

Optimal Disinflation with Delegation and Limited Credibility

Mridula Duggal* and Luis E. Rojas†

Abstract

We examine the challenge faced by a government aiming to implement a gradual reduction in inflation by entrusting monetary policy to an independent central bank with limited credibility. Expanding upon the framework established by [Barro and Gordon \(1983b\)](#), we demonstrate that an optimal policy for minimizing the sacrifice ratio of disinflation involves a gradual disinflationary process coupled with the announcement of intermediate targets. The speed at which disinflation occurs strikes a balance between the objective of enhancing credibility and the associated costs of unexpected inflation. Our theoretical framework provides an explanation for the disinflationary experiences observed in Chile and Colombia during the 1990s, wherein these countries established new monetary institutions and steadily achieved single-digit inflation levels through the annual announcement of decreasing inflation targets. We argue that the use of intermediate targets played a pivotal role in their design, facilitating the establishment of credibility with lower output costs.

Keywords: Disinflation, Credibility, Inflation, Inflation Expectations

JEL Classification: D83, E17, E31, E52, E58

*The University of Glasgow. Email: mridula.duggal@glasgow.ac.uk. Duggal acknowledges the support from FPI Scholarship (2020-2024) project number SEV-2015-0563-19-1, by Ministerio de Economía, Industria y Competitividad, Government of Spain and support from Research grant 2021 SGR 00194 from Generalitat de Catalunya, Spain, 2022-2024. Thanks are due the European Research Council under grant Horizon2020 grant agreement no. 788547 (APMPAL-HET) (Asset Prices and Macro Policy When Agents Learn and are Heterogeneous)

†MOVE, Universitat Autònoma de Barcelona (UAB) and Barcelona School of Economics (BSE) Email: luis.rojas@uab.es. Rojas acknowledges financial support from the European Research Council under Grant Horizon 2020GA 788547(APMPAL-HET), and from the Spanish Agencia Estatal de Investigación(AEI), through the Severo Ochoa Programme for Centres of Excellence in RD (Barcelona School of Economics CEX2019-000915-S). A previous version of this draft was circulated with the title “(Dis)Inflation Targeting.”

1 Introduction

Chile and Colombia (amongst others) grappled with persistently high and volatile inflation for several decades until constitutional reforms in the early 1990s led to the establishment of independent central banks. Subsequently, a decade-long period of gradual disinflation unfolded, witnessing a decline in inflation from levels above 20% to single-digit figures. This achievement remained sustainable, maintaining relatively stable inflation rates from 2000 to 2020.

The newly established central banks adopted a standard statutory configuration, encompassing a primary mandate to "preserve the value of the currency." They were led by a head and a board of directors whose terms extended beyond the presidential or congressional election cycles, enjoying autonomy in their decision-making regarding monetary instruments. Two forward guidance tools were implemented: 1) a long-term inflation objective and 2) a one-year inflation target. Even before officially adopting an inflation targeting regime, these countries began announcing the one-year targets annually. Initially set at 22% in Colombia, they gradually decreased in subsequent years, ultimately reaching single-digit levels by the early 2000s.

Given the history of high and volatile inflation in these economies, the promise of a central bank tasked with controlling and reducing inflation to single-digit levels did not immediately command full credibility. Moreover, this commitment relied on a newly established institutional framework, leaving people with limited information about its likelihood of success. We argue that the delegation of monetary policy to an independent central bank- which introduced one-year ahead inflation targets- served as a tool to enhance credibility while minimizing the associated output costs. In doing so, we extend the literature on optimal inflation contracts between a government and an independent central bank ([Rogoff \(1985\)](#), [Svensson \(1995\)](#)) by assuming limited credibility.

We substantiate our argument through motivating evidence of the institutional details and a theoretical model that builds upon the [Barro and Gordon \(1983b\)](#) framework. Our model extends this setup by introducing the delegation of monetary policy to an independent central bank. The policy design includes the government's ability to provide the central bank with a sequence of publicly announced loss functions represented by inflation targets (delegation). However, the private sector does not necessarily fully believe in the credibility of this reform, forming a prior expectation regarding the central

bank's commitment to the announced targets and updating this expectation based on observed inflation outcomes and the announced inflation targets (limited credibility). We further provide some empirical evidence in support of the findings of our model.

Our primary finding suggests that when credibility is limited, it is optimal for the government to announce a gradual decrease in inflation targets. The pace at which disinflation occurs strikes a delicate balance between enhancing credibility and mitigating the costs associated with unexpected inflation. Conversely, in a scenario where credibility is fully established, intermediate targets become redundant, and the government would create a central bank aimed at achieving the long-run optimal inflation level immediately akin to [Rogoff \(1985\)](#)'s conservative central banker¹.

The result hinges on the fact that the central bank does not have perfect control over inflation, resulting in inflation outcomes that do not fully reveal the central bank's intended objectives. In this scenario, economic agents face an inference problem and employ optimal strategies that lead to a revision of their prior beliefs regarding the credibility of the central bank. Specifically, the closer realised inflation is to the inflation target, the greater the revision of priors regarding central bank credibility. Consequently, lower inflation targets are associated with larger expected disinflation surprises. The benefit of such surprises is enhanced credibility, but it comes at the cost of a decline in output. The optimal contract strikes a balance between these factors and yields a gradual disinflation process.

Another factor that determines the optimal contract, is the optimal speed of the disinflation, which in turn relies on two crucial factors: the credibility of the central bank and its limited control over inflation. Credibility encompasses two key dimensions: the mean and the variance of the prior distribution held by economic agents concerning the importance given by the central bank to the inflation target. The mean represents people's expectations of the central bank's actions, while the variance reflects the level of uncertainty they harbor. Consequently, the mean determines the expected inflation, and the variance determines the extent to which prior beliefs are revised in response to inflation surprises. When people have confidence that the newly appointed central

¹In our analysis, we adopt a highly stylized setup devoid of output persistence and without accounting for the costs associated with output volatility. This deliberate simplification enables us to sharpen the comparison of policies. However, the effects of alternative setups and their implications are deferred to the discussion section

bank places little emphasis on the inflation target, a slower disinflation process becomes optimal.

The limited control of inflation pertains to the discrepancy between realized inflation and the central bank's desired inflation level. A higher variance indicates that inflation offers less insight into the central bank's objectives, resulting in a slower development of credibility. In extreme cases where the reform's credibility is expected to be severely limited or the central bank's ability to control inflation is low, it may be optimal to maintain the current system and forgo the establishment of an independent central bank.

Our contribution is to propose a new notion of credibility that is dynamic and costly to build over time into the literature of monetary policy, particularly suited for understanding disinflation processes in developing economies and rationalising the use of intermediate targets. Most existing literature treats credibility as a static concept when discussing disinflation. Credible disinflation plans are typically described as situations where the government has no incentives to deviate due to the high costs associated with deviation. These costs are often modeled as trigger strategies that revert the economy to the inflation bias (as seen in [Barro and Gordon \(1983b\)](#)) or to a delegation arrangement (such as [Herrendorf and Lockwood \(1997\)](#), [Jensen \(1997\)](#)). Another static notion of credibility is credible delegation, which refers to the government's ability to renounce the independence of the central bank and intervene ([Lohmann 1992](#), [Herrendorf \(1998\)](#)). In such cases, the government can choose to intervene in the central bank's decisions at a cost, and the higher the cost, the more credible the delegation arrangement becomes. In contrast, our dynamic approach would be akin to consider the possibility that agents learn over time about this unobserved cost.

Discussion of the Literature This paper speaks to three strands of literature. First, we build on the literature on optimal monetary policy rules and time inconsistency models by [Kydlan and Prescott \(1977\)](#), [Barro and Gordon \(1983a\)](#), [Barro and Gordon \(1983b\)](#), and [Barro \(1986\)](#). As noted before, specifically building on [Barro and Gordon \(1983b\)](#). This paper also refers to the Inflation Bias which was first established in [Kydlan and Prescott \(1977\)](#) (and later in [Barro and Gordon \(1983b\)](#)), which is the systematic difference between actual (realised) inflation and optimal inflation. We deviate from both papers by introducing an independent monetary authority which does not face a trade off between inflation and output. Therefore, agents must distinguish between the two institutions.

The paper also adds to the discussion of optimal monetary policy when there is delegation such as [Rogoff \(1985\)](#), [Svensson \(1995\)](#), [Herrendorf and Lockwood \(1997\)](#), [Jensen \(1997\)](#). For instance, [Herrendorf and Lockwood \(1997\)](#) take into account a central bank who is weight restricted. That is, central banks are unable to respond to the information of the wage setters and thus end up with an equilibrium with a stochastic inflation bias. Contrary to that, in our set up, the central bank is aware of how agents form expectations and know they are Bayesian. Therefore, they are able to respond to private information of the agents.

