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The Effects of Wage Indexation on Adjustment, Inflation and Equity
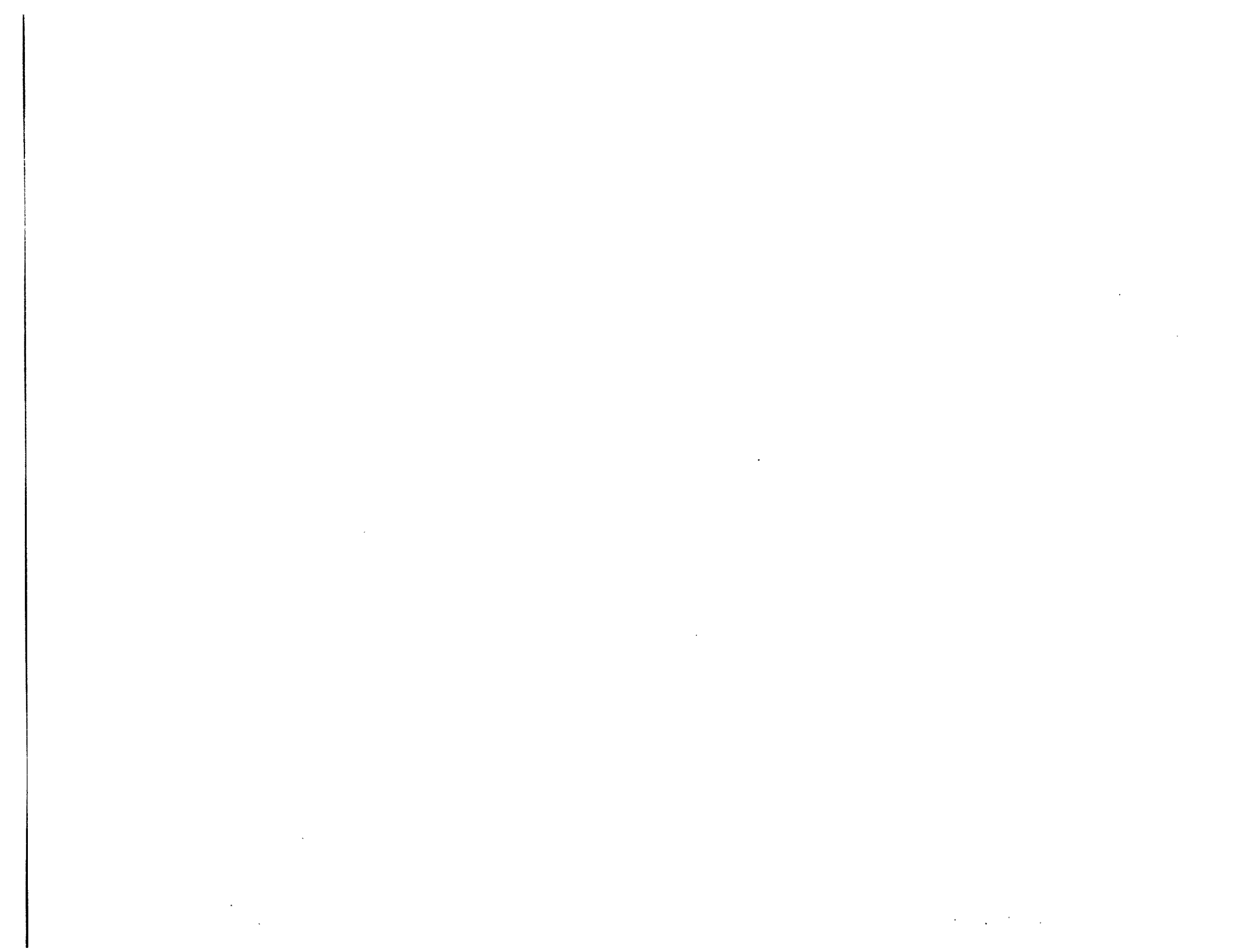
Luis Riveros

Abstract

Wage indexation has been an important policy instrument in several developing countries. The alliance of endemic internal imbalances and long-lived labor market institutions has made indexation a normal practice, as much as a crucial barrier to attain competitive labor markets. This paper reviews the literature in light of three questions: whether wage indexation is a significant obstacle to macroeconomic adjustment; whether indexation perpetuates inflation or solves some of the problems caused by inflation; and whether wage indexation hurts equitable income distribution, particularly for informal sector labor. It concludes that in countries subject to both real and nominal shocks, exogenous indexation may counter adjustment and stabilization policies. Fostering decentralized wage bargaining and implementing a social safety net would be more effective to attain politically acceptable economic programs while, at the same time, promoting economic efficiency.

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The Effects of Wage Indexation on
Adjustment, Inflation and Equity

What is the role of government in setting wages to compensate for cost of living increases? Wage indexation, primarily a Latin American phenomenon, has become controversial. International lending institutions are concerned about its effects on structural adjustment. The goal of indexation has typically been to protect real labor incomes, while allowing for politically sustainable labor reforms. In Latin American and other developing countries suffering from endemic internal imbalances, however, indexation has hindered price stabilization and inter-industry labor mobility. In most developing countries undergoing structural adjustment, wage indexation has resulted in a significant, and sometimes dramatic, drop in real wages.

