A NEW SYSTEM FOR MEASURING THE FIXED REPRODUCIBLE TANGIBLE CAPITAL IN CANADA

by Peter Koumanakos

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Introduction

Accurate capital data are critically important in the measurement of productivity. Accurate capital data are also important for measuring capacity utilization and interindustry and international competitiveness both at the aggregate and the individual industry levels. The evaluation of proposed tax policies also depends on accurate data for capital stocks; without these data, it is difficult to determine, for example, the tax liability of one industry compared with that of another industry or the impact that a change in tax laws would have on a particular industry. Accurate measures of capital stocks are important in evaluating macroeconomic policy; for example, the responsiveness of industry to changes in interest rates or in government spending critically depends on the level of capacity utilization.

In this paper, capital is defined as a factor input that consists of commodities produced by the economic system for use in the production of other commodities. Capital stocks therefore consist of reproducible tangible assets and exclude tangible assets such as land, mineral deposits, and natural forests.

Reproducible tangible assets vary in age, in their degree of obsolescence, and in the intensity of their utilization. Consequently, although there is a substantial theoretical and technical literature about the measurement of capital, the diverse nature of capital goods and their technological evolution make the measurement of capital a difficult task.

Although there are a number of methods such as surveys of physical assets, of book values, and of insured values for measuring capital stocks, the "perpetual inventory" method is the one that is the most often used, primarily because of its flexibility in creating time series of capital stocks. This method requires an investment series, the relevant price indexes, service life information, and a method of depreciation. The reliability of the capital stock time series generated using this method depends on the quality of the investment data that are cumulated, the accuracy of the price indexes that are used, the realism of the service life assumptions that are made, and the method that is used to depreciate the capital assets over their service lives.

The investment series for various vintages must be combined into overall capital stock estimates that are relevant for a particular analysis. The information needed to aggregate vintages can be summarized in terms of an "efficiency function" that gives the relative efficiency of capital stocks of different ages and that is based, for example, on the data for prices from transactions in used assets.

Given the efficiency functions for existing assets and the discard rates for assets by age, it is possible to employ the perpetual inventory method to obtain annual, or more frequent, time series estimates of capital stocks. The efficiency functions refers to the decline in productiveness as it ages. The depreciation functions refer to the decline in the value of equipment as it ages. The choice is determined by the context to the analysis. Efficiency is relevant to the analysis of physical in

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1 Peter Koumanakos is the Director of the Investment and Capital Stock Division, Statistics Canada

vestment, replacement requirements and capital stock estimation while depreciation is relevant to asset prices and the measurement of income.

Because the perpetual inventory method requires so many assumptions and so much data, not all of which are equal to the uses made of them, it would be useful to have periodic benchmark surveys of assets actually in place at a particular time. This paper discusses the development of such a survey.

The Feasibility Study

Because of concern about the accuracy and the adequacy of the existing data for capital stocks, Statistics Canada, the Bank of Canada, the Economic Council of Canada, and the Department of Finance established the Capital stock Survey Project in early 1982. In 1983, 125 companies were interviewed about the availability of information on economic lives of fixed assets, sales of used assets, levels of assets, and retirement policies for assets.

In these interviews, five aspects of capital data in which information was said to be unavailable or incomplete were identified: (1) economic service life of fixed capital assets, (2) transactions in used assets, (3) premature retirement, or discarding, of fixed capital assets in response to changes in relative factor prices or changes in technology, (4) leased fixed capital assets, and (5) the investment in fixed capital assets for pollution abatement and control. As the final phase of the feasibility study, a pilot survey was conducted.

The Pilot Survey of Fixed Assets

The Pilot Survey of Fixed Assets was sent to more than 1,000 establishments. The survey questionnaire asked these establishments to report information about existing capital stocks and the flow of new investment.

The question about capital stocks requested the following information:

- The value of fixed capital assets specifically, the total original cost for assets still in use, the total estimated current (or replacement) value of assets, the average age of assets, the estimated remaining useful life of fixed assets, and the percentage of assets leased to others;

- The percentage of structures and of machinery and equipment acquired for pollution abatement and control; and

- A disaggregation of assets into categories of building and engineering structures and into categories of machinery and equipment.

