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INDEX-LINKING OF FINANCIAL CONTRACTS:

A SURVEY OF THE STATE-OF-THE-ARTS

by

Kul B. Bhatia

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Kul B. Bhatia*

I. Introduction

Index-linking is a device by which financial contracts are linked to a price index or some other standard. It can take the form of purchasing power guarantees for deferred payments, escalated contracts, variable-return bonds or bonds denominated in real terms--issued by the government or private borrowers, readjustable mortgages, etc. In all cases, unlike a conventional financial transaction, the agreement is not simply to repay the principal at a predetermined nominal rate of interest at the end of a certain period, but also to include some compensation for inflation, directly or indirectly.

This paper is a survey of the literature on index-linking of financial contracts. It provides a fairly comprehensive account of the schemes of indexing adopted in various countries. At the analytical level, the main topics covered are the efficacy of indexing in ameliorating some of the adverse effects of inflation, the pros and cons of index-linking, and how such linkages affect financial markets and stabilization policy. In discussing these topics, the paper draws heavily on the actual experience of several countries which have tried index-linking. Topics such as the inclusion of escalation clauses in wage contracts, the linking of income tax rates to cost of living indices, etc., are left out to limit the length of the paper, and to deal more fully with the economic effects and policy implications of index-linking. Although the paper relies considerably on the literature and actual experience of developed countries, the emphasis is on less developed countries (LDC's) which form the backdrop of much of the discussion.¹

The Plan of the Paper

Section II deals with the pros and cons of index-linking; the history of indexing--both in theory and practice--is discussed in Section III; the effects of index-linking on saving, resource allocation and investment are examined in Section IV; the questions of inflationary expectations and control of inflation are taken up in Section V; Section VI is devoted to the effects of index-linking on financial markets; various alternatives to index-linking are presented in Section VII; and the paper concludes with a summary and suggestions for further research in Section VIII.

II. The Pros and Cons of Index-Linking

Not many studies have been devoted to index-linking in developing countries. Even the few that have dealt with this topic are descriptive, by and large, and do not incorporate the economic characteristics and institutional arrangements of LDC's into the analysis. One is therefore forced to draw inferences from theoretical studies, and those dealing directly or indirectly with indexing in developed countries.

It is well known that, in a world of perfect markets, if inflation is correctly anticipated by everyone in the economy, and economic agents are left free to adjust their behaviour, there will be few deleterious effects of inflation. However, in the real world, especially in LDC's, market imperfections often restrict people's choices, and policies such as interest rate ceilings, credit restrictions, etc., prevent a full adjustment to even a fully anticipated inflation. In such cases, and when prices rise at unanticipated rates, inflation causes a transfer of resources from lenders to borrowers, and from holders of cash balances to the government by way of an "inflation tax." Moreover, financial markets no longer provide the "correct" signals for resource allocation. Assets which provide

good hedges against inflation begin to predominate people's portfolios, in preference to productive investments. Also, development of financial markets, notably those dealing with long term transactions, is likely to suffer.

Arguments For and Against Index-Linking

Proponents of index-linking claim that, in the context described above, it would ameliorate many of the adverse effects of inflation. In particular, it would: (1) provide an inflation-proof asset which will be of special benefit to lower income classes who, because of their small savings, do not have much access to other types of investment [Slichter (1950a, 1950b), Houthakker (1959), Massé (1962)]; (2) ameliorate the adverse effects of inflation on income distribution and resource allocation by ensuring that at least one relative price--the interest rate--does not lag behind other prices in an inflationary situation [Morag (1962), Palander (1957)]; (3) dampen people's price expectations [Palander, Slichter (1950a, 1950b)] and prevent speculative purchases of durables and inventories in anticipation of inflation [Goode (1951)]; (4) promote saving by drawing funds that would otherwise be spent to increase inflationary pressures [Bach (1952)] (Friedman (1952) concurs "...[they] might increase voluntary savings because they would be more attractive than existing means of investing savings open to the general public, but I regard this as a minor advantage..."); (5) reduce the borrowing costs for the government [Keynes (1927)] or a subsidized industry [Massé] because the bond offerings will be tailored to the needs of potential bond buyers who, in the absence of escalation clauses, would wish to include an inflation premium in the nominal bond yield; (6) increase political pressures for anti-inflationary policy because failure to control inflation will increase the liabilities of the government and firms which have issued indexed bonds [Bach and Musgrave]; and (7) provide one more policy instrument and add to "the potency of monetary policy in regulating output, income, and employment" [Gurley and Shaw

(1960)]. Tobin (1963) also supports this last point because bonds with purchasing power escalation clauses will be better substitutes than existing debt instruments for capital equity. The government will thus be able to affect the overall return on capital equity more easily, without changing the relative return on specific equities. For LDC's, which are the main focus of this study, it is suggested that index-linking will have the additional advantage of reducing outflow of capital, and lowering the relative prices of real estate and gold because their demand as inflation hedges will fall. Indexing will also help in legally circumventing usury laws and interest rate ceilings because these are usually stated in nominal terms [Robinson (1971)]. Finally, indexing will promote long-term capital flows.²

These arguments are countered, almost point by point, by opponents of index-linking. They claim that escalation clauses, especially in government bonds, would: (1) create inequities of their own by protecting a few (the holders of government bonds) while all tax-payers bear the cost; (2) add to inflationary expectations because index-linking would symbolize the ineffectualness of government's anti-inflationary policies [Joint Committee on the Economic Report [JCEC hereafter](1952)]; (3) replace consumption demand by demand for investment goods if higher savings find their way to private investors [Finch (1956)]; (4) increase borrowing costs if prices rise faster than expected, and also impose indeterminate liabilities on the government; (5) reduce support of anti-inflationary measures by those who are normally hurt by inflation [Suviranta (1951)]; (6) spread to the whole economy and "might easily have disruptive consequences for our economic system" [Radcliffe Committee (1959)]; and (7) create a host of practical difficulties due to inadequate indices and administrative problems.

It should be emphasized that the above is a very brief summary of the main points and counterpoints made in the literature. These and similar other arguments have often been adduced in brief, often rhetorical, statements, without basing

them on any analytical or empirical studies. Consequently, many of these arguments on both sides will have to be qualified. For example, Keynes' point about reduced borrowing costs for the government will hold if inflationary expectations are not fully realized. If prices rise faster than expected, interest payments on government bonds are likely to be higher for indexed bonds than for the more conventional ones. There are other points, such as the effects of indexing on inflationary expectations, about which not much can be said on a priori grounds. Expectations will be affected by the history of inflation in a given country, the other monetary and fiscal policies being followed there, and a host of other considerations which will vary from one situation to the next. The pros and cons of index-linking will be discussed at length in Sections IV, V, and VI.

III. Index-Linking in Theory and Practice

The History of Index-Linking

Discussions of index-linking have a long history in economic literature. Jevons (1875) was already referring to suggestions made in 1822 by Joseph Lowe, in 1833 by H. Poulett Scrope, and by G. Porter in 1838. Also well known from the 19th century literature are Marshall's arguments (1887) in favour of a "tabular standard" which would give the holders of debentures and government bonds "what they want--a really constant income." These ideas were revived again during the inter-war period, notably by Fisher (1928, 1934), Keynes (1924), and others. Fisher said that "Such practices are prudent, and it would be well if they were more widely adopted."³ Keynes suggested that index-linked bonds would "prove popular with particular individuals and so enable the State to raise funds a little more cheaply."⁴

The Scandinavian countries, notably Finland and Denmark, have experimented extensively with several forms of index-linking. Many descriptive and theoretical

articles therefore have appeared in Scandinavian languages. The work of Palander in Swedish is of special interest in this context because he provides a comprehensive discussion of actual schemes of index-linking as well as a thorough analysis of the theoretical aspects of the matter. Earlier writings of Lindahl (1929) and subsequent papers by Arvidsson (1959a), Ahtiala (1967), among others, have kept up the interest in this topic. The Revue économique devoted the entire March, 1955 issue to the subject of indexation, dealing at length with the French experience, and there has been a steady stream of papers in English during the last two decades.⁵

Most of these studies either present the arguments for and against indexing, or review earlier literature, and in many cases provide highly descriptive accounts of index-linking in various countries. What is lacking, with a few notable exceptions of course, is a rigorous theoretical analysis of different aspects of indexing, especially its effect on saving, investment, monetary policy, and the functioning of financial markets. Similarly, hardly any systematic empirical studies have been done to examine the actual experience of individual countries with index-linking, or to evaluate the contribution of indexing to various economic phenomena. These inadequacies in theoretical and empirical literature are even more substantial for developing countries because the special characteristics of their financial markets (including non-existence in some cases) and economic structure have not been incorporated into much of the literature on index-linking. These themes will be developed more fully in the next section. For now, let us look at some of the indexing practices actually followed in various countries.

