INFLATION, INFLATION ACCOUNTING AND ITS EFFECT, CANADIAN MANUFACTURING, 1966-82*

BY D. J. DALY

York University, Downsview, Ontario

This paper provides estimates of the effects of inflation in Canada on the reported rate of return in manufacturing from 1966 to 1982. It provides estimates for several different concepts of rate of return (both for all assets, whether financed by equity or debt, and for the narrower equity to the owners) and for both a narrow and wide range of financial assets. Comparisons are made with similar studies for the United Kingdom. Such studies show that reported profits are overstated and total assets are undervalued during and after periods of inflation with traditional accounting concepts relative to an economic concept designed to maintain the firm as an ongoing entity.

The paper also discusses a number of factors that have contributed to the marked drop in the rate of return in Canadian manufacturing when both income and assets are valued at replacement costs. Some of these factors are also present in the other industrialized countries, such as increased raw materials prices, and a slower increase in productivity. Other factors have been relatively more important in Canada than in other countries, such as the historically higher level of production costs in Canada than in the United States and Japan, the two most important countries in Canadian trade. This is important during a period of tariff reductions when international competition in manufactured products is widespread.

Although corporate profits and the adjusted profits rates of return were depressed by the severity of the 1981-82 recession, some of the key factors depressing the rates of return are longer-term in nature. A continued persistence of these factors during the balance of the 1980s could contribute to restraint in business investment in manufacturing when total returns on a replacement cost basis are so much below the corporate long-term cost of capital.

This paper applies the concepts of inflation accounting to total Canadian manufacturing for the period from 1966 to 1982. Measures of rates of return for individual years are provided, both on the basis of total assets and on the basis of the net assets attributable to the owners. There are four sections in the paper after an introduction. Section 2 is a brief conceptual statement and outlines the methods. Section 3 makes comparisons with similar studies for the United Kingdom and summarizes the results of this and other studies. Section 4 discusses the environmental factors for Canadian manufacturing that appear to contribute to the lower rates of return in recent years. Section 5 discusses the implications of the results for future business decisions.

1. INTRODUCTION

The emergence of the most extended and widespread period of inflation in peacetime history in the industrialized countries has led to renewed discussion of the appropriate measurement of profits and rates of return in the corporate sector. This has been reflected in previous General Conferences of this Association, in articles in the *Review of Income and Wealth*, and papers covering this topic at the 18th General Conference in Luxembourg. Other studies have been made for many individual countries, for individual industries, and some studies of individual firms. In addition, some countries have introduced inflation cost

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accounting recommendations on a voluntary basis by the individual accounting organizations, or on a required basis for public accounting statements and for tax purposes.

A number of previous Canadian studies have been made of these issues, but only a small minority of companies are using inflation cost accounting even for internal purposes. No strong recommendations have yet been made by the professional accounting associations, and no changes in reporting for corporate profits taxes have yet been proposed.

This paper will concentrate on Canadian manufacturing. A number of important longer-term changes in the environment for Canadian manufacturing have occurred since early in the 1970s that have led to increased upward pressures on manufacturing costs. The slowdown in productivity growth and in total output, lower rates of capacity utilization, increased international competition and the severity of the 1981–82 recession in Canada have led to sharp drops in reported corporate profits and rates of return. Inflation adjusted rates of return show declines earlier to substantially lower recent levels, and rates of return well below the current costs of long-term corporate borrowing. Inflation adjusted rates of return would be helpful for corporate decisions with respect to medium term investment decisions for the 1980s, and also for the reporting of corporate profits for the taxation of corporate profits. These themes will be considered further in the last section of the paper.

2. Conceptual

The conceptual issues in estimating corporate profits and the rates of return on total assets during a period of inflation have been widely recognized and discussed for decades. The question of how to measure the key accounting and economic variables can only be resolved with a reasonably clear view of the purposes of measurement. For our purposes, J. R. Hicks's definition is satisfactory, with an emphasis on measuring income in a manner to ensure retaining an adequate level of income in the firm to maintain it as an ongoing entity (Hicks 1946, pp. 171–181). The Sandilands Committee accepted the same philosophy and adapted the definition to read "the maximum amount which a company can distribute during the year, and still expect to be as well off at the end of the year as at the beginning." Similar themes have been expressed by Yuji Iriji, Daniel Holland (1980), John Walton (1978 and 1981) and others. The theoretical basis of these adjustments has been well covered in these papers and will not be repeated here.

Two examples can illustrate these problems in a period of inflation. Accounting practice has historically encouraged the use of depreciation at historic cost as a basis of reporting profits for public reporting and for tax purposes, and this is still the dominant practice in Canada. The valuation of inventories is based on historic cost or current market cost, whichever is lower. During a period of inflation this approach to the valuation of these assets will lead to a higher reported estimate for profits before taxes than would be the situation if profits were estimated on the basis of the costs of replacing those physical assets at the new and higher level of prices for similar durable capital assets and inventories.

These estimates of profits can have several further effects. When these reported profits are used as the basis of corporate profits taxes to the government, it leads to larger tax payments, and the government can become an important beneficiary of inflation. Furthermore, if reported profits are used as a basis of corporate decision making the companies may not be setting prices sufficiently high to ensure an adequate rate of return on a long-term basis, if they have some scope for pricing policies. In addition, dividends may be paid out to an excessive degree and thereby they might not have an adequate level of internal reserves to maintain their real resources intact.

These same issues arise in the context of estimating the balance sheet, and the related rates of return on total assets. The balance sheets are based on historic costs, so the balance sheets as reported will be lower than replacement costs.

