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ECONOMIC ASPECTS OF FEDERAL GOVERNMENT SPONSORED INSTITUTIONAL AND ON-THE-JOB TRAINING IN CANADA

by

Keith Newton

B.Sc.(Econ.), University of Hull, 1963
M.A., McMaster University, 1968

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Name: Keith Newton

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Examining Committee:

Chairman: Zane Spindler

Dennis R. Maki
Senior Supervisor

Robert Rogow

Kenneth Strand

Sandra Christensen

J.C.R. Rowley
External Examiner
Associate Professor
Carleton University, Ottawa

Date Approved: Nov. 21, 1975

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ABSTRACT

The subject matter of this dissertation concerns economic aspects of manpower training programs sponsored by the federal government in Canada. In particular it focuses upon the relative efficacy of two of the methods of training used -- on-the-job training (OJT) and institutional training. The relevance of the investigation is suggested by the large expenditures on manpower training and by the dearth of comparable studies to date.

The analysis employs theoretical, descriptive, and empirical approaches in addressing the economic aspects of training programs which are (a) Canada-wide, (b) funded by the federal government, and (c) of two main types: institutional and on-the-job. First, the definitions and characteristics of training are examined, including the various forms it may take. An attempt is made to examine some theoretical aspects of one variant of training which is of particular interest -- namely, OJT. The theoretical rationale for government intervention in training is examined and empirical evidence is brought to bear upon such arguments in the Canadian context. The operations of federal government training programs in Canada are then examined: their objectives, their relative emphasis upon institutional and OJT methods, respectively, and their performance vis-à-vis objectives. Theoretical and *a priori* arguments concerning the relative efficacy of institutional and on-the-job training are then examined. Finally, an analytical framework is

employed for an empirical investigation of the relative efficiency of the two methods in training clients for four selected occupations.

The study shows, first, the differences in kind which exist between the two main methods of training considered, and indicates how economic analysis may elucidate the learning from experience variant of OJT. Secondly, it is shown that there exists potential, on theoretical and empirical grounds, for the fruitful operation of training programs in Canada. Next, the Canada Manpower Training Program is seen to be addressed to a variety of economic objectives, which it has met with varying degrees of success. The heavily institutional character of the Program is apparent. This institutional emphasis of Canadian training programs stands in marked contrast to the balance of the theoretical debate on the relative merits of institutional training and OJT, and to the results of empirical studies in this area.

Finally, it is demonstrated that for four populous occupations in each of which some clients are presently trained in institutional courses and some by OJT, the concentration of activity in the more efficient training method can yield significant benefits, and cost reductions, for the Department of Manpower and Immigration. This reallocation is accompanied by an improvement in the department's objective function of 5.4 per cent, or close to $2 million, in courses covering 5,700 trainees. The concomitant cost savings amount to $1.06 million.

Moreover, the concentration of trainees in the most efficient method for each occupation has the effect of doubling the number of clients trained on the job.

ACKNOWLEDGMENT

Thanks are due to a number of people who provided me with assistance and encouragement during the preparation of this thesis. My senior adviser, Professor Dennis Maki, has monitored the study from the start and his constructive criticism and suggestions at each stage have been a crucial ingredient in its preparation. Moreover, the promptness with which he unfailingly met innumerable requests for comments was always an encouragement in itself.

Professor Kenneth Strand originally sparked my interest in the subject area and when in 1968 I gained a president and lost an adviser it was he who arranged my transition to the Economic Council. At that institution Sylvia Ostry proved to be an inspiring colleague and teacher who read and commented upon many of the background papers on which the thesis is based. Professor Robert Rogow's careful reading of my drafts has greatly enhanced the exposition of the final version. My external examiner, Professor Robin Rowley, also contributed a number of useful suggestions.

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CHAPTER 1

INTRODUCTION AND OUTLINE

This study is concerned with some economic aspects of manpower training programs sponsored by the Canadian federal government. Within this framework, a major objective will be to examine the relative effectiveness of two methods of training -- institutional and on-the-job -- under the Canada Manpower Training Program.

The purpose of this chapter is twofold. The first section is designed to suggest the timeliness and relevance of the economic analysis of training programs in terms of the apparent interest shown in them by governments in many countries, including Canada. The second section then outlines the particular aspects of training programs which are to be analysed in subsequent chapters, together with a brief sketch of the structure and content of those chapters.

1. The Historical Evolution of Manpower Training Programs

The decade of the 1960s witnessed the growth, in many industrialized countries, of what have come to be known as "manpower policies". The emergence of these policies may be described as follows.

In the years immediately following the Second World War, the memory of the Depression was still fresh in many minds, governments passionately espoused the pursuit of full employment, and policy-makers thankfully received the Keynesian legacy of countercyclical fiscal policy. More recently, however, many

Western economies experienced a surge of growth uninterrupted by severe depression and massive unemployment, yet characterized by the emergence of different, though nevertheless troublesome, phenomena related to the labour market. The co-existence of substantial unemployment and inflation led to a new orientation of concern -- with the allocative efficiency of the labour market. Geographical and occupational mismatching of men and jobs -- the simultaneous existence of inflationary bottlenecks in some areas and/or trades, and idle workers in others -- pointed up the need for some kind of augmentative measures to aid the operation of the labour market.[1/]

With recognition of this need came government programs of training, to meet the occupational mismatching; of mobility, to meet the geographical mismatching; and of counselling and placement services to bolster the quantity, quality, and dissemination of information in the labour market. It is this range of activities which is generally considered to be subsumed under the heading of "manpower policy".[2/]

Training programs appear to play an important role in all countries pursuing an active manpower policy. They are seen as the way in which existing skills can be improved, and new

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1/ The particular problems of the "hard-core unemployed", the disadvantaged: the unskilled, poorly educated, black, aged, disabled, etc., whose plight has not proven susceptible of alleviation by traditional measures, imparted a sense of urgency to the formulation of manpower policies in the United States.

2/ Immigration is frequently included in this list of activities.

skills acquired. Thus skill shortages may be alleviated, productivity increased, and/or employability improved.[3/]

In the United States, training was an integral part of the Area Redevelopment Act of 1961, which may be considered as one of the first steps towards modern manpower policies in that country.[4/] The Manpower Development and Training Act of the following year called for a diversified nationwide training program, including on-the-job training, for persons who could not reasonably be expected to find full-time employment without such training.[5/] The Economic Opportunity Act of 1964 established two other programs -- the Neighbourhood Youth Corps and the Job Corps -- which constituted another important federal involvement in the training field. Later in the 1960s a range of new programs involving training were oriented towards the problems of particular groups.

Throughout this period, there took place a proliferation of training programs in the United States which was accompanied by steadily increasing federal expenditures, as may be seen from Table 1-1. By 1973, over 2 3/4 billion dollars were spent on this activity.

3/ A further dimension to the role of training programs is the possibility of their use in a specifically anti-cyclical manner: see OECD Manpower and Social Affairs Committee, "Adult Training as an Instrument of Active Manpower Policy" (Paris, May 15, 1970), and Newton, K., "A Countercyclical Training Programme for Canada?", *Industrial Relations/Relations Industrielles*, vol. 26, no. 4, December 1971, pp. 865-888.

4/ See A. R. Weber in *Public-Private Manpower Policies* (IRRA, 1969), p. 1.

5/ *Manpower Report of the President*, 1965, p. 125.

Table 1-1

GROWTH OF FEDERAL GOVERNMENT EXPENDITURES ON TRAINING IN THE UNITED STATES*

(Thousands of current dollars)

Fiscal Year:	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Federal Obligations											
Grand Total	56,070	142,111	414,247	628,407	795,950	802,173	1,029,730	1,418,552	1,485,466	2,696,940	2,753,485
Manpower Development and Training Act Total	56,070	142,111	286,505	339,649	298,247	296,418	272,616	336,580	335,752	424,553	380,812
Institutional training(1)	55,219	135,525	249,348	281,710	215,588	221,847	213,505	287,031	275,467	355,708	303,814
JOP-OJT(2)	851	6,586	37,157	57,939	82,659	74,571	59,111	49,549	60,285	68,845	76,998
Neighbourhood Youth Corps Total	--	--	127,742	263,337	348,833	281,864	320,696	356,589	426,453	517,244	416,931
In school	--	--	(5)	(5)	67,448	58,908	49,048	59,242	58,052	74,897	64,083
Out of school	--	--	(5)	(5)	148,079	96,279(6)	123,721(6)	97,923(6)	115,195(6)	121,962	106,854
Summer	--	--	(5)	(5)	133,306	126,677(6)	147,927(6)	199,424(6)	253,206(6)	320,385(6)	245,994
Operation Mainstream	--	--	--	--	23,628	22,319	41,000	51,043	71,550	85,164	81,068
Public Service Careers(3)	--	--	--	--	15,573	7,557	18,460	89,366	91,636	58,301	30,719
Special Impact(4)	--	--	--	--	7,000	2,038	1,100	--	--	--	--
Concentrated Employment Program	--	--	--	25,421	78,411	93,057	114,220	187,592	166,752	154,602	130,268
JOBS (federally financed)	--	--	--	--	24,258	89,920	160,821	148,820	169,051	118,224	72,914
Work Incentive Program	--	--	--	--	--	9,000	100,817	78,780	64,085	174,788	208,830
Job Corps	--	--	--	--	--	--	--	169,782	160,187	202,185	192,800
Public Employment Program	--	--	--	--	--	--	--	--	--	961,879	1,239,143

*Detailed explanatory notes concerning programs shown in this table are to be found in the appendix to this chapter.

(1) Includes part-time and other training.

(2) Includes the JOBS-Optional Program (JOP) which began in fiscal 1971, and the MDTA on-the-job training (OJT) program, which ended in fiscal 1970 except for national contracts. Also includes Construction Outreach.

(3) Includes the New Careers Program.

(4) Transferred to the Office of Economic Opportunity effective July 1, 1969.

(5) Data are not available for NYC components prior to fiscal 1967.

(6) Includes obligations made available by MDTA supplemental funds; these were $130,238,500 in fiscal 1972, $83,296,000 in fiscal 1971, $26,367,800 in fiscal 1970, $7,446,000 in fiscal 1969, and $12,881,000 in fiscal 1968.

Source: *Manpower Report of the President*, prepared by U.S. Department of Labor, March 1973, and April 1974.

In the United Kingdom the Industrial Training Act of 1964 established Industrial Training Boards in a number of industries,[6] charged with ensuring an adequate provision of training facilities in their particular industries. Unlike the systems of the United States and Canada, the British training programs are not financed via heavy involvement of the central government. Rather what is involved is the redistribution of training funds among firms by a levy-and-grant system in which firms must pay a levy whether they train or not, and receive grants, not simply if they undertake training, but if they do so in the manner prescribed by their respective Industrial Training Boards. The Act, does, however represent recognition of the importance of adult training and it has clearly had a sizable impact in financial terms. Early in 1970, total levies were close to $320 million, of which, after administration expenses, about $306 million was returned to firms in the form of grants.[7] This amounts to approximately $12 per labour force member.[8]

In Canada also, the federal government has played a significant role in the provision of training during the last decade. The Technical and Vocational Training Assistance Act of 1960 (TVTA) provided for federal participation in a number of programs, including occupational training for adults, training

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[6] As of February 1970 there were 28 such boards.

[7] See D. Lees and P. Chiplin, "The Economics of Industrial Training", *Lloyds Bank Review*, April 1970, pp. 29-41.

[8] Cf. expenditures on training per labour force member in the United States and Canada in Chart 1, page 9.

in co-operation with industry, and training of the unemployed. The Act also included a Capital Assistance Program by which provinces were reimbursed for 75 per cent of their spending on expansion of, alterations to, and purchases of equipment for approved technical and vocational training facilities.[9/]

The Adult Occupational Training Act (AOT) of 1967, which is currently in force, leaves the training of youth to the provinces and provides for full federal absorption of occupational training costs for adults. Trainees, who need not be unemployed at time of referral, may be eligible for allowances according to certain criteria.[10/] The actual training courses are, for the most part, purchased from the provinces by the federal government. The capital assistance provisions of TVTA were carried over to AOT and there is further provision for loans to the provinces for the construction of training facilities.[11/]

Thus federal training expenditures in Canada have grown substantially, and there is reason to believe they will continue to do so. In an address to economists, Dr. W. R. Dymond, then Assistant Deputy Minister of the Department of Manpower and Immigration, told his audience that the AOT program was "doing

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9/ See D. Glendenning, "A Review of Federal Legislation Relating to Technical and Vocational Education in Canada", Technical and Vocational Training Branch, Department of Labour (Ottawa, March 1965).

10/ See Chapter 4 for details of the Canadian training system.

11/ See Planning and Evaluation Branch, Program Development Service, Department of Manpower and Immigration, "The Canadian Adult Training and Retraining Program", prepared for the OECD, July 1968.

broadly what it was intended to do", and suggested the federal government's confidence in the program by reporting,

> "During the period of very substantial government restraints on expenditures, because of inflationary pressures, it is one of the few programs of the federal government which has expanded, because of its contribution to productivity and hence to reducing the labour market pressures of inflation."12/

The growth in the Canadian government's expenditures on training, for the period 1961-75, is shown in Table 1-2, below.

Table 1-2

GROWTH OF FEDERAL GOVERNMENT EXPENDITURES ON TRAINING: CANADA, 1961-75*

(Thousands of current dollars)

Fiscal Year	Operating	Capital	Total
1961	8,453	--	8,453
1962	17,829	17,901	35,730
1963	28,288	179,627	207,915
1964	34,394	102,038	136,432
1965	44,476	52,758	97,234
1966	48,672	104,090	152,762
1967	85,331	136,056	221,387
1968	190,703	119,019	309,722
1969	192,966	105,950	298,916
1970	245,045	83,673	328,717
1971	289,577	75,443	365,020
1972	328,437	76,078	404,515
1973	343,498	--	343,498
1974	363,196	--	363,196
1975**	364,848	--	364,848
1976**	381,472	--	381,472

*Detailed notes on items in this table may be found in the appendix to this chapter.

**Estimates.

Source: *Public Accounts of Canada*, 1961-69 and *Estimates*, 1975-76, and *Manpower and Immigration Annual Report* (Ottawa: Information Canada).

12/ W. R. Dymond, "Manpower Policy in Canada as a Selective Instrument of Economic Policy" (Address to Economics Department, University of Massachusetts, Amherst, Mass., February 18, 1970), p. 10.

In addition to training programs per se, the Canadian government has also mounted a number of direct job-creation programs in recent years which provide valuable work experience. In 1971-72 the Local Initiatives Program (LIP) and the Opportunities for Youth Program (OFY) were launched. LIP is the larger of these two programs which, together, involved a federal expenditure of over $100 million in fiscal years 1973-74 and 1974-75. In these same years the Local Employment Assistance Program (LEAP) has been in operation and involved expenditures of $5.5 and $12 million, respectively. Such programs may be compared with some of the work experience programs in the United States -- such as the Neighborhood Youth Corps and Job Opportunities in the Business Sector -- listed in Table 1-1 and described in the appendix.

The burgeoning expenditures on training by the federal government are further illustrated in Chart 1-1, which shows federal training expenditures per labour force member in both the United States and Canada.