Actual Experience

Although index clauses have been used in mortgage contracts, loan agreements and savings deposits also in many countries, for simplicity much of the following discussion is presented in terms of bond issues.⁶ The principles involved are the

same in all cases. A saving deposit can thus be treated as a bond-purchase by the depositor, and a mortgage is like a bond-sale by the mortgagor. A term-deposit is like a bond with a fixed maturity.⁷

A wide variety of linkages has been used by government agencies and private firms in various countries in recent years. The index clause has been applied to interest, principal, or both. The linkages have been partial or full (i.e., 100 per cent), continuous or periodic, applicable to increases in price level alone or both inflation and deflation, and in many cases, there have been floors and ceilings to restrict the amount of compensation. The range of links used extends from cost of living indices to the price of a third class railway ticket. The list includes such curious links as price of orange groves (Israel), volume of oil extracted (Argentina), the price of meat (Brazil), and index of industrial output (France).⁸ For analytical purposes, it is useful to classify this bewildering variety of linkages by three criteria: firstly, by the nature of return; secondly, by the type of linkage; and thirdly, by the terms and conditions attached.

A. The nature of return.- The primary classification here is between fixed and variable return bonds. In the former, a fixed inflation premium is specified, either at the time of issue or at a later date.⁹ The effect is really a higher nominal yield. Of course, the yield could be fixed in real terms in which case the nominal return will vary directly with the index to which the bond was linked. If the linkage was not 100 per cent, both the nominal and real yields will vary over time. Many bonds of these types were issued in France between 1952 and 1957, and in other countries.

B. The type of linkage.- The following types of indices have been mainly used:

1. A price index, either to reflect changes in cost of living, or the wholesale price index.

2. The exchange rate, either by linking the bond specifically to the exchange rate, or denominating the bond in terms of a foreign currency. For example, U.S. dollar bonds have been issued in Israel and in some Latin American countries.¹⁰

3. Some variable connected with the issuer of the bond. For example, in Argentina, the government-owned oil company (YPF) issued bonds where the principal was linked to the average wage rate of YPF employees, and interest payments varied with the volume of oil extracted each year.

4. Other indices, for example, an index of industrial production in France.

Of these four only the first can be called a direct purchasing power bond. Its main purpose is to provide a hedge against changes in the price level. The other three types of linkages might also serve this purpose, but indirectly. The foreign exchange linkage is used mainly to protect foreign investors against devaluation risk or to protect an intermediate lending agency which has borrowed funds abroad. If the country has a truly flexible exchange rate, the bond will also provide an inflation hedge.

The third type of linkage really provides a low risk equity. In some cases, the bonds have been tied to corporate earnings and/or dividends. In other cases, the linkage is with turnover, or the price of the product manufactured by the firm that issued the bond [Rozental (1959)]. These are obviously proxies for profits and dividends which, in the absence of linked bonds, would have benefited only the equity holders. It is difficult to determine a priori how well such bonds will hedge against inflation. In the Argentine example cited above, if wage rates lag behind changes in price level, as they have in many countries, the real value of the bonds will decline. Often the raison d'être of such bonds is to prevent the issuers' liabilities from rising too much if their earnings do not increase as fast as the general price level. This point probably explains the wide variety of links adopted for bonds of this type.

Many indices, external to the firm which issues bonds, have been employed from time to time, especially in France. for bonds issued by the nationalized sector. National or industrial averages have been commonly used. Sometimes "external" and "internal" indices are combined.¹¹ These bonds are similar to the third category discussed above, except that their return does not directly depend on the performance of the issuer. They are a type of equity but provide no sure hedge against inflation.

C. The terms and conditions attached.- Many terms and conditions have been attached to indexed bonds. Linkages in some cases cover only the interest rate, in others the principal is also linked, and sometimes both the interest and the principal are included. The coefficient of indexation, which governs the extra compensation to be paid, can range from zero (indicating no indexing) to one (indicating full linkage). In France, in the fifties, this coefficient varied from 1:1 to 1:30 or less. Furthermore, the coefficient of indexation may be different for different components of the index. The scope of the linkage can also vary with the term of the loan. For example, in Israel in the mid-1950's, loans for less than two years were granted without linking, there was a 50 per cent linking for loans for two to five years, 60 per cent for those between five to eight years, and 70 per cent for loans of longer durations.

All these are attempts, in one form or another, to regulate the yield on indexed bonds and provide only a partial compensation for inflation. These riders have the disadvantage of complicating the comparative evaluation of rival issues and perhaps confusing potential buyers of bonds. In many instances, such conditions are added to take care of the exigencies of a given situation, perhaps to enhance the appeal of such bonds to a particular group of investors. These considerations are of minor importance when compared with the larger questions concerning the economic effects and other aspects of such bonds. Throughout the rest of the paper,

therefore, we shall not refer much to these terms and conditions, assuming that they can be summarized in yield differentials in most cases.

IV. Index-Linking, Aggregate Saving, and Resource Allocation

Supporters of index-linking claim that it would promote saving and improve resource allocation. The main question is "How does indexing affect people's portfolio choices--i.e., saving held in the form of financial assets--aggregate saving, and investment in an economy?"

Effects on People's Portfolios

It is to be expected that in an inflationary situation, people will try to protect the real value of their savings, and this is usually accomplished by replacing cash and financial deposits by better inflation-hedges such as business assets, equities, real estate, consumer durables, and precious metals. In fact, if banks are prohibited from raising interest rates, and the prevailing inflation is higher than the interest payable on deposits, savers will be better off by withdrawing their deposits and simply holding inventories of goods. Investment in equities and business assets requires the savers to assume a business risk. Most small savers, because of the small absolute amounts of their saving, do not have the resources to diversify their portfolios enough to minimize such risk. Index-linking will provide a special incentive to savers in the lower income classes by raising the real yield on financial saving while helping savers to avoid the risks involved in other types of investment.¹²

Indexing and Aggregate Saving

The total saving in any economy consists of saving by households, business saving, and saving on the part of the government. Most of the discussion in the literature has focussed on how index-linking will influence household saving, even though the subject being discussed, ostensibly, is aggregate saving.¹³

It is argued that indexing will increase household saving because (1) Indexing removes a part of the saver's risk. "On the assumption that saving...is negatively related to uncertainty regarding the future value of savings, the reduction or abolition of this risk will increase the flow of saving." (Please and Christoffersen (1966), p. 21). (2) In countries where high rates of inflation and relatively low ceilings on legal interest rates conjoin to cause negative real rates of interest, indexed debts may be a prerequisite for voluntary personal savings (cf. Cohen, p. 454). (3) "In underdeveloped countries, there often exists a significant 'luxury' consumption difficult to reach by taxation, which might be tapped if the alternative of value-stable saving is offered." [Economic Bulletin for Latin America (1957), p. 84].

The arguments against a beneficial effect of indexing on saving are:

(1) People save for a "real" target, say, a given standard of living, or building a house, etc. They will therefore save less when a part of their saving is guaranteed against purchasing power loss. (2) Even if savers do not have a well-defined target, in an inflationary situation, they will maintain some "safety margins" in their savings to hedge against inflation. These will now be eliminated or reduced, resulting in lower saving. (3) "If all financial assets were linked to a price index, rising prices would no longer induce more personal savings via a reduction in people's real wealth." (Goode, p. 339).

It is difficult to resolve this issue by the above arguments alone, without asking the more basic questions, viz. what are the determinants of saving and how are they affected by index-linking?

Indexing and the determinants of saving.- Research on aggregate personal saving, both in developed and developing countries, suggests that current and lagged incomes are the most important determinants of saving. Although empirical evidence is inconclusive, several studies of the saving function in developing countries suggest that saving will also respond to variables such as capital inflow (Landau (1969), Chenery and Eckstein (1970)), taxation (Please (1970), Singh (1971)), exports

(Lee (1971), Chenery and Eckstein), and interest rates (Williamson (1968), Gupta (1970)).¹⁴ Since saving is simply income minus consumption, variables that affect consumption also affect saving. From the theoretical and empirical work on aggregate consumption we learn that, besides income, wealth (Spiro (1960)), distribution of income, capital gains (Bhatia (1972)), perhaps interest rates (Weber (1970)), and some socio-economic variables should also affect savings.¹⁵ Of these determinants of aggregate saving, it is reasonable to expect that indexing will have a direct impact on interest rates only. In all likelihood, it will tend to raise the real yield on saving, especially if prices are rising at unanticipated rates. But the response of saving to interest-rate changes, whether caused by index-linking or other factors, is uncertain. An increase in yield has both an income and a substitution effect, and the two effects do not always work in the same direction. The effect of index-linking on interest rates, and the resulting response of saving, thus, will vary from one situation to the next. Yet, hardly any empirical research has been done on these topics for any of the countries which have experimented with index-linking. This is obviously a promising area for productive, new econometric work.

