C/81-5 F

#

# EX POST AGGREGATE REAL RATES OF RETURN IN CANADA: 1947-1976*

A. Tarasofsky
T.G. Roseman
H.E. Waslander

June 1981

*This is a draft of a study to be published by the Economic Council of Canada. It is made available to participants in the Rates of Return Conference on the strict understanding that it is not to be circulated or quoted without permission from the Economic Council of Canada.

ACKNOWLEDGEMENTS

The assistance is acknowledged of members of the staffs of The Department of Finance, The Bank of Canada, and Statistics Canada, and of John Bossons of the University of Toronto. The discussions with Bossons and with members of the Long Range and Structural Analysis Division of the Department of Finance were especially -- and hopefully mutually -- valuable, given our analogous research interests. In addition, G. Belanger and J.H. Sargent of that Department made notable contributions to our collective efforts to resolve the complex issues of backlog depreciation.

TABLE OF CONTENTS

## LIST OF TABLES

# INTRODUCTION

This study is one of the background papers related to the Economic Council of Canada's Sixteenth Annual Review. This Annual Review shared with several of its recent predecessors -- and will doubtless share with at least some of its immediate successors -- a deep concern with the effects of inflation upon the Canadian economy. These effects are both numerous and profound. They leave their mark, unequal and inequitable though it may be, on every economic agent and every economic indicator, a mark that is all the more damaging for being obscured by the wedges that inflation drives between economic measurements expressed conventionally, in current dollars, and their real, generally unexpressed, values. Those wedges driven between profits measured in conformity with conventional accounting methods and real profits are particularly important. They facilitate misperception of their true situations on the part of firms' managements, misperception that may well prompt behaviour that is inconsistent with their objectives and contrary to their firms' best interests. Analogous misperceptions may also be caused and inappropriate behaviour prompted in financial markets. The possibility also exists that certain institutional arrangements -- such as tax rules -- may, because they are couched in terms of conventionally measured profits, produce effects that were unintended by the tax authorities and are in any case inappropriate.

The primary purpose of this study is to identify and remove those inflationary wedges that have impinged during the thirty years since 1946 upon certain important economic measurements. These measurements are: the annual rates of return actually earned in the aggregate by the Canadian industrial sector, the effective annual tax rates that it actually paid, and the annual dividend payout ratios that it actually experienced.

This study goes beyond its main objective in two respects. First, it makes a beginning -- broadly analogously to several American studies -- in the empirical analysis of real rates of return in Canada by examining a number of factors thought to influence the variations in the rate of return. The factors investigated include the rate of inflation, the acceleration of inflation, and productivity, variables often connected with business performance.

Secondly, while deriving and measuring the requisite inflation adjustments the authors have reviewed and made selections from various approaches available in the literature. In the process they have developed views regarding fundamental accounting concepts and inflation adjustments which may help to clarify and perhaps resolve some of the current controversies in the

field. Conveying these views is an important purpose of this study.

The importance of determining the real, as opposed to the merely apparent, values of the rates of return and related measurements is considerable. Ex post aggregate real rates of return are central to an understanding of an economy's past investment and growth performance, and they may provide important indications of its future performance. The sizes of the gaps between their real values and their corresponding reported values may also shed useful light on the past behaviour of financial markets and may well have implications for future behaviour. Much the same can be said of real effective tax rates and real dividend payout ratios, since real retained after-tax profits constitute the actual resources that corporations have set aside for the future at the end of each year.

The rate of return earned by a firm is a relative measure of its profitability. It relates the firm's profits (income) to some of its other attributes, in particular its capital employed and its shareholders' equity. Although all of the constituent concepts are well established in conventional accounting practice, some discussion of them is presented. The concept of income receives particular attention, since

the adjustments made to correct reported profits for the distortions caused by inflation are intended to restore the measurements that would otherwise have obtained during the period reviewed. Hence a clear understanding of the meaning of what is being measured is especially desirable. In addition, at a later stage in the study the notion of capital maintenance, which underlies the income concept, is discussed further. One purpose is to clarify it in relation to depreciation, and the other is to offer our view on an important issue -- again involving depreciation -- that has arisen with respect to inflation adjustments.

There is less need to discuss extensively the concepts of capital employed in the firm and of shareholders' equity, but a certain discussion is necessary. Our view of the former concept differs somewhat from other views found in the literature, and this must be explained. Similarly, as to the latter concept, the exigencies of the data prevent us from disaggregating the various categories of shareholders in the fashion that would be possible when dealing with individual firms, and here, too, explanation is necessary.

Though the period from 1947 to 1976 is the longest examined, this is by no means the first study of ex post aggregate real rates of return in Canada. The methodologies adopted in some -- though by no means all -- of these other studies, and in analogous American studies, differ from one another, sometimes quite significantly. Hence they also differ in various ways from the methodology adopted in this study. In order to assist the reader in positioning this study in relation to previous work, a brief review of these analogous Canadian and American studies, which highlights their main similarities to and differences with this study, is presented in Part III.

# PART I

## Chapter 1

## The Concept of Corporate Income

The notion of corporate income (profit) is to a large extent a matter of perspective. In other words, when defining it the first question to be asked is: Whose income? The fact is that there are always a number of claimants on any firm's assets and income flows. These include bondholders, banks and other short-term lenders, as well as the holders of preferred and common shares. Each of these claimants views the results of the firm's operations from a different vantage point.

The perspective most commonly adopted -- by tax authorities, the accounting profession, financial analysts, and national income accountants -- in defining and measuring a corporation's income is that of its owners, the preferred and common shareholders. Seen from their perspective, the firm is an on-going entity that is expected to continue operating for the foreseeable future in the same broad line of business, and whose capacity to do so is therefore to be preserved. This is the approach to the measurement of income that has traditionally prevailed, explicitly or implicitly, in Canada, as well as in many other countries. Since it is not the proper function of inflation adjustments to alter the pre-existing concept of income, this approach also underlies the adjustments discussed below. Although, as will be seen below, it does not square fully with that concept, this approach is broadly in the spirit of one version -- namely the operating capacity version[1] -- of what is widely known as the capital maintenance concept of income. As formulated by Hicks, among others, a firm's profit for a given period consists of the maximum amount that it can distribute to its owners at the end of the period after making such provisions as leave it as "well off" as it was at the start of the period.[2] In order for it to remain as well

off as it was before, the firm's operating capacity must implicitly be maintained.

Hence, profits -- the amount that can safely be distributed to the owners at the end of a given accounting period -- are defined, in effect, as the revenues that remain in the firm after all of the deductions required to accomplish this preservation of capital have been made. Of necessity, these deductions must include provisions, in the form of depreciation and depletion allowances, for the degree to which the useful lives of capital assets have diminished during the period.

In the accounting traditions from which Canadian practices derive, the primary focus in measuring a firm's profits is on operating income -- profits arising from sales of the goods that the firm produces or trades. The firm is regarded in effect as being in the business of selling certain assets, inventories, and not selling others, capital assets. In keeping with a conservative tradition that prefers to err on the side of understatement of profits rather than risk overstatement, a further distinction is usually made between realized profits and unrealized profits, of the kind that might arise, for example, from changes in the market values of the firm's capital

assets and debt instruments. (This represents a deviation from what might be termed the pure concept of capital maintenance.) When these unrealized profits are realized through the intermittent disposal of capital assets or the retirement of debt, they are then included in the firm's distributable income but are usually reported separately from its operating income.

It has also traditionally been a fundamental principle of conventional accounting practice in Canada that profits should be calculated by matching current costs with current revenues. As to valuing assets, two rules have generally applied: capital assets are reported at historical cost and the others at the lower of cost or market value. Except for the sometimes significant problems arising from changes in relative prices, and from the not insubstantial problems inherent in the determination of the market values of the assets of a going concern, this approach worked reasonably well throughout the era of relative stability of the purchasing power of money. The underlying principles were widely known and understood; they carried the imprimatur of the accounting profession; and they were broadly accepted by governments for the purpose of levying taxes. They also made it possible, within limits, for financial statements to be used for the

objective evaluation of a firm's performance and financial position, and also to compare these with those of other firms.[3] The advent of chronic inflation, however, drastically altered this state of affairs.

## Chapter 2

## The Effects of Inflation on Reported Profits and Other Variables

Inflation, whether fully, partly or not at all anticipated by the firm, has far-reaching, if varying, effects upon its earnings and upon its overall financial position. As will be shown below, it tends to open up a gap between reported profits, calculated by means of conventional accounting methods, and real profits, namely the firm's profits after all of the necessary provisions have been made to ensure maintenance of its operating capacity. Inflation also tends to alter the effective rate of income tax paid by the firm; and it may cause the portion of profits that the firm's management actually distributed in dividends to differ from the portion that it intended to distribute. We now identify and adjust for the various effects of inflation that are not adequately reflected by conventional accounting methods or by present Canadian tax rules. As indicated above, these adjustments are intended to conform with the traditional approach to measuring the firms' income -- broadly speaking, the

operating capacity version of the capital maintenance approach. They are intended, in other words, to derive as closely as possible the same income measurements that conventional accounting would have done if prices had remained stable over the interval examined.

Before turning to the various adjustments to reported profits necessitated by inflation, it is useful to apprise the reader of the approach adopted with respect to the issue of the appropriate price index for correcting the reported values of the assets and liabilities of the firms included in the aggregates. We have not adopted the view implicit in the General Price Level approach, whereby the same price index is applied to all of the values to be adjusted. We have instead used several price indices, each applied to the specific items to which it had the most relevance. We share the view adopted by virtually all of the authors of analogous work with which we are familiar, that the overall effect of price changes upon a firm's reported profit for a given accounting period consists of the sum of their individual effects upon the specific type of assets that the firm held during the period as well as upon the liabilities that it incurred. As a practical matter, however, not too much should be made of this issue, since we suspect that neither our estimates nor their trends, especially the latter, would have been significantly different if we had relied upon only one index.

Depreciation Adjustment

The rate of depreciation refers to the annual rate at which a capital asset's productive life erodes due to wear and tear and obsolescence; and the annual provision for depreciation expense is intended to charge systematically against profits the corresponding proportion of the asset's value. Although this provision has traditionally been regarded as being primarily a means of cost allocation, it has also been recognized as having the important consequence of sheltering within the firm adequate resources which would be available to replace the depreciated assets when the time came to do so. This is not to suggest that provision for depreciation involves the setting aside of specific resources for this purpose -- it does not. What it does represent is a reduction in distributable earnings, which prevents the (unspecified) resources in question from leaving the firm inadvertently in the form of dividends.

Both conventional accounting and Canadian income tax rules have hitherto defined depreciable asset value as historical cost, although they have tended to differ conceptually as to the base to which the annual rate of depreciation should be applied. The former has commonly involved the straight-line method, whereby a constant annual rate is applied to historical cost. This method implicitly assumes

that capital assets depreciate at a uniform rate over their useful lives. The latter, on the other hand, has generally required that the diminishing-balance method be followed, whereby the prescribed annual rate is applied to the undepreciated portion of the asset's historical cost.[4] Here the implicit assumption is that the degree of erosion decreases as the asset ages.

Inflation renders inadequate the depreciation charges based on historical cost: the higher and the more chronic the inflation the greater the inadequacy. This has been widely recognized for many years, but both the Canadian accounting profession and tax authorities have continued to rely on the historical cost base. There are now strong indications that the former, at least, is moving towards a new base, perhaps as a supplement to the traditional one. This has already happened, or is about to happen, in many countries, including the United States, so there is little danger that Canada will be plunging into uncharted waters.[5]

To say this, however, is by no means to deny that going to a new base involves difficulties. The great, if increasingly irrelevant, merit of historical cost is that it is objective, while virtually any version of replacement cost must inescapably reflect some degree of subjectivity.

Subjectivity, of course, is an outstanding bête noir in accounting, because it impedes the attainment of comparability among firms and industries, and this is a consideration not to be minimized. But neither should the difficulties that admittedly attend the estimation of the continually changing current prices of capital assets under inflationary conditions be exaggerated. Reliable industry-specific indices for depreciable assets are now provided by Statistics Canada, and in quite a few other countries as well. In any event general price indices are also available. Granted that their use would obscure differences between firms and industries, it is nevertheless true that, if they were applied uniformly and consistently, assets valued thereby would be much less misleading than historical cost values.

The basic procedure for calculating a firm's depreciation expense on a replacement cost basis involves adjusting, at the end of a given current year, the acquisition costs of the stock of depreciable assets held so as to reflect their current replacement costs. Since these assets were acquired during the current and previous years, the firm must first age them according to the years in which they were acquired. It must then adjust the costs of the assets acquired in each of these years on the basis of the appropriate index representing the cumulative price

change from the year of acquisition to the current year. Having thus derived the current replacement costs of the assets, the current year's depreciation expense is calculated for each group of assets by applying to its current replacement cost the appropriate rate of depreciation.