The evidence from industrial economies suggests that full wage indexation, where all wages rise at the inflation rate, may insulate employment and output from the effects of inflation, but it does not help to curb inflation itself. An alternative, partial wage indexation, in which all incomes are partly adjusted, or some are fully adjusted while others are partially adjusted, may help in preparing the public for structural adjustment by managing inflation expectations. But such schemes may be questionable on political grounds, due to concerns about their equity.

This paper reviews the literature on wage indexation in light of three questions: Is wage indexation a significant obstacle to macroeconomic adjustment? Does indexation perpetuate inflation, or does it solve some of the problems caused by inflation? Does wage indexation hurt equitable income distribution, particularly for labor in the informal sector.

A. Wage Indexation: General Considerations

The simplest form of indexation adjusts wages, when they are negotiated, according to all or part of past inflation (Emerson, 1983; Simonsen, 1983). "Indexation is a mechanism designed to adjust wages to information that cannot be foreseen when the wage contract is negotiated" (Aizenman, 1987). Although in developing countries government policies generally advocate wage adjustments

based on past inflation, negotiated agreements are also found that index wages to expected inflation (Devereaux, 1988; Fischer, 1977; Drazen and Hamermesh, 1987).

Most studies find that wage indexation may benefit not only labor but also employers. Prachowny (1980), for instance, argues that indexation clauses in labor contracts operate as an insurance mechanism. Workers are more risk averse than firms, and so they are willing to accept lower real wages in exchange for smaller wage fluctuations.[1] In the same vein Hendricks and Kahn (1986) show that, depending on the degree of risk aversion of workers, wage indexation may explain existing wage differentials. Chaudhri and Ferris (1985), who consider wage indexation in the framework of optimal labor contracts, explain predetermined wage contracts in terms of the better and costless information made available to participants in the wage bargaining process.

Wage indexation is a key component in the efficiency wage theory (Katz, 1986; Katz and Summers, 1989; Yellen, 1984; Stiglitz, 1987). According to this theory, to minimize the risk of a drop in labor productivity because of a decline in real wages, a firm would find it cost-effective to link wages to a relevant price index. In developing countries, however, government intervention, not decisions by firms, has caused most of the indexation and the resulting macroeconomic effects. There is substantial theoretical and empirical literature on "endogenous" wage indexation – indexation set within the firm – for the OECD countries, but little research on developing countries (Riveros and Bouton, 1991).

The effectiveness of wage indexation depends on both its scope and its degree. Scope refers to the proportion of wage contracts in the economy that are indexed. Degree refers to the proportion in which nominal wages are adjusted compared with the relevant inflation rate. The scope of indexation affects resource allocation and income distribution, depending on the sectors or types of workers covered.[2] The degree of indexation affects an economy's ability to respond to adjustment policies intended to shift and reduce domestic expenditures.

How frequently indexed wages are adjusted during periods of inflation is also important (Danziger, 1983). High frequencies of indexation, combined with full wage adjustment to past inflation, lead to rigid real wages (Liviatan, 1985). As wage indexation becomes a key factor in achieving economic

adjustment, its frequency becomes a crucial device in attaining flexible wages. In many developing countries governments have recently focused less on reducing the degree of indexation and more on limiting its frequency, combined with policies to restrain inflationary expectations.

Optimal Indexation Schemes

Wage indexation helps reduce the distributive effects arising from unanticipated inflation. Unexpected price shocks may affect real wages and prices and cause undesirable equity effects. Levi and Makin (1980), for instance, found that uncertainty about inflation had a significant negative effect on employment growth, while Makin (1982), Ratti (1985) and Mullineaux (1980), found that such uncertainty resulted in more open unemployment. Fischer (1977), Gray (1976, 1978) and Pazner (1981), while finding that full indexation of the nominal wage rate is an effective way to insulate real wages from inflationary shocks, also found that it may exacerbate the effects of real economic shocks. In an economy that is subject to both real and nominal disturbances, a case can be made against full indexation in favor of a partial indexation scheme that reflects the underlying stochastic structure of the economy (Gray, 1976). Brunner and Beladi (1985) also favor varying the degree of indexation according to the source of the price shocks, with a fully proportional wage increase granted when the shocks are associated with monetary disturbances and only a partial wage increase granted when the source of shocks is a change in a real variable.

Several designs for optimal indexation schemes have been proposed. For instance, since nominal shocks are the most common, Eden (1978) has proposed that wages be tied to the money supply. Alternatively, Fischer (1977) has proposed that an optimal scheme must minimize the output variance, suggesting that wages be kept at a constant proportion of aggregate prices, with the proportion depending on the unemployment rate. This would allow real wages to fall when unemployment exceeds the natural rate (Rosenberg, 1984). Karni (1983) holds that an optimal indexation scheme should replicate the equilibrium real wage that would prevail if price shocks could be anticipated. Marston and Turnovsky (1985), based on information about firms, suggested a mechanism that combines wage

indexation and tax adjustments so that the firm's behavior in inflationary times would be similar to its behavior in a competitive economy without inflation.