The only other definite effect indexing will have is to expand the portfolio choices open to the people. Besides conventional bonds, equities, and other assets, they will now have an extra asset whose yield and face value will be linked to a price index. As noted above, the presence of indexed assets will cause portfolio reshuffles but it is not clear if any new saving will emerge.

Indexing and Investment

Two types of issues have been dealt with in the literature: firstly, the effects of indexing on borrowers and their investment plans [Arvidsson (1959)], and secondly, how the allocation of investible funds is altered by the introduction of index-linking [Ahtiala (1967)].

Effects on business borrowing.- When indexed bonds are issued, how firms alter their borrowing plans will depend on their price expectations and attitude to

risk, among other factors. Firms which anticipate a smaller rise in the price index than the market will prefer to borrow in the index market. But it is not clear if the indexed loan will be a new borrowing or just a replacement for an existing nominal loan. Other firms, holding different expectations, might keep their borrowing plans intact or borrow more in the nominal-bonds market. The effect of indexed bonds on aggregate business borrowing thus is uncertain.

Effects on allocation of investible funds.- It is widely believed by economists and financial analysts that inflation, especially the unanticipated type, will distort allocation of investible funds. If interest rate ceilings or other institutional restrictions prevent interest rates from rising, a bank facing an excess demand for loans will have to ration credit either by (1) ranking prospective projects in order of decreasing (social) return and financing the most productive of them, or (2) using "fine print" clauses to raise interest rates in effect, or (3) resorting to some other non-market method of selecting acceptable borrowers. The latter two options are likely to result in some misallocation which can be corrected, at least partially, by introducing index-linking. Purely speculative projects, such as investments in inventories, which are profitable merely because the price level rises faster than borrowing costs, will be ruled out immediately. Even other low-productivity investment, which could be undertaken because some investors had access to bank loans at the ceiling rate, would now be discouraged by the higher cost of credit brought about by escalation clauses in loan contracts.

Medium- and long-term projects are affected most adversely in the absence of index-linking because banks would be willing, if at all, to give loans for short periods only. In Brazil, for example, before escalation clauses were permitted, there was no commercial market in which a loan for any length of time could be raised. From the point of view of economic development, paucity of funds for long-term projects is particularly harmful because such projects provide the infrastructure for development in many cases. Unless inflation could be predicted with certainty,

index-linking is the only effective way of channeling private financial savings into long-term investments.

In summary, index-linking, by ensuring a positive real yield on financial saving, will increase the holding of financial assets, especially by households in the lower income brackets. The overall rate of household savings also might be larger if the real return on them were not zero or negative. No empirical studies, however, deal directly with the effect of indexing on saving and even those which analyze the effects of interest rates on aggregate saving do not resolve the issue. By raising the cost of credit and charging positive real interest rates on loans, index-linking will eliminate purely speculative investments and discourage projects with low returns. Besides, the yields on indexed loans will enable the banks to pay higher interest rates on deposits which will help the saving picture.

V. Indexing and Inflation

It is generally accepted that index-linking will offset some of the undesirable redistributive and allocational effects of inflation, but critics claim that indexing itself would promote inflation and also hamper anti-inflationary policy. This section deals with the broad issues of how index-linking affects inflation and anti-inflationary policy, drawing upon the actual experience of countries such as Finland and Brazil which have experienced both indexing and inflation.

Can Indexing Promote Inflation?

Three sets of arguments can be used to answer this question in the affirmative. Firstly, the Radcliffe Committee took the view that indexing could spread to the entire economy and disrupt the economy because price increases in one sector will immediately lead to increases elsewhere and result in a cumulative, multiplier effect. In the absence of escalation clauses, some prices will lag behind others, but index-linking will eliminate such lags,

resulting in a larger inflationary impact. Secondly, there is the theoretical result, implicit in Patinkin's work (1965) and stated also by Baumol (1965), that any economy in which everything is fully indexed--including money--cannot have a determinate overall price level. "Any price level will do as well (or as badly) as any other. More specifically, if the economy is in a state of general equilibrium, no price level change can cause disequilibrium in any sector of the economy--not even in the money market... ." [Baumol (1965), p. 110)]. And finally, to complete the case against indexing, there is the observation by the Bank for International Settlements about the 1967 devaluation of the Finnish markka: "The difficulties which led to this step... appear to have derived mainly from the persistence of cost/price inflation, the intensity of which was ascribable partly to the widespread use of indexation arrangements."¹⁶ This observation can be regarded as a special case of the Radcliffe Committee view. Let us examine these arguments in turn.

The Radcliffe Committee view.- Implicit in the view of the Radcliffe Committee are a number of assumptions about the functioning of an economy, the speed of adjustment, and the relationship between anticipated and actual changes. If prices rise as expected, the effect on the economy will be the same, more or less, whether escalation clauses are used or not. If prices rise faster than expected, index-linking could prove more inflationary if it is assumed that no provision would otherwise have been made in contracts for such unforeseen happenings. These, however, are strong assumptions. Economic groups which tend to lag behind changes in price level will learn from their mistakes. They will revise their expectations, and try to over-protect themselves if their circumstances permit. For example, a strong trade union, even in the absence of escalation clauses, could not be denied provisions for unanticipated price increases in wage settlements for any length of time, especially if it has erred on the side of under-compensation during the last few rounds.

The Baumol-Patinkin argument.- Consider a situation in which all markets, except the market for commodity X, are initially in equilibrium. Assume that an excess demand for X exists, resulting in an increase in its relative price. People will tend to substitute other commodities for X which is now relatively more expensive. Since all other markets were in equilibrium, this results in an excess demand for some other commodity, and hence an increase in its price. The price increases, however, have no income or real-balance effect because full escalation ensures that the real values of money income and cash balances are immediately restored. There is nothing in this economy to stop the prices from rising indefinitely. In the absence of indexation of money, for instance, rising prices would have reduced the real value of money balances, which in its turn would have eliminated the excess demand in the commodities market.

The Baumol-Patinkin argument is theoretically correct, but it can lead to continued deflation just as easily as it describes runaway inflation. In the above example, if the initial excess demand for X is replaced by an excess supply, the result will be a steady decline in the price level provided that indexing clauses apply to both upward and downward movements in the price level. Fortunately, no country has ever gone so far as to index everything, including the money supply. And in a real world situation, with fixed exchange rates, once the inflationary process starts, such an economy would soon run into serious balance-of-payments difficulties, which would require remedial action. This theoretical argument therefore need not detain us much longer.

The Finnish experience.- Indexing was discontinued in Finland because it was felt that the benefits of the 1967 devaluation would have been wiped out very quickly due to escalation clauses throughout the economy. An incomes policy solution, with a general abolition of index linkages, was devised through

negotiations between the Government and various interested parties. A massive stabilization program was introduced in 1968 under which a temporary freeze on rents and prices was placed, and provisions were made for comprehensive wage agreements every year. Several questions arise in this context: (1) How much did indexing contribute to inflation? (2) Can the role of escalation clauses in financial contracts per se be isolated? and (3) How have prices behaved since the abolition of index-linking?

Unfortunately, no definite answer can be given to the first two questions. Several published and unpublished studies have been conducted at the Bank of Finland but these are mostly descriptive and do not isolate the contribution of indexing, or index-linking in financial markets, to inflation. To consider the third question, during 1969 and 1970, the two years immediately following the removal of indexing, the Finnish cost of living index rose at less than 3 per cent a year. Nevertheless, in 1971, the cost of living increased by 5.5 per cent, in 1972 by 7.8 per cent, and the increase in 1973 was 10.8 per cent. It is obvious that inflation is back on the scene. The cost-of-living increases in 1972 and 1973 are higher than the average increases during the period when indexing was in force in Finland.¹⁷

The Brazilian experience.- The Brazilian experience in this regard is also interesting. According to Simonsen (1969), "The inflationary gallop of recent years apparently began in 1959, when the government decided to abandon the promising program of monetary stabilization prepared at the end of 1958. In 1959 prices rose some 40 to 50 per cent. In 1960 inflation relented a bit; prices rose only 25 to 30 per cent. But in 1961 they jumped again, 40 to 50 per cent, and in 1962 even higher, 50 to 60 per cent. In 1963...prices rose 80 percent..effort on the part of the Castello Branco government not exactly to combat inflation, but to escape

hyperinflation, succeeded in reducing the effective rate of price increases to about 90 per cent in 1964." (p. 135). Savings deposits and savings bonds were linked to the general wholesale price index in 1964, and other types of linkages were introduced in subsequent years. From the data on price movements in Brazil presented in Table 1, it appears that the inflationary record is no worse than in the years before 1964. Prices have in fact been rising at a somewhat slower rate.

