

# Inflation and the Indexation of Personal Income Taxes in Theory and in Practice \*

## 1. Effects of Inflation on Personal Income Tax Liability

In most countries personal incomes above certain exempted levels are taxed with statutory rates that are progressive. These rates apply to income brackets specified in money terms in the tax legislation. The personal exemptions, as well as some of the deductions, are also fixed in current values. Such a legal structure for the personal income tax guarantees that, in the absence of evasion, higher taxable incomes will be subjected to higher average tax rates.<sup>1</sup> This feature has generally been considered desirable from both an equity and a stabilization point of view: (a) because it promotes the objective of income redistribution and conforms to the principle of ability to pay; and, (b) because the progressivity of the income tax generally increases its built-in flexibility and this increase is supposed to moderate cyclical fluctuations.

In an inflationary situation, however, the above-mentioned characteristics of the income tax may, and often do, create difficulties since the growth in the money incomes for most taxpayers will necessarily exceed any growth in real income. It may even happen, as the present situation in several countries indicates, that while money incomes are rising, real income may actually be falling. Still, the unadjusted tax system will not differentiate real from purely inflationary increases; the average tax rate for most taxpayers is, thus, likely to grow and to exceed, in relation to real incomes, the levels contemplated when the tax structure was established. Some taxpayers who, because of their low incomes in relation to the exemptions and deductions to which they were entitled, had previously been exempted from paying any taxes, may now become taxable. Others who were already taxed may

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1. Of course whether higher *gross* incomes are also taxed with higher average tax rates depends also on the existence of loopholes.

become subject to higher average (and often also marginal) tax rates. If the inflationary pressures continue, and if the government does not react in some way to correct this situation, the increase in money incomes may in time cause increases in tax revenues that are not desirable from an equity, resource allocation, or stabilization point of view.

If the growth in real income is ignored, and if there is no substantial change in the pretax distribution of income, the increase in the ratio of personal income tax revenue to some concept of gross income (i.e., adjusted gross income or personal income or national income) will depend on (a) the rate of inflation, (b) the legal structure of the tax, and (c) the method of tax payment.

As far as the structure of the tax is concerned, the level of the *personal exemption* and its relation to the per capita income of the country is particularly important. If this personal exemption is several times the *per capita* income of the country, as it is true in some developing countries, then even with two-digit rates of inflation many taxpayers would still be exempted from the tax for a long time. If, on the other hand, the personal exemption is low or even less than the *per capita* income of the country, as it is generally true in most industrialized countries,<sup>2</sup> then the exemption will quickly lose its importance and even relatively poor individuals may experience substantial increases in income tax burdens.

In addition to the basic exemption, the rate structure and the width of the income brackets to which the rates are applied are also important since inflation, beside shrinking the real size of the exemption, will also lead to a shrinkage of the real size of the brackets. Consequently, the wider are the income brackets, the longer it will take for a given rate of inflation to push a taxpayer into a higher income bracket where he will face a higher marginal tax rate.<sup>3</sup> And, obviously, the steeper is the increase in the rates, the more responsive will the revenues be to inflationary increases in current incomes. In most countries where a basic exemption is followed by progressive tax rates that increase up to a given statutory maximum, the average

<sup>2</sup> See VIRO TANZI, *The Individual Income Tax and Economic Growth* (Baltimore: Johns Hopkins Press, 1969), Tables III-5 and III-6, pp. 32-33.

<sup>3</sup> It should be understood that it is not necessary for a taxpayer whose income has already become taxable to be pushed into a higher income bracket to experience an increase in the average tax rate. Such an increase would take place even if there were no progressivity in the income tax besides the one provided by the existence of the basic exemption.

tax rate for a taxpayer will be zero when his income is lower than the exemption, and, once he becomes taxable, will follow the form of an S, or logistic, curve, rising at an increasing rate at first and then slowing down to approach a maximum near the highest marginal tax rate.<sup>4</sup> The increase in the average tax rate at any level of income will depend on the relationship between the marginal and the average tax rates which in turn depends on the effective progressivity of the income tax structure.

The pattern described in the preceding paragraph characterizes most income taxes around the world. If the income tax were truly proportional — that is, if there were no progressive rates and no exemption or if the exemption were a fixed *proportion* of income, and provided that the taxable base for all taxable incomes increased at the same rate as the price level — the average tax rate would not be affected by inflation except for lags in assessment and/or collection.

Given the rate of inflation, the rate of growth in real income, and the legal income tax structure, the increase over a given period of time in the average tax paid by an individual that can be attributed to inflation will depend on: (a) the initial position of the taxpayer in the income distribution — that is on the level of his income —; (b) the particular status of the taxpayer — i.e., marital status, number of children, etc. — which will determine the exemptions and deductions to which he is entitled; (c) the type of income — whether wages, interest, etc. — that the taxpayer receives, and (d) the method of tax assessment and collection with respect to that income.

Empirical studies for Australia,<sup>5</sup> Canada,<sup>6</sup> the United Kingdom,<sup>7</sup> and the United States<sup>8</sup> have shown that:

(1) The interaction of inflation and the structure of the personal income tax has had the effect of generally increasing the average tax burden at all levels of taxable income.

<sup>4</sup> See, for more detail on this point and on the next several paragraphs VIRO TANZI, "A Proposal for a Dynamically Self-Adjusting Personal Income Tax", *Public Finance*, Vol. XXI, No. 4, 1966, pp. 514-515.

<sup>5</sup> Taxation Review Committee, *Preliminary Report* (Canberra: June 1, 1974), p. 75.

<sup>6</sup> GEORGE VUKELICH, "The Effect of Inflation on Real Tax Rates", *Canadian Tax Journal*, Vol. XX, No. 4 (July-August 1972).

<sup>7</sup> R.I.G. ALLEN and D. SAVAGE, "Inflation and the Personal Income Tax", *National Institute Economic Review*, No. 70 (November 1974).

<sup>8</sup> C. J. GOETZ and W. F. WEBER, "Intertemporal Changes in Real Federal Income Tax Rates, 1954-70", *National Tax Journal*, Vol. 24, No. 1 (March 1971).

(2) Different classes of taxpayers have experienced different increases in average tax rates. Lower income taxpayers and those with more dependents have generally experienced the largest percentage increases in average tax rates. The main reason for these results is the shrinkage of the real value of the exemptions although the rate structures have also played a considerable role.

(3) Discretionary tax changes have not fully removed the effects of inflation.

The second conclusion must be interpreted with caution since a controversial and important point of interpretation arises. The problem is that the impact of inflation on taxpayers' liabilities can be measured in at least two different and often contrasting ways: one can either concentrate on the inflation-induced *percentage* increases in the average tax rates (this is the interpretation implied above); or one can concentrate on the *percentage points* — i.e., the absolute — increases in those rates. The first way has attracted more attention but it is the second way that is more significant in regard to the effects on disposable incomes and after-tax income distribution. When the emphasis is on the reductions in disposable incomes rather than on percentage changes in average tax rates, the empirical studies mentioned above show that these reductions are often greater for higher incomes than for lower ones. But there is less uniformity than implied by the above conclusions.<sup>9</sup>

## 2. Description of Analytical Adjustment Scheme

Countries may wish to correct for changes in the average tax rates induced by inflation. If inflation is considered a passing phenomenon, they would probably opt for discretionary, *ad hoc*, adjustments. However, if rising prices are considered to be a more permanent problem, they might in some cases choose adjustment mechanisms of a more permanent nature. They would want to do this in the hope to immunize the effective structure of the personal income

<sup>9</sup> It should also be pointed out that these studies have not tried to estimate the distorting effects of inflation among taxpayers with different *types* (and not just levels) of incomes and subjected to different methods of tax assessment and collection. Thus, they have dealt with only part of the problem.

tax from the effects of inflation. This second route has been taken by several countries as we shall see below.