This study being an analysis of aggregates, it was impossible to age depreciable assets in the manner described above, which would be appropriate to an individual firm for which the necessary data would presumably be available. Instead, a perpetual inventory method developed at Statistics Canada was adapted to the needs of the present analysis. How this was done is described in considerable detail in the Appendix.

The inflation-adjusted depreciation expenses, calculated for each year along the foregoing lines, and being a (negative) component of inflation-adjusted profit, enter into the numerators of each year's rates of return on capital and on net worth. The assets that have given rise to these expenses are, of course, part of both capital and net worth. They therefore enter into each year's denominators at values that reflect the undepreciated portions of their current year's replacement cost. In other words, for the purpose of the

denominators, accumulated depreciation -- the aggregate of the current and previous years' depreciation expense -- is calculated entirely on the basis of the current year's replacement values. Of necessity, the accumulated depreciation expenses implicit in these undepreciated asset values exceed the sum of the annual replacement cost depreciation expenses attributed respectively to the current and preceding years. These accumulated depreciation components of the denominations are calculated in effect on the basis of "backlog" depreciation while the depreciation expense components of the numberators are not. Because of the positions adopted on the issue of backlog depreciation by some authoritative Canadian and British accounting bodies, and because its quantitative implications are substantial, this matter is discussed further in Part III. In addition, there is a discussion, also in Part III, of the relationship between the provision for depreciation expense and the operating capacity version of the capital maintenance concept of income. This is intended to clarify certain ambiguities that exist in some of the literature.

Depletion Adjustment; Depletable Assets and Land

Depletion expense is the measure of the proportion of the cost of a firm's nonrenewable resources

that is used up in a given year. Although it might be thought that the conceptual adjustment would, in principle, have a good deal in common with the depreciation question, it has received very little attention in the literature.[6] In any event, especially severe data problems precluded any attempt to proceed along the same lines as were followed in regard to depreciation.[7] Consequently, the admittedly imperfect adjustments consisted of adjusting both annual depletion expense and net depletable assets by a measure of inflation based on the corresponding indices for buildings and equipment. The same indices, incidentally, were also used to estimate the replacement values of land.

Cost of Sales Adjustment

The basic, traditional accounting principle governing the imputation of a monetary value to a firm's stocks of raw material, work-in-process and finished goods is that the imputed value should reflect the lower of cost or market value. While it is never easy to ascertain the market values of an ongoing enterprise's inventories, there is also the further problem in Canada of measuring the cost of those inventories during inflation. This problem arises because, under the inventory valuation

rules accepted for tax purposes in Canada, firms are placed in the position, when calculating cost of sales, of matching current selling prices with costs that reflect earlier, and therefore lower, prices. In other words, the tax rules prevent firms from applying to current selling prices the costs that would need to be incurred currently in acquiring or producing the goods sold.

There are three alternative assumptions that can be made as to the sequence in which a firm's inputs are transformed and sold as outputs: that the inputs acquired first are transformed and sold first, that they are transformed and sold last, or that they are transformed and sold in variable sequences. The first and last of these alternatives are accepted for tax purposes in Canada, and both are apparently widely used. The first, known as the first in-first out method of inventory valuation (FIFO), needs no further description. The last, which is not commonly specified for all firms that rely on it, involves the use of some average of the cost prices prevailing during the relevant period. It produces an inventory valuation that is intermediate between FIFO and the second alternative method, known as last-in first out (LIFO), which is not accepted by Canadian tax authorities, though it is widely adopted in some other countries, including the United States. LIFO is the

only method of inventory valuation that inherently matches current input costs with current output prices.

As the result of denying Canadian firms the right to use the LIFO method of inventory valuation, or an appropriate equivalent, for tax purposes, their costs of sales have been continually understated and their taxable incomes continually overstated during the present inflationary era. So, for the same reason, have reported profits been overstated. Thus, in order to adjust for this overstatement of profits, and on the assumption that firms used the FIFO valuation method, reported profits should be reduced by the following cost of sales adjustment.[8] (The indices used may be obtained from the authors by request.)

$$CSADJ_i = \frac{\Delta p_i}{P_{i-1}} INV_{i-1}$$

where $\Delta p_i$ = change in the production cost index during the current year

$P_{i-1}$ = production cost index of the previous year

$INV_{i-1}$ = opening inventories of the current year

In an effort to ameliorate this problem, the Minister of Finance introduced a deduction of 3 per cent of opening inventory, to apply to 1977 and subsequent years. The Minister pointed out that:

> "This measure does not represent a comprehensive response to the problems caused by the interaction of inflation and taxation on business income. However, it will provide a broad measure of relief and thereby enhance the flow of internally generated funds available for business expansion. It also has the considerable merit of being simple to use and requires no fundamental change in accounting practices."[9]

Debt Adjustment

Inflation reduces, by definition, the monetary unit's command over goods and services: hence it necessarily affects the relationship between borrowers and lenders. Since debt is denominated in dollar terms, lenders stand to lose, and borrowers to gain, from inflation. Interest rates therefore rise, as lenders seek to maintain the realyield on the loan and to preserve its real value. Economic theory has traditionally held that, under ideal conditions in a tax free world, if the rate of inflation is fully anticipated, it will be neutral in its effects on financial markets. That is, the resulting nominal rate of interest will consist of the sum of the real rate of interest and the rate of inflation, and the volume of lending will be unchanged.[10]

More recent research has shown that this neutrality disappears when taxes and other realistic institutional factors are introduced into the analysis, especially the existence of marginal tax rates that differ between borrowers and lenders.[11]

The extent to which nominal interest rates rise when inflation is fully anticipated is, however, a secondary issue in this study. What is of greater relevance is the manner in which this inflation premium -- which constitutes an additional cash transfer from borrower to lender -- is treated by conventional accounting and by the tax authorities. For the borrower the nominal interest payment is recorded as an operating expense, and it is deductible for tax purposes: for the lender it is recorded and taxed as income. No recognition is given in the accounts and in tax policy to the real gain of the borrower nor to the real loss of the lender. Consequently, the reported profit of the former is understated and that of the latter overstated.

Because this study is concerned with ex post inflation-adjusted rates of return it deals with the effects of actual inflation, irrespective of the degree to which it was anticipated. Therefore, instead of reducing the borrower's interest costs by the premium embodied therein for anticipated inflation, his income is

increased by his gain on outstanding debt due to actual inflation. A corresponding, and opposite, adjustment is made to the income of the lender. The net effects of unanticipated inflation emerge indirectly, however, since the real gains or losses that occur when the actual rate of inflation differs from the anticipated one represent, in effect, transfers between a firm's creditors and its shareholders. They thus enter into the difference between the firm's real returns on capital employed and its real returns to equity (net worth), both of which are presented below.

The inflation adjustment with respect to short-term debt forms part of the adjustment with respect to other working capital, described below. As to net long-term debt, the adjustment, based on the assumption that the flow of funds is uniform throughout the year, is as follows:

$$\text{Gain/loss on net noncurrent liabilities} = \left(\frac{NCL_i + NCL_{i-1}}{2}\right)\left(\frac{GNE_i - GNE_{i-1}}{GNE_{i-1}}\right)$$

where

$NCL_i$ = net noncurrent liabilities at end of year i

$GNE_i$ = GNE deflator for year i

Other Working Capital Adjustment

Conventional accounting records most of the firm's current assets, other than inventories,[12] as well as its current liabilities at their cost or nominal values. This means that the contraction of their real values that inflation imposes on these assets, and the real gains correspondingly bestowed on these liabilities, are not captured in the accounts. These effects must be taken into account in determining the firm's real returns.

Assuming that the flows of current assets and liabilities are uniform throughout the year, the adjustment is as follows:

Gain/loss on other working capital

$$= \left[ \left( \frac{CL_i + CL_{i-1}}{2} \right) - \left( \frac{CA_i + CA_{i-1}}{2} \right) \right] \times \left( \frac{GNE_i - GNE_{i-1}}{GNE_{i-1}} \right)$$

where

$CL_i$ = current liabilities at end of year i

$CA_i$ = current assets other than inventories at end of year i

$GNE_i$ = GNE deflator for year i.

Investments in, Loans to, and Loans from Canadian Affiliated Adjustments

The acquisition by one corporation of the shares of another corporation appears as an asset in the investing company's books, and the dividends earned on these shares appear as investment income and enter into its profits. Unless these shares were required when issued, there is no corresponding entry in the accounts of the corporation whose shares were bought, and the dividends paid on those shares, being charges to retained earnings, are not deducted from its profits. If the two corporations are in different sectors, the asset representing the investment could be considered part of the capital employed in the owning firm's sector, and the dividends earned part of its income. An inflation adjustment might well be necessary -- though it would be difficult to calculate -- to reflect the changing real value of the asset. If, however, the two corporations are in the same sector, it would be necessary, in order to avoid double counting, to exclude the asset from the capital employed and net worth of the owning company, and the related dividends from its income. It was assumed as a practical matter that all affiliated corporations are in the same sector.[13]

Analogous considerations arise with respect to noncurrent loans to affiliates and to other long-term loans and mortgages receivable. Because as noted, the data did not permit the necessary disaggregation, it was assumed that all the firms involved were in the same sector. These assets are, in effect, excluded from capital employed and from net worth. Although this tends to bias the estimates, the direction of the bias is not readily apparent. In any event, given the relative unimportance of the assets involved, the magnitude of the bias is probably slight.

Other Noncurrent Assets Adjustment

This category embraces a miscellany of items, ranging from deferred charges to a variety of intangible assets, such as goodwill, trademarks, franchises, and the like. The deferred charges usually refer to various past costs of establishing and maintaining the corporate entity and its financial instruments which have not been written off. It is reasonable to assume that the current equivalent of these costs would be higher due to inflation. The same is true of the intangible assets. There is, however, a practical problem in determining their current dollar value. Many of these items are carried in the accounts at a purely nominal value or at a cost value that

has long since gone out of date. Since these items represent, as a group, a negligible proportion of total assets, it was decided, somewhat arbitrarily, to disregard them, both with respect to the inflation-induced changes in their real values and as components of capital employed and net worth.

## Chapter 3

## Real Rates of Return and Other Inflation-Adjusted Indicators

### Capital Employed

Definitions of capital vary in the literature. A number of writers who have recently estimated rates of return have defined capital as the sum of inventories and the depreciated values of fixed assets at replacement cost.[14] This might be regarded as the conventional method, which focuses on the output of the firm and on the assets that produce it directly. Statistics Canada defines capital far more comprehensively, in effect as total assets less current liabilities.[15] Whatever validity this definition may have in the context of the individual firm, it appears that major double counting of inter-firm loans, etc., would result if it were applied to large aggregates such as those used in this study. Jenkins (1977a) defines capital as the sum of inventories, certain other working capital, and the

depreciated values of fixed assets at replacement cost. This is closer to the spirit of the definition used here since it recognizes that working capital is no less essential to the firm than inventories and fixed assets. Our definition implies a similar view but is somewhat broader. It embraces all current assets (including inventories) less current liabilities plus the depreciated values of fixed assets at replacement cost. (Hence the term "capital employed" is preferred.) This is equivalent to the sum of equity and net noncurrent liabilities, and it represents the net assets employed in the firm's operations.

Rate of Return on Capital Employed After Taxes

The nominal (reported) rate of return on capital employed, after taxes, is defined as follows:

$$NRC_i = \frac{RP_i - DV_i + IN_i - IT_i}{INV_i + OWC_i + BK_i + BL_i}$$

where

$RP_i$ = reported net profit before income taxes in year i

$DV_i$ = dividends earned in year i

$IN_i$ = net interest expense on net noncurrent liabilities in year i

$IT_i$ = income taxes paid in year i

$INV_i$ = inventories valued at FIFO at mid-year i [16]

$OWC_i$ = other working capital at mid-year i

$BK_i$ = depreciable and depletable assets at depreciated book value at mid-year i

$BL_i$ = land at book value at mid-year i

In the light of the foregoing inflation adjustments, the real rate of return on capital employed is defined as follows:

$$RRC_i = \frac{RP_i - DV_i + BD_i - RD_i + IN_i - CSADJ_i \pm WC_i - IT_i}{INV_i + OWC_i + RK_i + RL_i}$$

where

$BD_i$ = book depreciation and depletion expense in year i

$RD_i$ = replacement cost depreciation and depletion expense in year i

$CSADJ_i$ = cost of sales adjustment in year i (also known as inventory valuation adjustment)

$WC_i$ = real gain or loss on working capital in year i

$RK_i$ = depreciable and depletable assets at depreciated replacement cost at mid-year i

$RL_i$ = land at replacement cost at mid-year i

These nominal and real rates of return are presented in Table 1. It should be mentioned that the income taxes deducted above represent the actual income taxes paid by the firms. This is an overstatement in the present context, because it includes the taxes paid on interest earned on long-term loans receivable. We did not adjust for this because of the difficulties involved in estimating the appropriate aggregate annual tax rates over a thirty-year period. The nominal and real after-tax rates of return on capital employed are therefore slightly understated, but their trend over the interval, and the relation between the two are probably unaffected.