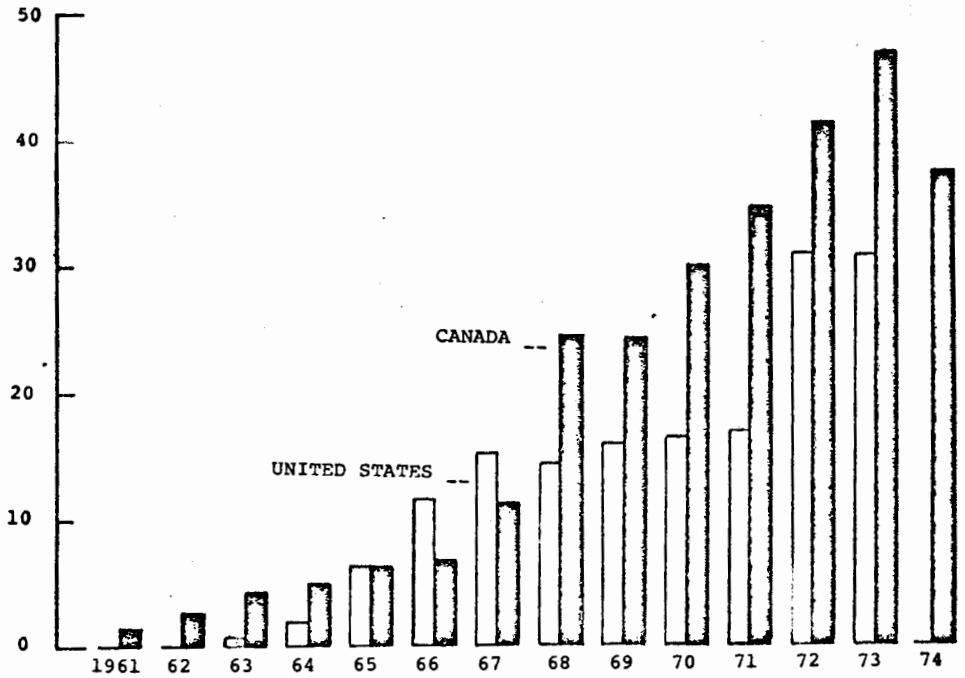
Thus it is apparent that the training component of Canadian manpower programs is of sizable proportions. Moreover, the absolute magnitude[13/] and steady growth of federal expenditures on training suggest the need for economic analysis and evaluation in this field.

13/ In fiscal year 1973-74, for example, the Canadian federal government spent over $363 million on training, as compared to almost $2 billion on health, $3/4 billion on family allowances, $580 million on postal services, and a little over $2 billion on unemployment insurance.

Chart 1-1

FEDERAL GOVERNMENT OPERATING EXPENDITURES ON TRAINING PER LABOUR FORCE MEMBER, CANADA AND UNITED STATES, FISCAL YEARS 1961-73

(Dollars)



Source: Canada -- *Public Accounts of Canada* and *Estimates*; Dominion Bureau of Statistics *Labour Force Survey*; United States -- *Manpower Report of the President*, U.S. Department of Labor, *Employment and Earnings*.

2. Dimensions of Analysis

There are many dimensions of evaluative analysis with respect to government expenditures on training. At what might be called the "policy level" of decision-making, one might ask

whether certain economic objectives could best be achieved via manpower policy or by means of some alternative policy. At the "program level" one might enquire whether, say, training or mobility could better be used to achieve a particular goal. Then with respect to a particular program "activity", such as training, there is the question of the appropriate role for government: what is the relative effectiveness of public and private training programs? How much government involvement, therefore, should there be? In what areas (occupations, industries, geographical locations, clientele, etc.) should the government intervene? Finally, one might want to know what *type* of training should be utilized -- for example, institutional training or on-the-job training?

Some consideration of a large number of such questions is almost inevitable for anyone researching government training activities, and some of the facets mentioned above will, indeed, be touched upon in the ensuing chapters. The primary orientation of the present undertaking, however, is motivated by the apparent dearth of studies in the economics of training in a number of specific dimensions. First, while a number of evaluative studies of training programs have been undertaken in recent years, they are almost exclusively American in origin and subject matter. Second, most of them are, moreover, concerned with institutional training only: few empirical studies have been addressed to on-the-job training (OJT), and the theoretical implications of such training remain largely unexplored. Finally, the relative effectiveness of OJT and institutional training programs has been the subject of only three investigations to date -- two in the

United States and one for the province of Ontario under the TVTA legislation which, as described above, was superceded by the present Adult Occupational Training Act.[14/] The following chapters, accordingly, constitute an attempt to redress this apparent imbalance.

The primary focus of the exercise is upon the economic aspects of training programs which are (a) Canada-wide, (b) government sponsored, and (c) of two major types: institutional and OJT. The analytical procedure employs theoretical, descriptive, and empirical approaches in addressing a number of questions subsumed by this delineation. First, what is training, in theory and in practice? What forms may it take, what is its theoretical rationale, and what light can economic theory shed upon one variant which is of particular interest -- namely, OJT? Secondly, what is the theoretical rationale for government intervention in training activities, and what empirical evidence can be brought to bear upon such arguments in the Canadian case? Thirdly, how do Canadian government training programs operate, what objectives are they designed to meet, how much emphasis do they place upon institutional and on-the-job training, respectively, and how successful are they? Investigation of these questions is undertaken to furnish the necessary background against which to pose the question of major concern in this study -- namely, what evidence can be brought to bear concerning the relative efficacy of OJT and institutional programs

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14/ The major studies concerning the economics of institutional and on-the-job training are described in Chapter 5 below.

in Canada? What is the empirical evidence concerning the relative efficacy of OJT and institutional programs in Canada?

3. Outline of the Study

First, in Chapter 2, some conceptual aspects of the economics of training are examined - particularly training on the job and one of its variants: "learning from experience". The several dimensions of training are described: formal and informal, general and specific, public and private, institutional and OJT. Its relationship to formal education is discussed, and recent attempts to distinguish training and learning from experience are critically examined. In refuting earlier arguments that learning from experience is costless, the concept of "dynamic opportunity costs" is introduced. A further characteristic which has been attributed to learning from experience -- that it is "unavoidable" -- is analysed with the use of the theory of joint products.

The rationale for government-supported training is developed in Chapter 3. The theoretical case for the potential contribution of training programs to the attainment of various economic goals is constructed. It is argued that training is one of a set of alternative instruments which may be utilized in pursuit of national economic objectives and that these alternatives are not independent of each other. Nor, it is maintained, are the objectives (growth, stabilization, equity) independent of one another, so that, even when training is directed predominantly towards the achievement of a particular goal, there will inevitably be "spillovers" into other goal areas. In

outlining the case for government training programs in relation to each of the objectives in turn, the arguments based on scale economies, externalities, and imperfections in labour and capital markets are examined.

Next, in Chapter 4, the Canadian Manpower Training Program is described. Its characteristics are critically examined in the light of the objectives, explicit and implicit, of the Department of Manpower and Immigration. The predominantly institutional nature of Canadian training is observed, and the question is raised as to why more industry-based training is not undertaken.

The evidence of previous studies on the efficacy of OJT and institutional training programs is presented in Chapter 5. The chapter examines *a priori* arguments and empirical evidence as to the relative advantages of the two types of training for various purposes.

Chapter 6 offers an approach to the evaluation of institutional and on-the-job training in Canada. A framework is suggested for the analysis of institutional and OJT courses conducted for the same occupations under the Canada Manpower Training Program in fiscal year 1971-72. Concluding comments are contained in Chapter 7.

Appendices follow various chapters to supply augmentative material. Finally, a comprehensive bibliography, relating to the subject matter of the study, appears at the end.

APPENDIX TO CHAPTER 1

Table 1-1

(i) The first major item of legislation to influence the course of U.S. federal government involvement in training programs in this period was the Manpower Development and Training Act of 1962. MDTA called for a diversified nationwide training program (including OJT) and was particularly oriented towards family heads, youths aged 19-21, and workers from low-income families.

Amendments to the Act in 1963 provided for expansion of the program to accommodate out-of-school youths under 19, persons needing education prior to training, and those requiring allowances or part-time work in order to undertake training.

In 1964 the Economic Opportunity Act authorized two work training programs -- the Job Corps and the Neighbourhood Youth Corps -- for young people from impoverished families.

(See *Manpower Report of the President*, 1965, p. 125.)

(ii) Responsibility for NYC seems to have been transferred from the Office of Economic Opportunity to the Department of Labor in fiscal 1967. Job Corps, too, has now been delegated to the Department of Labor -- as of the beginning of fiscal 1970.

(iii) Some training seems to have been undertaken with federal assistance under the provisions of the Area Redevelopment Act of 1961. It appears, however, to have been rather small compared to the other programs we have included in the table. For this reason it was omitted. The ARA training provisions were in any case transferred to MDTA in 1965.

(*Manpower Report of the President*, 1969, p. 78.)

(iv) A significant feature of the U.S. training scene is the proliferation of programs oriented to the needs of particular groups. Thus Operation Mainstream is directed towards unemployed adults or those with low incomes, and provides work experience in community betterment activities which will prepare them for competitive employment. The objective of the New Careers Program for unemployed and underemployed persons is to develop entry level professional aide jobs, with maximum career-ladder opportunities, in such critically undermanned fields as health, education, welfare, neighbourhood redevelopment, and public safety. The Work Incentive Program is designed to break the cycle of poverty for public assistance recipients.

Note that all of these programs are essentially "work-experience programs" in which training is acquired on the job.

(v) Perhaps the most widely hailed of the new training programs of the work experience variety is Job Opportunities in the Business Sector (JOBS), which was aimed at:

> "...a new partnership between government and private industry to train and hire the hard-core unemployed.... Essentially the partnership will work this way: The government will identify and locate the unemployed. The company will train them, and offer them jobs. The company will bear the normal cost of training- as it would for any of its new employees. But with the hard-core unemployed there will be extra costs.
>
> And these extra costs will be paid for by the government."

(*Manpower Report of the President*, 1968, p. 193.)

(vi) The reason for the falling-off of the expenditures under MDTA may be explained in part by the fact that, "though MDTA resources have increased, they have been used, along with those under the Economic Opportunity Act, to finance the CEP and the JOBS program..."

(*Manpower Report of the President*, 1970, p. 60.)

Table 1-2

With respect to Table 1-2, it should be noted that:

(i) Two items of legislation guided the federal government's involvement in training in this period: the Technical and Vocational Training Act (TVTA) from 1960 to 1967, and the Adult Occupational Training Act (AOT), which is still in force.

(ii) 1967-68 was a "phase-out" year for TVTA. Expenditures in this year therefore reflect commitments under TVTA as well as expenditures under the new AOT Act. The 1968 figure of 309,722, for example, breaks down as:

AOT		
Training purchases	49,188	(Thousands of dollars)
Training allowances	55,878	
	105,066	
TVTA PHASE-OUT		
Training payments	85,637	
Capital Assistance Program	119,019	
	309,722	

(iii) Similarly, the total for fiscal year 1969 includes a payment of three million dollars committed under TVTA.

(iv) Figures for "operating expenses" include grants for operation and maintenance of technical and vocational high schools and technical institutes, contributions towards training in co-operation with industry, etc. (under TVTA); and, under AOT, the purchase from the provinces, or from private industry or schools, the training courses given to adults, plus the allowances paid to trainees.

(v) Figures for 1975 and 1976 are estimates and are taken from the Government of Canada's *Estimates*, which present to Parliament the budgetary expenditure proposals of the government for each forthcoming fiscal year.

(vi) Figures shown in the "capital" column of Table 1-2 represent federal assistance to the provinces under special provisions in both the TVTA and the AOT Act. The former included a Capital Assistance Program under which the provinces could recover 75 per cent of their capital expenditures on technical and vocational training facilities. The AOT Act contained a provision for loans by the federal government to the provinces for construction of training facilities, and also carried over the Capital Assistance Program of TVTA under "transitional governments".

(*14-15-16 Elizabeth II*, Chapter 94, An Act respecting the occupational training of adults, Part III, pp. 1214-1215, 8 May 1967.)

(vii) It is important to note that the Capital Assistance Program has been essentially a cost-sharing scheme. The extent to which the federal government has made capital expenditures has therefore been influenced, among other things, by the willingness and/or ability of the provinces, in any year, to provide their share of the funds required for particular investments in training facilities. This helps to explain the volatility of the capital series and, similarly, it is suggested that the figures for "operating expenditures" probably give a clearer picture of the expansion of federal involvement in training than do the total figures.

CHAPTER 2

DEFINITIONAL AND CONCEPTUAL ASPECTS OF THE ECONOMICS OF TRAINING

1. Introduction

The purpose of the present chapter is to consider the nature of the economic concept which constitutes the basis of the enquiry in subsequent chapters: what is training, what forms does it take, and what are some of the theoretical implications of the definitions advanced in the literature to date? Section 2 therefore provides a detailed description of the various dimensions and characteristics of training and distinguishes the two broad categories whose economic effectiveness is compared in later chapters: government-funded institutional and on-the-job training, respectively.

Conceptually, institutional training does not differ substantially in kind from formal education, to which considerable economic analysis has been devoted in recent years. Relatively little, however, has been written on OJT *per se* despite its importance. The basic theory of training has been elegantly constructed by Becker[1/] and Mincer,[2/] and their theoretical framework is not reproduced here. It is intended, rather, to emphasize those special features of on-the-job

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[1/] Becker, G. S., "Investment in Human Capital: A Theoretical Analysis", *Journal of Political Economy*, Supplement, October 1962, pp. 9-49; and *Human Capital* (New York: NBER, 1964).

[2/] Mincer, J., "On-The-Job Training: Costs, Returns, and Some Implications", *Journal of Political Economy*, Supplement, October 1962, pp. 50-79.

training, and particularly one of its variants -- learning from experience -- which have further implications for the present study. This is the purpose of sections 3, 4, and 5. The third section introduces the concept of "learning from experience" and discusses recent attempts in the literature to distinguish it from "training". Section 4 presents a critique of recent theoretical attempts to base such a distinction upon cost criteria. The realism of the theoretical models employed in this exercise is questioned. When a more realistic model is posited the cost criterion fails to yield the "training" vs. "learning" distinction. Perhaps the single most important distinguishing characteristic to be attributed to OJT is its joint product nature. Accordingly, section 5 examines some theoretical implications of this characteristic.