Second, this paper inserts self at the intersection of the the literature of disinflation and the literature on subjective expectations. Specifically, the paper builds on [Backus and Driffill \(1985\)](#), [Lu \(2013\)](#), [Lu et al. \(2016\)](#), [King et al. \(2020\)](#), and [Kostadinov and Roldán \(2020\)](#). [Kostadinov and Roldán \(2020\)](#) comes closest to the model we present in the subsequent sections however with some key deviations. The authors present a model where the government faces a trade-off between inflation and output but announces a sequence of inflation targets and the model is set up as a principal-agent model. In their paper, after the announcement of the targets, agents set expectations using Bayes's rule. Subsequently, the government then chooses inflation depending on the behavioural type it is. Therefore, agents must now distinguish whether the government is rational or of a behavioural type. On the other hand, the uncertainty in our paper is about the policy rather than the type of the agent. That is, from the perspective of the agents both the central bank and government are rational but they do not know the policy that is being followed by the new institution. Other papers which also build on type preferences of the government are [Lu \(2013\)](#) and [Lu et al. \(2016\)](#).

This paper also closely relates to [Cukierman and Meltzer \(1986\)](#) specifically the mechanism which prescribes that monetary surprises may lead to future higher inflation expectations. However, their paper assumes that agents are rational but have limited information about the monetary procedures. Moreover, they develop a model with discretionary policy. Our paper assumes that agents are Bayesian learners where they forecast the future taking into consideration all past information. Furthermore, the announcement of the future policy path acts as a commitment device which the central bank cannot renege on.

Third, our paper ties into the literature on adaptive learning. Specifically, [Marcet and Nicolini \(2003\)](#) and [Sargent et al. \(2009\)](#). Both the above mentioned papers focus

on the case of the South American context using bounded rationality. However, both papers study the hyperinflationary phases in these economies. Specifically, they explain how a combination of beliefs and debt dynamics were responsible for the hyperinflation experienced in these economies. That is, both papers are able to explain the behaviour of prices based on deviations from rationality. However, none of the papers focus on disinflation in the economies.

Road map The remainder of this paper is divided as follows. Section 2 presents a description of the institutional setup of disinflations in Latin America, Section 3 presents the model. Section 4 discusses the results with model simulations, detailing the welfare gains from the policy interventions and the role of inflation surprises. Section 6 provides empirical evidence to support the implications of the model for expectations and inflation. Finally, the paper concludes in section 6.

2 Delegation and disinflation in Latin America

This section describes the institutional design that was created in Chile and Colombia to disinflate and achieve stable, single digit inflation. We consider three dimensions of the design, namely: delegation, monetary policy, and limited credibility.

2.1 Delegation

Delegation in this paper refers to the process of creating a new institution for the purpose of de-linking monetary policy from the political cycle in Chile and Colombia. Both countries undertook constitutional amendments to create an *independent* central bank which had its own charter. Below, we provide articles from the amendments and the organic laws of the central bank for both economies. ²

Chile

Chile established its independent central bank in December 1989, outlining its functions in Article 97. This transformed the central bank into an entity tasked with the primary goal of maintaining price stability.

²Some of the laws are in Spanish and have been provided for reference in Appendix A

Constitutional Amendment

Article 97

“There shall be an autonomous body of a technical nature with patrimonial assets of its own, known as the Central Bank, whose composition, organization, functions and powers shall be determined by a constitutional organic law.”

Colombia

Similar to Chile, Colombia created an autonomous institution in December 1992. The key focus of the legislation was to preserve the value of the currency through a reduction in inflation. Thus, making price stability the main objective of the central bank. Furthermore, the central bank was responsible for adopting specific policies to achieve this objective. In the event of failing to attain the said objective, the central bank was obligated to present an assessment outlining the reasons for missing the targets, along with setting new targets for the subsequent period.

Legislation of the Central Bank

Article 2: Purpose

“Banco de la República, on behalf of the State, will see to the maintenance of the national currency’s acquisitive capacity as provided in the standards set forth in Article 373 of the Political Constitution and in the present Law.

Paragraph: To fulfill the above purpose, the Board of Directors of the Banco will adopt specific inflation goals that will always be below the last recorded results, will use instruments of the policies at its charge and will issue the recommendations conducive to the same purpose”

Article 5: Schedule and Reports to the Congress

“Within ten days after the initiation of each period of ordinary sessions, the Board of Directors of the Banco through its Manager will render a report to the National Congress, on the execution of the monetary, exchange, and credit policies, including at least the general guidelines of the cited policies, an assessment of the results achieved in the previous period, and the objective, purposes, and goals thereof for the subsequent period, and in the mid-term. Similarly, a report will be rendered on the policy for the administration and composition of the international reserves, and of the financial situation of the Banco and its perspectives.”

Figure 1: Central Bank Independence Index Extended

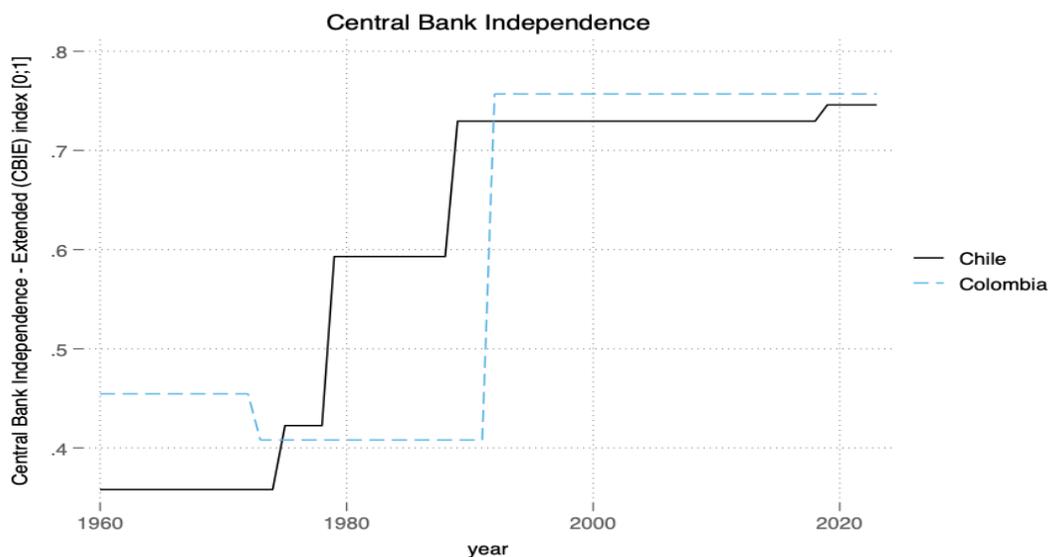


Figure 1 illustrates the evolution of the independence of the central banks of Chile (black solid line) and Colombia (blue dashed line). The data is based on the central bank independence index taken from [Romelli \(2022\)](#) and [Romelli \(2024\)](#). The index takes values between zero and one. The closer the index to 1, the more independent the central bank. It takes into consideration different aspects such as the governor & central bank board, monetary policy & conflict resolution, objectives, limitations on lending to the government, financial independence, and reporting & disclosure.

We find that for both Chile and Colombia, independence of the central bank increased in the late 1980s and early 1990s when the central banks were overhauled, with a value of

0.725 and 0.75, respectively. The more critical aspect of the index is the continued high value since the constitutional amendments for the central banks. This figure provides early motivational evidence about the optimal contract between the government and the central bank and its enforcement.

2.2 Monetary Policy

One of the objectives of introducing an independent central bank was the delegation of monetary policy to an autonomous authority. Figures 2 and 3 provide whether the central banks in Chile and Colombia had independence in the direction of the policy and the objectives of the central bank. As can be seen in both figures, the organic law of the central banks dictated the changes in the formulation of the policy and the primary objective of the central bank.

Figure 2 illustrates the objective of the central bank and the changes made to it as part of the optimal contract when the banks were made independent. The index is a continuous variable which takes values between 0 and 1. A value of 0.5 indicates that the central bank has financial stability as a secondary objective in addition to price stability. While a value of 0.75 indicates that there are other objectives but they do not compete with price stability.

For Chile and Colombia, price stability took the forefront upon the central banks gaining autonomy and their own charter. This has been the case since the 1990s without any changes.³

³This is unlike the case of Argentina, where there have been several changes after the initial adoption of independent monetary policy.

Figure 2: What is the objective of the central bank?

