_4_06122007.html)

Reserve Bank of New Zealand

The Reserve Bank of New Zealand provides the following arguments about how the inflation target is chosen: "*The agreement [about inflation target] is broadly as the markets have been anticipating and is consistent with the publicly stated advice of expert commentators. I expect it to be well-received by the financial markets and by other stakeholders in the economy.*"
(see http://www.rbnz.govt.nz/news/2002/0124629.html). "*The raising of the bottom of the band brings the overall target more in line with New Zealand's inflation outcomes in recent years and those in other countries.*" (RBNZ, 2002). As we read these lines, the first statement suggests the role of financial market expectations, while the second points out an importance of both domestic and foreign inflation developments.

Sveriges Riksbank

The Sveriges Riksbank states in a press release to the introduction of inflation target in 1993 that "*This objective corresponds to the current underlying rate of inflation.*" (Sveriges Riksbank, 1993). The only determinant referred is thus current inflation. Recently, a more elaborate description of the target

appeared at the Riksbank web pages. Similarly to the main arguments of optimal inflation theory (see Billi and Kahn, 2008), the Riksbank explains the target as a result of trade-off between high volatile inflation: "*Too high inflation is harmful to the economy, as inflation usually varies substantially when it is high.*" and deflationary risks: "*But too low inflation is not good either. A too low inflation target increases the risk of deflation, that is, the general price level falls. Deflation has historically been proved to create problems.*", also pointing out the consumer price index (CPI) bias: "*There is a tendency for the CPI to overestimate the actual rate of increase in the general price level. This is because it is difficult to entirely exclude the effects of quality changes in the CPI. To avoid deflation there is thus reason to set the target at a positive figure.*" (see http://www.riksbank.com/templates/Page.aspx?id=10596). The Riksbank sees 2% inflation target as consistent with the above arguments.

Swiss National Bank

The bank states that it takes measument error of inflation in consideration for the choosing the target: "*Measurement problems arise, for example, when the quality of goods and services improves. Such changes are not properly accounted for in the CPI; as a result, measured inflation tends to be slightly overstated*" (see http://www.snb.ch/en/iabout/monpol/id/monpol_strat/6).

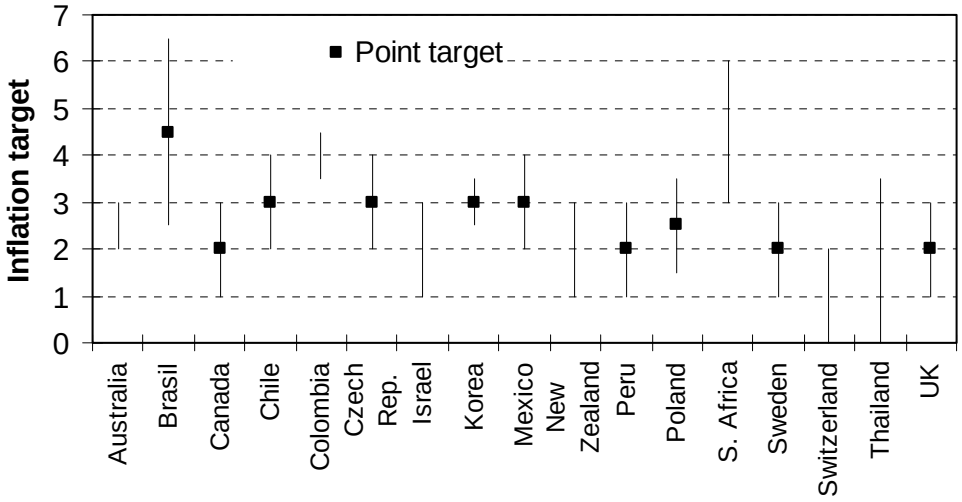
We were unable to find the potential determinants of inflation target for other central banks. It is noteworthy that Bank of Finland and Bank of Spain no longer target inflation, as they are now part of the euro area. Therefore, information about previous monetary policy regime could no longer be available. Some other central banks such as Central Bank of Colombia or South African Reserve Bank do not clarify how the inflation target is set, but explain the benefits of low inflation environment.

All in all, central banks state that economic variables play a role in considerations for setting the target. It is typically (domestic and foreign) inflation rate, stability of macroeconomic environment as well as the degree of economic activity that are mentioned to matter. Sometimes, price convergence and statistical overvaluation is noted. As regards the latter, the central banks refer to it as one of the factors for targeting positive inflation. We want to empirically investigate whether these factors contribute to inflation target setting. Nevertheless, we also aim to examine a broader set of indicators especially those related to institutional setting of central banks, i.e. indicators such as central bank credibility or central bank independence, as the government is a part of inflation target setting in most countries in our sample.

3 Data and Empirical Methodology

We collect the data on 19 countries targeting inflation from the year when the country adopted inflation targeting regime until 2008. As a result, our panel is unbalanced. The cross-sectional dimension of our data matrix is the same as in Mishkin and Schmidt-Hebbel (2001), but more recent data on these countries are included as well. Several developing countries that adopted inflation targeting only recently are thus not included, as the time coverage is too short (see Horváth, 2009, for a list of countries that adopted inflation targeting regime). The list of countries in our sample is available in Table 1 and their current inflation targets are presented in Figure 1. Our sample consists of developed as well as emerging economies. Yearly data are used, as inflation targets do not change more frequently.

Figure 1 – Inflation Targets, As of 2008



Note: The figure presents the annual inflation target for our sample countries (Finland and Spain are not reported, as they do not target inflation any longer and currently, they are members of the euro area).

Most countries revise their inflation targets from time to time and inflation targets are typically defined in terms of range with or without some central value. Central banks evaluate inflation to be consistent with their inflation target, if it develops within the target band. For this reason, we employ panel interval regression with random effects, where the dependent variable is defined as interval (Cameron and Trivedi, 2005). Moreover, this technique also deals with the issue that the dependent variable is censored. For robustness checks, we use[2] target midpoint as the dependent variable and estimate the standard random effects model. Nevertheless, it is important to emphasize that in this case the analysis would not reflect uncertainty concerning the nature of the

[2] Some central banks specify only target band and do not provide central target, see Figure 1. In this case, we calculate the mid-point of target band. The regression results are largely in line with baseline estimates and are available upon request.

exact values within each interval correctly nor would it deal adequately with the left- and right-censoring in the tails.