2. Dimensions and Characteristics of Training

First, what is training? Although it may be considered from various viewpoints it is suggested, as a start, that training may be thought of as a process of skill acquisition. The economist frequently treats this process as a form of "investment in human capital" and it is in this sense that training is sometimes distinguished from general education.[3/] "General education (literacy, for example) contributes to productivity, but it also makes life more enjoyable. Hence general education has to be regarded as a mixture of consumption and

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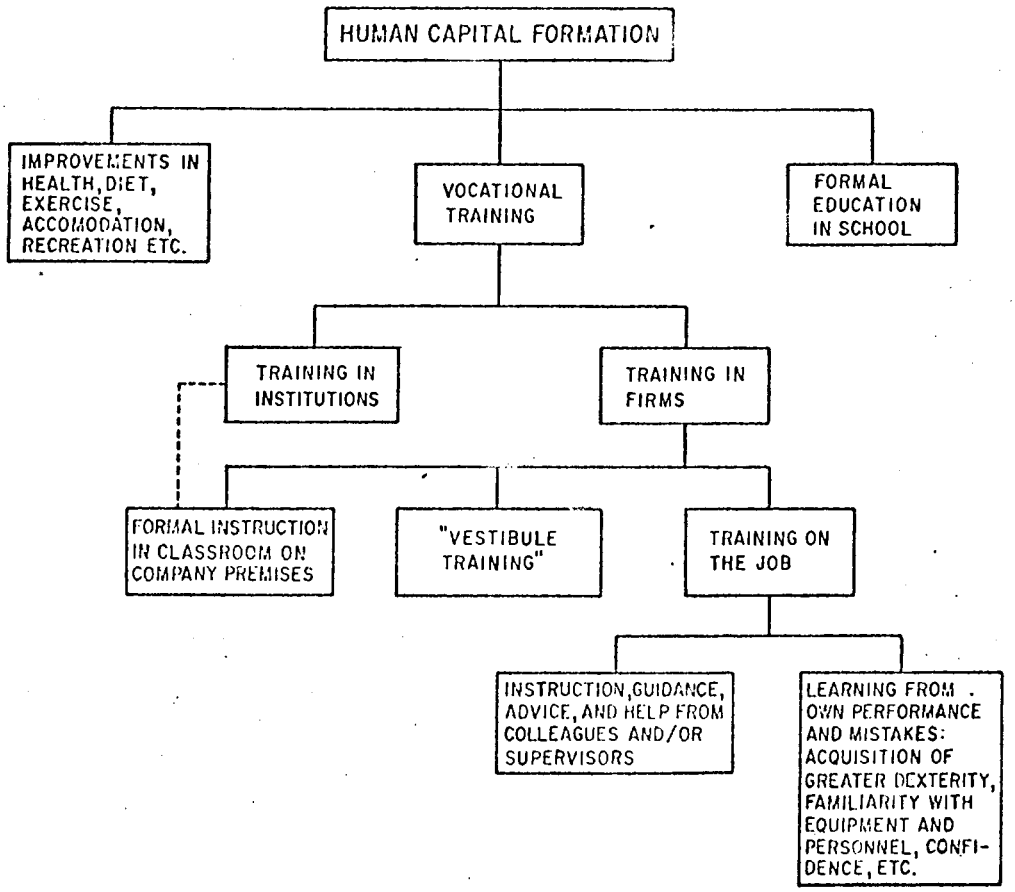
[3/] See Figure 2-1.

investment".[4/] Training, by contrast, is oriented towards the world of work, is undertaken to enhance future productivity, and may therefore be classified as an investment.

Figure 2-1

TRAINING AS PART OF THE PROCESS OF HUMAN CAPITAL FORMATION



[4/] Rivlin, Alice, "Critical Issues in the Development of Vocational Education", ch. 11 of *Unemployment in a Prosperous Economy*, eds. W. G. Bowen and F. H. Harbison, Report of the Princeton Manpower Symposium May 13-14, 1965, p. 156.

Jacob Mincer, who defined training as "investment in acquisition of skill or in improvement of worker productivity",[5] sees an essentially complementary relationship between education and training in the process of preparation for a particular occupation. Thus completion of some levels of schooling is seen as "the end of a more general preparatory stage" of this process. The second stage consists of the "more specialized and often prolonged process of acquisition of occupational skill, after entry into the labour force".[6] This second, or "training", stage may manifest any combination of a wide variety of characteristics. Thus, for example, training may take the guise of very formal, highly structured and systematic classroom instruction in a vocational training school or technical institute. Or it may be so informal and unstructured as to consist of an experienced worker demonstrating, occasionally, time-, effort-, or material-saving "tricks of the trade" to less skillful colleagues. These rather extreme examples serve to illustrate the differences between institutional training and training on the job. It should be noted, however, that classroom training is not confined to an institutional arrangement outside the work-place, since formal classroom training is conducted on the premises of many companies, in varying degrees of proximity to the work-scene.

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[5] Mincer, *op. cit.*, p. 51.

[6] *Ibid.*, p. 50. Another interesting article on the complementarity of education and learning by doing is: Sen, A. K., "Education, Vintage, and Learning by Doing", *Journal of Human Resources*, vol. 1, no. 2, Fall 1966, pp. 3-21.

Other distinctions cut across those drawn above. Thus training may be public or private, with respect to financing, operation, curriculum control, entry and admission control, etc., and combinations of these. The institutional versus on-the-job contrast drawn above is, therefore, not synonymous with the "public versus private" distinction. First, vocational training institutions may be publicly or privately financed and operated -- witness the proliferation of private "secretarial schools" in many large cities. Secondly, on-the-job training may be subsidized by government grants to private employers.[7/]

Training is also seen as varying in "specificity". Gary Becker, with whom this concept is usually associated, describes two types of training: general and specific. The former may usefully be applied in many firms other than that in which it is provided. For this reason many firms express a reluctance to provide general training on the grounds that a large proportion of the benefits of such training may be reaped by other employers to whom trainees may move. Completely specific training, on the other hand, is defined as training which imparts skills relevant only to the training firm.[8/]

In summary, then, training may vary in three important ways:

(a) according to the method by which vocational skills are imparted -- by institutional training, OJT, or some combination of these;

[7/] See the DMI paper, "The Canadian Adult Training and Retraining Programme", prepared for OECD (*op. cit.*, footnote 12, ch. 1) and the AOT Act itself (S.C. 14-16 Elizabeth II, C. 94).

[8/] Becker, *op. cit.*

(b) according to whether the training raises marginal productivity only in the training firm (specific), in all firms equally (general), or to some extent in others;

(c) according to whether the training is financed and/or operated and/or controlled by a public or by a private agency, or by some combination of these possibilities.

These dimensions may, of course, intersect to yield a variety of training characteristics. It should be emphasized, therefore, that the two methods of occupational training to which the present study accords the rather general epithets of "institutional" and "on-the-job" do not always in reality reflect clear-cut definitions. The following working definitions will, however, be employed. By "institutional training" is meant the process of acquiring (or imparting) vocational skills in the classroom setting in an institution the raison d'être of which *is* the transmission of knowledge. OJT, by contrast, is distinguished by taking place in an organization which has, as its primary function, the production and sale of goods or services, and consists in the acquisition of occupational skill and experience during the process of performing the tasks assigned to the incumbent. (These training methods, as examined in later chapters, are further defined by location -- Canada; by eligibility -- they are confined to adults; and by the fact that they are subsidized by the federal government.)

3. On-the-Job Training and Learning from Experience

This section develops in more detail the concept of training within the firm (as opposed to training in an institution such as a school or technical institute). This type of training, in the form of learning by experience, is as old as man and, in the more modern setting of the industrialized countries, it has assumed a somewhat more formal character in the shape of the long-standing and widespread apprenticeship system.[9] It is generally recognized that, in its many forms, training by firms constitutes a significant proportion of all training. Its measurement and evaluation do, however, pose a number of difficulties and there have been remarkably few studies in this area.

As mentioned earlier, many private firms have very sophisticated training facilities on company premises. In some cases the presence of specialized instructors, and the classroom setting, makes the training more akin to what we have called "institutional" training. Our present concern, however, is with the kind of training that goes on in the work-place per se -- that is, "on the job".[10]

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[9] See "A Five Hundred Year Old System", article in *News from the Ontario Department of Labour* (later renamed *Task*, vol. 1, Jan.-Feb. 1966, p. 3.

[10] An intermediate position, between the company classroom and training on the job, is occupied by what is known as "vestibule training". This frequently involves the practising of work-place tasks and operations in a simulated work environment. The term, however, is commonly used in Canada to describe training in the firm undertaken with government subsidy. The "vestibule" requirement is that the training should not be strictly "on-the-job", but rather removed from the work-place per se, in order to ensure that the firm is not simply receiving a production subsidy. See Strang, A. and Whittingham, F., "An Analysis of the Characteristics of Trainees from Selected Government-Sponsored On-The-Job Training Programmes in Ontario", Mimeograph, Research Branch, Ontario Department of Labour, March 1970, p. 4, for further description of vestibule training.

On-the-job training, like training in general, may exhibit a variety of characteristics. It may be more or less formal and systematic. For example, at one extreme we might find a specialized instructor who starts the trainees' day with a briefing, follows this with a practical demonstration of the operation and care of a particular machine, and then closely monitors the performance of the trainees on an assigned task which requires use of the machine.

An intermediate degree of formality is the fairly common situation in which a foreman or supervisor "keeps an eye on" trainees, offering advice and demonstration as the situation suggests.[11/]

Finally, at the highly informal end of the spectrum is that process of skill acquisition which accompanies experience on the job. That is, an individual worker, left, let us say, to his own devices, undergoes a learning process in the very performance of his assigned task. From a hesitant beginning and a little timid experimentation he may progress to greater familiarity with the dimensions of his job, improved speed and dexterity and increased confidence.

It should be noted that this last method of skill acquisition, learning from experience, is sometimes not regarded as "training". Thus in one recent article training is defined as

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11/ One variant in the range of formality is what Michael Oatey quaintly describes as the "sitting by Nellie" method, in which skill is acquired by the trainee's observing and imitating experienced colleagues. Oatey, M., "The Economics of Training with Respect to the Firm", *British Journal of Industrial Relations*, vol. 8, no. 1, March 1970, p. 4, n. 15.

any activity which *deliberately* attempts to improve a person's skill at a task, while learning from experience is the improvement of a person's skill by the normal execution of a task, and with *no deliberate* attempt at improvement.[12]

Another interpretation maintains that "learning" involves only one person, whereas the word "training" implies a process involving two persons: the trainer and the trainee.[13] A difficulty with this definition of training is that it would exclude that process in which occupational skills are acquired via programmed learning techniques, where the text is, in some sense, the "trainer". And what of other self-instructional techniques in which the individual is, at once, both trainer and trainee?

A further distinction between learning from experience, on the one hand, and training on the other, appears to be based upon the criterion of whether costs are increased in the process.

4. The Cost Criterion Distinction between Training and Learning from Experience: A Critique

It has been suggested that learning from experience and training be distinguished as follows. Define the level of competence or productivity of a fully experienced and skilled worker as the "experienced worker's standard" (E.W.S.)[14] of

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[12] Oatey, *op. cit.*, p. 4.

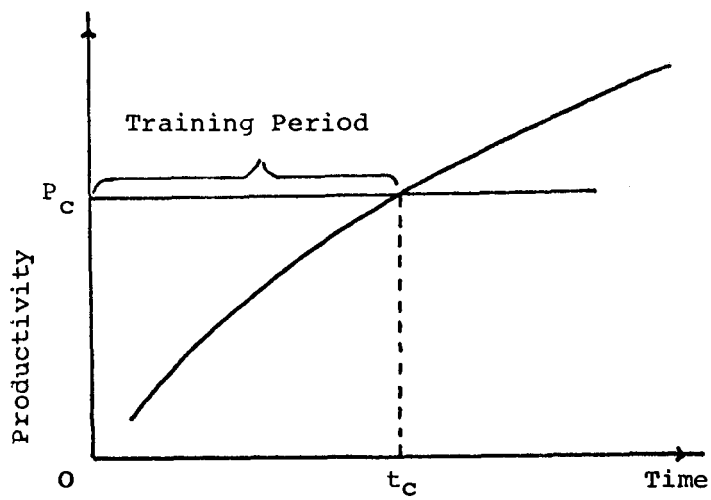
[13] F. Machlup, as reported by P.C.R. Williams in "Summary Record of Discussions", in E.A.G. Robinson and J. E. Vaizey (eds.), *The Economics of Education* (New York: St. Martin's Press, 1966), pp. 694-6.

[14] This terminology is employed in Thomas, B., Moxham, J., and Jones, J.A.G., "A Cost Benefit Analysis of Industrial Training", *British Journal of Industrial Relations*, July 1969, pp. 231-263 and in Oatey, *op. cit.*

skill for the job in question. Less experienced workers will have lower skill-levels. The lowest acceptable level for any job is called the "criterion" level. New workers, below the criterion level, are considered "trainees" and the ("training") process of skill acquisition is the way in which the criterion is attained. In the diagram below the curve represents the individual's growing skill and competence over time. The criterion level for his job is shown by the horizontal line at height OP_c. The training period is then defined as the time taken to achieve the criterion level -- namely, Ot_c.

Figure 2-2

THE TRAINING PERIOD FROM THE FIRM'S STANDPOINT



In this context it is said that the general difference between training and learning from experience is that the latter is likely to continue *after* the criterion level, the acceptable level of competence, has been reached. "But it certainly is not costing the firm anything -- the employee is performing at least

at the criterion level for which he is getting paid, and a situation of opportunity-costless skill acquisition would arise."[15/] The distinction thus appears to centre around the question of whether or not the skill acquisition process costs the firm money.

It may be argued that this definition, though possibly useful for some purposes, also leaves something to be desired. It is not inconsistent with this last definition to conceive of training as a process of investment in skill acquisition for which costs are incurred and on which a future return is anticipated. However, this process typically involves costs both to the firm *and* to the individual. Thus training may be defined in terms of the firm or, equally, of the individual. To ignore the costs of the individual trainee is to look at only one side of the coin.

Now, the opportunity costs of training for the individual are the earnings he forgoes by electing to take a job requiring training rather than one in which initial earnings are higher and no training is required. The standard illustration of this concept involves the comparison of two lifetime earnings streams -- L_1 and L_2 in Figure 2-3 -- for two jobs. Job number 1 requires no training but, initially, it carries higher earnings per period than does job number 2, for which training is required. The opportunity cost to the individual of undertaking training therefore consists of the earnings he could be enjoying in the no-training job. Note that on this definition of training, the

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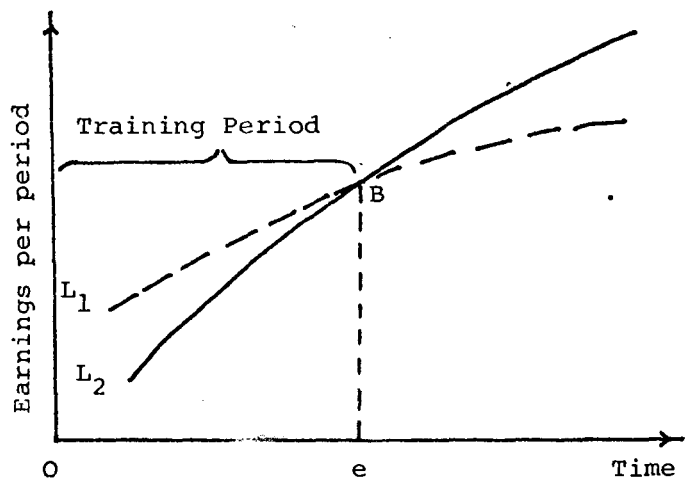
[15/] Oatey, *op. cit.*, pp. 3-6.

time period e is that period at the end of which earnings in job 1 and job 2 are equal. Beyond this point, the individual's income from job 2 would not be less than that from job 1.[16/]

Diagrammatically, the opportunity cost to the individual of undergoing training on job 2 is the earnings gap which is experienced up to the "break even point" B:

Figure 2-3

THE TRAINING PERIOD FROM THE INDIVIDUAL'S STANDPOINT



From the standpoint of the individual, then, training is an investment which necessitates incurring a cost in order to reap a future return. And the investment period, in which the cost outlays are made, has duration e. So we have an alternative definition of training: training is the time span during which

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16/ Two comments seem in order with respect to this model. First, the curves could represent earnings streams for two levels in a training hierarchy, rather than the training/no training case. Second, if time is considered continuous we should really talk of relative earnings at points in time and of the opportunity costs as the difference between the definite integrals of the two curves over the interval oe.

the individual incurs positive net opportunity costs in the form of foregone earnings. It is immediately apparent that there is no necessary reason why the criterion level (which determines the training period from the firm's standpoint) and the break even point (which determines the training period from the individual's standpoint) should be attained simultaneously.