The questions about the flow of new investment requested the following information:

- The expected useful life of new assets;

- The expenditures on renovation, retrofit, refurbishing, overhaul, or rehabilitation of existing assets;

- The floor space of buildings and the number of units of machinery;
- The purpose of capital expenditures;
- The expenditures on assets for lease to and from others;
- The reasons for discards; and
- The purchases and sales of used assets.

The Results of the Pilot Survey[2]

Capital stock questions

The overall rate of response to the questions about capital stocks was 77 percent, and most industries had response rates near the average. The rates of response were particularly high from the petroleum and natural gas industries, petroleum and coal products manufacturers, retail trade, and services. The rates of response were somewhat lower from the electric power utilities, primary metal and nonmetallic mineral manufacturers. and finance, insurance, and real estate industries. In general, most of the companies took the time to complete the survey.

Nearly all of the respondents to the survey reported the value of fixed capital assets in terms of total original cost for assets still in use. This response is consistent with the responses of the companies during the earlier interviews. Although in the interviews some companies had expressed reservations about the availability of the data for the total original cost of fully depreciated assets still in use, their availability does not appear to have been a serious problem for the survey respondents.

Approximately 90 percent of the respondents reported the average age of assets. This high rate of response is particularly gratifying; in the earlier interviews, the initial industry response indicated that the average age of assets would be very difficult to report.

About 75 percent of the respondents reported estimates for the remaining useful life of fixed assets. However, this question was clearly somewhat difficult for companies to answer; there was considerable interindustry variation in the rates of response to this question. The rates of response were higher from the manufacturers of paper and allied products, of primary metal, and of electrical products than from the manufacturers of transportation equipment and of chemical products. It would be worthwhile to investigate the reasons for this variation in responses among industries. This overall rate of response should be considered positive because the initial industry response indicated that projected service lives would be very difficult to report. But these estimates must be checked to ensure that industries have not simply used tax lives to make this calculation.

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2 For additional information, see the "Evaluation Report for the Capital Stock Survey Project, June 1986," which is available from the author.

Flow questions

The overall rate or response to the flow questions was nearly 100 percent. About 82 percent of the respondents reported estimates for the expected useful service life of new assets. This rate of response should be considered high, because this question asks companies to predict the future and is, therefore, inherently speculative. Moreover, although it may be relatively easy to make this estimate for well-known types of capital assets, it is more difficult to make it for new types. For example, the rate of response from retail trade was 54 percent; this low rate was, perhaps, partly attributable to the difficulty in estimating the service life of new automated machinery, such as the integrated point-of-sale systems that are designed to facilitate inventory control.

It is clear from the survey responses that firms can report the reasons for discards and the purchases and sales of used assets, though it is difficult to assess the validity of these data. The data for discards are particularly interesting because these data from the survey may be used to cross-check the estimated level of discards in each industry with comparable data from the perpetual inventory calculation. Virtually all of the respondents who reported data for discards also gave some reason for the discards; this response is interpreted as a positive result for the feasibility of capital stock surveys. The data for discards should be especially useful when they are regularly available. In particular, the data provided in response to this question would provide direct evidence that indicates when assets are discarded prematurely in response to changes in relative factor prices.

The expenditures on assets for lease were reported by two-thirds of the respondents in services and by one-third of the respondents in finance, insurance and real estate; additionally, a significant number of respondents in retail trade reported some leasing activity. These results suggest that assets for lease are an important part of the capital stock owned by the services industry. Moreover, the survey responses clearly indicate that companies are capable of reporting this information.

The Capital and Repair Expenditures Survey

Based on the results of the Pilot Survey of Fixed Assets, Statistics Canada revised and expanded the capital and repair expenditures survey. The revised survey collected data for the following:

- Capital expenditures specifically, the acquisition of new assets and the renovation, retrofit, refurbishing, overhauling, and rehabilitation of existing assets;
- Expected useful service life of new assets;
- Original cost and age of assets that are discarded, retired, or destroyed;
- Sales and purchases of used assets;
- Reasons for capital expenditures and for discards;
- Expenditures for automation for example, for robots, automated material-handling equipment, automated production machinery and equipment, and computerized, numerically controlled machine tool equipment;

- Value of work in progress at year end; and

- Value of fixed assets that is, the cost of accumulated capital (gross book value) and accumulated depreciation, beginning with 1987 data.