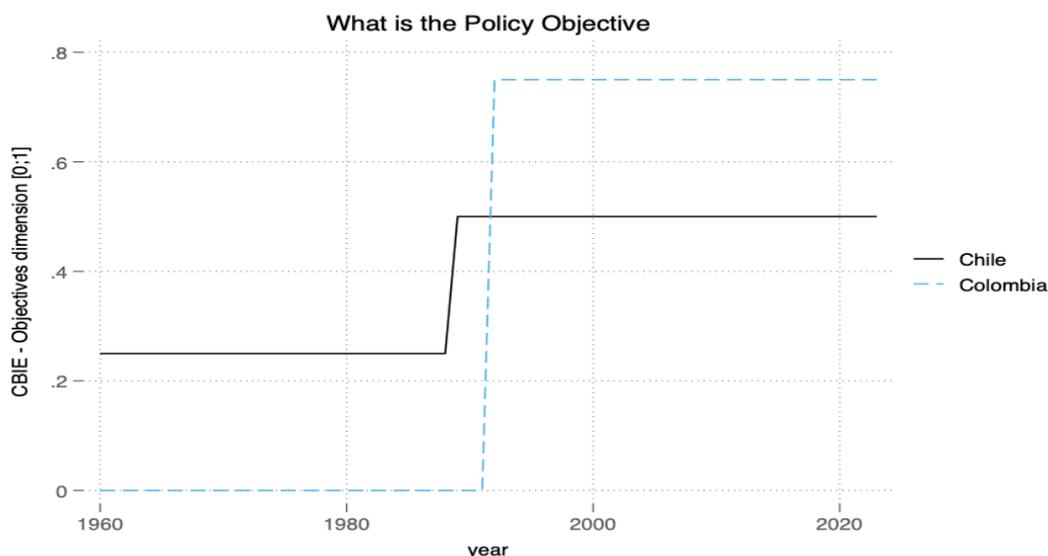
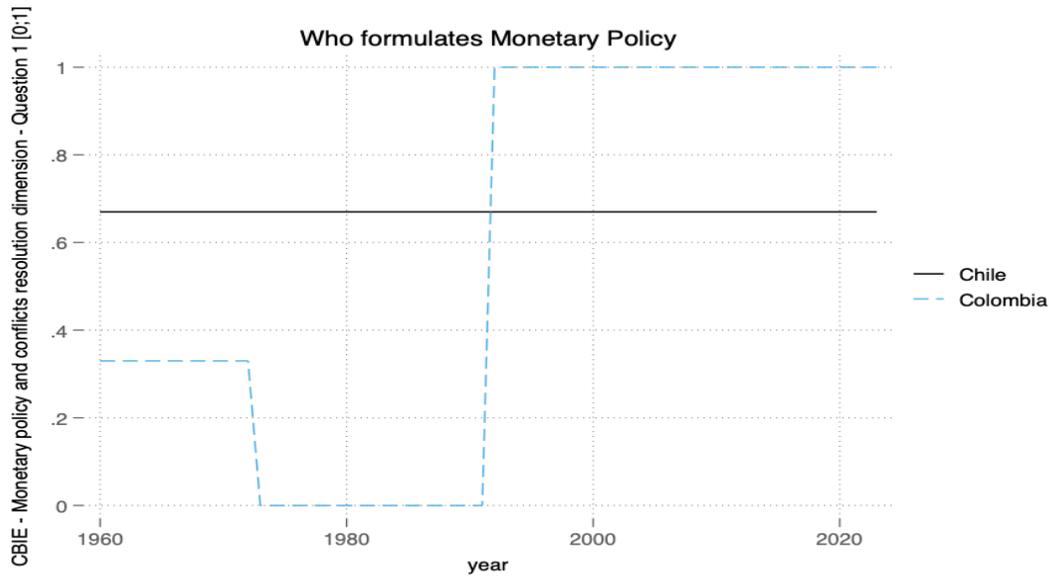


Figure 3 shows the index measure from zero to one, with regard to who controls the formulation of monetary policy. A value of zero implies the central bank has no say, while a value of 1 implies only the central bank is responsible for monetary policy. In Chile, we find that the central bank together with the government is responsible for the formulation of policy, with some influence. This has remained unchanged after the independence of the central bank. On the other hand, in Colombia, since independence, the central bank is responsible for formulating monetary policy.

Having control over monetary policy was therefore, part of the optimal contract enforced upon the delegation of powers to the central bank. This implied that the central bank was able to respond to changes in the economy in accordance with the objectives set out in the charter.

Figure 3: Who has control over the formulation of Monetary Policy?



2.2.1 Intermediate Inflation Targeting

As noted in the legislation of the central bank of Colombia, the primary objective of making the central bank independent was for them to reduce inflation from the previous recorded period. In order to achieve this objective and implement independent monetary policy, the central banks instituted a policy known as *intermediate inflation targeting*.

Intermediate inflation targeting was a monetary policy measure which entailed **setting and announcing** an annual inflation target (one-year-ahead) prior to the minimum wage negotiations. This target was set by taking into account previous inflation and whether the central bank was able to achieve the target in the previous period. Both Chile and Colombia used gradually decreasing inflation targets⁴ to disinflate in the 1990s before formally adopting Inflation Targeting in 1999.

Concretely, focus on the experience of Chile. It announced an annual inflation target of 20% in September 1990 which was close to the average inflation rate during the 1980s⁵. The adoption of the target coincided with the independence of the central bank. Following the announcement of the announced target in 1990, from 1991-1999,

⁴Please refer to section 5 for details on the targets.

⁵Based on [Morandé \(2002\)](#)

the inflation target was linked to the current annual inflation forecast⁶ of the central bank.

Colombia shares its experience with Chile in the process of disinflation. Colombia⁷ also introduced a sequence of intermediate inflation targets in 1991 with a constitutional redesign of central bank which involved the central bank to be responsible for monetary, exchange, and credit policies. In addition, in 1995, the central bank introduced several models for forecasting inflation and circulated monthly internal inflation reports. The intermediate targets were set every year in November starting in 1991. Failure to meet the target required the central bank to provide the reasons for missing the target along with an adjustment of the target for the following period.

Former Chief Economist of the Central Bank of Chile [Morandé \(2002\)](#) writes, “The Central Bank of Chile initiated a monetary policy framework based on an explicit, publicly announced, annual inflation target. The target was announced in September 1990 for the subsequent calendar year.” In particular, “. . . the central bank was required to report to Congress each September outlining prospects for the following calendar year. In particular, with regard to inflation, growth, and balance of payments.”

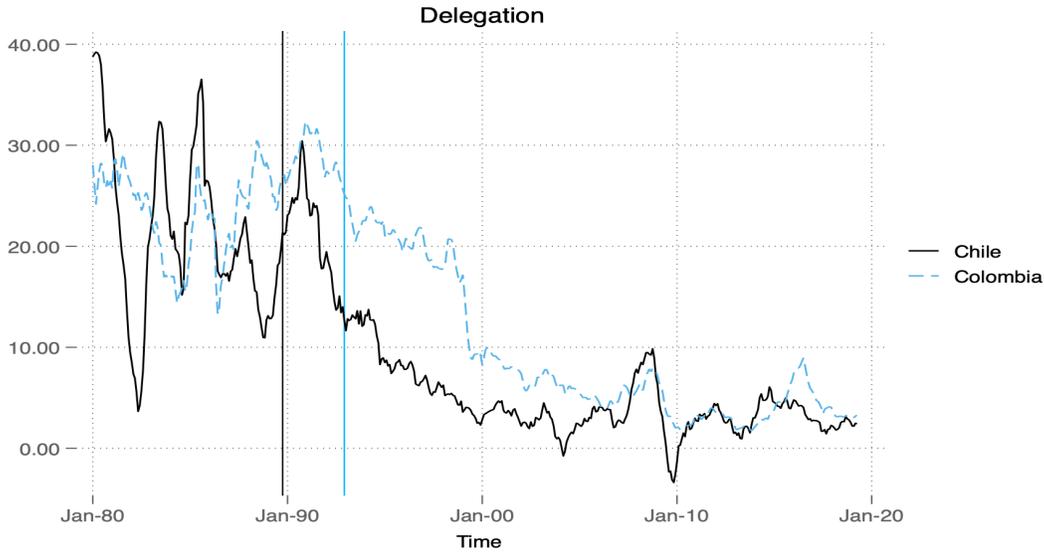
[Morandé \(2002\)](#) further suggests that the adoption of the intermediate inflation targets stemmed from the belief that providing the public with an explicit target and implementing it using monetary policy would reduce the use of indexation-mechanisms which would reduce the cost of stabilisation.

Taken together, the process of delegation (independence of the central bank and price stability as the objective), led to a decline in inflation for both economies. [Figure 4](#) displays the evolution of monthly inflation starting in 1960 until 2020. We find that on average inflation declined in both countries after the changes were introduced to disentangle political and monetary policy. Inflation in both economies reduced from roughly 30% annually in the 1980s, to less than 10% in the late 1990s, with most of the decline taking place upon the independence of the central bank.

⁶The targets prior to 1999 are approximated based on [Céspedes and Soto \(2006\)](#)

⁷See also [Gómez et al. \(2002\)](#), [Echavarría et al. \(2013\)](#)

Figure 4: Inflation Over time with Delegation



2.3 Limited Credibility

One of the key reasons for disentangling monetary policy from the political cycle and introducing intermediate inflation targets was the reduction in the wage and price indexation in the two economies. As stated in [Morandé \(2002\)](#), the reduction in indexation would reduce the cost of stabilisation for the economy. However, when the governments undertook the re-writing of the optimal contract, which we define as the process of delegation, it raised uncertainty for the private sector about the ability of the new institution to achieve the objective of lowering inflation.

In order to measure the uncertainty arising in the private sector, we look at the evidence for wage indexation. We hypothesise that the reduction in inflation over a sustained period would lead to a reduction in wage indexation over time. While not a direct measure of credibility, it does provide limited evidence to support the argument for disinflating gradually.

We use the nominal wage index to create a measure of year-on-year percentage changes in wages and the CPI index to create a measure of inflation. Finally, a measure of wage indexation is defined as $WP_t = \frac{\frac{W_t - W_{t-1}}{W_t}}{\frac{P_{t-1} - P_{t-2}}{P_{t-1}}}$, we measure the response of a change in wages to a change in the price levels.