Our baseline empirical model takes the following general form

$$[\pi_{i,t}^{T(L)}, \pi_{i,t}^{T(U)}] = \beta \mathbf{X}_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

where $\pi_{i,t}^{T(L)}$ and $\pi_{i,t}^{T(U)}$ inflation target lower and upper bound, respectively, in country i and time t. $\mathbf{X}_{i,t-1}$ is a vector of explanatory variables in country i and time $t-1$. Finally, β is a vector of estimated parameters of the model and $\varepsilon_{i,t}$ is a residual.

In our baseline model, the explanatory variables are lagged by one period to deal with potential endogeneity. This is adequate in our view, as there is evidence that inflation targets have an effect on at least some of our explanatory variables.[3] Many central banks, especially those which adopted inflation targeting as a disinflation strategy such as Colombia and Peru as well as Israel, Korea, Chile or Mexico in the past set their inflation target one year ahead. In the U.K., the Government's inflation target is announced each year by the Chancellor of the Exchequer in the annual Budget statement. Nevertheless, other central bank announce the target more years in advance. For example, Central Bank of Brasil announced its target several times two years in advance. To deal with this issue, we re-estimate all regressions with explanatory variables lagged by two as well as three periods. In addition, we estimate our empirical model based on the restricted sample, where we include only those countries in those time periods, for which we know the exact date, when the decision about inflation target was made and when it became into effect. The lag of explanatory variables is thus time and country specific in the 'Exact lag' model, i.e. the lag exactly conforms to the announcement of the target.

[3] The empirical literature typically analyzes the impact of introducing inflation targeting on other macroeconomic variables (such as: development of – expected – inflation and GDP) or their characteristics (such as volatility or persistence of inflation). Mishkin and Schmidt-Hebbel (2006), for example, have analyzed an impact of inflation targeting on the level of inflation, as well as intensity of inflation response to various shocks. Levin et al. (2004), Vega and Winkelried (2005) and Yigit (2007) have examined if introducing an inflation target has lowered the persistence and volatility of inflation. Johnson (2002, 2003), de Mello and Moccero (2006) and Cerisola and Gelos (2009) have evaluated the inflation target impact on the level of expected inflation. Babecky et al. (2009) and Franta et al. (2007) have inter alia analyzed the impact introducing the inflation target on inflation persistence. Demir and Yigit (2008) find that inflation targeting matters for central bank credibility.

Our explanatory variables, $\mathbf{X}_{i,t-1}$, are, to a certain extent, motivated by the findings of Section 2. These are typically variables capturing the state of economy such as inflation or the degree of economic activity. In addition, we include variables that are deemed to influence central bank policies in general such as the institutional setup of central bank, i.e. whether the banks are granted independence or how credible their policies are perceived by the public.

Next, we provide a full list of our explanatory variables, $\mathbf{X}_{i,t-1}$. These are both variables capturing the stance of economy as well as the institutional variables such as central bank independence or credibility.

Inflation

Consumer price index inflation measured as year-on-year change is included in order to evaluate,if the central bankers take into account past inflation developments when setting the target. We hypothesize that higher inflation is associated with higher inflation target. This can be so as central bankers may believe that inflation expectations are as least to a certain extent formed by the past inflation.[4] The source of data is IFS database of the International Monetary Fund.

Inflation volatility

As a measure for inflation volatility (being of utmost importance in debate about optimal inflation, see Billi and Kahn, 2008) we use sample variance of past detrended inflation record. Inflation is detrended using the Hodrick-Prescott filter in order to reflect the fact that some countries adopted inflation target as a disinflation strategy. For sensitivity analysis, we also calculate inflation volatility based on inflation series that are not detrended.[5] As we expect that policymakers who decide about inflation target value more recent developments, we make average of sample variances in past 5 and 10 years (where the inflation measures π are already HP-detrended).

$$var(\text{inflation})_t = \frac{1}{2}\sum_{i=t-5}^{t}\frac{(\pi_t-\bar{\pi})^2}{5}+\frac{1}{2}\sum_{i=t-10}^{t}\frac{(\pi_t-\bar{\pi})^2}{10} \qquad (2)$$

Obviously, the choice of 5 and 10 years is somewhat arbitrary, but it has to be mentioned that alternative specifications such as simple 10 years sample variance resulted in largely similar

[4] We prefer actual inflation to inflation expectations data that are typically based on surveys due to data availability as well as due to the fact that the accuracy of expectations data may be an issue; see Caskey (1985), Evans and Gulamani (1984), Jeong and Maddala (1996), Evans and Honkapohja, (2001), among others. Note that the inflation measure includes the measurement error of inflation and there are not reliable estimates of the measurement error to model the effect of this error separately from inflation.

[5] Nevertheless, our regression results are largely unchanged irrespective of the measure of inflation volatility we use.

estimated effect of inflation volatility on inflation target in our econometric exercises. The source of data is IFS database of the International Monetary Fund.

World inflation

We also use world CPI inflation, as central banks especially in small open economies may understand world inflation as a certain leading indicator for domestic inflation. This supposition is supported by recent empirical evidence by Mojon and Cicarelli (2010), who document that nearly 70% of variance of inflation in OECD countries is due to common shocks. The source of data is Federal Reserve Bank of Cleveland.

Price level

We include the price level measured by PPP to test the hypothesis of price convergence: Do countries with lower price level set higher inflation target to reflect the expected price convergence towards more developed countries? Price level may also serve as a useful indicator to assess if inflation target are set differently in emerging market countries. The source of this data is the Penn World Table.

GDP per capita

Similarly to the price level, GDP per capita is included to investigate if inflation targets are higher in poorer countries. Poorer countries also tend to have more volatile macroeconomic environment (as financial markets are typically underdeveloped, see Coricelli and Roland, 2008) and central bankers may more likely set wider tolerance intervals for inflation target. Alternatively, we use the dummy for emerging market economies instead of GDP per capita. The source of data is IFS database of the International Monetary Fund.

GDP growth

We hypothesize that central bankers set higher inflation target in fast growing economies, as these countries typically exhibit higher inflation at least in short and medium-term (this can be rationalized by the New Keynesian Phillips curve, see Gertler and Gali, 1999). The source of data is IFS database of the International Monetary Fund.