It would be naive to conclude from these facts about Finland and Brazil that indexing has no appreciable effect on inflation, or that indexing exacerbated inflation in Finland but ameliorated it in Brazil. Simultaneously with index-linking, so many other changes have been taking place in these two countries, domestically and in their trading relations with the rest of the world, that it is difficult to zero in on the role of index-linking by casual empiricism only. Nevertheless, it may be possible to control for these other developments in econometric studies. Further econometric work with Finnish and Brazilian data, therefore, promises rich dividends.

Indexing and Control of Inflation

There is much controversy about the contribution of indexing to anti-inflationary policy. Those who feel that index-linking will hinder control of inflation claim that indexing implies "a deliberate acceptance of inflation by the monetary authorities" [Day (1964)], and "it is a clear admission of the expectation of defeat by the one agency in the economy which has both the power and the responsibility for combating inflation." [Nevin (1962)]. Somers (1952) added a political argument: "...the inclusion of an escalator clause...gives everyone a stake in inflation. If everyone has a stake in inflation, what chance is there of enacting or enforcing any counter-inflationary measures?" [Collier (1969, p. 119)], summarizing his discussion with some economists at the British Treasury, states:

TABLE 1: Inflation in Brazil

	<u>The Consumer Price Index</u>		<u>The Wholesale Price Index</u>	
	Index (Base 1963=100)	Percent Change in Index	Index (Base 1963=100)	Percent Change in Index
1963	100		100	
1964	187	87.0	192	92.0
1965	302	61.5	290	51.0
1966	443	46.7	396	36.5
1967	591	33.4	496	25.2
1968	723	22.3	615	24.0
1969	866	19.8	739	20.2
1970	1,082	24.9	902	22.0
1971	1,300	20.1	1,087	20.5
1972	1,514	16.5	1,287	18.4
1973	1,709	12.9	1,499	16.5

Source: International Financial Statistics, various issues.

"It is disastrous for the government to admit that inflation is inevitable, for this reinforces the price rise. Only a country subject to overpowering inflation, and willing to admit it, would use such bonds from choice, for they reflect badly on the nation's financial strength and stability."

Similar arguments are adduced by those who believe that index-linking will help in controlling inflation. Palander opines that index bonds eliminate some of the injustices which result from changes in the value of money, at the same time giving the authorities greater scope for fighting an inflation, presumably because they will have an extra weapon in their economic arsenal.¹⁸ Moreover, by appropriate inter-market operations (e.g., by borrowing in the conventional bond market), the government could narrow the spread between the yields on conventional and index bonds, thereby dampening inflationary expectations.¹⁹ Then there is Slichter's argument, already noted above, that indexing will help in implementing an anti-cyclical policy by promoting saving, or at least inducing individuals not to increase their consumption when prices are expected to rise. Tobin (1963) also rejects the view that index-linking of financial contracts will promote inflation because "...it is far from clear that a regime with purchasing power bonds would actually be more susceptible to inflation than the present financial regime. In the first place, purchasing power bonds would strengthen the controls over the economy possessed by the monetary and debt management authorities. In the second place, the availability of a more satisfactory menu of assets might well increase non-inflationary saving." (p. 208).

In this largely rhetorical debate, there are three basic economic issues involved: (1) the effect of indexing on aggregate demand, the principal components of which are consumption and investment; (2) the influence of index-linking on people's expectations about inflation; and (3) the contribution of indexed bonds to stabilization policy, more precisely, to anti-inflationary monetary and debt management policies. We have already dealt with the response of saving and

investment to indexing, concluding that some increase in saving will probably take place. The rest of this section will deal with expectations, and stabilization policy.

Indexing and expectations.- How people form their expectations about inflation is primarily an empirical question. Expected price variables in most econometric studies have been approximated by weighted averages of past changes in prices, which suggests that expectations are based on past experience. Other than that, believers in the quantity theory of money would say that, over long periods of time, price changes are highly correlated with changes in money supply, but this correlation becomes tenuous and slight for short-run forecasts. In developed countries, price forecasts are often based on large or small econometric models, and since these are widely circulated, they might have some effect on price expectations. But in developing countries, where econometric models are scarce, and the use of financial newspapers, etc. is limited, how price expectations are formed is even more of a mystery. It is difficult to expect, on a priori reasoning alone, that the mere introduction of indexed bonds will have any effect on expectations.

There is no systematic discussion in the analytical or empirical literature about how or why index-linking should alter price-expectations. It is true that, if money markets are functioning reasonably well, the yield differential between indexed and non-indexed bonds will reflect expected price changes, but it is difficult to determine if this measure of expectations would be larger or smaller than that used in the absence of indexed bonds. It cannot be denied that the terms on which indexed bonds are issued, and the government's other policy measures could affect price expectations. For example, given the choice of two markets, if the government sells non-indexed bonds, people might interpret this action to mean that the government expects prices to rise faster than the existing

yield differential between the two types of bonds. In the light of this interpretation, people could revise their price expectations upward. (Robson, p. 65).

Under the present state-of-the-arts, therefore, the question of how indexing would affect price expectations should be regarded as wide open. There are no strong theoretical arguments one way or the other. The actual results in a given country will depend on the history of price changes there, the terms on which index bonds are issued, and the functioning of financial and other markets.

Indexing and stabilization policy.- Gurley and Shaw (pp. 168-69) express the view that the introduction of real bonds makes monetary policy more effective in regulating output, income, and employment. Money is not neutral in its effects on the real variables in this case. To illustrate this point, assume first that there is only inside money, created by the purchase of nominal bonds by the monetary authorities (the Banking Bureau), money and such bonds are the only financial assets and there is a fixed number of bonds paying \$1 (nominal) a year forever. The bonds, thus, are like consols. Gurley and Shaw assume that compensation for inflation will be paid by simply issuing more nominal bonds to the bondholders. In the absence of index-linking, starting from an equilibrium position, if money supply is doubled, the new equilibrium is reached when the price level doubles, leaving the interest rate unchanged. All markets are cleared and there is no change in output. The new equilibrium, however, will be different if all bonds have escalation clauses because, at twice the original price level, the Banking Bureau gets more bonds than before. The real money balances in the hands of the public will be the same as before but the ratio of real balances to real bonds is higher than before. There is an excess supply of money and an excess demand for bonds, goods, and labour. Gurley and Shaw conclude: "In a new general equilibrium, the interest rate is lower, the price level is higher but not in proportion

to monetary expansion, and output is increased." If there is uncertainty regarding the price level, these tendencies are reinforced because people will prefer real-bonds to money and try to adjust their portfolios accordingly.

Tobin also agrees with the Gurley-Shaw opinion, albeit for a different reason. "The power of the monetary and debt authorities to control the economy would be enhanced if they could deal in equities themselves or at least in debt instruments that are closer substitutes for equities than conventional government obligations. At present the authorities try to affect the supply price of capital by exchanging with the public one kind of government debt for another--demand debt for short debt, demand debt for long debt, short debt for long debt... If investors regard one kind of debt as a good substitute for another, they will require little movements in rates... In contrast, imagine that the authorities could exchange government debts for equities. Then open market and debt management operations would alter the relative supplies of government debt and capital outstanding, and the supply price of capital would change. Open market and debt management operations would be a tremendously powerful tool of economic stabilization." Since the government cannot issue equities without causing unintended and arbitrary distortions of the allocative mechanism of the capital market, a purchasing power bond would be the ideal instrument to use. It would share the role of equity as an inflation hedge, and would also be a much better substitute than existing debt instruments for ownership of capital.

Tobin's argument is based on changing the supply price of capital, or the yield investors require of capital equity. The Gurley-Shaw analysis is carried out in terms of regulating output, income, and employment. The question of how indexed bonds will affect prices is not taken up at all. It follows from the Gurley-Shaw discussion, however, that such bonds might reduce the efficacy of monetary policy as an anti-inflationary tool. A reduction in money supply in

the Gurley-Shaw framework will not lead to a proportionate decline in the price level because part of the adjustment will be made in interest rate and output.

Indexing and built-in economic stability.- Related to the issue of stabilization policy is the question of built-in economic stability. Tobin (1973), a long-standing advocate of index bonds, states: "The common objection to escalated bonds is that they would diminish the built-in stability of the system. The stability in question refers to the effects on aggregate real demand, ceteris paribus, of a change in the price level. The Pigou effect tells us that government bondholders whose wealth is diminished by inflation will spend less. This brake on old-fashioned gap inflation will be thrown away if the bonds are escalated... In the 1970's we know that the government can, if it wishes, control aggregate demand--at any rate, its ability to do so is only trivially affected by the presence or absence of Pigou effects on part of the government debt." Waud (1973) presents a rigorous analysis of index bonds and economic stability, using the IS-LM framework. He demonstrates that if wealth effects enter the money demand function, it is not possible to say unambiguously whether an index bond regime will be more or less stable than a non-index bond regime.