The revised survey provided detail that had not previously been available; for example 30 different types of equipment were reported and classified according to the 45 industries that bought the equipment. (See Table III). Moreover, an analysis of the data from this survey will now yield the amount that an industry invests, the kind of machinery being purchased, and the technological and structural changes taking place.

Studies Using the Survey Data

Based on the work that we have done on the capital stock survey project, we have now produced an integrated system for measuring capital stocks and flows. Starting in 1990, this system has enabled us to do the following:

- Tabulate new industry benchmarks for construction and for machinery and equipment;

- Incorporate the new estimates of service lives into our calculation of fixed assets;

- Introduce new forms and new rates of depreciation that were suggested by our research; and

- Introduce the normal distribution model as our new mortality function.

The data from the expanded capital and repair expenditures survey has helped us to improve our understanding of the nature of investment expenditures. The survey provides new information on modernization, on overhauls, and on types of equipment. Using the survey data, researchers can study various topics, such as the importance of the investment in fixed capital assets for pollution abatement and control.

Based on the data from the Capital and Repair expenditures Surveys, the new estimates of the service lives of equipment can now be compared with the existing estimates that have been used in the perpetual inventory calculation method. The old estimates of service lives relied primarily on the estimates made from a variety of sources, such as corporation tax returns, the relationship between capital cost allowances and investment expenditures, and tables from *Bulletin "F"*.[3] In most cases, the new estimates of service lives are shorter than the existing ones.[4]

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[3] U.s. Department of the Treasury, Bureau of Internal Revenue, Bulletin "F" (Revised January 1942)-Income Tax, Depreciation, Obsolescence, Estimated Useful Lives, and Depreciation Rates, (Washington, DC:GPO, 1942).

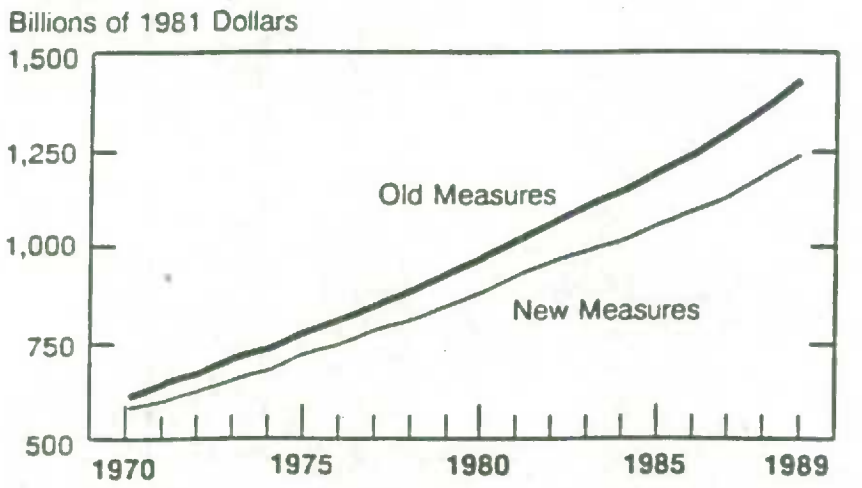
[4] Tabulations of the existing and of the new estimates of service lives by industry and by type of equipment are available from the author.

For example, the information derived from the Capital and Repair Expenditures Survey suggests that companies replace old equipment at a much faster rate than before. In manufacturing, the average service life of assets fell to 17 years from 25, while in the non-manufacturing sector, the average life dropped to 22 from 32 years.

The estimation of the values of capital stocks relies on: the value of new acquisitions of capital, the expected service life of the newly acquired capital, and the rate at which existing assets are being discarded. Previously, assets were assumed to remain in the stock for the exact amount of time their service life stipulated. However, new information derived from the Survey of Capital and Repair Expenditures suggests that there is a more complex pattern involving premature discards because of accelerated obsolescence as well as the retention of fully depreciated assets.

The accompanying graph compares the old and new measures of gross fixed assets over time. The revised measures are less than the old ones. For example, in 1989 the new constant dollar estimate of $1,235 billion is 14% less than the old estimate of $1,430 billion. This reflects the findings of the survey: shorter lives and more complex ways of discarding. For the period 1970 to 1989, the average real growth rate for the new measures is 4.2%, compared with 4.6% for the old. Table I presents the old and new measures of gross fixed assets by industry and Table II shows their respective growth rates.