Credibility

Central bank credibility is likely to affect the formation of inflation expectations. Private sector long-term inflation expectations are found to give greater weight to inflation target under credible

central bank (Bomfim and Rudebush, 2000). Typically, credibility is defined as a difference between inflation target and inflation expectations (Svensson, 1999). Blinder (2000) also argues that the difference between inflation target and inflation expectations can be taken as objective measure of central bank credibility.[6] For this reason, we use the cross-sectional index of central bank credibility developed by Cecchetti and Krause (2002). The credibility index has no time-series dimension, it will only serve to explain cross-country variation. This might be sufficient for our empirical exercise as central bank credibility is unlikely to change abruptly over time (Holub and Hurnik, 2008). The index is based on the data before the inflation targeting was introduced in our sample countries. We hypothesize that more credible central banks, especially those in developed countries, can manage inflation expectations more effectively and set inflation target below the targets typical for emerging market economies.

Independence

Less independent central banks may be more prone to government influence and, knowing that they are likely to deliver higher inflation, may eventually prefer higher inflation target (see Siklos, 2008, for a recent survey of theories and empirical evidence on central bank independence and inflation). There are various measures of central bank independence and various studies cover different set of countries (for a survey on central bank independence measures see Arnone et al., 2006). Cukierman (1992) sets up a central bank independence (CBI) index, which is a composite measure based on both legal and real indicators. We use several recently developed CBI indexes that build on original Cukierman (1992) contribution. First, we employ central bank autonomy index by Arnone et al. (2008), who developed the index for a large group of central banks for the late 1980s and 2003. We use the index only for 2003, as our sample countries adopted inflation targeting regime later than in the 1980s. The Arnone et al. (2008) index distinguishes between political (goal) and economic (instrument) independence. Political independence refers to the extent to which central bank can select the objective of monetary policy, while economic independence refers to the degree of freedom the central bank has in selecting its instruments. As Arnone et al. (2008) show that political and economic independence can differ sharply for certain central banks, we examine the impact of political and economic central bank independence jointly as well as separately. Alternatively, we also use data from Guillén and Polillo (2005), who

[6] It is vital to note that the difference between inflation expectations and inflation target is likely to be good indicator of credibility rather than the difference between actual inflation and inflation target. Short-term developments in inflation are influenced, to a certain extent, by temporary shocks, while long-term inflation expectations are likely to be immune to the short-term disturbances. For instance, Holub and Hurnik (2008) document that albeit inflation targets were missed relatively often in the Czech Republic, inflation expectations remained anchored, i.e. close to the inflation target.

extend the Cukierman central bank independence index up to 2000, as their country coverage is comprehensive. Their measure is time-varying and more recent data that are not available are extrapolated using the last observation in each country.

Government party orientation

Finally, we include a measure of government party orientation. In principle, government may influence the setting of inflation target, as the targets are typically set based on a joint agreement of central bank and government. In some countries such as the United Kingdom it is the government who sets the target and central bank does not have a goal independence. We hypothesize that left-leaning governments favor greater expenditures and higher inflation (Hibbs, 1977, Alesina, 1988) and in consequence, may support higher inflation targets. The data are taken from the World Development Indicators database. The variable is coded is follows: -1 for left wing (UK labour, US democratic), 0 for center and other orientation, 1 for right wing (UK conservative, US republican).

Obviously, government party orientation may be more influential in less independent central banks and therefore we construct an additional variable capturing the joint effect of government party orientation and the central bank independence. As we work with two different indexes of independence, we consequently have two corresponding measures of joint effect of government party orientation and independence. Moreover, for Arnone et al. (2008) index we are also able to distuinguish political and economic central bank independence. In this respect, Alesina, Roubini and Cohen (1997), Boix (2000), Clark (2003), Sakamoto (2008) and Belke and Potrafke (2009) study whether government party orientation matter for interest rate setting in less independent central bank. Their research shows that party orientation is of limited importance probably due to high degree of central bank independence. In constrast to these studies, we examine the effect of government party orientation on setting the inflation target and we also distiguish between political and economic central bank independence, as political independence can clearly be more relevant in our case. The scatter plots of inflation target (central value) and explanatory variables are presented in Figure 2 and 3 in the Appendix.

4 Results

We present our baseline estimates in Table 2 and focus in a detail on the effects of central bank independence in Table 3. The results unambigously suggest that actual inflation rate matters for the setting of inflation targets. Similarly, policy makers also take the variability of inflation into

account and set higher targets in an environment with more volatile inflation. This likely reflects their concerns about deflation risk. Alternative measures of inflation variability yield largely similar results (these are available upon request). The degree of economic activity is also found to matter. Higher growth is likely to go hand-in-hand with higher inflation at least in short to medium-term horizon. This corresponds to the reasoning based on the New Keynesian Phillips curve. Higher world inflation delivers higher inflation targets, as policy makers recognize that substantial part of inflation price index is often driven by world prices. This finding conforms with Cicarelli and Mojon (2010), who document a prominent role of global inflation for domestic inflation developments in the OECD countries.

The results indicate that central bank credibility influences the level of inflation target. This is probably so, as less credible central banks (i.e. those with less impressive track record) may be more concerned about their ability to anchor inflation expectations of the public and rather prefer higher target. This correnspponds to the findings of Blinder (2000), whose survey indicates that central bankers recognize credibility as a very important factor for maintaining low inflation. Similarly, more credible central banks can set lower target during the disinflation with the same output loss (Nikolae and Nolan, 2006).

On the other hand, despite some central banks mention price convergence as a factor for the choice of inflation target (see Table 1), we do not find it to be a general phenomenon. Nor central bank independence neither government party orientation is found to influence the level of inflation targets. As Belke and Potrafke (2009) note, government party orientation may still matter if the degree of central bank independence is low. Therefore, we construct an interaction term of government party orientation and central bank independence, but similarly to Belke and Potrafke (2009) we fail to find it significant anyway.