Valuations of both profits and balance sheets at replacement costs can have a significant impact on rates of return (both on net trading assets and shareholder's interest). Replacement cost rather than historic costs will lead to *lower* levels of corporate income and *higher* levels of assets and unambiguously *lower* rates of total return on both assets and net equity.

Estimates for two alternative concepts of income and assets are provided in subsequent sections. One concept of rate of return relates to total income and the related coverage of total assets. This would cover net trading income *before* interest to total net trading assets. This would cover all income from capital, both debt and equity, and all related assets. An advantage of this measure is that it is not affected by the changing proportions of debt and equity.

The second concept of rate of return relates to net trading income *after* interest paid to shareholder's interest. This would exclude interest income in the numerator and long-term debt liabilities in the adjusted balance sheets.

One of the concepts of capital maintenance is based on the returns to capital in the corporate sector after provision for the consumption of fixed assets based on replacement cost, and after eliminating the inventory valuation adjustment. Such adjustments to both inventories and durable capital facilities have been recommended as part of the national accounting concepts of net national income for decades. We will use the term "pure Sandilands" as used by John Walton (1981) for this variant. A second concept to be used will make an additional adjustment of monetary working capital. It is recognized that a typical manufacturing firm needs other assets than physical assets as part of its ongoing operation and trade debtors and creditors are a normal part of financing these additional assets. When prices are rising during inflation, additional finance is required to sustain this trade lending and trade credit received or paid is a continuing part of the business situation for the firm.

3. Illustrative Empirical Results

As part of developing inflation adjusted estimates of rates of return, a number of options are available for price deflators, and there is considerable discretion on the extent of disaggregation within manufacturing that can be attempted. Our objective was to make an adjustment for changes in the general price level

associated with inflation. Different rates of inflation in different products, demand sectors, and industries are inevitable during inflationary periods but our aim was to choose simple, easily understood procedures that could be easily duplicated, rather than more complex component price indices. One of our purposes was to develop a relatively simple procedure that could be used by individual firms. The G.N.P. deflator has been used for all the estimates reported on this paper.

Similar studies of inflation adjusted rates of return for Canada and for other countries have sometimes been made using the individual price components for the components of the capital stock. For Canada this option would have made very little difference in the results. By 1982, for example, the implicit price index for the GNE deflator was 2.74 times the 1971 level. The price deflators for both non-residential construction and machinery and equipment had increased somewhat less over that period with a relative price decline averaging 0.1 percentage points per year for non-residential construction and almost 0.5 percentage points per year for machinery and equipment. This option would make very little difference to the size of the adjustments.

The objective in making adjustments to go from reported profits to an aggregate adjustment for inflation was to correct for the decline in purchasing power of the unit of account, but *not* to make changes reflecting a change in *relative* prices for individual types of physical assets. Another advantage in using a simple and readily available price index was that the same methodology could then be easily applied by financial accountants and other managerial personnel at the company level to clarify issues of corporate decision making in relation to pricing, dividend and investment policies. A more complex procedure for adjusting rates of return could introduce additional complications that would be more difficult for the management personnel to understand and to implement. The philosophy was that even a simple adjustment would be preferable to the current dominant practice of making *no* adjustment at all, which is apparently still the dominant practice for even large companies in Canada.

The adjustments in this paper have been made for total manufacturing by direct adjustment of the aggregates. An alternative approach would have been to make the adjustments at the level of the individual industries within manufacturing, and obtain the totals for manufacturing as a sum of the individual components.

A similar issue had been researched previously in the context of seasonal adjustment in Canada. Comparisons had been made between seasonal adjustment at the aggregate level, or seasonal adjustment of the individual components which are then aggregated. The conclusion from that study was that the results were very similar, and even identical for all practical purposes. It was concluded that one need only go to the level of disaggregation that was needed for purposes of that analysis, and the additional time and costs did not seem to give any better results (Daly 1961). However, other researchers in Canada have made comparable inflation adjustments to profits and rates of return for individual industries within manufacturing.

Table 1 summarizes the main results for Canadian manufacturing for 1976, on a historical cost basis, and for a number of alternative capital maintenance concepts. The comparable results for United Kingdom manufacturing are also

TABLE 1

INCOME TO ASSET RATIOS, INCOME BEFORE TAX, MANUFACTURING, UNITED KINGDOM AND CANADA, 1976

	Large U.K.	All Canadian
1. *Net trading income before interest to net trading assets*		
Capital maintenance concept:		
Historical cost	18.8	10.2
"Pure" Sandilands	4.3	3.9
Extended to include wide definition of monetary working capital	3.4	4.3
2. *Net trading income after interest to shareholder's interest*		
Capital maintenance concept:		
Historical cost	22.3	8.0
"Pure" Sandilands	3.4	2.4
Extended to include wide definition of monetary working capital—realized and unrealized holding gains	8.5	2.9

Sources: Walton (1981), p. 120; Daly/MacCharles (1983), Appendix IV.

shown. One difference is that the data for the United Kingdom cover large listed companies in manufacturing, while the Canadian data cover all manufacturing. For the 1974-76 period, for example, the Canadian Corporation Financial Statistics (Cat. 61-207) was based on all corporations with assets in excess of $5 million, and a stratified sample of the others (normally a 5 percent sample). There is normally a fairly large variation in rates of return around the average for smaller companies, with some making quite high rates of return, but others making much lower rates of return. This may pull the rate of return for total manufacturing somewhat below the rate for large companies, but the extent of any difference could only be quantified by further research.

One other difference is that the United Kingdom data include investment income in manufacturing, while the Canadian data that were used exclude investment income. This difference is not large, however. Unrealized holding gains are also excluded from income in the Canadian data.

The Canadian data for 1976 were somewhat lower than earlier or later years during the period of slower economic growth about the middle of the 1975-79 expansion, but 1976 can be seen in a longer historical perspective for Canada in later tables.