The schemes actually used for these permanent adjustments not always use indexes which reflect just the rate of inflation. In many of the countries using indexation, the indexes reflect not only the rate of price increases but also changes in other factors of which the most important is probably productivity.<sup>10</sup> Even when the countries wish to make adjustments only for inflation and not for productivity changes, they still have to decide whether to adjust the personal income tax structure to reflect the full rate of inflation or only part of it. Thus, an element of discretion is often introduced in what is normally thought of as a completely automatic rule. As we shall see below, of the countries that now index their personal income taxes:

(a) Some have a rule that allows for *full* adjustment for inflation on an *annual* basis (e.g., Canada);

(b) Others make *annual* adjustments, but only for part of the inflationary change (e.g., the Netherlands);

(c) Still others adjust the tax structure only when the rate of inflation, *in a particular year*, has exceeded a stated level — say, five per cent (e.g., France). Thus, in this particular alternative, a creeping inflation will not lead to any automatic change in the nominal tax structure regardless of the cumulative change in the average price level;<sup>11</sup>

(d) Finally, the rule may be such that the adjustment mechanism will become effective only when the cumulative increase in the price index from a reference year has reached a certain level (e.g., Luxembourg).

It is obvious that only the first of these alternatives, if properly applied, would maintain unchanged the real effective structure of the tax. However, when the rate of inflation becomes particularly high, the difference between the first of these alternatives and the third and fourth disappears.

<sup>10</sup> This is often the case when the income tax structure is indexed in relation to the legislated minimum wage which, over the long run, is likely to reflect price and productivity changes as well as political considerations.

<sup>11</sup> This alternative is similar to that suggested by A. R. PRBST in "Inflation and the Public Finances", *The Tree Banks Review*, No. 97 (March 1973), p. 26.

Before examining the countries' experiences, we shall describe, briefly, some of the basic schemes of indexation for inflation that have been suggested in the literature.<sup>12</sup> An ideal adjustment scheme for inflation should first of all, be simple; second, it should maintain the initial distribution of the personal income tax burden among real income levels regardless of the source of income and of the particular family situation;<sup>13</sup> and, thirdly, it should prevent a purely nominal increase in income from generating a real increase in the revenue from the personal income tax. Four different adjustment schemes have been proposed in the literature to correct for the impact of inflation on personal income tax liabilities. These are briefly outlined below.

The first of these would involve the equi-proportional lowering of the statutory tax rates to eliminate the increase in revenue due to inflation. This adjustment might be successful in preventing the growth in the aggregate personal tax ratio, but it certainly would not prevent the unintended redistribution of tax burden among different income levels. Furthermore, the direction of these redistributive changes would most likely not be the one desired by most governments. For example, the income of a relatively poor family that, because of the increase due to inflation, becomes subject to personal income taxation for the first time, would still be taxable even if the statutory tax rates were reduced. On the other hand, those with the highest incomes would benefit from progressively lower marginal tax rates. Although rate reductions have been put into effect in several countries in inflationary periods, no country appears to have introduced an «indexation rule» based on this method.<sup>14</sup>

<sup>12</sup> For earlier descriptions of some of these schemes and for their use in several countries, see A. H. PETREI, "Inflation Adjustment Schemes Under the Personal Income Tax", *IMF Staff Papers* (July 1975) and DAVID MORGAN, "Inflation and Progressive Personal Taxation" (mimeograph, 1974).

<sup>13</sup> No practical and general adjustment scheme can satisfy this specific requirement. See on this, P. A. DIAMOND, "Inflation and the Comprehensive Tax Base" in *Journal of Public Economics*, Vol. 4, No. 3, August 1975.

<sup>14</sup> A variation of this alternative would leave unchanged the nominal income tax structure but would adjust the annual tax bills on a formula basis. See R. S. WECKSTEIN, "Fiscal Reform and Economic Growth", *National Tax Journal*, December 1964. Both the scheme itself and Weckstein's variation were first proposed as far back as 1923 by JACOB VINER, in "Taxation and Changes in Price Level", *The Journal of Political Economy*, Vol. 31 (August 1923) republished in JACOB VINER, *The Long View and the Short* (Glencoe, Illinois: The Free Press).

The second scheme would exempt from the taxable income of an individual, the increase in adjusted gross income that can be attributed to inflation. Thus, for example, cost of living adjustments in wage and salaries would automatically be tax exempt. In general the individual would be allowed an «inflation deduction» that would depend on the rate of inflation. This inflation deduction would be calculated by multiplying the adjusted gross income of the taxpayer in the previous year by the rate of inflation for the taxable year.<sup>15</sup> The trouble with this scheme is that apart from any real growth, the taxable portion of income would remain constant not in real but in nominal terms. Consequently, the real value of the tax payment and, thus, the average tax rate would fall as long as the rate of inflation continues to be positive. This is clearly an overadjustment. Furthermore, its equity implications are not obvious.

Israel is the only country that up to 1975 adopted an adjustment mechanism somewhat resembling the scheme just described. It was not an *automatic* indexation, however, since it only provided that the cost of living adjustment component of wages and salaries could be exempted from personal taxation *at the* discretion of the Ministry of Finance. Until March 1964 the cost of living allowance was completely exempted. Since then there were limitations to the part exempted.<sup>16</sup>

The third scheme would deflate adjusted gross income to a base year; then taxable income in base year prices would be calculated and the resulting tax liability would be multiplied by the ratio of the price index of the taxable year to the price index of the base year. The operation of deflating gross income to the base year and then of inflating the tax liability to the current year gives this scheme an apparent complexity that has so far prevented its adoption in any country.<sup>17</sup> However, one of the Swiss cantons, Basel-Land, does follow this approach and uses the cost of living index for January 1953 as the base.

The last and most important adjustment scheme introduces price escalators into the income tax structure so that, over a period

<sup>15</sup> See for this proposal DOUGLAS ADIE and SVETOSAR PEJOVICH, "Inflation and Taxes: A Case for the Taxpayer" (mimeo, Ohio University, March 1973).

<sup>16</sup> In July 1975 a comprehensive tax reform abolished this system and replaced it by one similar to the fourth scheme discussed below.

<sup>17</sup> This scheme was suggested in AMOTZ MORAG, *On Taxes and Inflation* (New York: Random House, 1965), p. 169.

of time, the progressive income tax rates, in the absence of any discretionary changes, would apply to constant *real* incomes rather than to constant *nominal* incomes. To achieve this result, the limits of the taxable income brackets and the exemptions and deductions expressed in fixed monetary values would be increased on an annual basis at a rate equal to the rate of inflation. This scheme has received the greatest attention and support and, to varying degrees, has been introduced in a number of countries, including most recently in Canada in 1974.<sup>18</sup>

At this juncture, we must point out that if inflation is accompanied by real growth in *per capita* income, neither the aggregate personal tax ratio to GNP, nor the initial distribution of the tax burden would remain unchanged unless the adjustment is made with a kind of super-index that takes into account not only the change in the price index but also the change in real *per capita* income. Indexing only for inflation is tantamount to accepting the conclusion that the rise in the ratio of personal income taxes to national income and the inevitable redistribution of the income tax incidence are acceptable when caused by real growth but are not acceptable when caused by inflation. Some countries, including Iceland, and, since September 1974, Denmark have not accepted this conclusion and have subsequently « super-indexed » their income tax structure.<sup>19</sup>

### 3. Special Problems with Adjustment Schemes

To achieve the objectives of indexation, any inflation-adjustment scheme must deal with difficult theoretical and practical problems. The most important among these are: (a) the choice of the

<sup>18</sup> In the United States this adjustment mechanism is usually associated with the name of Milton Friedman who backed it in his *Newsweek* column on March 3, 1969. A later elaboration is found in MILTON FRIEDMAN, "Monetary Correction" in American Enterprise Institute, *Essays on Inflation and Indexation* (Washington, D.C.: 1974).

