Department of Communications
Ministère des Communications

RATE ADJUSTMENT FORMULA
An Overview and Assessment

ECONOMIC POLICY AND STATISTICS BRANCH

RATE ADJUSTMENT FORMULA (1)
An Overview and Assessment

ECONOMIC POLICY DIRECTORATE

April 1975

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Executive Summary

High rates of inflation in recent years have been instrumental in causing the federally-regulated common carriers to seek rate adjustments through public hearings. Annual rate applications have been both costly to the common carriers and have damaged the carriers' public relations image. For these reasons, the Canadian Transport Commission and Bell Canada have proposed an "automatic rate adjustment procedure" whereby rates would be indexed to the "uncontrollable" cost increases faced by the carriers. In this way, the frequency of public hearings would be lessened. This paper evaluates both the specific proposals for indexation and the more general topic of automatic rate adjustments per se.

The advantage foreseen by the advocates of automatic rate adjustments is the lessened frequency of rate hearings. The benefits derived therefrom would be two: first, the carriers would be more certain of attaining rate relief which could facilitate their planning. Second, there would be a cost swing to the carriers in avoiding preparation for public hearings. The average cost to Bell Canada for the five most recent rate cases was $500,000. This administrative cost represents 1 percent of the total revenues involved in the most recent rate case and some of this expense would be saved by dispensing with public hearings. (Not all would be saved, however, as indexation itself would create new administrative costs).

There are many disadvantages to both the particular indexation proposals put forth by the CTC and by Bell Canada and to the concept of indexation per se.

First, for many components of costs we lack the appropriate knowledge of the most desirable indices of price increases and of productivity. In some cases, reliance must be placed on economy-wide indices of little direct relevance to the costs faced by the carriers, which appear to be unreliable. Slight alterations in the index used involves millions of dollars either accruing to the company or saved by the consumer.

Second, there is no hard and fast division between "controllable" and "uncontrollable" cost increases. Both the CTC and Bell recommend that indexation procedures be limited to "uncontrollable" cost increases, but in making specific proposals they recommend that such items as management fees, advertising, equipment purchases from Northern Electric, the capital construction programme, be treated as "uncontrollable." However, in spite of the fact that elements of these cost categories are obviously under the control of management, it makes little sense to remove them from the indexing formulae. Since the advantage of indexation lies in the reduced frequency of rate hearings, elimination of these "uncontrollable" cost elements would negate the advantage foreseen for automatic adjustments. Rate hearings would be just as frequent to enable the carriers to recoup their "controllable" costs. Indexation would imply therefore, no distinction between "controllable" and "uncontrollable" cost increases if any when it were implemented.

Third, indexation will create incentives for inefficiency of operation. The CTC proposed that all operating expenses be indexed, but that the costs of capital (debt and equity) not be subject to indexation. The carriers, under this proposal, would be able to pass on increases in wages to the consumer automatically, it would only be able to recoup increased capital costs through a rate hearing. This could distort the factor mix. In addition, indexation of operating expenses without indexation of capital costs would probably cause a very rapid rise in telephone rates. Companies possess a great deal of discretion as to expensing vs. capitalizing items. In the past, the carriers capitalized as many items as possible in order to expand their bases. However, indexation of expenses without indexation of the cost of capital would cause the carriers to expense items that were formerly capitalized. Since items that before indexation had been recovered only over a period of years would now have to be recovered immediately, telephone rates would rise rapidly at the time indexation was introduced.

On the other hand, indexation of both operating expenses and interest payments (as recommended by Bell) would effectively deregulate the Company. Indexation of interest payments as an expense necessarily implies indexation of interest as a component of the rate of return. Nothing is left to regulate except the return on equity.

Fourth, indexation of depreciation (like interest payments) is subject to abuse. Due to the system of incentives created by the mechanism of regulation, whereby the utility is inelastably driven to expand its rate base and enter competitive markets at non compensatory rates, indexation would be, in effect, a licence for predatory pricing in competitive markets and monopoly pricing in telephone markets. Most of the "modernization" and "growth" categories of investment have benefitted business users (data route, packet switching, electronic switching, etc.), but indexation of the costs of these investments (reflected in both interest payments and in depreciation expense) would provide automatic rate increases to telephone users for whom the benefits of these investments are negligible.

Fifth, automatic rate adjustments of necessity do away with many of the criteria used by the regulatory body in appraising the "justness" and "reasonableness" of Bell's rates. The formula opted for will bring to bear as the sale criterion for a rate adjustment inflation of the carriers' over-all costs. At present, rate adjustments are approved after consideration of many factors: ability to pay, social equity, regional equality. Apart from the whole question of cross-subsidization by monopoly users to competitive (business) users any automatic rate revisions negates the ability of the public authorities to assess the socio-economic impact of the revisions and the sole criterion becomes the carriers' need for more money.

Sixth, indexation may be criticised on grounds of lessened answerability of the carriers to the public. Regulation has been invoked because it is believed that something would be amiss were it not invoked.

In other words, society does not trust a private monopoly (unrestrained by regulation) to act in the public interest as broadly conceived. Unregulated monopoly, in other words, possesses powers to inflict social injury through monopoly pricing (and the consequent maldistribution of income and misallocation of resources) as well as through poor service quality. Unfortunately, the introduction of regulation itself creates new problems. These are best summarized as the Averch-Johnson Effect and can take several forms, the most important being an inherent bias towards inefficiency and creation of incentives for entrance into competitive spheres of activity at non-compensatory rates at the expense of the user of monopolized services. The regulatory authority should stand vigil to ensure not only that the worst abuses of unrestrained monopoly are not taking place, but also that the biases inherent in the regulatory process itself to not take an undesirable turn.

Regulation with indexation introduces a new set of potential abuses, as discussed above, while at the same time reducing the powers of the regulator authority to guard against such abuses. In short, indexation appears to be inconsistent with regulation:

- *Regulation is invoked because unregulated monopolies cannot be "trusted" to act in the public interest.*

- *Indexation creates new incentives to the firm to abuse the public interest while simultaneously reducing the ability of the regulatory authorities to correct such abuses.*

Finally, there is an inherent danger that if the indexation proposals are implemented, the infrequent public hearings that would be required to adjust the rate of return range would become mere formalities. If all "uncontrollable" cost increases are indexed (with increased expenses owing to expansion covered by increased revenues accruing from the new service offerings) it is conceivable that the only item for debate in the hearings would be the cost of capital.

Important issues such as the rate structure, efficiency of the firm, the propriety of the construction programme, potential abuses of vertical integration, and so on, would be hidden in the automatic rate adjustment procedures with the only questions of direct relevance to the Commission concerning the costs to the utility of raising new capital. In other words, the bias introduced by indexing into the regulatory proceedings would be to direct attention to future policies of the Company at the possible expense of reviewing past performance. The danger exists that indexation of costs will provide justification of costs.

If the cost of debt is included in the indexation procedures, the probability that the hearing process will become a mere formality to adjust the rate of return is increased. Indexation of interest costs as an expense item necessarily implies an adjustment to the cost of capital (the permitted rate of return). It seems unlikely that a utility would be allowed to claim increased interest expense automatically as an operating cost and at the same time be denied such an expense when the regulatory authority reviewed its overall rate of return.

It is clear that the social benefits to be derived from an automatic rate adjustment procedure would be negligible (although the benefits to the Company from the resultant deregulation could be substantial). The social costs involved would be significant, however. It is recommended, therefore, that any automatic rate adjustment procedures not be applied to the telephone industry.

This is not to say that further studies of indexation would not be of value. Indexation of component costs of Bell Canada when compared to comparable indices derived from other sectors in the economy could prove to be of great value in the public hearing process by giving a yardstick with which to judge Bell's ability to keep costs in line. Indices, as a tool in the hearing process, would therefore be of value as one input into the assessment of Bell's rate structure.