Tables 2 and 3 both show lower levels of rates of return after maintenance of capital on a current cost basis than on a historical cost basis as reported. The differences are even greater in the late 1970s and early 1980s than they had been in the 1960s and early 1970s. Furthermore these differences emerge in *all* the variants of rates of return. These are shown for all income (both profits and interest paid) in relation to total net assets (with expenses and physical assets valued at current costs). These differences are shown for maintenance of capital relating to physical assets of plant, equipment and inventories ("pure Sandilands") and are also adjusted to the wide definition of monetary working captial. Similar differences emerge for net trading income after interest to

TABLE 2

TOTAL INCOME TO ASSET RATIOS BEFORE TAX, CANADIAN MANUFACTURING, 1966-82

	Historical Cost	"Pure" Sandilands	Extended Wide Monetary Working Capital	Long-term Corporate Bond Rate
1966	8.0	6.7	6.7	6.9
1967	7.7	5.7	5.7	7.7
1968	8.4	6.2	6.2	8.2
1969	9.1	6.2	6.3	9.7
1970	6.7	4.7	4.9	8.8
1971	6.9	4.1	4.1	8.2
1972	8.0	3.8	3.9	8.2
1973	11.9	5.2	5.4	8.6
1974	12.9	5.9	6.4	10.2
1975	11.0	4.7	5.5	10.8
1976	10.2	3.9	4.3	9.4
1977	9.8	3.5	3.9	9.7
1978	11.9	4.2	4.5	10.3
1979	14.3	4.9	5.3	12.2
1980	13.0	3.5	4.1	13.3
1981	7.7	0.1	1.2	16.3
1982	7.1	0.1	1.2	15.9

Sources: D. J. Daly and D. C. MacCharles (1983, Appendix IV, 1980 to 1982 are estimates based on partial data.); *Bank of Canada Review*, 1966-83.

TABLE 3

NET TRADING INCOME AFTER INTEREST TO SHAREHOLDERS' INTEREST, CANADIAN MANUFACTURING, 1966-82

	Historical Cost	"Pure" Sandilands	Extended Wide Montary Working Capital	Long-term Corporate Bond Rate
1966	7.4	6.6	6.6	6.9
1967	6.8	5.1	5.1	7.7
1968	7.5	5.8	5.9	8.2
1969	8.0	5.6	5.7	9.7
1970	4.7	3.4	3.6	8.8
1971	5.2	2.5	2.6	8.2
1972	6.9	2.9	3.0	8.2
1973	11.3	5.1	5.3	8.6
1974	11.9	5.8	6.5	10.2
1975	9.3	4.2	5.3	10.8
1976	8.0	2.4	2.9	9.4
1977	7.7	2.3	2.7	9.7
1978	10.4	3.3	3.6	10.3
1979	13.0	4.2	4.7	12.2
1980	10.9	2.3	3.1	13.3
1981	4.1	(1.1)	0	16.3
1982	3.0	(2.5)	(2.0)	15.9

Sources: D. J. Daly and D. C. MacCharles (1983, Appendix IV, 1980 to 1982 are estimates based on partial data.); *Bank of Canada Review*, 1966-1983.

shareholders' interest, and the widening wedge between historical cost and capital maintenance at replacement cost emerges with both the "pure" Sandilands measure and the extended wide monetary working capital measure.

The results in this paper are broadly in line with earlier Canadian studies of the comparisons of profits and rates of return with capital maintenance at replacement cost compared to historical cost as reported. However, the last years in most of the earlier studies ranged between 1974 and 1979 [Basu and Hanna (1976); Belanger and McIlveen (1980); Bossons (1977); Jenkins (1977a and 1977b); Tarasofsky, Roseman and Waslander (1981) and Patrick Grady, ed. (1982)]. These studies varied somewhat in the price deflators used, or in the range of expenses, incomes or assets used for total manufacturing, but they all describe broadly similar stories with some variations in detail, depending on the broad purposes of the analysis.

One study of inflation and taxation in Canada suggests that inflation has had very little effect on the rate of return [Boadway, Bruce and Mintz, (1984)]. Their study deals with the economy as a whole, with special emphasis on the effective tax rate. Their results show that corporate holders of buildings, machinery and inventories are adversely affected by inflation, while those with financial liabilities on a net basis gain from inflation. The manufacturing sector has a quite different structure of assets and liabilities from the total economy which was the basis of the Boadway, Bruce and Mintz study. The ratios of buildings, equipment and inventories to total assets for manufacturing were 2.2 times the ratio for all companies in Canada in 1980. Furthermore, the ratio of debt liabilities to total assets for all corporations in Canada was about one-third higher than manufacturing for the same year. The ratio of debt to equity (book value) for the economy as a whole was 2.3 times the average for all manufacturing [Statistics Canada, 1983, pp. 3 and 47]. Manufacturing was clearly affected adversely by inflation, while other industrial sectors gained from inflation so that inflation had a more modest effect on the aggregate. A reduction of the corporate tax rate in manufacturing to 40 percent in 1973 compared to a rate of approximately 50 percent in earlier years prevented an even greater drop in the after tax rate of return in Canadian manufacturing during the late 1970s and early 1980s.

A number of studies of rates of return to shareholders' interest in North American manufacturing have concluded that the rates of return in manufacturing had declined in the latter part of the 1970s [Feldstein and Summers (1977); Holland and Myers (1979); Nordhaus (1975); Tarasofsky, Roseman and Waslander (1981, pp. 27-28); Daly and MacCharles (1982); Wilcox (1983)]. Several of these studies suggest that declines were clearer for manufacturing than for the broader non-financial sector.