A more systematic analysis of the variations in the real after-tax rates of return on capital employed is presented below, so only a few brief observations will be offered here. As might have been expected, nominal and real rates of return on capital employed varied together, with very few exceptions, over the thirty years reported. Also, again as might have been expected, and without referring to specific cyclical indicators -- this is done later -- these rates of return tended to fluctuate with the business cycle. Of special interest is the size of the gap between nominal and inflation-adjusted rates of return. It was always considerable and often very large;

Table 1

Nominal and Real After-Tax Rates of Return on Capital Employed, 1947-76

| | Non-Farm Non-Financial | | Manufacturing | |
|---|---|---|---|---|
| | Nominal (%) | Real (%) | Nominal (%) | Real (%) |
| 1947 | 11.17 | 4.49 | 14.95 | 7.11 |
| 1948 | 10.49 | 2.15 | 14.13 | 5.10 |
| 1949 | 9.16 | 4.26 | 12.31 | 7.69 |
| 1950 | 11.00 | 4.59 | 14.62 | 9.08 |
| 1951 | 10.34 | 2.34 | 13.55 | 4.87 |
| 1952 | 8.00 | 4.60 | 10.42 | 8.27 |
| 1953 | 7.73 | 4.51 | 10.60 | 7.63 |
| 1954 | 6.62 | 4.15 | 8.31 | 6.22 |
| 1955 | 7.93 | 4.62 | 10.00 | 7.24 |
| 1956 | 7.96 | 4.25 | 9.97 | 6.04 |
| 1957 | 7.60 | 4.90 | 8.82 | 5.36 |
| 1958 | 6.11 | 3.96 | 7.66 | 5.18 |
| 1959 | 6.87 | 4.45 | 8.36 | 5.62 |
| 1960 | 5.28 | 3.44 | 6.19 | 4.08 |
| 1961 | 4.46 | 2.91 | 5.00 | 3.16 |
| 1962 | 4.99 | 3.21 | 5.87 | 3.70 |
| 1963 | 5.17 | 3.06 | 7.20 | 4.68 |
| 1964 | 6.04 | 3.92 | 7.49 | 4.93 |
| 1965 | 7.28 | 5.68 | 8.26 | 6.19 |
| 1966 | 7.19 | 5.66 | 8.07 | 5.85 |
| 1967 | 6.48 | 5.21 | 6.43 | 4.70 |
| 1968 | 6.73 | 5.68 | 7.22 | 5.89 |
| 1969 | 7.01 | 5.53 | 7.77 | 5.81 |
| 1970 | 5.67 | 4.55 | 5.26 | 3.41 |
| 1971 | 7.15 | 4.27 | 7.01 | 4.53 |
| 1972 | 7.56 | 4.20 | 8.58 | 5.24 |
| 1973 | 11.02 | 5.87 | 12.50 | 6.64 |
| 1974 | 12.80 | 5.80 | 14.79 | 6.00 |
| 1975 | 10.98 | 4.65 | 11.50 | 3.99 |
| 1976 | 10.22 | 4.50 | 10.08 | 4.38 |

and the variations in its magnitudes may be attributed primarily to those in the rate of inflation and to the intermittent changes in tax rules that were introduced at various points during the interval.

Since it has a considerable currency in the literature, the real after-tax rates of return on capital as defined "conventionally" are also presented, in Table 2. It may be defined as follows:

$$RC_i^c = \frac{RP_i - DV_i + BD_i - RD_i + INT_i - CSADJ_i - IT_i}{INV_i + RK_i + RL_i}$$

where

$INT_i$ = net interest expense.

Rate of Return on Net Worth After Taxes

Net worth (equity) is simply capital employed less net noncurrent liabilities. It must be recognized, however, that the rate of return on net worth that is reported below is a somewhat ambiguous indicator and not the one that we would have chosen had the exigencies of our data been otherwise. This is because there generally exist various classes of shareholders in the firm, ranging from the common shareholders, who are the most truly residual claimants to its profits, to the several possible types of preferred shareholders. It

Table 2

Real After-Tax Rates of Return
on Capital-"Conventional" Method, 1947-76

| Year | Non-Farm Non-Financial | Manufacturing |
|---|---|---|
| 1947 | 5.74 | 8.91 |
| 1948 | 3.63 | 6.95 |
| 1949 | 5.35 | 9.50 |
| 1950 | 5.52 | 11.01 |
| 1951 | 3.45 | 6.34 |
| 1952 | 5.53 | 9.55 |
| 1953 | 5.29 | 8.81 |
| 1954 | 4.99 | 7.52 |
| 1955 | 5.78 | 8.81 |
| 1956 | 5.53 | 7.55 |
| 1957 | 6.13 | 6.55 |
| 1958 | 5.06 | 6.56 |
| 1959 | 5.51 | 7.03 |
| 1960 | 4.33 | 5.31 |
| 1961 | 3.86 | 4.33 |
| 1962 | 4.35 | 5.10 |
| 1963 | 4.02 | 6.31 |
| 1964 | 4.89 | 6.61 |
| 1965 | 7.25 | 7.96 |
| 1966 | 6.91 | 7.33 |
| 1967 | 6.49 | 6.19 |
| 1968 | 7.14 | 7.52 |
| 1969 | 7.02 | 7.45 |
| 1970 | 6.04 | 4.95 |
| 1971 | 5.44 | 5.88 |
| 1972 | 5.12 | 6.47 |
| 1973 | 6.73 | 8.05 |
| 1974 | 6.16 | 6.71 |
| 1975 | 5.22 | 4.61 |
| 1976 | 5.38 | 5.28 |

is the rate of return on the equity held by the common shareholders that we would have preferred to estimate. Our data did not, however, permit differentiation between these groups of shareholders. If it had done so, it would have been necessary to take account of the fact that inflation induces real transfers between the holders of the firm's preferred shares and the holders of its common shares, in ways that are analogous to the real transfers induced between creditors and shareholders that were discussed above. Because this was not possible, the rate of return on net worth was calculated. Although it must be regarded as a second-best alternative, it remains an indicator of considerable interest, not least because it gives, in its real version, a sense of the transfers between creditors and shareholders. It is defined in nominal after-tax terms as follows:

$$NRNW_i = \frac{RP_i - DV_i - IT_i}{INV_i + OWC_i + BK_i + BL_i - NCL_i}$$

where

$NCL_i$ = net noncurrent liabilities at mid-year i

The real rate of return on net worth after taxes is defined as follows:

$$RRNW_i = \frac{RP_i - DV_i + BD_i - RD_i - CSADJ_i \pm WC_i + GL_i - IT_i}{INV_i + OWC_i - RK_i + RL_i - NCL_i}$$

where

$GL_i$ = gain on net noncurrent liabilities in year i.

These rates of return are presented in Tables 3 and 4. In general, and given stable prices, the difference between the rate of return on capital employed earned by a firm and the rate of return on its net worth will be determined largely by the relationship between the former and the average annual rate of interest that the firm paid on its net noncurrent debt. The advent of unanticipated inflation (or deflation), however, causes, as has been shown, real transfers to take place between the firm's creditors and its shareholders. It is thus reasonable to attribute the fact that real after-tax rates of return on net worth in both aggregate sectors reported were invariably greater than corresponding real after-tax rates of return on capital employed to two basic factors, although we cannot easily differentiate between them. One factor is the net return that firms earned on borrowed resources; the other is the gains that shareholders earned at the expense of creditors as actual inflation consistently turned out to be higher than had been anticipated and reflected in interest rates. Since the effects of unanticipated inflation are reflected in the real, but not in the nominal, rates of return on net worth, it is not surprising that these two rates of return have not varied together as closely as did the corresponding rates of return on capital employed. As to the variations in

Table 3

Nominal and Real Rates of Return on Net Worth, 1947-76
Non-Farm Non-Financial

| Year | Nominal | | Real | |
|---|---|---|---|---|
| | Before Tax | After Tax | Before Tax | After Tax |
| 1947 | 21.36 | 14.98 | 10.59 | 5.84 |
| 1948 | 20.59 | 14.03 | 8.41 | 3.59 |
| 1949 | 18.14 | 12.26 | 9.93 | 5.58 |
| 1950 | 22.13 | 14.88 | 11.16 | 5.76 |
| 1951 | 24.47 | 14.19 | 11.71 | 4.11 |
| 1952 | 20.89 | 11.02 | 13.71 | 6.26 |
| 1953 | 19.25 | 10.81 | 12.12 | 5.58 |
| 1954 | 15.66 | 9.21 | 10.54 | 5.40 |
| 1955 | 18.45 | 11.31 | 11.72 | 5.96 |
| 1956 | 18.55 | 11.35 | 11.83 | 5.96 |
| 1957 | 16.49 | 10.94 | 11.32 | 6.75 |
| 1958 | 13.34 | 8.63 | 9.17 | 5.25 |
| 1959 | 15.76 | 10.00 | 11.01 | 6.24 |
| 1960 | 13.19 | 7.73 | 9.27 | 4.71 |
| 1961 | 12.07 | 6.70 | 8.43 | 3.88 |
| 1962 | 13.24 | 7.74 | 9.33 | 4.73 |
| 1963 | 13.62 | 8.03 | 9.26 | 4.57 |
| 1964 | 15.66 | 9.73 | 11.17 | 6.24 |
| 1965 | 18.14 | 10.75 | 16.36 | 8.40 |
| 1966 | 16.42 | 9.89 | 14.63 | 8.06 |
| 1967 | 14.77 | 8.87 | 13.36 | 7.36 |
| 1968 | 15.92 | 9.36 | 14.87 | 8.06 |
| 1969 | 16.42 | 9.89 | 14.88 | 8.16 |
| 1970 | 13.58 | 7.63 | 12.59 | 6.61 |
| 1971 | 15.50 | 10.00 | 10.22 | 5.74 |
| 1972 | 16.46 | 10.53 | 10.74 | 5.89 |
| 1973 | 22.57 | 15.93 | 14.83 | 9.03 |
| 1974 | 27.62 | 18.70 | 16.48 | 9.68 |
| 1975 | 23.66 | 15.81 | 12.81 | 7.17 |
| 1976 | 21.51 | 14.38 | 11.87 | 6.74 |

Table 4

Nominal and Real Rates of Return on Net Worth, 1947-76

Manufacturing

| Year | Nominal | | Real | |
|---|---|---|---|---|
| | Before Tax | After Tax | Before Tax | After Tax |
| 1947 | 25.82 | 18.21 | 15.00 | 8.44 |
| 1948 | 26.05 | 18.13 | 13.41 | 6.83 |
| 1949 | 22.94 | 15.73 | 15.64 | 9.69 |
| 1950 | 27.74 | 18.73 | 18.57 | 11.22 |
| 1951 | 30.28 | 17.61 | 17.18 | 6.94 |
| 1952 | 25.06 | 13.67 | 19.96 | 10.75 |
| 1953 | 24.24 | 14.26 | 17.82 | 9.61 |
| 1954 | 19.01 | 11.06 | 14.72 | 8.03 |
| 1955 | 22.31 | 13.46 | 16.68 | 9.24 |
| 1956 | 22.14 | 13.50 | 15.52 | 8.22 |
| 1957 | 18.72 | 12.08 | 12.70 | 7.08 |
| 1958 | 16.16 | 10.51 | 11.63 | 6.82 |
| 1959 | 18.38 | 11.55 | 13.44 | 7.58 |
| 1960 | 14.64 | 8.50 | 10.65 | 5.36 |
| 1961 | 12.81 | 6.93 | 9.07 | 4.01 |
| 1962 | 14.76 | 8.43 | 10.49 | 5.05 |
| 1963 | 17.13 | 10.66 | 12.21 | 6.64 |
| 1964 | 17.72 | 11.25 | 12.67 | 7.16 |
| 1965 | 20.53 | 11.42 | 17.32 | 8.29 |
| 1966 | 18.15 | 10.33 | 15.14 | 7.31 |
| 1967 | 14.87 | 8.24 | 12.66 | 5.97 |
| 1968 | 17.02 | 9.46 | 15.67 | 7.70 |
| 1969 | 18.40 | 10.32 | 15.44 | 7.01 |
| 1970 | 12.68 | 6.60 | 10.43 | 4.26 |
| 1971 | 15.43 | 9.06 | 11.14 | 5.63 |
| 1972 | 18.11 | 11.29 | 12.73 | 6.82 |
| 1973 | 24.91 | 16.88 | 16.01 | 9.20 |
| 1974 | 28.98 | 19.76 | 15.91 | 8.49 |
| 1975 | 22.44 | 15.00 | 10.95 | 5.27 |
| 1976 | 19.51 | 12.88 | 10.65 | 5.67 |

the real after-tax rate of return on net worth, we have not attempted to analyse them, but it seems not unlikely that they, too, were influenced by the cyclical factors that are identified as having contributed to the variations in the real after-tax rates of return on capital employed.