However, even if training is considered solely from the viewpoint of the firm, Oatey's definition is still lacking. One may argue that it is highly unrealistic to conceive of firms as training individuals only up to some rather well-defined criterion level. In many firms, by contrast, "promotion from within", which necessitates a continuous process of skill-acquisition by workers, is a conscious and deliberate policy of management. As soon as we introduce the concept of a job hierarchy in which workers are continually enhancing their promotion potential, opportunity costs to the firm assume a peculiarly dynamic nature such that learning from experience is never truly costless.[17/]

To present the argument in more detail, the notion we are trying to convey is that frequently, in firms in which there is a more or less well-defined sequence of jobs and a policy of promotion from within, the requirements of any job in the sequence inevitably entail some expectation of "promotability" on the part of the incumbent. In other words, although the *job itself* may be performed satisfactorily by normal, measurable, productivity

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17/ In fairness to Oatey it should be pointed out that there may well be some "dead end" jobs for which the criterion level concept is a useful approach and that it may also be applicable in those cases where the firm typically hires from the external labour market rather than promoting from within, and/or experiences high turnover rates.

criteria, a continuing requirement for training nevertheless stems from the need to develop *individuals'* promotion potential, which in turn is a direct consequence of the policy of promotion from within. Furthermore, although development of promotion potential may take the form of learning from experience, it may nevertheless be a conscious and deliberate goal of the firm. And it is *not* costless: in the dynamic context which we have outlined, there is an opportunity cost involved *after* the criterion level, up to the point at which the incumbent has realized his promotion potential. The cycle is then repeated for the next job in the hierarchy. The phrase "dynamic opportunity costs" is suggested to describe this concept.[18]

5. Learning by Doing as a Joint Product of the Firm

A further attempt to distinguish learning from experience from some more formal type of training rests upon the assertion that the former is an "unavoidable" joint product with the firm's regular output.[19]

This section therefore briefly examines the implications of applying the theory of joint products to the phenomenon of learning from experience. In particular an attempt is made to pursue the question of whether "learning by doing" as opposed to formal training, is "*unavoidable*".

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[18] Thanks are due to Professor D. Maki for the germs of this argument.

[19] R. S. Eckaus suggests that "learning by doing" is of quantitatively larger proportions, in the real world, than formal training undertaken away from production facilities. See "Investment in Human Capital: A Comment", *Journal of Political Economy*, October 1963, pp. 501-504.

In simple terms, the standard analysis for the joint product case envisages a firm producing two products from a common input. We might begin by constructing a figure with "product" expressed as some composite of the firm's normal, intended, range of saleable products on one axis, and training -- the "unintended", "unavoidable", joint-product -- on the other, as in Figure 2-4:

Figure 2-4

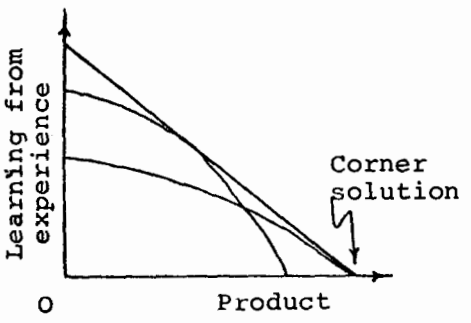
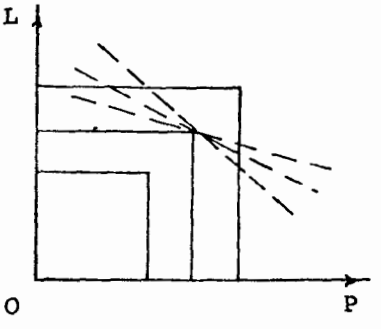


Figure 2-5



In the classic Marshallian example of joint products -- wool and mutton from sheep -- there is, of course, a fixed technological relationship between the two outputs such that the product transformation curves are rectangular.[20/] Figure 2-4 would, in such circumstances, appear as in Figure 5 where L and P represent "learning from experience" and "product", respectively.

The more "normal" configuration of product transformation curves as in Figure 2-4 allows, in principle at least, for the phenomenon of "avoidability". That is, a *conceivable* solution is a corner solution on the "product" axis, where all of the given

[20/] Note, however, that Marshall points out that even in this case it is sometimes possible, through careful breeding practices, to change in the long run the proportions in which such joint products are produced.

input is devoted to "product" and no learning from experience is forthcoming.

What might this question of "avoidability" mean in practice? From casual observation of the real world it does, of course, seem reasonable to expect that some learning from experience is likely to occur during the normal process of production. Moreover, it is very difficult to see how the firm could prevent or "avoid" this skill-acquisition process -- or even why it would want to. However, it may be useful at this point to conceive of the "jointness" of the two products, L and P, as stemming from two sets of relationships within the firm -- one of a technological nature and one of what we might call an institutional or organizational nature. That is, for purely technological reasons there may, indeed, be some inevitable, unavoidable learning from experience. On the other hand, it may be possible, by organizational means, to vary the amount of learning from experience which accompanies production of "product". Thus while the possibility of the corner solution shown in Figure 2-4 is rather extreme, it is suggested that *some* degree of avoidability may be achieved by organizational means.

Thus one may consider it not untypical that an individual worker, on a particular job, learns from experience in the very repetition of the tasks which comprise his job. Increased dexterity, greater familiarity and confidence with his tools, the learning of short-cuts, etc., enable him to perform his assigned tasks more quickly and with less physical and mental stress. This part of learning by doing, it may be agreed *is*

largely unavoidable. Suppose, however, that the organization of the production process is such that workers on particular jobs are expected to fulfill a certain production quota, or to perform a given number of tasks or operations during the course of the standard working day. In such circumstances an experienced worker, who has learned the short-cuts, may be capable of fulfilling the requirements of his job in, say, six rather than eight hours. There are, of course, various ways in which the extra two hours may be employed: they may be absorbed in a slower and more relaxed work-pace, or in extended breaks. They may, however, permit the worker greater opportunities for communication with workers on other machines, or in different parts of the plant, and in different stages of the production process, and he may, thereby, acquire some feel for and understanding of other skills. Such highly informal learning from experience is, indeed, fairly typical in many industries. In many cases it is recognized by management and tolerated for the "flexibility" it provides.

But it is a part of learning from experience, large or small, which is avoidable. Conceivably, at the request of management, much of the "slack" could be eliminated by the upgrading of standards and quotas by watchful industrial engineering personnel. Moreover, much of such slack is taken up as a matter of course in times when heavy workloads are necessitated by order-backlogs.[21/]

[21/] Indeed, many managers would suggest that during periods of less intensive activity more attention can be paid to training. Such training may, of course, be more or less formal. The point, however, is that there may be some degree of flexibility which allows for the possibility of avoiding some learning by doing by organizational means.

The next series of questions which might be raised when considering Figure 2-4 centres around the conceptual aspects of "learning from experience" as a product. In what sense, one may ask, is learning from experience a saleable output in the way that "product" is? Does it earn revenue, and to whom does this revenue redound? Is there any conceivable way in which the revenue could be measured? We may note, first of all, that the learning from experience output, L, has value both to the firm and to the individual worker. As mentioned above, the individual may enjoy several benefits: more time to chat, or to daydream, or to drink coffee;[22/] less physical effort, less mental stress; and greater opportunity to learn something of the wider work environment outside his own immediate tasks and work-station. Depending upon the specificity of his learning from experience, the worker may reap its benefits by using it in a better job elsewhere.

The firm, too, may benefit from the joint product. Depending again upon its specificity, the learning from experience may reduce turnover by giving workers a greater feeling of identity with the firm. Secondly, it may make for lower hiring costs for various jobs in the hierarchy if learning from experience helps to develop promotion potential and allows the firm to promote from within rather than resorting to the external

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22/ Belton M. Fleisher, in discussing H. Gregg Lewis's article, "Hours of Work and Hours of Leisure", *Proceedings of the Industrial Relations Research Association*, December 1956, pp. 196-206, suggests that workers "can be expected to prefer some of the increased leisure to be in the form of "on-the-job" leisure such as coffee breaks and longer lunch hours, because such leisure makes work more pleasant; furthermore, employers may find that up to a certain point "on-the-job" leisure improves productivity." Fleisher, B. M., *Labor Economics: Theory and Evidence* (Englewood Cliffs, N.J.: Prentice-Hall, 1970), pp. 57-58.

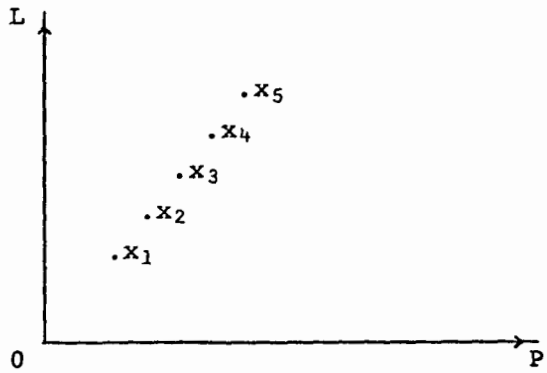
labour market and the costly process of screening, testing and hiring. Finally, the flexibility which learning from experience brings may permit readier adaptability to technological change and/or to unforeseen increases in orders.

With respect to the saleability of the L output it is well known that in some cases the skill and experience embodied in the human agent through learning by doing may command large sums of money. The "transfer fees" of professional soccer players (though in part a return to "natural talents") provide an example.

Despite the above comments it is apparent that there are considerable problems in trying to measure learning from experience. That is, one may point out that it is of value to the individual, and to the firm, and that, embodied in a soccer player, it can be saleable. Yet even at the conceptual level it is difficult to see more than a very limited applicability of the conventional joint product analysis. That there is jointness seems eminently reasonable: indeed one might expect that "you do more learning by doing the more doing you do". But in terms of the two-dimensional diagram considered above, this catch-phrase suggests a series of points aligned north-east to south-west and not a smooth and continuous concave product transformation curve.

Figure 2-6

"YOU DO MORE LEARNING BY DOING, THE MORE DOING YOU DO"



x_1, x_2 ....x_5 are successively larger quantities of input.

More generally still, however, L appears to be a function of several variables, of which time is perhaps the most important. In other words, learning from experience may go on more or less regardless of the rate of output P.

It may be concluded that, for the more formal types of on-the-job training, there may be a fairly discernible trade-off between training output and product output. Thus managers may take advantage of a slow-down in orders to devote more time to training. Note, however, that this relationship is demand-determined: the demand for product output determines the mix of training output and product output that will be forthcoming. It is, however, possible that the mix may be determined from the training side. Thus, for example, the firm may be contemplating the institution of some technological change and may deliberately undertake a slow-down of product output in order to do more training. Another way in which product output is consciously traded for training output arises from the fairly common practice

(especially for supervisory and managerial positions) of job-rotation in order to develop promotion potential.

6. Conclusions

This chapter has set out various aspects of the definition of training relating to its location, method of financing, and its beneficiaries. Two broad categories were distinguished for the purposes of later analysis: institutional training and OJT. In the light of the various characteristics of training discussed these were seen to be far from precise and unequivocal concepts but appear sufficiently distinct for the specific purposes of subsequent chapters.

In view of the relatively slight attention which has been paid to OJT, section 3 undertook a fuller description of this type of training including an important variant -- learning from experience. A critique of a theoretical attempt to distinguish learning from experience and training on the basis of cost criteria was the subject of section 4. It was concluded that if one takes the standpoint of the individual, there is no reason why the time period over which he incurs opportunity costs should coincide with the time required to reach the firm's "criterion level" -- the trainee may continue to incur costs after this point has been reached. Furthermore, in a real world situation embracing the notion of a job hierarchy in the firm and a policy of promotion from within, the concept of "promotability" could imply that costs are incurred sequentially through time as efforts are made to equip trainees for ever-higher levels of responsibility and performance.

Finally, the theoretical implications of the "joint-product" characteristic of OJT were examined in section 5, where it was found that, in theory at least, learning from experience may be "avoidable". Furthermore it may be possible in actuality to exercise some degree of control over the production of learning from experience by organizational methods within the firm.

CHAPTER 3

THE RATIONALE FOR GOVERNMENT INVOLVEMENT IN TRAINING

1. Introduction

In describing the dimensions and theoretical characteristics of training in Chapter 2, much of the analysis focused upon the firm. Governments, however, are heavily involved in the provision of manpower training so that the public-private split lends an important facet to the economics of training. Furthermore, the present study is concerned with training programs funded by the Canadian government. It is therefore important to review the arguments upon which government intervention in the training field is based, and to assess, as far as possible, the extent to which the Canadian situation justifies government involvement.

In the following section a number of theoretical arguments for state intervention are examined. Many of them apply rather generally to intervention in a number of areas of economic activity other than manpower training *per se*. Section three advances a case for government involvement in manpower training specifically, based upon the "structural maladjustment hypothesis". This conceptual framework provides the background for an attempt, in the fourth section, to bring some empirical evidence to bear upon the propriety of the federal government's involvement in training in the Canadian case.

2. General Arguments for Government Subsidized Manpower Training

When an economic activity generates external economies and/or diseconomies of production and/or consumption which militate against the attainment of the optimum conditions of social welfare, it is often argued that government intervention is required to offset the effects of such externalities. The basic externality argument is well known and will not be examined formally here.[1/] Rather, the important question for present purposes is whether training is characterized by such external effects. Alfred Marshall apparently thought so, and clearly saw that an employer might be reluctant to invest in an activity from which the benefits might accrue to someone other than himself. Thus, with respect to the technical training of adults,

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1/ An externality is said to arise "wherever the value of a production function, or a consumption function, depends directly upon the activity of others". Mishan, E. J., "The Postwar Literature on Externalities: An Interpretative Essay", *Journal of Economic Literature*, March 1971, vol. IX, no. 1, p. 2. As to the inimical properties of externalities, the argument is again succinctly put by Mishan: "Assuming sufficient divisibility, any economic organization is deemed satisfactory (in the Pareto sense, that no factor movements can make everyone better off) only (i) if the market tends to a solution in which the value of the marginal product, as measured by market prices, of each factor class is the same in all uses in the economy, and (ii) if all relevant effects, as defined by the welfare economist, make their impact on the pricing system. Universal perfect competition is believed to meet the requirement of the first condition, but it does not in general meet the requirements of a Pareto optimum if the latter condition is not met; in short, *if there are external effects*". ["Reflections on Recent Developments in the Concept of External Effects", in Mishan, E. J., *Welfare Economics* (New York: Random House, 1964), p. 99.]

> "... we meet the difficulty that whoever may incur the expense of investing capital in developing the abilities of the workman those abilities will be the property of the workman himself: and thus the virtue of those who have aided him must remain for the greater part its own reward."[2]

Firms, in other words, are aware that they may lose much of their investment if the workman in whom the investment is embodied departs to join another firm. The latter then appropriates the benefits of the training firm's investment. Employers, then,

> "... are sometimes checked by the reflection that they are in a similar position to that of a farmer who, with an uncertain tenure and no security of compensation for his improvements, is sinking capital in raising the value of his landlord's property."[3]

The categorization of training into "general" and "specific", as described in section two of the last chapter, is relevant in the context of the externality argument. That is, the more general the nature of the training in which the firm invests, the greater the danger of external appropriation of the benefits of that training. Therefore, to the extent that the government wishes to promote training which is widely applicable, subsidization seems appropriate.