<sup>19</sup> For a proposal and discussion of such a super-indexation scheme, see VITO TANZI, "A Proposal for a Dynamically Self-Adjusting Personal Income Tax", *Public Finance*, Vol. XXI, No. 4 (1966). The mechanics for the application of this super-index is similar to that for the fourth scheme. The limits of the taxable income brackets and the exemptions and deductions expressed in fixed nominal amounts could, for example, be increased annually at a rate equal to the nominal growth of per capita income or of some similar concept such as hourly earnings. Obviously, the revenue loss associated with

index to be used for escalating the nominal income tax structure, (b) the problem of lags, and (c) the difficulties posed by hard-to-index incomes such as interest payments, capital gains, and profits.

#### a. *The Choice of the Index.*

The choice of the index depends to a large extent on the objective to be achieved through indexation.<sup>20</sup> That the choice of a proper index is fundamental to the success of indexation is rather obvious and needs no elaboration. As it is well known, all indexes of price changes suffer from sampling and reporting errors and in some countries they may also suffer from political manipulations. Since the main objective of indexation seems to be the prevention of price-induced increases in the real tax burdens of taxpayers, the most used of the indexes has been the consumer price index since this is supposed to reflect the change in the purchasing power of the nominal incomes of the taxpayers. But, several studies for different countries have shown that the basket of goods included in that index may not be and, in many cases it almost certainly is not, representative of the expenditure pattern of the whole population. Price changes may be more favorable to taxpayers with higher incomes than to those with lower incomes especially when food prices increase at a faster rate than prices of other products.<sup>21</sup>

The countries that have indexed their taxes have made no attempt at generating indexes that would be applied to different income classes. However, at least one country, the Netherlands, has constructed a special index — the total population index — that is

this super-index is greater than under a scheme that indexes only for prices. This loss depends on the rate of growth of per capita income or hourly earnings in addition to the rate of inflation.

<sup>20</sup> If the objectives are multiple, perhaps no index will ever be able to make possible their simultaneous achievement. For example, no index could achieve the objective of keeping constant the ratio of income tax revenue to GNP while leaving unchanged the relative tax burdens on groups of taxpayers.

<sup>21</sup> Several studies have dealt with these aspects in several countries. *Inter alia*, see D. C. TIPPING, "Price Changes and Income Distribution", *Applied Statistics*, vol. 19, No. 1, 1970; J. MUELBAUER, "Prices and Inequality: the United Kingdom Experience", *Economic Journal*, Vol. 84, No. 333, 1974; RYOTARO IOCHI, *Measurement of Consumer Price Changes by Income Class* (Tokyo: Kinikuniyo Book Co., 1964); Y. MANZLY, "Price Changes in the Consumption Basket of Various Income Groups in Israel", *Bank of Israel Economic Review*, April 1974; E. M. SNYDER, "Cost of Living Indexes for Special Classes of Consumers", in *The Price Statistics of the Federal Government*, National Bureau of Economic Research 73, General Series 1961.

more general than the consumer price index and that is supposed to better reflect the expenditure of the whole population and not just that of a particular subgroup of it. In the particular case of the Netherlands, because of lower increases in food prices in recent years, the annual rate of increase of this total population index has been slightly lower than that of the consumer price index.<sup>22</sup>

Another issue that has attracted a lot of attention outside of the United States relates to whether the index should or should not reflect the effects on prices of changes in indirect taxes and, less importantly, in subsidies. Simply stated, if indirect taxes are raised, should this be allowed to lead to an adjustment in the nominal income tax structure and thus to an automatic decrease in income tax liability? The standard theoretical position on this issue has been that, if the additional revenues from the indirect taxes are reflected in higher governmental spending, which presumably increases the welfare of the taxpayers, then index should not reflect the change in indirect taxes. In other words, it should be corrected for these changes. Other observers, however, have pointed out that taxpayers generally do not see the connection between higher taxes and higher benefits from public spending so that they may view in the same fashion an increase in the consumer price index regardless of whether it is due to an increase in taxes or to other factors.<sup>23</sup> If this second position is the valid one, then no adjustment in the index ought to be made.

This discussion may give the impression that the issue is just a theoretical one without any practical significance. This, however, is not so. In the Netherlands, that now adjusts the index for changes in indirect taxes and subsidies, the differences between corrected and uncorrected total population index has been significant. For example, in 1972, without the correction for the change in indirect taxes and subsidies, the total population index changed by 8.0; with the correction it only changed by 5.7. In 1973 the difference was somewhat smaller: 8.1 and 7.8, respectively.<sup>24</sup> In pursuance of the Act on

<sup>22</sup> For the 1972-74 period annual increases in CPI were respectively 7.8, 8.0 and 9.6, while for the total population index they were 8.0, 8.1 and 9.8. The adjustments in the tax system were based on this total population index but they were also affected by changes in indirect taxes and economic considerations as discussed below.

<sup>23</sup> Incidentally, the assumption in these discussions is that the tax is fully shifted forward.

<sup>24</sup> In 1974 no adjustment was made.

the construction of a wage regulating price index Denmark has also generated an index whereby "Taxes and duties are, to the extent possible, deducted from the prices collected, whereas subsidies provided in order to achieve a general price reduction are added to the prices."<sup>25</sup> For 1973, the increase in the CPI of this country was 14.4 (January 1973-January 1974) while the increase in the wage regulating price index was 12.9. For January 1974-January 1975 the corresponding increases were 13.5 and 14.4.

In contrast with the Netherlands and Denmark, Canada opted for the unadjusted consumer price index on the ground that in a federal country where various local governments have the power to change the sales taxes just for a part of the country, it would be very difficult and perhaps unequitable to make adjustments for changes in taxes.

#### b. *The Problem of Lags.*

There are two types of lags which are relevant to the discussion of adjustment of taxation for inflation: one is the lag between the current rate of inflation and the rate reflected in the adjustment scheme; the other is the lag between the earning of income and the collection of taxes.<sup>26</sup> The first of these, which is more important from the point of view of indexation, can be long and can create difficulties especially when the rate of inflation is high and changing.

When indexation was started in Canada on January 1, 1974, it was decided that, given the time needed to prepare the income tax forms, the latest month for which price increases could be observed was September 1973. It was further decided that, since the increase in the CPI between September 1972 and September 1973 would be sensitive to the behavior of prices in those particular terminal months, the index to be used in 1974 would reflect the *average* increase for the 12-month period ended September 30, 1973 over the 12-month period ended September 30, 1972. This same lag will apply to future years. For the Netherlands the lag is even

<sup>25</sup> Statistiske Efterretning (Statistic News), *Konjunkturoversigt* (Economic Trends), p. 89, April 1975.

