# INDEXATION, INFLATION, AND MONETARY POLICY: AN OVERVIEW

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Indexation policies and practices are common in many markets and economies. In most cases, price adjustment mechanisms arise in private contracts as a consequence of high and pervasive inflation. Sometimes governments also play an important role in promoting the use of indexation in their issues of public debt, taxation systems, public tariff settings, and other institutional arrangements.

Although practices that can generally be classified as indexation are widespread in most modern economies, this topic remains highly controversial. On the one hand, from a microeconomic point of view, it is clear that indexation facilitates economic arrangements and contracts between private agents under high and even under moderate inflation. In particular, indexation allows the system of relative prices to survive large inflation shocks. Wage and financial indexation are clear examples of arrangements that accomplish this purpose. Wage indexation substitutes for the need for frequent renegotiation of wages and may reduce labor market transactions costs in economies where inflation is at least moderate. And the experience of several emerging economies shows that indexing financial instruments may be key to success in developing liquid long-term fixed-income markets.

On the other hand, indexation also has macroeconomic implications. In particular, indexation has played a critical role in many stabilization programs. The academic literature regarding this point is not without controversy. Supporters of indexation claim that automatic price adjustments facilitate the reduction of inflation and

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the stabilization of output in the presence of monetary shocks. But indexation has its detractors as well. The standard case against indexation is built on the premise that indexation to past inflation increases inflationary inertia, tending to perpetuate inflation and making rapid, low-cost stabilization less likely. It has also been argued that exchange rate–based stabilization programs in countries suffering from stubbornly persistent inflation—to which indexation may contribute—are doomed to fail by causing a real overvaluation of the domestic currency (Goldfajn and Valdés, 1999; Fischer, 2001).

The recent history of the Chilean economy provides fertile ground for assessing the extent and impact of indexation, from both the macroeconomic and the microeconomic viewpoint. Chile has had it all: indexation of private contracts including wages, house rentals, tuition, and health insurance; indexation of financial instruments such as consumer loans, mortgages, corporate bonds, and indeed almost all fixed-income securities with a maturity beyond one quarter; and indexation of policy instruments such as exchange rates, interest rates on public debt, income tax brackets, and public sector wages.

The development of these indexation mechanisms beginning in the 1960s was undoubtedly a rational response to high inflation. However, in the wake of this generalized indexation, inflation was reduced massively during the 1990s. The policy implemented by the newly independent central bank attained a reduction in annual consumer price inflation from 27 percent in 1990 to 3 percent in 2001.

At the beginning of the 1990s, policymakers saw it as important to reduce the widespread prevalence of indexation based on past inflation, and especially its role in determining the prices of nontradable goods, wages, the nominal exchange rate, and interest rates. Consequently, in September 1990 the Central Bank of Chile adopted a monetary framework based on public announcement of an explicit, forward-looking annual inflation target. Today there is wide agreement that this significant change in monetary regime has contributed to a gradual decline in inflation to levels consistent with a permanent target range of 2 to 4 percent per year (Loayza and Soto, 2002). This was attained only recently, however, when inflation targeting was perfected by the adoption of a flexible exchange rate system and significant improvements in the transparency and accountability of monetary policy.

The Central Bank of Chile recently introduced two further changes that contribute to deindexation in financial markets:

nominalization of interest rates on short-term central bank debt, and nominalization of the monetary policy interest rate. The central bank started issuing nonindexed short-term domestic debt of forty-two days' and of ninety days' maturity in July 1997. Placement of these issues at fixed nominal interest rates has been very successful on four counts. First, financial markets have received them well, as reflected in low inflation risk premiums. Second, these issues help in completing Chile's financial markets, adding nominal debt instruments to the existing ninety-day indexed debt. Third, this placement provides the public and the monetary authority with direct information about inflation expectations (including the inflation risk premium). Last but not least, the placement of nominal debt represents an important step toward the nominalization of short-term financial instruments issued by the private sector.

By 2001, inflation expectations in Chile had stabilized at levels consistent with the official target range of 2 to 4 percent. In August of that year the central bank took an additional step toward nominalization, setting its main monetary policy instrument, the overnight interbank loan rate, in nominal terms. The bank also started to issue 30, 60, and 90-day nominal debt and stopped issuing 90-day indexed debt, replacing it with 360-day indexed debt. Hence the market for short-term indexed financial instruments has been partially replaced by the market for nonindexed debt, and this development is supported by much less volatile nominal interest rates.