In this context, therefore, it is recommended that the following studies be undertaken by the Department:

1. *an analysis of the concept and measures of productivity and their effects on labour adjustments in the telecommunications sector*

2. *an analysis of the labour markets for the federally-regulated carriers with specific reference to the change of occupational mix, union affiliation and regional distribution*

3. *patterns of capital expenditures, depreciation methods and vertical integration in the federally regulated carriers in order to assess the effects of depreciation adjustments vertical integration on prices of capital equipment.*

INTRODUCTION

By Order No. T-474, August 15, 1974, the Telecommunications Committee of the Canadian Transport Commission announced its intention to hold a public hearing on a proposed rate adjustment formula for telecommunication carriers under jurisdiction of the CTC. The Order cited rising costs during the current inflationary period and the concomitant necessity of holding frequent public rate hearings as the reason for proposing an adjustment formula that would automatically index rates charged by the carriers to "uncontrollable" rising expenses.

This document contains the following sections in an attempt to assess both the concept of indexing per se and the particular formula proposed by the CTC:

1. Inflation - a review of recent inflationary trends, and the impact of inflation on public utilities.
2. Review of CTC (and Bell Canada) proposals for indexing particular cost items, namely taxes (except income tax); "other expenses;" wages, salaries and fringe benefits (adjusted for productivity changes); depreciation; cost of capital.
3. Assessment of the advantages and disadvantages of indexing these particular cost components.
4. Assessment of the advantages and disadvantages of indexation of public utility rates per se.
5. Recommendations.

I INFLATION

(i) RECENT TRENDS

Over the period 1960-1965 the consumer price index showed a modest increase of 1.6 per cent per year.

However, the rate of inflation began to accelerate rapidly, reaching 3.7 per cent per annum in 1966-1971 and 7.8 per cent per annum in 1972-1974. Table I depicts recent inflationary trends in greater

detail. It will be noted the consumers' price index increased by 10.9 per cent in 1974.

TABLE 1

INCREASE IN CONSUMER PRICE INDEX

Year	Percent Increase	Year	Percent Increase	Year	Percent Increase
1960	1.2	1966	3.7	1972	4.8
1961	1.0	1967	3.6	1973	7.6
1962	1.2	1968	4.1	1974	10.9
1963	1.8	1969	4.5		
1964	1.7	1970	3.3		
1965	2.5	1971	2.8		

(ii) IMPACT OF INFLATION

Recent experience with very high rates of inflation, in apparent defiance of conventional stabilization weapons, has resulted in the adoption of indexing formulae in some sectors of the economy in an attempt to alleviate some of the impact of inflation.

- Escalator clauses in the collective bargaining agreements. The most familiar cost of living escalator clause (COLA) provides wage adjustments indexed to the Consumer Price Index. In 1971 only 7 per cent of collective agreements in all industries with 500 or more employees (excluding construction) included cost-of-living adjustment clauses. Since 1972, however, the acceleration in the rate of price increase and the uncertainty vis-à-vis the future evolution of prices during the life of the contracts have influenced workers to protect real gains by wider use of COLA. In 1973, for example, 13 per cent of the contracts settled included such clauses and in the first 8 months of 1974 this proportion increased to 30 per cent. The COLA provision has

gained particular prominence in the manufacturing sector where, in 1974, 64 per cent of workers settling contracts were covered by COLA as compared to 18 per cent in 1971.

- Indexation of government pensions (Bill C-220, Supplementary Retirement Benefits Act).
- Personal exemptions for income tax purposes indexed upon the basic exemption effective in 1973.
- It should be noted, however, that government itself, as an employer, has resisted COLA in its own negotiations with labour.

(iii) PUBLIC UTILITIES AND INFLATION

While sectors of the labour force characterized by strong unions and many business firms are both able to protect themselves against inflation, whether by COLA in the former case or unilateral price increases in the latter, regulated industries do not have this luxury. Public utilities must appear before regulatory tribunals for approval for rate increases, and such approval may be subject to lengthy delay.

Bell Canada, in a March 3, 1975, submission to the Canadian Transport Commission argued that public utilities in particular are adversely affected by inflationary pressures. They state that public utilities generally have charter obligations to provide service on demand, regardless of profit levels, and therefore they cannot abandon marginal markets as can most firms. In addition, utilities are capital-intensive in nature and are required to invest large amounts of capital in physical equipment and therefore, it is held, inflation is unduly harmful to the financial viability of utilities. In addition, Bell states, most utilities do not have sufficient internal resources to provide the required capital for expansion and modernization and therefore must continually seek additional capital from investors.

These points raised by Bell should not be accepted uncritically however. First, it must be realized that public utilities are characterized by

economies of scale and large fixed cost investments. In order to keep up with inflationary pressures in this situation, therefore, the company is under pervasive incentives to maintain and expand the use made of the system. Since the short run marginal cost of each service is very low, any cut back in service by the Company would worsen its profit position rather than improve it. Therefore, it is unlikely that the Company would cut back on service in the face of declining profit levels.

Second, very few large firms possess sufficient internal resources to provide required capital. The fact that public utilities must continually seek additional capital from investors does not completely set them apart from other sectors in the economy. As Table 2 shows the debt-equity ratio of Bell Canada as in line with other-regulated sectors.

TABLE 2

DEBT-EQUITY RATIOS

A COMPARATIVE ANALYSIS

	Bell Canada	Communications	Transport	Relative Power Gas, Water and Utilities
1970	.459	.461	.429	.574
1971	.464	.472	.461	.601
1972	.473	.472	.448	.628
1973	.476	.485	.461	.638

Sources: Bell Canada's "Annual Reports"
Statistics Canada "Industrial Corporations Financial Statistics" Cat# 61-003

Third, in the short run public utilities are less harmed by inflation than manufacturing industries, other things equal, due to the capital-intensive nature of public utilities. For manufacturing industries, variable costs (labour and materials) form the greatest portion of total costs; such industries are, however, free to raise prices. For public utilities, amortization of plant equipment (fixed costs) form a much larger component of total costs, and fixed costs are not subject to inflationary pressure in the short run. To summarize, while utilities are not free to raise prices as are manufacturing firms, they do not suffer inflationary pressures as strongly as manufacturing firms, at least in the short run.

(iv) CTC AND INFLATION

The Commission in its Order T-474 and in its Decision on Amended Application "B" made the following statement:

- *"The pressures of rising costs have resulted in a need for more frequent rate relief. To meet this problem under current regulatory procedures, the Committee is faced with the dilemma of either holding public hearings more frequently, which would place a significant burden on all parties, carriers and intervenors alike, or holding hearings less frequently, which would bring about inadequate levels of revenue with possible unfortunate consequences for the adequacy and quality of service.*
- *"We consider, therefore, that we should make regulation more responsive to present circumstances, so as to ensure that the carriers are able to provide adequate service of good quality, without the necessity of frequent lengthy public hearings. To this end, the Committee is proposing a Rate Adjustment Formula Procedure that would be effective in 1975."*

Several points should be made with regard to the CTC's concern over frequent rate hearings. First, the argument that more frequent rate hearings "place a significant burden" on intervenors is spurious.

Public interest intervenors (provincial governments, consumers' associations, Action Bell Canada) appear before the CTC voluntarily. An automatic adjustment formula would deny them this right and such denial could be termed "a significant burden."

Second, while frequent rate hearings may "place a significant burden" on the carriers, it could be well argued that this burden is imposed upon the carriers as a quid pro quo for their monopoly privilege. In a presentation to officials of the DOC, however, Bell Canada stated that the cost to the Company of a public hearing (averaged over the five most recent hearings) was $500,000. The most recent Bell rate application entailed rate revisions amounting to $52,000,000. Therefore, if the costs to Bell of rate hearings are viewed as an administrative expense, they represent under 1% of the volume of business generated. In other words, rate hearings are not "a significant burden."

Third, while the Rate Adjustment Formula will ensure that "the carriers are able to provide adequate service of good quality," it very much weakens the ability of the Commission to ensure that rates are "just and reasonable" - the major raison d'être of regulation. Rates are approved in any given hearing on the basis of the costs of providing service, the cost of capital to the utility, socio-economic criteria regarding the ability of consumer groups to pay, the capital construction programme of the firm, and innumerable other factors. The rate Adjustment Formula proposes to adjust rates in accordance with various indices applied to cost components. Briefly, three points should be made here and each will be treated in much greater detail later in the report. First, for some cost components the only index available is an economy-wide deflator which may or may not have close bearing upon costs actually incurred by the carriers. Second, indexing may serve to distort incentives for efficiency, in which case rates based on costs may not be "just and reasonable." Third, since rates will be adjusted solely on the basis of increased costs, the other criteria used by the CTC in determination of "just and reasonable rates" (e.g. the socio-economic factors) will be beyond the Commission's control.