Gross Fixed Capital Stocks - All Industries, 1970-1989



Source: Statistics Canada, National Wealth and Capital Stock Section, Investment and Capital Stock Division

Table I

Gross Fixed Capital Stocks by Indutry (billions of constant 1981 dollars)

Industry	New Measures			Old Measures		
	1970	1980	1989	1970	1980	1989
Agriculture	35.4	51.0	42.0	40.6	63.8	66.1
Forestry, Fishing and Mining	46.1	83.7	121.5	49.9	97.5	151.3
Manufacturing	93.2	134.2	185.3	102.9	154.0	225.1
Construction	5.8	9.9	14.4	5.7	10.0	14.5
Transportation and Utilities	165.4	250.2	340.8	169.9	266.6	373.2
Trade	20.5	25.7	31.2	24.9	34.4	49.4
Finance, Insurance and Real Estate	16.4	42.3	94.7	16.5	42.8	97.4
Personal and Commercial Services	60.0	93.3	173.8	61.5	97.0	193.8
Public Administration	127.2	183.3	231.5	133.0	197.3	258.8
Total	570.0	873.6	1,235.2	604.9	963.4	1,429.6

Table II

Gross Fixed Capital Stocks by Industry Average Real Annual Growth Rates

Industry	New Measures		Old Measures	
	1970 - 1980	1981 - 1989	1970 - 1980	1981 - 1989
Agriculture	3.7	-2.1	4.6	0.4
Forestry, Fishing and Mining	6.1	4.3	6.9	5.0
Manufacturing	3.7	3.7	4.1	4.3
Construction	5.6	4.2	5.7	4.2
Transportation and Utilities	4.2	3.5	4.6	3.8
Trade	2.3	2.2	3.3	4.1
Finance, Insurance and Real Estate	10.0	9.4	10.0	9.6
Personal and Commercial Services	4.5	7.2	4.7	8.0
Public Administrations	3.7	2.6	4.0	3.1
Total	4.4	3.9	4.8	4.5

Using these new estimates of service lives, a number of simulations have been performed to show the impact of these data on capital stock estimates. An analysis of those simulations was also done in order to determine the impact of the new service lives on the growth rates of the gross stock estimates.

In our paper,[5] J.C. Hwang and I used the price-age profiles of used assets that were reported in the revised capital expenditures survey to estimate the form and the rates of economic depreciation. We concluded that the patterns of depreciation are close to the geometric form for both the manufacturing sector and non-manufacturing sector.

As was said at the outset, accurate data on capital stocks and flows data are essential information for economic analysis. We are now in a position to produce improved and verified data on a regular basis.[6]

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5 "The Forms and Rates of Economic Depreciation, Canadian experience" is available by contacting Peter Koumanakos.

6 Fixed Capital Flows and Stocks - Methodology 1990. Statistics Canada

Table III **Capital Expenditures on Machinery and Equipment in Canada, 1990 by Industry and by Type of Asset**

(millions of current dollars)