Despite these policy changes, however, the Chilean economy remains highly indexed, especially in the medium-term fixed-income financial market and in the markets for nontraded goods and services and for labor. In the absence of strong reasons or incentives to abandon indexation, even under conditions of low and stable inflation, agents in these markets tend to stick to their decades-long habits of indexation based on past inflation. Hysteresis in indexation thus mimics hysteresis in currency and asset dollarization, the alternative response to high inflation observed in many countries.

This volume contributes to the literature on indexation and inflation by publishing nine new papers that are at the research frontier on these issues. Their scope ranges from analyses of specific topics, such as the optimal management of indexed public debt and the consequences of wage indexation, to presentations of recent empirical evidence regarding indexation and inflation persistence.

The papers are revised versions of papers presented at the First Annual Conference of the Central Bank of Chile, on "Indexation, Inflation, and Monetary Policy," held in Santiago in August 1997.

This introduction reviews the issues addressed by the various papers, in the context of the related academic and policy literature. First, we look at specific indexation practices adopted in different markets in response to inflation and their consequences for those markets. Here we discuss the creation of artificial indexed units of account as well as the indexation of wages, financial instruments, and public debt. Second, we discuss the relationship between indexation practices, inflation persistence, and the outcome of stabilization programs. In this context we also reconsider the question of the appropriate choice of monetary policy regime in a deindexed, low-inflation economy.

The first paper, written by Oscar Landerretche, Fernando Lefort, and Rodrigo Valdés, can be seen as a direct extension of this introduction. The authors provide a comprehensive review of the theoretical literature on indexation that, unlike other surveys on this subject, analyzes the effects of indexation in specific markets on aggregate inflation. It thus updates and complements previous surveys, including those of Van Gompel (1994), who emphasizes labor market indexation; Campbell and Shiller (1996), who focus on financial indexation; and Dornbusch and Simonsen (1983), who look at the relationship between indexation and inflation in general. The paper examines the theoretical literature and policy dimensions of the three main categories of indexation: wage indexation, financial indexation, and exchange rate indexation. The authors identify the causes of each type of indexation and its consequences both for the corresponding market and for the broader economy. They then analyze the effects of each type of indexation on the inflation process as well as on the costs of stabilization and the authorities' willingness to adopt a stabilization program.

## 1. Indexation Practices and Their Effects

Price indexation of policy instruments, labor, and financial contracts can be considered a rational response, observed in many countries, to persistent inflation. Market participants and policymakers have devised various indexation mechanisms as means of protection, to reduce the costs of high and variable inflation. We begin by

reviewing the main indexation practices and their implications for policy instruments and market behavior.

## 1.1 Choosing an Indexed Unit of Account

Many economies have faced high inflation at one point or another in their history. When inflation rises to two- or three-digit levels, market transactions and contracts become disrupted. As inflation erodes real values and misaligns relative prices, agents are required to reset prices and renegotiate contracts with increasing frequency. At some point, to reduce the need for constant readjustments, prices and contracts begin to be quoted in a unit of account that is not affected by domestic inflation. Selecting an indexed unit of account involves separation of the first two functions of money—as a medium of exchange and as a store of value—from its third function, that of a unit of account. Of course, this can be done in many different ways. Several countries experiencing high inflation have chosen a foreign currency as their unit of account (and often as a store of value as well) while retaining local money as the medium of exchange. Substitution of the U.S. dollar for local currencies and in the denomination of asset prices is observed in several Latin American countries, including many that have achieved low inflation. Hysteresis of de facto dollarization is widespread, making it very difficult to reintroduce the domestic currency after currency and asset substitution have taken place (Calvo and Végh, 1992).

The paper by Robert J. Shiller in this volume analyzes the experience of the Chilean Unidad de Fomento (UF), an artificial unit of account that provides an alternative to adopting a foreign currency. Adopted in 1967, the UF was the world's first successful inflation-indexed unit of account. It was later adopted by Colombia, Ecuador, and Mexico. Shiller, following the pioneering work of Irving Fisher (1911, 1928, 1934), analyses the factors that led to the creation of the Chilean UF.