II SUMMARY OF CTC PROPOSALS

In order that the telecommunications common carriers can be placed on a more equal footing with other firms and industries with regard to adjusting prices continuously in the face of inflationary pressures, and in order "to ensure that the carriers are able to provide adequate service without resorting to frequent lengthy public hearings," the CTC proposes an Automatic Rate Adjustment Formula Procedure.

The criteria listed by the CTC for evaluating formulae are:

(1) uncontrollable costs "The formula selected should compensate the carriers for uncontrollable changes in costs. Any changes in costs under the control of the carriers will not be considered."

(2) sound economic base "The structure of the formula [should be] defensible and in line with basic economic principles."

(3) continuity "The formula [should] provide continuity and be compatible with the present system of regulatory accounting procedures ... [and interfere] as little as possible with the current regulatory structure."

(4) feasibility "The formula should be feasible in its computation and execution ... The formula should be simple in its structure so that its objective and its implementation will be understood by the public at large ... [It should be acceptable] by the public at large."

(5) incentives "It is very important that the formula not be a disincentive to the carriers' efficiency. The formula should cause the minimum possible interference with the carriers' managements' decisions on the pattern of allocation of resources, debt/equity ratio, etc."

In proposing the rate adjustment procedures that the CTC feels best meet the above criteria, the Commission distinguishes between two elements of the mechanism: the zone of reasonableness approach to rate return, and indexation of particular cost components.

The CTC states that it would be possible to neutralize for inflationary pressures solely by authorizing a rate of return at a formal hearing along with a zone or range within which the realized rate of return would be allowed to fluctuate. "If the realized rate of return of any of the carriers falls below the lower limit of the zone, or rises above the upper limit of the zone, the rate level (and hence the revenue requirement) would be revised to return the realized rate of return to the appropriate boundary. Thus the authorized change in the revenue requirement would be that which would be required to maintain the carriers' realized return in the zone of reasonableness."

While rejecting this procedure as the sole or even major indicator of a need for a rate revision (because "it deals only with the revenue short fall or excess and assumes that this is a result of the uncontrollable changes in costs; areas with uncontrollable changes in costs are not identified and as a result compensation cannot be justified directly") the CTC does propose to incorporate the zone of reasonableness into its formula. Specifically, "the range of the rate of return, set at each public hearing, will be used by the Committee as a benchmark in order to control the application of the selected formula."

The second and major element of the indexing proposal is the indexation of particular cost components. The CTC lists four categories of costs which it believes are "uncontrollable," namely wages and salaries; taxes, excluding income taxes; depreciation; "other expenses." In the following discussion, proposals for indexing each of these cost components are described. The methodology for indexation in each of these cases is the same. Base year costs (Co) are multiplied by a particular index applicable to the cost component (e.g. if the index were 110, reflecting a 10% increase in costs over the year, revenue requirements would be increased by 110 Co).

1. Wages and Salaries (all but construction)

The Commission proposed separating wages and salaries into two components: capitalized and non-capitalized labour costs. The former would enter into

depreciation and be treated under that cost category. Furthermore, with regard to non-capitalized labour costs, the CTC proposed making allowance for uncontrollable cost increases only. Indexation, therefore, would be applied to operations and maintenance only and the category would include all associated fringe benefits.

In order that the index constructed measure "uncontrollable" increases in labour costs, the CTC proposed computing two indices - a wages and salaries index specific to each of the carriers (which would directly measure the actual change in the aggregate wages and salaries per employee from one period to another), and an "economy-wide wages and salaries index" (the Bank of Canada index). In order that indexation interfere as little as possible with the labour negotiations within the carrier, the CTC proposed the adoption of the lower of the two indices.

Bell Canada is in general agreement with the concept of using an economy-wide index to assure that wage and salary increases are not excessive and that the carriers' incentive to keep labour expenses as low as possible is maintained. However, it favours an index based on all collective agreements currently in force in Canada covering 500 or more employees in all industries except construction. As such, it is more comparable to the carrier index than the Bank of Canada index proposed by the CTC which is a measure only of new settlements reached in the previous quarter and therefore does not reflect settlements in effect during the period when the actual costs being considered for recovery were incurred.

Both the CTC and Bell propose reducing the indexed labour bill by a productivity index; however, they differ on what measure of productivity to use.

The CTC's position regarding productivity is as follows:

> *"We recommend that a labour productivity adjustment be made, in view of the fact that total-factor productivity measures are available only from the carrier. This adjustment will be based on a 10-year average of labour productivity gains in all Canadian*

manufacturing as measured by Labour Canada. We also intend to use as benchmarks any other productivity indices that we may find applicable."

Bell Canada favours the use of a "total-factor productivity measure based on a 10-year moving average to offset uncontrollable changes in labour expenses. However, only a portion of this measure of productivity (e.g. 60%) should be used as an offset of uncontrollable cost increases. The reasons, advanced by Bell Canada, for using only a portion of the total factor measure of productivity are as follows:

a) *"As noted by the Commission, the use of a "productivity index constructed by Bell Canada may produce a disincentive to Bell Canada for further productivity improvements. Of course, this latter may be corrected by taking away only a portion of Bell's productivity."*

b) *"Year to year total factor productivity gains can fluctuate greatly. For example, in the years 1970, 1971 and 1972 the gains in total factor productivity were 8.9%, 0.8% and 6.0% respectively. This variability can be reduced by using a 10-year moving average. However, while this would stabilize the offset used in the calculation* $\frac{1 + c}{1 + p}$ *, for any year the offset may result in substantially less revenue than required to maintain an adequate rate of return. By taking only a portion of the total factor productivity offset (e.g., 60%) this problem would be reduced."*

Table 3 below compares the adjustments that would have been forthcoming in previous years for the CTC and Bell Canada proposals.

TABLE 3

WAGES AND SALARIES ADJUSTMENTS, 1970-1973, BELL CANADA

	1970	1971	1972	1973
Bell Canada Labour Costs ($ Million)	227.3	248.3	273.0	308.8
Bell Canada Labour Index	108.1	108.1	107.7	108.1
Bank of Canada Index	108.5	107.8	107.9	107.8
Labour Canada Index (Part A)	108.4	107.8	107.3	108.2
Index of Productivity (Manufacturing)	104.2	104.3	104.4	104.4
Total Factor Productivity in Bell (60 Per cent)	103.8	103.5	103.3	103.5
CTC Adjustment ($ Million)	8.2	8.1	8.4	9.7
Bell Canada Adjustment ($ Million)	9.0	9.9	10.2	13.1

Over the period 1970-73, the CTC labour adjustment method would have amounted to $34.4 million, compared to the Bell adjustment of $42.2 million.

2. Taxes

The CTC proposed the following with regard to taxes:

- *"All tax expense changes which are a result of changes in the effective tax rate will be regarded as uncontrollable changes in costs. Any changes in the tax expense as a result of growth will not be included here since these taxes should be recovered by increased revenues."*
- *"Any changes in the tax expense resulting from changes in the income tax rates will also be excluded from this category so as to avoid conflict with government fiscal policies."*

Bell Canada is in agreement with the method proposed by the CTC. All changes in legislation or assessment affecting either the tax rate or the tax base are considered to be uncontrollable changes in costs.

The proposed method yields the results shown in Table 4.

TABLE 4

ADJUSTMENTS FOR "OTHER TAXES"

BELL CANADA, 1970-1973

1970	$ 205,000
1971	2,095,000
1972	(510,000)
1973	13,051,000

This table can be broken down into particular components of taxes, as shown in Table 5.

TABLE 5

BELL CANADA TAX ADJUSTMENTS

BY CATEGORY OF TAX, 1973

Unemployment Insurance	$ (83,000)
Canada Pension	61,000
Quebec Pension	46,000
Quebec Health Insurance	106,000
Quebec Capital Tax	0
Quebec Special Tax	0
Ontario Capital Tax	1,271,000
Ontario Sales Tax	171,000
Workmen's Compensation	115,000
Nfld. Tel	0
Ontario Gross Receipts Tax	11,323,000
Ont. and Quebec Prop. and Bus.	(454,000)
Quebec Net Revenue	495,000
Total Adjustments	$13,051,000

3. Depreciation

The CTC proposed making two adjustments for changes in depreciation expense:

(i) price increases in capital expenditures. Since revenue requirements are established at rate hearings on the basis of prevailing price levels for capital equipment, it is conceivable that new capacity installed subsequent to the rate hearing will not engender the anticipated revenues due to the rising costs of capital equipment. Put another way, a construction programme of $x million would be expected to yield $y million in revenues at the time of the hearing. However, since the price of capital equipment is rising, an investment of $x million will not purchase as much capital equipment as anticipated, and therefore the resultant revenues will be less than $y million.