	Office Furniture	Office Computers	Non-Office Furniture	Scientific Equipment	Heating/ Air Cond.	Pollution Abatement	Safety & Security	Sanitation Equipment	Motors & Generators
Agriculture	-	-	-	-	-	-	-	-	-
Forestry	1.2	3.2	-	0.1	0.1	1.9	-	-	0.2
Mines	1.6	14.1	0.4	6.3	12.8	7.3	2.7	-	27.5
Gold Mines	0.3	1.5	0.1	1.8	3.1	1.5	0.8	-	7.3
Copper, Gold, Silver	0.2	2.3	x	1.0	1.9	x	0.5	-	2.8
Silver, Lead, Zinc	0.2	0.5	-	-	1.2	x	0.2	-	1.1
Other Met. Mines	0.3	2.8	-	1.5	4.3	x	x	-	2.6
Non-Met. Mines	0.6	6.9	x	1.9	2.4	3.8	x	-	13.5
Oil Drillers	0.1	0.1	-	-	-	-	-	-	-
Manufacturing	211.3	494.7	32.2	99.7	120.6	745.1	20.6	x	246.4
Food & Beverages	36.9	69.9	2.5	2.3	13.2	10.8	0.5	0.6	21.3
Rubber & Plastic	16.2	28.7	-	x	10.0	1.6	0.4	-	-
Textiles	0.3	7.6	-	0.8	1.8	0.3	0.2	-	x
Wood	x	3.4	-	0.5	4.3	19.9	0.5	-	7.1
Paper & Allied	3.0	20.2	1.9	3.5	19.4	427.8	3.5	0.7	25.1
Printing & Pub.	20.3	28.3	10.8	0.1	15.0	x	-	-	-
Primary Metal	5.6	31.7	0.4	5.9	8.5	241.3	1.3	0.2	14.2
Metal Fabricating	5.2	8.8	-	x	0.6	5.5	0.6	-	3.6
Machinery	6.1	26.8	5.2	5.1	4.6	0.1	0.1	-	x
Transportation	17.2	37.9	1.2	2.3	2.7	10.2	6.6	-	3.2
Electrical Prod.	21.9	77.3	0.7	31.6	10.7	x	0.2	x	12.9
Non-Met.Minerals	2.2	17.1	-	2.1	0.8	1.1	0.1	0.2	1.1
Petroleum & Coal	x	43.1	-	2.0	0.9	1.4	2.1	-	55.2
Chemicals	27.4	65.1	6.7	41.1	22.7	22.0	4.1	0.6	82.3
Misc. Manufact.	10.2	15.7	2.4	1.0	4.6	0.5	0.4	-	0.1
Other manufact.	x	13.1	0.4	x	0.8	0.4	-	-	0.4
Capital Charged to Operating	-	-	-	-	-	-	-	-	-
Utilities	94.9	301.3	102.0	43.0	70.7	7.1	1.8	x	76.2
Air Transp.	0.9	1.1	98.0	-	-	-	-	-	-
Rail Transp.	1.8	16.6	-	-	-	-	-	-	x
Water Transp.	3.1	x	0.8	-	x	3.4	x	x	0.5
Motor Transp.	9.3	11.9	2.3	-	0.5	-	0.1	-	-
Urban Transit	2.3	14.7	x	0.3	1.2	-	x	x	-
Grain Elevators	0.6	x	-	-	-	x	-	-	-
Broadcasting	16.9	32.3	-	7.2	-	-	0.4	-	-
Telephone & Tel.	52.3	190.9	0.2	23.7	-	-	-	-	2.8
Gas Dist.	6.0	22.0	-	x	x	-	-	-	x
Other Utilities	1.7	2.4	x	x	-	x	0.1	-	0.8
Capital Charged to Operating	-	-	-	-	-	-	-	-	-
Trade, Fin. Comm.	1,210.2	3,063.4	1,297.2	122.0	44.1	1.9	13.5	0.4	137.5
Wholesale	34.3	95.6	210.3	2.6	3.7	-	-	-	2.5
Dept. Stores	15.8	36.8	90.2	-	0.4	-	2.4	0.2	-
Chain Stores	23.9	50.8	143.0	-	1.0	-	0.6	-	-
Automotive Trade	4.6	20.5	0.3	-	2.1	1.8	-	-	80.5
Comb. Food Stores	6.8	2.8	182.8	-	13.7	-	x	-	1.7
Capital Charged to Operating	-	-	-	-	-	-	-	-	-
Banks	220.3	534.9	0.4	-	-	-	-	-	-
Ins., Trust & Loans	101.9	165.7	2.9	-	0.2	-	-	-	x
Other Finance	184.5	142.2	309.4	-	14.5	-	x	-	x
Motion Picture	0.3	0.4	14.1	0.2	-	-	-	-	-
Hotels & Motels	7.6	4.2	167.0	-	1.3	-	1.3	-	-
Other commercial	603.9	2,002.3	114.3	119.2	4.9	0.1	6.6	0.2	50.8
Other Trad, Fin.Comm.	6.3	7.2	62.5	-	2.3	-	2.1	-	0.6
Institutions	114.0	204.8	203.4	542.2	9.8	-	1.4	0.3	3.1
Private Schools	11.2	5.4	4.9	0.5	0.6	-	0.1	-	-
Universities	83.4	115.7	12.1	129.6	x	-	0.5	-	2.6
Hospitals	14.1	82.1	143.7	411.2	x	-	0.8	0.3	0.5
Special Care	4.2	0.5	30.7	0.9	0.6	-	-	-	-
Churches	1.1	1.1	12.1	-	0.3	-	-	-	-
Govt. Dept.	268.2	788.4	36.2	144.4	29.3	49.1	35.3	12.1	30.1
Fed.Govt.	136.0	432.7	17.6	129.3	12.4	7.2	24.5	7.4	2.1
Prov.Govt.	89.4	242.4	7.2	12.8	x	x	4.7	-	1.8
Mun.Govt.	42.8	113.4	11.4	2.3	x	x	6.0	4.7	26.2
Grand Total	**1,901.5**	**4,869.7**	**1,671.2**	**957.8**	**287.6**	**812.3**	**75.2**	**15.5**	**520.8**