There are several lessons to be learned from the Chilean experience. For example, the UF is linked to a price index, the official consumer price index (CPI), that attempts to measure the true cost of living in Chile. Therefore, when debts and other obligations are denominated in UF, they are held constant in terms of purchasing power. Using the dollar as an alternative unit of account would not provide the same protection, for the same reasons that preclude

international purchasing power parity from holding. At the same time, the government's adoption of an indexed unit of account solves a coordination problem that otherwise could inhibit indexation or trigger the use of the dollar. The UF has additional features that may appear secondary but in fact have contributed to its success. For instance, the daily proportion of the lagged monthly CPI change is reflected in the daily value of the UF, contributing to its widespread use in daily transactions.

In sum, Shiller is enthusiastic about the Chilean UF. He argues that using this indexed accounting unit solves important practical problems that arise when financial indexation is not introduced despite conditions of moderate to high inflation. However, one important caveat in adopting an indexed unit of account is that it may contribute to more sticky inflation expectations and greater inflation inertia. Despite the latter danger, Shiller recommends its use in other countries, including the United States. However, in countries that have achieved relatively low inflation, one might also consider using units of account indexed to nominal income, to attain a superior sharing of risks across different generations. Shiller argues that an alternative unit, indexed to wages, as was considered in Chile and is currently being used in Uruguay, may also provide a suitable instrument of indexation. This leads us to consider the more general issue of wage indexation next.

## 1.2 Wage Indexation

Under moderate to high inflation, wage contracts tend to include arrangements between workers and employers that remove the need for continuous renegotiation and recalculation of wages in response to inflation shocks. High costs of wage renegotiation favor lengthening the duration of labor contracts. As shown by Gray (1978) and Aizenman (1984), wage indexation allows a reduction in the frequency of wage renegotiation by keeping real wages relatively constant. Wage indexation is also justified as a risk-sharing mechanism. Here the idea, as formalized by Baily (1974) and Azariadis (1975), is that more risk-averse workers are willing to accept real wages paid by their less risk-averse employers that are lower than those observed in the spot job market, as long as the workers are offered a mechanism that keeps real wages unchanged when unexpected inflation shocks occur. Of course, wage indexation mechanisms also generate the potential for redistribution between employers and employees. The paper

by Landerretche, Lefort, and Valdés in this volume provides a more detailed discussion of this topic.

Views on wage indexation largely depend on the form of wage indexation being considered. The literature (for example, Aizenman, 1987) has emphasized that wage indexation must entail mechanisms that allow wages to adjust automatically to new information without having to renegotiate the terms of the contract. Therefore it is not sufficient simply to take inflation into account when setting wages. The paper by Esteban Jadresic in this volume focuses on the implications of wage indexation for macroeconomic stabilization programs, a topic discussed further below. Jadresic also discusses in detail the different categories of wage indexation mechanisms. He makes a crucial distinction between wages that are indexed to current inflation, as in Gray's (1976) original analysis, and wages indexed to lagged inflation, as frequently observed in actual wage contracts.

## 1.3 Financial Indexation

The Unidad de Fomento was introduced in January 1967 by the Chilean Superintendency of Banks and Financial Institutions, the government agency in charge of the regulation and supervision of banks and other financial institutions. The intent was to provide an indexed unit of account in which long-term financial instruments could be denominated. It is clear that indexing financial instruments provides protection against inflation risk and therefore helps to complete financial markets. As pointed out by Campbell and Shiller (1996), there are other ways to protect financial investments from inflation risk. A standard procedure consists in rolling over short-term securities, since their nominal rates quickly adjust to inflation shocks. However, a series of rolled-over short-term securities is not equivalent to a single long-term indexed instrument, because the latter also provides insurance against changes in the real interest rate. Such insurance is of particular value for investments of long duration, including pension savings and mortgages.

Financial indexation has other benefits as well. One is that the coexistence of nominal and indexed bonds that are otherwise identical (including identical maturities) provides a measure of market expectations of inflation (strictly speaking, the sum of inflation expectations and the inflation risk premium). Another benefit is that the existence of indexed long-term securities provides an

incentive to increase financial savings. The recent experience of Chile, the United Kingdom, and the United States, starting from very different initial conditions, reflects these benefits. In Chile, where all medium- to long-term debt was indexed, the central bank has started issuing one-year nominal bonds that complement existing indexed bonds. In the United Kingdom and the United States, where long-term indexed government paper was nonexistent, both governments started issuing long-term indexed bonds in the 1990s (Breedon, 1995).