## Effective Tax Rates and Dividend Payment Ratios

The effective tax rate reported below, in Table 5, in both nominal and real terms, is defined as the ratio of the annual income tax provision to, respectively, the corresponding nominal and the real before-tax profits.[17] Similarly, the dividend payout ratio is defined as the ratio to after-tax profits of annual dividends. These ratios are reported, in nominal and real terms, in Table 6.

Considerable caution should be exercised when discussing the effective tax rates paid by large aggregates, such as the two sectors dealt with here, over a long interval. The main problem is that the mix of relevant factors has tended to change over the years, with the result that superficial trends and comparisons can be misleading if taken at face value. Not only did a variety of changes in tax rules take place over the years -- ranging from changing tax rates through investment tax credits of various kinds

Table 5

Nominal and Real Effective Tax Rates, 1947-76

| Year | Non-Farm Non-Financial | | Manufacturing | |
|---|---|---|---|---|
| | Nominal (%) | Real (%) | Nominal (%) | Real (%) |
| 1947 | 29.86 | 44.87 | 29.48 | 43.71 |
| 1948 | 31.86 | 57.37 | 30.40 | 48.01 |
| 1949 | 32.40 | 43.86 | 31.46 | 38.00 |
| 1950 | 32.76 | 48.39 | 32.49 | 39.59 |
| 1951 | 42.04 | 64.94 | 41.83 | 59.60 |
| 1952 | 47.25 | 54.37 | 45.42 | 46.12 |
| 1953 | 43.83 | 53.97 | 41.18 | 46.08 |
| 1954 | 41.22 | 48.75 | 41.80 | 45.44 |
| 1955 | 38.70 | 49.16 | 39.65 | 44.59 |
| 1956 | 38.80 | 49.67 | 39.01 | 47.05 |
| 1957 | 33.69 | 40.38 | 35.48 | 44.24 |
| 1958 | 35.31 | 42.72 | 34.97 | 41.35 |
| 1959 | 36.53 | 43.35 | 37.16 | 43.65 |
| 1960 | 41.42 | 49.23 | 41.91 | 49.68 |
| 1961 | 44.55 | 53.94 | 45.90 | 55.80 |
| 1962 | 41.57 | 49.31 | 42.87 | 51.88 |
| 1963 | 41.07 | 50.66 | 37.75 | 45.58 |
| 1964 | 37.91 | 44.18 | 36.51 | 43.47 |
| 1965 | 40.74 | 46.41 | 44.39 | 52.08 |
| 1966 | 39.76 | 44.90 | 43.07 | 51.74 |
| 1967 | 39.97 | 44.90 | 44.57 | 52.82 |
| 1968 | 41.22 | 45.81 | 44.46 | 50.84 |
| 1969 | 39.78 | 45.12 | 43.90 | 52.82 |
| 1970 | 43.78 | 47.50 | 47.92 | 59.13 |
| 1971 | 35.49 | 43.85 | 41.31 | 49.46 |
| 1972 | 36.02 | 45.09 | 37.68 | 46.43 |
| 1973 | 31.22 | 39.15 | 32.25 | 43.01 |
| 1974 | 32.28 | 41.26 | 31.80 | 46.60 |
| 1975 | 33.59 | 44.04 | 33.14 | 51.87 |
| 1976 | 33.15 | 43.22 | 33.99 | 46.77 |

Table 6

Nominal and Real Dividend Payout Ratios, 1947-76

| Year | Non-Farm Non-Financial | | Manufacturing | |
|---|---|---|---|---|
| | Nominal (%) | Real (%) | Nominal (%) | Real (%) |
| 1947 | 53.98 | 103.22 | 44.21 | 82.12 |
| 1948 | 48.42 | 139.39 | 38.98 | 82.39 |
| 1949 | 58.38 | 95.15 | 51.60 | 68.89 |
| 1950 | 53.82 | 103.58 | 51.99 | 70.82 |
| 1951 | 49.20 | 125.64 | 44.03 | 90.32 |
| 1952 | 53.72 | 71.47 | 44.77 | 46.04 |
| 1953 | 51.30 | 77.09 | 39.89 | 48.70 |
| 1954 | 57.03 | 77.36 | 49.07 | 56.90 |
| 1955 | 45.91 | 70.33 | 35.01 | 42.87 |
| 1956 | 45.30 | 70.49 | 39.23 | 54.50 |
| 1957 | 44.87 | 59.83 | 43.97 | 63.45 |
| 1958 | 51.37 | 70.20 | 45.32 | 59.41 |
| 1959 | 49.20 | 65.40 | 44.41 | 58.19 |
| 1960 | 66.75 | 91.57 | 58.93 | 80.63 |
| 1961 | 97.96 | 142.78 | 97.27 | 144.72 |
| 1962 | 90.32 | 123.52 | 85.56 | 122.93 |
| 1963 | 77.93 | 114.80 | 56.49 | 78.02 |
| 1964 | 67.28 | 87.21 | 56.36 | 75.36 |
| 1965 | 53.46 | 70.24 | 57.74 | 78.60 |
| 1966 | 55.96 | 69.08 | 63.14 | 89.47 |
| 1967 | 60.42 | 73.94 | 69.20 | 96.34 |
| 1968 | 53.52 | 64.51 | 60.55 | 78.22 |
| 1969 | 47.65 | 59.29 | 46.76 | 71.91 |
| 1970 | 64.55 | 74.99 | 74.87 | 117.76 |
| 1971 | 51.41 | 72.98 | 57.02 | 79.27 |
| 1972 | 49.92 | 72.81 | 46.80 | 67.09 |
| 1973 | 37.57 | 53.84 | 37.66 | 58.64 |
| 1974 | 36.87 | 54.33 | 34.90 | 65.42 |
| 1975 | 38.88 | 61.64 | 39.86 | 86.65 |
| 1976 | 38.63 | 59.31 | 46.69 | 79.65 |

to inventory valuation adjustments and changing depreciation rates -- but so did the mix of small and large firms in the sample, each subject to different tax rates. All this is in addition to the data problems involving the years 1965 to 1970, inclusive, described in the Appendix. Consequently, the only observation regarding the effective tax rates reported that we can make with confidence is that failure to adapt Canadian tax rules to the realities of an inflationary era has meant that the effective tax rates that a great many firms ostensibly paid were considerably less than those that they actually paid.

The trends of the aggregate dividend payout ratios reported must also be contemplated with caution. This is partly because the mix of larger firms that pay dividends and the (much more numerous) smaller firms that do not tends to vary over time, and partly because dividends paid in a given year depend upon a variety of factors, of which current profits are only one. Contractual factors affecting preferred shares, as well as past years' profits and dividends, and the exigencies of the stock market also have a bearing upon the dividends paid by firms. As before, what is particularly striking is the fact that the proportions of current profits that many firms ostensibly distributed to shareholders in dividends is very substantially less

than what they distributed in reality. Indeed, it would not be unwarranted to suggest that some, and perhaps quite a few, firms paid out in dividends during at least some years of high inflation more than they really earned during those years. In other words, they distributed capital, wittingly or unwittingly.

# PART II

## Chapter 4

## Movements in the Ex Post Real Rate of Return

Some of the series of real rates of return presented and discussed in the previous pages have been subjected to econometric analysis so as to shed some light on their movements over time and on possible underlying factors. In econometric analysis of this kind, two types of analyses may be distinguished.

In one approach, estimable functions are derived on the basis of economic theory. It is customary to start from well-established microeconomic theory that sees profits as dependent upon all output and input prices. While this would be a valid approach for sectoral profits, problems arise in the case of aggregate profits. The outputs of one firm are the inputs of another, and prices

that help explain the profits of both are netted out in aggregation. The explanatory elements that remain, especially labour cost, cannot be regarded as independent of profits in the macro-economy. It is, therefore, necessary to introduce a theory of the dynamics of income shares; this is a general equilibrium problem that has given rise in the literature to a variety of approaches. Of course this argument applies more to nonfinancial corporations than to the manufacturing sector, although the latter is a borderline case. In short, the theoretical development needed is on the scale of that required for a large disaggregated model like CANDIDE, the difference being that the specification has to be condensed to a single equation.

A more simple and direct approach to the econometric analysis of time series of real rates of return consists of testing for the presence of trends and cyclical variation, and for the influence of broad economic indicators, such as inflation, productivity, and competitive position. An examination of this type is only a first cut at empirical analysis. It serves mainly to dispel simplistic views about the economy, while occasionally, if a significant relation is found, it may spur further investigation. The presence of a robust trend, for instance, may indicate

a gradual structural change in the economy. Alternatively, it may be found that some observations of the real rate of return deviate sharply from the historical pattern. For example, recent work in the United States along these lines has sought to determine whether the rate of profit has been falling.[18] This study follows this second approach to the econometric analysis of the rate of return.

Regressions were run for the before- and the after-tax rates of return on capital employed, for both nonfinancial and manufacturing corporations. Although firms presumably aim at maximizing after-tax returns on net worth, these are subject to changes in taxation rules and in financial structure which in the short run may have a significant influence on net returns. We did not attempt to model these complex factors, but we did examine the influence of general economic conditions, which are probably most clearly reflected in the before-tax rate of return on capital employed. Goodness of fit was generally superior for the before-tax rate of return, which seems to lend some support to this view.

Our main result is straightforward: there is a fairly strong and robust downward trend in the real aggregate rate of return of corporations in the manufacturing sector. Otherwise, only business cycle indicators have a significant

and robust effect upon the real rate of return on capital employed, both for manufacturing corporations and for all nonfinancial corporations. All other variables tested for proved to be either insignificant or far from robust, and it has to be concluded that they have no direct influence on the real rate of return.

To repeat, one of our most unambiguous findings is a significant downward trend in the real rate of return in manufacturing. No other variable seems to describe nearly so well the secular pattern of historically high real rates of return during the Fifties. Judging from the pattern of residuals, a nonlinear trend, close to zero in later years, would give a better fit. Perhaps this reflects specific circumstances in the Fifties and Seventies -- the former unusually favourable, the latter unusually unfavourable -- which are not reflected in the explanatory variables that we tested for. No such trend is present in the real rate of return on capital employed of nonfinancial corporations of which manufacturing accounts for a substantial share. This indicates that a rising trend occurred in the real rates of return of nonmanufacturing corporations. It is a plausible assumption that changes in the relative price of energy had an influence.[19]

Our second finding is that cyclical variables have substantial explanatory power. The output-gap measures developed in Chapter 1 of the Sixteenth Annual Review performed well, but a second indicator, the difference between the actual and the equilibrium unemployment rate, obtained from the same source, consistently performed better. This was unexpected, since an output-based indicator should, in principle, be a better proxy for the degree of utilization of the firm's resources and hence for its real return on capital. Allowing for a lagged effect of the cyclical variable improved the goodness of fit, also a somewhat surprising result. The coefficients on the cyclical variables were consistently larger for before-tax real rates of return than for after-tax rates, reflecting the smoothening effect of corporate taxes. The real rate of return in manufacturing was found to have a larger cyclical amplitude than did the real rate of return of the nonfinancial corporate sector.

The rate of growth of output and the rate of growth of output per employed person proved to be very poor substitutes for these cyclical indicators. They obviously have a cyclical content, and they also reflect medium-term or structural changes in the rate of growth of the economy, but they were consistently insignificant in our regressions.

A third group of variables, representing Canadian prices or costs relative to those of our trading partners also proved insignificant. For the nonfinancial corporations as a whole, the ratio of export and import prices of domestic prices was expected to have a positive influence on real profits, on the grounds that corporations may respond to changes in the trading environment by making price adjustments, in addition to making quantity adjustments that are reflected in the cyclical variables. The same reasoning underlay testing for an independent effect of relative unit labour cost (U.S. vs. Canada) upon manufacturing. Neither hypothesis proved tenable.

Changes in the terms of trade have a direct impact on the amount of real income available in the economy. A direct effect upon the real rate of return may therefore be hypothesized. In our regressions we found a small effect upon the nonfinancial sector as a whole but not upon the manufacturing sector. The explanation for this may lie in the structure of Canada's foreign trade. Manufacturing firms experience competition from imports but account for only a moderate share of exports, and are therefore unlikely to be the initial beneficiaries of an improvement in the terms of trade. Canadian producers of resource products are in a better position, especially when a terms-of-trade improvement involves a rise in export prices.

We found no convincing evidence of a direct effect of inflation upon real rates of return, whether positive or negative. The change in the rate of inflation showed a negative effect; this, however, was small and generally insignificant.

Our finding of an absence of strong systematic influences, other than a trend for manufacturing and cyclical indicators, upon real rates of return may point to a healthy capacity on the part of firms to adapt to changes and disturbances. It must be admitted, however, that our data do not cover the whole decade of the Seventies, which differed in so many ways from the generally stable and favourable earlier postwar period. Although we have not found evidence of serious erosion of profitability, the continuing experience of stagflation in years subsequent to our sample may yet prove damaging.