It is widely recognized in these and other studies that corporate profits are extremely volatile over the business cycle, typically undergoing larger swings than any other income component of the national accounts. Clearly the severity of the 1981-82 business cycle recession in Canada and its impact on manufacturing is reflected in the measures of corporate income in Tables 2 and 3 in the estimates for those years. However, some of the empirical tests on rates of return in Canadian manufacturing were showing declines even before the recession, and much of this paper deals with those longer-term developments, recognizing that the

recession and its severity have depressed some of the recent values below the longer-term sustainable levels.

It is also significant that all the measures of rates of return that provide for the maintenance of capital at replacement cost show a widening gap below long-term corporate bond yields. It is clear that the rates of return to physical assets in manufacturing have dropped drastically below the long-term costs of borrowed funds for the same broad industry group. There can be tax considerations that can affect the decisions for manufacturing corporations to invest in physical or financial assets, as there are from the point of view of individuals and others to invest in the financial instruments of manufacturing firms, but none of the changes over the period could modify this basic conclusion.

However, the main purposes of this paper are not only to go over the issues of measurement of rates of return in manufacturing (which have been reviewed extensively in Canada and elsewhere), but to explore two other questions. One question is to review some of the major reasons for the drop in the rates of return in Canadian manufacturing, some of which are similar to the same developments in other countries. The second question is to review the implications of the evidence and the analysis for the medium term prospects for Canadian manufacturing investment.

4. Factors Contributing to Declines in Corporate Rates of Return

The extent of the declines in the rates of return in Canadian manufacturing after adjusting for inflation is quite significant. There is no question that these declines have been accentuated by the severity of the 1981-82 recession. Manufacturing output, for example, dropped 20.2 percent between June 1981 and December 1982 (the respective high and low months using the National Bureau approach to dating business cycle peaks and troughs). The unemployment rate approached 14 percent seasonally adjusted in the 1982-83 winter high. This is the first time in the present century when a recession in Canada had been more severe than one occurring concurrently in the United States [White (1967); Daly (1969)]. Such a severe recession was bound to have a significant impact on corporate profits. Corporate profits per unit of output in manufacturing (as reported) dropped from about 170 in the first quarter of 1981 (1974 = 100) to under 65 in the second quarter of 1982, or a drop of more than 60 percent in five quarters. Corporate profits in manufacturing are now recovering from this very low level, and the current expansion will continue this process that is now under way. The purpose in this paper, however, is to assess some other longer-term factors that have contributed to the lower returns that are expected to persist for a number of years ahead.

4.1. *Terms of Trade Between Raw Materials and Manufactured Products*

Initially some of the factors affecting corporate profits in manufacturing in many of the major industrialized countries will be discussed, while later parts of this section will consider factors that are rather unique for Canada, in either source or magnitude.

The terms of trade refer to any differences in price changes over time, for example, those between raw materials and manufactured products. It has sometimes been alleged by some of the developing countries that the prices of manufactured products (which they import) have tended to increase compared to the prices of raw materials (which they export). This view had been put forth by Raul Prebisch, for example, in a U.N. study [Prebisch (1950)]. The prices of manufactured products did increase relative to primary product prices during the latter part of the 1950s, but primary product prices have gone up much more rapidly than manufactured goods prices since 1970. Kravis and Lipsey have been engaged in developing new and better export price indices for manufactured products for the industrialized countries, and have also experimented with quality adjustments for manufactured goods prices. These measures show sharp *drops* in the terms of trade of manufactured goods prices relative to primary commodities since 1970, and by 1977 these measures were well below the 1953 level. The authors estimated the decline in the terms of trade of manufactures relative to primary products from 1953 to 1976 was 45 percent, considerably more than the decline of 28 percent in the more readily available measures of prices based on unit values [Kravis and Lipsey (1981)].

This decline in the terms of trade for manufactured products relative to primary products over the 1970s internationally is bound to have an influence on the relative position of Canadian manufacturing. This operates two ways. For one thing, primary products are an important input cost for manufacturing. Manufacturers experience a cost squeeze when primary product prices have gone up more than selling prices of manufactured products from 1971 to date. In addition, the higher price increases for primary products than manufactured products permit higher wages and profits in the primary products area to help the shift in resources between sectors that the shifts in relative prices are signalling as appropriate. Some examples of the relatively greater price increases in the primary sector than the manufactured sector are shown in Table 4 below. From 1971 to 1981, the average price increase in four manufactures price indices was 135 percent or 8.9 percent per year. However, for the five primary products, the average price increase was substantially greater, namely 551 percent higher at the end of the period or 20.6 percent per year. Furthermore, every single measure of price increases for primary products had gone up more rapidly than the most rapidly increasing group of manufactured products prices. When the prices of energy and other primary products prices (which are an important area of input costs to manufacturing) have gone up more rapidly than the prices of manufactured outputs, an important squeeze on profit margins in manufacturing has to occur. This is reflected in lower rates of return to the manufacturing sector. This increase in the relative prices of raw materials to manufactured goods prices can contribute to a squeeze on profits in manufacturing, even though the increases in prices of primary products may only make a modest contribution to the rate of inflation in final demand. This partly reflects the fact that raw materials amount to only 10 to 15 percent of expenditures on final demand in such countries as United States, West Germany and Japan. About 80 percent of the price increases from 1971 to 1979 in both the United States and Japan come from price increases in the non-primary area [Bosworth and Laurence (1982), pp. 48-56]. This