The paper by Eduardo Walker in this volume reviews the Chilean experience with financial indexation. He shows that indexation of financial markets has contributed to the development of Chile's capital markets. Of course, indexation alone is not enough. Walker argues that three specific reforms are required to complement the adoption of an indexed unit of account: lifting financial repression and liberalizing interest rates, reforming the tax code to achieve inflation neutrality, and creating effective supervisory institutions. Walker and Lefort (1999) add to this list the adoption of a sound macroeconomic environment, privatization of public enterprises, and privatization of the pension system.

Walker's paper provides empirical evidence that creation of an indexed fixed-income market has also contributed to the development of Chile's stock market. Moreover, he shows that short- and long-term indexed bonds provide unique and relevant yield patterns that cannot be replicated by international markets. Therefore they constitute an effective way of completing financial markets. Walker argues that in the absence of a government-backed UF, Chilean capital markets would have relied on foreign currency to protect against inflation, and the maturities of peso-denominated securities would have been much shorter. The paper also provides empirical evidence regarding the optimal portfolio composition needed to hedge specific sector risks in the Chilean economy. Walker concludes by suggesting that, given the existence of indexed financial instruments in Chile, central bank asset holdings should include long-term U.S. public debt and equities from other emerging economies, and investment in fixed-income foreign securities by local investors is not advisable.

## 1.4 Indexed Public Debt

An indexed unit of account opens the door to the issuance of indexed public debt. Since Calvo (1988), it is well understood that

the inflation bias of a central bank, reflected by its incentive to erode the real value of public debt, declines with the level of indexed public debt. Hence issuing such debt is a signal of the central bank's commitment to achieve low inflation.

On the other hand, the possibility of issuing indexed debt in addition to nominal and foreign-currency debt raises issues for the optimal management of public debt. In addition to deciding the maturity structure or contingent payments of such debt, policymakers must now make decisions about its denomination. Two papers in this volume contribute to the literature on this topic. The paper by Robert J. Barro analyzes public debt management from the point of view of public finance theory. The author focuses on the structure of public debt under the assumption that the government aims at tax smoothing when facing a stochastic sequence of exogenous government expenditure. This work is related to earlier work by Barro (1979), Lucas and Stokey (1983), and Persson and Svensson (1984), but unlike the last two contributions, it assumes that the government can effectively commit itself to future fiscal actions, and thus the resulting composition of the debt is not necessarily time consistent.

Barro analyzes optimal public debt management at three levels. First, the optimal level of public debt cannot be determined for the extreme case where taxes are not distortionary and other conditions of Ricardian equivalence hold. Second, if taxes are distortionary, then tax rates should be smoothened over time; hence the optimal level of public debt is determinate, but its composition by maturity or by category (indexed versus nonindexed) is not. Third, the optimal composition of debt can only be determined under conditions of uncertainty regarding fiscal or macroeconomic variables. Under the latter condition, Barro's paper derives some interesting conclusions. On the one hand, if the government can issue debt contingent on the level of outlays, all noncontingent debt should be issued as an indexed consol. The idea is to achieve a maturity structure of the noncontingent debt without any gaps. Then the author looks at the optimal debt structure when contingent debt is not available. Under such conditions the optimal structure can be attained by issuing indexed bonds with longer maturities than a standard consol. Consistent with the idea that the optimal debt structure will take the form of long-term indexed bonds, some developed countries such as the United States and the United Kingdom started issuing indexed long-term public debt instruments in the 1990s, as noted above.

Related literature on this topic, such as Bohn (1990) and Calvo and Guidotti (1990), argues that since inflation and current government outlays are positively correlated, nominal public debt may be desirable in order to exploit the negative covariance between inflation and the real value of debt. In his paper, however, Barro disputes this argument. If there are no moral hazard problems regarding public sector behavior, and therefore nominal debt can be issued at no extra cost, it seems much more convenient to issue only explicit contingent debt and indexed debt.

The paper by Ilan Goldfajn in this volume complements the preceding discussion with an analysis of the Brazilian case. His paper examines a model for optimum management of debt by the public sector, considering three types of debt: nominal, CPI-indexed, and foreign currency–denominated debt. Like Bohn (1990) and Calvo and Guidotti (1990), who consider the nonfeasibility of issuing explicit contingent debt, Goldfajn's model predicts that the main factors determining debt composition are the inflation variance, total outstanding debt, the nominal exchange rate variance, and the correlations between inflation and public revenue and expenditure. The empirical findings reported by Goldfajn for the case of Brazil tend to confirm these hypotheses. The intuition for these results is that the main benefit of indexed debt is in stabilizing the real value of debt and eliminating the temptation to inflate it away. On the other hand, and for the same underlying reason, nominal debt serves as implicit contingent debt, and its importance should increase with the correlation between inflation and public net expenditure. Finally, foreign currency–denominated debt should be issued when real exchange rates are not excessively volatile and the correlation between real exchange shocks and government outlays is negative. The application of this model to Brazil's experience is relatively successful in explaining the relative composition of that country's public debt during the past decade.