<sup>26</sup> This second lag has often been ignored in the literature although when inflation is very high it may become very important as the recent Argentinian and Chilean experiences show. For an important exception, see TERUO HIRAO and CARLOS AGUIRRE, "Maintaining the Level of Income Tax Collections Under Inflationary Conditions", *IMF Staff Papers*, Vol. XVII, No. 2 (July 1970).

longer since the index for a given year reflects the change in prices for the twelve-month period ending in July of the previous year, over the twelve-month period ending in July of the year before that. Substantial lags exist in all the other countries which index their tax systems.

*c. The Problems Posed by Hard-to-Index Incomes.*

Indexation rules have been discussed and applied as if all types of incomes were equally affected by inflation. The truth is that different types of incomes are differently affected by inflation. In fact while for wages and salaries the problems are mainly the result of a *progressive* structure, for the kinds of income discussed below, the problems are independent of a progressive structure and would exist even with a strictly proportional tax system. The automatic adjustment mechanisms introduced in the various countries have ignored distinctions among different kinds of incomes.

Under inflationary conditions wages and salaries are likely to increase by and large in line with inflation. On the other hand, interest incomes, capital gains and profits, as defined for tax purposes, are likely to increase by much more than rate of inflation especially when inflation is a new phenomenon.<sup>27</sup> Much of this increase in taxable income, however, may be just a return of capital rather than a return *on* capital so that equity, and perhaps efficiency would require that taxes be applied to the real component of those incomes.

Take the case of interest incomes first. If inflation is anticipated, then the monetary rate of interest will tend to be higher than the rate prevailing with price stability. In a simplified model which assumes perfect foresight the monetary rate can be assumed to approximate the sum of the real rate and the anticipated increase in the price level. Thus, if the anticipated rate of inflation were 10 per cent and the real rate of interest were 5 per cent, the monetary rate would approximate 15 per cent.<sup>28</sup> In this particular situation,

<sup>27</sup> The problems raised by the taxation of profits are not discussed in this paper since they require very detailed treatment. See, on this, GEORGE E. LENT, "Adjustment of Taxable Profits for Inflation", *IMF Staff Papers*, Vol. XXII, No. 3 (November 1975).

<sup>28</sup> In practice institutional constraint and imperfect foresight will bring about monetary, or market, rates which are often lower than the summation of the real rate and the rate of inflation. For a detailed discussion of the taxation of interest income under inflationary situations, see VITO TANZI, "Inflation, Indexation and Interest Income Taxation" in this *Review*, Vol. 116, March 1976.

and in the absence of any income tax on interest income, the individual who had lent \$1,000 would receive \$1,150 after one year. In the absence of taxes, this individual would not be any better off or worse off than he would have been had he received back \$1,050 when there was no inflation. This is so since \$100 out of the \$150 of interest income just compensates him for the loss caused by inflation on his original financial capital of \$1,000.<sup>29</sup> But if the full \$150 is taxed and if we assume that the marginal tax rate is 50 per cent, the individual will pay \$75 in taxes. A 10 per cent increase in the price level has led to a 200 per cent increase in taxable income and at least to a comparable percentage increase in tax liability. But this means that he has received a negative real interest rate of 2.5 per cent since the net-of-tax return is not enough to compensate him for the erosion in the real value of his financial capital. The higher is the rate of inflation and the higher is the marginal tax rate at which the income of the individual is levied, the more pronounced is the real loss that the creditor is likely to experience. The tax on interest income in fact becomes largely a tax on the capital itself.<sup>30</sup>

Consider next the case of capital gains. Suppose that with stable prices, a real asset would have increased in value from \$100,000 to \$105,000 over a given period. Thus, the capital gain, if realized, would have been \$5,000. Now, assume that over the period prices increased by 10 per cent and assume also that this increase was fully reflected in the value of the asset. Thus, the current price would be about \$115,250.<sup>31</sup> The nominal capital gain of \$15,250 would be more than three times as large as the real gain and consequently the tax liability would also be sharply higher even if the gains were taxed with proportional rates. As with income from interest, and unlike wages and salaries, the distorting effects of inflation are not a consequence of a progressive tax structure.

As far as interest incomes and capital gains are concerned, the evidence indicates that many countries have not worried much about them within the context of the indexation of personal income taxes. However, some have. Perhaps as an appreciation of this particular

<sup>29</sup> Strictly speaking the real value of \$50 has fallen so that he is somewhat worse off. See *ibid.*

<sup>30</sup> This conclusion does not depend on the progressivity of the personal income tax; it would be valid even if the tax were strictly proportional.

<sup>31</sup> Depending on the assumption that one makes about when, over the period, the real capital gains occur, the range of values will be between \$115,000 and \$115,500.

problem, since 1974, which is the first year when indexation was introduced in Canada, net interest up to \$1,000 per year received by individuals from Canadian sources is to be deductible in computing taxable income. In Denmark a government report, published in early 1975, dealt with the issue of the taxation of interest income but so far there has been no attempt in the legislation to deal with this particular problem. In Brazil, in connection with indexed loans it is stipulated that the borrower will pay periodically a given interest on the loan and, at maturity, would return an amount which has been adjusted for any price change over the period of the loan. Only the periodic interest payment is taxed. An alternative solution to this particular problem was followed by Colombia up to 1974.<sup>32</sup> There, for indexed loans, it was stipulated that the borrower would pay periodically a given agreed interest and, additionally, at the end of each period, would pay a monetary correction as a compensation for inflation. Only the agreed interest was subject to the income tax.<sup>33</sup> In Chile, which does index its income tax, indexed loans are in existence and carry a taxable interest rate and a monetary correction for inflation payable on an annual basis. This monetary correction is legally not considered income and, thus, the question of whether or not to tax it does not arise. In Israel indexed loans have been in existence for many years and the monetary adjustment for inflation is not taxed. Some other countries, including Finland and France, and very recently the United Kingdom have at times issued indexed loans which have carried particular tax advantages.

Relatively few countries tax capital gains. For those that do, two adjustment mechanisms for illusory capital gains have been frequently suggested and in a few cases used. The first would relate the proportion of the realized capital gain that would be taxed, or the tax payment itself, to the number of years that the asset was owned. The taxable proportion would fall the longer the asset had been held.<sup>34</sup> Of course, only by accident would such an approach

<sup>32</sup> Colombia has not indexed its tax system and has now discontinued the use of indexed loans.

<sup>33</sup> See for these two experiences: ALEXANDER KAPKA, "Indexing for Inflation in Brazil", in *Essays on Inflation and Indexation* (Washington, D.C.: American Enterprise Institute), pp. 90-91; and ALBERT GOLTZ and DESMOND LACHMAN, "Monetary Corrections and Colombia's Saving and Loan System", *Finance and Development*, Vol. II, No. 3, September 1974.

<sup>34</sup> Such an approach is in existence in Colombia where the taxes on capital gains from the sale of owner-occupied homes are reduced by 10 per cent for each year — beyond

give the correct adjustment for inflation. The second method which is more common would increase the base value of the capital asset in proportion to the rise in the general price level as measured by the consumer price index or some other suitable index. The taxable capital gain would be the difference between the current value and the adjusted base value. This second method is now in existence in Argentina and Sweden and applies to gains from the sale of real property held for more than two years. In Argentina the base for the calculation of the capital gains is escalated by the change (over the period between the acquisition and the sale of the property) of a wholesale price index which excludes the agriculture sector. In Sweden, the National Tax Board annually fixes coefficients for the adjustment. Such a method was in the past also in existence in Chile. It, however, led to the problem that after the escalation of the base many capital gains became capital losses. As a consequence of this, capital gains taxes were abolished.