Waud's model, although adequate for proving his point, is not well suited for discussing anti-inflationary policy. The model assumes that the price level is a positive function of real income, which is a simplistic assumption and also incorrect in all probability because, in the real world, price increases have often accompanied both constant and decreasing real incomes. Moreover, the only way of checking inflation under this assumption is to reduce the rate of growth of real income which is hardly an encouraging prospect for policy. The model is particularly unsuited to a developing country, even for comparative-statics analysis, because it makes no room for interest rate ceilings, other capital market imperfections, and the salient structural features of LDC's.

The Brazilian experience once again.- The theoretical literature summarized above suggests that index-linking does not necessarily help or hinder control of inflation. Indexing has no strong, clear-cut effects on inflationary expectations, stabilization policy, and built-in economic stability. However, speaking of index-linking in Brazil Friedman (1974) states: "With it, they have been able to reduce inflation gradually from about 30 per cent now without inhibiting rapid growth, and they may be able to succeed in gradually bringing inflation down to near zero." Several points should be noted in this context.

Firstly, while index-linking neutralizes some inflationary distortions, it can also have a feedback effect on inflation. This is essentially the Radcliffe Committee argument which was also applied in the Finnish case. In Brazil, according to Simonsen, "It is true that [monetary] correction permitted substantial sale of Readjustable (Treasury) Bonds to the public, thus serving to dampen inflation on the side of demand. On the other hand, it is probable that the extent of feedback has been appreciably enhanced by the large scale application of monetary correction." (Quoted by Fishlow (1974)).

Secondly, besides index-linking, the government followed growth-inducing policies in the domestic and foreign sectors, and also directly intervened to limit industrial prices. Fishlow (1974) asserts that "the successful reduction of inflation in Brazil has little to do with indexing, but is related both to direct governmental intervention and successful monetary and fiscal policy..." This view is shared by Krieger (1974) who states: "In fact, Brazilian anti-inflation strategy during this period (1964-67) consisted mainly of the old-fashioned classical medicine: an agonizing contraction of growth in aggregate demand by means of fiscal and monetary restraint. This was combined with...a tough wage policy imposed by an authoritarian government." (p. 44)

Thirdly, in terms of the concerns of this paper, indexing in Brazil has not been restricted to financial contracts only. Also it has been far from an

automatic correction for general price movements because the government has freely modified the indexing schemes and continually used tax concessions, etc. to accommodate other policy objectives. Indexing, thus, has been a tool for government intervention.

In view of these points, it is difficult to agree with a literal interpretation of Friedman's statement which seems to be based on casual observation rather than on a rigorous analysis of the Brazilian situation. Under a broader interpretation, however, the statement raises two important questions: (1) Did indexing force the adoption of other policy measures which led to a reduction in the rate of inflation in Brazil? This is the "feedback argument" in reverse because the government knew that if wages and prices of key industrial goods were not checked, the resulting inflation would be much worse because of widespread index-linking. (2) Did index-linking enhance the efficacy of other policies designed to stimulate exports, output, and financial saving in the economy?

The answer to these questions might resolve the controversy about the effects of indexing on inflation and its control. There is no doubt that index-linking increased the flow of financial saving and improved the working of financial markets in Brazil--a subject to which the next section is devoted--but it is not clear if all the policies used in Brazil since 1964 would have been adopted, or would have been as effective, without widespread index-linking. Further analysis of the Brazilian experience along these lines will be highly productive.²⁰

VI. Index-Linking and Financial Markets

This section deals with the effects of indexing on financial markets, taking into account some of the features of such markets in developing countries. The main issues considered are the coexistence of indexed and non-indexed securities, the effects of indexing on the operations of financial intermediaries, and on the development and functioning of financial markets in LDC's.

Can Indexed and Unindexed Securities Coexist?

Eagly (1967) deals with the concern often expressed in the literature that once indexed bonds are issued, even on a small scale, it will be very difficult to sell unindexed bonds. Whether this will happen depends on inflationary expectations, the terms on which the two types of securities are issued, and the nature of secondary markets. If bonds are transferable, and the secondary markets are active and efficient, prices of bonds will adjust to reflect changes in inflationary expectations. In an extreme case, when there is great uncertainty about future changes in the price level, there may not be a positive price at which anyone would wish to buy a bond without an escalation clause. Only in such an unusual situation will unindexed bonds go out of business.

Effects on the Operation and Profitability of Financial Intermediaries

It was noted earlier in the paper that indexing of deposits will raise the yield on financial saving and increase their flow in an inflationary setting. Clearly, such institutions will need higher earnings, in the form of higher interest rates, more profitable investments, or escalation clauses in loan contracts to meet their increased liabilities on deposits. In this context, schemes of partial indexing, under which escalation clauses do not apply to all types of contracts and all institutions, can create many complications:²¹

1) It has been suggested that since indexed bonds are needed mainly to protect the long-run savings by small savers, the government should issue non-marketable indexed bonds to such people.²² Or, they should be issued only to pension funds and insurance companies which would then offer the corresponding retirement and insurance policies. If banks are not permitted to index deposits in this situation, they are bound to lose some business to these other institutions. The banks' plight would be worsened considerably if there are ceilings on interest rates they can charge or pay, and prices are rising at a rapid rate.

Tobin (1963) suggests that banks can offer escalated deposits or shares to the public, or they can make escalated loans. Under the first option, these institutions "would serve as middlemen, overcoming for the small savers the obstacles to direct ownership of bonds: indivisibilities, transaction costs, and interest rate risks."²³ The second option will, of course, increase the earnings of banks, enabling them to meet their escalated liabilities on deposits.

In most cases, both measures suggested by Tobin will be needed. The first one puts the banks on the same footing as insurance companies, thereby preventing the loss of some bank deposits to them, but it does not cover bank investments other than in government bonds. The second measure will be needed to increase banks' earnings from mortgages, business and personal loans which form the bulk of their assets in many countries.

2) If banks accept both indexed and unindexed deposits and also give both types of loans, deposit-switching in response to changing price expectations can create difficulties if the liabilities typically have a shorter maturity than the assets. Banks, however, can use several devices to get around the problems posed by deposit-switching. They can reduce the liquidity of index deposits by making them payable only after a notice. They can insert renewal clauses in their long-term loan agreements, so that they can change the interest rates and other terms of lending before maturity. And deposit-switching can always be slowed down somewhat by changing relative yields on deposits.²⁴

3) Special problems will arise in the absence of index-linking for institutions which borrow abroad, or transmit funds given to them by agencies such as the World Bank, because they will have to cover both the inflation and devaluation risks. One analyst unofficially calculated for the Industrial Development Bank of Turkey, when

it had obligations repayable in dollars, that a 10 per cent devaluation of the lira could, if the bank were unprotected, wipe out one year's profit. A 25 per cent devaluation would wipe out the accumulated profits and the reserves of previous years, and a 75 per cent devaluation would completely decapitalize the bank. Clearly, the banks cannot bear such risks themselves. In fact, the International Financial Corporation requires, as a condition of a credit to, or an investment in, a development bank, that the problem of maintenance of value be solved to its satisfaction.²⁵ In such cases, the loan might be linked to the exchange rate or, as was done in Israel after the devaluation in 1962, the government can assume the foreign exchange risk while the ultimate borrower will bear the inflation risk.

These problems, although ostensibly emanating from index-linking, are really caused by inflation. A financial institution facing deposit-switching will be faced with exactly the same problem as in the second point above if depositors withdrew funds to invest in inventories in the absence of indexed deposits. Indexed deposits perhaps make it easier for depositors to hedge themselves against inflation but that does not create the basic problem. Indexing probably ameliorates the difficulty by preventing some of these funds from leaking out of the banking system.

If index-linking has to become viable, the above problems will have to be solved. Ultimately, institutions which have adjustable liabilities will have to acquire adjustable assets, and with similar maturity structure. Some policy innovations might also be necessary to solve these difficulties. It would be very useful to examine the experience of countries which have tried index-linking to determine the nature and extent of the problems discussed here, and what measures were taken to resolve or circumvent them. No such studies appear to have been undertaken, or at least published, so far.

Effects on Financial Markets in LDC's

Most of the earlier discussion in this section applies, mutatis mutandis, to the organized or modern sector of financial markets in developing countries also. Such markets in many countries have commercial banks, saving institutions, and insurance companies, similar to the institutions in developed countries, so their operations will be similarly affected by index-linking. Secondary markets and long-term lending agencies, however, are not as developed in most LDC's, and much long-term financing has to be done by the government directly, or through development banks and finance institutions controlled and subsidized by the government. The biggest advantage of index-linking in this context will be to increase the flow of financial saving to existing institutions, and promote the growth of financial intermediaries, especially for long- and medium-term loans. As Harberger (1966) states in a Latin American context, "...under the typical financial arrangements of the inflationary countries, there is today no commercial market in which such (long- and medium-term) credit can be obtained. It is obvious that no such market will develop in an inflationary environment unless the lenders can be assured of a positive real return on their funds. The introduction of readjustable loans is thus the clear way of filling what has up to now been a very important gap in the credit structure of the inflationary countries of Latin America. And once again, this measure would permit the payment of positive real interest rates on the deposits that are the counterpart of long and medium term loans, and thus help to offset the negative effect of inflation on household savings."