2.3.1 Colombia

Figure 5: Wage Indexation Colombia

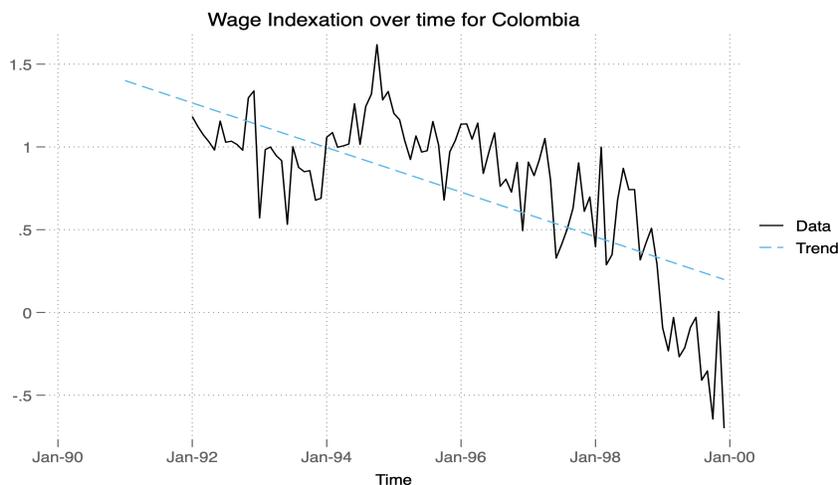


Figure 5 illustrates the evolution of wage indexation in Colombia. The solid line is the index WP_t , referred to above. The blue dashed line is a trend line which demonstrates that wage indexation has declined over time. The trend is the estimate from regressing WP_t on the time variable. An index value of greater than zero would indicate that wages respond more than one-to-one to the changes in prices. On the other hand, a value less than zero would imply wages do not keep up with changes in prices. The evidence seems to suggest a decline in wage indexation after a period of 3 years following the introduction of an independent central bank. This indicates that wages did not grow at the pace of inflation providing preliminary evidence of central banks gaining credibility after the introduction of the independent central bank.

3 The Model

This section presents a model based on Barro and Gordon (1983b) that incorporates the delegation of monetary policy to a "conservative" central banker with limited credibility. We explore how the introduction of intermediate targets can increase welfare. We illustrate numerically the properties of the optimal delegation arrangement in the presence of limited credibility.

3.1 Government's Loss Function

The government aims to maximize social welfare, approximated by an instantaneous social welfare loss function:

$$L_t^G = \pi_t^2 - a\tilde{y}_t \quad (1)$$

Here, \tilde{y}_t represents the output gap, which is weighted by parameter a , and π_t denotes the current inflation level.

The output gap is determined by inflation surprises:

$$\tilde{y}_t = 2c(\pi_t - \pi_t^e) \quad (2)$$

where π_t^e represents expected inflation, π_t is realized inflation, and c is a parameter.

The government has limited control over inflation. Realized inflation is equal to the target inflation set by the government, denoted as $\bar{\pi}_t$, plus a shock that is unobserved. Thus, inflation is given by:

$$\pi_t = \bar{\pi}_t + \epsilon_t \quad (3)$$

Here, ϵ_t follows a normal distribution with mean 0 and variance $\tilde{\sigma}_\epsilon^2$, representing the component of inflation that the government cannot control and is independent of $\bar{\pi}_t$.

Since the government lacks commitment, its problem can be considered static. The government's objective is to maximize:

$$V = \max_{\bar{\pi}_t} E(\bar{\pi}_t + \epsilon_t)^2 - ac(\bar{\pi}_t + \epsilon_t - \pi_t^e) \quad (4)$$

The solution to this maximization problem yields the target inflation:

$$\bar{\pi}_t = ac \quad (5)$$

Consequently, in equilibrium, under rational expectations, the inflation, inflation expectations, and the output gap are given by:

$$\pi_t = ac + \epsilon_t; \quad \pi_t^e = ac; \quad \tilde{y}_t = 2c\epsilon_t \quad (6)$$

This result demonstrates the classical inflation bias. Due to the government’s lack of commitment and its temptation to stimulate output through inflation surprises, an equilibrium is established with positive average inflation but no gain in output. A commitment solution would result in an average inflation and output gap of zero.

The expected discounted value in this case is given by:

$$\mathcal{L}^G = \sum_{t=0}^{\infty} \beta^t E_0 L_t^G = \frac{1}{1-\beta} ((ac)^2 + \tilde{\sigma}_\epsilon^2) \quad (7)$$

In contrast, the expected discounted value with commitment is $\frac{1}{1-\beta} (\tilde{\sigma}_\epsilon^2)$.

3.2 Rogoff’s Conservative Banker with Limited Credibility

Now, we introduce the government’s ability to delegate monetary policy to a central bank and assign a specific loss function that the central bank must minimize by independently determining its target inflation. If the reform is fully credible, the optimal policy is to select a ”conservative” central banker who minimizes only inflation volatility, assigning no weight to output volatility:

$$L_t^{CB} = \pi_t^2 \quad (8)$$

This outcome is optimal in a setup where there is no concern for output volatility, supply shocks, or output persistence (see [Svensson \(1995\)](#)). In the case of full credibility, this solution aligns with the outcome of a commitment regime.

However, suppose the announced objective of the central bank to focus solely on inflation is not fully credible. People may question how strictly the central bank will adhere to this rule, considering the possibility of an intermediate objective between the government’s preference and the announced objective. Alternatively, they may wonder to what extent the government can influence the central bank to deviate from the announced objective. In our notion of limited credibility, people’s beliefs about the conservatism of the central banker’s actions may differ from the announced reform. Individuals in the economy hold a prior belief about the weight a^{CB} that the central bank assigns to output.

Consequently, individuals perceive the loss function of the central bank as:

$$\widehat{L}_t^{CB} = \pi_t^2 - a^{CB} \tilde{y}_t \quad (9)$$

where the prior belief at $t = 0$ for a^{CB} is given by $\mathcal{N}(\tilde{a}_0, \tilde{\sigma}_0^2)$. Full credibility corresponds to the particular case where $\tilde{a}_0 = \sigma_0^2 = 0$.

Using a normal distribution to characterize beliefs has the advantage of capturing beliefs through the mean and variance, allowing us to straightforwardly represent the evolution of beliefs using the Kalman filter. Expected inflation depends solely on the mean of the prior and is given by:

$$\pi_t^e = \tilde{a}_{t-1}c \tag{10}$$

Beliefs are optimally updated as follows:

$$\begin{aligned} \tilde{a}_t &= \tilde{a}_{t-1} + K_t (\pi_t - \pi_t^e) \\ \tilde{\sigma}_t^2 &= (1 - K_t c) \tilde{\sigma}_{t-1}^2 \\ \text{where } K_t &= \left(\frac{c \tilde{\sigma}_{t-1}^2}{c^2 \tilde{\sigma}_{t-1}^2 + \tilde{\sigma}_\epsilon^2} \right) \end{aligned} \tag{11}$$

Here, K_t represents the Kalman gain, which determines the optimal revision of the prior's location parameter in response to a unitary inflation surprise.

The system of equations given by equations 2, 10 and 11 forms the foundation of our analysis throughout the paper. A negative inflation surprise incurs output costs (equation 2) and leads to credibility gains (equations 11), resulting in lower expected inflation for the subsequent period (equation 10). Furthermore, credibility gains are larger when there is higher uncertainty in people's prior judgment of the central bank ($\tilde{\sigma}_{t-1}^2$) and in the central bank's ability to control inflation (inverse of $\tilde{\sigma}_\epsilon^2$).

The sequence of \tilde{a}_t for Rogoff's conservative central bank decreases on average and converges to 0. Although \tilde{a}_t is subject to inflation shocks, it converges almost surely to zero in the limit, representing full credibility. Therefore, in the limit, we obtain the result described by Rogoff (1985), where the conservative central banker implements the first-best outcome. However, limited credibility imposes output costs during the transition period.

To assess the welfare implications of the reform, we begin by characterizing the expected path of inflation expectations. This path is determined by the following equation:

$$E_0 \{ \pi_t^e \} = \kappa_{t-1} E_0 \{ \pi_{t-1}^e \} \quad (12)$$

where $\kappa_{t-1} = \frac{\tilde{\sigma}_\epsilon^2}{(c^2 \tilde{\sigma}_{t-2}^2 + \tilde{\sigma}_\epsilon^2)}$

Thus, expectations are expected to decrease over time at a rate determined by κ_t , which itself decreases over time. We interpret κ_t as the persistence in inflation expectations. By iterating backwards, we can characterize the entire sequence of expected inflation expectations as:

$$E_0 \{ \pi_t^e \} = \left(\prod_{j=1}^{t-1} \kappa_{t-j} \right) (\tilde{a}_0 c) \quad (13)$$

This expression establishes expectations as a function of the prior and the variance of inflation shocks.

Moving on, the expected discounted loss of implementing the reform is given by:

$$\mathcal{L}^R = a 2 \tilde{a}_0 c^2 \sum_{t=1}^{\infty} \beta^{t-1} \left(\prod_{j=1}^{t-1} \kappa_{t-j} \right) + \frac{\tilde{\sigma}_\epsilon^2}{1 - \beta} \quad (14)$$

Here, \mathcal{L}^R represents the loss incurred by Rogoff's central banker. The terms highlighted in blue are the new components that arise in comparison to the inflation bias benchmark. The potential welfare gains from implementing the reform depend on the prior mean \tilde{a}_0 and the level of persistence in inflation expectations. Greater initial credibility (lower \tilde{a}_0) and lower persistence of inflation expectations (lower $\tilde{\sigma}_\epsilon^2$ or higher $\tilde{\sigma}_0^2$) lead to larger welfare gains with the conservative banker.