TABLE 4

PRIMARY AND MANUFACTURED PRODUCTS, SELECTED PRICE AND COST MEASURES, CANADA, 1971 = 1.00

	1981
Manufactured Products	
Industry selling price index, non-food	2.70
Labour cost per unit of output, Canadian dollars	2.31
Motor vehicles and parts, export price index	2.07
Other manufactured goods, excluding motor vehicles and parts, export price index	2.31
Unweighted average of above manufactured products price indices	2.35
Primary Products	
Crude oil prices, imported, CIF Montreal	14.57
Crude oil prices, FOB Edmonton	6.62
Farm and fish products, export price index	3.24
Forest products, export price index	3.20
Metals and minerals, export price index	4.94
Unweighted average of above primary products prices indices	6.51

Sources: Department of Finance, *Economic Review, April 1982,* pp. 173 and 1974; *Bank of Canada Review,* January 1983, pp. S144-S145; and Bureau of Labor Statistics *News* (Washington: U.S. Department of Labor, June 2, 1982), Table 9.

interpretation is consistent with a recent U.S. study which has emphasized the role of supply shocks from higher energy prices as a factor in the lower pre-tax profit rate in U.S. manufacturing [Wilcox (1983)]. This is also consistent with an emphasis on the increases in energy prices on the profits in other sectors in a Department of Finance study [Belanger and McIlveen (1980)].

These pressures of higher costs of raw materials relative to the selling prices of manufactured products are likely to have been a factor contributing to a squeeze on the rates of return to manufacturing in other countries as well. The declines in raw material prices during the worldwide recession of the early 1980s may have softened this tendency to some degree, but any continued strength in the expansion would probably lead to the reemergence of higher raw material prices.

4.2. *The Slowdown in Productivity Increases*

During the earlier post-war years, increases in output per hour in manufacturing were able to provide an important but partial offset to increases in wages and other costs. However, in many countries since early in the 1970s there has been an acceleration in wage costs, energy costs, and other primary material costs, and a significant slowdown in the rate of productivity increases. The timing and the extent of the slowdown has varied from country to country.

Data for output per hour in manufacturing for a number of the major industrialized countries are shown in Table 5. Two important points can be made about Canada in the perspective of the international comparisons shown there. For one thing, the extent of the difference since 1973 compared to the previous two decades is greater for Canada than for most of the other countries shown. Secondly, the size of the increase in Canada from 1973 to 1982 is less than any

TABLE 5

CHANGES IN OUTPUT PER HOUR IN MANUFACTURING, SELECTED COUNTRIES, 1950-73 AND 1973-83

	1950-73	1973-83	Difference
Canada	4.29	1.79	−2.50
United States	2.79	1.98	−0.81
Japan	9.98	6.82	−3.16
France	5.78	4.64	−1.14
Germany	6.47	3.69	−2.78
Italy	6.60	3.22	−3.38
United Kingdom	3.33	2.35	−0.98

Source: U.S. Department of Labor *News*, International Comparisons of Manufacturing and Labor Cost Trends, Preliminary Measures for 1983 (Washington: May 31, 1984).

of the other six countries shown. This marked slowdown in productivity increases has been pointed out in other recent studies, such as recent O.E.C.D. studies [Daly (1981)].

It is also of interest that although some slowdown in the rate of increase in the net stock of capital in manufacturing had already begun by 1981, the increase was still 4.37 percent per year, well above the increases in employment and total hours worked. From 1973 to 1981 the diminished contribution of fixed capital stock to output growth in manufacturing was the least important factor in the slower increase in output of manufacturing, as can be seen in Table 6. The decline in output in relation to total factor inputs contributed a bit more than four-fifths of the total output decline.

TABLE 6

CANADIAN MANUFACTURING, SELECTED GROWTH RATES 1950-73 AND 1973-81

	Contribution to Growth Rates		
	1950-73	1973-83	Change
Labour (0.75 weight)	0.87	0.40	−0.47
Capital (0.25 weight)	1.25	1.09	−0.16
Total factor input	2.13	1.49	−0.64
Output in relation to total factor inputs	3.40	0.16	−3.24
Total output	5.53	1.65	−3.88

Sources: U.S. Department of Labor, Bureau of Labor Statistics, *Output Per Hour, Hourly Compensation, and Unit Labor Costs in Manufacturing, Eleven Countries, 1950-81* (Washington: December 1982) and Statistics Canada, *Fixed Capital Flows and Stocks, 1926-73* and *Fixed Capital Flows and Stocks*, 1982 (Catalogue 13-211).

4.3. *Inflation and the Slowdown in Productivity*

One factor that emerges as important in the decline in productivity in North America and internationally is the impairment of efficiency by inflation. Rational decisions by businessmen about production, investment, borrowing, cash management, wage settlements, and international trade all require the use of information from the price system to make longer term decisions. It is easier to detect emerging

changes in relative prices on both input and output prices when the general price level is stable than when all prices are going up. Furthermore, a high average rate of inflation normally involves greater variations in individual price changes. Higher rates of inflation in goods prices eventually end up in higher interest rates normally. There are also larger differences in the rates of price changes internationally, and the differential experiences in prices and interest rates among countries are reflected in exchange rate changes. Market prices become less effective in decision making and in the coordination of economic activity during inflation, so senior business leaders spend more time trying to find out what is going on in the economy with increased environmental uncertainty and thus have less time to manage and coordinate internal decision making within their organizations effectively.

Peter Clark has published a recent study on inflation and the productivity decline in the United States. He finds a close connection between the deviations in the levels of prices and the levels of productivity from their longer term trends and presents some evidence that the causal direction is from high price level deviations to low productivity level deviations [Clark (1982)]. A duplication of his methods for Canada yielded very similar results.