Table 2: The Determinants of Inflation Targets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CPI inflation	0.50***	0.49***	0.549***	0.49***	0.49***	0.49***	0.50***
	(15.75)	(14.47)	(15.83)	(15.15)	(15.05)	(15.47)	(15.55)
Inflation volatility	0.29**	0.29***	0.23***	0.23***	0.24***	0.22***	0.31***
	(2.61)	(2.46)	(2.67)	(2.64)	(2.68)	(2.51)	(2.71)
GDP growth	0.15***	0.16***	0.16***	0.15***	0.15***	0.15***	0.16***
	(3.96)	(3.76)	(4.11)	(3.77)	(3.77)	(3.75)	(4.03)
World inflation	0.12**	0.11*	0.13**	0.13**	0.13**	0.12**	0.11*
	(2.13)	(1.75)	(2.29)	(2.19)	(2.24)	(2.15)	(1.91)
Credibility	-0.51**	-0.53*	-0.49**	-0.58**	-0.60**	-0.48	-0.65**
	(-2.21)	(-1.76)	(-2.13)	(-2.30)	(-2.39)	(-1.56)	(-2.15)
Price level		-0.01					
		(-0.16)					
Independence			-0.50				
			(-1.01)				
Gov. party orientation				-0.07			
				(-0.66)			
(Independence + Gov. p. or.)					-0.09		
					(-0.68)		
GDP per capita						-2.50	
						(-0.19)	
Emerging markets dummy							-0.19
							(-0.73)
Constant	0.63*	0.76*	0.88**	0.66**	0.72**	0.65*	0.77**
	(1.95)	(1.86)	(2.16)	(2.03)	(2.13)	(1.86)	(2.04)
No. of observations	134	114	130	130	130	130	130
Pseudo R-squared	0.78	0.80	0.78	0.78	0.79	0.77	0.77

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Panel interval random effects estimation. Inflation volatility, GDP per capita and price level coefficient premultiplied by 10^6 and 10^3, respectively. T-statistics in parentheses. All explanatory variables are lagged by one period. Independence refers to the central bank independence index developed by Arnone et al. (2008).

Next, we also examine if the inflation target setting is different in emerging countries (i.e. the countries that often implemented inflation targeting as disinflation strategy), proxied by GDP per capita. GDP per capita may be preferable to dummy for emerging countries, as it gives richer information on the state of economic development (the group of emerging market economies is rather heterogenous, for example, Israel is often considered as emerging economy, but its GDP per capita is at the level of industrialized countries and some countries that are typically regarded as emerging economies have the GDP per capita about ten times lower than Israel not far from the levels of some developing countries). The results suggest that albeit the inflation targets are typically higher in emerging countries, the inflation target setting process is largely similar. This is also confirmed by the regression in Table 2, column 7, where we use the dummy for emerging market economies.

Table 3: The Determinants of Inflation Targets:
Different Measures of Central Bank Independence

	(1)	(2)	(3)	(4)	(5)	(6)
CPI inflation	0.50***	0.50***	0.49***	0.49***	0.50***	0.50***
	(15.97)	(15.66)	(15.01)	(15.10)	(15.71)	(15.07)
Inflation volatility	0.29***	0.30***	0.31***	0.31***	0.23***	0.23***
	(2.56)	(2.51)	(2.75)	(2.68)	(2.57)	(2.65)
GDP growth	0.16***	0.15***	0.14***	0.15***	0.16***	0.15***
	(4.17)	(3.96)	(3.73)	(3.79)	(4.02)	(3.85)
World inflation	0.13**	0.12**	0.13**	0.13**	0.11**	0.12**
	(2.30)	(2.12)	(2.28)	(2.218)	(1.96)	(2.00)
Credibility	-0.49**	-0.51**	-0.63**	-0.56**	-0.44	-0.54**
	(-2.14)	(-2.12)	(-2.50)	(-2.29)	(-1.57)	(-1.97)
Independence 1	-0.45					
(Arnone et al. index – political part)	(-1.51)					
Independence 2		0.01				
(Arnone et al. index – economic part)		(0.02)				
(Independence 1 + Gov. p. or.)			-0.13			
			(-1.21)			
(Independence 2 + Gov. p. or.)				-0.06		
				(-0.64)		
Independence 3					0.11	
(Guillén and Polillo index)					(0.21)	
(Independence 3 + Gov. p. or.)						-0.05
						(-0.50)
Constant	0.77**	0.62	0.74**	0.71**	0.55	0.70**
	(2.34)	(1.23)	(2.23)	(2.205)	(1.09)	(2.01)
No. of observations	130	130	130	130	123	123
Pseudo R-squared	0.78	0.77	0.78	0.77	0.78	0.78

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Panel interval random effects estimation. Inflation volatility, GDP per capita and price level coefficient premultiplied by 10^6 and 10^3, respectively. T-statistics in parentheses. All explanatory variables are lagged by one period.

A large body of research has focused on the effect of central bank independence on inflation performance (see Klomp and de Haan, 2010, for a quantitative survey of this issue). Although there is a vivid debate and the empirical results are to a certain degree mixed, the literature puts forward that central bank independence is negatively associated with inflation. As Siklos (2008) points out that no single definition of central bank independence is right for all countries at all times, we use various measures of central bank independence to provide more robust evidence on the effect of independence on inflation targets. As noted in the data description we employ the Arnone et al. (2008) and Guillén and Polillo (2005) measures of independence that have appropriate country and time coverage for us. Our results suggest that central bank independence does not matter for inflation targets in our sample. Obviously, this finding may be driven by the fact that sufficient central bank independence is, in general, one of the pre-conditions for the adoption of inflation targeting (Amato and Gerlach, 2002) and that the degree of central bank independence is thus typically high in inflation targeting countries. We also interact central bank

independence indexes with government party orientation and fail to find any systematic role for government interference, despite it is mostly the case that central banks do not have a goal independence and set the inflation target jointly with government.

Finally, we also examine the determinants of the width of inflation target. Typically, the central banks set the point inflation target with a tolerance band of +/- 1 percentage point. Nevertheless, some central banks such as the Bank of Korea have chosen narrower tolerance bands, while others such as Central Bank of Brasil set the tolerance bands of a larger magnitude. As we have seen in Section 2, central banks note the volatility of macroeconomic environment as the factor they consider when setting the width of their target. Indeed, our results, as presented in Table 4, indicate that controlling for other factors the volatility of macroeconomic environment together with the level of inflation is likely to be the primary cause for the width of the target. We find that inflation volatility is positively associated with the width of infation target. Additional evidence for the supposition that the volatility of macroeconomic environment matters is that the width of inflation target is greater in emerging market economies (i.e. the countries that typically exhibit more volatile environment).