Capital Expenditures on Machinery and Equipment in Canada, 1990 by Industry and by Type of Asset (millions of current dollars) (continued)

	Heavy Const. Equip.	Tractors All Type	Capitalized Tooling	Drillling Rigs	Ind. Cont.	Undergr. Equip.	Mining Equip.	Autos	Buses	Trucks	All-Ter. Vehicles
Agriculture	-	1,257.3	-	-	-	-	-	204.7	-	315.4	-
Forestry	39.8	25.2	2.9	-	-	-	-	x	x	17.9	0.6
Mines	191.8	60.2	6.5	33.6	0.6	32.6	10.8	x	-	35.3	x
Gold Mines	25.4	3.5	1.5	3.8	0.1	13.2	3.5	0.9	-	2.9	-
Copper, Gold, Silver	18.7	5.2	0.4	1.6	-	4.9	1.4	x	-	3.0	-
Silver, Lead, Zinc	5.2	x	0.2	1.7	-	3.9	x	-	-	x	-
Other Met. Mines	20.2	x	0.7	12.7	x	1.6	x	x	-	20.2	x
Non-Metal Mines	122.0	30.0	3.7	5.7	x	9.0	2.9	3.3	-	6.6	0.2
Oil Drillers	0.2	-	-	8.1	-	-	-	0.5	-	x	-
Manufacturing	36.5	10.4	432.4	x	5.6	-	-	36.7	x	90.4	-
Food & Beverages	-	0.6	5.7	-	0.8	-	-	15.1	x	21.0	-
Rubber & Plastic	-	-	13.3	-	x	-	-	0.4	-	2.7	-
Textiles	-	-	x	-	-	-	-	0.2	-	0.1	-
Wood	13.2	x	0.6	-	-	-	-	1.6	-	5.5	-
Paper & Allied	x	3.9	7.9	-	x	-	-	0.3	-	8.9	-
Printing & Pub.	-	-	6.6	-	-	-	-	6.5	-	7.2	-
Primary Metal	1.7	-	9.7	x	0.3	-	-	0.7	-	13.8	-
Metal Fabricating	-	x	10.1	-	-	-	-	0.4	-	3.6	-
Machinery	-	0.2	19.3	x	-	-	-	0.1	-	1.0	-
Transportation	x	-	325.8	-	-	-	-	x	-	1.5	-
Electrical Prod.	-	-	15.1	-	0.3	-	-	0.1	-	0.5	-
Non-Met.Minerals	8.6	-	-	-	0.8	-	-	x	-	17.2	-
Petroleum & Coal	6.8	-	x	-	-	-	-	x	-	x	-
Chemicals	1.4	x	x	-	0.8	-	-	3.8	-	x	-
Misc. Manufact.	1.0	-	6.3	-	0.6	-	-	x	-	1.2	-
Other manufact.	-	-	3.8	-	-	-	-	0.9	-	0.5	-
Capital Charged to Operating	-	-	-	-	-	-	-	-	-	-	-
Utilities	8.2	3.7	36.1	x	x	-	-	66.2	230.6	403.6	17.1
Air Transp.	-	x	0.9	-	-	-	-	-	x	-	-