In the same vein, Pazner (1981) has suggested that wages be tied fully to a price index and tied partially to a real GDP index. This proposal assumes that, when prices increase as a result of a real economic shock, both output and real wages fall. A nominal shock, however, increases nominal prices and wages, but real wages remain constant. Following a similar argument, Karni (1983) and Aizenman and Frenkel (1985b) propose the nominal GDP as the appropriate index, since this reduces the social loss associated with using the consumer price index (CPI) or a value added index as the basis for adjusting wages.

In analyzing how export-earning shocks affect employment, Gros (1986) concludes that indexing wages based on export earnings as well as consumer prices would minimize the adverse effect of indexing. Calmfors and Viotti (1982) argue that the correct wage index depends on policy makers' priorities. For instance, if the objective is to keep consumption constant, the CPI should be used as the basis. However, reducing macroeconomic instability means responding to shocks, rather than attempting to freeze real variables. Thus full indexation to the CPI would make adjustment more difficult. Marston (1984) argues that an increase in imported inputs, which are not covered by the CPI, would affect production and employment in domestic firms. To solve this problem Marston and Turnovsky (1985) propose a price index derived from value added, which is affected by input prices. As the price of imported inputs rises, wages fall.[3]

The theoretical debate has neglected a practical problem. Limited information or insufficient resources may prevent policy makers from using certain complicated indexes, such as those tied to GDP, even though they might be optimal. Indexation schemes inevitably become more complex in response to the diverse economic and political interests of different groups of workers. The blanket imposition of indexing mechanisms is highly unlikely.

B. Macroeconomic Adjustment and Wage Indexation

Structural adjustment depends on a flexible response of the labor market to economic policies. Going from a nominal to a real devaluation requires that real wages be open to change and that labor be able to shift among industries. If real wages in expanding sectors do not fall as much as required, labor may have no incentive to reallocate, as it should in restructuring. Also, if wages do not decline in the aggregate, unemployment will persist. These problems warrant a discussion of the adjustment process in an economy with indexed wages.

Optimal Indexation and the Effectiveness of Macroeconomic Policy

There are two different points of view on the effect that indexation has on output. The first view, associated with Friedman (1974) and with Giersch (1974), is that full wage indexation stabilizes real output and employment, protecting them from monetary shocks. Friedman claims that in the U. S. during 1967-70, sticky nominal wages together with rising prices led to an excessive expansion of output, exacerbating domestic economic imbalances. Both authors suggest that a contractionary monetary policy would have had smaller effects on output if wages had been indexed.

The second view, associated with Bernstein (1974), is that wage indexation exacerbates real economic instability by reducing the economy's responsiveness to disturbances that require changes in real wages. Not all price increases justify wage increases. Bernstein points to the oil shock of 1973-74 as an example. Other examples include the successful end of the Finnish indexing scheme in 1968, and Israel's delaying of wage indexing in 1974, following currency devaluations.

Neither of the views is necessarily wrong. Fischer (1977) shows that each view is correct in certain circumstances. Real output tends to be more stable in an indexed system than in a non-indexed system when disturbances are primarily nominal. Real output is less stable, however, when disturbances are primarily real. Fisher argues that, even without real shocks, lagged indexation can be destabilizing.[4] When the economy faces both real and nominal shocks, partial indexation may be an appropriate policy response, with the degree of indexation increasing as the proportion of nominal shocks increases.

Supporting this idea, Gray (1976) asserts that the optimal degree of wage indexation depends on the variance of monetary and real supply shocks. Although wage indexation hinders the aggregate demand policies that are used to overcome recession, it increases the effectiveness of such policies in an anti-inflationary setting (Prachowny, 1980).

The Fisher-Gray approach implies that active monetary policy can be stabilizing, if monetary authorities react to economic shifts between contract renegotiations. In contrast, Lucas (1975) and Barro (1977) conclude that active monetary policy is ineffective if the government and the private sectors have access to the same set of information. In this approach it is the existence of imperfect information that explains the real effect of nominal disturbances, because firms and workers perceive nominal shocks as real.[5] Also in connection with the short-run macroeconomic management, and in terms of the supply response to real shocks, the widely held view is that the optimal degree of indexing depends on the size and variability of the real shocks, the underlying stochastic structure of the economy, and the elasticities of both labor demand and supply (Beeton, 1985; Blanchard, 1979; Gray, 1983).[6]

Most empirical studies support the view that a high degree of indexation reduces the effectiveness of macroeconomic policy. For example, Ahmed's (1987) regression results for Canada show no systematic relationship between the slope of the Phillips curve and the indexation intensities across industries. Also, Beeton (1985) argues that the huge balance of payment deficits in Brazil and Israel were caused by a failure to influence the real exchange rate effectively, because of rigid wages. Likewise, in Argentina, Brazil, and Italy, as well as in Israel in the late 1970s, large devaluations were followed by increases in wage inflation, closely associated with widespread indexation schemes (Tweedeale, 1985; Walker, 1983). In Argentina, real wage resistance to nominal devaluations has been a major cause of endemic inflation and of failures of structural adjustment (Riveros and Sanchez, 1992). Similarly, in Uruguay during the late 1980s the government was forced to reduce the degree of indexation in order to attain stabilization (Sapelli, 1988). And in Chile between 1979-82 a combination of full wage indexation and the fixing of the nominal exchange rate deepened the recession by impairing the economy's ability to respond to external shocks (Corbo, 1985).