Table 4: The Determinants of Inflation Target Band Width

	(1)	(2)	(3)	(4)	(5)	(6)
CPI inflation	0.03***	0.03***	0.04***	0.03***	0.03***	0.03***
	(3.13)	(3.00)	(3.32)	(3.13)	(2.84)	(3.04)
Inflation volatility	0.01*	0.01*	0.01	0.01*	0.01*	0.01*
	(1.77)	(1.76)	(1.60)	(1.70)	(1.95)	(1.78)
Credibility	0.35	0.35	0.64	0.35	0.86	1.05**
	(0.69)	(0.70)	(1.34)	(0.66)	(1.57)	(1.99)
World inflation		-0.01				
		(-0.11)				
Price level			-0.01			
			(-1.35)			
GDP growth				0.02		
				(0.15)		
GDP per capita					-35.2**	
					(-2.03)	
Emerging markets dummy						0.91**
						(2.13)
Constant	1.70***	1.70***	1.93***	1.69***	1.93***	1.00***
	(5.13)	(5.16)	(5.31)	(4.86)	(5.72)	(2.32)
Observations	139	139	124	139	139	139
R-squared	0.08	0.08	0.15	0.08	0.19	0.20

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Inflation volatility and GDP per capita coefficient premultiplied by 10^6. T-statistics in parentheses. All explanatory variables are lagged by one period. Random effects estimation.

We also provide further robustness checks. First, our inflation volatility measure is based on inflation, rather than detrended inflation. Second, we lag all explanatory variables by two periods to reflect the fact the inflation targets in some countries are set two years ahead. The results, which are available in Table A1-A6 in the Appendix, support our baseline estimates to a large extent.

In addition, we also estimate the model with explanatory variables lagged by three periods. The results remain largely unchanged and are available upon request. Finally, we estimate our empirical model based on the restricted sample, where we include in the data matrix only those countries in those time periods, for which we know the exact date, when the decision about inflation target was made and when it became into effect. The lag of explanatory variables is thus time and country specific, i.e. the lag exactly conforms to the difference between the announcement of target and when the target becomes effective. While this approach tackles endogeneity well, the disadvantage is that the sample size is reduced by about one third. Despite lower number of observations, these regressions confirm our previous findings largely. The results are available is Table A7 in the Appendix. Inflation as well as GDP growth is again a robust determinant of inflation targets. The degree of central bank credibility is negatively associated with the level of inflation targets. Despite the world inflation and inflation variability keep their expected signs, they are no longer significant at conventional levels (eventhough world inflation is statistically significant in one specification and its p-values are about 0.15 in the remaining specifications).

5 Concluding Remarks

In this paper we analyze how inflation targets are set. Despite its obvious high policy relevance, this issue is virtually untouched in academic community. On top of that, this is despite the fact that more and more countries adopt inflation targeting regime and inflation targets sometimes differ largely among countries. Therefore, we first gather evidence on what central bankers themselves say about how the inflation targets are set. Second, we provide panel interval regressions to shed light on which factors matter for the setting of inflation target.

We find that higher level as well as higher variability of inflation makes central banks to set higher target. The setting of inflation target is found to have an important international dimension, as higher world inflation is positively correlated with inflation targets. Rapidly growing countries

exhibit higher inflation targets. Our results also suggest that central banks set larger width of inflation target in more volatile macroeconomic environment.

Next, central bank credibility is negatively associated to the level of inflation target suggesting that less credible central banks recognize the risks of anchoring inflation expectations at low levels. This correnspponds to the findings of Blinder (2000), whose survey indicates that central bankers recognize credibility as very important in order to keep low inflation. On the other hand, government party orientation does not matter even in less independent central banks. This likely reflects the fact that inflation targeters typically exhibit a high degree of independence already before the adoption of inflation targeting regime and sufficient degree of independence is viewed as one of the pre-conditions for successful adoption of inflation targeting.

In terms of future research, we believe it would be vital to analyze inflation targets on the theoretical grounds and to clarify the links between optimal inflation and inflation target.

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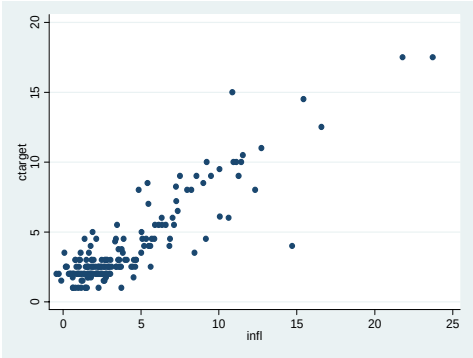
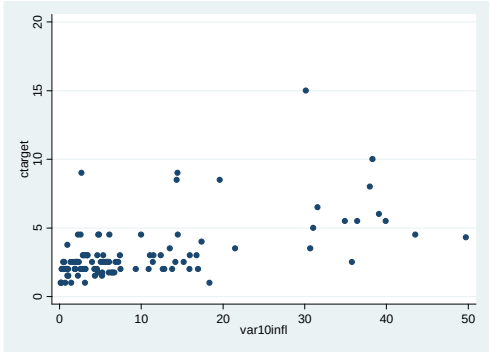
Appendix

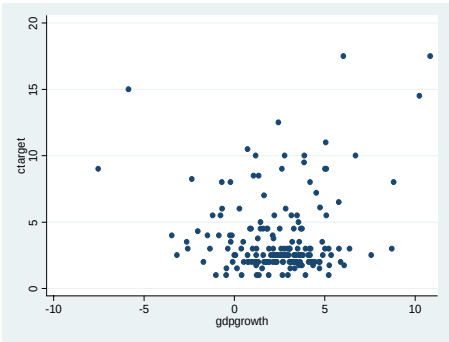
Figure 2: (Mid-point) Inflation Targets and Explanatory Variables



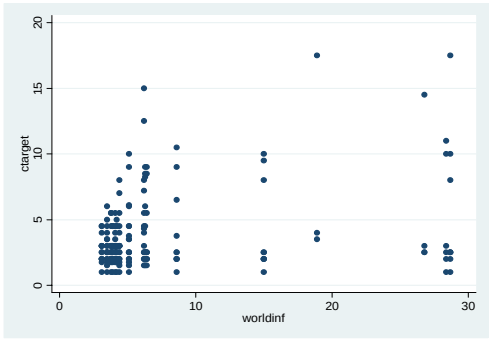
Mid-point inflation target and inflation