It is worth noting that since $\left(\prod_{j=1}^{t-1} \kappa_{t-j} \right)$ is bounded above by 1, a sufficient condition for the welfare improvement from the reform is that individuals believe the central bank to be at least as twice as conservative as the government ($2\tilde{a}_0 \leq a$).

Our main point is that there exists an optimal delegation arrangement—a central bank designed to become progressively more conservative over time and to announce this specific path to the public from the outset. We explore this case further in the next section.

3.3 Disinflation with Intermediate Targets

We now consider a scenario where the government assigns the central bank a time-varying loss function characterized by a sequence of inflation targets. The objective of the conservative central bank is to minimize the deviation of inflation from the specified targets, resulting in the following instantaneous loss function:

$$L^{CB*} = (\pi_t - \pi_t^*)^2 \quad (15)$$

Here, L^{CB*} represents the loss function with intermediate targets $\{\pi_t^*\}_{t=0}^\infty$. Consequently, the optimal inflation decision by the central bank is to set the target equal to the aimed inflation, i.e., $\bar{\pi}_t = \pi_t^*$.

However, individuals may not fully trust or consider this arrangement credible. They might believe that the central bank's loss function is a combination of the stated objective and the government's objective. This belief leads to the following expression for the perceived loss function of the central bank:

$$\widehat{L}_t^{CB*} = (1 - \gamma) (\pi_t - \pi_t^*)^2 + \gamma ((\pi_t)^2 - a\tilde{y}_t) \quad (16)$$

Here, γ represents the perceived weight assigned by the central bank to the inflation target. Individuals form a prior belief about γ given by $\mathcal{N}(\hat{\gamma}_0, \hat{\sigma}_0^2)$. The case of full credibility corresponds to $\hat{\gamma}_0 = \hat{\sigma}_0^2 = 0$. Notably, this setup is equivalent to the previously analyzed case when all targets are set equal to zero.

At any time period t , given the beliefs at that point $\mathcal{N}(\hat{\gamma}_{t-1}, \hat{\sigma}_{t-1}^2)$, the expected inflation is given by:

$$\pi_t^e = (1 - \gamma_{t-1})\pi_t^* + \gamma_{t-1}ac \quad (17)$$

Consequently, expected inflation becomes a weighted average between the inflation target and the inflation bias level. The belief updating system can be characterized by the following equations:

$$\begin{aligned}
\hat{\gamma}_t &= \hat{\gamma}_{t-1} + K_t (\pi_t - \pi_t^* - \gamma_{t-1} (ac - \pi_t^*)) \\
\hat{\sigma}_t^2 &= (1 - K_t (ac - \pi_t^*)) \hat{\sigma}_{t-1}^2 \\
\text{where } K_t &= \frac{\hat{\sigma}_{t-1}^2 (ac - \pi_t^*)}{\hat{\sigma}_{t-1}^2 (ac - \pi_t^*)^2 + \sigma_\epsilon^2}
\end{aligned} \tag{18}$$

Consequently, the expected path of inflation expectations can be characterized as:

$$\begin{aligned}
\pi_t^e - \pi_t^* &= \kappa_{t-1} (\pi_{t-1}^e - \pi_{t-1}^*) \\
\text{where } \kappa_{t-1} &= \frac{\sigma_\epsilon^2}{\hat{\sigma}_{t-2}^2 (ac - \pi_{t-1}^*)^2 + \sigma_\epsilon^2}
\end{aligned} \tag{19}$$

Here, κ_{t-1} represents the persistence of expectations and is determined by the prior variance and the variance of inflation shocks. Importantly, note that lower inflation targets lead to faster convergence of expectations, as larger surprises reveal more information about the central bank's loss function. This is not surprising, as the Rogoff banker generates faster learning. However, early on, this can also lead to substantial output costs due to large inflation surprises.

In this new setup, the government can balance the trade-off between output costs and gains in credibility by selecting a sequence of targets π_t^* . It is essential to understand that high credibility does not automatically imply inflation close to zero. It signifies inflation expectations close to the target, which may not necessarily be zero at any given point.

For a given sequence of targets π_t^* , the present value of the social welfare is given by:

$$\mathcal{L}^{G^*} = \sum_{t=1}^{\infty} \beta^{t-1} (\pi_t^*)^2 + (ac - \pi_1^*) \hat{\gamma}_0 a 2c \sum_{t=1}^{\infty} \beta^{t-1} \left(\prod_{j=1}^{t-1} \kappa_{t-1} \right) + \frac{\sigma_\epsilon^2}{1 - \beta} \tag{20}$$

The first term captures the inflation costs associated with the intermediate targets above zero, the second term represents the output costs, and the last term accounts for the costs imposed by the inflation shock. Both the inflation bias case and the Rogoff case are particular instances of this specification. The inflation bias case involves a sequence of targets equal to the inflation bias, resulting in the second term being zero. All costs emerge from inflation costs. On the other hand, the Rogoff banker sets all targets equal to zero, leading to the first term being zero, with all costs arising from

the output costs. The use of intermediate targets allows the government to select a sequence that balances these costs and potentially increases welfare.

To illustrate the trade-off involved in deciding the speed of the disinflation process, let's consider a policy announcement where the target inflation is lowered by the same percentage each period, given by $\pi_t^* = \rho^t ac$. Here, ρ captures the persistence of the disinflation process. We can examine two extreme cases: when $\rho = 1$, we have the inflation bias case, and when $\rho = 0$, we have the Rogoff central banker case.

With this specific disinflation plan, social welfare can be expressed as follows:

$$\mathcal{L}^{G*} = \underbrace{\frac{\rho^2}{1 - \beta\rho^2} ac}_{\text{Inflation cost}} + \underbrace{(1 - \rho)\hat{\gamma}_0 2(ac)^2 \sum_{t=1}^{\infty} \beta^{t-1} \left(\prod_{j=1}^{t-1} \kappa_{t-1} \right)}_{\text{Output cost}} + \frac{\sigma_\epsilon^2}{1 - \beta} \quad (21)$$

We observe that as ρ decreases and disinflation becomes faster, the costs associated with inflation decrease. However, a lower value of ρ also leads to higher output costs. It results in a larger initial surprise, although it lowers the persistence of expectations captured by κ . To gain further insight into the mechanisms at play, we conduct a numerical analysis in the next section to demonstrate how gradual disinflation can indeed increase welfare.

4 Numerical Illustration

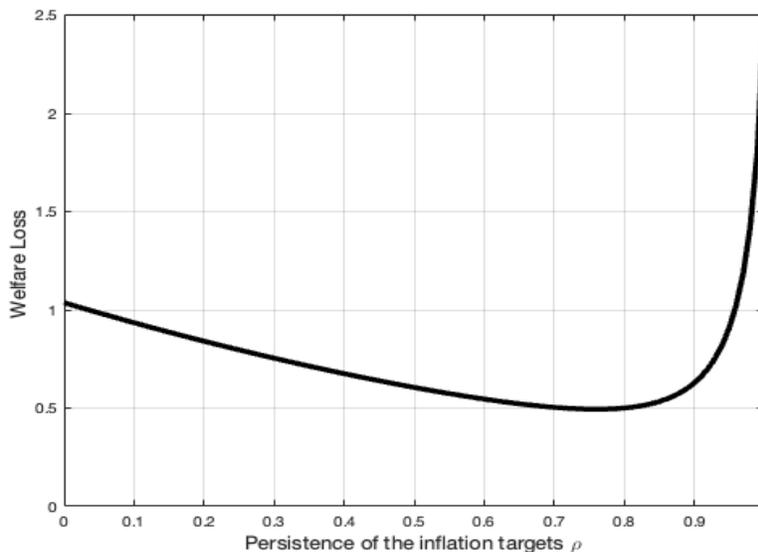
In this section, we analyze the welfare implications of the three cases discussed earlier, using a simple calibration that involves specifying a single parameter, ρ , to characterize the speed of disinflation in a policy with intermediate targets. The calibration assumes an inflation level of 35% under the inflation bias regime ($a = 1, c = 0.35$) and a risk-free real rate of approximately 2% ($\beta = 0.98$). Additionally, the standard deviation of inflation shocks is set to 3% ($\sigma_\epsilon^2 = 0.03^2$), and the prior credibility of the central bank, $\tilde{\gamma}_0$, is set to 1, with a standard deviation of 0.1.

Figure 6 depicts the welfare function \mathcal{L}^{G*} for the intermediate targets policy across various levels of the persistence of the targets path, $\rho \in [0, 1]$. The two extremes correspond to the cases of the Rogoff central bank ($\rho = 0$) and the inflation bias ($\rho = 1$). In this calibration, the Rogoff central bank achieves a lower loss than the inflation bias

case. The optimal policy corresponds to an interior solution with $\rho = 0.76$, representing a gradual disinflation process. At the optimum, a one percentage point inflation surprise in the first period results in a decrease of expectations of 0.7% relative to the target.