(ii) changes in depreciation rates. If depreciation rates are increased, expenses would be greater than anticipated at the public hearing.

The first adjustment (due to changes in price levels of capital equipment) would be implemented by multiplying the gross added investment by the actual depreciation rate of this investment times the change in the price index applicable to telephone plant investment.

The second adjustment (due to changes in depreciation rates) would be accommodated by multiplying the change in the depreciation rate by the book value of the categories affected. Bell Canada accepted the method proposed by the Commission as a proper method for calculating the uncontrollable changes in depreciation expense. If the suggested index had been in effect over the period 1970-73, revenue requirements for Bell Canada would have increased by $25.1 million as is shown in Table 6.

TABLE 6

DEPRECIATION ADJUSTMENTS

BELL CANADA, 1970-1973

	1970	1971	1972	1973
Adjustment for changes in prices ($ Million)	1.0	1.1	1.4	1.8
Adjustment for changes in depreciation rates ($ Million)	0.3	0.6	11.3	6.6
Total adjustments ($ Million)	1.3	1.7	13.7	8.4

4. Other expenses

"Other expenses" are defined as total operating expenses less employee expense less depreciation expense. "Other expenses" include materials, supplies and services used for maintenance and operations, rentals, printing, etc.

The CTC proposed indexing this expense category to the Gross National Expenditure Implicit Price Index, "in view of the significant difficulties in constructing an index based on actual prices for this category." Bell Canada agrees with this proposal.

Had such an index been in effect in the years 1970-1973 it would have resulted in a total adjustment of $34.2 million, as shown in Table 7.

TABLE 7

ADJUSTMENTS UNDER INDEXING, "OTHER EXPENSES"

BELL CANADA 1970-1973

	1970	1971	1972	1973
Other Expenses ($ Million)	145.5	167.9	181.4	200.7
Change in the GNE Implicit Price Index (%)	4.8	3.1	4.8	7.6
Adjustment ($ Million)	6.7	5.0	8.3	14.2

5. Cost of capital

The final item of expense that was considered by the Commission for indexation is the cost of capital. Although the CTC rejected any indexation of the cost of capital, such indexation with regard to one component of capital (debt) is favoured by Bell.

In rejecting indexation of the cost of capital, the CTC stated:

> *"An additional comment may be necessary with respect to the cost of debt and cost of equity. Both cost components may change in view of market conditions outside the control of the carrier. However, these components are the determinants of the rate of return; the Commission feels that this should be determined in a public hearing and not be subject to change between public hearings."*
>
> *"Therefore, the rate adjustment formula will not incorporate any changes in costs as a result of changes in the cost of debt and equity."*

Bell Canada accepts that the reasonable rate of return range set by the Commission should be determined at public hearings and not be subject to change by formula adjustment. However, Bell recommends that changes in the Company's average embedded cost of debt should be subject to indexation as these changes are based on market requirements, can be readily ascertained, and are "outside the control of the Company".

The proposed calculation by Bell would compare actual test year interest charges with test year interest charges calculated by multiplying the base year average embedded cost of debt by the test year average amount of debt. Any difference would represent an uncontrollable cost change. The results of applying this formula to the years 1970-73 are given below in Table 8.

TABLE 8

INTEREST CHARGE ADJUSTMENT,

BELL CANADA 1970-1973

($ MILLION)

1970	1.6
1971	3.3
1972	3.5
1973	5.0

6. Total adjustments

The following table presents the total revenue adjustments that would have accrued had the CTC or the Bell proposals been in effect in the years 1970-1973.

It will be noted that labour costs and "other expenses" consistently form the most important cost categories in terms of the adjustment. "Other expenses," it will be recalled, are not indexed to telephone expense but rather to an economy-wide price deflator.

Depreciation adjustments in 1972 and 1973 are much more important than the adjustments in the first two years. Depreciation adjustments are based, in large part, on equipment prices charged to Bell by Northern Electric and changes in Bell Canada's depreciation rates.

Tax adjustments can be of importance, as the 1973 adjustment shows. Such adjustments show no distinct trend as they reflect exogenous governmental measures.

Cost of capital adjustments would have risen steadily throughout the period surveyed.

In 1973, total adjustments under the Bell Canada proposal would have amounted to $53.7 million or 4.21% of total operating revenues, whereas the CTC proposal would have yielded an additional $45.3 million, an increase of 3.55% in total operating revenues. During the period 1970-1973, Bell Canada obtained additional revenues of $141.4 million through public hearings. If the automatic adjustment formula had been applied, additional funds available to Bell would have amounted to $108.9 million based on the CTC formula and $131.8 million based on the Bell Canada method of calculation.

7. Rate structure adjustments

Having put forth its suggestions for indexation of various cost components; it remained for the Commission to make suggestions as to how the higher revenue requirements would be reflected in the rate structure.

The CTC states the following:

"Once the uncontrollable costs have been computed they should be applied across the board on all rates where feasible. Deviations from this rule may be necessary in some cases. For example, it may not be feasible to apply a four per cent increase to a coin public telephone rate. In addition, it may be necessary to deviate to take into account the effect of competition within the industry."

"Other marginal changes in the rate structure may also be approved. However, it will be up to the carrier to prove the necessity of these marginal changes. Any significant departures from the existing rate structure will be resolved within the context of the following public hearing."

TABLE 9

TOTAL ADJUSTMENTS, BELL CANADA 1970-1973

($ Millions)

	1970		1971		1972		1973	
	Bell	CTC	Bell	CTC	Bell	CTC	Bell	CTC
Labour costs	9.0	8.2	9.9	8.1	10.2	8.4	13.1	9.7
Depreciation	1.3	1.3	1.7	1.7	13.7	13.7	8.4	8.4
Other expenses	6.7	6.7	5.0	5.0	8.3	8.3	14.2	14.2
Other Taxes	0.2	0.2	2.1	2.1	-0.5	-0.5	13.0	13.0
Cost of capital	1.6	-	3.3	-	3.5	-	5.0	-
Total	$18.8	$16.4	$22.0	$16.9	$35.2	$29.9	$53.7	$45.3
Total Operating Revenues	$936.6		$1,018.8		$1,125.4		$1,275.2	
Adjustments as % of Total operating revenues	2.00	1.75	2.16	1.66	3.13	2.66	4.21	3.55

During the period 1970-1973 Bell Canada obtained additional revenues of $141.4 million through public hearings. If the automatic adjustment formula was applied, additional funds available to Bell would amount to $108.9 million (based on the CTC formula) and $131.8, based on the Bell Canada method of calculation.

III ASSESSMENT OF INDEXATION PROPOSALS

In assessing proposals for indexation, it is useful to bear in mind the criteria brought forth by the CTC itself and summarized above, namely the formula compensate for uncontrollable costs only, that it be defensible and in line with basic economic principles, that it be feasible in computation and execution, that it be simple and acceptable to the public, and that it not operate as a disincentive for efficiency.

In the following discussion, proposals for indexation of the particular cost components are discussed first and then the general principle of indexing the costs of a public utility is addressed.

1. Wages and salaries (all but construction)

The CTC proposes that an index, specific to the carrier, be used to measure the actual change in the aggregate wages and salaries per employee from one period to another. In order to prevent interference with the wage negotiations within the carrier, however, it is proposed that the lower of this index and an economy-wide wage and salaries index be used for the adjustment formula.

There are several points worth noting regarding this proposal in connection with the criteria used for evaluating indexing proposals.

First, the CTC views all wages and salaries as uncontrollable. This is undoubtedly an erroneous assumption. In the first place, one should distinguish between unionized labour and non union management. While it could be argued that wage rates arrived at through collective bargaining are in some sense "uncontrollable," it is more difficult to make the same argument with regard to management. The following table shows the number of employees by employment category in Bell Canada and distinguishes between unionized and non unionized labour.