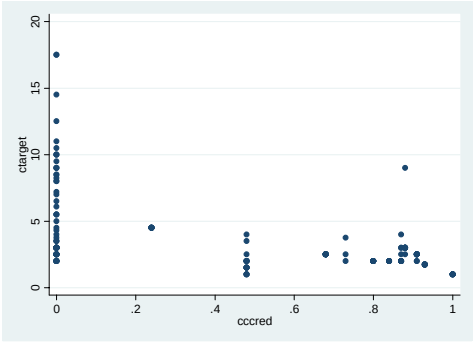
Mid-point inflation target and inflation volatility



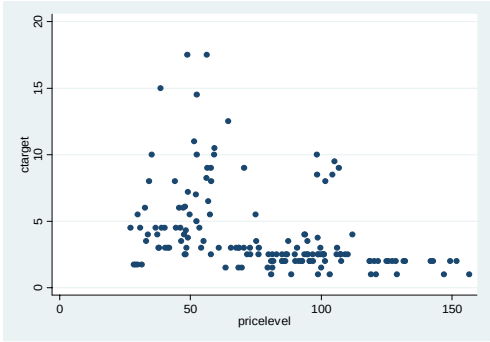
Mid-point inflation target and GDP growth



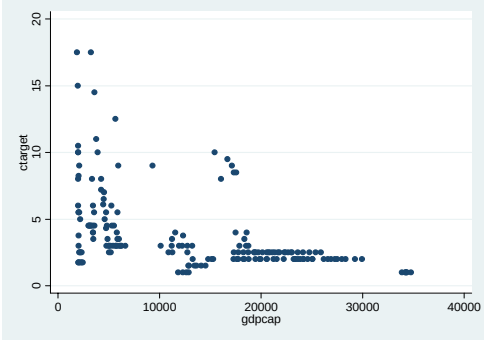
Mid-point inflation target and world inflation



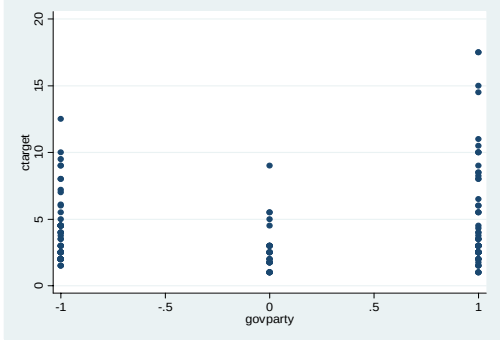
Mid-point inflation target and CB credibility



Mid-point inflation target and price level

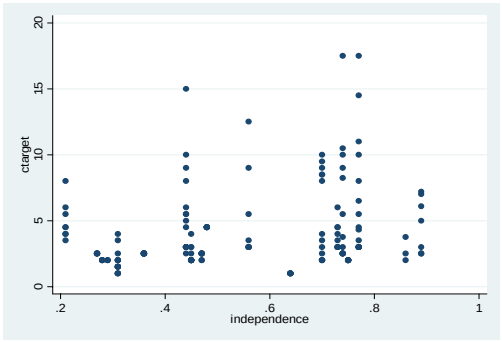


Mid-point inflation target and GDP per capita

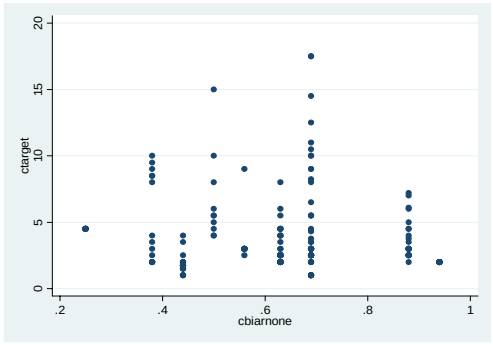


Mid-point inflation target and government party

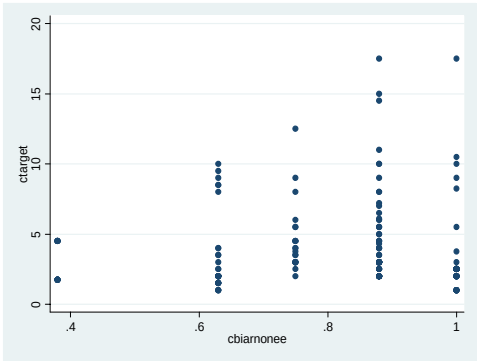
Figure 3: (Mid-point) Inflation Targets and Central Bank Independence



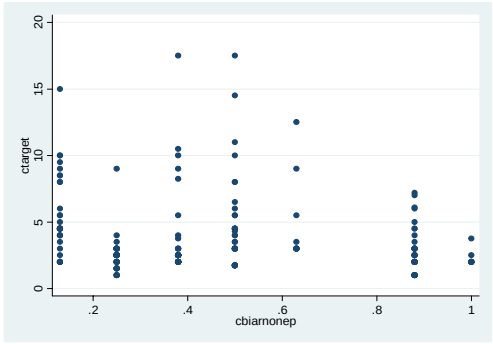
Mid-point inflation target and CBI Guillen Pollilo



Mid-point inflation target and CBI Arnone et al.



Mid-point inflation target and CBI Arnone et al. – economic part



Mid-point inflation target and Arnone et al. – political part

Additional Regression Results

1. Different Measure of Inflation Volatility

Table A1: The Determinants of Inflation Targets

	(1)	(2)	(3)	(4)	(5)	(6)
CPI inflation	0.50***	0.49***	0.50***	0.49***	0.49***	0.49***
	(15.75)	(14.47)	(15.64)	(15.12)	(14.92)	(15.35)
Inflation volatility	0.44**	0.44***	0.45**	0.46***	0.46***	0.46***
	(2.51)	(2.43)	(2.54)	(2.60)	(2.61)	(2.47)
GDP growth	0.15***	0.16***	0.16***	0.14***	0.15***	0.15***
	(3.93)	(3.76)	(4.00)	(3.73)	(3.82)	(3.75)
World inflation	0.12**	0.11*	0.12**	0.13**	0.12**	0.12**
	(2.15)	(1.77)	(1.96)	(2.22)	(2.02)	(2.16)
Credibility	-0.52**	-0.53*	-0.44	-0.58**	-0.55**	-0.49
	(-2.22)	(-1.77)	(-1.56)	(-2.26)	(-1.96)	(-1.54)
Price level		-0.72				
		(-0.17)				
Independence			-0.50			
			(-0.98)			
Gov. party orientation				-0.07		
				(-0.67)		
(Independence + Gov. p. or.)					-0.10	
					(-0.92)	
GDP per capita						-2.29
						(-0.17)
Constant	0.62*	0.75*	0.56	0.65**	0.71**	0.64*
	(1.92)	(1.85)	(1.09)	(2.00)	(2.01)	(1.83)
No. of observations	134	114	123	130	134	130
Pseudo R-squared	0.77	0.79	0.78	0.78	0.77	0.77