#### 4. Practical Applications of Indexation

In this section we shall briefly outline the practical experiences of several countries with the indexation of the personal income taxes. We shall classify the countries in three groups on the basis of the type of adjustment made. For the first group, the connection between the adjustment made and the rate of inflation will be direct and complete apart from discrepancies introduced by some of the special problems mentioned in the previous section. For the second group the connection will be somewhat more tenuous since substantial discretionary elements are introduced in the adjustment mechanism. Finally, for the third group, although one can still talk about inflationary adjustments, and inflationary changes still remain the most important factor, other elements have become so important that one is hesitant to still refer to them as indexation *for inflation*.

##### a. Countries with Full, Annual Automatic Inflationary Adjustments

The laws which describe the adjustment mechanisms are not always easy to interpret but it would appear that only Canada and

a two-year minimum holding period — the house has been held. A criticism of this approach can be found in Taxation Review Committee, *Preliminary Report*, June 1, 1974 (Canberra: Australian Government Publishing Service), Ch. 9.



Uruguay would qualify for this category. In both of these countries the exemptions, deductions in fixed amounts, and the brackets are fully, annually, and automatically increased to reflect the change in the cost of living index. This is undoubtedly the purest form of automatic adjustment for inflation.

*Canada:* The Canadian scheme went into effect on January 1, 1974 with a 6.6 per cent escalation of the whole nominal structure of the personal income tax. For 1975 the increase in exemption levels and in bracket limits due to indexation was 10.1 per cent. Tables 1 and 2 are largely self-explanatory. They show the impact that indexation has had on the Canadian income tax structure in 1974 and 1975. Table 3 shows for typical taxpayers the tax reductions due to indexation. As it was not easy to judge the impact of inflation on tax incidence by income groups, it is equally not easy to judge that of indexation. Table 3 shows that the *absolute* amounts of tax reductions increase with the level of income. Furthermore, these

TABLE 1  
CANADA. FEDERAL PERSONAL EXEMPTIONS SUBJECT TO INDEXING

	1973 (\$)	1974 Inflation Factor 6.6% (\$)	1975 Inflation Factor 10.1% (\$)
Single status . . . . .	1,600	1,706	1,878
Married status . . . . .	3,000	3,198	3,522
Aged, additional . . . . .	1,000	1,066	1,174
Incapacitated, additional . . . . .	1,000	1,066	1,174
Dependent child under age 16 . . . . .	300	320	352
Dependent child age 16 or older . . . . .	550	586	646
Other dependent under age 16 . . . . .	300	320	332
Other dependent age 16 or over . . . . .	550	586	646
Dependents' earnings not affecting tax- payer's claim:			
— wife . . . . .	300	314	334
— dependent child under age 16 . . . . .	1,100	1,166	1,274
— dependent child age 16 or over . . . . .	1,150	1,220	1,332
— other dependent under age 16 . . . . .	1,100	1,166	1,274
— other dependent age 16 or over . . . . .	1,150	1,220	1,332

SOURCE: Canadian Tax Foundation, *The National Finances, 1974-75* (Toronto: 1975), p. 69.

TABLE 2  
CANADA. TAXABLE INCOME BRACKETS SUBJECT TO INDEXING AND TAX RATES

1973	1974: inflation factor 6.4%		1975: inflation factor 10.1%	
	Taxable Income Bracket	Rate %	Taxable Income Bracket	Rate %
first \$ 500	15	9	first \$ 587	9
501 - 1,000	18	18	588 - 1,174	18
1,001 - 2,000	19	19	1,175 - 2,348	19
2,001 - 3,000	20	20	2,349 - 3,522	20
3,001 - 5,000	21	21	3,523 - 5,870	21
5,001 - 7,000	23	23	5,871 - 8,218	23
7,001 - 9,000	25	25	8,219 - 10,566	25
9,001 - 11,000	27	27	10,567 - 12,914	27
11,001 - 14,000	31	31	12,915 - 16,436	31
14,001 - 24,000	35	35	16,437 - 28,176	35
24,001 - 39,000	39	39	28,177 - 45,786	39
39,001 - 60,000	43	43	45,787 - 70,440	43
60,000 +	47	47	70,441 +	47

SOURCE: Canadian Tax Foundation, *The National Finances, 1974-75* (Toronto: 1975), p. 69.

TABLE 3

CANADA. TAX REDUCTIONS DUE TO INDEXING, 1974 AND 1975  
(Married couple under 65 with two children under 16, all income earned, standard deduction)

Income (1) (Can\$)	Federal and Provincial Tax *		Tax Reductions		Tax Reductions as Per cent of Income		
	Without Indexing (2) (Can\$)	After Indexing		Relative		1974 (9)	1975 (10)
		1974 (3) (Can\$)	1975 (4) (Can\$)	Absolute	Relative (per cent)		
4,000	7	0	0	7	100	0.2	0.2
5,000	133	51	14	82	62.6	1.6	2.4
6,000	383	298	193	85	22.2	1.4	3.2
7,000	646	555	444	91	14.1	1.3	2.9
8,000	920	827	704	93	10.1	1.2	2.7
9,000	1,198	1,101	978	97	8.1	1.1	2.4
10,000	1,498	1,389	1,252	109	7.3	1.1	2.5
12,000	2,129	2,002	1,843	127	6.0	1.1	2.4
15,000	3,145	2,996	2,793	149	4.7	1.0	2.3
20,000	5,198	4,950	4,617	248	4.7	1.2	2.9
30,000	9,699	9,358	8,965	341	3.5	1.1	2.5
50,000	20,138	19,636	18,862	502	2.5	1.0	2.6

SOURCES: Adapted from Table 1 of paper by J. R. ALLAN, D. A. DORR, and N. S. FORDYK, "Indexing the Federal Income Tax: A Federal Perspective", *Canadian Tax Journal*, July/August 1974 and from table by Canadian Finance Department as reproduced on p. 12 of Financial Times' Tax Newsletter (London), November 1974.

\* Provincial tax used is the lowest existing provincial rate.

reductions become progressively larger between 1974 and 1975. This is shown by columns (5) and (6) in the table. On the other hand, the percentage reductions in tax liabilities — shown in columns (7) and (8) — are much greater for smaller incomes than for larger ones. Finally, the relationship of the tax reduction to before-tax incomes — see columns (9) and (10) — is similar at most income levels. The revenue losses to the government due to indexation have been estimated at about Can\$400 million in 1974 and Can\$750 million in 1975.

The description of the Uruguayan system described below relates to the situation that prevailed there between 1968 and 1973. It appears that as of January 1, 1974, the government of this country decreed the abolishment of the tax on the income of individuals although a schedular tax on industry and trade remained in existence. Obviously, without an income tax, there is nothing to index at the moment.

*Uruguay:* The *Uruguayan* adjustment scheme was almost identical to the Canadian one. Here, too, the nominal income tax structure was adjusted fully, annually, and automatically for the change in the cost of living. This mechanism had been in effect since 1968 when, on the basis of amendments made in 1967 to the income tax law, the personal exemption and dependent allowance were adjusted in line with changes in the cost of living index. Since the brackets were expressed as multiples of the personal exemption, the whole nominal structure of the tax came to be fully and directly tied to the cost of living index.

#### b. Countries with Partial Indexation for Inflation.

Three alternative but equally interesting examples of what could be called a corrupted or less direct approach to indexation for inflation are provided by France, Luxembourg, the Netherlands, Israel, and Argentina.