Rail Transp.	1.7	-	x	-	-	-	-	2.6	-	12.0	16.1
Water Transp.	0.6	x	1.0	-	-	-	-	x	-	1.5	-
Motor Transp.	0.2	-	1.8	-	-	-	-	2.8	80.7	228.5	0.8
Urban Transit	x	x	5.3	-	-	-	-	1.4	x	5.4	-
Grain Elevators	-	-	-	-	-	-	-	-	-	x	-
Broadcasting	-	-	1.5	-	-	-	-	8.4	-	7.2	-
Telephone & Tel.	-	-	13.7	-	-	-	-	37.3	-	86.5	0.2
Gas Dist.	x	-	6.8	x	-	-	-	12.8	-	4.9	-
Other Utilities	1.2	1.1	x	-	x	-	-	x	-	x	-
Capital Charged to Operating	-	-	-	-	-	-	-	-	-	-	-
Trade, Fin. Comm.	409.1	39.5	55.9	-	2.6	-	-	4,600.0	11.3	1,020.7	18.6
Wholesale	172.3	x	x	-	0.6	-	-	23.6	-	x	-
Dept. Stores	-	-	1.7	-	-	-	-	0.1	-	9.8	-
Chain Stores	-	x	x	-	x	-	-	1.6	-	4.2	-
Automotive Trade	-	-	0.7	-	x	-	-	258.6	-	31.7	x
Comb. Food Stores	x	-	-	-	-	-	-	1.1	-	1.2	-
Capital Charged to Operating	-	-	-	-	-	-	-	-	-	-	-
Banks	-	-	-	-	-	-	-	x	-	-	-
Ins., Trust & Loans	-	-	-	-	-	-	-	6.7	-	-	-
Other Finance	x	-	-	-	-	-	-	156.3	-	49.9	-
Motion Picture	-	-	-	-	-	-	-	-	-	-	-
Hotels & Motels	-	-	-	-	-	-	-	x	-	x	-
Other commercial	196.8	8.6	49.7	-	0.5	-	-	4,147.2	11.3	820.3	x
Other Trad, Fin.Comm.	-	-	-	-	-	-	-	3.8	-	9.5	-
Institutions	-	0.5	2.6	-	-	-	-	2.2	x	1.7	-
Private Schools	-	-	-	-	-	-	-	0.3	0.8	0.2	-
Universities	-	0.5	x	-	-	-	-	0.8	-	1.2	-
Hospitals	-	-	x	-	-	-	-	x	-	0.3	-
Special Care	-	-	-	-	-	-	-	x	x	-	-
Churches	-	-	-	-	-	-	-	0.6	-	-	-
Govt. Dept.	99.7	14.4	14.4	-	x	-	-	201.9	x	193.2	x
Fed.Govt.	1.4	3.3	4.2	-	x	-	-	48.2	0.1	11.4	0.1
Prov.Govt.	45.3	2.6	3.5	-	-	-	-	98.2	x	27.3	x
Mun.Govt.	53.0	8.5	6.7	-	-	-	-	55.5	-	154.5	0.3
Grand Total	**785.0**	**14,411.1**	**550.7**	**34.9**	**12.7**	**32.6**	**10.8**	**5,119.7**	**243.5**	**2,078.2**	**39.6**