A second and related point regarding the question of whether labour costs are entirely "uncontrollable" relates to categories of labour

TABLE 10

BELL CANADA EMPLOYEES BY CATEGORY

AS OF SEPTEMBER 1973

(From H.Q. Labour Relations)

	Number of Employees		
	Bargainable	Mgmt & Other*	Total
Real Estate	829	335	1,164
Mat. & Auto, Eqpt.	870	281	1,151
Executive	35	175	210
Treasury	426	124	550
Marketing - Sales	461	694	1,633
Marketing - Other	478		
Accounting	1,258	888	2,146
Engineering	1,531	2,611	4,142
Commercial	3,221	1,003	4,224
Plant	11,989	2,765	14,754
Traffic	8,704	1,189	9.894
Other	1,437	1,369	2,806
	31,239	11,434	42,673

* Other includes clerical exempt and non-bargainable non-management employees.

PER CENT OF TOTAL COMPANY EMPLOYEES

COVERED BY AGREEMENTS

1969	1970	1971	1972	1973	1974
75.7	74.8	73.9	72.9	73.2	73.5

expense. It would appear that there are certain categories of labour expense that are clearly under management control, such as "executive" "marketing-sales," "marketing-other," "commercial." By way of illustration, the following table shows the increase in Bell Canada's marketing expenditures before and after the 1974 rate increase.

TABLE 11

GROWTH IN COST COMPONENTS,

FOURTH QUARTER OF 1973 VS.

FOURTH QUARTER OF 1974, BELL CANADA

Cost Category	1973 ($ Millions)	1974 ($ Millions)	Percentage Growth
Maintenance	57.2	66.9	16.9
Depreciation	66.0	74.4	12.8
Traffic	19.7	22.5	14.5
Sales	19.2	23.6	23.1
Other	51.2	64.5	26.2
TOTAL	213.2	252.0	18.2

It will be noted that sales expenses since the rate increase have been increasing at a faster rate (23.1%) than total expenses (18.2%). One must believe that a large portion of management expenses are controllable. By the CTC's own standards, therefore, any indexation of labour costs should apply to certain components of labour costs only, and these components should be clearly identified as "uncontrollable."

Third, labour costs are highly sensitive to productivity changes. Any modification in the index can produce widely divergent results. The following statement by the Commission provides scope for wide variations: "We also intend to use as benchmarks any other productivity indexes that we may find applicable."

Data produced by Dr. Olley ("Productivity Gains in a Public Utility - Bell Canada 1952-1967", p. 31, Table 18) shows such wide divergence in yearly gains in the total factor productivity that it must be concluded that further refinement and studies are required before the adoption of such measures.

TABLE 12

TOTAL FACTOR PRODUCTIVITY

YEAR-TO-YEAR CHANGES

BELL CANADA, 1953-67

1953	5.4	1961	6.9
1954	-1.6	1962	4.6
1955	-2.0	1963	2.4
1956	-0.4	1964	4.5
1957	16.7	1965	8.9
1958	2.8	1966	5.8
1959	1.2	1967	9.1
1960	0.6		

In addition, it is not at all clear why productivity adjustments should be based on a ten year moving average while the wage and salaries index is based on year to year changes. This could result in a situation in which the Company would be able to pass on higher labour costs even though productivity improvements had made such increased prices unnecessary. The wide fluctuation in year to year productivity improvements have been depicted above and some stability in productivity adjustments as undeniably desirable; however, the 10 year moving average allocates only 10% of a given year's productivity improvement to the year in which it occurs (which, under Bell's proposal, would be further reduced by 40 per cent), while the full increase in the year's labour costs are allocated to that year.

To summarize, the suggested adjustments for productivity fail on the CTC's criterion of "sound economic base" due to the arbitrariness of the

percentage to be used and the length of the averaging period.

Fourth, indexation of labour costs without indexation of capital costs can distort the factor price ratios facing the Company. While Bell would be able to pass on increases in wages to the consumer automatically, it would only be able to recoup increased capital costs through a rate hearing. The CTC recommends that capital costs not be included in an indexing formula. It may be noted, however, that such a procedure could serve to weaken the "Averch-Johnson" incentives toward capital intensity. The general thrust of indexation of only one set of factor prices is to distort efficiency incentives, however.

Fifth, the CTC proposes to adjust labour costs by an index based on settlements in the manufacturing sector or on an index specific to the carrier, whichever is the lower. Such a policy would appear to ensure that wage settlements would seldom, if ever, result in an increase that was less than the economy-wide wage and salary index. Therefore, further consideration should be given to limiting the amount of increased labour costs that can be flowed through by an automatic rate increase.

Both B.C. Telephone and the CTCA have argued that a regional wage index would be much more appropriate than an economy-wide index. This may be a valid point, but the same remarks apply to a regional index as given above in the context of the national index.

To summarize, indexation of labour costs will weaken the carriers' incentive to keep wage increases low since labour will be able to argue that there would be no cost to the company to settle at a rate of increase equal to the economy-wide (or regional) index.

The following table shows clearly the sensitivity of labour costs under an indexing procedure to productivity changes. It will be recalled that Bell Canada proposed offsetting the Company's index of wages and salaries by 60 per cent of the Company's total productivity measure based on a 10-year moving average. The CTC hinted that only a portion of the Company's

productivity increases should be taken away. Any percentage that is chosen is purely arbitraty, but slight variations in the percentage result in millions of dollars either accruing to the Company or saved by the consumer. For example, in 1973, an offset of 50% of the Company's total factor productivity would result in a revenue requirements adjustment of $14.9 million while a 70 per cent offset would have resulted in an adjustment of $11.4 million.

TABLE 13

LABOUR COSTS SENSITIVITY TO PRODUCTIVITY CHANGES, BELL CANADA 1970-1973

	1970	1971	1972	1973
Bell Canada Labour Costs	227.3	248.3	273.0	308.8
Bell Canada Labour Index	108.1	108.1	107.7	108.1
Labour Canada Index (Part A)	108.4	107.8	107.3	108.3
Total Factor Productivity (50 per cent)	103.2	102.9	102.8	102.9
Adjustments ($ Millions)	10.9	11.3	11.4	14.9
Total Factor Productivity (70 per cent)	104.4	104.1	103.9	104.1
Adjustments ($ Millions)	7.8	8.5	8.7	11.4
Total Factor Productivity (80 per cent)	105.0	104.6	104.4	104.6
Adjustments ($ Millions)	6.5	7.4	7.4	10.0

2. Taxes (excluding income tax)

The CTC proposes treating all expense charges which are a result of changes in the effective tax rate or tax base as uncontrollable changes in costs. Income taxes would, by the CTC proposal, be excluded so as to avoid conflict with government fiscal policies.

It should be noted, however, that profit maximizing firms are unable to shift the entire burden of any tax in the short run onto the consumer unless

the demand for the firm's output is completely inelastic. In the particular case of the corporate income tax, none is shifted in the short run as the tax does not interfere with either demand or cost conditions. To the extent that most firms in the economy are unable to fully shift taxes in the short run, the cost of capital (the competitive rate of return) falls with an increase in tax. Therefore, if a regulated firm is permitted to shift taxes onto the consumer while the majority of other firms are unable to do so, the utility will be earning a rate of return greater than its cost capital.

Taxes that can in part be shifted in the short run are those that result in a shift in either demand or marginal costs (such as a sales tax on capital equipment, a revenue tax, an excise tax, etc.). Taxes that cannot be shifted (in the short run) include property tax (on existing land and buildings) and corporate income taxes.

In summary, permitting the utilities to fully shift all taxes would result in a misallocation of resources and would contradict the CTC's criterion of efficiency.

3. Depreciation

In the CTC proposal, the gross added investment multiplied by the actual depreciation rate of the investment multiplied by the change in a price index applicable to telephone plant investment is termed the uncontrollable increase in depreciation expense.