The Brazilian experience.- The financial markets in Brazil present almost a textbook illustration of some of the points discussed in this section. Simonsen (1969) states: "Long term loans are virtually unavailable in Brazil, except through certain government institutions... The impasse results basically from uncertainty about the future rhythm of inflation. In an inflationary situation, the rate of

interest that would tend to be established in a free market depends on expectations about the velocity of price increases, which for the long run is totally unpredictable. A rate of 3 per cent a month in a ten-year operation can be disastrous for the borrower if prices stabilize, or disastrous for the lender if inflation explodes." The prohibition of inflation clauses until 1964 caused the disappearance of any private supply of funds for long-term loans. "The sources of supply were thus limited to government institutions like the National Economic Development Bank (BNDE), the biggest supplier of long-term loans; the Bank of Brazil; and a few regional and state institutions. Also, some international financial agencies, particularly USAID, occasionally extend long-term loans in cruzeiros." (pp.150-51). Loans from such institutions, however, were heavily subsidized, so at one time Brazil was in the curious situation of having a long-term interest rate well below the short-term rate.

It is also interesting to know how financial institutions circumvented usury laws and how their attempts influenced their operations. In Brazil, interest in excess of 12 per cent has been illegal since 1933. To quote Ellis (1969), "But even by the time that inflation had reached a 12 per cent annual rate, the banks had invented several ways of circumventing the law: by oral understandings with borrowers by which they paid sums in excess of the interest stipulated in writing; by adding various commissions and ostensible costs to the nominal interest charged; by requiring a large unspent balance from the deposit resulting from a loan, and so on." (p. 205). The banks did not do much for their depositors, however, so new firms grew up to capture savings from the commercial banks. "The Sociedades de Crédito, Financiamentos e Investimentos offered letras de câmbio (Bills of Exchange) at whatever discount was necessary, without actually violating the usury law." The situation in the capital markets, nonetheless, was unsatisfactory. "While the banks were paying depositors 3-6 per cent per year,

they were charging borrowers 4 or 5 per cent or more per month, and the letras de câmbio were furnishing capital to businessmen at rates as high as 90-100 per cent per year." (p. 205). (Emphasis added.)

Strangely enough, in spite of the heavy discounts on the letras de câmbio, "the average real yield was negative, by varying amounts running as high as 2.6 per cent per month, from September 1961 to the end of 1965, except for ten months in late 1964 and early 1965 when positive yields were achieved varying from .07 to 1.52 percent per month." (p. 206). "The success of these instruments can be explained only by the money illusion of a good part of the public, by the lack of better alternatives on the market, and by the aggressive sales policy of the credit and finance companies." (Simonsen, p. 149).

Although the above discussion so far relates mostly to the period before indexing, or monetary correction as it is called in Brazil, was introduced, it provides a perfect illustration of what indexing will do to the financial markets. The supply of long-term credit was severely restricted in the absence of index-linking. Banks could raise interest rates on loans without changing the yield on deposits, so they made huge profits. But other institutions, which too could charge high interest rates from borrowers, soon stepped in and competed away the supply of savings from commercial banks. This is what would happen if index-linking is restricted to a few institutions. Moreover, in spite of all the schemes devised by banks and credit companies, the supply of saving did not keep up with the demand for loans. The biggest losers were the savers who received a low, or even a negative, real return on their savings. In this situation, index-linking alone could have ensured a positive real yield on saving, and it might also have increased the flow of financial saving to the institutions.

Experience with indexing.- As one would predict from the above discussion, indexing did considerably increase financial intermediation in Brazil. Fishlow

(1974) states, "While credit might be expensive, it could at least be predictably obtained. There can be little doubt that an organized capital market did much to dispel the uncertainty and inefficiencies of previous years." Between 1966 and 1973, the public's holdings of financial assets increased from 13.2 billion to 115 billion cruzeiros, which represents an increase of almost 900 per cent. Time deposits too increased by leaps and bounds--from 327 million in 1966 to 27.5 billion cruzeiros in 1973. Virtually all the time deposits were of the indexed variety in 1973.

It is interesting to note that escalation clauses are not being used in all financial contracts. Acceptances, which are an important source of short-term credit, continue to be quoted in nominal terms. Their high yield and short duration attracts investors. Monetary correction has been used mainly in medium-term loans (two years or less) which are generally floated for working capital requirements. A long-term capital market, with private investment banks and other institutions, however, has not come into existence. The government is offering fiscal incentives, and attempts are currently under way to introduce fixed and convertible debentures to encourage long-term capital flows.

Indexing and unorganized markets.- In many LDC's, the money market, like the rest of the economy, has a dualistic character. The unorganized sector of the money market, comprising mainly of indigenous bankers, money lenders, shopkeepers, landlords, etc., is often much larger than the organized sector. Unlike the modern sector, however, transactions in the unorganized markets rarely follow standard banking practices. Loans are often contracted and paid for in commodities; loans are often unsecured and carried forward from generation to generation. The institutions are scattered all over the rural areas. Borrowers

and lenders are usually confined to the same local area and they have little information about interest rates and terms and conditions of loans in other parts of the country. The two sectors of the money market are loosely connected through large exporters, wholesalers, and landlords who sometimes borrow in the organized sector and lend in the unorganized market, or who might occasionally deposit their surplus funds in a bank for a short period.²⁶

The question arises: "How does index-linking affect the unorganized sector and its relationship with the organized sector?" Although this point has not been discussed in the literature, given the institutions involved in the unorganized market and the type of transactions that take place there, it is doubtful that index-linking could be introduced and enforced in such a market. Since the unorganized market in many countries has remained free from regulation by the monetary authorities, it has devised its own safeguards against inflation. In many rural areas in India, for example, agricultural loans are contracted in terms of a proportion of the harvest. This is not index-linking but a loan contract repayable in kind. Nonetheless, it does serve to protect the lender against inflation risk to some extent. The conditions in the unorganized markets vary so much from country to country, and from one region to another within the same country, that it is difficult to make any general statements about how index-linking might affect the unorganized money markets.

The introduction of index-linking in the organized sector will affect the unorganized sector, but once again the effect will vary from one situation to the next, depending upon the existing links between the two sectors of the financial markets. The markets can be linked on the supply side if, for instance, the rural

moneylenders keep their surplus deposits in commercial banks. If these banks index their deposits, it is conceivable that the rural moneylenders might bring back the deposits they had withdrawn earlier because of the low real returns they earned at the commercial banks. Similar arguments can be made for links on the demand side. Clearly, these are empirical matters which depend on the particular circumstances prevalent in a given situation.

To sum up the main conclusions of the discussion of index-linking and financial markets in this section, it is shown that indexed and unindexed securities can coexist provided there are no restrictions on the terms at which they are issued or traded in the secondary markets. Index-linking will have appreciable effects on the operation and profitability of financial institutions, and schemes of partial indexing under which indexing is limited to a few institutions, or a few types of activities, will create complications. Indexing will help in channeling private saving into long- and medium-term investments more effectively, which will be of special benefit to developing countries. Besides, indexing will help in the growth of financial intermediaries in LDC's. Nevertheless, the effects on the unorganized sectors of the money markets in such countries are uncertain.

VII. Alternatives to Index-Linking

It is often suggested that the effects of index-linking can be achieved by removing interest rate ceilings and adopting other policy measures. We have observed above that index-linking has important effects on financial saving, resource allocation, the financial markets, and perhaps control of inflation itself. Is index-linking the best way of bringing about these results, or is a more efficient technique possible? The question is important per se,

and also because index-linking may not be feasible in many countries where, for instance, suitable price indices might not be available.

Alternatives to index-linking can be divided into three categories:

(1) technical alternatives, which essentially duplicate the mechanical aspects of index-linking; (2) facilitating alternatives, which try to achieve the effects of indexing on saving, resource allocation, etc. without resort to index-linking, and (3) preventive alternatives, which attempt to make index-linking unnecessary by controlling inflation. It should be obvious that there would be considerable overlap among the three sets of alternatives, and that some would be closer substitutes than others for index-linking.