Capital Expenditures on Machinery and Equipment in Canada, 1990 by Industry and by Type of Asset (millions of current dollars)

(continued)

	Rail/Subway Transit Eqp.	Ships & Boats	Aircraft	Oth. Transp. Equip.	Material Handling	Proces-ssing Eqp.	Communic. Equip.	Other	Total
Agriculture	-	-	-	-	-	-	-	-	1,777.3
Forestry	0.3	x	x	1.1	10.6	18.2	0.4	6.4	134.9
Mines	2.3	-	x	0.5	28.2	190.5	1.9	17.4	895.1
Gold Mines	x	-	x	-	1.4	48.0	0.7	1.9	125.3
Copper, Gold, Silver	x	-	-	-	0.1	9.8	0.2	3.5	61.0
Silver, Lead, Zinc	-	-	-	-	0.6	5.2	-	0.3	32.7
Other Met. Mines	x	-	-	0.1	11.2	101.9	0.8	x	201.6
Non-Met.Mines	0.4	-	-	0.4	14.9	25.6	0.7	8.4	263.3
Oil Drillers	-	-	-	-	-	10,517.6	-	x	11.2
Manufacturing	19.9	x	-	6.2	152.1	930.9	35.9	2,367.4	15,692.7
Food & Beverages	x	x	-	0.9	10.8	528.2	4.2	25.9	1,182.5
Rubber & Plastic	-	-	-	0.3	4.5	255.5	0.3	6.3	615.7
Textiles	-	-	-	-	0.3	378.0	0.2	1.3	282.1
Wood	-	-	-	0.3	31.0	3,130.5	-	29.5	498.2
Paper & Allied	0.6	x	-	x	17.0	338.9	2.1	9.4	3,691.4
Printing & Pub.	-	-	-	-	1.1	1,388.7	x	3.8	440.4
Primary Metal	1.3	-	-	0.9	26.2	204.6	x	39.3	1,793.2
Metal Fabricating	-	-	-	0.1	5.8	315.0	0.5	4.9	257.9
Machinery	-	-	-	-	10.5	833.3	x	3.9	413.9
Transportation	x	-	-	-	17.0	323.1	x	4.2	1,283.5
Electrical Prod.	-	-	-	-	2.7	387.3	17.6	x	515.9
Non-Met.Minerals	0.3	-	-	x	6.4	192.0	0.3	23.0	471.2
Petroleum & Coal	-	-	-	-	1.8	1,085.3	0.1	x	343.6
Chemicals	x	-	-	1.1	15.6	104.9	4.3	19.4	1,409.9
Misc. Manufact.	x	-	-	-	0.3	121.4	0.4	7.2	158.9
Other manufact.	-	-	-	-	0.6	-	-	0.7	149.5
Capital Charged to Operating	-	-	862.1	-	-	x	-	2,183.9	2,183.9
Utilities	282.2	152.7	862.1	25.4	90.1	-	3,312.1	162.0	6,357.2
Air Transp.	-	-	-	x	x	1.5	1.3	x	967.1
Rail Transp.	171.7	-	-	21.9	x	-	1.4	-	250.1
Water Transp.	-	152.7	-	x	28.6	-	0.5	1.4	200.5
Motor Transp.	-	-	-	0.9	1.1	-	1.8	0.3	322.8
Urban Transit	x	-	-	x	0.3	x	2.5	x	318.1
Grain Elevators	x	-	-	-	52.8	1.5	-	-	63.2
Broadcasting	-	-	-	-	1.1	-	127.4	1.3	205.1
Telephone & Tel.	-	-	-	-	-	-	3,174.0	-	3,581.8
Gas Dist.	-	-	-	-	x	-	3.1	x	222.0
Other Utilities	-	-	-	-	5.2	-	0.1	2.1	81.1
Capital Charged to Operating	-	-	-	-	-	190.7	-	145.4	145.4
Trade, Fin. Comm.	46.3	5.6	25.5	4.1	336.7	21.0	110.8	421.9	13,189.7
Wholesale	-	-	-	x	38.7	x	4.4	29.9	767.7
Dept. Stores	-	-	-	-	x	x	0.8	4.6	174.6
Chain Stores	-	-	x	-	3.1	-	0.6	1.6	235.5
Automotive Trade	-	x	-	-	44.7	0.9	x	20.4	470.8
Comb. Food Stores	-	-	-	-	-	-	-	-	212.4
Capital Charged to Operating	-	-	x	-	-	60.3	-	199.1	199.1
Banks	-	-	-	-	x	-	x	0.1	838.9
Ins., Trust & Loans	-	-	-	-	-	x	x	1.8	284.2
Other Finance	-	-	-	-	-	1.7	4.3	4.4	906.2
Motion Picture	-	-	-	-	-	-	1.3	1.6	19.6
Hotels & Motels	-	-	20.0	-	-	95.7	1.0	-	194.0
Other commercial	46.3	x	-	x	210.4	7.1	82.8	156.6	8,770.4
Other Trad, Fin.Comm.	-	-	-	-	20.5	-	2.5	1.8	126.3
Institutions	-	-	-	x	0.1	-	3.9	14.2	1,105.3
Private Schools	-	-	-	-	-	-	-	0.7	24.7
Universities	-	-	-	-	-	-	1.3	10.5	361.4
Hospitals	-	-	-	x	0.1	-	2.6	1.7	665.3
Special Care	-	-	-	-	-	-	-	0.6	38.0
Churches	-	-	-	-	-	x	-	0.7	15.9
Govt. Dept.	-	101.1	x	x	11.6	x	532.9	258.2	2,851.5
Fed.Govt.	-	87.0	3.2	1.6	8.4	x	477.5	198.1	1,621.3
Prov.Govt.	-	14.0	x	x	0.2	-	38.7	12.1	637.0
Mun.Govt.	-	0.1	-	-	3.0	10,928.4	16.6	48.0	593.2
Grand Total	**351.1**	**270.5**	**897.8**	**50.5**	**629.4**		**3,998.5**	**3,246.8**	**41,803.8**