Our findings show, however, that simple, sweeping assertions about the ills afflicting the economy tend to have little basis in fact. Inflation, acceleration of inflation, the slowdown in productivity growth -- none of these has had a direct influence upon real rates of return. The factors that may well have to be introduced in order to

## Preferred Results

$$BUT = 8.38 + .028TIME - .70UGAP - .28UGAP_{-1}$$
$$(28.5)\ (1.6)\qquad (4.8)\qquad (2.1)$$

$$- 1.42D51 \qquad \bar{R}^2 = .75 \qquad DW = 1.59$$
$$(1.9)\qquad SEE = .66$$

$$RAT = 4.33 + .041TIME - .34UGAP - .17UGAP_{-1}$$
$$(18.6)\ (3.0)\qquad (3.0)\qquad (1.6)$$

$$- 2.58D51 \qquad \bar{R}^2 = .68 \qquad DW = 1.37$$
$$(4.3)\qquad SEE = .52$$

$$BUM = 13.22 - .143TIME - 1.36UGAP - 1.94D51$$
$$(26.3)\ (4.8)\qquad (7.6)\qquad (1.5)$$

$$\bar{R}^2 = .76 \qquad DW = 1.55 \qquad SEE = 1.15$$

$$RAM = 7.55 - .099TIME - .76UGAP - 3.53D51$$
$$(21.5)\ (4.8)\qquad (6.1)\qquad (4.0)$$

$$\bar{R}^2 = .69 \qquad DW = 1.50 \qquad SEE = .80$$

Estimation Period: 1950-1976

BUT : Before-tax rate of return on capital employed: non-farm non-financial
RAT : After-tax rate of return on capital employed: non-farm non-financial

BUM : Before-tax rate of return on capital employed: manufacturing
RAM : After-tax rate of return on capital employed: manufacturing

TIME : Linear trend 1950 = 1

UGAP : Difference between actual and equilibrium Unemployment Rate

D51 : Dummy for 1951 (Korean crisis)

better understand the impacts of these phenomena are their respective sources. Excess demand inflation, for example, will probably have a very different effect upon real rates of return than inflation emanating from the supply side. By the same token, the effects of changes in the terms of trade will differ according to whether they arise from changes in international markets or from domestic economic conditions. Refinements along these lines may yield more complete explanations of the determinants of the rate of return.

## PART III

### Introduction

The contents of the two chapters that make up this Part are quite different from one another. Moreover, the first of these two chapters itself consists of two distinct, though related -- since they both concern aspects of depreciation -- issues. Both of these issues are of considerable conceptual importance, but one of them is also, potentially, of considerable quantitative importance. The second chapter consists of a brief review of work analogous to this study that has been done in recent years in Canada and the United States.

# Chapter 5

## Two Issues Involving Depreciation[20]

### Capital Maintenance and Depreciation

As was explained earlier, the income concept upon which the inflation adjustments are based is -- subject to various traditional conservative practices with regard to unrealized profits and the valuation of assets -- in the spirit of the operating capital version of the capital maintenance concept of income. There is a tendency in the literature to imply that this income concept requires, in order to preserve the firm's "well-offness", the maintenance of its operating capacity at precisely the same level at the end of each accounting period as it was at the start. For example:

> "...It may be argued, in terms of Hicks' definition of income, that a business is not as 'well-off' at the end of the period as it was at the beginning unless it has at least maintained its capacity to continue its operations at the same level -- i.e., unless it has maintained its operating capacity. A business which consistently fails to maintain its operating capacity will decline. It may be argued that such a business should not be considered profitable. Accordingly a profit should be reported only when operating capacity, as represented by a collection of assets, has increased.[21] (Emphasis added.)

This rationale, though not basically incorrect, is rather ambiguous. It is not clear whether the term "operating capacity" refers to the firm's capacity to produce the goods it sells or to the capacity of its net assets to either produce output or earn other revenue, such as interest. Neither is it clear how the firm's depreciable assets are to be viewed for the purpose of measuring "well-offness", whether in gross terms or net of accumulated depreciation. Most importantly, however, this type of formulation (which is not uncommon), clearly implies that the firm's operating capacity can increase only when a profit is earned. This implication, if unqualified, can be misleading, and it is the purpose of this note to clarify matters. In particular, it will be shown that a firm adhering to the capital maintenance concept of income will, if it merely breaks even in effect but holds assets for which depreciation expense is provided, necessarily tend to increase its capacity both to earn revenues and to produce output. In other words, the very existence of provisions for depreciation implies, during most of the replacement cycle of depreciable assets, increases in the firm's capacity to earn revenues and produce output, even if the firm retains no earnings at the end of each period.

Consider a new firm that breaks even (or, alternatively, a firm that distributes in dividends all of its after-tax profits), at the end of its first year. Assume that prices are stable. This firm's total gross assets less total liabilities at year end will exceed the corresponding figure at the start of the year by the amount of depreciation expense provided for during the year. However, its total depreciated assets less total liabilities will remain unchanged. As to the mix of its assets as between, say, fixed depreciable assets and others, this is indeterminate. Given the way most firms operate, it is probable that fixed depreciable assets have increased at least somewhat during the year.

We therefore find this firm, which has no retained earnings, in the following situation at the end of its first year. Its revenue earning assets -- we assume that the firm will decline to hold assets which earn nothing -- have certainly increased, and its physical capacity to produce output has probably done so, but to a lesser extent. Only in terms of <u>net</u> depreciated assets (total depreciated assets less total liabilities) has its position remained unchanged.

Assume further that these same conditions recur every year until the year when the firm's initial depreciable fixed assets are fully depreciated. By this time the firm

is in a position to replace these assets from its own resources. In other words, it can apply a combination of cash and the proceeds of the sales of other assets (assume that their costs equal their market values) to the replacement of the depreciated assets. Assuming that this is done at the start of the next year, the replacement cycle is completed.

But what has been the pattern of revenue-earning capacity and the capacity to produce output over the cycle? The former rose steadily, increasing at the end of each intervening year by the annual provision for depreciation. The latter also rose, though less evenly and predictably. However, both fell when the depreciated assets were replaced, the former by the full extent to which it increased over the life cycle of the depreciated assets, the latter by the extent to which its undepreciated value increased over the cycle.

One variable, however, has not increased over the cycle due to successive annual provisions for depreciation, and that is the value of the firm's initial gross assets less its initial liabilities, a sum which remains equal to the firm's net depreciated assets at the end of each subsequent year. Neither does it change when the depreciated assets are replaced. It is therefore the value of net depreciated assets that alone represents the capital maintained and preserved by the annual provisions for depreciation.

Inflation complicates but does not alter the foregoing argument. As we have seen, each year's provision for depreciation is represented by a corresponding increase in the firm's gross assets less its liabilities. If the firm provides for annual depreciation on the basis of the current year's replacement cost of its depreciable assets, accumulated depreciation will not suffice to equal the ultimate replacement price of these assets. But, as is explained below, if the firm also makes the necessary annual inflation adjustments on all of its other assets and liabilities, it will preserve their real values and rectify this inadequacy. Thus it will succeed in sheltering internally from dividends sufficient resources to replace these depreciated assets at the end of their useful lives (assuming, again, that there are no capital losses on any assets due to bad investment decisions, or the like.)

It must be admitted, however, that this last assumption is somewhat facile, in view of recent Canadian (and U.S.) experience with inflation. The behaviour of securities markets during the Seventies has shown that market values of equities and bonds -- which firms hold as both current and non-current assets -- do not necessarily

keep pace with inflation. This makes the inflation adjustment for these assets rather more complex, especially in the case of equities and, above all, common equities. Bonds, after all, are denominated in dollar terms, and they have specific maturity dates. Equities generally lack both of these attributes: hence their future market values when depreciated assets need replacing are perhaps even harder to predict than those of bonds. The problem is further complicated by the accounting convention that requires that marketable securities be reported on the balance sheet at the lower of cost or market value. This otherwise admirable rule, which is intended to prevent erring on the side of overstatement of the firm's profits and financial position, may have the inadvertent effect of obscuring the degree to which the firm is maintaining its capital, as this term was defined above. In any event, irrespective of how the firm might wish to report these assets on its balance sheet, it would not be unreasonable for it to adjust its annual distributable, though not its operating, profit by the amount necessary to close any gap that might exist between the market values of securities held and their acquisition costs in current dollar terms.

## The Issue of Backlog Depreciation

In the most recent of its various pronouncements on the subject of inflation accounting,[22] the Accounting Research Committee of the Canadian Institute of Chartered Accountants adheres, after considering various alternatives, to much the same income concept as that adopted in this study -- the operating capacity version of the capital maintenance concept of income. There are, however, some aspects of the Committee's approach with which we disagree. One of these warrants special attention, partly because of its quantitative importance but especially because the same notion has been presented in other authoritative investigations.[23] It may, therefore, have a quite material impact upon events in Canada, as it may already have done in the United Kingdom and other countries. The notion at issue involves what is known as "backlog" depreciation (also called "the amortization gap").

The underlying principle seems straightforward: at the end of any given year the undepreciated value of a depreciable asset should be that part of its current replacement price represented by the remaining proportion of its useful life.[24] When prices are stable historical cost depreciation meets this requirement, but it naturally fails to do so during inflation (or deflation). So, again on the face of it, does replacement cost depreciation,

when it is calculated each year on the basis of the replacement price prevailing at the end of that year. In the Committee's words:

> "The expiry of the service potential of plant and equipment over extended periods of time results in some additional complications. In particular, if the current cost of an item of plant increases in each year of its useful life, the total amount of current cost depreciation expense charged at the expiry of its life will not equal cost of replacement at that date. The difference between total depreciation expense during an asset's life and the cost of replacement at the end of its useful life is often referred to as "backlog depreciation". For example, consider an asset costing $1,000 and having a useful life of two years. If the current cost of the asset increases by 20% each year, depreciation expense, based on the average current cost in each year, would be $550 in year 1 and $660 in year 2; the total of $1,210 is less than the current cost of $1,440 at the date of replacement. The significance of this shortfall in assessing maintenance of operating capability depends on the pattern of asset replacements. For example, take a situation in which an enterprise owns ten similar assets, each with a useful life of ten years, and the present ages of the assets range from one to ten years. The aggregate current cost depreciation expense on the ten assets would represent the current cost of the asset that needs to be replaced currently. When an enterprise has a pattern of asset replacement that is subject to significant irregularities, backlog depreciation may become a material factor to be considered by management in assessing maintenance of operating capability.[25] (Emphasis added.)

This view is hardly unprecedented.[26] The Sandilands Committee, for example, reviewed the issue at some length and agreed that accumulated depreciation is inadequate during inflation when replacement cost depreciation is computed on a current basis only. It also stated that

strict adherence to the capital maintenance concept of income requires provision for backlog depreciation. But, since its preferred concept of income was rather different, it concluded that, for many firms, it would be better if operating profits were calculated without providing for it. The Committee envisaged, presumably along lines similar to those of the above quotation, that these firms replace a fairly constant proportion of their depreciable assets each year. Hence current replacement cost depreciation provisions would suffice to shelter from dividends the resources needed to replace old assets that had reached the end of their useful lives during that year. The Committee, however, shared the above view that firms that do not replace depreciated assets in this regular, revolving fashion would need to reduce operating profit by an adjustment for backlog depreciation.[27] A broadly similar view was taken by the Ontario Committee on Inflation Accounting.[28]

The fact is, however, that, <u>provided that all the necessary inflation adjustments are made to all of the firm's assets and liabilities</u>, an adjustment for backlog depreciation is not necessary, irrespective of the sequence in which its depreciable assets are replaced.[29] The assets sheltered by the annual depreciation provision based on current replacement prices are, after all, distributed among the other assets held by the firm. In other words, some will be subsumed in working capital,

including inventories, and the rest -- often the largest part -- will be composed of additional fixed assets.[30] The real values of the assets included in working capital and inventories will be maintained (and the inadequate earlier depreciation compensated for and shielded from dividends), by taking up the inflation loss on the former and the cost of sales adjustment on the latter. As to the assets included in fixed assets, there are two important considerations to keep in mind. Those that are depreciable will themselves be subject in subsequent years to replacement cost depreciation at current prices. In addition, these assets -- as well as those that do not depreciate, such as land -- will appreciate in value, usually at a rate corresponding approximately to the rate of inflation. It will thus be possible to replace those depreciable assets that have reached the end of their useful lives by means of the proceeds from the sales of an appropriate combination of working capital, inventories and appreciated fixed assets.[31]

Another approach to backlog depreciation -- which turns out to be compatible with ours though the rationale differs somewhat -- is described by the Sandilands Committee and by others.[32] This involves making the adjustment for backlog depreciation in the firm's balance sheet but not in its income statement. That is, the adjustment is applied to the firm's equity, either as a reduction of retained earnings or other reserves, or as a debit to the capital

maintenance account or equivalent (the credit being to accumulated depreciation). The central idea is that provision must be made to shield from dividends the additional resources that "regular" replacement cost depreciation fails to provide, but that this additional amount should not be charged to operating income. Although there is some danger that firms may choose not to make this adjustment to equity in an unprofitable year,[33] it is apparent, given the foregoing argument, that this adjustment is not needed to correct nominal profits, if all the other inflation adjustments are made. But it is needed to ensure that the net depreciated values of the assets in question are correctly reported.[34]

## Chapter 6

## Analogous, Recent Research in Canada and the United States, and Their Methodologies

### Canadian studies

Jenkins (1977a) is an exercise in measuring the social and private rates of return on capital and equity in Canada for the period 1965 to 1974, inclusive. As indicated earlier, his definition of capital is somewhat different from our definition, but the main difference between this study and ours lies in the methodology used to calculate the (private) rate of return on net worth.