1. Technical Alternatives

One reason why index-linking has been used in Israel, Brazil, and other countries is that the interest rate ceilings in many instances are well below the prevalent rates of inflation. An obvious and rather close substitute for index-linking, therefore, is the removal of all restrictions on interest rates and other terms and conditions which might be attached to financial contracts. If capital markets are functioning well, some mechanism will be found by which interest rates will fully reflect a changing price level and expectations about its future course. Such a mechanism, if it does not incorporate indexing explicitly, could include one or more of the following: (1) Recontracting clauses which require renegotiation of terms periodically or whenever one of the parties desires. Such clauses can be observed in some business loans and mortgage contracts at least in Canada and the United States. (2) Secondary markets in which borrowers and lenders can hedge themselves against future inflation through discounting or resale of negotiable instruments. (3) For instruments which cannot be transferred, for example Canada Saving Bonds, the issuer might raise the yield periodically by a series of discrete, lagged adjustments in an inflationary situation.

For ease of reference, let us refer to these three devices as the "renegotiation", "secondary markets" and "discrete adjustments" alternatives.

In developed financial markets, all these alternatives might be feasible. The interesting question to ask, therefore, is: Which alternative would be the best and under what circumstances? Could we say, for instance, that "renegotiation" is better for medium-term loans but indexing is indispensable for long-term loans? Can threshold levels of inflation and uncertainty--as measured by, say, mean and variance of changes in the price level--be determined to choose among the various alternatives? And for index-linking per se, perhaps one could ask: "Left to itself, under what circumstances will index-linking develop if all restrictions against it were removed?" These questions do not seem to have been dealt with at all in the literature so far. Explorations along these avenues, therefore, promise rich dividends.

In LDC's, given the nascent state of their financial markets, it seems that the "secondary markets alternative" will not be feasible. The government is therefore left with only the "renegotiation" and "discrete adjustments" alternatives. It is also likely that index-linking will require a spur from the government, at least initially. The government could actively promote indexing, or issue indexed bonds which will provide a cue to the rest of the economy. On the contrary, if indexing had to be discouraged, the government could explicitly forbid indexing as in Finland after 1967, or take a strong stand against it. If the government seeks to promote index-linking, it will involve sizeable administrative costs, in compiling adequate price indices, in selling the idea to the public, and in the overall supervision of various indexing schemes which will inevitably evolve. From an administrative point of view, therefore indexing might well turn out to be the

most expensive alternative, especially in those LDC's where statistical services, etc. are not yet highly developed.

The important policy question then arises: Why use index-linking--with all its administrative costs--when other alternatives could do the job? In other words, what is the purpose of introducing additional institutional constraints on borrowing and lending if the price mechanism can handle the problem without external intervention? The literature once again does not give us much guidance on this issue. In fact, one wonders if a satisfactory, general answer can be found to this question. Much depends on the circumstances prevailing in a given situation. The Canadian government, for example, without expressly taking a stand on index-linking, resorted to "discrete adjustments" to stem the tide of saving bonds which were being turned in for cash. In Brazil, as the discussion in Section VI indicates, the ceilings on interest rates were clearly being circumvented on deposits by varying the discount rates on bonds, and on loans by levying service charges, etc. These devices essentially made a one-shot adjustment for inflation. They did not keep up with continuing inflation, so index-linking had to be introduced.

In the face of uncertainty about changes in the price level, there is no better device than index-linking. "Purchasing power bonds and mortgages clearly represent a much more satisfactory financial adjustment to inflation than an increase in nominal interest rates on conventional debt instruments since they compensate for any price level change, either up or down, whether foreseen or not, and in so doing make the time shape of debt repayments more closely match the time shape of income receipts." [Poole (1972), p. 211.]

2. Facilitating Alternatives

Some of the effects of index-linking could be duplicated by following policies tailored to such objectives in different areas. Although there is no sure way, except indexing, of explicitly guaranteeing a positive real return on saving,

special saving bonuses in the form of tax concessions, prize bond schemes, or straight monetary payments have been tried with varying degrees of success in many developing countries. These schemes may have the effect of increasing saving, but they do virtually nothing for the resource allocation effects of indexing. In any case, if a set of policies, each specifically designed for a particular purpose, could be devised, they would certainly be more cumbersome and expensive than the simple device of index-linking.

The idea of a national equity has been discussed by Day (1964), and Nevin (1962) to replace index-linking. According to Nevin, it gives investors "an asset whose yield can grow pari passu with the national output as a whole. ...it will be an announcement by the authorities of the probability, not of inflation, but of continued economic growth." Nevin would link the bond to real per capita GNP whereas Day would prefer GNP in current prices. The main argument in favour of a national equity is that it will prevent people from "benefiting" from inflation if it is not accompanied by an increase in real output.

First of all, as Please (1964) points out, national equity is an indexed bond--the index, however, is not an index of the price level. Historically, there has been no definite correlation between GNP or its growth rate on one side, and inflation on the other. Therefore, only fortuitously will the national equity provide a hedge against inflation. In any case, the alleged superiority of such a bond over direct index-linking is based on the argument that somehow the announcement of indexing is a major factor in the inflationary process. That argument, in our judgment, has been grossly overworked.

3. Preventive Alternatives

Admittedly, index-linking is not a first-best policy. It is useful mainly because under the present state-of-the-arts we cannot predict inflation with certainty, much less control it. Any policies which improve our expertise in

these two areas therefore can be treated as alternatives to index-linking. Monetary policy, fiscal policy, or any combination of these and other policies, if they can reduce the uncertainty of inflation and keep it within reasonable bounds, will be much better than any form of index-linking, provided that the financial markets are not hampered by undue restrictions on interest rates, etc. While the search for that elixir goes on, index-linking should be accepted as a palliative which ameliorates but does not cure the malady.

VIII. Concluding Comments

This paper has surveyed the state of theoretical and empirical knowledge about index-linking, a device by which escalation clauses are introduced into financial contracts to link them to an index. Although we have drawn heavily on the literature of developed countries, developing countries, faced with high rates of inflation, have provided a backdrop for much of the discussion. The most common objective of indexing in inflationary situations is to protect the lenders against inflation, especially unanticipated inflation, so a price index has been the most commonly used linkage. However, many other linkages, some reflecting the performance of the borrowers, and others relating to the performance of an industry or the entire economy, have also been used.

A pertinent question to raise at this stage is that if index-linking is indeed as beneficial as its supporters suggest, why has it not been used more extensively? Also, why have countries such as France and Finland discontinued indexing after experimenting with it for many years? The answer to the first question lies mainly in institutional reasons. In many countries, there has been explicit or implicit prohibition of escalation clauses in financial contracts.²⁷ In the absence of such restrictions, the popularity of index-linking will depend on the expectations of borrowers and lenders. If in a given situation, lenders would like to charge a rate of 15 per cent on an unindexed loan, or 8 per cent

with an escalation clause, and the borrower would pay 15 per cent for an unindexed loan but only 6 per cent for an indexed one, clearly the transaction will be made at 15 per cent without any escalation clauses. In this case, the borrower's expectations about future inflation exceed those of the lender. If people are left completely free to make any transactions they wish, the use of index-linking thus will depend on the intersection of future price-expectations held by rival parties.

Regarding the second question, the main reason given for the scrapping of index-linking in France was the confusing array of linkages already in use. The real reason was probably the same as in Finland, namely, the belief that it would contribute to inflation. The immediate reason for abolishing indexing in Finland was the fear that the benefits of the 1967 devaluation of the Finnish markka will be wiped out in a short time because of the extensive system of escalation clauses throughout the Finnish economy. Nonetheless, it remains to be proved that index-linking caused the initial inflation or even exacerbated it considerably in Finland.

The professional debate about index-linking has remained mostly at the theoretical level, and in many cases, the arguments pro and con have been almost rhetorical. However, the basic issues about the effects of indexing on saving, resource allocation, financial institutions, and on inflation itself, are largely empirical. A wealth of data has been collected in countries which have adopted index-linking in one form or another. Systematic empirical work with these data will be highly productive in enhancing our knowledge about the effects of index-linking.²⁸

Footnotes

* University of Western Ontario, Canada. This paper is a condensed version of a larger study done for the International Bank for Reconstruction and Development. It is a pleasure to acknowledge the very helpful comments on an earlier draft of this paper by Oktay Yenal, Shankar Acharya, and Suman Bery. Hjalte Sederlof, John Holsen, and Rolando Arrivilaga were generous with their time in providing much background information about index-linking in various countries. Thanks are also due to Louise Nabben for competent research assistance, and to the Inter-Library Loan Section of the D.B. Weldon Library at the University of Western Ontario for collecting much of the material used in writing this Survey. An earlier version of the paper was presented to a seminar at the World Bank. I am indebted to all the participants in the seminar, particularly D. C. Rao, A. G. Chandavarkar, Graeme Dorrance, Shahid Yusuf, and W. H. White, whose suggestions have been very useful in revising the Survey. The author alone, however, is responsible for the contents of the paper. The views expressed here do not purport to be those of the World Bank or its staff members.