Exchange Rate Devaluation and Indexation

Under certain conditions, indexation may impede the economic restructuring that is intended to follow devaluation (Baldry, 1984). For example, if wages are linked to a price index that has a large tradables component, real wages in the tradables sector may not fall enough after a devaluation to encourage increased labor demand and expansion. In developing countries, however, wage-indexation is typically enforceable only in the formal urban sector, which generally corresponds to the importables sector. Indexation is not likely to affect wages as much in the exportables sector, mainly agriculture. Thus labor may move from nontradables to exportables, that is, from the urban, formal sector to the rural, agricultural sector.

Policies on the degree of wage indexation are related to government exchange rate intervention policies, and each helps determine the other (Aizeman and Frenkel 1985a). Thus full wage indexation can make exchange market intervention ineffective in insulating real wages and prices from fluctuation in economic conditions. Likewise, intervention in the exchange market to cope with nominal disturbances can make wage indexation ineffective in protecting real wages and prices (Turnovsky, 1983).

Several studies have argued that real wage resistance is an obstacle to effective economic adjustment (Jackman, Layard and Nickel 1992, Dornbusch 1982b). Dornbusch, for example, takes the case of a devaluation that occurs when there is some unemployment and an external deficit. In this case raising import prices lead to lower real wages, while employment expands. A real wage gap opens as higher employment and lower real wages cause workers to demand nominal wage increases. A wage increase, however, could reduce the benefits of the devaluation by causing a reduction of import prices and of employment. An alternative is that, due to persistent unemployment, real wage demands could be scaled down. Thus there is no single response. Rather, the role of real wage resistance should be considered carefully when implementing stabilization policies.

What stabilization policies might take account of the role of real wage resistance? Employment subsidies or tax changes that aim to increase profit margins introduce a buffer between labor costs and wages. Such a policy, however, only substitutes a budgetary problem for a real wage problem

(Dornbusch, 1982). Increasing productivity is by far the best way to reconcile real wage requirements with internal and external balances. Of course, policy makers cannot command productivity gains. But trade liberalization, which encourages competition in the domestic economy, fosters productivity gains. To the extent that there is a greater inflow of capital and technology following a devaluation, with improved conditions for learning and innovation, productivity should increase. The only question is whether such increases occur soon enough.

C. Indexation and Inflation

Some economists argue that indexation ought to be used in any national program to control inflation. Others point to high and persistent inflation in Argentina, Brazil, and elsewhere and warn that indexation contributes to inertia in the general price level.

Indexation alone cannot stop, or cause, inflation. For indexation to affect inflation, monetary policy must be accommodating. Does indexation, however, help bring down the rate of inflation faster? And does indexation reduce the unemployment costs of bringing down inflation? The answers to these questions depend in part on whether the economy is reacting to a real or nominal shock, and whether there is excess demand or supply. Indexation's role in inflation control also depends on when it is introduced: whether when a balanced inflation is being sustained by the momentum of expectations, or when real wages are above their equilibrium level, as might be the case after a terms-of-trade shock. It also depends on the nature of wage contracts, whether they are predetermined, or determined on the basis of market clearing conditions, and on whether indexation is backward or forward looking.

The Arguments For and Against Indexation

The real problem in tackling inflation is political, not technical. Ending inflation produces a temporary recession, with relatively high unemployment, while supply adjusts to changed rates of spending. The time lag for adjustment distorts relative prices,[7] the structure of productio, and the level of employment. Furthermore, a plausible rationalization of the hysteresis hypothesis of unemployment

is that the long-term unemployed may face a reduced probability of being employed, as has occurred in Spain, for example. A longer period of adjustment plays a significant role in causing and perpetuating unemployment.

Some authors argue that indexation reduces inflation by lessening the social costs of inflation and thus, the tendency for people to resist government disinflationary policies (Friedman, 1974). Monetary policies to reduce the inflation rate will work faster and with less negative impact on output in an economy with indexed wages than in one without indexed wages.[8] Indexation ensures that inflation is transmitted more quickly and evenly, thus avoiding distortions of relative prices and wages, and shortening the adjustment lag (Friedman,1974). These arguments are not without their problems, however. It is difficult to estimate the length of a "natural" adjustment lag. The above argument assumes that it is longer than that which occurs with indexation (Plowman,1981).

Following Friedman's logic, moreover, indexation eliminates the role of price expectations. But, just as the stickiness of price expectations reduces the inflationary response to excess demand, indexation may well accelerate inflation where there is excess demand, (Flemming, 1976).