A study on the interrelations between inflation and productivity in Canada concluded that "the increased inflation rates of the 1970s are sufficient to explain virtually the entire recent slowdown in productivity growth" [Jarrett and Selody (1982)]. A study on Japan also shows similar negative effects of inflation on productivity and economic growth [Oritoni (1981)]. It may be significant that the rate of economic growth in Japan has continued higher than in the other industrialized countries since the inflation of the early part of the 1970s has been controlled.

A number of studies of periods of hyperinflationary episodes indicate that such periods lead to sharp drops in productivity as individuals and businesses revert to barter types of trade with the collapse in the use of money for transactions purposes [Friedman (1956), esp. Chapter by E. M. Lerner].

Earlier studies of productivity over business cycles have established that productivity increases slow down in the early stages of recession in demand, and can even become negative in more severe recessions. This theme was an integral part of W. C. Mitchell's (1941) theory of business cycles, and the empirical evidence was studied by Thor Hultgren (1965). Arthur Okun emphasized the degree to which changes in the unemployment rate and the related fluctuations in actual output relative to potential output were related to variations in productivity [Okun (1970)]. A number of studies of economic growth and its shorter-term variation have quantified the effects of shorter term demand fluctuations [Denison (1979)]. These cyclical variations in prices, costs, productivity and profits are an important and integral part of business cycles and these timing interrelations have persisted for decades [Moore (1980), Chapter 14].

The increased importance of inflation and studies of its effect on productivity suggest that steady non-inflationary growth in demand would be favorable to high productivity growth over extended periods while *either* weakening in demand *or* inflationary pressures of demand would have adverse effects on productivity growth.

4.4. *International Comparisons of Canadian Productivity and Cost Levels*

Sections 4.1 to 4.3 have dealt with factors that have affected rates of return in manufacturing for many of the industrialized countries. The balance of this section will discuss a number of topics that are particularly important for Canada.

The levels of Canadian real GNP per person employed and per capita had been one of the highest in the world after the United States for decades. However, manufacturing has not been one of the industrial areas in which Canada's comparative advantage lay. Levels of output per hour in total manufacturing have been about twenty-five percent *below* the United States for most of the last decade, and the gap was even wider in the 1950s and 1960s. There is, of course, considerable variation around that average with some individual industries above the United States, while others are markedly lower [West (1971); Frank (1977)]. This is a wide gap, bearing in mind the high degree of foreign ownership and control, the high levels of the capital stock per person employed, and the high degree of knowledge of successful practices being employed in other countries, and the relatively easy and open transfer of technologies both in the scientific and engineering areas and in the managerial and organizational aspects. Prominent themes in the reasons for these persisting gaps in productivity levels would include the importance of product specific economies of scale in productivity and cost levels, the greater degree of product diversity at the typical plant in Canada, and the continued existence of tariff and nontariff barriers to trade in Canada and elsewhere. These institutional factors have made it difficult for Canadian manufacturers to take full advantage of the economies of scale within the smaller Canadian market. There is also evidence from a number of studies that Canada has been slower in adopting new technology than other and larger economies.

Although output per hour in Canadian manufacturing has been about 25 percent below the United States for many years, total compensation per hour has been between 5 and 10 percent below the United States since about 1977, even after allowing for the decline in the value of the Canadian dollar below the United States dollar. This implies higher levels of labour costs per unit of output in a majority of the individual industries within manufacturing than in the same industries in the United States. This is an important consideration when labour costs amounted to about 63 percent of GDP in manufacturing in 1980 (the last full year before the recession began).

It is also significant that levels of output per hour in manufacturing in Japan have begun to exceed the levels in Canada in recent years. Furthermore, the levels of output per hour in the larger Japanese plants are now about one-third higher than the larger Canadian plants, and it is these larger Japanese plants that have been increasingly dominating the world export market in recent decades. These higher levels of output per hour in Japanese manufacturing have been taking place with lower levels of compensation per hour than in Canada, which is an important factor in the continuing strong competitive position of Japanese manufacturing in North American and world markets. These Japanese developments are important for Canada as the two way flow of trade with Japan makes this country the second largest of Canada's trading partners. The themes in the

above paragraphs have been documented more fully in Daly and Globerman (1976), Daly (1970), (1980) and (1981), and references cited therein.

These long-term cost and productivity problems for Canadian manufacturing are important for the rates of return to capital in manufacturing, especially in light of the further increases in manufacturing costs that have taken place in Canada since the 1970s. With further reductions in tariffs now in the process of being implemented under the Tokyo Round of GATT negotiations, and a high degree of international competition in manufacturing internationally, it is less easy to pass on increased costs to the buyer, and more erosion of corporate profit margins begins to take place. Subsequent discussion in this section should be considered in the perspective of this longer term discussion of the competitive position of Canadian manufacturing in relation to its two most important trading partners.

4.5. *Inflation, Exchange Rates and Profitability in Canadian Manufacturing*

It has been widely recognized that the degree of inflation has been more pronounced in Canada than in the United States since the late 1960s or early 1970s. Three measures of domestic inflation are shown in Table 7 for the two countries, namely the GNP deflator, hourly compensation in manufacturing, and unit labour costs in manufacturing.[1] By 1982 Canada had experienced between 26 and 33 percent greater price increases since 1971 than the same price measures for the United States. Over the same period, however, the Canadian exchange rate had dropped almost twenty percent in relation to the U.S. dollar, a result that might have been expected on the basis of the purchasing power parity theory of exchange rates.