Bell Canada is allowed a rate of return (equal to its cost of capital) on a rate base composed of its capital structure. The general formula is:

$$(1) \quad TR = r.\ (B) + (OC + D)$$

where TR = total revenues

r = permissible rate of return

B = rate base

OC = operating costs

D = depreciation

The rate of return, r, is set at a level that will permit the company to undertake its capital construction programme. Let the construction programme increase the rate base by ΔB. The construction programme will increase profits to the Company by $(r. \Delta B)$. It will also increase depreciation expenses by ΔD. In approving a rate structure, the CTC attempts to ensure that:

$$(2) \quad \Delta TR = r. \quad (\Delta B) + (\Delta D)$$

(assuming for simplicity no increase in operating costs)

The CTC is arguing that the cost of capital equipment is rising and that ΔB will not purchase sufficient capital equipment that ΔTR will be generated given the rate structure. Since equation (2) is an identity, the rate of return r must fall below the cost of capital in times of rising prices for capital equipment. Therefore, the CTC argues, ΔD must be indexed to the cost of capital equipment in order that r will not fall below the cost of capital.

Here again there are several difficulties with indexing. First, the CTC formula requires all calculations be made at the account level, as depreciation expense is determined for each account. Such an approach is lengthy, difficult to audit and control and its success is largely dependent on the extent of cooperation and willingness of the carrier.

Second, given the present integrated structure of Bell Canada and its purchasing policy, it is not at all clear that the Company cannot control at least part of the increase in prices of new equipment. A large part of its construction expenditures is supplied by Northern Electric (Bell holds 90 per cent of N.E. shares) and the major research and development projects are carried out by Bell-Northern Research which is jointly owned by Bell and Northern Electric. The following table highlights the link between Bell Canada and its suppliers.

TABLE 14

CONSTRUCTION PROGRAM

BELL CANADA 1970-1973

(Per cent attributable to source)

Year	Northern Electric	Bell Canada's Labour Component	Others	Total
1970	57.0	21.0	22.0	100.0
1971	57.0	22.0	21.0	100.0
1972	54.0	22.0	24.0	100.0
1973	53.0	25.0	22.0	100.0

It will be noted that an average of about 78 per cent of Bell's construction program is supplied by the Bell system and therefore the Company has a better opportunity to control its cost than most firms in Canadian industry.

Third, the CTC proposes to adjust rates for all new investment. In the case of Bell Canada, construction expenditures can be broken down into four usage categories:

Growth - Increased capacity for new customers, increased usage by the existing customers.

Movement - Relocation of telephones other customer equipment due to movement of customers.

Replacement - Replacement of damaged or worn-out plant and equipment.

Modernization - Innovation and modernization designed to "improve service and to introduce improved operational efficiency".

Expenditures on "modernization", by improving the quality of service, quite often will result in less maintenance costs and higher productivity in the long run and therefore should not be subject to price adjustments. Furthermore, expenditures on "growth" are related to the level of operating revenues of the Company and price increases in this category should not be

absorbed by the rate structure of existing service. Consequently, at most, only the movement and replacement categories should be subject to price adjustments. Table 15 illustrates the importance of these groups of expenditures.

TABLE 15

CONSTRUCTION EXPENDITURES

BELL CANADA, 1970-1978

(Classified by Usage)

Year	Growth (%)	Modernization (%)	Movement and Replacement	Total (%)
1970	69.2	9.7	21.1	100.0
1971	68.0	12.5	19.5	100.0
1972	66.7	14.9	18.4	100.0
1973	64.4	15.5	20.1	100.0
1978*	63.2	20.8	16.0	100.0

It is interesting to note that the Company's own forecast of construction expenditures (1978) is oriented towards expenditures which could lead to high productivity and therefore should not be subject to price adjustments.

Fourth, it would be an extremely dangerous policy for the government to approve indexing of the "growth" expenditures. Due to the system of incentives created by the mechanism of regulation, the firm is ineluctably driven to expand its rate base by entering competitive markets (data transmission, for example). By indexing the price of capital equipment in "growth" areas, the possibilities of predatory pricing through cross-subsidization of revenues are magnified.

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* Bell's Estimates Exhibit No. B-73-372.

Even indexation of capital expenditures in the "modernization" category could be subject to abuse. For example, the replacement of cross-bar switching by electronic switching would be termed "modernization", but it can well be argued that the primary beneficiaries of this modernization are data users in the competitive field. Indexation of these items of capital expense would permit the Company to recover expenses from the monopolized sector in order to create demand in the competitive sector, even though there has been little, if any, improvement in basic telephone service.

It can be argued that the capital construction programme of the Company (and its consequent need to continually enter capital markets to finance its programme) is the greatest single cause for its continuing need for rate relief. However, the prices charged by the Company in the competitive sphere have continually been falling through time while the prices of its monopolized services have been rising. Indexation of depreciation expenditures would enable the Company to expand its construction programme and magnify the disparity in price trends observed in the monopolized vs competitive spheres.

Fifth, changes in depreciation rates are not necessarily "uncontrollable". Depreciation rates used by the carriers reflect both historic experience regarding the physical life of equipment categories and the anticipated rates of technological advance. Depreciation rates based on the estimated useful life of capital equipment, therefore, are within the control of the carriers to the extent that such rates are based on estimates of the dates at which such equipment will become technically "obsolete". Due to the vertically-integrated nature of the carriers, technological obsolescence (as opposed to physical life) is within the control of management. It is conceivable, therefore, that indexation of depreciation based on changes in depreciation rates could induce management to arbitrarily adjust depreciation rates in order to increase revenue requirements. It is not at all clear that such behaviour would lead to improved efficiency.

Sixth, one may question the suitability of the index proposed. The Telephone Plant Index of Bell Canada is comprised of six major components:

central office exchange, station equipment, outside plant, buildings, furniture and equipment, and motor vehicles. While the last three components are based on Statistics Canada price indices, the first three are developed on the basis of the company's own accounts. A comparison of Bell Canada's Telephone Plant Index and Statistics Canada's Telephone Systems Stock of Capital Price Index, as shown in Table 16, indicates that capital costs within Bell have generally been increasing at a faster rate than in the telephone industry generally. One possible explanation could be the Bell - Northern Electric relationship discussed earlier.

TABLE 16

BELL CANADA TELEPHONE PLANT INDEX COMPARED TO STATISTICS CANADA TELEPHONE SYSTEMS STOCK OF CAPITAL PRICE INDEX, 1969-1973

	Bell Index		Statistics Canada Index	
Year	Index	Percent growth	Index	Percent growth
1969	127.3	-	124.8	-
1970	136.5	7.2	129.5	3.8
1971	143.8	5.3	134.8	4.1
1972	152.0	5.7	140.5	4.2
1973	161.3	6.1	149.9	6.7

If the Statistics Canada index as selected, the required adjustments would be less than under the Bell index. This comparison is shown in Table 17.

Over the period 1970-1973, adjustments using Bell's index would be $26.1 million compared to $21.3 million with the Statistics Canada index.

TABLE 17

DEPRECIATION ADJUSTMENTS, BELL CANADA INDEX VS STATISTICS CANADA INDEX, 1970-1973

($ Millions)

	1970	1971	1972	1973
Statistics Canada Index	0.7	1.3	10.1	9.2
Bell Canada Index	1.3	1.7	13.7	8.4
Difference	0.6	(0.4)	3.6	(0.8)

4. Other expenses

The Commission proposes indexing materials, supplies and services used for maintenance and operations and other expense items such as rentals, printing, postage, stationery, and other general expenses not already provided for in the other three categories, to the Gross National Expenditure Implicit Price Index.

It remains to be demonstrated, however, that the GNE deflator is "most appropriate", as it includes items such as food, clothing, appliances, etc. whose rate of price increases bear little, if any, relationship to expenses experienced by the utilities. The index proposed is a measure of price changes for all final expenditures on goods and services produced in the domestic economy in the accounting period. The scope of the index is, therefore, very broad.

A more suitable index would be the Semi-Durable and Services Implicit Price Index (SDS)*as it would be more closely related to "other expenses" of Bell Canada. Table 18 compares the adjustments that would have taken place in the period 1970-1973 had Bell Canada been allowed to use either of these indices.

*Statistics Canada

TABLE 18

"OTHER EXPENSES" ADJUSTMENTS - BELL CANADA 1970-1973,

COMPARISON OF GNE AND SDS IMPLICIT PRICE DEFLATORS

	1970	1971	1972	1973
Other Expenses ($ millions)	145.5	167.9	181.4	200.7
Change in the SDS Implicit (*) Price Index	4.1	3.3	4.1	5.5
Adjustments ($ million)	5.7	5.4	7.1	10.5
Adjustment of the GNE index Bases ($ million)	6.7	5.0	8.3	14.2
Difference in adjustments SDS vs GNE ($ million)	(1.0)	0.4	1.2	3.7

* The SDS implicit price index is the arithmetic average of the Semi-Durables and Services Implicit Price indices.