Finally, if indexation is introduced when a balanced inflation is being sustained by the momentum of expectations, indexation would undoubtedly reduce the cost in unemployment of purging the system of its inflationary expectations. But if it is introduced when real wages are above their equilibrium level, as might be the case after a deterioration in terms of trade, indexation may make the fundamental adjustment more difficult, although it still overcomes the expectations problem.[9]

It can also be argued that, in the absence of indexation, wage contract negotiations include estimates of future inflation (Braun, 1970). Phipps (1981) concludes from the Australian experience that indexation had a restraining influence on wage inflation. Likewise, Peeters (1985) argues that between 1948 and 1973, indexation was considered as a symptom of price stability in Belgium. However after the real shock brought about by the 1973 oil shock, the elimination of indexation clauses is credited with aiding in the reduction of imbalances in the financial sector and labor markets in Belgium (Kouri, 1985).

Given lagged indexation, staggered wage and price setting, and passive monetary policy, the argument against indexation is that it causes inertial inflation, reinforcing the system's inertia and perpetuating a wage-price spiral (Fischer's 1985). As Devereux (1988) points out, in Fischer's model of indexation's impact on inflation, indexation is ex-ante, that is, it corrects unanticipated movements in the price level. An assumption about monetary and fiscal policies is also crucial to Fischer's results: if monetary policy did not depend on fiscal policy, wage indexation would not be an inflationary source. Along this line Emerson (1983) associates wage indexation with huge fiscal deficits and the resistance of governments to accept a fall in real wages.

Although lagged indexation and staggered wage and price setting are the rule in most countries, these features are not necessarily inflationary when there is monetary discipline. There are three reasons: First, wage increases may not be fully passed on in price increases. Among other reasons, competition restricts a firm's ability to raise prices, many commodities have controlled prices, and the operational cost of raising prices may be too high. Second, wage costs are only a part of total production costs. Thus, even if fully transferred to prices, they would only increase prices less. Third, to the extent that indexation brings some predictability to wage determination, wage expectations of price-setters are restrained.

Another qualification is that all wage increases, do not automatically result in price increases, and all price increases do not mean wage increases (Plowman, 1981). If workers do not suffer from money-illusion -- i.e. the inability to distinguish real from nominal variables -- they would accept some price rises even without indexation. Furthermore, in most developing countries, full wage indexation is not the dominant practice. Partial indexation, which is more widespread, would not have as large an effect on prices.

The scope of indexation is a key factor in determining the impact of shocks on the economy. The rate of inflation is by far the most important determinant of the scope of wage indexation (Braun, 1970; Lowenstein, 1974; Prachowny 1980; Beeton, 1985).[10] The reason for this is that the basic aspect of a wage contract is the real wage agreed to by workers and firms. Holland (1986) argues that

higher inflation rates increase the variability and uncertainty of inflation and prices. This variability, more than the rate of inflation, explains the proportion of workers covered by "cost of living" (COLA) clauses, according to Holland. Union power has also been identified as another key factor in determining the scope of indexation (Holland, 1988; Staller and Solnick, 1974; Beeton, 1985). Most studies assume uneven coverage across sectors (Fethke and Policano, 1984; Williamson, 1985; Prachowny, 1980). Another factor that determines the scope of indexation is the length of wage agreements (Beeton, 1985). But here the causality is not clear, and scope is measured only by a proxy: the proportion of wage contracts covered with "COLA" and "escalator" clauses, which predominate in long-term contracts.

Indexation and the Dynamics of Inflation

Most studies agree that wage indexation tends to de-stabilize the price level compared with a non-indexed system.[11] Most theoretical models, however, predict that wage indexation alone cannot generate permanent inflation, which also requires money growth. Thus most models include a behavioral "reaction function" by the monetary authority. The actual behavior of monetary authorities is, of course, a key issue in developing countries that are facing economic strain and complex political problems.

Gray (1976) and Fischer (1983) find that the variability of inflation increases with indexation, although they also find that the average rate of inflation is not clearly affected by wage indexation. A model proposed by Spivak, Weinblatt and Zilberfarb (1987) differentiates between contracts that are simultaneous or overlapping. They conclude that simultaneous contracts affect the changes in prices only between periods in which contracts are signed. Indexation affects the growth rate of prices between the periods but not the absolute magnitude. When contracts overlap, however, indexation always increases the rate of inflation and its variability. This model uses the approach that indexation is neutral to monetary shocks, and appears relevant to countries such as Chile and Israel where inflation is high and wage contracts are distributed throughout the year. Using an overlapping model, Morande

(1985) proved that full wage indexation is destabilizing but that, after a negative price shock, full indexation stabilizes aggregate output and prices.

Fischer (1984) analyzes the case in which an increase in the fiscal deficit is to be financed by money creation. Asset indexation perpetuates this deficit, because the resulting increase in inflation prevents a reduction of the government debt that is indexed. Wage indexation directly increases wages along with inflation, while fiscal revenues can fall.[12] Fischer argues that, while wage indexation would generate inflation, the speed of adjustment would be independent of the scope of indexation, and the price level would be more unstable, because money growth is more responsive to shocks than to indexation.