We decompose the welfare loss in argue thatto inflation loss and output loss, as shown in equation 21, to illustrate the trade-off faced by the government when determining the speed of disinflation. Figure 7 demonstrates that a faster disinflation ($\rho \rightarrow 0$) reduces inflation costs at the expense of larger inflation surprises and, consequently, higher output costs. The optimal policy strikes a balance between the two.

Figure 6: Welfare loss with intermediate targets \mathcal{L}^{G*}



The optimal disinflation speed in our calibrated economy closely matches the disinflation processes observed in the Latin American countries discussed. It implies that within a decade, the economy practically converges to be within a 5% difference from the long-run target.

Figure 8 presents how persistent inflation expectations depending on the size of the shock to inflation. As has been highlighted in section 4, equation (19), the persistence of expectations is a function of the exogenous shock to inflation and the priors of the agents. As the exogenous volatility increases, the persistence of expectations also increases due to the increased uncertainty around whether the central bank can achieve the inflation target. This leads to a high initial κ which will decline as realised inflation

and the inflation target decline. For the welfare loss, it is the product of the persistence which shall impact the output cost of inflation deviating from expectations. Thus, the higher the speed of learning, the lower the κ implying a higher output cost.

Figure 7: Decomposition of the welfare loss

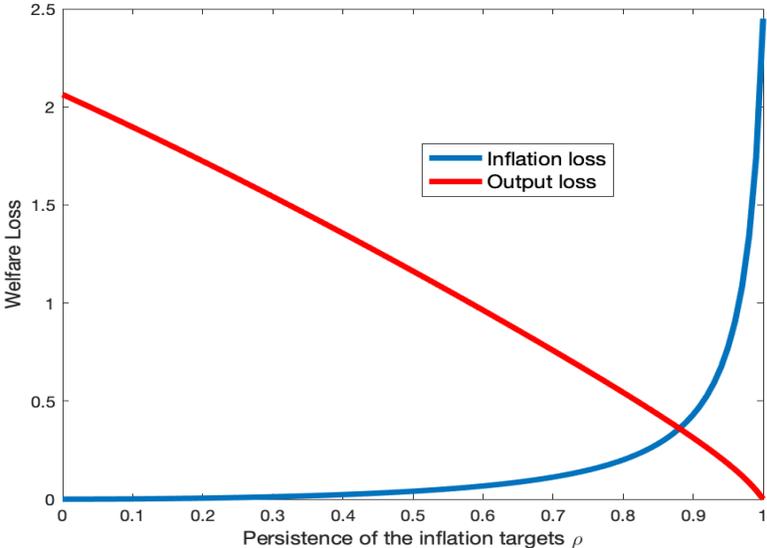
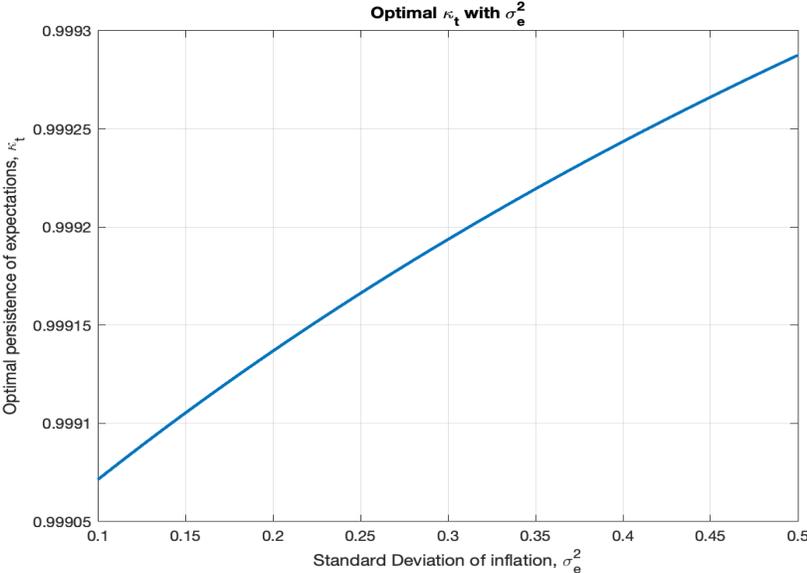


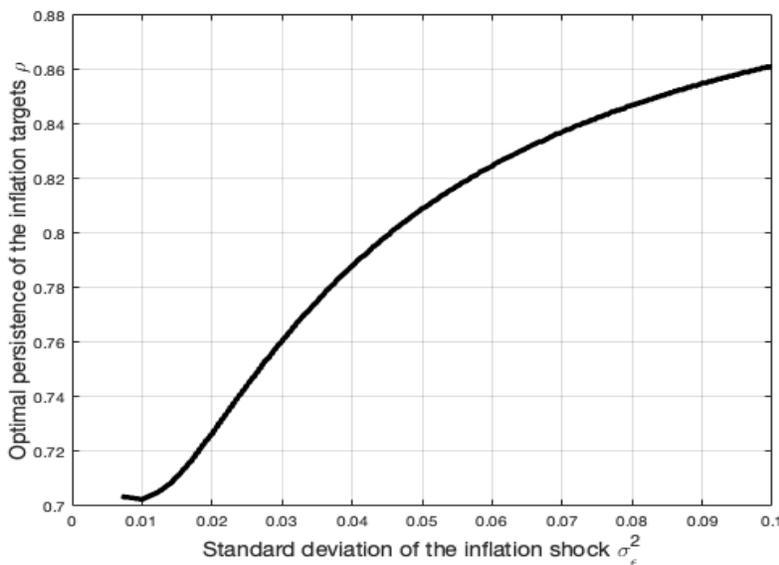
Figure 8: Evolution of κ with inflation volatility



Lastly, we highlight how the optimal speed of disinflation depends on the speed at

which credibility can be built. The greater the volatility of inflation shocks, the more challenging it is to establish credibility, as agents may attribute negative inflation surprises to inflation shocks rather than the central bank’s policy. Figure 9 illustrates how the optimal persistence of the targets varies with the standard deviation of inflation shocks. As the central bank has less control over inflation (higher variance), the disinflation path has a slower convergence to the long run objective.

Figure 9: Optimal disinflation for varying inflation volatility



5 Empirical Evidence

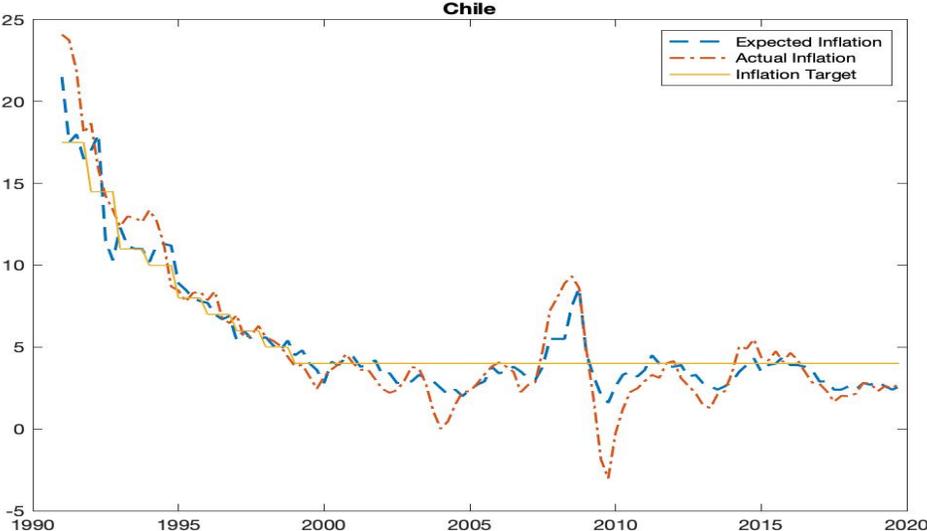
In this section, we provide empirical evidence to support the implications and mechanisms of our model. We analyze data on inflation, inflation expectations, and one-year-ahead inflation targets from Chile and Colombia from 1991:Q1 to 2002:Q4 to test for a reduction in inflation expectations prior to the introduction of inflation targeting. The data on inflation expectations is sourced from the Ifo World Economic Survey (WES)⁸, which collects forecasts from professional forecasters. Before testing the model’s implications, we present the time series for inflation, inflation expectations, and intermediate inflation targets for both economies.

Figures 10 and 11 illustrate the evolution of inflation (blue solid line), inflation expect-

⁸The survey was discontinued in 2019.

tations⁹ (red dotted line), and intermediate inflation targets (yellow solid line). These series cover the period from January 1990 to January 2020. Both countries exhibit a decline in inflation until 1999, coinciding with the adoption of inflation targeting as their monetary policy. This decline in inflation is closely followed by a decline in inflation expectations, indicating that expectations are anchored toward the announced inflation target, providing initial evidence of agent learning. We now apply econometric strategies to test if this observation aligns with the model’s implications.

Figure 10: Inflation Target, Inflation and Inflation Expectations: Chile



Next, we address two key implications from the model presented in Section 4.