In calculating this rate of return no adjustment is made in this study for the effects of inflation upon the firms' debts. The need to make such an adjustment is recognized in Jenkins (1977b), which is a study of the various real transfers induced by inflation between different sectors of the Canadian economy, including the government sector, and especially between debtors and creditors. The interval examined is again 1965 to 1974, inclusive. If conceived in ex post terms, the conceptual nature of the adjustments to conventional accounts necessitated by inflation corresponds to that of the adjustments made in our study.

The only other, published, analogous Canadian research that we know of are Basu and Hanna (1976), Belanger and McIlveen (1980), and Bossons (1977). The first of these is an exercise in general price level accounting, whereby a single price index is used to re-estimate certain firms' financial statements for the years 1967 to 1973, inclusive, in order to adjust for inflation. Although rates of return are calculated on total assets and common equity instead of on capital and net worth -- and subject to this being an exercise in general price level accounting -- the nature of the specific adjustments for inflation is on the whole compatible with that of our adjustments. The second study

(prepared concurrently with ours) reports inflation-adjusted aggregate rates of return on net worth for the years 1963 to 1979, inclusive, for the nonfinancial, manufacturing, energy, and nonmanufacturing other-nonenergy sectors. The methodology used to adjust reported figures for inflation is the same as our methodology. As to the third of these studies, which covered the years 1971 to 1975, inclusive, inflation-adjusted rates of return are calculated on capital employed and common equity for several industry groups. Except for two important differences, the adjustment methodology adopted in this study has much in common with our methodology. The most important difference is this: instead of making the kind of debt adjustment that we make, the sum of the depreciation and cost-of-sales adjustments is reduced by the proportion that net debt bears to total nonmonetary, depreciated assets at replacement cost, and this reduced amount is deducted from reported profits. It is noteworthy that in an update of this exercise, to be published in the near future, Bossons discontinued this device and makes the same type of debt adjustment that we do. The other difference -- by no means insignificant -- between this exercise and ours (as well, apparently, as all others concerned with rates of return on capital) lies in the calculation of the after-tax rate of return on capital. Bossons, in effect, offsets

the tax savings that firms realized by virtue of the fact that net interest expense is deductible from taxable income.

It would appear, then, that, although our study is unique to a significant degree in a Canadian context -- in that we report over a much longer interval than any other study does, and, especially, in our estimates of aggregate real rates of return on capital employed -- our methodology has considerable support in the work of other researchers in the field. This methodological support is also evident in the work relating to the American economy that is identified below.

American studies

Published American studies are more numerous than Canadian ones, and they are only reviewed cursorily. Nordhaus (1974) reports real shares of capital income in total corporate income and, more pertinently to our purposes, real rates of return on corporate capital. Capital is measured "conventionally" in this study, as it is in all American studies that we know of, but the methodology of the adjustment for inflation is similar to ours. Shoven and Bulow (1975) and Shoven and Bulow (1976) do not report rates of return. Also, they prefer the Haig-Simons purchasing-power-accrual approach to income to the capital-

maintenance approach that we favour. Hence they take up capital gains that we do not. Otherwise their adjustments for inflation are very similar to ours. Tideman and Tucker (1976) also do not deal with rates of return as such, but their discussion of the types of adjustments to reported income necessitated by inflation corresponds closely to ours. Feldstein and Summers (1977) report pre-tax real rates of return on capital after making the usual adjustments for inflation. Lovell (1978) also makes the usual adjustments for inflation in reporting real rates of return on equity, but in a spirit that is basically similar to that of Shoven and Bulow. Kopcke (1978) reports real rates of return on capital in the usual fashion. He also reports real rates of return on equity, but he does not make the type of debt adjustment that we and others make. He acknowledges, however, that failure to make some such adjustment understates real rates of return on equity.

It is worth mentioning that, apart from the avowed general price-level accounting exercise of Basu and Hanna, all of the studies cited use, as we do, various specific indices to adjust specific assets and liabilities. (Though specific, these indices are not, of course, necessarily common to all the studies.)

While it is, once again, evident that the methodology adopted in this study is very much in the mainstream of the recent Canadian and American literature in the field, there are some differences. These, however, are for the most part minor, and our particular views are developed in detail in the text. It is somewhat surprising that the probably most important difference between our approach and that of a small minority of the above-mentioned studies concerns the debt adjustment, since this would seem to be one of the more straightforward inflation adjustments, both conceptually and as a practical matter.

# APPENDIX

## Notes on Data and Adjustment Methodology

### Primary data sources

(a) 1947-1964 Taxation Statistics, Department of National Revenue

1965-1976 Corporation Financial Statistics, Statistics Canada (Cat. 61-207)

(b) Fixed Capital Stocks and Flows, Statistics Canada (Cat. 13-211).

### The Sample of Corporations Reported in Taxation Statistics and Corporation Financial Statistics

| Year | Sample |
|---|---|
| 1947-1955 | Virtually all corporations that filed income tax returns. |
| 1956-1958 | All corporations reporting total assets of $500,000 or more, or profits of $25,000 or more; a 10 per cent stratified sample of the others. |
| 1959-1964 | All corporations reporting total assets of $1 million or more, or profits of $50,000 or more or, after 1960, losses of $25,000 or more; a 10 per cent stratified sample of the others. |
| 1965-1968 | All corporations reporting net assets of $5 million or more, 50 per cent of corporations reporting net assets between $1 million and $5 million, and a 5 per cent stratified sample of the others. |
| 1969-1971 | All corporations reporting net assets of $1 million or more, a 10 per cent stratified sample of corporations reporting net assets in excess of $250,000 or sales in excess of $500,000, and a 5 per cent stratified sample of the others. |

| | |
|---|---|
| 1972-1973 | Virtually all corporations reporting net assets in excess of $5 million, sales in excess of $5 million or profits or losses in excess of $250,000; a 5 per cent stratified sample of the others. |
| 1974-1976 | All corporations with assets in excess of $5 million and a stratified sample of the others. |

The income and balance sheet data provided by the sources in (a) above are in terms of fiscal year end. The fiscal years of some corporations do not correspond to the calendar year. Since the various deflators used in the inflation adjustments are annual ones, this may impart a slight downward bias to the real earnings and real rates of return for the years during which inflation was relatively high.

Crown corporations

Prior to 1965, the Department of National Revenue excluded Crown corporations from the taxation statistics. From 1965 to 1970, however, Statistics Canada included federal proprietory crown corporations in the financial statistics; and thereafter, agency Crown corporations and provincial and municipal Crown corporations were also included.

Very little information is available regarding the proprietory Crown corporations for the years 1965 to 1969 inclusive. The data for 1970 is much more complete, but the sectoral breakdown does not permit separating the financial Crown corporations from the nonfinancial. In order to deal with this problem with respect to these six years, reference was made to the analogous analysis in Department of Finance (1980), based upon a sample of corporation financial statistics that excluded Crown corporations, and an admittedly rough scaling adjustment was made to our results. While the adjusted rates of return are plausible for the nonfarm nonfinancial sector, we are somewhat uncomfortable about those for the manufacturing sector. The possibility cannot be excluded that these adjusted rates of return are slightly too high. We doubt, however, whether the upward bias during these six years is sufficient to affect the long-term trends.

Statistics Canada was able to provide additional information for the years 1971 to 1976 inclusive which made it possible to remove Crown corporations from the sample for those years.

Income taxes, payable and deferred

Income taxes paid in each year is the provision for current taxes payable for that year. Each year's closing balance of deferred income taxes was regarded as part of that year's equity. This item generally

derives from the difference between book depreciation expense and the capital cost allowances used for income tax purposes. Consequently, as long as the firm engages in capital formation at a steady or increasing rate, this amount will probably never be paid. A problem arose, however, with respect to the years 1965 to 1970, inclusive, because the data did not permit distinguishing between current taxes payable and deferred taxes. Since no satisfactory way could be found to estimate the deferred taxes for these years, no adjustment was made. Hence taxes paid and effective tax rates during those years are over-stated, as are dividend payout ratios. But, given the above adjustment with respect to Crown corporations, which had the effect of scaling the results on the basis of data that are free of this problem, it is likely that the estimates of after-tax rates of return were not adversely affected to a significant extent.

1965 Data

The data for the year 1965 constitute a problem. This is the first year of the Corporation Financial Statistics series, and Statistics Canada reports that it is not fully compatible with the preceding series. We have been informed, however, that although the 1965 data have never been revised, the problems that occurred in relation to that year were largely resolved during the following years.

The Depreciation Adjustment

In order to estimate accurately the replacement cost of depreciable assets and replacement cost depreciation, it is necessary to know when investments were made and when old assets were written off. As well, for the starting year of the analysis (i.e., 1947), it is necessary to know the age distribution of the depreciable assets held at that time so that the replacement cost for that year can be accurately estimated.

While Taxation Statistics and Corporation Financial Statistics (the main data sources) provide some of this information, they are by no means complete for the following reasons:

(a) Taxation Statistics start in 1947. Thus, we do not know the age distribution of depreciable assets held in that year; and

(b) More generally, Taxation Statistics and Corporation Financial Statistics do not deal with write-offs (and write-ups) in a systematic manner.

For these reasons it was decided to make use of the so-called "perpetual inventory" technique method of building up gross and net capital stocks. It is this computational technique which is used in the estimates reported in Fixed Capital Stocks and Flows. This approach has the added advantage that the computational technique makes it relatively simple to compute replacement cost figures with and without backlog

depreciation. The method involves the accumulation of gross investment over a period of years in order to obtain the gross depreciable assets in a given year. The technique also generates estimates of the depreciation expense for each year. In order to compute the replacement values of gross fixed assets, net fixed assets and depreciation expense, price indices are needed for each sector. These indices are available from Fixed Capital Stocks and Flows.

(a) Estimation of Average Asset Life

As a first step, it was necessary to estimate average asset life (the lives given in Fixed Capital Stocks and Flows seemed too long). Average asset life is defined as follows:

$$(1) \quad L_i = \frac{GDA_i}{BD_i}$$

where $L_i$ = average asset life of total depreciable assets in year i;

$GDA_i$ = gross depreciable assets at the end of year i;

$BD_i$ = book depreciation expense in year i.

A problem arose in regard to the years 1947-1964. The data source for those years, Taxation Statistics, does not report book depreciation expense. Instead, capital cost allowances used for income tax purposes are reported. These were probably always substantially greater than book depreciation expense, and could therefore not be used for

the above purpose. (When Capital Cost Allowances were used to estimate average asset life the results were implausibly low.) Since Corporation Financial Statistics reported book depreciation expense for the years 1965-1976, these twelve observations were used to calculate $L^*$ as an unvarying estimate of $L_i$.

$L^*$ turned out to be 19 years for both sectors.

Since there is some evidence that asset lives have been becoming shorter in recent decades, 19 years may be an underestimate. This figure was used, however, because no better estimate was readily available.

(b) Derivation of the Investment Series

In developing the investment series, it was necessary to distinguish between the pre-1947 period and the post-1947 period. It was not possible to obtain from Fixed Capital Stocks and Flows an investment series that was consistent with Corporation Financial Statistics. Two of the reasons for this are:

-- the data in Fixed Capital Stocks and Flows are collected on an establishment rather than on a corporate basis.

-- Corporation Financial Statistics refer in certain years to non-Crown corporations while Fixed Capital Stocks and Flows includes both Crown corporations and unincorporated firms.

The investment series for the 1947-1976 period was therefore calculated from Taxation Statistics and Corporation Financial Statistics as follows:

(a) $x_i = NDA_i - NDA_{i-1} + BD_i$

where $x_i$ = gross investment in year i;

$NDA_i$ = net depreciated assets in year i.

Book depreciation expense had to be estimated for the years 1947-1964. This was done by dividing gross depreciable assets at the end of each year by 19, the estimated average useful life of these assets.

In order to calculate the replacement value of the stock of depreciable assets held at the start of 1947, it was necessary to have an annual investment series which begins in 1927. Since the Taxation Statistics series does not go back that far, it was necessary to adapt the pre-1947 data provided in Fixed Capital Stocks and Flows. This was done by scaling the annual investment figures in the latter publication on the basis of the average ratio of the two investment series for the years for which both are available.

(c) Estimation of Replacement Cost Gross and Net Depreciated Assets and Depreciation Expense

This was done using the methodology described in the Fixed Capital Stocks and Flows methodology (Cat. 13-522). Details of the methodology used in computating backlog depreciation can be obtained from the authors by request.