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Panel interval random effects estimation. Inflation volatility, GDP per capita and price level coefficient premultiplied by 10^6 and 10^3, respectively. T-statistics in parentheses. All explanatory variables are lagged by one period. Independence refers to the central bank independence index developed by Arnone et al. (2008). Inflation is not detrended for the calculation of inflation volatility.

Table A2: The Determinants of Inflation Targets: Different Measures of Central Bank Independence

	(1)	(2)	(3)	(4)	(5)	(6)
CPI inflation	0.50***	0.50***	0.49***	0.49***	0.50***	0.49***
	(15.84)	(15.55)	(14.85)	(14.93)	(15.64)	(14.92)
Inflation volatility	0.22**	0.22**	0.24***	0.23**	0.45**	0.46***
	(2.49)	(2.43)	(2.68)	(2.60)	(2.54)	(2.61)
GDP growth	0.16***	0.15***	0.14***	0.15***	0.16***	0.15***
	(4.15)	(3.94)	(3.71)	(3.76)	(4.00)	(3.82)
World inflation	0.12**	0.12**	0.13**	0.13**	0.12**	0.12**
	(2.33)	(2.15)	(2.31)	(2.23)	(1.96)	(2.02)
Credibility	-0.50**	-0.53**	-0.65**	-0.58**	-0.44	-0.55**
	(-2.12)	(-2.13)	(-2.49)	(-2.27)	(-1.56)	(-1.96)
Independence 1	-0.46					
(Arnone et al. index – political part)	(-1.48)					
Independence 2		0.03				
(Arnone et al. index – economic part)		(0.07)				
(Independence 1 + Gov. p. or.)			-0.13			
			(-1.23)			
(Independence 2 + Gov. p. or.)				-0.07		
				(-0.67)		
Independence 3					0.10	
(Guillén and Polillo index)					(0.18)	
(Independence 3 + Gov. p. or.)						-0.06
						(-0.55)
Constant	0.77**	0.59	0.74**	0.71**	0.56	0.71**
	(2.31)	(1.16)	(2.20)	(2.03)	(1.09)	(2.01)
No. of observations	130	130	130	130	123	123
Pseudo R-squared	0.78	0.77	0.78	0.77	0.78	0.77

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Panel interval random effects estimation. Inflation volatility, GDP per capita and price level coefficient premultiplied by 10^6 and 10^3, respectively. T-statistics in parentheses. All explanatory variables are lagged by one period. Inflation is not detrended for the calculation of inflation volatility.

Table A3: The Determinants of Inflation Target Band Width

	(1)	(2)	(3)	(4)	(5)	(6)
CPI inflation	0.03***	0.03***	0.04***	0.03***	0.03***	0.03***
	(3.17)	(3.04)	(3.36)	(3.17)	(2.88)	(3.04)
Inflation volatility	0.01*	0.01*	0.01	0.01*	0.01*	0.01*
	(1.76)	(1.75)	(1.58)	(1.69)	(1.93)	(1.78)
Credibility	0.35	0.35	0.64	0.35	0.86	1.05**
	(0.69)	(0.70)	(1.34)	(0.66)	(1.57)	(1.99)
World inflation		-0.01				
		(-0.11)				
Price level			-0.01			
			(-1.35)			
GDP growth				0.02		
				(0.15)		
GDP per capita					-35.2**	
					(-2.02)	
Emerging markets dummy						0.91**
						(2.13)
Constant	1.70***	1.70***	1.93***	1.69***	1.93***	1.93***
	(5.12)	(5.16)	(5.31)	(4.85)	(5.72)	(5.72)
Observations	139	139	124	139	139	139
R-squared	0.08	0.08	0.15	0.08	0.19	0.20

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Inflation volatility and GDP per capita coefficient premultiplied by 10^6. T-statistics in parentheses. All explanatory variables are lagged by one period. Random effects estimation. Inflation is not detrended for the calculation of inflation volatility.

2. Explanatory Variables Lagged by Two Periods

Table A4: The Determinants of Inflation Targets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CPI inflation	0.37***	0.36***	0.37***	0.37***	0.37***	0.36***	0.37***
	(7.92)	(7.27)	(7.99)	(7.90)	(7.90)	(7.50)	(7.76)
Inflation volatility	1.53	1.33	1.70	1.60	1.66	1.32	1.50
	(1.41)	(1.22)	(1.57)	(1.47)	(1.51)	(1.20)	(1.38)
GDP growth	0.18***	0.18***	0.19***	0.18***	0.18***	0.17***	0.18***
	(6.08)	(6.01)	(6.37)	(5.75)	(5.43)	(6.36)	(6.14)
World inflation	0.14*	0.16**	0.14*	0.14*	0.13*	0.14*	0.14*
	(1.84)	(1.99)	(1.95)	(1.87)	(1.83)	(1.86)	(1.86)
Credibility	-0.33**	-0.18	-0.29*	-0.36**	-0.34*	-0.11	-0.30
	(-2.22)	(-0.97)	(-1.79)	(-2.02)	(-1.65)	(-0.48)	(-1.59)
Price level		-0.01**					
		(-1.98)					
Independence			-0.77**				
			(-2.04)				
Gov. party orientation				-0.04			
				(-0.50)			
(Independence + Gov. p. or.)					-0.04		
					(-0.54)		
GDP per capita						-1.45	
						(-1.33)	
Emerging markets dummy							0.04
							(0.24)
Constant	0.57	0.87**	0.98***	0.65**	0.64	0.71*	0.53*
	(1.36)	(2.08)	(2.63)	(2.00)	(1.36)	(1.90)	(1.25)
No. of observations	134	118	134	130	134	134	130
Pseudo R-squared	0.77	0.80	0.78	0.78	0.78	0.77	0.77

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Panel interval random effects estimation. Inflation volatility, GDP per capita and price level coefficient premultiplied by 10^6 and 10^3, respectively. T-statistics in parentheses. All explanatory variables are lagged by one period. Independence refers to the central bank independence index developed by Arnone et al. (2008). Explanatory variables lagged by two periods.