Implication I: Revision of Expectations Given Inflation Surprise

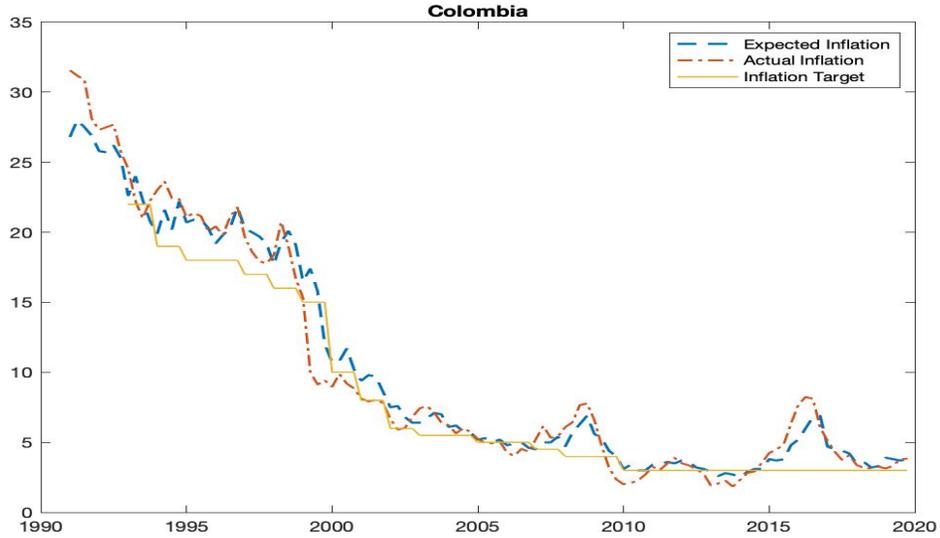
The model suggests that an inflation surprise will lead to an adjustment of inflation expectations based on the direction of the surprise and the variance of prior expectations. For a positive inflation surprise ($\pi_t > \pi_{t-1}^e$), the model predicts an upward revision of expectations, while for a negative surprise ($\pi_t < \pi_{t-1}^e$), expectations should be revised downward. Thus, the model anticipates a positive correlation between forecast revisions and inflation surprises.

Implication II: Revision of Excess Expectations Given Inflation Surprise

⁹The figures do not include inflation expectations before 1999 as most central banks started tracking expectations post-adoption of inflation targeting.

When the central bank announces intermediate inflation targets ($\bar{\pi}_t$), inflation expectations should adjust relative to the announced target ($\bar{\pi}_t - \pi_t^e$). Specifically, following an inflation surprise, the deviation of expectations from the target (excess expectations) should decrease with a negative surprise and increase with a positive surprise. On average, this revision coefficient is expected to be negative during periods of disinflation.

Figure 11: Inflation Target, Inflation and Inflation Expectations: Colombia



5.1 Empirical Specification

Based on the model's implications, we run two regressions. First, we capture the interaction between changes in inflation expectations and inflation surprises. This is represented by the forecast revision given the forecast error from the previous period as shown in Equation 22.

$$(\pi_{t|t-1}^e - \pi_{t-1|t-1}^e) = \alpha + \beta(\pi_{t-1|t-1} - \pi_{t-1|t-1}^e) + \epsilon_t \quad (22)$$

Where $\pi^e t$ are six-month-ahead inflation expectations, πt is the realized inflation for the forecasted period, and $\epsilon_t \sim \mathcal{N}(0, \sigma_\epsilon^2)$. We expect $\beta > 0$, indicating that inflation expectations should adjust in the direction of the inflation surprise.

5.1.1 Result I: Inflation Expectations Respond to Inflation Surprises

The positive and significant coefficient on inflation surprise in Table 1 indicates the speed of learning for agents in the economy. The results suggest that agents' expectations in Colombia and Chile were highly responsive to inflation surprises. If agents over-predicted inflation in the previous period, they revised their expectations downward, and vice versa.

Table 1: Forecast Revision on Inflation Surprise: Intermediate Targets

	(1) Colombia	(2) Chile
Inflation Surprise (β_1)	0.177** (0.0603)	0.458* (0.177)
Constant (α)	-0.115 (0.196)	-0.125 (0.168)
N	32	31

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Newey-West standard errors are in parenthesis, with 1 lag

Given that inflation expectations respond to inflation surprises, we now examine if expectations also adjust toward the inflation target following an inflation surprise. Specifically, we test whether a reduction in inflation leads agents to update their beliefs toward the central bank's target.

5.1.2 Result II: Inflation Expectations respond to deviations from the inflation target

In the model presented in section 4, agents use realized inflation and the inflation target to infer the central bank's objectives. In order for us to measure whether inflation expectations respond to deviations of inflation from the target we build a second specification.

The second specification we evaluate is given by equation 23, and measures the response of inflation expectations to the deviation of realised inflation from the announced inflation target. We do so by adding an excess inflation term - denoted by ω - which is the deviation of inflation from the inflation target.

$$(\pi_{t|t-1}^e - \pi_{t-1|t-2}^e) = \delta + \beta_1(\pi_{t-1|t-1} - \pi_{t-1|t-1}^e) + \beta_2 \underbrace{(\pi_{t-1|t-1} - \pi_{t-1|t-1}^*)}_{\omega} + \varepsilon_t \quad (23)$$

Excess inflation allows us to measure how much inflation expectations change when realised inflation deviates positively or negatively from the inflation target for a given level of inflation surprise (β_1). According to our model, conditional on a given inflation surprise, inflation expectations should revise downward and toward the inflation target, if realised inflation equals the target ($\pi_{t-1} \leq \pi_{t-1}^*$). Therefore, we expect β_2 to be negative.

As before, we expect a positive coefficient on β_1 , indicating that a positive inflation surprise leads agents to revise expectations upward relative to the inflation target, while a negative surprise leads to a downward revision.

	(1) Colombia	(2) Chile
Inflation Surprise (β_1)	0.615*** (0.113)	0.834*** (0.221)
Excess Inflation (β_2)	-0.516** (0.163)	-0.701*** (0.161)
Constant (δ)	1.187* (0.435)	0.289 (0.175)
N	26	31

Newey-West Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results of the regression align with the model's implications. First, excess inflation responds positively to the inflation surprise, as indicated by the positive coefficient on β_1 . Second, the negative coefficient on the interaction term β_2 suggests that inflation expectations adjust downward relative to the target when the central bank misses the inflation target. To quantify how expectations adjust when the central bank misses its target, we perform a back-of-the-envelope calculation, detailed below.

6 Conclusion

The literature on optimal delegation of monetary policy has focused on setting up contracts between the government and the central banker to achieve the highest welfare. However, we argue that such contracts might lack credibility among the public due to potential hidden "side-payments" that could align the central bank with the government. Limited credibility affects the perceived welfare achievable through the contract. In such cases, we propose that contracts should consider limited credibility and balance the costs of gradual introduction with the benefits of credibility gains. The use of decreasing intermediate targets in the establishment of independent central banks in many Latin American countries can be viewed as an attempt to implement such a policy.

References

- Backus, D. and Driffill, J. (1985). Inflation and reputation. *The American Economic Review*, 75(3):530–538.
- Barro, R. J. (1986). Reputation in a model of monetary policy with incomplete information. *Journal of Monetary Economics*, 17(1):3–20.
- Barro, R. J. and Gordon, D. B. (1983a). A positive theory of monetary policy in a natural rate model. *Journal of political economy*, 91(4):589–610.
- Barro, R. J. and Gordon, D. B. (1983b). Rules, discretion and reputation in a model of monetary policy. *Journal of monetary economics*, 12(1):101–121.
- Céspedes, L. F. and Soto, C. (2006). Credibility and inflation targeting in chile. *Documentos de Trabajo (Banco Central de Chile)*, (408):1.
- Cukierman, A. and Meltzer, A. H. (1986). A theory of ambiguity, credibility, and inflation under discretion and asymmetric information. *Econometrica: journal of the econometric society*, pages 1099–1128.
- Echavarría, J. J., N., N. R., and Rojas, L. E. (2013). The Target of the Central Bank and Inflation Persistence in Colombia. In D’Amato, L. I., Enciso, E. L., and Giraldo, M. T. R., editors, *Inflationary Dynamics, Persistence, and Prices and Wages Formation*, volume 1 of *Investigación Conjunta-Joint Research*, chapter 5, pages 105–126. Centro de Estudios Monetarios Latinoamericanos, CEMLA.
- Gómez, J., Uribe, J. D., and Vargas, H. (2002). The Implementation Of Inflation Targeting In Colombia. BORRADORES DE ECONOMIA 003603, BANCO DE LA REPÚBLICA.
- Herrendorf, B. (1998). Inflation targeting as a way of precommitment. *Oxford Economic Papers*, 50(3):431–448.
- Herrendorf, B. and Lockwood, B. (1997). Rogoff’s” conservative” central banker restored. *Journal of Money, credit, and Banking*, pages 476–495.
- Jensen, H. (1997). Credibility of optimal monetary delegation. *The American Economic Review*, pages 911–920.