A number of Canadian government studies have made comparisons of labour costs per unit after adjusting for exchange rates, and concluded that the competitive position of Canadian manufacturing was about the same as it had been in the 1950s and 1960s [Astwood (1981), Department of Finance (1982), pp. 83-85]. There are a number of problems with this emphasis. For one thing, it ignores the evidence summarized in Section 4 that Canadian productivity levels have been below the United States and unit labour costs higher in many manufacturing industries for decades. Secondly, some narrowing in these historic productivity and cost levels has become necessary with the reductions in tariff and nontariff barriers to trade in Canada and elsewhere, and further reductions are in process. Thirdly, the calculations on an exchange rate adjusted basis assume that an exchange rate devaluation will offset similar domestic cost increases and be neutral in its effects on industrial competitiveness and profitability. This point needs some further discussion.

[1]These have a number of advantages over other measures that are sometimes used. All three avoid the indirect effects of exchange rate changes on prices. The two for manufacturing avoid the large changes in energy prices and food prices that took place in some of the years over that period, when special factors affected the relative prices for those products. These two problems are both present in the consumer price index and the wholesale price index. The latter price index for Canada basically reflects world commodity prices and any changes in exchange rates and frequently can be a seriously misleading measure of the degree of domestic inflation in Canada.

An important cost to manufacturing firms is the importation of a significant amount of raw materials and components. The relative size of this cost component has tended to grow with the increased ratio of material purchases to value added in manufacturing and the increased two-way flow of trade in manufactured products and components. A decline in the value of the Canadian dollar increases the costs of all imported items in Canadian dollars, even if those prices had remained unchanged in world markets. These cost increases in Canadian dollars put further pressure on profit margins in the companies making such purchases, and they may try to pass them along to their buyers. The extent of the drop in profits for a one percent change in the exchange rate can be quite large, especially if profit margins are small in relation to sales [Daly and MacCharles, (1983b)].

On the other hand, the same depreciation in the value of the Canadian dollar can lead to a dramatic increase in profits in the export industries and companies. This comes about as many companies take world prices as a given and quote and deliver sales in U.S. dollars. A depreciation in the Canadian dollar can lead to a corresponding increase in the price of exports when converted into Canadian currency. As most of the costs of production are incurred in domestic currency, an exchange depreciation can lead to dramatic increases in corporate profits (especially when profits are a small residual between the two larger totals of receipts and costs). Examples of elasticity of plus 5 to plus 10 for a one percent decline in the Canadian dollar have been encountered in studies of the responses of individual firms to exchange rate changes. These results are based on the application of a small open economy model to the decision making process of the individual firm [Daly and MacCharles (1983b)]. In other words, the effect of an exchange rate depreciation can improve the profit position of an exporting firm at the same time that it puts pressure on the profit margins and profits of the manufacturing and importing firms. This non-neutral response of profits explains why manufacturing firms (frequently in Ontario and Quebec) oppose exchange rate depreciation, while natural resource exporting firms in the west and other non-urban areas would welcome exchange depreciation.

As far as manufacturing is concerned, an exchange depreciation has a negative effect on profits through the effects on imported costs, while at the same time it can reduce the extent of competitive pressure on domestic firms producing similar manufactured products. The widespread and uncritical use of statistics of unit labour costs adjusted for exchange rates recognizes the positive aspects on direct competition, but ingores the even larger and immediate negative effect of higher cost of imports on profits in manufacturing industries and firms.

4.6. *Inflation and Inflation Adjusted Rates of Return*

Sections 4 to 4.5 have all dealt with various factors that affect corporate profits and rates of return in Canadian manufacturing as reported to management, shareholders and the tax authorities. Section 3 showed the extent of adjustments that emerge from applying adjustments for changes in the general price level to reported profits. This section outlines a number of reasons why the magnitude of those adjustments are likely to be larger for Canadian manufacturing than if the same adjustments were made for United States manufacturing.

The magnitude of the adjustment to reported profits would depend on the rate of price inflation and the length of time that inflation had been occurring. Table 7 shows the extent to which inflation in Canada has been more rapid than in the United States since 1971, and such a differential might have begun even a few years before 1971.

TABLE 7

MEASURES OF DOMESTIC INFLATION AND COMPETITIVENESS, UNITED STATES AND CANADA, RATIOS, 1982-71

	Canada	U.S.A.	Canada / U.S.A.
GNP deflator	2.74	2.17	1.26
Hourly compensation in manufacturing, national currency basis	3.36	2.59	1.30
Unit labor costs in manufacturing, national currency basis	2.72	2.04	1.33
Canada-U.S. exchange rate change			0.818
Unit labor costs in Canadian manufacturing, U.S. dollar basis	2.22	2.04	1.09

Sources: U.S. Department of Labor, *Output per Hour, Hourly Compensation and Unit Labor Costs in Manufacturing, Twelve Countries, 1950-82* (Washington: Office of Productivity and Technology, Jan. 1984), *Bank of Canada Review*, Dec. 1983, p. 115, O.E.C.D., *Main Economic Indicators*, Aug. 1983. p. 88, and *Historical Statistics*, 1960-1975 (Paris: 1977), p. 48.

The size of the adjustment would also be expected to be greater if the stocks of capital and inventories were larger in relation to employment and output. A number of studies for Canadian manufacturing and the economy as a whole have established that the levels of both the stock of capital and inventories are higher in Canada than in the United States, relative to employment and output [Daly and Walters (1967), Daly (1979a), and Frank (1977)]. These higher levels of business capital facilities to national income have not been reflected in higher shares of profits or return to capital than in the United States or the other major industrialized countries. In these circumstances, a given rate of price increase would lead to a larger difference between reported rates of return and inflation adjusted rates of return in Canada than in other less capital intensive countries.

The implications of these two points are additive. A combination of higher rates of inflation and higher capital to output ratios in Canada than in the United States would be expected to lead to relatively larger adjustments for Canadian manufacturing when rates of return are adjusted for inflation.