It should be noted, however, that in practice the government may not supply the training itself but rather may help finance it through (for example) a contingent loan system where the borrower repays the government only if the training is

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[2] Marshall, Alfred, *Principles of Economics*, Ninth Edition (London: Macmillan, 1961), p. 565.

[3] *Ibid.*, p. 566.

successful. As Gunderson[4] points out, the repayment in such a scheme would have to be sufficient to cover those who do not repay, but borrowers would be willing to participate since the venture is riskless. Alternatively the government might provide the training and charge only those who benefit to cover total cost.

Three other aspects of the externality argument deserve mention. Richard Judy,[5] for example, treats vacuum and complementary multiplier effects in the context of externalities. The vacuum effect occurs when a trainee is upgraded and vacates a job which is then filled by an unemployed person. The benefits of such training therefore include the additional income for both the upgraded worker and the unemployed worker. If, moreover, training relieves a serious skill bottleneck it may have a "multiplier" effect by opening up a number of related, complementary jobs for auxiliary workers.[6]

The third aspect is what has been called the "option demand externality"[7] which maintains that a case may be made for government intervention when society would be willing to pay for the option to use a service in the future either because the service may be very valuable if and when it's needed (like hospitals)

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[4] Gunderson, M., "The Case for Government Supported Training Programs", *Relations Industrielles/Industrial Relations*, vol. 29, no. 4, p. 717.

[5] Judy, R., "Conceptual Problems and a Theoretical Framework for Analysing the Distribution of Benefits from Government-Assisted Training-In-Industry", Toronto, Systems Research Group, 1970.

[6] See Economic Council of Canada, *Eighth Annual Review*, *op. cit.*, p. 113.

[7] Gunderson, *op. cit.*, p. 715.

or because the decision to discontinue the service may be irreversible (like forest preserves). Such arguments may fit the case of training. Society collectively may be willing to pay for the option to have a well-trained, flexible labour force available for use in times of national emergency such as a war, or in times of very rapid technical change. Further, because of the obsolescence of human capital, the decision not to invest in training may be irreversible, and therefore society may be willing to pay for the option of having a pool of skilled labour in the future even though it may not be fully utilized in the present.

The externality argument is almost inextricably intertwined with two other notions concerning public, as opposed to private, provision of some activity. Thus it is sometimes argued, first, that human capital has some of the characteristics of a "public good".[8/] Basically, it is suggested that certain services like defence, administration of justice, education -- and training -- are characterized by the generation of benefits which are enjoyed by *society as a whole*. This case differs from the "simple" externality case discussed earlier in so much as the externalities are enjoyed equally by the whole society. That is, in the "simple" externality case, the divergence

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[8/] See, for example, Thurow, *op. cit.*, p. 104.

between private and social net benefit[9] may be closed, in principle, by appropriate taxes and subsidies, but pure public goods will not be provided at all in a purely competitive market because their benefits are indivisible: everyone enjoys the benefits of such things as national defence, noise and smoke abatement, or the cultural enrichment and social stability that flow from education and training of the populace, no matter who pays for them. Therefore everyone is motivated to evade payment for such things and there is no incentive for a private agent to provide them.

Is training such an activity? Obviously the economic benefits of training are to a large extent personal and divisible, but there are spillover benefits which confer upon training, like education,[10] the characteristics of a "quasi-public good", so that its production by competitive market forces might well result in social underinvestment in training.

The second argument which is closely bound to the basic externality notion, is that human capital may be considered a "merit want"[11] -- a want which the government regards as so

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[9] A. C. Pigou first distinguished between (a) the value of the marginal *private* net product (which is the marginal physical product of the factor, as appropriated by the producer, times the market price of the product), and (b) the value of the marginal *social* net product, which is the total of the products and services arising from the employment of the additional factor unit, *no matter to whom they accrue*, each product or service being multiplied by the relevant market price; *The Economics of Welfare* (London: Macmillan, 1932).

[10] Mark Blaug suggests that education might be thought of as a "quasi-public good", in *Economic Theory in Retrospect* (Homewood, Illinois: Irwin, 1968), p. 605.

[11] See Musgrave, R. A., *The Theory of Public Finance* (New York: McGraw-Hill, 1959), pp. 13-14, for a fuller exposition of merit wants.

important as to justify its provision in a manner which interferes with private preferences. "Government, in this case, substitutes collective for individual choice, be it through budgetary provision (fully, or partially through subsidy) of 'meritorious' goods (the consumption of which is assigned to particular consumers), or through regulatory devices to deter 'undesirable' goods, e.g., prohibition of sale of dangerous drugs or sumptuary taxes."[12] Such subsidization of "good" products, and penalizing of "bad", is based on the proposition that the government is capable of superior judgment: it acts *in loco parentis* to provide free milk, or a minimum of education to all children.[13]

Finally, it must be pointed out that in some ways the general externality argument is difficult to apply to training, since there is reason to believe that in fact markets do arise to internalize the externalities. Thus Becker argues that the trainee bears the cost of general training by accepting a lower wage-rate during training and reaps the benefits later in the form of a higher competitive market wage rate. Moreover, if a

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[12] Musgrave, R. A., *Fiscal Systems* (New Haven: Yale University Press, 1969), p. 12.

[13] To what degree training, *per se*, possesses merit want characteristics is unclear. We might argue, however, that to the extent that (i) income distribution is inequitable, (ii) a desire to rectify the inequity is incorporated in a social welfare function, (iii) the government makes decisions with reference to the social welfare function, and (iv) the Puritan work-ethic prevails, the government may subsidize training (for it is "good" to get people to work) rather than paying direct income subsidies (for these encourage sloth, which is "bad") -- see Musgrave's free milk example in *Fiscal Systems*, *op. cit.*, p. 12.

firm that does no training pirates an employee from a firm that does training it must compensate that worker for his training costs by paying a sufficiently attractive wage.

A further dimension of the contention that the government may be in a better position to make decisions is that its superior information may reduce the uncertainties which can deter investment by private agents.[14/] Experience with large numbers of people may allow the government to assess the probabilities of success or failure of human capital investment more accurately than private agents.

Moreover, while individuals may be risk averters where large uncertain human capital investments are concerned, governments may be neutral with respect to risk, or even have preferences for it.[15/] For the individual worker or firm, expected losses from a training program may be small, but maximum losses, if things turn out badly, may appear very large. They might therefore proceed not on the basis of expected gains or losses but, more conservatively, pursue a strategy that avoids maximum losses.

14/ Investment in training is clearly subject to many uncertainties: What, for example, are the shapes of the anticipated benefit and cost streams? How quickly will the human capital asset deteriorate? Private agents way handle uncertainty by (implicity or explicity) adding an uncertainty premium to the interest rate used to discount future net benefits to the present. Uncertainty therefore limits the amount of training which can profitably be undertaken by the private individual or firm.

15/ Thurow, *op. cit.*, p. 109.

Governments, by contrast, are perhaps better able to sustain the losses of a program that is a failure than are most individuals to sustain the losses of a personal investment program that is a failure, so that identical objective risks may be much less inhibiting to the government than to the individual.

Another argument favouring government involvement in the provision of training rests upon the hypothesis that the social rate of time discount is lower than the private rate, and that investment based upon the latter will fall short of the socially desirable optimum. Determination of the appropriate social discount rate is too vast a topic to allow any detailed discussion here, but a brief consideration of one of the approaches to the problem will serve to illustrate our present argument.

The social discount rate may be approached from the viewpoint of society's rate of time preference, as Irving Fisher pointed out:

> "... if the theory to be presented in this book is correct, interest is an index of the community's preference for a dollar of present over a dollar of future income."[16]

There appears good reason to suppose that society's rate of time preference is lower than that of any individual person or firm, because society's time horizon is longer. As Pigou put it, individuals suffer from "defective telescopic faculty", so that government intervention may be needed to give adequate weight to the welfare of unborn generations.[17]

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[16] Fisher, I., *The Rate of Interest* (New York: Macmillan, 1907).
[17] Pigou, *op. cit.*, pp. 24-30.

Occasionally it is suggested that where an activity is characterized by considerable economies of scale, government may be in a better position because of its sheer size vis-à-vis private concerns to take advantage of such economies. At first glance there might appear to be such economies present in training: the physical capacity of a public institution may be a point in its favour relative to the "classroom in the factory". In the United Kingdom, apparently, the disadvantages of smallness have led to the phenomenon of "grouping" for training purposes.[18/] Generally, however, we can see little evidence for the scale economies argument in training. Granted, one instructor to ten trainees makes more sense than a separate instructor for each, but extension of this principle is curtailed by the requirement for "manageable" pupil-teacher ratios, the need for personal supervision, etc. Moreover, for many kinds of training, all that's needed is a room, chairs, and a blackboard -- which even the small firm can frequently provide at little or no cost.

In fact, some economists feel that the "standard" arguments for government intervention which we have advanced so far have rather doubtful applicability to training. Accordingly, they justify such intervention on still different grounds. Weisbrod, for example, maintains that the probability of the government succeeding where private markets have failed is likely to be low except for cases of collective consumption goods from which the external benefits of private provision are

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18/ Lees, D. and Chiplin, B., "The Economics of Industrial Training", *Lloyds Bank Review*, April 1970, p. 36.

very large relative to the internal benefits of the provider. But, "manpower training and relocation programs do not seem to have a significant collective good component".[19] Although he finds "extremely limited evidence" for the proposition that the private market is economically inefficient or that it significantly underproduces training, Weisbrod maintains that public concern about poverty and economic opportunity provides another rationale for attention to manpower programs.[20]

That is, to the extent that the distribution of human capital, as determined by the market, produces an undesirable income distribution, society may wish to promote a more equitable distribution of human capital. As mentioned earlier (see footnote 13), the distribution of income[21] may be altered by direct

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[19] Weisbrod, B. A., "Benefits of Manpower Programs: Theoretical and Methodological Issues", in G. A. Somers and W. D. Wood (eds), *Cost Benefit Analysis of Manpower Policies* (Queen's University, Industrial Relations Centre, 1969), p. 12.

[20] R. S. Goldfarb has used a model to show that, under certain conditions, the private sector will undertake that amount of training which maximizes net output over time. Its "message" is that government support of training efforts cannot necessarily be justified as an attempt to raise net output; if knowledge is well distributed, the private sector may do very well on its own. Goldfarb argues that programs like the "war on poverty" are suggestive of a social welfare function which attaches high values to income gains at the lower end of the distribution. The net output maximand, by contrast fails to discriminate between a dollar increase accruing to Mr. X and a dollar increase to Mr. Y. The private net output maximand is therefore socially inappropriate and government-sponsored training may be justified as a device to alter income distribution. See "The Evaluation of Government Programs: The Case of New Haven's Manpower Training Activities", *Yale Economic Essays*, vol. 9, no. 2, Fall 1969, pp. 60-61.

[21] By income distribution in this context is meant, broadly, interpersonal distribution, and the role of training is therefore viewed in the light of the extent to which the redistribution of human capital may contribute to a more equitable distribution of personal incomes.

transfer payments. Training, however, may be preferred -- and for reasons other than the pervasiveness of the Puritan work ethic. It may be less costly. The net discounted present value of the series of investments in training required to achieve a desired effect upon income distribution may be less than the net present value of the transfer payments required to produce the same income-distributional effect. Investment in training is, in a sense, a "one shot deal" in that once made it affects income distribution in subsequent years, whereas transfer payments must be made each successive year to achieve the desired income distribution.[22/]

The standard arguments for government intervention which we have reviewed so far are potentially applicable to the provision of any good or service. Moreover, their applicability to the particular case of training is not always convincingly apparent. In the next section we turn to another line of argument which we believe to be more fruitful. It focuses specifically upon the allocative mechanism of the unfettered labour market: its imperfections, frictions, segmentation, maladjustment; the way in which these phenomena may obviate the attainment of national economic objectives; and the way in which government training programs, as an aspect of manpower policy, may be expected to prove beneficial.

22/ Professor Dennis Maki has pointed out that this assertion assumes an absence of displacement effects. Certainly, one of the third party effects of training may be the displacement of workers who do not have the training "seal of approval", so that the need for training could be a continuing one. Furthermore, transfer payments may, or may not, create the kind of "dependence" which perpetuates their necessity.

3. The Structural Maladjustment Hypothesis

The fundamental assertion of what may be called the structural maladjustment case for government involvement in training is that the labour market, left to its own devices, encounters impediments to efficient allocation which give rise to structural unemployment and potentially inflationary, growth-inhibiting bottlenecks.[23] In this section we discuss the allocative inadequacies of the labour market and suggest that to the extent that government-sponsored training may alleviate them it may be expected to make some contribution to certain national economic objectives.

It is useful at the outset to illustrate the complex nature of the allocation task which the labour market is called upon to perform. Figure 3-1[24] depicts the stocks and flows of workers and jobs which characterize the labour market.

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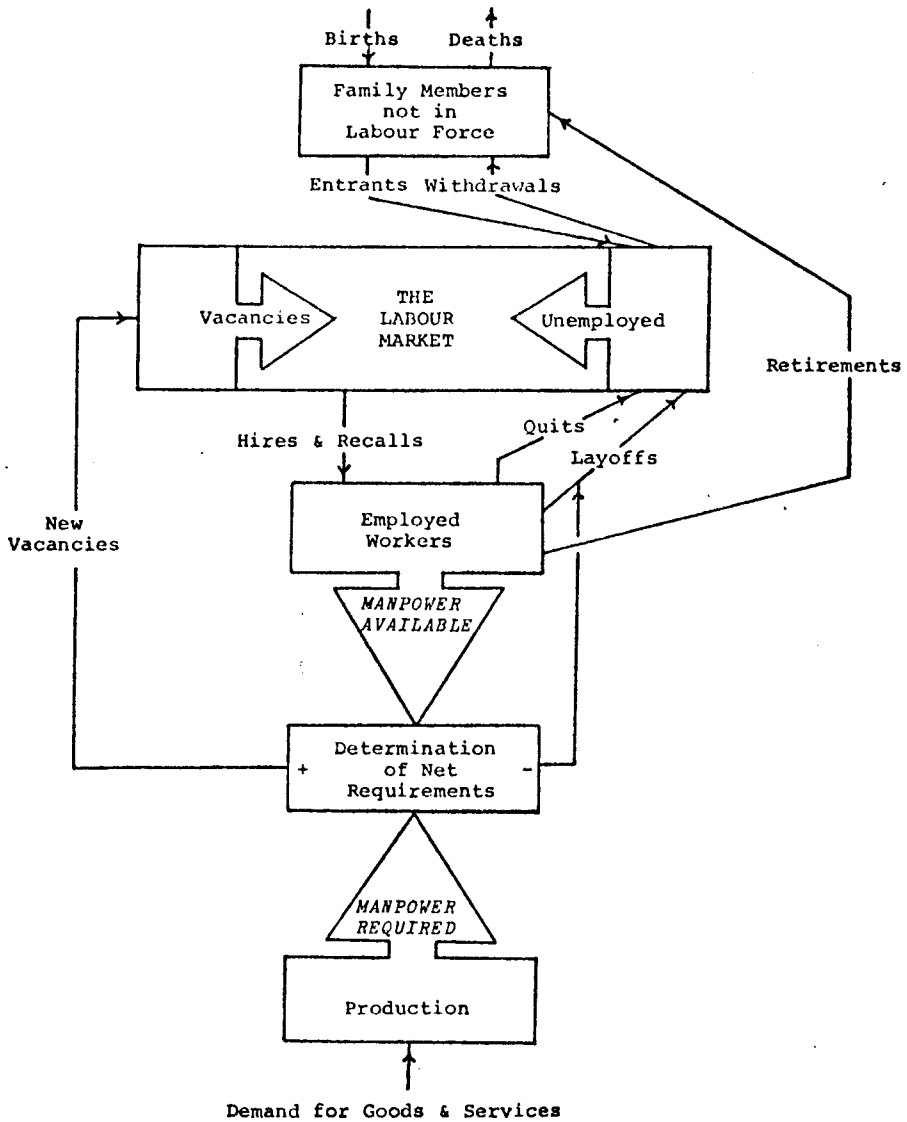
[23] See Mehmet, O., "A Critical Appraisal of the Economic Rationale of Government-Subsidized Manpower Training", *Relations Industrielles/Industrial Relations*, vol. 25, no. 3, September 1970, pp. 568-580.