Table A5: The Determinants of Inflation Targets: Different Measures of Central Bank Independence

	(1)	(2)	(3)	(4)	(5)	(6)
CPI inflation	0.37***	0.37***	0.36***	0.37***	0.37***	0.37***
	(8.07)	(7.83)	(7.27)	(7.84)	(8.00)	(7.90)
Inflation volatility	1.42	1.75	1.71*	1.64	1.67	1.66
	(1.31)	(1.59)	(1.65)	(1.51)	(1.52)	(1.51)
GDP growth	0.19***	0.19***	0.18***	0.18***	0.19***	0.18***
	(6.38)	(6.31)	(4.94)	(5.81)	(5.86)	(5.43)
World inflation	0.14**	0.14**	0.14***	0.14*	0.13*	0.13*
	(1.96)	(1.86)	(2.60)	(1.87)	(1.76)	(1.83)
Credibility	-0.30*	-0.28*	-0.43*	-0.37**	-0.41**	-0.34*
	(-1.84)	(-1.77)	(-1.76)	(-2.14)	(-2.39)	(-1.65)
Independence 1	-0.62**					
(Arnone et al. index – political part)	(-2.34)					
Independence 2		-0.34				
(Arnone et al. index – economic part)		(-1.38)				
(Independence 1 + Gov. p. or.)			-0.11			
			(-1.07)			
(Independence 2 + Gov. p. or.)				-0.04		
				(-0.69)		
Independence 3					- 0.45	
(Guillén and Polillo index)					(-1.06)	
(Independence 3 + Gov. p. or.)						-0.04
						(-0.54)
Constant	0.79**	0.82	0.67**	0.63	0.56	0.64
	(2.17)	(1.93)	(2.14)	(1.37)	(1.09)	(1.36)
No. of observations	134	134	134	134	123	134
Pseudo R-squared	0.78	0.77	0.78	0.78	0.78	0.77

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Panel interval random effects estimation. Inflation volatility, GDP per capita and price level coefficient premultiplied by 10^6 and 10^3, respectively. T-statistics in parentheses. All explanatory variables are lagged by one period. Explanatory variables lagged by two periods.

Table A6: The Determinants of Inflation Target Band Width

	(1)	(2)	(3)	(4)	(5)	(6)
CPI inflation	0.01*	0.01	0.01*	0.01*	0.01	0.01
	(1.78)	(0.19)	(1.85)	(1.67)	(1.20)	(1.62)
Inflation volatility	0.02***	0.03***	0.02***	0.03***	0.03***	0.02***
	(3.85)	(5.25)	(3.60)	(3.94)	(4.20)	(3.87)
Credibility	0.17	0.13	0.33	0.19	0.84	0.90*
	(0.33)	(0.29)	(0.66)	(0.36)	(1.50)	(1.73)
World inflation		0.01				
		(1.34)				
Price level			-0.01			
			(-0.68)			
GDP growth				0.01		
				(0.93)		
GDP per capita					-46.4***	
					(-2.70)	
Emerging markets dummy						0.95***
						(2.24)
Constant	1.87***	1.88***	1.99***	1.84***	2.18***	1.13***
	(5.58)	(6.81)	(5.30)	(5.39)	(6.29)	(2.68)
Observations	139	139	124	139	139	139
R-squared	0.11	0.11	0.15	0.10	0.22	0.24

Note: * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Inflation volatility and GDP per capita coefficient premultiplied by 10^6. T-statistics in parentheses. All explanatory variables are lagged by one period. Random effects estimation. Explanatory variables lagged by two periods.

3. 'Exact Lag' Specification

Table A7: The Determinants of Inflation Targets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CPI inflation	0.40***	0.40***	0.40***	0.40***	0.40***	0.40***	0.40***
	(13.24)	(12.91)	(13.24)	(12.93)	(12.94)	(13.28)	(13.99)
Inflation volatility	1.16	0.02	0.04	0.01	0.01	0.08	0.08
	(0.08)	(0.02)	(0.03)	(0.01)	(0.09)	(0.06)	(0.06)
GDP growth	0.11**	0.13**	0.14**	0.11**	0.12**	0.12**	0.09*
	(2.15)	(2.34)	(2.42)	(2.12)	(2.15)	(2.20)	(1.80)
World inflation	0.03	0.02	0.03	0.03	0.03	0.03	0.04*
	(1.48)	(0.99)	(1.42)	(1.50)	(1.43)	(1.41)	(1.80)
Credibility	-1.30***	-1.56***	-1.71***	-1.33***	-1.28***	-1.50***	-1.31**
	(-3.11)	(-3.23)	(-3.14)	(-3.03)	(-2.88)	(-2.83)	(-2.54)
Price level		-0.01					
		(-0.91)					
Independence			-1.42				
			(-1.20)				
Gov. party orientation				-0.05			
				(-0.25)			
(Independence + Gov. p. or.)					0.02		
					(0.06)		
GDP per capita						1.58	
						(0.61)	
Emerging markets dummy							0.31
							(0.71)
Constant	2.04***	1.69***	3.03***	2.06***	2.04***	1.93***	2.16***
	(6.05)	(2.82)	(3.42)	(6.01)	(5.93)	(4.96)	(6.67)
No. of observations	85	81	84	85	85	85	85
Pseudo R-squared	0.41	0.41	0.41	0.41	0.41	0.41	0.46

Note: The lag of explanatory variables is country and time specific and is set exactly to reflect the time lag between the announcement of inflation target and when inflation target becomes effective. * statistically significant at 10% level, ** statistically significant at 5% level, *** statistically significant at 1% level. Panel interval random effects estimation. Inflation volatility, GDP per capita and price level coefficient premultiplied by 10^6 and 10^3, respectively. T-statistics in parentheses. All explanatory variables are lagged by one period. Independence refers to the central bank independence index developed by Arnone et al. (2008).