5. IMPLICATIONS FOR FUTURE BUSINESS DECISIONS

Earlier sections have outlined some of the major developments in Canadian manufacturing in a longer term context, and discussed how domestic and world inflation has affected manufacturing and the associated rates of return to capital.

A number of the major factors would include the historic high cost, low productivity position in manufacturing, a problem that becomes more important

with the increased amount of international competition in manufactured products and the further reductions in tariffs currently under way. The more rapid increase in material costs than in the prices of manufactured products over the 1970s has led to further pressure on profit margins and rates of return in Canadian manufacturing. The rates of increase in output per hour in Canadian manufacturing have slowed down dramatically since 1973, so it is no longer possible to offset increases in wages and material costs by productivity increases as in the 1950s and 1960s. It is likely that inflation and the uncertainties it contributes to are a contributing factor to the observed productivity slowdown, but this is hard to identify and quantify. The exchange rate depreciation after 1975 has led to increases in delivered costs of imports of materials and components in Canadian currency, and put further pressure on profit margins in this important cost component of manufacturing. The major favorable impact on profits from exchange depreciation occurs in the natural resource export industries rather than in manufacturing. All of these factors have contributed to the declines in reported rates of return to shareholders' interest and total assets in Canadian manufacturing. The severity of the 1981-82 recession and the traditional impact of recessions on corporate profits have further contributed to the extent of the declines in rates of return to capital.

The extent of the differences between the rates of return as reported and adjusted for changes in the general price level make these problems even more acute. The extent of the adjustments shown in earlier tables reflects the magnitude of inflation in Canada and the capital intensive nature of Canadian manufacturing, compared to the United States, for example. These adjustments reduce the recent rates of return appreciably below those reported to management, shareholders, investors, the tax authorities and the public.

It would appear that Canadian management has not yet been using inflation adjusted rates of return for internal decision making or public reporting to the same extent as has already taken place in the United Kingdom and the United States. This reflects a tendency that has been apparent in a number of fields for management in Canada to be slower in adopting new technology and improved management practices than in other countries [Daly and Globerman (1976), Daly (1979b)]. Although Canadian managers are acutely aware of the extent of the declines in profits and rates of return in 1981 and 1982, only a minority are aware that the prevailing accounting practices followed by their accountants have masked and obscured the extent of the decline when adjustments to maintain capital intact have been made.

The severity of the drop in profits and rates of return has already been reflected in plant closures, corporate bankruptcies, layoffs of blue collar and white collar workers and business executives and significant inventory reductions and cancellation or deferment of business investment decisions. These factors have clearly been a factor in the severity of the 1981-82 recession in Canada. Some of the most acute problems of the recession have passed and manufacturing output has recovered significantly since the end of 1982. If the emphasis in the earlier parts of this paper are broadly correct, some continuing problems in Canadian manufacturing will persist even after higher rates of utilization reemerge.

These themes are important for the medium term prospects for business investment in Canadian manufacturing. The early 1980s are showing high levels of the stock of capital in manufacturing relative to the levels of employment and output. Other countries, such as the United States and Japan, have been achieving higher levels of output per hour with lower levels of stock of capital per person employed in manufacturing than in Canada. In addition, the rates of return in Canadian manufacturing (both before and after adjustments for inflation) have dropped appreciably from earlier levels. Corporate managements will not have the incentives to expand capacity and related capital stock and investment decisions to the same degree as earlier, especially if the rates of growth in potential output continue to be slower than in the two decades or so before 1973.

During earlier post-war years, corporate internal funds could provide an important source of financing of the investment program in manufacturing. Depreciation allowances at historic cost are now falling increasingly below the replacement costs of new plant and equipment, and corporate undistributed profits have dropped dramatically as discussed in earlier pages. Any continuing net investment in manufacturing in the 1980s will have to be financed from external sources, to a much greater degree than in past decades. However, the rates of return shown in Tables 2 and 3 on assets in total manufacturing are so low relative to the costs of new borrowing that only very profitable companies could undertake much new expansion and the associated financing. Investment expenditures in the years ahead will be influenced by expected future returns. However, expectations of future returns are bound to be affected by the disappointingly low returns on past investment. High levels of the stock of capital and high ratios of capital stock to both output and labour input have not been reflected in levels of both productivity and profits. Some new companies may find it cheaper to buy existing capital facilities from companies going out of business rather than build new facilities. And investors in financial markets may find the rates of return on financial assets such as bonds and mortgages more attractive than equity investment in plant and equipment in manufacturing subject to heightened international competitions [Daly (1984)]. This suggests that new investment and capacity expansion in Canadian manufacturing will likely be much more limited and selective in the 1980s than in the three previous decades.

The real answer to the problems in Canadian manufacturing can most fruitfully be addressed by increased emphasis by Canadian management and employees in manufacturing on the need to achieve increased productivity levels and reduced costs per unit. This can be achieved through intensifying the movements towards increased specialized and increased exports of manufacturing that has already begun in a number of smaller Canadian owned companies and a limited number of subsidiaries of foreign-owned companies. Movements in this direction will help to maintain employment and high and rising levels of real income. It would also lay the basis for a sustainable increase in the rates of return on assets in manufacturing firms [Daly (1984)].

However, low rates of utilization of capacity, high unemployment rates and low rates of return on both total assets and shareholders' interest can also increase protectionist pressures on governments to adopt more restrictive policies on imports or to divert government procurement to domestic rather than foreign

sources of supply. Small countries like Canada have experienced significant gains in real income from the reductions in tariffs and non-tariff barriers to trade since the Second World War. Any reversal in these developments would have a much larger real cost per person on the small than the large countries. It is to be hoped that the protectionist pressures present in all countries in the 1980s can continue to be largely resisted.

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