In contrast, Spivak, Weinblatt and Zilberfarb (1985) find that indexation increases the variability of inflation. They examine data for Canada, Japan, the U.S. and several European countries for the years 1954-76. Drazen and Hamermesh (1987), who analyze the relationship between unanticipated inflation and price and wage variability,[13] find that the relationship depends on how price shocks affect indexation. If shocks increase the "demand for indexation" and its degree, shocks can reduce the variance of wages and prices. But if indexation does not change as a result of these shocks, there will be an increase in price dispersion.

The experience of highly indexed economies test the theoretical relationships between inflation and indexation. Williamson (1985) suggests that, although the inflationary experiences of Argentina, Brazil and Israel have different causes, deindexation policies in all these countries have been key to their disinflationary programs. In Brazil, Devereux (1988) found "clear evidence that indexation policy was important for the propagation of inflation." In Argentina, Williamson found that the persistent inflation in the late 1980s is explained by political factors, since disinflation would cause important income redistribution.[14] In Israel, by contrast, the mechanism that made inflation persist was a combination of asset indexation and exchange rate management (Fischer, 1985).

In Brazil, as in most of Latin American, there is support for the idea that there exists a correlation between indexation and inflation. The "inertial inflation" theory discussed earlier (Williamson,

1985; Devereux, 1988; Diaz, 1987; Arida and Lara-Resende, 1985; Marshall and Morande, 1989) has provided the basis for stabilization programs based on the explicit management of inflationary expectations. As Arida and Lara-Resende (1985) point out, because a reduction in inflation increases real wages, firms face an increase in labor costs as inflation subsides and thus reduce employment. If the government reacts by increasing money creation to allow a drop in real wages, the disinflationary attempt will fail. Moreover, as the variability of prices and inflation increases, the frequency of adjustment needs to rise and, to keep real wages constant, an even higher inflation rate results.

Some empirical studies have attempted to relate inertial inflation to the degree of indexation. McNelis (1987), who studied data from a sample of Latin American countries found support for the hypothesis that indexation explains inflation. It has been argued that an effective control of inertial inflation would require wage and price controls. During inflation, however, price variability is so high that price fixing might set prices at distorted levels. Also, wage and price controls would not be sufficient to control inflationary pressures. Any disinflation plan also requires the reduction of the sources of money creation, such as the existence of a large fiscal deficit. Their deficits explain the failure of recent stabilization attempts in Argentina and Brazil using wage and price controls.[15]

The Choice of an Appropriate Index

When the government mandates wage indexation, it should also retain the option of reducing real disposable income. As an index, the wholesale price index (WPI) would be preferable to the CPI because it is adjustable for indirect taxes and subsidies and for changes in the terms of trade. The WPI is also more relevant from the viewpoint of labor demand as it allows for defining the real production wage. The CPI tends to have an upward trend, even when wholesale prices of manufactured goods are stable, which any indexing system should take into account (Bernstein,1974). In developing countries such as Argentina, however, there is no trend in the CPI, which fluctuates wildly in both amplitude and frequency. This fluctuation makes the indexing of wages to the CPI even less desirable (Douty, 1975; Card, 1986). A further problem with the CPI is that even during generalized price inflation,

specific components of the index can cause large increases in the index. In such a case, an offsetting increase in wages would tend to accelerate inflation. For example, if the price of food or imported oil rises, there is no increase in the ability of domestic firms to pay wages. In fact, for firms that use imported oil, the ability to pay wages is diminished. So there is no justification for a wage increase, all else being equal.[16]

Despite its superiority to the CPI, the WPI is not an appropriate index, due to two problems. First, in attempting to reflect output prices it may not be representative at the firm level. Second, and perhaps more important, the final policy goal of wage indexation is to keep purchasing power constant (Sheifer, 1979). For this purpose a "consumption" wage is much more relevant that a "production" wage such as the WPI.

The lack of an appropriate index for wages is one of the strongest arguments in favor of wage adjustments through decentralized collective bargaining instead of indexation or centralized bargaining. Decentralized bargaining permits greater flexibility and allows consideration of industry-specific factors. This view is consistent with the more realistic conception of "the" labor market as being, in fact, segmented -- by region, industry, legislative protection and loyalty. Segmentation is a feature both of developing and of developed countries, although in different ways. Coordination of collecting bargaining agreements is important, however, as firms need to take into account how their wage policies affect unemployment and inflation in the economy at large.[17]

D. Equity Effects of Indexation in Developing Countries

The view that in a prolonged inflation indexation is necessary to protect the real income of workers is based on several assumptions. First, inflation shifts a larger share of output to profits than to wages. Another assumption is that a price index measures this shift. Third, an increase in wages to offset inflation would not be offset by a further rise in prices. Finally, if labor were assured of wage adjustments whenever prices rose, demands for other wage increases would become more moderate, making it possible to gradually slow inflation. Because the labor markets of most developing countries

are segmented indexation benefits only a part of the labor force, usually the more unionized and relatively better off segment, but does little for the informal sector. The informal urban sector and the rural sector are usually removed from government regulations, and thus from such legal provisions as wage indexation (Ishikawa, 1981).