*France:* Since 1968, by resolution of the National Assembly, the government is required to adjust the structure of the personal income tax whenever inflation in a particular year exceeds the rate of 5 per cent. No adjustment is required as long as the rate of inflation remains below that threshold. Furthermore, the authorities

have discretion so that they can adjust differently the various brackets. Thus, for example, between 1968 and 1972, the consumer price index rose by 25.5 per cent; over this period the limits in the taxable income brackets rose 31.6 per cent for the smallest bracket and 20.2 per cent for the highest. At the same time the marginal rate on each bracket was lowered by three percentage points. The French experience provides thus an example of indexation being used to achieve objectives — such as the redistribution of the tax burden — unrelated to the presumed main purpose of indexation. In 1974 all the brackets were raised by an even 12 per cent.

The French experience is interesting since it shows that it is not necessary to adjust the personal income tax every year but that one can specify the adjustment mechanism in such a way that it will become operational only when the rate of inflation becomes significant. On the other hand, there is a price to be paid for this option since a creeping inflation which persisted for several years below the threshold level could seriously distort the structure of the tax without ever setting in motion the corrective mechanism. In this respect the alternative used by Luxembourg appears more attractive.

*Luxembourg:* Luxembourg provides another example of partial indexation. A law of 1967 requires that whenever "the average consumer price index for the first six months of a year shows, in relation to the average index for the first six months of the year preceding the coming into effect of the scale, a variation of at least 5 per cent..." the government shall recommend a revision of the nominal tax structure in proportion to the variation in the CPI.<sup>35</sup> Since 1968, all the brackets have been adjusted strictly in line with the change in the price level.

*The Netherlands.* In contrast with France and Luxembourg, in the Netherlands the legislation concerning indexation, which was enacted in 1971, did not put any restriction in terms of the rate of inflation or the cumulative change in the price index that are necessary to set in motion the adjustment mechanism; however, it

<sup>35</sup> Luxembourg, Income Tax Law of December 4, 1967 (Article 125).

did specify that the adjustment could be limited to only 80 per cent of the rise in the relevant index if, in the view of the responsible authorities, financing difficulties would result from full indexation. This discretion was used in 1972 and 1973 when the special index for tax adjustment rose by 5.7 per cent and 7.8 per cent, respectively. In those two years the nominal income tax structure was escalated by 4.56 and 6.24, respectively. It was used again in 1975 when the escalation in the nominal tax structure was 6.64 while the increase in the special index was 8.3. Furthermore, in September 1973 it was decided that the automatic inflation adjustment would not be used at all in 1974. However, as a discretionary measure an increase of the personal allowance was accorded. A further increase of the personal allowance was announced in March 1974 to take effect from July 1974.

By limiting indexation to 80 per cent of the special index, the government can continue raising more revenue than it would if full indexation were used. By the same token this limitation assures that some of the distortions in the tax incidence due to inflation would not be avoided. For 1972 and 1973 the revenue losses to the government due to indexation were 465 million guilders and 880 million guilders, respectively, or about 2.7 per cent and 4.4 per cent of personal income tax revenues for those years. Obviously, these losses increase with an increase in the rate of inflation. For 1975 they have been estimated to be about 1,350 million guilders.

*Israel:* The July 1975 Israel tax reform abolished the system of indexation that had been in existence up to that time and replaced it by one somewhat akin to the Dutch. From now on the nominal structure of the income tax will be linked to the cost of living index. However, while the escalation of the nominal values will be full and automatic for the tax credits (which in the new law have replaced some deductions) and for the remaining tax deductions, that for the tax brackets will, if the Minister of Finance deems it desirable, be less than full.

*Argentina:* Since 1972 Argentina has automatically indexed exemptions and deductions but has adjusted the tax brackets on an *ad hoc* basis. This system keeps off of the tax rolls those taxpayers who because of very low incomes should not be subjected to any income taxation.

c. Countries with Indexation Mechanisms Not Related Directly to Inflation.

Unlike the countries already discussed, Brazil, Chile, Denmark and Iceland adjust their personal income tax structures not by direct reference to an indicator of change in the purchasing power of money, such as the cost of living index, but by reference to other indexes such as earnings of industrial workers, legal minimum wages, *per capita* income, etc. Thus to varying degrees the adjustment schemes in these countries reflect changes both in prices and in other variables such as productivity, economic conditions or governmental willingness to adjust "minimum wages" or "basic salaries".

*Brazil:* The Brazilian indexation system has received considerable attention in the past couple of years. It was introduced in 1961 with the decision to express the personal exemptions and the upper limits of the taxable income brackets as multiples of the largest monthly minimum wage for the country.<sup>36</sup> Up to 1964 the income brackets were adjusted in line with the minimum wage which in turn moved closely with the rate of inflation. However, after 1964 the new government, in its attempt to stabilize the economy, chose to increase the minimum wage by less than the rate of inflation. This would have resulted in increases in tax burdens at all income levels which was a result not wanted by the government. Consequently, in November 1964 the link to the minimum wage was cut. A new law came in existence with a mechanism that combined the French approach with that of Luxembourg. Income tax brackets were to be adjusted in line with the price level any time that inflation exceeded 10 per cent in a given year or 15 per cent in three years. This alternative remained in effect until 1967 when new legislation gave the Minister of Finance the option of adjusting the brackets either in line with the rate of inflation or with the minimum wage.

This modification introduced a very important discretionary element in the indexation process. The available evidence indicates that the government of Brazil has taken full advantage of this discretionary power as it can be seen from Tables 4 and 5. The departure from pure indexing has been particularly significant in

<sup>36</sup> This was normally that of the State of Guanabara.

TABLE 4

BRAZIL. UPPER LIMITS OF INCOME BRACKETS EXPRESSED AS UNITS OF MONTHLY MINIMUM WAGE 1

Income Brackets	Marginal Tax Rates %	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	3	24.0	24.0	22.7	25.4	24.8	27.0	26.9	26.9	26.8	28.3	34.3
2	3	30.0	30.0	27.3	30.4	29.7	28.9	28.8	28.8	28.7	30.5	36.9
3	5	45.0	45.0	36.4	40.6	39.6	38.6	38.5	38.5	38.3	40.6	49.0
4	8	60.0	60.0	50.0	55.8	54.4	54.0	53.8	53.8	53.6	56.5	68.1
5	12	75.0	75.0	72.7	81.1	79.2	77.2	76.9	76.9	76.6	80.7	96.3
6	16	90.0	90.0	100.0	111.6	108.9	106.1	105.8	105.8	105.3	110.5	130.6
7	20	120.0	120.0	136.4	152.1	148.5	144.7	144.2	144.2	143.6	149.9	175.0
8	25	150.0	150.0	181.8	202.9	198.0	192.9	192.3	192.3	191.5	198.7	228.4
9	30	180.0	180.0	272.7	304.3	297.0	289.4	288.5	288.5	287.2	296.5	330.1
10	35	250.0	250.0	363.6	405.7	396.0	385.8	384.6	384.6	383.0	387.6	419.1
11	40	350.0	350.0	545.5	608.6	594.0	578.7	576.9	576.9	574.5	568.1	579.3
12	45	450.0	450.0	727.3	811.4	792.0	771.6	769.2	769.2	766.0	739.2	713.3
13	50	600.0	595.2	—	—	—	—	—	—	—	—	—
14	57	800.0	800.0	—	—	—	—	—	—	—	—	—
15	65	—	—	—	—	—	—	—	—	—	—	—

SOURCE: Ministério da Fazenda, Secretaria da Receita Federal, *Anuário Econômico-Fiscal* (1970); Ministério da Fazenda, Secretaria da Receita Federal, *Instruções para Pagamento de Imposto* (1971 a 1974). From FERNANDO A. REZENDE DA SILVA, *O Imposto Sobre a Renda e a Justiça Fiscal* (Rio de Janeiro: IPEA, 1974).