[24] The diagram is a modified version of that which appears in Holt, C. C. and David, M. H., "The Concept of Job Vacancies in a Dynamic Theory of the Labor Market", in *The Measurement and Interpretation of Job Vacancies* (New York: NBER, 1966), p. 79. It is largely self-explanatory, but two points should be noted: (a) although the diagram presumably could be used to depict a micro market with homogeneous workers and vacancies, we are examining the complicated adjustments required by the heterogeneity of men and jobs at the macro level; (b) it is assumed for simplicity that only unemployed workers are hired, so that a worker moving directly from one job to another is considered momentarily unemployed. Similarly, new entrants to the labour force who are brought straight from the household to a job are assumed to move via the pool of unemployed. Moreover, apart from retirements, persons withdrawing from the labour force are assumed to do so via the unemployment pool.

Figure 3-1

STOCKS AND FLOWS IN THE LABOUR MARKET



A fuller appreciation of the intricacy of the allocation process is gained when it is borne in mind that each stock and flow is multidimensional: workers are characterized by age, education, experience, occupation, geographical location, etc., while jobs are similarly specified by a variety of characteristics. The market, in this representation, is seen as the locus of myriad reconciliations between the variegated requirements of many jobs, and the vastly diversified blends of workers' characteristics and qualifications.

A numerical example will serve to illustrate the sheer size of the flows involved in the Canadian labour market. The data are derived from estimates complied by Statistics Canada of the gross flows of the population among the "employed", "unemployer", and "not in the labour force" categories. Table 3-1 shows that the relatively small change in employment of 11,000 persons between the months of January and February 1972 in fact masks an inflow to employment (from unemployment and from not in the labour force) of 293,000 persons, an outflow of 296,000 persons from the employed to the unemployed or not in the labour force categories, and a net inflow into employment from external sources (immigration, school leavers) of 14,000 persons.

Table 3-1

STOCKS AND FLOWS IN THE CANADIAN LABOUR MARKET:
AN ILLUSTRATIVE EXAMPLE FOR JANUARY-FEBRUARY 1972
(000's)

Total employment in previous month	7,917
Population flow into employment from unemployment	174
Population flow into employment from not in the labour force	119
Population flow out of employment to unemployment	-134
Population flow out of employment to not in the labour force	-162
Net external population flow into employment	14
Total net change in employment	11
Total employment in current month	7,928

Source: Denton, F., C. Feaver and A. L. Robb, "Stock-Flow Relationships and Short-Run Dynamics: A Study of the Canadian Labour Market", Economic Council of Canada, Discussion Paper no. 37.

In addition to the quantitative magnitude of these flows of workers and jobs, their qualitative dimension imposes a further burden upon the allocative mechanism. It is argued by the exponents of the structural maladjustment hypothesis that the process of growth in the industrialized economy entails rapid and continuous changes in tastes, income distribution, and technology. Simultaneously, there occur shifts in emphasis from one product to another within firms, from one firm to another within industries, from one industry to another within regions. In this way are generated the large and complex flows we have described.

The inherent ability of the labour market to undertake the task of matching men and jobs is hampered by the following factors. First, ties of culture and religion, together with distance, impede geographical mobility. Secondly, occupational mobility may be discouraged by trade union limitation of entry

into certain trades and by the phenomenon of monopsonistic 'locking-in' of employees to jobs in which they acquire 'specific', non-transferable skills. In addition, the labour market is segmented by artificial barriers based on such things as race, sex, and age, legislation notwithstanding.

Finally, the ability of the individual to overcome the unsuitability of his present human capital characteristics is severely limited. Training requires money. But human capital cannot be divorced from its possessor, and is therefore illiquid. This characteristic cuts both ways: the unemployed worker may have great difficulty in borrowing money on the security of his own potential and may himself be reluctant to incur a debt because of the uncertainty of his prospects. Adjustments to skill-mismatching are therefore further impeded.

It is in the light of such factors that government manpower policy is advocated to augment the allocative mechanism of the market. By intervening in such areas as training, mobility, the provision of labour market information, and vocational counselling and placement services, it is argued, the public authority may promote a better matching of supply to the continuous, rapid and often sharp, changes in labour demand. This in turn would help to reduce the bottlenecks, structural unemployment, and other market pressures and strains which impede and distort the process of economic growth.

Such comments must, of course, be tempered with the observation that to deal with changing labour demands, manpower policy itself must be capable of continuous, rapid, and sharp adjustment. Indeed this requirement was specifically recognized in a recent OECD study:

> "... it may be considered advantageous for the economy to accept the cost of a certain over capacity of the adult training system in order to maintain a high degree of flexibility and preparedness for rapid and adequate reaction to unforeseen balance disturbances in various parts of the labour market."[25/]

Moreover, it might be argued that more emphasis should be placed upon the demand side of the market in the form of encouraging and accelerating job redesign.[26/] With regard to the first of these points there is evidence that the purchase agreements between the federal and provincial governments for institutional training in Canada do tend to produce a rather inflexible training system, and it is on these grounds that arguments have been made for greater emphasis on OJT, which has a greater measure of built-in responsiveness to demand conditions.[27/] As to the second point, a number of demand-side programs have been launched by the Canadian Department of Manpower and Immigration in recent years, but to date there is no single program directed to the (longer term) objective of job redesign *per se*.

[25/] OECD, Manpower and Social Affairs Committee, "Adult Training as an Instrument of Active Manpower Policy" (Note by the Secretariat), Paris, May 1970, p. 36.

[26/] See, for example, Davis, L. E., "The Design of Jobs", *Industrial Relations*, October 1966, pp. 21-45.

[27/] See Newton, K., "A Countercyclical Training Programme for Canada", *Relations Industrielles/Industrial Relations*, vol. 26, no. 4, pp. 882-883.

Structural maladjustment from the particular standpoint of training may be illustrated with reference to a model developed by Barbara Berman.[28] It is assumed that there exist two kinds of labour -- skilled and unskilled -- which are fixed in supply[29] so that the size and skill composition of the labour force are represented by the point E in Figure 3-2. ON and OM are the economy's endowments of skilled and unskilled labour, respectively, so that the rectangle OMEN contains the feasible combination of the two kinds of labour.[30]

Suppose that the economy is initially at point A, where output is such as to employ OS skilled workers and OU unskilled workers. It is the "employment composition point" for a given level of output. The curved employment expansion path is then the short-run locus of such points for various output levels: an increase in aggregate demand necessitates greater employment of both skilled and unskilled labour. Unemployment at A is equal to AG units of skilled and GE units of unskilled labour.

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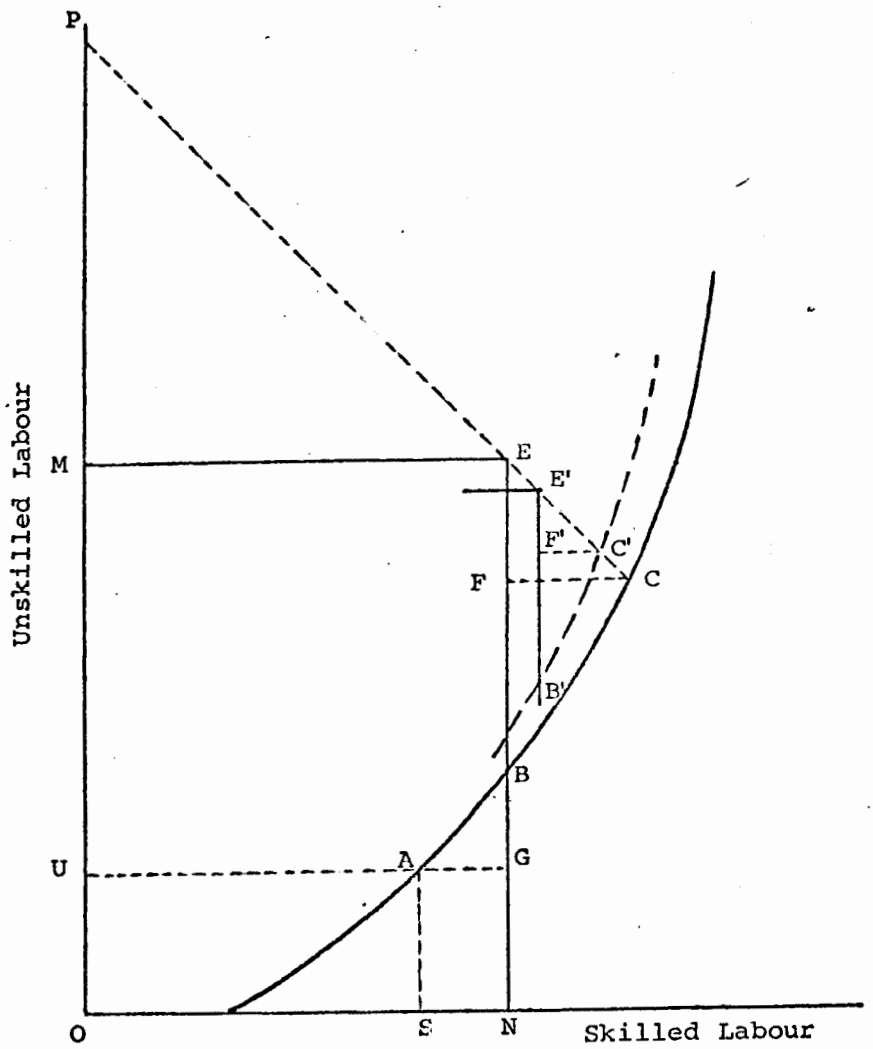
[28] Berman, B. R., "Alternative Measures of Structural Unemployment", in A. M. Ross (ed.), *Employment Policy and the Labour Market* (Berkeley: University of California Press, 1965), pp. 256-268.

[29] The analysis is short run.

[30] If all skilled workers were willing to take unskilled jobs, then the area of feasible combinations is extended to include the triangle PME.

Figure 3-2

STRUCTURAL MALADJUSTMENT IN THE LABOUR MARKET



The curvature and position of Berman's expansion path suggests that a short-run increase in demand would raise the proportion of unskilled employed.[31] As aggregate demand is increased from point A, however, the economy's expansion is curtailed by the bottleneck at B, where the supply of skilled labour is exhausted, though there remain BE units of unskilled labour structurally unemployed. (This exemplifies the classic case of the simultaneous existence of excess demand for one kind of labour and excess supply of another.)

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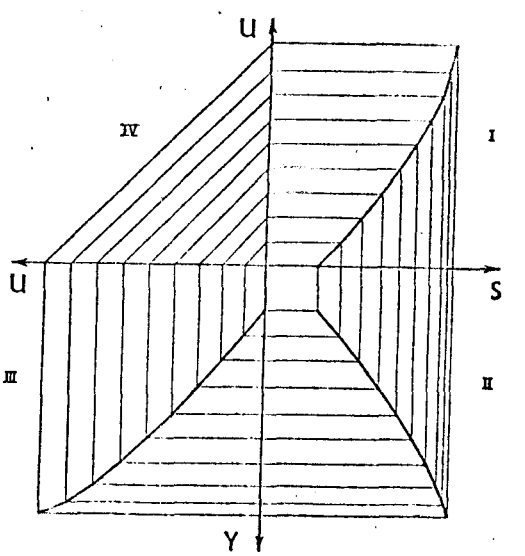
[31] With respect to the shape of the employment expansion path Berman simply says that it is the result of assuming that (a) "the marginal propensity to hire unskilled labor is higher than the average propensity to hire unskilled labor", and (b) "that the marginal propensity to hire skilled labor is lower than the average". Berman, *op. cit.*, p. 259. This is elaborated in the diagram opposite. Quadrant II depicts hirings of skilled workers, S, as aggregate output, Y, increases. It is consistent with assumption (b). Quadrant III, which is consistent with assumption (a), shows the hirings of unskilled workers, U, associated with the same income levels as those shown in Quadrant II. In Quadrant I we then obtain the combinations of U and S corresponding to common levels of Y, and consistent with assumptions (a) and (b).



GRAPHICAL DERIVATION OF THE EMPLOYMENT EXPANSION PATH

To achieve an orderly expansion beyond point B, Berman suggests that the skill mix of the economy needs to be relocated from point E to a point closer to the expansion path. Transformation of unskilled into skilled workers through training will achieve this end, causing E to move "south-east". If EF unemployed unskilled persons are trained, then FC persons are added to the skilled work force, BF additional untrained unskilled persons are hired along with the FC (=EF) newly-trained skilled workers.

We may elaborate on the adjustment mechanism, injecting a further element of reality, as follows. We may suppose that the labour market will be undergoing an adjustment process from two sides. On the one hand, employers are frequently endowed with sufficient business acumen to recognize the onset of potential bottlenecks and to make adjustments accordingly: hiring standards may be lowered and jobs redesigned[32] so that their input mix is torqued in the direction of more "unskilled-intensive" production methods. This will tend to move the employment expansion point "north-west" as shown in Figure 3-2: point C is transformed into point C'.

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[32] For employer reactions to tight labour markets, see Doeringer, P. B. and Piore, M. J., "Labour Market Adjustment and Internal Training", *Proceedings of the Industrial Relations Research Association*, Winter 1965, pp. 250-263; Davis, L. E., "The Design of Jobs", *Industrial Relations*, October 1966, pp. 21-45; Livernash, E. R., "An Active Employer Manpower Policy", *Proceedings of the Industrial Relations Research Association*, Winter 1966, pp. 208-218.

On the supply side, simultaneously, factors are at work which tend to transform the skill endowment mix. Firms faced with the growing tightness in the market for skilled labour will tend increasingly to "make" rather than "buy" their skilled labour requirements, by undertaking training. In the face of the buoyancy of the market for skilled labour, unskilled workers may also be tempted by the prospective returns to invest in skill training. These two forces tend, of course, to move the skill endowment point, E, south-eastward, from E to E', as shown in Figure 3-2.

We have already discussed the reasons why the labour market, unaided, may not be capable of adjusting fully -- that is to the point where the expansion path and the endowment point coincide. There remains what we shall call a "residual adjustment task" that needs to be performed on grounds of allocative efficiency. It is represented, geometrically, by the triangle E'F'C'. In other words, after the free-market adjustment forces have worked out, there still exists a bottleneck at B' with structural unemployment of B'E' unskilled workers.