The Structure of the Economy

Lopez and Riveros (1989, 1992) have constructed a model of wage indexation that recognizes the existence of a formal labor market comprising large firms subject to government regulations. The informal sector is a neoclassical price-clearing market not covered by regulations, and uses only unskilled labor in the production of non-tradable goods. In this model the introduction of wage indexation increases the labor supply to the informal sector because of a drop in the employment of unskilled labor in the formal sector.[18] In addition, during structural adjustment, the model predicts a drop in labor demand in the informal sector as a result of the decline in the relative price of non-tradables. Therefore, with rigid formal wages, the formal/informal wage gap increases and the income distribution becomes more inequitable.[19] Segmented labor markets dilute the effects of indexation on the economy. The gap between the formal and the informal sectors, and the resulting deterioration in the equality of income distribution, should weaken the political sustainability of structural adjustment and stabilization policies. If no adjustment occurs because of wage rigidity in the formal sector, indexation may be blamed both for the ineffectiveness of adjustment policies and for the deterioration in income distribution equality.

Indexation and the Wage Structure

Gray (1983) and other studies point to the issue of real wage rigidity as a key to the problem indexation causes for adjustment. Bruno and Sachs (1985) argue that in Europe in the 1970s, wage indexation was the main cause of the high unemployment rate because it made wages more rigid. But the experience of some developing countries, particularly in Latin America, is not consistent with Gray's hypothesis. In fact, the cases of Argentina and Brazil show that, in spite of the wide scope of their

indexation schemes, real wages are highly variable (Devereux, 1988). In a comparative study of seven Latin American countries where indexation is common, Riveros (1990) found that real wages were highly variable and declined throughout the 1980s. These findings are confirmed by Ahmed's (1987) study, using Canadian data, which "cast considerable doubt on the empirical importance of the rigidity of nominal wages and question the use of wage contracting models to explain the movements of money and real economic activity."

What accounts for such different findings? Smith (1988) argues that, even under full indexation, average wages are flexible because of turnover and recontracting. These factors highlight the importance of flexible job security regulations. Also, the existence of segmented labor markets in most developing countries means that average wages - a weighted average of the protected formal sector and unprotected informal sector wages - would vary even if wages in the formal sector were rigid. The evidence in industrial economies, however, does not fully fit that explanation. For example, Holland (1988) finds that in the United States wages were equally responsive to price shocks for unionized and non-unionized sectors, with unionization acting as a proxy for sectors protected by wage indexation.[20]

Gray's model assumes that nominal wages are adjusted so that real inflation-adjusted wages always remain constant. But, indexation actually operates at wide intervals, allowing real wages to change in the interim. Moreover, because wage contracts cover the future, expectations about inflation and the indexation method chosen affect real wages. Dehez and Fitoussi (1985) point out that inflation can make wages more flexible when indexation is not too sensitive to labor market conditions. Finally, indexation of labor incomes, which may concentrate on non-wage costs as well as wages themselves, is likely to be widely used in developing countries because it allows for varying wage adjustment among different labor groups. In such a case, it is possible to have declining real wages with rigid labor costs.

Political Factors

In a developing country the role of the state is different than its role in an industrial country. On the one hand, in developing countries the government is expected to be a manager as well as an originator. On the other hand, when the state faces a key choice, it may be more constrained. A given "sacrifice ratio" may cause greater human suffering in a developing country than in a country with a higher standard of living. In particular, governments of developing countries seem compelled to take a protectionist stance toward the working class. This may be a populist or post-colonial outlook, or it may stem from genuine conviction that, without state support, workers would not get their fair share. For example, a government may be constrained from drastic economic action for fear of workers rioting in response to consumer price inflation. Indexation of wages is not an appropriate short-term stabilization policy, since the government cannot switch it on or off or use it discriminatingly. For instance, if the government only indexes the wages of its own employees, which is easy to do in the short run, it risks raising the deficit, especially where public sector employment is large. Also, when a government tries to control inflation, any approach is limited to the extent that it does not reach to the informal sector.

E. Conclusion

Wage indexation is a mixed blessing. In economies subject to real and nominal shocks, indexation tends to destabilize output and to create inflationary momentum. It may also cause serious deterioration in the equality of income distribution during periods of adjustment. On the other hand, wage indexation may help to stabilize monetary conditions, especially in the face of nominal shocks. It may also help to increase the political sustainability of adjustment and stabilization policies, if indexation is looked at as a signal of government concern for the welfare of the working poor.

If labor markets are segmented, however, indexation introduces rigidity in formal sector wages. Even in face of only nominal shocks to the economy, this rigidity can lead to a drop in productivity and a reallocation of resources that may create a real economic shock. Thus it may be better

to allow real wages to drop in order to attain structural adjustment goals, while adopting other policies to soften the social impact of the adjustment.