The capital stock series, based on the perpetual inventory data contained in Fixed Capital Stocks and Flows are mid-year estimates. However, the data contained in Taxation Statistics and Corporation Financial Statistics represent year-end figures. Thus we have the following definitions:

(5) Financial statistics $BD_i = \frac{GDA_i}{L^*} = \frac{1}{L^*} \sum_{j=i-L^*+1}^{i} x_j$

(6) Perpetual inventory $BD_i = \frac{1}{2L^*} (x_i + x_{i-L^*}) + \frac{1}{L^*} \sum_{j=i-L^*+1}^{i-1} x_j$

Since annual investment, $x_i$, tended to rise consistently over the long interval, reliance upon the perpetual inventory method results in the underestimation of annual depreciation expense and, therefore, of accumulated depreciation. Consequently, net depreciated assets are overestimated. In order to correct for these biases, the estimates of annual depreciation expense and annual net depreciated assets were both scaled on the basis of the annual ratios of the Corporation Financial Statistics figures to the corresponding figures in Fixed Capital Stocks and Flows.

## NOTES

1 Two other versions of the capital maintenance concept of income that exist in the accounting literature are the money capital version and the purchasing power version. See, for example, Scapens (1977), pp. 64-66.

2 See Hicks (1946), pp. 171-181.

3 There is no doubt that the adherence to such practices as valuing, say, current assets at the lower of cost or market value has introduced subjective considerations of potentially significant proportions, with corresponding risks that inter-firm comparability of financial statements might be impaired. It is probable, however, that the evolution of increasingly stringent and uniform Canadian public accounting standards during the last thirty years has greatly reduced these risks.

4 This concept was modified in 1972 when the two-year writeoff -- 50 per cent each year -- provision was introduced with respect to new machinery and equipment acquired by manufacturing and processing firms.

5 It is widely anticipated that the Canadian Institute of Chartered Accountants will legislate new depreciation (and other) rules to reflect the effects of inflation within the next year or two. Whether and when Canadian tax rules will be changed is anybody's guess. Description of changes in the accounting practices of various other countries can be found in Sandilands Committee, and in Skinner (1977).

6 An apparently rare exception is Jenkins (1977a).

7 The absence of data relating to gross depletable assets was particularly restrictive, since it rendered unduly speculative any estimate of the equivalent of useful lives.

8 The adjustment methodology adopted was derived from Bossons (1977). A critical element in the adjustment is the assumption that the closing inventories of all firms are valued on a FIFO basis at year-end replacement cost.

9 Budget Document, issued by the Honourable Donald J. McDonald, Minister of Finance, March 31, 1977, p. 37 (quoted in Report, Ontario Committee on Inflation Accounting, p. 64).

10 See, for example, Jenkins (1977b); and Chant and McFetridge (1979).

11 See Feldstein (1966); Feldstein and Chamberlain (1973); Feldstein and Eckstein (1970); Feldstein, Green and Sheshinski (1976); and Pesando (1977), and references cited therein.

12 Current assets such as marketable securities may be reported at market value when that is lower than cost. Since in a study of aggregates the necessary firm-specific data are not available, it is assumed that these assets were reported at cost.

13 The data did not permit the identification of investments and loans, etc., within and beyond the sectors. It is highly probable that an overwhelming proportion of these items was within the non-farm non-manufacturing sector. As to the manufacturing sector, the proportion is probably smaller, but perhaps not unduly so.

14 See, for example, Kopcke (1978); Lovell (1978) (it is not obvious, however, that this writer includes inventories in capital); and Feldstein and Summers (1977).

15 Corporation Financial Statistics, 1971, Appendix B, Statistics Canada, Cat. No. 61-207 (annual).

16 Strictly speaking, capital should be measured at the start of the year. However, because a crucial data series on fixed assets was available only in terms of mid-year figures, the other components of capital were also measured in mid-year terms.

17 Attention is drawn to the data problems pertaining to the years 1965 to 1970, inclusive, described in the Appendix, in the section dealing with income taxes.

18 See, for example, Nordhaus (1975); Feldstein and Summers (1977); and Lovell (1978).

19 This is the view argued and tested in Department of Finance (1980).

20 For simplicity, the term "depreciation" connotes, in this specific context only, depletion as well as depreciation in its usual sense.

21 Scapens (1977), p. 65.

22 Canadian Institute of Chartered Accountants (1979).

23 This should not be taken to mean that the other differences between our methodology of adjusting for inflation and that of the Committee are necessarily insignificant. As is apparent, we disagree, for example, with the Committee's "financing adjustment" and this can make for an appreciable difference in the measurement of real profits. Another example of a potentially non-trivial difference concerns the contrasting treatments of deferred taxes. Other such examples may also exist.

24 Taking into account estimated salvage value at the end of its useful life. Since this study is concerned with large aggregates, this consideration is ignored.

25 op. cit., pp. 30-31.

26 See, for example, Kirkman (1974), pp. 65-76, and further references cited therein.

27 Sandilands Committee, pp. 142-146.

28 Report, Ontario Committee on Inflation Accounting, Government of Ontario, Toronto, 1977, p. 126.

29 It is likely that this has not emerged clearly in the literature because of the variety of concepts of income that have been contemplated explicitly or implicitly. Although the income concept preferred by the Sandilands Committee, for example, appears to have something in common with the capital maintenance concept, the Committee, while not favouring a backlog depreciation adjustment, nevertheless did not see the need for a working capital adjustment either. Nor, for that matter, was an adjustment for debt effects thought necessary.

30 The argument remains unchanged if it is assumed that some of the shielded assets are used to reduce liabilities or to acquire other assets, such as long-term loans receivable or securities of affiliates.

31 Granted that it may seem at first glance to be something of a departure from the traditional view of depreciation for the firm to apply depreciation on existing assets to the replacement of old ones, this is in fact fully consistent with the concept of capital maintenance as explained in this paper.

32 Some of the others are: Alexander and Barrington (1975); Stamp and Mason (1977); Kirkman, op. cit; and Report, Committee of Inquiry into Inflation Accounting, Government Printer, Wellington, N.Z., 1977.

33 Kirkman, op. cit., p. 141.

34 It is worth noting that there is evidence that provision for backlog depreciation is being made along these lines by various British firms. See Sandilands Committee; and Kirkman, op. cit.

## SELECTED BIBLIOGRAPHY

Surendra, P. Agrawal, "Accounting for the Impact of Inflation on a Business Enterprise," Accounting Review, October, 1977.

Michael O. Alexander and J. Douglas Barrington, "A Feasible Measure of Current Value Accounting," C.A. Magazine, September, 1975.

Michael O. Alexander (ed.), Accounting For Inflation, MacLean-Hunter Ltd., 1975.

P. Bakker, Inflation and Profit Control, Methuen, 1974.

S. Basu and J.R. Hanna, "Accounting for Changes in the General Purchasing Power of Money: The Impact on Financial Statements of Canadian Corporations for the Period 1967-74, Cost and Management, January-February, 1976.

W.T. Baxter, Accounting Values and Inflation, McGraw-Hill, 1975.

Gerard Belanger and Neil McIlveen, Rate of Return and Investment Profitability, Department of Finance, Ottawa, 1980.

John M. Boersema, General Price Level Accounting. A paper prepared for the Ontario Committee on Inflation Accounting, Supplementary Paper No. 4, Government of Ontario, Toronto, 1977.

John Bossons, The Impact of Inflation on Income and Financing of Large Non-Financial Corporations. A paper prepared for the Ontario Committee on Inflation Accounting, Supplementary Paper No. 5, Government of Ontario, Toronto, 1977.

Phillip Cagan and Robert E. Lipsey, The Financial Effects of Inflation, National Bureau of Economic Research, 1978.

Canadian Institute of Chartered Accountants, Accounting Research Committee, Current Cost Accounting, Toronto, 1979.

J.F. Chant and D.G. McFetridge, The Allocative Effects or Inflation, Anti-Inflation Board, Ottawa, 1979.

Sydney Davidson and Roman L. Weil, "Inflation Accounting: The SEC Proposal for Replacement Cost Disclosures," Financial Analysts Journal, March/April, 1976.

Sydney Davidson, Clyde Stickney and Roman L. Weil, Inflation Accounting: A Guide to the Accountant and Financial Analyst, McGraw-Hill, 1976.

Sydney Davidson and Roman L. Weil, "Inflation Accounting: Implications of the FASB Proposal," in Henry J. Aaron (ed.), Inflation and the Income Tax, Brookings Institution, 1976.

Solomon Fabricant, "Accounting for Business Income Under Inflation: Current Issues and Views in the United States," Review of Income and Wealth, March, 1978.

Angela Falkenstein and Roman L. Weil, "Replacement Cost Accounting: What Will Income Statements Based on the SEC Disclosures Show? -- Part I," Financial Analysts Journal, January-February, 1977.

Angela Falkenstein and Roman L. Weil, "Replacement Cost Accounting: What Will Income Statements Based on the SEC Disclosures Show? -- Part II," Financial Analysts Journal, March-April, 1977.

M. Feldstein, "Inflation, Income Taxes and the Rate of Interest: a Theoretical Analysis," American Economic Review, December, 1966.

M. Feldstein and O. Eckstein, "The Fundamental Determinants of the Interest Rate," Review of Economics and Statistics, November, 1970.

M. Feldstein and G. Chamberlain, "Multimarket Expectations and the Rate of Interest," Journal of Money, Credit and Banking," November, 1973.

M. Feldstein, J. Green and E. Sheskinski, Inflation and Taxes in a Growing Economy with Debt and Equity Finance, Discussion Paper No. 481, Harvard Institute of Economic Research, 1976.

M. Feldstein and L. Summers, "Is the Rate of Profit Falling," Brookings Papers on Economic Activity, 1: 1977.

A. Gaudeket, "An Application of Replacement Value Theory," Journal of Accountancy, July, 1960.

J.R. Hicks, Value and Capital, 2nd ed., Oxford, 1956.

Inflation Accounting Committee, Inflation Accounting, Report of the Inflation Accounting Committee, F.E.P. Sandilands, Chairman, London, Her Majesty's Stationery Office, 1975. Cited hereafter as "the Sandilands Committee."

Glenn P. Jenkins, Capital in Canada: Its Social and Private Performance, 1965-1974, Discussion Paper No. 98, Economic Council of Canada, Ottawa, 1977.

Glenn P. Jenkins, Inflation: Its Financial Impact on Business in Canada, Economic Council of Canada, Ottawa, 1977.

Patrick R.A. Kirkman, Accounting Under Inflationary Conditions, George Allen and Unwin, London, 1974.

Richard W. Kopcke, "The Decline in Corporate Profitability," New England Economic Review, May-June, 1978.

James A. Largay III and John Leslie Livingstone, Accounting for Changing Prices, John Wiley and Sons, 1976.

Michael C. Lovell, "The Profit Picture: Trends and Cycles," Brookings Papers on Economic Activity, 3: 1978.

Abram Mey and Kenneth S. Most, "Replacement Value Accounting," The Accountant, September 7, 1963.

William D. Nordhaus, "The Falling Share of Profits," Brookings Papers on Economic Activity, 1: 1975.

James E. Pesando, The Impact of Inflation on Financial Markets in Canada, C.D. Howe Research Institute, Montreal, 1977.

Lawrence Revsine and Jerry J. Weygandt, "Accounting for Infation: the Controversy," Journal of Accounting, p. 77.

Paul Rosenfield, "The Confusion Between General Price-Level Restatement and Current Value Accounting," Journal of Accountancy, October, 1972.

Report, Committee of Inquiry into Inflation Accounting, Government Printer, Wellington, New Zealand, 1977.

Report, Ontario Committee on Inflation Accounting, Government of Ontario, Toronto, 1977.

John D. Shoven and Jeremy I. Bulow, "Inflation Accounting and Nonfinancial Corporate Profits: Physical Assets," Brookings Papers on Economic Activity, 3: 1975.

John D. Shoven and Jeremy I. Bulow, "Inflation Accounting and Nonfinancial Corporate Profits: Financial Assets and Liabilities," Brookings Papers on Economic Activity, 1: 1976.

Keith Shwayder, "The Capital Maintenance Rule and the Net Asset Valuation Rule," Accounting Review, April, 1969.

Ross M. Skinner, Memorandum on the Significance of Debt Financing During an Inflationary Period. A paper prepared for the Ontario Committee on Inflation Accounting, Supplementary Paper No. 2, Government of Ontario, Toronto, 1977.

Edward Stamp and Alister K. Mason, "Current Cost Accounting: British Panacea or Quagmire," Journal of Accountancy, April, 1977.

Robert R. Sterling, "Relevant Financial Reporting in an Age of Price Changes," Journal of Accountancy, February, 1975.

T. Nicolaus Tideman and Donald P. Tucker, "The Tax Treatment of Business Profits under Inflationary Conditions," in Henry J. Aaron (ed.), Inflation and the Income Tax, Brookings Institution, 1976.