In the absence of further adjustments by the unaided market, the potential role for government intervention is apparent: the gap between E' and C' may be closed by government-sponsored training which would transform F'E' unskilled workers into skilled workers. The skill endowment point E' is thereby moved south-east until it is coincident with C'. At this point there is no unemployment of either kind of labour and the economy's short-run production potential is realized.

The rationale for government intervention of this type is that by augmenting the allocative efficiency of the labour market, certain national economic objectives are served. By alleviating the potentially inflationary and output-inhibiting shortages represented by bottlenecks such as B and B', the aims of price stability and economic growth are served. To the extent, moreover, that government intervention will perform the "residual adjustment" task, structural unemployment is reduced -- which promotes attainment of the full-employment goal.

4. Empirical Evidence of Maladjustment in Canada

Theoretical discussion of the structural maladjustment case for government intervention in the labour market suggested the propriety of an attempt to adduce empirical evidence as to the degree of structural maladjustment in Canada. One approach is to take as a model the methodology of Dow and Dicks-Mireaux[33] whose seminal article in this field is probably responsible for the currency which the term "structural maladjustment" now enjoys.

Essentially, the model focuses upon the relationship between the vacancy rate and the unemployment rate, and may be described with reference to Figure 3-3.

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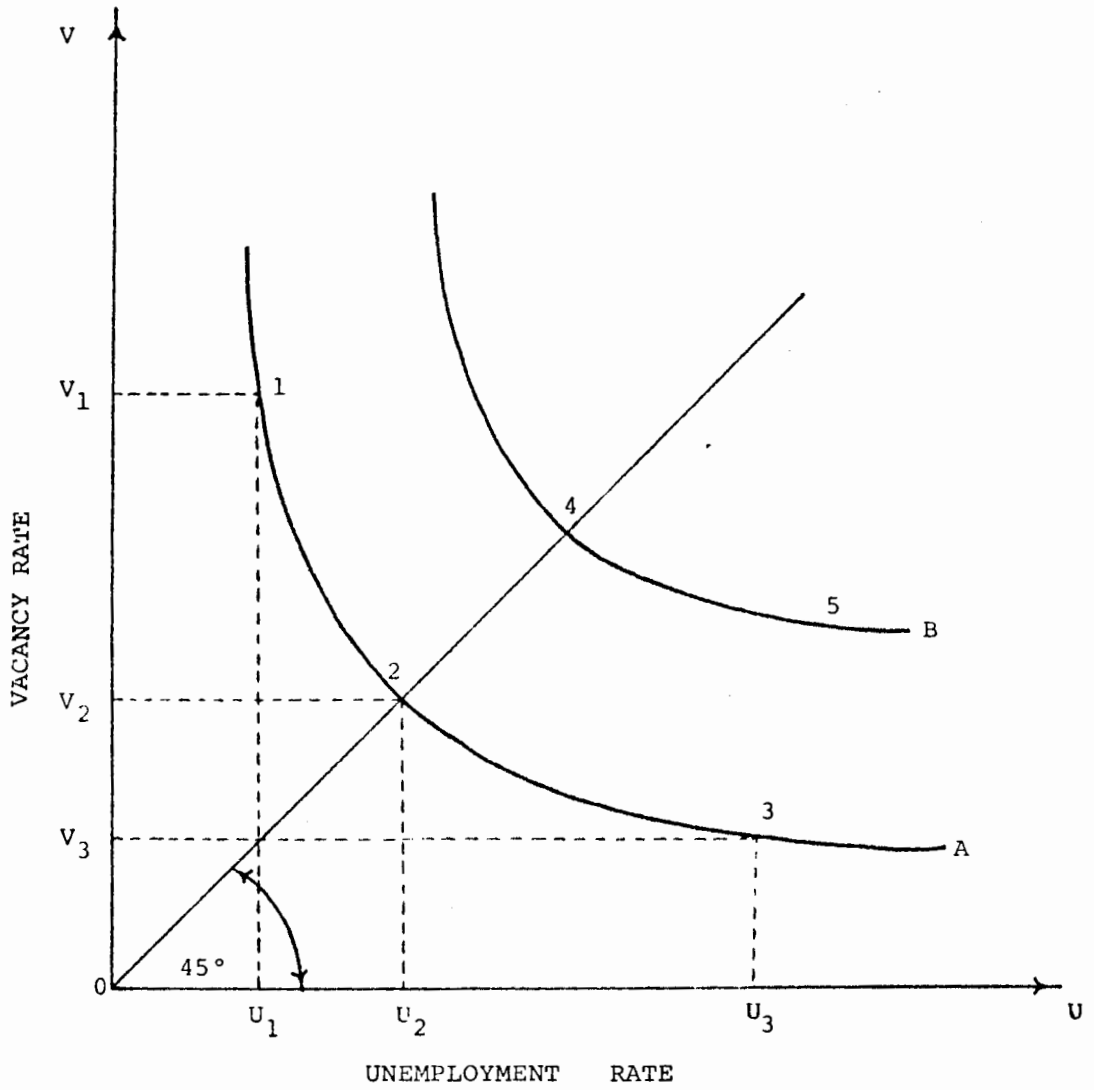
[33] Dow, J.C.R. and Dicks-Mireaux, L. A., "The Excess Demand for Labour: A Study of Conditions in Great Britain, 1946-56", *Oxford Economic Papers*, New Series, vol. 10, no. 1, February 1958, pp. 1-33.

Figure 3-3

THE UNEMPLOYMENT-JOB VACANCIES MAP[34]



[34] This is the term used by Jacob Mincer in a more recent application of the Dow, Dicks-Mireaux model: "Comment", in NBER, *The Measurement and Interpretation of Job Vacancies* (New York, 1966), pp. 120-126.

Areas of high demand and low demand may be thought of as separated by the line running north-east from the origin, with high demand above and to the left of the line; low demand below and to the right. Zero net excess demand is defined as all points where unemployment and "true"[35] vacancies are equal -- that is, the 45-degree line.[36] Various points on this line, such as points 2 and 4, correspond to different *degrees of maladjustment*. The degree of maladjustment at any time is measured as the amount of unemployment which would exist if there were zero excess demand. Thus for curve A in Figure 3 the degree of maladjustment is measured as OU_2.

Assuming that the curves such as A and B approximate a rectangular hyperbolic shape, the degree of maladjustment, m, can be calculated for any pair of values of unemployment, u, and vacancies, v, as $m = \sqrt{uv}$.

For any given degree of maladjustment, there is a series of points corresponding to different degrees of net excess demand. Thus movements *along* a curve such as A or B

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[35] Dow and Dicks-Mireaux discuss in some detail the factors likely to cause under-statement or over-statement in reported vacancies. They estimate the value of a 'statement ratio', s, defined as *reported* vacancies divided by *true* vacancies, so that their corrected vacancy data are in fact 'v/s'.

[36] So, at least runs the stylized version of the theory. Jacob Mincer has pointed out that "it is not ... clear whether the equality of unemployment and job vacancies represents an aggregative equilibrium in any sense other than of its own definition.... This is an empirical question and it is not, a priori, obvious whether this locus would be below or above the 45-degree line." Comment on Holt, C. C. and David, M. H., "The Concept of Job Vacancies in a Dynamic Theory of the Labour Market", in NBER, *The Measurement and Interpretation of Job Vacancies* (New York: Columbia University Press, 1966).

represent *cyclical* changes, and *shifts* of the curve, north-east or south-west, represent *structural* changes in the degree of maladjustment.

The British data reported by Dow and Dicks-Mireaux manifest what the authors describe as a "striking inverse parallelism" of the vacancy and unemployment series. Moreover, when the two series were plotted against each other the resulting scatter displayed a hyperbolic configuration. The degree of maladjustment over the decade 1946-56 appeared to have diminished in the British case.

A recent study by Mahmood Zaidi employed the same basic approach in examining the Canadian case. On the basis of the scatter of points showing combinations of seasonally adjusted unemployment rates and vacancy rates for the period 1953-64, Zaidi appears to have hand-drawn two hyperbolae[37] representing "two distinct periods of maladjustment" -- for 1953-57, and for 1958-64. The associated rates of structural maladjustment, m, are 5.3 per cent and 6.3 per cent, respectively.[38]

These results must be treated with considerable caution for two reasons. First, there is the problem of the precise positioning of the curves which are assumed to represent the u, v relationship in the arbitrarily distinguished periods of maladjustment. Second, the vacancy data are derived from the

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[37] No statistical techniques are reported for establishment of the position and shapes of the curves.

[38] Zaidi, M., "Unemployment, Vacancies, and Conditions of Excess Demand for Labor in Canada", *Applied Economics*, vol. 2, no. 2, 1970, pp. 101-112.

estimates of the National Employment Service, which suffer from a number of well-documented deficiencies. Indeed, in a conference on the measurement and interpretation of job vacancies in 1966, Mr. W. Thompson of the Canadian National Employment Service declared that the NES data "are used chiefly in the operations of that organization. They are considered adequate for this purpose and for some general economic analysis by members of the Service. The use of the data in the latter role is only possible, however, because the members of the NES are knowledgeable about the methods of calculation and data collection, and they make their analysis on the whole reporting system of the NES and not merely on the vacancy series."[39/]

Results of the Canadian Job Vacancy Survey have been published since the third quarter of 1970 -- hardly a long enough series for cyclical analysis. Moreover, a number of caveats have emanated from official sources concerning the utility of the Job Vacancy Survey data for the type of analysis described above, based mainly on the conceptual incompatibilities of the unemployment and vacancy series.[40/] The most recent warning is worth reproducing in full:

39/ Thompson, W., "Collection and Use of Job Vacancy Data in Canada", in NBER, *The Measurement and Interpretation of Job Vacancies*, *op. cit.* Thompson goes on to outline a number of specific weaknesses of the vacancy data in the 1960s, including their incomplete coverage (a little more than 30 per cent of actual vacancies in the country) and "the absence of any satisfactory method, at the present time, of assessing the causal factors in shifts in volume of vacancies reported".

40/ "A Note on Job Vacancy and Unemployment Statistics", *Quarterly Report on Job Vacancies*, Fourth Quarter, 1972, Statistics Canada, cat. no. 71-002.

> "There is one area where job vacancy data must be used with the utmost caution; that is, the relationships between unemployment data and job vacancy data. These relationships are often being examined to measure various economic phenomena such as the degree of structural imbalance in the labour market. Also, attempts are being made to extend Phillips' curve analysis, restricted until now to the "unemployment-price trade-off", with the use of job vacancy data."41/

For this reason it was felt that attempts at precise statistical estimation of u, v relationships, and the degree of structural maladjustment in Canada were not warranted. The more modest alternative employed is simply to look at the behaviour of unemployment and vacancy rates over time as the basis for some rather guarded comments. For this purpose quarterly, seasonally adjusted unemployment rates are used in conjunction with a newly constructed series of quarterly seasonally adjusted vacancy rates which incorporates elements of the NES vacancy estimates, the Department of Finance Help Wanted Index, and the Job Vacancy Survey estimates.42/

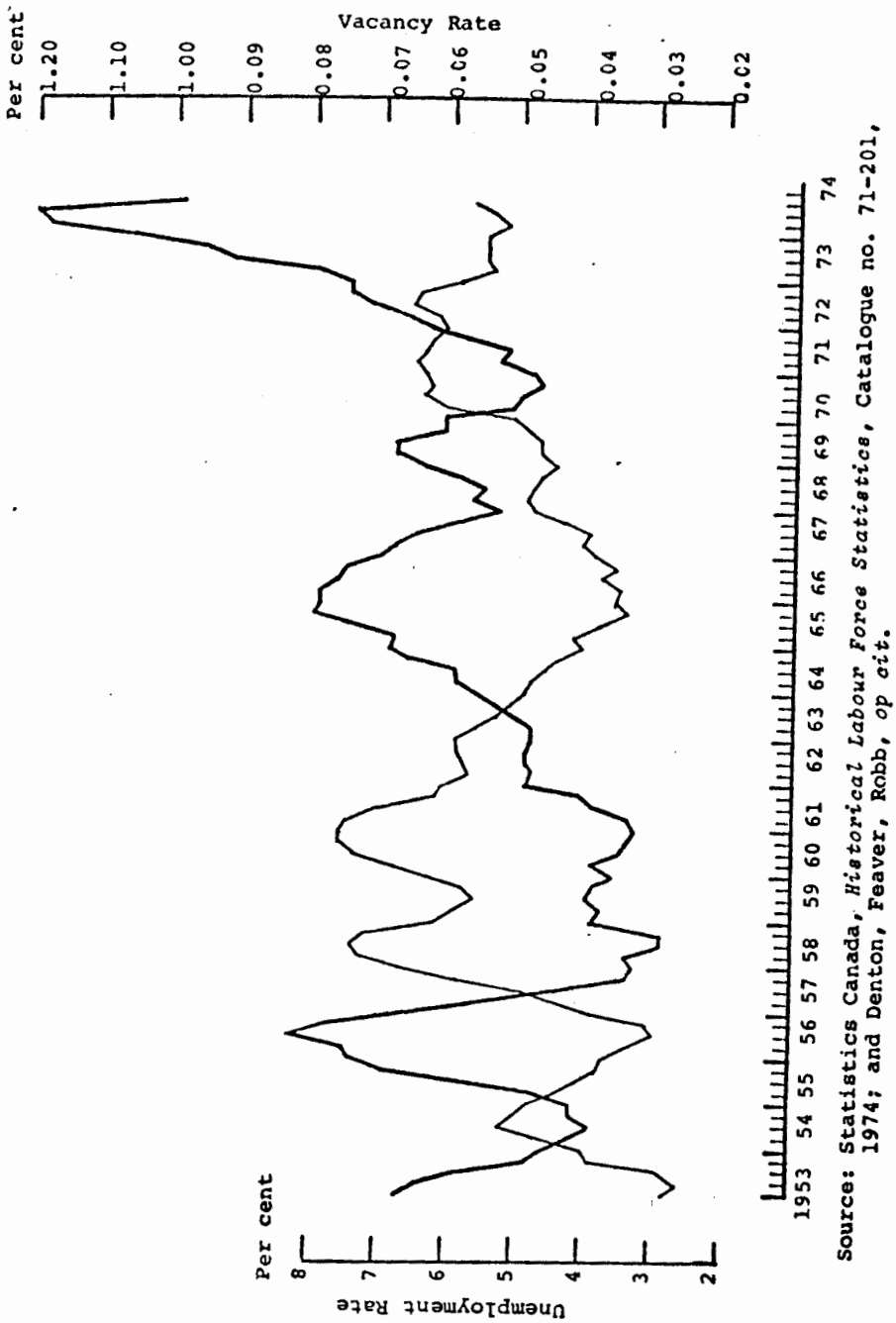
In Figure 3-4 the unemployment and vacancy rates are plotted over the period 1953-74, and the "inverse parallelism" referred to by Dow and Dicks-Mireaux is apparent -- the peaks of the u series being approximately aligned with troughs of the v series, and *vice versa* -- although some evidence of a general upward drift of *both* series in recent years may be discerned.

41/ Boucek, J. A., "Job Vacancy Survey", *Canadian Statistical Review*, April 1975.

42/ The rather complex merging procedure is described in Denton, F. T., Feaver, C. H. and Robb, A. L., "Patterns of Unemployment Behaviour in Canada", study for Economic Council of Canada, July 1974, Ch. V.