¹ The current interest in index-linking is due mainly to the inflationary situation that prevails all over the world today. The subject of indexing throughout this paper is discussed in an inflationary context although it should be recognized at the outset that by and large the same issues will arise in a deflationary situation.

² It should be noted that many of these points were made in connection with the issue of indexed bonds by a government [Friedman, Goode, etc.], or in discussions of specific indexing proposals. Most of these arguments, however, will apply, mutatis mutandis, to practically all cases.

³ Fisher (1928), p. 117. Here Fisher was talking of "single-commodity standards," for example, "gold clauses" in financial contracts, or the practice at Oxford, mentioned by Jevons, "that the rentals of the foundation land grants were to be paid not in money but 'in corn'." Fisher, of course, goes on to discuss linkages to indices or "multiple-commodity standards," and many war-time examples. See, ibid., pp. 117-23. Also see Fisher (1914).

There are many earlier examples also. In Massachusetts, from 1742 to 1749, judges could increase equitably the amounts payable on Bills of Credit if they depreciated relative to English silver coins. After 1747, these Bills were linked to "prices of provisions and other necessities of life" in an attempt to preserve the parity of purchasing power. These and other examples are attributed to Nusbaum (1950) by Collier (1969). Friedman (1974b), similarly, mentions a Cambridge don, William Fleetwood, who in 1707 estimated the change in prices over a six-hundred-year period to determine comparable limits on outside incomes which fellowship holders should be allowed to receive.

⁴ Colwyn Committee, Minutes of Evidence, vol. I, p. 278.

⁵ Mention should be made here of papers by Bach and Musgrave, Goode, Finch, Robson (1960), Knox (1964), and Waud (1973). Several aspects of index-linking were discussed before the Patman Committee [JCEC, 1952] by Friedman, Bach and others. For additional references, see the bibliography listed at the end of the paper.

⁶ Interest in some explicit or implicit indexing in home mortgages has been revived again in recent years. See, for example, Poole (1974) and Tucker (1974).

⁷ Some differences between bonds and deposits, however, do exist. For example, bonds can be traded in secondary markets whereas the only option open to a holder of a term deposit generally is to borrow from the bank on the security of the deposit. Also, deposits have invariably been linked to cost-of-living indices, but many different types of linkages have been used for bonds. These differences are minor and do not affect the substance of the discussion. Deposits will be referred to specifically wherever need arises as, for example, in the treatment of financial saving in the next section.

⁸ A fairly complete list of such index-linked bonds is presented in an appendix available from the author.

⁹ In Israel, in 1962, the borrower of public funds for agricultural purposes could repay the loan at the nominal rate of 8 per cent plus a 3 per cent inflation premium. In Canada, in 1974, in view of the high rate of inflation, the government has announced an inflation premium which is different for bonds of different maturity, but raises the nominal yield on all of them to 9 percent. The inflation premium, however, is payable only if the bonds are held to maturity.

¹⁰ I am told that it is a fairly common practice in the Euro-dollar market to give loans at a certain percentage above the prime lending rate in Zurich. As of this writing, I have not been able to find any documentation on this practice. In any case, such clauses are intended to ensure that the loans remain profitable for the lending bank throughout the term of the loan, and in this respect they are different from the other types of index-linking discussed in this section.

¹¹ For example, for the MONOD bonds issued in France in 1952, the extra return was a nonlinear function of the wage bill, the price of steel, and the price of cement.

¹² The Finnish experience provides a good example of the effects of index-linking on financial saving. During the fifties and early sixties, holdings of indexed government bonds increased at the rate of more than 50 million markkas a year. By 1965, such bonds accounted for more than 50 per cent of all outstanding government bonds (excluding indemnity bonds). The holdings of indexed bonds issued by financial institutions also increased

steadily until, in 1966, 89 per cent of all outstanding bonds of financial institutions were tied to a price index or the pound sterling. Index-tied deposits accounted for more than 20 per cent of all term deposits in banks during 1958 and 1959.

These facts and figures do not isolate the effect of index-linking on the flow of financial saving. Appropriate econometric analysis should be carried out to eliminate the influence of other factors such as changes in income, money supply, tax regulations, etc. in order to quantify the contribution of index-linking to financial saving in Finland. Between 1955 and 1967, increases in the cost of living ranged from a low of 1.6 per cent in 1959 to a high of 11.4 per cent in 1967, with the median being at 4.9 per cent. Interest rates on indexed bonds during these years were roughly 1 to 2 percentage points below those on other bonds. Unindexed term deposits had a nominal yield of about $4\frac{1}{2}$ per cent. It is highly unlikely that bonds and financial deposits in such magnitudes would have been held in the absence of index-linking. Of course, it is very likely that, in the absence of index-linking, some other devices might have been adopted to stimulate financial saving in Finland.

¹³Of the three components of aggregate saving, it is not clear if indexing will affect business and government saving. Presumably, if all private and government loans are indexed, and inflation occurs at a high rate so that borrowing costs are higher than before, firms might be forced to replace loans by undistributed profits or equity issues. This result, however, depends on the interest elasticities of investment and demand for loans, and the magnitude of the actual increase in borrowing costs, beside other factors. Similarly, even if indexing does raise the debt-servicing costs of the government, and the revenue from the "inflation tax" is lower, it is not clear if budgetary surplus or deficit will be affected at all. How interest costs on public debt are affected by indexing should not be a very important consideration because the government can use other policy instruments to offset such increases in its liabilities.

¹⁴For a summary and appraisal of many of these studies, see Mikesell and Zinser (1973).

¹⁵A detailed review of this literature is outside the scope of this paper. A comprehensive, up-to-date survey has been published by Ferber (1973).

¹⁶38th Annual Report, p. 77.

¹⁷These data are available in various Bank of Finland monographs. The higher rates of inflation in 1972 and 1973, to a large extent, reflect the inflationary situation in the rest of the world. That, however, does not deny the validity of the argument that indexing per se may not have much effect on inflation.

¹⁸Palander, p. 16, quoted by Knox, p. 240.

¹⁹In equilibrium, the yield-spread between indexed and non-indexed bonds will be exactly equal to the expected rate of inflation. Arvidsson (1962, p. 118) attributes the argument in the text about inter-market operations to Palander, pp. 211-12.

²⁰ Fishlow (1974) provides a useful summary of the various types of index-linking adopted in Brazil and the circumstances in which these were introduced.

²¹ In the discussion that follows it is assumed that if both assets and liabilities of a financial intermediary are indexed, the linkage is to the same index. Situations can arise, however, in which deposits are linked to, say, the wholesale price index but loans are linked to some other index; for instance, the price of the borrower's output. Unless the two price indices move together, some cash flow problems are likely to arise. This point was suggested by Graeme Dorrance.

²² This was the essence of Senate Bill 1331 in the United States. The maximum amount an individual or his agent could purchase in one year was set at \$10,000, and no individual could hold more than \$60,000 worth of them. See Eagly (1967), pp. 281-84 for a critique of that Bill.

²³ At a bank one can withdraw a sum today, and redeposit it tomorrow, with no penalty except loss of interest from the previous crediting date. By contrast, if one cashes a nine-year old government savings bond today, he cannot buy it back tomorrow. He can buy only a brand-new bond, with ten years to maturity instead of one. Also, a bond has to be cashed in full whereas any part of a deposit can be withdrawn.

²⁴ The discussion of this point draws heavily on Ahtiala (1967), pp. 45-57. He mentions an interesting innovation used by Finnish banks to protect themselves against risks of deposit-switching. All loans were subject to 100 per cent linking but the index compensation was prorated to the share of indexed deposits in the total liabilities of the bank. Accordingly, the borrower's cost increased with inflation only if depositors switched to index deposits thereby increasing the bank's interest costs. Similar innovations may have been used in other countries also.

²⁵ See Dock Houk (1968), pp. 26-47 for a discussion of the operations of development banks in inflationary situations and the various devices they can use to protect themselves. The calculation about the Turkish Bank is also reported by Dock Houk.

²⁶ For a further discussion of organized and unorganized money markets, see Wai (1956, 1957).

²⁷ Indexing has been explicitly forbidden in France since 1958. In the United States, any financial instrument with index-linking would not be treated as a negotiable instrument under the law.

²⁸ Mainly to limit the length of the paper, we have not paid much attention to many practical problems which will arise whenever any country wishes to introduce index-linking. For example, which assets to index? Whether to link interest rates, the principal or both? Should a cost of living index, a wholesale price index or some other linkage be used? How should inflation premium be treated for tax purposes? And so on. The list of such issues is obviously quite long. They have not been dealt with in any generality in the literature although descriptive articles about index-linking in various countries do give some information about how such problems were handled in Israel, Finland and some other countries. See, for example, Aharoni and Ophir (1967), and Robinson (1971).

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