## 2. Indexation and Macroeconomic Stabilization

Indexation of wages, prices, and policy instruments also involves costs. In particular, it contributes to inflation inertia, making it slower and harder to reduce inflation and amplifying the inflationary impact of adverse price shocks. The cost-benefit ratio of indexation becomes unfavorable when a formerly high-inflation country achieves moderate to low inflation, as the benefits of indexation are diluted while its costs rise.

In recent years several developing countries (including Brazil, Chile, Mexico, and Israel) have implemented successful macroeconomic stabilization programs, including as part of their reform package the deindexation of wages, the use of the exchange rate as the economy's nominal anchor, or both.

## 2.1 Indexation and the Persistence of Inflation

We noted at the outset the claim by critics of indexation that indexation, especially to past inflation, increases the persistence of inflation and makes it much harder to achieve macroeconomic stabilization. Bruno (1993) and Edwards (1993) argue that the persistence of inflation, partly caused by indexation practices, may have jeopardized the success of exchange rate–based stabilization programs, because such practices are bound to generate a real overvaluation of the currency and may contribute to balance of payments crises.

The paper by Sebastian Edwards and Fernando Lefort in this volume seeks to increase our understanding of the empirical relationship between indexation practices and inflation and its persistence. The authors analyze and estimate inflation persistence over time in sixteen developing and industrial countries. Their empirical evidence suggests that persistence varies greatly across countries and, for a given country, over time. This finding is in contrast with a standard assumption in the literature, notably by Fuhrer and Moore (1995), that measurement of the effect of wage indexation on inflation persistence requires that such persistence be time invariant.

Edwards and Lefort also provide conclusive evidence on the relationship between the degree of inflationary persistence and the level of inflation. They show that the higher a country's inflation, the more inflationary inertia is present. More important for the question of the effect of indexation on the success of stabilization, they also present evidence indicating that inflationary persistence rises with the degree of indexation. Finally, the paper provides a detailed study of inflationary inertia in repeated exchange rate–based stabilizations in Chile, Israel, and Mexico. The authors show that inflationary persistence tends to decline with the adoption of a stabilization program, but to rise again as time passes. They ascribe this result to indexation practices based on past inflation, which persist after stabilization has been implemented, and to the lack of credibility of the exchange rate–based stabilization program.

## 2.2 Macroeconomic Consequences of Wage and Price Indexation

The empirical evidence just discussed indicates that the adoption of indexation practices tends to increase the persistence of inflation, making stabilization more difficult. This is in contrast to the claims of economists during the 1970s, when it was asserted that indexation actually favored output stabilization and inflation reduction. Friedman (1974), Gray (1976), and Fischer (1977) reached the conclusion that indexation helps in stabilizing output when monetary shocks dominate real shocks. Consistent with this line of argument, Ball (1994) showed that greater wage flexibility—measured by an indicator that averages contract duration, degree of indexation, and degree of synchronization—reduced the sacrifice ratio during stabilization programs. To make this empirical result consistent with the findings of Edwards and Lefort in this volume, one must consider that Ball focused exclusively on periods of time and economies where stabilization programs were being implemented, whereas Edwards and Lefort look at the general relationship between indexation practices and inflation persistence, independent of whether a stabilization program was under way. In addition, Ball's measure of wage flexibility is affected not only by the degree of indexation, but also by other features of wage contracts.

In any case, Simonsen (1983) and others after him have criticized the argument by Friedman and others on the grounds that actual indexation practices have amounted to lagged and uncoordinated indexation rather than the instantaneous and synchronized type that the latter authors assumed. This distinction is important, since it implies that wages indexed to lagged inflation imply nominal rather than real wage rigidity. Accordingly, Fischer developed a line of research (Fischer, 1977, 1985, 1988) that analyzes the precise consequences of wage indexation for output stabilization.