Richard F. Vancil, "Inflation Accounting -- The Great Controversy," Harvard Business Review, March-April, 1976.

Richard F. Vancil and Roman L. Weil, "Current Replacement Cost Accounting, Depreciable Assets, and Distributable Income," Financial Analysts Journal, July/August, 1976.

Table 1A

Nominal and Real After Tax Rates of Return on Capital Employed
1947-1980

| | Non-Farm Non-Financial | | Manufacturing | |
|---|---|---|---|---|
| | Nominal (%) | Real (%) | Nominal (%) | Real (%) |
| 1947 | 11.17 | 4.49 | 14.95 | 7.11 |
| 1948 | 10.49 | 2.15 | 14.13 | 5.10 |
| 1949 | 9.16 | 4.26 | 12.31 | 7.69 |
| 1950 | 11.00 | 4.59 | 14.62 | 9.08 |
| 1951 | 10.34 | 2.34 | 13.55 | 4.87 |
| 1952 | 8.00 | 4.60 | 10.42 | 8.27 |
| 1953 | 7.73 | 4.51 | 10.60 | 7.63 |
| 1954 | 6.62 | 4.15 | 8.31 | 6.22 |
| 1955 | 7.93 | 4.62 | 10.00 | 7.24 |
| 1956 | 7.96 | 4.25 | 9.97 | 6.04 |
| 1957 | 7.60 | 4.90 | 8.82 | 5.36 |
| 1958 | 6.11 | 3.96 | 7.66 | 5.18 |
| 1959 | 6.87 | 4.45 | 8.36 | 5.62 |
| 1960 | 5.28 | 3.44 | 6.19 | 4.08 |
| 1961 | 4.46 | 2.91 | 5.00 | 3.16 |
| 1962 | 4.99 | 3.21 | 5.87 | 3.70 |
| 1963 | 5.17 | 3.06 | 7.20 | 4.68 |
| 1964 | 6.04 | 3.92 | 7.49 | 4.93 |
| 1965 | 7.28 | 5.68 | 8.26 | 6.19 |
| 1966 | 7.19 | 5.66 | 8.07 | 5.85 |
| 1967 | 6.48 | 5.21 | 6.43 | 4.70 |
| 1968 | 6.73 | 5.68 | 7.22 | 5.89 |
| 1969 | 7.01 | 5.53 | 7.77 | 5.81 |
| 1970 | 5.67 | 4.55 | 5.26 | 3.41 |
| 1971 | 7.15 | 4.27 | 7.01 | 4.53 |
| 1972 | 7.56 | 4.20 | 8.58 | 5.24 |
| 1973 | 11.02 | 5.87 | 12.50 | 6.64 |
| 1974 | 12.80 | 5.80 | 14.79 | 6.00 |
| 1975 | 10.98 | 4.65 | 11.50 | 3.99 |
| 1976 | 10.22 | 4.50 | 10.08 | 4.38 |
| 1977* | | | 10.9 | 4.7 |
| 1978* | | | 12.9 | 5.8 |
| 1979* | | | 16.5 | 6.9 |
| 1980* | | | 14.7 | 5.6 |

*Estimates provided by Keith Brewer, Department of Energy, Mines and Resources, Ottawa.

Data Source: Statistics Canada, Industrial Corporations: Financial Statistics, Cat. 61-003.

Table 2A

Nominal and Real Rates of Return on Net Worth 1947-1979
Non-Farm Non-Financial

| | Nominal | | Real | |
|---|---|---|---|---|
| Year | Before Tax | After Tax | Before Tax | After Tax |
| 1947 | 21.36 | 14.98 | 10.59 | 5.84 |
| 1948 | 20.59 | 14.03 | 8.41 | 3.59 |
| 1949 | 18.14 | 12.26 | 9.93 | 5.58 |
| 1950 | 22.13 | 14.88 | 11.16 | 5.76 |
| 1951 | 24.47 | 14.19 | 11.71 | 4.11 |
| 1952 | 20.89 | 11.02 | 13.71 | 6.26 |
| 1953 | 19.25 | 10.81 | 12.12 | 5.58 |
| 1954 | 15.66 | 9.21 | 10.54 | 5.40 |
| 1955 | 18.45 | 11.31 | 11.72 | 5.96 |
| 1956 | 18.55 | 11.35 | 11.83 | 5.96 |
| 1957 | 16.49 | 10.94 | 11.32 | 6.75 |
| 1958 | 13.34 | 8.63 | 9.17 | 5.25 |
| 1959 | 15.76 | 10.00 | 11.01 | 6.24 |
| 1960 | 13.19 | 7.73 | 9.27 | 4.71 |
| 1961 | 12.07 | 6.70 | 8.43 | 3.88 |
| 1962 | 13.24 | 7.74 | 9.33 | 4.73 |
| 1963 | 13.62 | 8.03 | 9.26 | 4.57 |
| 1964 | 15.66 | 9.73 | 11.17 | 6.24 |
| 1965 | 18.14 | 10.75 | 16.36 | 8.40 |
| 1966 | 16.42 | 9.89 | 14.63 | 8.06 |
| 1967 | 14.77 | 8.87 | 13.36 | 7.36 |
| 1968 | 15.92 | 9.36 | 14.87 | 8.06 |
| 1969 | 16.42 | 9.89 | 14.88 | 8.16 |
| 1970 | 13.58 | 7.63 | 12.59 | 6.61 |
| 1971 | 15.50 | 10.00 | 10.22 | 5.74 |
| 1972 | 16.46 | 10.53 | 10.74 | 5.89 |
| 1973 | 22.57 | 15.93 | 14.83 | 9.03 |
| 1974 | 27.62 | 18.70 | 16.48 | 9.68 |
| 1975 | 23.66 | 15.81 | 12.81 | 7.17 |
| 1976 | 21.51 | 14.38 | 11.87 | 6.74 |
| 1977* | 18.9 | 13.0 | 9.0 | 4.8 |
| Revised Data* | | | | |
| 1975 | 22.6 | 14.4 | 14.1 | 8.2 |
| 1976 | 20.5 | 13.3 | 11.6 | 6.6 |
| 1977 | 20.4 | 13.7 | 10.3 | 5.6 |
| 1978 | 22.3 | 15.4 | 10.9 | 6.1 |
| 1979** | 27.4 | 18.9 | 13.7 | 7.9 |

*Estimates provided by Gerard Belanger and Neil McIlveen; Department of Finance, Ottawa.

**Average of 1st and 2nd quarters.

Data Source: Statistics Canada, Industrial Corporations: Financial Statistics, Cat. 61-003.

Table 3A

Nominal and Real Rates of Return on Net Worth 1947-1979
Manufacturing

| Year | Nominal | | Real | |
|---|---|---|---|---|
| | Before Tax | After Tax | Before Tax | After Tax |
| 1947 | 25.82 | 18.21 | 15.00 | 8.44 |
| 1948 | 26.05 | 18.13 | 13.41 | 6.83 |
| 1949 | 22.94 | 15.73 | 15.64 | 9.69 |
| 1950 | 27.74 | 18.73 | 18.57 | 11.22 |
| 1951 | 30.28 | 17.61 | 17.18 | 6.94 |
| 1952 | 25.06 | 13.67 | 19.96 | 10.75 |
| 1953 | 24.24 | 14.26 | 17.82 | 9.61 |
| 1954 | 19.01 | 11.06 | 14.72 | 8.03 |
| 1955 | 22.31 | 13.46 | 16.68 | 9.24 |
| 1956 | 22.14 | 13.50 | 15.52 | 8.22 |
| 1957 | 18.72 | 12.08 | 12.70 | 7.08 |
| 1958 | 16.16 | 10.51 | 11.63 | 6.82 |
| 1959 | 18.38 | 11.55 | 13.44 | 7.58 |
| 1960 | 14.64 | 8.50 | 10.65 | 5.36 |
| 1961 | 12.81 | 6.93 | 9.07 | 4.01 |
| 1962 | 14.76 | 8.43 | 10.49 | 5.05 |
| 1963 | 17.13 | 10.66 | 12.21 | 6.64 |
| 1964 | 17.72 | 11.25 | 12.67 | 7.16 |
| 1965 | 20.53 | 11.42 | 17.32 | 8.29 |
| 1966 | 18.15 | 10.33 | 15.14 | 7.31 |
| 1967 | 14.87 | 8.24 | 12.66 | 5.97 |
| 1968 | 17.02 | 9.46 | 15.67 | 7.70 |
| 1969 | 18.40 | 10.32 | 15.44 | 7.01 |
| 1970 | 12.68 | 6.60 | 10.43 | 4.26 |
| 1971 | 15.43 | 9.06 | 11.14 | 5.63 |
| 1972 | 18.11 | 11.29 | 12.73 | 6.82 |
| 1973 | 24.91 | 16.88 | 16.01 | 9.20 |
| 1974 | 28.98 | 19.76 | 15.91 | 8.49 |
| 1975 | 22.44 | 15.00 | 10.95 | 5.27 |
| 1976 | 19.51 | 12.88 | 10.65 | 5.67 |
| 1977* | 19.0 | 13.2 | 8.9 | 4.5 |
| Revised Data* | | | | |
| 1975 | 21.5 | 13.9 | 13.2 | 7.3 |
| 1976 | 18.7 | 11.8 | 10.8 | 5.7 |
| 1977 | 18.9 | 12.9 | 9.3 | 4.8 |
| 1978 | 21.7 | 15.3 | 10.2 | 5.4 |
| 1979** | 27.7 | 19.3 | 13.4 | 7.2 |

*Estimates provided by Gerard Belanger and Neil McIlveen, Department of Finance, Ottawa.

**Average of 1st and 2nd quarters.

Data Source: Statistics Canada, Industrial Corporations: Financial Statistics, Cat. 61-003.

Table 4A

Nominal And Real Effective Tax Rates, 1947-1979

| Year | Non-Farm Non-Financial | | Manufacturing | |
|---|---|---|---|---|
| | Nominal (%) | Real (%) | Nominal (%) | Real (%) |
| 1947 | 29.86 | 44.87 | 29.48 | 43.71 |
| 1948 | 31.86 | 57.37 | 30.40 | 48.01 |
| 1949 | 32.40 | 43.86 | 31.46 | 38.00 |
| 1950 | 32.76 | 48.39 | 32.49 | 39.59 |
| 1951 | 42.04 | 64.94 | 41.83 | 59.60 |
| 1952 | 47.25 | 54.37 | 45.42 | 46.12 |
| 1953 | 43.83 | 53.97 | 41.18 | 46.08 |
| 1954 | 41.22 | 48.75 | 41.80 | 45.44 |
| 1955 | 38.70 | 49.16 | 39.65 | 44.59 |
| 1956 | 38.80 | 49.67 | 39.01 | 47.05 |
| 1957 | 33.69 | 40.38 | 35.48 | 44.24 |
| 1958 | 35.31 | 42.72 | 34.97 | 41.35 |
| 1959 | 36.53 | 43.35 | 37.16 | 43.65 |
| 1960 | 41.42 | 49.23 | 41.91 | 49.68 |
| 1961 | 44.55 | 53.94 | 45.90 | 55.80 |
| 1962 | 41.57 | 49.31 | 42.87 | 51.88 |
| 1963 | 41.07 | 50.66 | 37.75 | 45.58 |
| 1964 | 37.91 | 44.18 | 36.51 | 43.47 |
| 1965 | 40.74 | 46.41 | 44.39 | 52.08 |
| 1966 | 39.76 | 44.90 | 43.07 | 51.74 |
| 1967 | 39.97 | 44.90 | 44.57 | 52.82 |
| 1968 | 41.22 | 45.81 | 44.46 | 50.84 |
| 1969 | 39.78 | 45.12 | 43.90 | 52.82 |
| 1970 | 43.78 | 47.50 | 47.92 | 59.13 |
| 1971 | 35.49 | 43.85 | 41.31 | 49.46 |
| 1972 | 36.02 | 45.09 | 37.68 | 46.43 |
| 1973 | 31.22 | 39.15 | 32.25 | 43.01 |
| 1974 | 32.28 | 41.26 | 31.80 | 46.60 |
| 1975 | 33.59 | 44.04 | 33.14 | 51.87 |
| 1976 | 33.15 | 43.22 | 33.99 | 46.77 |
| 1977* | 31.1 | 46.4 | 30.5 | 49.0 |
| Revised Data* | | | | |
| 1975 | 36.1 | 41.6 | 35.3 | 44.7 |
| 1976 | 34.9 | 43.1 | 36.6 | 47.5 |
| 1977 | 33.1 | 45.7 | 31.6 | 48.0 |
| 1978 | 30.7 | 43.9 | 29.6 | 46.8 |
| 1979** | 31.1 | 42.9 | 30.6 | 46.1 |

*Estimates provided by Gerard Belanger and Neil McIlveen, Department of Finance, Ottawa.

**Average of 1st and 2nd quarters.

Data Source: Statistics Canada, Industrial Corporations: Financial Statistics, Cat. 61-003.