1 The limits in each year are calculated on the basis of the minimum wage of the previous year.

TABLE 5  
BRAZIL. UPPER LIMITS OF INCOME BRACKETS EXPRESSED AS UNITS OF PER CAPITA INCOME 1

Income Brackets	Marginal Tax Rates %	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
1	0	3.8	7.5	7.1	4.5	3.8	4.1	4.0	4.1	3.8	3.9	3.7	3.4	3.2	3.2	3.6
2	3	5.7	9.3	8.9	5.6	4.8	5.2	4.8	4.9	4.6	4.2	3.9	3.7	3.4	3.4	3.8
3	5	7.6	10.9	13.4	8.4	7.1	7.7	6.4	6.6	6.1	5.6	5.2	4.9	4.5	4.5	5.1
4	8	9.5	12.5	17.8	11.2	9.6	10.3	8.8	9.0	8.4	7.8	7.3	6.9	6.3	6.3	7.1
5	12	12.6	14.0	22.3	14.0	12.0	12.9	12.8	13.2	12.2	11.2	10.4	9.8	9.0	9.0	10.0
6	16	18.9	15.6	26.8	16.8	14.3	15.5	17.6	18.1	16.8	15.4	14.3	13.5	12.4	12.4	13.6
7	20	25.2	18.7	35.7	22.4	19.1	20.7	24.0	24.7	22.9	21.0	19.6	18.4	17.0	16.8	18.2
8	25	31.5	21.8	44.6	28.0	23.9	25.8	32.0	32.9	30.5	28.0	26.1	24.6	22.6	22.3	23.7
9	30	37.8	24.9	53.5	33.7	28.7	31.0	48.0	49.3	45.8	42.0	39.1	36.8	33.9	33.2	34.3
10	35	41.1	31.1	65.4	46.7	39.8	43.0	64.1	65.8	61.1	56.0	52.2	49.1	45.2	43.4	43.6
11	40	63.0	37.4	77.3	65.4	55.8	60.2	96.1	98.6	93.6	84.0	78.3	73.7	67.9	63.7	66.2
12	45	126.0	49.8	89.2	84.1	71.7	77.5	128.1	131.5	122.2	111.9	104.4	98.2	90.5	82.8	74.2
13	50	189.1	62.3	104.1	112.2	95.6	102.5	—	—	—	—	—	—	—	—	—
14	57	—	77.9	119.0	149.6	127.5	137.7	—	—	—	—	—	—	—	—	—
15	65	—	93.4	148.7	—	—	—	—	—	—	—	—	—	—	—	—
16	—	—	140.1	178.5	—	—	—	—	—	—	—	—	—	—	—	—
17	—	—	—	237.9	—	—	—	—	—	—	—	—	—	—	—	—
18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

SOURCE: Ministério da Fazenda, Secretaria da Receita Federal, *Anuário Econômico-Fiscal (1970)*; Ministério da Fazenda, Secretaria da Receita Federal, *Instruções para Pagamento de Imposto (1971 a 1974)*. From FERNANDO A. RIZENDE DA SILVA, *O Imposto Sobre a Renda e a Justiça Fiscal* (Rio de Janeiro: IPEA, 1974).

1 The limits in each year are calculated on the basis of the per capita income of the previous year.

1973 and 1974 when the adjustment mechanism has been used by the Brazilian government in its attempt to improve income distribution. The upper brackets were adjusted upward by 15 per cent in 1973 and 12 per cent in 1974 while the lower ones by 26 per cent and 41 per cent, respectively. In 1975 all brackets were escalated by a uniform 30 per cent. The effects of these discretionary changes can easily be seen by comparing 1972 and 1974 in Tables 4 and 5. We find, thus, in Brazil, as we did in France, another example of the use of indexation to achieve an objective — the redistribution of the tax burden — not immediately related to it.

*Chile:* Chile's indexation of the tax system goes back to 1954 when, in the face of persistently high inflation, the government decided to relate the exemptions for the schedular income taxes, which are applied with proportional rates on different types of incomes, and the brackets for the global complementary tax, which is applied with progressive rates on the total income of the taxpayer, to the minimum wage. The latter was normally, but not always, adjusted on the basis of the change in the consumer price index of the previous year. From the beginning of 1975, on the basis of a law of December 31, 1974, the link to the minimum wage was cut; the income tax will now be adjusted on the basis of a "unidad tributaria basica". No details are available on how this basic tax unit would be calculated.

*Denmark:* A new income tax law enacted in 1969 and which became effective in 1970 introduced two novelties: (a) it established four basic rates, ranging from 18 per cent to 45 per cent, and required that Parliament vote every year on whether these rates should be applied, in the coming year, at 100 per cent of their basic value or by more (up to 105 per cent) or less; (b) it specified that these rates (at the yearly legislated value) would be levied on income brackets which would be adjusted annually starting in 1971, on the basis of an index (which excluded the effects of changes in indirect taxes) reflecting the change in the cost of living. Between 1971 and 1974 the income brackets were escalated to reflect the changes in prices and the basic rates were applied at 91 per cent of their basic values.

On September 20, 1974 the Danish Parliament voted a new schedule for individual income taxes to be used in 1975. It also

changed the indexation scheme. The personal deduction and the brackets would now be related to changes in the index for hourly earnings of an industrial worker which, of course, reflects price changes, union power, productivity changes, and other factors. Thus, the Danish scheme is no longer an adjustment for inflation alone. The change was apparently motivated by the belief that indexation for price changes alone had not prevented sharp increases in tax burdens on the middle-income groups. These increases had been brought about by the interaction of economic growth and a very progressive structure.

*Iceland and Switzerland:* It has often been reported that since 1966 Iceland has been escalating its income tax on the basis of changes in the nominal per capita income of the country. If this is correct, the indexation mechanism would be as described in the footnote 19 above. However, little specific information is available. Many Swiss cantons — including Aargau, Basel-Land, Basel-Stadt, Granbünden and Solothurn — have been indexing their income taxes. It would require, however, too much space to describe those practices.

### 5. Some Concluding Comments

Much of the controversy related to indexation has evolved around the issue of stabilization. Some writers, as for example, Walter Heller and Albert Fishlow, have maintained that: "Putting income tax liabilities on an indexed basis reduces the automatic stabilizing effect of inflationary increases in governmental revenues and thus requires more discretionary fiscal action."<sup>37</sup> And the (Canadian) Carter Commission had concluded that "... a tax system that taxed only increases in real purchasing power would irreparably damage the built-in stability of the system."<sup>38</sup> On the other hand, Milton Friedman has argued that: "Obstacles to ending inflation can be substantially reduced through... indexation."<sup>39</sup> The truth probably lies somewhere

<sup>37</sup> *News Letter*, National City Bank of Minneapolis, June 20, 1974.

<sup>38</sup> *Report of the Royal Commission on Taxation* (Ottawa: Queen's Printer, 1966), Vol. 2, p. 23.

<sup>39</sup> "Using Escalators to Help Fight Inflation" in *Fortune*, July 1974, p. 94.

between these extremes and may depend on factors that differ among countries. The arguments that are relevant in this discussion are of two types: political and technical.

The main political argument against indexation is that it represents a declaration of defeat on the part of the government that could have rather important psychological effects on the population. The defenders of this point of view argue that the fight against inflation will become more difficult once indexing is accepted since some of the pains of inflation would be removed from it and people may accept the view that inflation has become a way of life.