- King, R. G., Lu, Y. K., et al. (2020). Managing expectations in the new keynesian model. Technical report, HKUST Center for Economic Policy.
- Kostadinov, R. and Roldán, F. (2020). *Credibility Dynamics and Disinflation Plans*. International Monetary Fund.
- Kydland, F. E. and Prescott, E. C. (1977). Rules rather than discretion: The inconsistency of optimal plans. *Journal of political economy*, 85(3):473–491.
- Lu, Y. K. (2013). Optimal policy with credibility concerns. *Journal of Economic Theory*, 148(5):2007–2032.
- Lu, Y. K., King, R. G., and Pasten, E. (2016). Optimal reputation building in the new keynesian model. *Journal of Monetary Economics*, 84:233–249.
- Marcet, A. and Nicolini, J. P. (2003). Recurrent hyperinflations and learning. *American Economic Review*, 93(5):1476–1498.
- Morandé, F. (2002). A Decade of Inflation Targeting in Chile: Developments, Lessons, and Challenges. In Loayza, N., Soto, R., Editor), N. L. S., and Editor), K. S.-H. S., editors, *Inflation Targeting: Design, Performance, Challenges*, volume 5 of *Central Banking, Analysis, and Economic Policies Book Series*, chapter 14, pages 583–626. Central Bank of Chile.
- Rogoff, K. (1985). The optimal degree of commitment to an intermediate monetary target. *The quarterly journal of economics*, 100(4):1169–1189.
- Romelli, D. (2022). The political economy of reforms in central bank design: Evidence from a new dataset. *Economic Policy*, 37(112):641–688.
- Romelli, D. (2024). Trends in central bank independence: a de-jure perspective. *BAFFI CAREFIN Centre Research Paper*, (217).
- Sargent, T., Williams, N., and Zha, T. (2009). The conquest of south american inflation. *Journal of Political Economy*, 117(2):211–256.
- Svensson, L. E. (1995). Optimal inflation targets, conservative central banks, and linear inflation contracts.

A Constitutional Amendments and Charter of the Central Bank

A.1 Chile

A.1.1 Organic Law of the Central Bank

Artículo 7

“El Consejo estará constituido por cinco consejeros, designados por el Presidente de la República, median te decreto supremo expedido a través del Ministerio de Hacienda, previo acuerdo del Senado.”

Artículo 8

“Los miembros del Consejo durarán diez años en sus cargos, pudiendo ser designados para nuevos períodos, y se renovarán por parcialidades, a razón de uno cada dos años. El Presidente del Consejo, que lo será también del Banco, será designado por el Presidente de la República de entre los miembros del Consejo y durará cinco años en este cargo o el tiempo r:tenor que le reste como consejero, pudiendo ser designado pat·a nuevos períodos”

A.2 Colombia

A.2.1 Constitutional Amendment

Article 371 and 372

“Artículo 371. El Banco de la República ejercerá las funciones de banca central. Estará organizado como persona jurídica de derecho público, con autonomía administrativa, patrimonial y técnica, sujeto a un régimen legal propio.”

“Artículo 372. La Junta Directiva del Banco de la República será la autoridad monetaria, cambiaria y crediticia, conforme a las funciones que le asigne la ley. Tendrá a su cargo la dirección y ejecución de las funciones del Banco y estará conformada por siete miembros, entre ellos el Ministro de Hacienda, quien la presidirá. El Gerente del Banco será elegido por la Junta Directiva y será miembro de ella. Los cinco miembros restantes, de dedicación exclusiva, serán nombrados por el Presidente de la República para períodos prorrogables de cuatro años, reemplazados dos de ellos, cada cuatro años. Los miembros de la junta directiva representarán exclusivamente el interés de la Nación.”

A.2.2 Composition of the Central Bank

Article 28: Composition

“As provided under Article 372 of the Political Constitution, the Board of Directors will be composed of seven (7) members, as follows: a) The Minister of Finances and Public Credit, who will preside the Board; b) The General Manager of the Banco, and c) Five (5) more full-time members, exclusively dedicated to their post, appointed by the President of the Republic. The members of the Board of Directors exclusively represent the general interest of the Nation.”

B Data Sources

The table below provides information about the data sources as well as the definition of the variables as taken from the datasets.

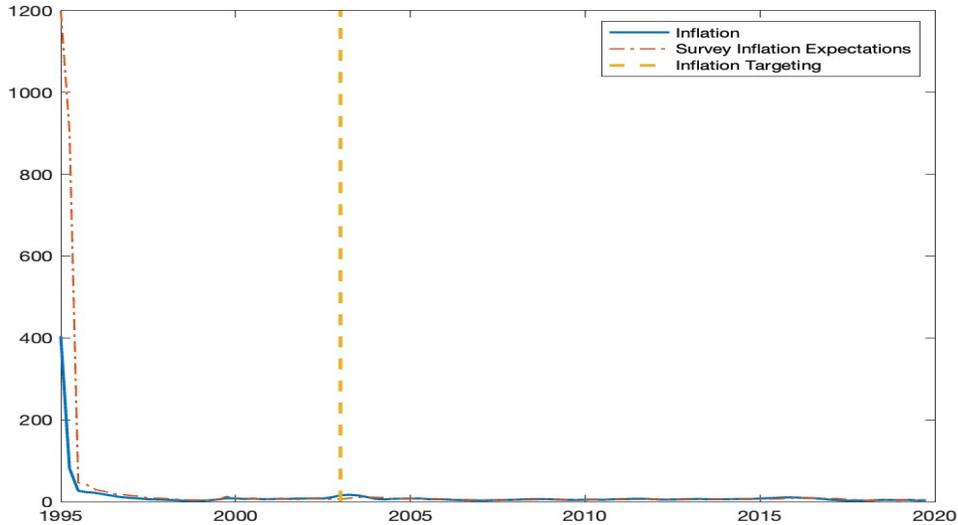
Table 2: Dataset Sources and Definitions

Variable Name	Data Source	Definition
Realised Inflation (π_t)	IMF International Financial Statistics	Annualised Quarterly Inflation
Inflation Expectations (π_t^e)	Ifo World Economic Survey	6-month-ahead quarterly inflation expectations
Inflation Targets (π_t^*)	Morandé (2002), Céspedes and Soto (2006)	1-year-ahead inflation targets
<i>cbie_index</i>	Romelli (2022, 2024)	Annual central bank independence index

C Brazil

Figure 12 delineates realised inflation, expected inflation and the inflation target in Brazil from 1995Q1 - 2020Q1. We restrict the time frame for Brazil since prior to 1995, Brazil experienced episodes of hyperinflation.

Figure 12: Inflation Target, Inflation and Inflation Expectations: Brazil



Brazil is the most distinct case amongst the three countries being considered in

this paper. The process for price stabilisation started in 1994. Brazil introduced an independent Monetary Policy Committee (Copom), whose members are the Governor and Deputy Governors. The Copom made decisions to raise the short term interest over the period between 1996 and 1999. Brazil did not have explicitly announced intermediate targets but rather focused on using monetary policy instruments to achieve disinflation. This process of disinflating using interest rates is abstracted from in our theoretical framework. The use of interest rates is resonant with using a Taylor type rule and therefore implicitly, Inflation Targeting before its formal adoption.

D Institutional Amendments

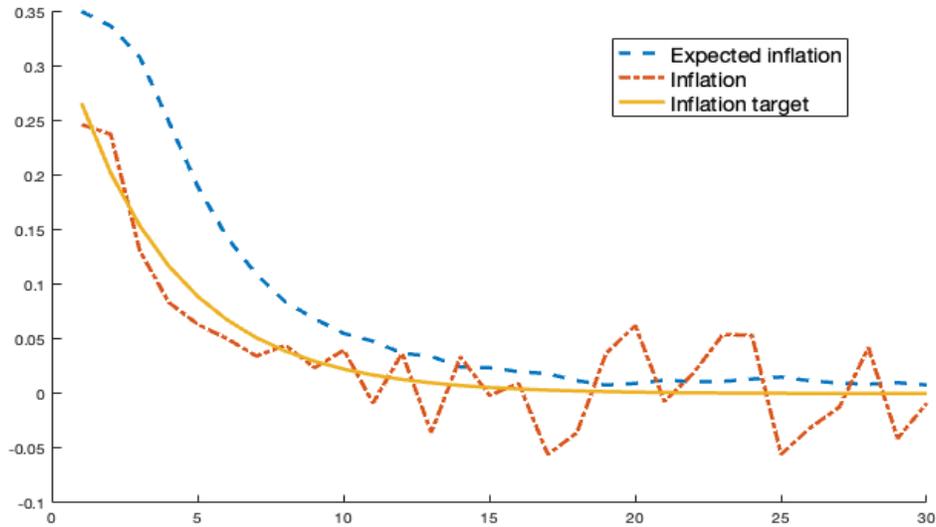
Table 3: Institutional Amendments

Country	Year of amendment
Brazil	1995
Chile	1989
Colombia	1991

E Simulation of the economy

Figure 13 plots a simulated disinflation path of the calibrated economy with the optimal disinflation path. Expectations start at the inflation bias and gradually converge to the inflation targets.

Figure 13: Inflation Target, Inflation and Inflation Expectations: Simulated model



F Forecast Revisions on Forecast Errors

Table 4: Forecast Revision on the Inflation Surprise

	(1) Colombia	(2) Chile	(3) Peru
Inflation Surprise	0.186*** (0.0335)	0.253*** (0.0535)	0.131*** (0.0283)
Constant	-0.0519 (0.0507)	-0.0404 (0.0587)	0.00381 (0.0433)
N	113	113	80

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Newey-West standard errors are in parenthesis, with 4 lags