Recent experience in Argentina, Czechoslovakia, Peru, Poland and elsewhere indicates that it is difficult to sustain a stabilization program unless it is accompanied by an indexation scheme. At the same time, an accompanying social safety net is needed to make the program politically sustainable. The problem is to create an indexation scheme that is "appropriate." An optimal wage indexation model may be a system of infrequent partial wage adjustment based on a coordinated system of collective bargaining, with wage adjustments set according to expected inflation.

To improve indexation policies during structural adjustment, researchers must gain better understanding of the nature of the economic shocks, particularly in a scenario of small open developing economies. Another research topic should be the effect of alternative wage policies on adjustment outcomes, particularly on the real exchange rate, output growth, and the inflation rate. This requires a simultaneous estimation of a wages-prices model, which should be constructed using a segmented labor markets approach.[21] Another subject for research is how fully indexation covers total labor costs and the total labor force in developing countries. Despite the fact of segmented labor markets, there has been no quantitative research on these two issues. An important question for further research is how adjustment policies affect income distribution, including profits versus wages, as well as formal-sector versus informal-sector wages. Finally, the nature of labor market institutions in developing countries should be studied further, particularly in connection with building more coordinated collective bargaining.

Endnotes

1. This literature also follows Azariadis' (1975, 1978) ideas on efficient contracts, which suggest that risk sharing between firms and workers leads to real wage rigidity and to some (voluntary) unemployment. As will be shown later, however, these ideas cannot explain inefficiencies as the effect of nominal disturbances on output (Blanchard, 1979).

2. Prachowny (1980) points to the abundant literature asserting that indexation is key in diminishing the negative effect of inflation on income distribution.

3. This is similar to the proposals of Hardouvelis (1987) and Rosenberg (1984) for small open economies facing external shocks.

4. For extensions of this argument see Taylor (1980) and Dornbusch (1982).

5. Hardouvelis (1987) and Rosenberg (1982), in models for small open economies facing external shocks, conclude that the optimal degree of indexation depends on the proportion of imported inputs, which is in turn closely associated with the effectiveness of the exchange rate policy. Similar arguments have ben advanced to indicate that the effects on inflation of some policy measures depend on the degree of indexation and on the share of exports in the GDP (Islam, 1982). Holland (1986, 1988) argues that implicit indexation mechanisms depend on inflation variability, exerting negative effects on growth.

6. Internationally, the degree of indexation covers a wide range. Some, such as France, Luxembourg and Netherlands, have indexation schemes with 100 percent adjustment. Others like Belgium, Israel, Norway, the U.S. and more recently Czechoslovakia and Poland, adjust wages by less than past inflation.

7. Different activities have different time speeds of adjustment, depending on the time-schedules of prices, wages and production.

8. By the same token, expansionary monetary policies will have a smaller real effect and a more rapid effect on prices in an indexed than in a non-indexed economy.

9. This is especially true if the indexation is not in voluntary, renegotiable contracts but becomes, in effect, a government commitment to maintain an unsustainable real income level.

10. See, for example, Beeton (1985), Hudson (1982), Sheifer (1979) and Fischer (1983). For the U.S., Douty (1975) found the elasticity between the proportion of workers covered by indexation clauses and the inflation rate to be 1.36. This shows that increases in the inflation rate increase the proportion of workers covered by indexation disproportionately. Beeton (1985) provides a comprehensive study confirming this finding with cross-sectional data.

11. An exception is Fethke and Policano (1984).

12. One way that revenues can fall during inflation is through the "Tanzi-Olivera" effect, that is, the fall in revenues resulting from delayed payment of taxes if the taxes are specified in nominal terms.

13. This relationship had been previously analyzed by Hamermesh (1986) and Allen (1986). The two studies yielded contradictory results.

14.   Prachowny (1980) theoretically supports this view.

15.   The only successful experiment using wage and price controls to control inflation has been the Mexican Social Pact, which introduced a simultaneous freeze of wages and prices through an agreement among the government, entrepreneurs and unions.

16.   In other words, wage increases are justified at the firm level only with a firm's increased profitability - profitability and liquidity measure a firm's ability to pay. The price of the firm's product is an important determinant of its ability to pay. In the short run, wage increases may be generated by increased demand and by increases in productivity. In the long run, the economic rents disappear due to competition and productivity growth translates into lower prices.

17.   Layard (1990) discusses this issue in connection with the transition of socialist economies.

18.   There also exist mechanisms of wage determination associated with insider-outsider or efficiency-wage theories that are also of significance only in the formal sector and may effectively substitute for legislated mechanisms like wage indexation.

19.   Due to the increase in the wage gap, there would also be an increase in quasi-voluntary unemployment (Harberger (1971)).

20.   An explanation not yet explored in the empirical literature is that the non-wage component of the total labor cost is a relevant variable to analyze in the context of rigid real wages. In countries like Colombia and Venezuela although real wages have dropped, the real labor cost has remained constant.

21.   See Riveros and Bouton (1991) as an example of such modelling and a proposition for possible empirical tests to look at the effect of indexation on macroeconomic outcomes.

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