Two of the papers in this volume contribute to this literature. The study by Esteban Jadresic reexamines the macroeconomic consequences of wage indexation, taking into explicit account specific lag structures used in actual wage contracts indexed to past inflation. He analyzes the effects of these lags on aggregate wage formation, the cost of deflation, output variability, and inflation, under different shocks and policy regimes. He addresses specifically the interaction between wage indexation practices and exchange rate regimes at different levels of inflation. The paper shows that,

unlike the (unrealistic) case in which wage increases are based on contemporary inflation, wage indexation based on past inflation can increase the cost of disinflation, destabilize output, and, when the central bank is not firmly committed to keeping inflation low, increase inflation. This paper also compares the effects of wage indexation based on past inflation with those of other rules for adjusting wages. Jadresic's main conclusion is that when actual wage indexation rules are modeled, their consequences for output and price stabilization tend to be as most policymakers believe: wage indexation increases the costs of disinflation. A contribution of Jadresic's paper, compared with similar work by Bonomo and Garcia (1994), is that the latter consider only the case of gradual and credible policies that contribute to output expansion. Jadresic's work extends the analysis to different classes of stabilization programs under various conditions.

The paper by Luis Oscar Herrera in this volume offers a complementary perspective, analyzing the relationship between automatic indexation of prices and wages and the cost of inflation reduction. Herrera derives an extended aggregate supply model by including automatic cost-of-living adjustment clauses in prices (or wages) based on past inflation, which he uses to examine stabilization costs. He assesses a number of stabilization plans that vary according to how gradual or credible they were, and he derives the impact of the frequency of indexation on these costs. The paper's main results suggest that the inertia introduced by indexation raises the cost of stabilizing inflation. That cost is much attenuated, however, when price stabilization is implemented gradually and credibly. In the various stabilization cases analyzed in the paper, the relationship between the frequency of indexation and the cost of stabilization follows an inverted U curve. Hence costs are lower when wage indexation is absent or infrequent and when it is very frequent, and highest at intermediate frequencies ranging from three to six months. The implication is that less frequent indexation does not necessarily lower sacrifice ratios, because whether or not it does so depends on the starting point. Another interesting application of these results is their contribution to explaining the persistence of moderate inflation processes. As inflation becomes chronic, the price and wage indexation that normally accompanies inflation tends to raise the cost of price stabilization. This increase reduces the political willingness to deal with inflation, thus contributing to its persistence.

## 2.3 Indexation and Monetary Policy

As already mentioned, Chilean policymakers have deindexed several of their monetary policy instruments in the recent past. When inflation fell to 3 percent a year, it became clear that the rationale for deindexation was not only to lock in low inflation but also to conduct monetary policy more effectively in a setting where real shocks become increasingly important.

Central bankers in developing economies, following the lead of many of their counterparts in industrial economies, have started using short-term interest rates as their main instrument for conducting monetary policy. This practice raises the question of whether a particular monetary regime is better suited than others for conducting monetary policy in a low-inflation environment. The shift of monetary regimes, in many industrial and developing countries alike, from targets based on the exchange rate or monetary growth to targets based on inflation, justifies an analytical approach to this question. Most inflation-targeting countries use short-term interest rates as their policy instruments. (See Loayza and Soto, 2002, for recent studies on the worldwide experience with inflation targeting.)

The paper by Carlos Végh in this volume analyzes the costs and benefits of different monetary regimes and policy rules in a setting like the one just described. Végh derives some basic equivalences for alternative monetary policy rules. He shows that under conditions of inflation inertia, the following three rules are exactly equivalent: a fixed growth rate of a monetary aggregate; a nominal interest rate combined with an inflation target; and a real interest rate combined with an inflation target. However, he also shows that implementation of these rules becomes increasingly complex. The first rule does not require a feedback or policy rule on the part of the central bank. The second rule is based on the central bank's response to the inflation gap. The third rule requires the central bank to respond to both the inflation gap and the output gap, as in a conventional Taylor-type policy. (See Taylor, 2002, and Loayza and Schmidt-Hebbel, 2002, for recent analytical and empirical studies of policy rules.) If the country aims to reduce stabilization costs, all three rules must respond to the output gap. From the policy perspective, the worldwide trend toward substituting nominal interest rules for monetary aggregate growth targets may reflect both the equivalence between the rules described in this paper and the well-known practical difficulties in controlling monetary aggregates under standard conditions of instability of money demand.

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