The other side of this argument is that on the contrary indexing will make easier for the government to pursue the kind of policies that will put a stop to inflation. Those who argue along this line point out that, during an inflationary situation, many contracts — wages, interest payments, rents, etc. — reflect the expected rate of inflation. Thus, if many companies have, for example, agreed to new labor contracts that will increase *money* wages at the rate of, say, 15 per cent per year over the next several years, on the expectation of an inflation rate of 12 per cent, they would face serious difficulties if inflation should fall much below 12 per cent. In such case, the sharp increase in the *real* wage bill at the current rate of employment would force these companies to lay off some of their employees. The increased unemployment might, then, induce the government to reverse its policy. The same argument applies to borrowers who have borrowed money at high rates of interest and for long terms expecting prices to continue rising. If prices cease rising, the real cost to them will be high. It is, thus, argued that, in the absence of indexation, the real costs associated with a stabilization policy become so great that the governments are no longer free to pursue such policies.

The points of view outlined above, of course, are related to indexing in general. Let us now consider more specifically some arguments connected with the indexation of personal income taxes.

There can be no argument that indexing for price changes will reduce the built-in flexibility — i.e., the responsiveness of income tax receipts to a change in income. In fact this is really the whole point about indexation and this reduction will come about because purely inflationary changes in income will no longer affect the average tax rate for the country; because of this, the marginal tax rate for the country will not grow but will remain the same as the average

rate.<sup>40</sup> However, there is now considerable controversy on whether this reduction implies a fall in the "automatic stabilizing effect" of the personal income tax that will "require more discretionary fiscal action" or that it will be inherently destabilizing as argued by Heller and Fishlow. This particular position has been challenged in different ways among which the most important are the following:

*Size of discretionary changes.* It should be emphasized that indexation of personal income taxes does not exclude the use of a discretionary fiscal policy. Many writers on the subject seem to assume that once indexation of income taxes is introduced, there will not be any more use of, or any more need for, discretionary tax changes. This assumption is of course neither necessary nor warranted and it is perhaps useful to think of indexation as just one additional instrument of policy. In other words, a useful and fair comparison would be one between a choice that involves indexation and occasional discretionary changes with one that involves only discretionary changes. The latter option may require much larger *ad hoc* tax cuts. And the very size of these cuts might introduce a destabilizing element in the economy.<sup>41</sup> On the other hand, too frequent but smaller cuts would take too much time on the part of the politicians or experts involved. Thus indexation may reduce the need for large and/or frequent *ad hoc* changes and thus it may introduce an element of stability in the economy.

*Autonomous nature of public expenditure.* The traditional argument about the usefulness of built-in flexibility is highly dependent on the assumption that, in the short run, public expenditure is autonomous with respect to tax revenues. This assumption is probably valid for some countries but it is less so for others where additional revenues may simply give rise, with very little lag, to additional expenditures. If this happens, the combination of higher taxes and

<sup>40</sup> Of course a change in real income would still lead to an increase in the average tax rate and, as long as inflation is accompanied by growth, the marginal tax rate will still exceed the average tax rate. Only if the index is tied to the growth of per capita income will this not happen.

<sup>41</sup> This will be particularly true if, because of the size of the change, more time is needed for analysis and for legislative approval so that, by the time fiscal policy exerts its influence, the situation may have changed and the effect of the policy may thus be destabilizing.

higher public expenditure could make the inflationary situation more serious. Thus, once again, if taxes are indexed so that inflation does not bring about an increase in the average tax rate, public expenditure would not increase in relative terms and there would not be the expansionary stimulus associated with more taxes and public expenditure.

*Built-in flexibility in recession.* Indexation will lower the built-in flexibility of the personal income tax. But doing so it might reduce its ability to stabilize the economy in downswings and in genuine upswings. But might also restrain its negative influence during a recovery by reducing the size of the fiscal drag at less than full employment.

*Wage multiplier argument.* The possibility that changes in personal income taxes may bring about changes in the wage level was first analyzed by Lundberg in 1953. Such a possibility has been the object of considerable attention in recent years especially in the Scandinavian countries and has received some empirical backing. In an inflationary situation workers who do not have money and fiscal illusions may be expected to bargain to maintain constant their real disposable incomes rather than their pretax incomes.<sup>42</sup>

If the personal income tax were truly proportional, the marginal and the average tax rates would be the same for the individuals and these rates would not change with inflation. However, given the progressive nature of these taxes and the fact that the rates apply to nominal rather than to real tax schedules, any wage increase — even if just enough to compensate the individual for inflation — will be taxed at a higher marginal rate. Thus the disposable income of the individual would fall if the wage increase had been just enough to keep up with price changes. Lundberg's argument is that the workers would consequently bargain for wage increases that reflect not only prices increases — and presumably productivity gains — but also the higher tax payment. Given the income of the majority of the workers, the higher is the marginal tax rate in relation to the average tax rate, in other words the more progressive is the tax at that particular level

<sup>42</sup> An analysis of the macroeconomic aspects of this possibility can be found in THOMAS F. DERNBURG, "The Macroeconomic Implications of Wage Retaliations Against Higher Taxation", *IMF Staff Papers*, Vol. XXI, No. 3 (November 1974).

of income, the greater will the wage increase have to be to appease the workers. But of course the increase in wages above the price level — and above the productivity gain — will lead to, or assist the process of cost-push inflation. The more important are wages in the determination of the price level, the greater will be this induced price change, or multiplier effect.<sup>43</sup>

If the previous discussion is correct for a given country — and of course one should not generalize since this depends on factors which differ among countries — indexation may help by reducing the wage increases that workers would ask. Thus, the autonomous price increase associated with the above-described wage multiplier, would be reduced or even eliminated even though the built-in flexibility of the tax is reduced. For this reason it has been argued that indexation is part of an incomes policy.

*The structural argument.* In the discussion of the effects of indexation on stabilization is often not specified whether one talks about stabilization of prices, output, employment or what. The argument about indexation being destabilizing is simplest if one assumes that the price level, output and employment move in unison without leads or lags. If this assumption does not hold, the issue of whether indexation does reduce or increase the stabilizing capacity of the tax on the economy is very complex. Prices in particular may lead or lag changes in output and employment and taxes may lag significantly changes in prices. A perusal of the literature seems to support the contention that the first impact of an inflationary shock — say an increase in export prices — might be (a) in developing countries to increase the general price level and then, with considerable lag, perhaps to increase output, but (b) in some industrialized countries to increase output rather quickly and then, many quarters later, to increase prices.

If one considers the situation described in (b) above where a given inflationary shock will increase rather quickly output and then, much later, will lead to price changes, indexing may be cutting taxes when output growth is slowing down. If this is the case, it may be

<sup>43</sup> It should be pointed out that this discussion assumes that the workers do not suffer from fiscal illusions on the tax side but they do suffer from such illusions on the expenditure side. This is so since they ignore the benefits to them coming from greater government expenditure associated with higher tax revenue.

stabilizing as it was found in an econometric study dealing with Canada.<sup>44</sup> On the other hand, if the situation described in (a) above prevails, then indexing may decrease taxes just when the inflationary pressure is greatest.

In conclusion, a case for or against the indexation of the personal income tax cannot be made in the abstract since the consequences of indexing will differ among different countries. On administrative ground, the indexation of wages and salaries does not generate unusually difficult problems, but the indexation of other types of income does raise problems which so far have received only limited attention both in practice and in theoretical discussion.

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<sup>44</sup> JOHN BOSSONS and THOMAS A. WILSON, "Adjusting Tax Rates for Inflation", *Canadian Tax Journal*, XXI (May/June 1973).