5. Cost of Capital

Since the cost of debt and equity are the components that determine the rate or return, the CTC stated that these elements of cost should not be indexed but rather should be determined in a public hearing and not be subject to change between public hearings. Therefore, the rate adjustment formula would not incorporate any changes in costs as a result of changes in the cost of debt and equity.

Bell Canada, however, in its submission to the CTC, stated that the debt component should be included in the adjustment procedures. Bell states:

> *"The reasonable rate of return range set by the Commission should be determined at public hearings and not be subjected to change by formula adjustment. It is felt that the calculation of the Company's changes in uncontrollable cost should include changes in the average embedded cost of debt as these changes*

are based on market requirements, can be readily ascertained, and are outside the control of the Company".

If debt charges were indexed, in addition to operating cost components, the Company would be, by and large, deregulated. This statement is made for the following reasons:

First, all interest costs are not uncontrollable. While it could be argued that the recycling of past debt does represent an uncontrollable cost, such is not the case for debt issues used to finance new capital expansion. In order to argue the opposite, one would have to assume that the firm's total capital construction programme is "uncontrollable". All of the arguments used above in connection with the indexation of depreciation can again be brought forth here.

Second, it is impossible conceptually to index interest costs without also indexing the permissible rate of return. One cannot index interest payments as an expense without indexing interest payments as a component of the rate of return. Bell proposes that the average rate of return range (call this r_1 to r_2) be set by a public hearing and not be subject to alteration by indexation. This range set, however, is the weighted average of the return permitted on equity (re) plus the return permitted on bonds (rd) that is,

$$r_1 \text{ to } r_2 = W1 \cdot re + W2 \cdot rd$$

where W1 = percent of total capital that is equity
W2 = percent of total capital that is debt

Bell proposes that r_1 to r_2 be fixed by public hearing; that re be fixed by public hearing; and that rd be indexed. Provided that the range set for the overall rate of return (r_1 less r_2) is not so large as to become meaningless, it is logically impossible to accomplish the suggested policy. Indexation of the interest component of necessity implies indexation of the rate of return.

It could be argued that indexation of the interest component of the rate of return is desirable, provided the upper limit of the range of the permissible rate or return is not exceeded. Presumably the range set would have to be quite wide. In such a case, regulation would have as its major thrust the imposition of a maximum rate of growth constraint on the company concerned. By continually increasing the embedded cost of capital (by issuing new debt) the Company would be able to grow up to the point where a) the average cost of capital approached the upper limit of the permissible range and/or b) the debt/equity ratio was about to exceed the maximum ratio felt tolerable by the company's management. In either case, a public hearing would be held (provided the cost of new equity exceeded that set at the last hearing and new investments did not earn the cost of capital, in the case of condition (b).

The question that must be asked, therefore, is whether the government is prepared to index all components of the rate of return formula (expenses and rate of return, with Company discretion as to the magnitude of its rate base) with a maximum limit set on the rate of growth. In such a context, how can rates be judged as to their "reasonableness"?

However, it must be emphasized that indexation of expenses without indexation of the rate of return also is subject to major abuses. Companies possess a great deal of discretion as to writing-off vs. capitalizing items. In the past, presumably, the carriers were under pervasive incentives to capitalize as many items as possible in order to expand their rate bases. Indexation of the rate of return would probably maintain this incentive to capitalize. However, if "expenses" were to be indexed while the rate of return was not indexed, the carriers would be under an incentive to expense many items that formerly had been capitalized. Since items, that before indexation had been recovered only over a period of years, would now have to be recovered immediately, the result of such a policy would be a very large increase in telephone

rates at the time indexation became operative (or perhaps, for political reasons, the rate increases would be spread over a greater length of time).

To summarize, assuming the indexation of "uncontrollable expenses" is introduced, very serious problems will arise whether or not indexation of interest payments is allowed.

6. Rate Structure Adjustments

The CTC suggested the following method of adjusting the rate structure to reflect the increased (indexed) revenue requirements:

> *"Once the uncontrollable costs have been computed they should be applied across the board on all rates where feasible. Deviations from this rule may be necessary in some cases ... It may be necessary to deviate to take into account the effect of competition within the industry".*

The Canadian Telecommunications Carriers Association state in their submission to the CTC:

> *"A resultant rate adjustment should not necessarily be applied uniformly to all services. The adjustment would apply on a selective basis with carrier participation in the selection giving due regard to the competitive relationship with other carriers".*

Bell Canada States:

> *"It is proposed that the Company's tariffs be revised to achieve the increased revenues identified ... in a fair and equitable manner by generally applying uniform rate increases across the board to all services where feasible. While some deviations from this rule may be necessary as noted in the Commission's proposal, departures would not be significantly large".*

Two points should be made with regard to the proposed rate adjustment mechanism. First, there is little justification for across-the-board increases. The factor mix employed by various services differs and therefore the rate of inflation of costs of providing the various services will differ. For example, one major cause for inflationary pressures on the carriers is the cost of capital for its construction programme. To the extent that the greatest proportion of the construction programme is in response to demands by business users, an across the board rate increase would entail subsidization by residential users of business users.

Second, there is even less justification for "giving due regard to the competitive relationship with other carriers" than for uniform across the board increases, since such a policy would be, in effect, a licence for predatory pricing and subsidization of competitive services by users of the monopoly service.

The regulated common carriers may wish to maximize profits within the regulatory constraint. They certainly are interested in growth. In either event, they have incentives to expand into competitive areas and charge as low a price as the regulatory body will allow in order to stimulate demand (even a non-compensatory price in terms of marginal cost as well as in terms of average cost). Cross-subsidization of these competitive ventures from revenues derived from the monopolized services will serve to increase profits (as shown by Averch-Johnson) and increase growth. Uniform across-the-board price increases, after making due allowance for "competitive services" would allow the carriers to dump all "uncontrollable" cost increases onto the telephone user and to continue to expand in the competitive sphere through cross-subsidization.

IV GENERAL ASSESSMENT OF INDEXATION

Indexation is associated with several important disadvantages. These disadvantages can be discussed in terms of efficiency, equity, practicality and answerability.

(1) efficiency

In terms of economic efficiency there are several reasons for opposing indexation.

First, the introduction of the automatic adjustment formula as proposed by the CTC would do away completely with the so-called regulatory lag. The introduction of the formula proposed by Bell would limit the regulatory lag to one year. In either case, there could be important consequences on the efficiency of the firm.

The regulatory lag is the only mechanism built into the regulatory process that induces efficiency. In times of little inflation and rapid increases in productivity, this lag rewards the firm for increased efficiency by permitting it to earn a return greater than the cost of the capital. If productivity increases were immediately indexed to revenues, the company would have no incentive to introduce cost-reducing innovations so cost decreases would be met automatically by rate reductions.

Similarly, in periods where rapid inflation is outstripping productivity increases (the present situation) the regulatory lag provides a valuable incentive for efficiency. While costs rise, rates charged must await regulatory approval before adjustments; therefore the utility must attempt to trim expenses in order to earn its permitted rate of return.

Obviously, there is an optimum length of time for the regulatory lag. If it is too long, the firm will earn excessive monopoly profits in good times and suffer losses in inflationary times. If it is too short, all incentives for efficiency are destroyed.

The CTC proposes instantaneous adjustments; there is no regulatory lag. This is obviously too short. Bell Canada proposes a one-year lag; this is approximately equivalent to the lag existing now through current public hearings procedures.

Second, indexation of some components of expense without indexation of other components would create positive incentives for inefficiency. For example, if labour costs are indexed but capital costs are not, the firm would be able to automatically pass on through higher rates inflated costs attributed to the former factor but not the latter. This could have two consequences - the substitution of labour for capital in the production function and the writing-off of previously capitalized items. The result in each case would be higher telephone rates than are necessary.

Third, under indexation with both depreciation and interest payments included in the formula, the firm would have complete freedom regarding its construction programme and would possess full discretionary powers regarding the extent of predatory pricing in competitive markets at the expense of telephone customers. At present, at rate hearings, the Company must present its capital construction programme to the CTC and the merits of the programme are discussed in a public forum. The revenue requirements of the firm and the permissible rate of return, are determined in light of the approval by the CTC of the construction programme. Indexation of depreciation weakens this safeguard; indexation of interest payments destroys it.

(4) equity

Indexation may be challenged on grounds of equity. In order to revise the rate structure in light of higher revenue requirements (as derived from the automatic adjustment formula) without a rate hearing, a formula must be adopted. The formula opted for by the CTC and the carriers is a uniform across the board increase except for services in the competitive sector which could be subject to little or no increase. Any formula could, however, be found objectionable on grounds of equity.

At present, the rate structure is approved by the CTC after consideration of many factors: cost, ability to pay, social equity, regional equality. Apart from the whole question of cross-subsidization by monopoly users to competitive (business) users, as discussed above, any automatic rate revision negates the ability of the public authorities to assess the socio-economic impact of the revisions and the sole criterion becomes the carriers need for more money.

(3) practicality

There are several features of the indexation plan which make it impractical. First, how does one distinguish between controllable and uncontrollable cost increases. This problem is most evident in the following areas:

(i) equipment purchases from Northern Electric

(ii) management salaries

(iii) depreciation expenese and interest payments resulting from the capital construction programme

(iv) advertising and other marketing expenses

It must be noted that if any of the above items were excluded from the adjustment formula because they are felt to be within the control of management, the usefulness of the adjustment mechanism declines. The only purpose of the formula is to avoid frequent rate hearings; if, however, the formula only permits the carriers to gain a portion of their costs through the formula, (the "uncontrollable" portion), it is doubtful whether the result would be less frequent hearings.

Second, indexation of operating expenses means defacto indexation of the rate of return due to the arbitrariness of accounting procedures. Indexation of expenses without concomitant indexation of the rate of return would result in the carriers' expensing everything in sight and capitalizing as little as possible. Indexation of expenses and rate of return would, to a large extent, result in deregulation of the carriers.

Third, we do not appear to have attained the required level of knowledge regarding indices to countenance indexation. The GNE Implicit Price Deflator is clearly inappropriate for "other expenses". Bell "productivity index" shows such volatility that its suitability must be questioned.

(4) answerability

Regulation has been invoked because it is believed that something would be amiss were it not invoked. In other words, society does not trust a private monopoly (unrestrained by regulation) to act in the public interest as broadly conceived. Unregulated monopoly, in other words, possesses powers to inflict social injury through monopoly pricing (and the consequent maldistribution of income and misallocation of resources) as well as through poor service quality.

Unfortunately, the introduction of regulation itself creates new problems. These are best summarized of the Averch-Johnson Effect and can take several forms, the most important being an inherent bias towards inefficiency and creation of incentives for entrance into competitive spheres of activity at non-compensatory rates at the expense of the user of monopolized services. The regulatory authority should stand vigil to ensure not only that the worst abuses of unrestrained monopoly are not taking place, but also that the biases inherent in the regulatory process itself do not take an undesirable turn.

Regulation with indexation introduces a new set of potential abuses, as discussed above, while at the same time reducing the powers of the regulatory authorities to guard against such abuses. In short, indexation appears to be inconsistent with regulation:

- Regulation is invoked because unregulated monopolies cannot be "trusted" to act in the public interest
- Indexation creates new incentives to the firm to abuse the public interest while simultaneously reducing the ability of the regulatory authorities to correct such abuse.

At this point it is appropriate to suggest one senerio by which indexation can be judged. Given an overall maximum on the rate of return the firm can earn, given that the firm is strongly motivated toward growth, given that the firm possesses a fully saturated monopoly market characterized by a price inelastic and income inelastic demand, and given that the firm has entered a growth market characterized by both competition and an elastic demand, it can be shown that the firm will be motivated to charge the profit maximizing (or revenue maximizing) price in its monopoly market which will be quite high (due to the demand inelasticity) and charge noncompensatory prices in the competitive sphere to stimulate demand. In other words, the firm will wish to charge "what the traffic will bear" in its monopolized telephone market and charge rates below marginal cost in the data transmission market.

It is known that most, if not all, innovations in the telephone industry in recent years have primarily benefited users in the competitive sphere (electronic switching, data route, packet switching, etc.) not the subscriber to the monopolized service. Uniform across the board price increases due to increased depreciation or higher interest payments occasioned by a capital construction programme, therefore, may reflect expenses incurred primarily to benefit data users but which are paid for in large part by telephone users. Rate increases that reflect the competitive nature of certain markets will be biased in this direction to an even greater extent.

Basic telephone service is becoming very expensive. While the telephone is considered a necessity for most people, monthly charges and security deposits are making the service very expensive for those at and below the poverty line. Unfortunately, the telephone company is operating under a system of incentives that would justify raising basic telephone rates perhaps several times what they are now and using the resultant revenues to subsidize business users.

Under the present system of regulation, the regulatory authority has the power (if it so chose) to scrutinize the construction programme and to estimate the proportion thereof that would result in improved service to the telephone user and to demand that the remaining (and probably greater proportion) be charged against the business user.

Under proposals for indexation as put forth by the CTC and Bell Canada, the construction programme would become a part of the automatic adjustment mechanism (whether through indexation of depreciation, or of interest payments, or through the tendency to expense rather than capitalize). The 'justness' of rates would be beyond the purview of the CTC. The result could be to place basic telephone service beyond the means of a large portion of the public.

There is an inherent danger that if the indexation proposals are adopted, the infrequent rate hearings that would be required to adjust the rate of return range would become mere formalities. If all "uncontrollable" cost increases are indexed (with increased expenses owing to expansion covered by increased revenues accruing from the new service offerings) it is conceivable that the only item for debate in the hearings would be the cost of capital. Important issues such as the rate structure, efficiency of the firm, the propriety of the construction programme, potential abuses of vertical integration, and so on, would be hidden in the automatic rate adjustment procedures with the only questions of direct relevance to the Commission concerning the costs to the utility of raising new capital. In other words, the bias introduced by indexing into the regulatory proceedings would be to direct attention to future policies of the Company at the possible expense of reviewing past performance. The danger exists that indexation of costs will provide justification of costs.

If the cost of debt is included in the indexation procedures, the probability that the hearing process will become a mere formality to adjust the rate of return is increased. Indexation of interest costs as an expense item necessarily implies an adjustment to the cost of capital (the permitted rate of return). It seems unlikely that a utility would be allowed to claim increased interest expense automatically as an operating cost and at the same time be denied such an expense when the regulatory authority reviewed its overall rate of return.

A final point should be emphasized. The major (sole) benefit to be derived from the rate adjustment procedures advocated by the CTC and Bell Canada is the resultant infrequency of rate hearings. As shown above, important qualifications must be raised with regard to indexation of several components of the utilities' over-all costs. It does not appear to be desirable, however, that indexation be introduced on a selective basis, as omitting certain cost components from the formula would cause rate hearings to be held with approximately the same frequency as would be the case without any indexation (thereby negating the sole advantage of indexation). In short, all cost components should be indexed or none at all.

V RECOMMENDATIONS

It is clear that the social benefits to be derived from an automatic rate adjustment procedure would be negligible (although the benefits to the Company from the resultant deregulation could be substantial). The social costs involved would be significant, however. It is recommended, therefore, that any automatic rate adjustment procedures not be applied to the telephone industry.

This is not to say that further studies of indexation would not be of value. Indexation of component costs of Bell Canada when compared to comparable indices derived from other sectors in the economy could prove to be of great value in the public hearing process by giving a yardstick with which to judge Bell's ability to keep costs in line. Indices as a tool in the hearing process, would therefore be of value as one input into the assessment of Bell's rate structure. In this context, therefore, it is recommended that the following studies be undertaken by the Department:

1. *an analysis of the concept and measures of productivity and their effects on labour adjustments in the telecommunications sector*

2. *an analysis of the labour market for the federally-regulated carriers with specific reference to the change of occupational mix, union affiliation and regional distribution*

3. *patterns of capital expenditures, depreciation methods and vertical integration in the federally regulated carriers in order to assess the effects of depreciation adjustments vertical integration on prices of capital equipment*

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