Figure 3-4

UNEMPLOYMENT AND VACANCY RATES, CANADA, 1953-74

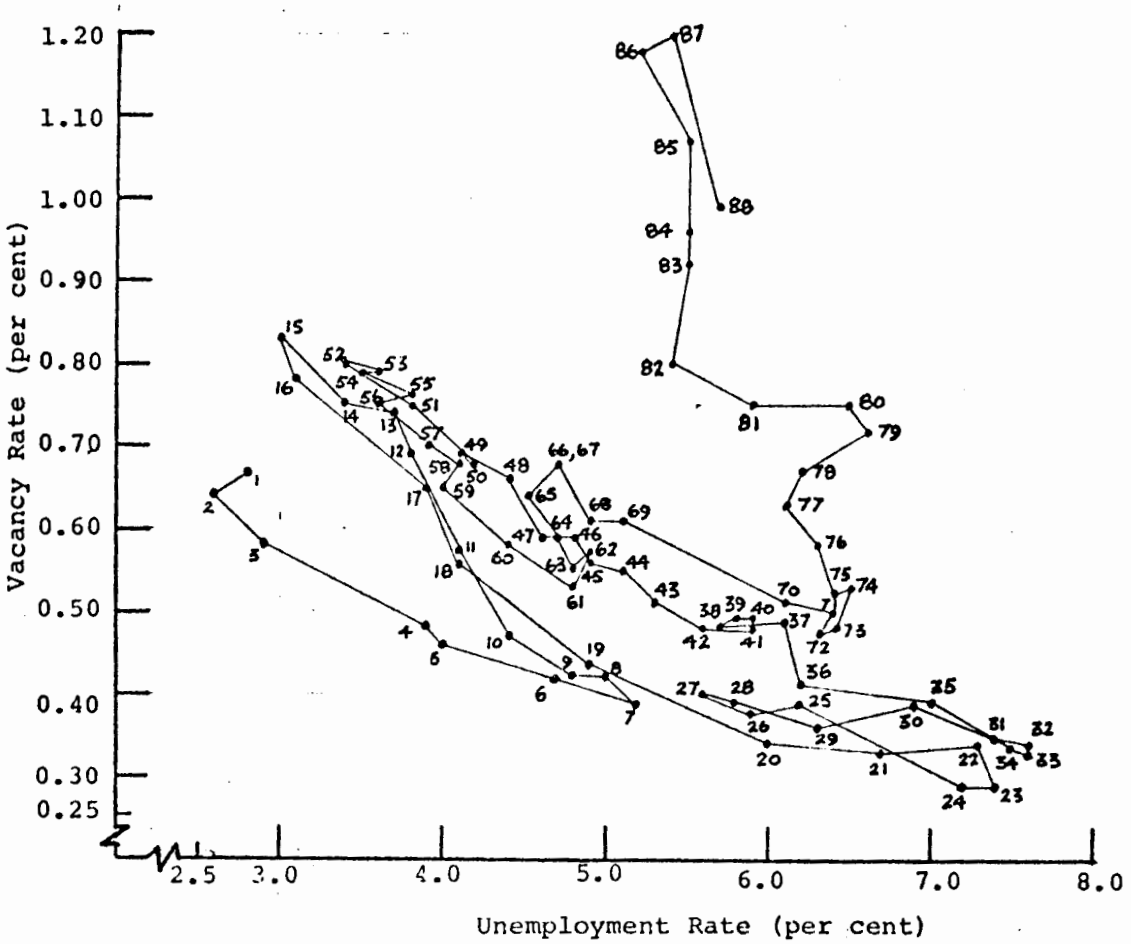


Source: Statistics Canada, *Historical Labour Force Statistics*, Catalogue no. 71-201, 1974; and Denton, Feaver, Robb, *op cit.*

More interesting, however, is the u, v relationship of Figure 3-5, in which each point identifies a particular quarter, its associated number indicating the chronological sequence of observations. Broad cyclical swings in the relationship -- such as that for observations 1 through 7 (Q1, 1953 through Q3 1954) or, more spectacularly, observations 15 through 22 (Q3, 1956 through Q2, 1958) -- do appear to trace out roughly hyperbolic curves. Furthermore, these broad cyclical sweeps appear to move outward from the origin over time -- a phenomenon consistent with the notion of increasing structural maladjustment. However, from observation 73 on (Q1, 1971) whatever cyclical relationship was previously distinguishable appears to break down, with increasingly higher vacancy rates being (generally) associated with a rather narrow range of unemployment rates which vary from a low of 5.2 per cent in the second quarter of 1974 (observation 86) to a high of 6.6 per cent in the third quarter of 1972 (observation 79). The vacancy rate in this period rises almost without pause from 0.48 per cent in the first quarter of 1971 (observation 73) to 1.2 per cent in the third quarter of 1974 (observation 87) before dropping slightly in the fourth quarter of that year to about 1.0 per cent. On theoretical grounds at least this period would constitute an almost classic case of increasing maladjustment. Such observations must, however, be tempered with the caveats advanced earlier concerning the conceptual properties of the series employed.

Figure 3-5

THE u, v RELATIONSHIP FOR CANADA, 1953-74



One additional minor exercise which is based on unemployment and vacancy data and must also, therefore, be interpreted with caution, examines the occupational dimension of such data for evidence of "mismatching". When unemployed workers are unsuited, because of education, training, experience, occupational background, location, and/or wage aspirations, for the vacant jobs, then mismatching occurs. Of course, there will generally be some vacancies in any labour market, but the point is that some markets may be experiencing relatively "tight" shortage conditions at the same time that other markets are experiencing relatively "slack" conditions. The following table reports a "relative tightness ratio" for 22 major occupational groups in 1971.

The ratio is:

$$V_i/U_i \div V/U$$

where V_i, U_i are unemployment and vacancies, respectively, for a particular occupation group i, and V, U are total vacancies and unemployment, respectively, for all occupations. Since the ratio of V to U is less than unity for every occupation the overall ratio is normalized by the average ratio for all occupations in order to provide a standard for comparison. The market for an occupational group is therefore relatively tight (slack) when its ratio exceeds (falls short of) a value of unity. These results are shown graphically in Figure 3-6 where occupations have been ranked from low to high in terms of their relative tightness ratio.

Table 3-2

RELATIVE TIGHTNESS IN MAJOR OCCUPATIONAL MARKETS, CANADA, 1971

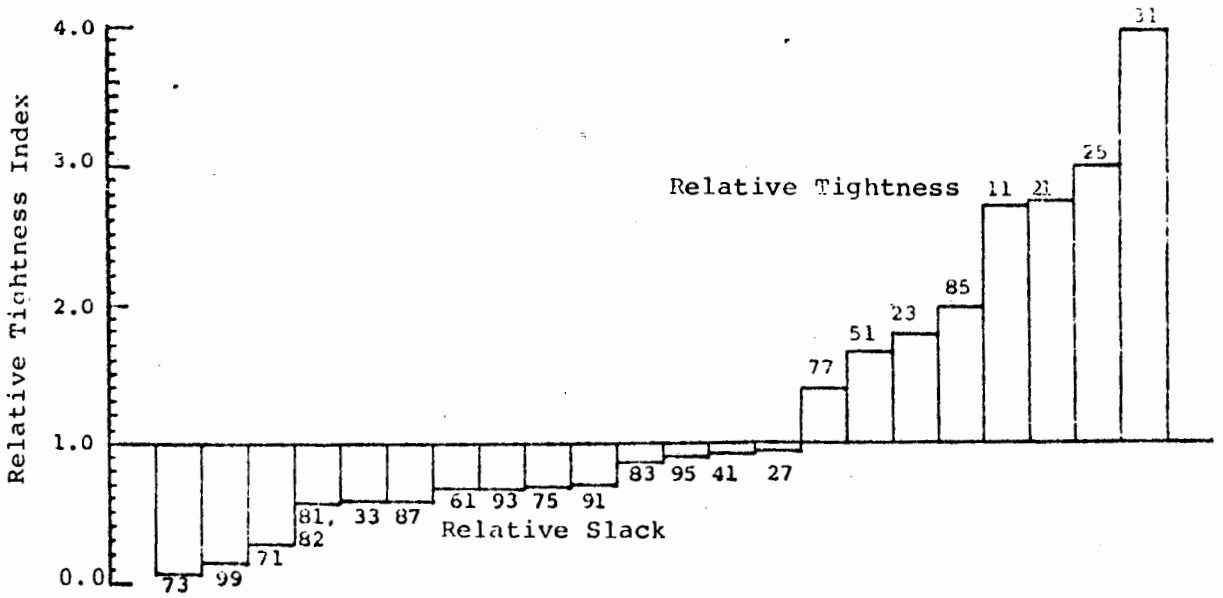
CCDO Code	Occupation	V_i	U_i	V_i/V %	U_i/U %	$V_i/U_i \div V/U$	Rank
11	Managerial, Administrative	1,130	5,680	3.42	1.26	2.71	4
21	Natural Science, English	1,648	8,140	4.98	1.81	2.75	3
23	Social Sciences	504	3,820	1.52	0.85	1.79	6
25	Religion	48	240	0.15	0.05	3.00	2
27	Teaching and related	441	6,330	1.33	1.41	0.94	9
31	Medicine and Health	2,346	7,970	7.10	1.78	3.99	1
33	Artistic, Literary, Recreational	262	5,980	0.79	1.33	0.593	17
41	Clerical and related	5,401	78,530	16.34	17.49	0.93	10
51	Sales	4,487	37,370	13.57	8.32	1.63	7
61	Service	3,282	67,910	9.93	15.12	0.656	16
71	Farming	263	12,300	0.80	2.74	0.29	20
73	Fishing, Hunting	9	1,830	0.03	0.41	0.07	22
75	Forestry and Logging	585	11,920	1.77	2.65	0.67	14
77	Mining and Quarrying, Oil Fields	530	5,170	1.60	1.15	1.39	8
81-82	Processing	1,033	24,740	3.12	5.51	0.57	19
83	Machinery and related	1,130	17,720	3.42	3.95	0.87	12
85	Product Fabricating	5,507	37,710	16.66	8.40	1.98	5
87	Construction Trades	2,225	50,960	6.73	11.35	0.592	18
91	Transport Equipment Operators	1,141	22,090	3.45	4.92	0.70	13
93	Materials Handling	994	20,490	3.01	4.56	0.66	15
95	Other Crafts	340	5,090	1.03	1.13	0.91	11
99	Occupations NEC	206	17,050	0.62	3.80	0.16	21
		V=33,512	U=449,010				

Source: Data from Meltz, N., "Information Requirements for Government Programs Directed toward the the Labour Market", Study for the Economic Council of Canada, Table 9-1.

Of the 22 major groups examined for 1971, it is apparent that 14 experienced relatively slack conditions while 8 were relatively tight. This simple exercise provides at least tentative illustration of the simultaneous existence of the relative shortage and relative surplus in occupational markets which characterizes structural maladjustment.

Figure 3-6

MAJOR OCCUPATIONAL GROUPS RANKED BY
RELATIVE TIGHTNESS RATIO, CANADA, 1971



Note: Occupational codes are as per Table 2 above.

Source: Data from Meltz, N., "Information Requirements for Government Programs Directed Toward the Labour Market", study for the Economic Council of Canada, 1975, table 9-1.

Finally, there is a steadily growing body of literature which suggests that the Canadian labour market has been experiencing a rather complex set of developments in recent years which render it qualitatively different from the market of even a decade ago, and which impose further adaptive strains upon the allocative mechanism. One such development is the rapidly growing proportions of young people (14-24 years of age), and of women, in the labour force -- groups whose labour force attachment is less firm than that of prime-age (25-54 years) males. These developments have important implications for the magnitudes of the gross flows with which the market must deal. In the last section the absolute magnitude of these flows was shown to be large relative to the net change in stocks. In the last decade, moreover, the magnitude of the flows into and out of the labour force has increased, as the following table shows.

Table 3-3

FLOWS INTO AND OUT OF THE LABOUR FORCE, CANADA, 1963 AND 1973

	Percentage of Average Labour Force During Year	
	1963	1973
Into employment from net in labour force	24.6	28.0
Into unemployment from net in labour force	2.9	4.7
Out of employment to net in labour force	-25.4	-29.1
Out of unemployment to net in labour force	- 1.3	- 2.1
Net external population flow into labour force	2.1	2.5

Source: Denton, *et al.*, "Stock Flow Relationships...", *op. cit.*

5. Conclusions

The rather limited data available permit the tentative conclusion of an increasing burden upon the labour-market adjustment mechanism in Canada in the period studied. According to the structural maladjustment case for government involvement in training and other manpower programmes, heavier federal expenditures -- given present forms of intervention -- would seem to be indicated. However, even if conceptual caveats are set aside, empirical evidence is not conclusive. Several interpretations are possible. If one is convinced by the theoretical arguments as to the efficacy of training programmes to alleviate structural maladjustment, the evidence calls for steps to alleviate what seems to be a growing problem. Alternatively, an anti-training cynic might point out that on the evidence of Figure 3-5, structural maladjustment in the Canadian labour market has manifested an upward trend throughout the period studied -- despite the introduction of an active manpower policy in the 1960s and the rapid build-up of training expenditures in the latter half of that decade. On this view manpower policy has had little or no impact upon the maladjustment problem.[43/]

To this argument a more sanguine observer might offer the suggestion that the pace of structural change *is* rapid, and

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[43/] Of course, this still begs the question of whether manpower policy is ineffective and should be scrapped, or whether it has so far proved unequal to the task only because of the small scale on which it has been operated. For comments on the notion of a critical minimum scale for training programs, see Newton, "A Countercyclical Training Programme....", *op. cit.*, section V.

a more severe build-up of structural maladjustment has been avoided only by the relatively large and increasing federal spending on manpower policy in recent years.

Whatever the "correct" interpretation, strong conclusions are in any case difficult to draw because of the ambiguous orientation of Canadian manpower policy. It will be seen in Chapter 4 that manpower training is directed at a variety of goals, some of which may not be completely complementary. It is possible, therefore, that a more spectacular attack upon the problem of structural maladjustment has been blunted somewhat by pursuit, conscious or unconscious, of manpower goals inconsistent with the reduction of maladjustment.

This serves to raise the further point, fundamental to the subject of this chapter, that there exist not only a multiplicity of ends to which training programs may be directed, but also that training programs themselves constitute only one of a variety of means. The next chapter looks at some of the ostensible goals of the Canadian Manpower Training Program and its efficacy in meeting them.

CHAPTER 4

THE CANADIAN MANPOWER TRAINING PROGRAM*

1. Introduction

This chapter examines federal government involvement in training in Canada at the present time. Section 2 attempts to define the aims of the programs on the basis of official statements and empirical evidence, while Section 3 presents some data relating to the performance of the programs in meeting these goals. A brief description of the circumstances leading up to the current legislation, plus an outline of the provisions of that legislation, serve to introduce the analysis of the Canada Manpower Training Program which is contained in later sections.

Prior to 1960, government intervention in the labour market in Canada was rather limited. Some small amounts of money (relative to present levels of expenditure) were spent on vocational training,[1/] but the main federal programs relating to manpower were unemployment insurance and the National Employment Service.

The late '50's and early '60's in North America, however, were times of considerable economic slack. The ensuing

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*Some of the working papers and notes on which this chapter is based served also as background material for Chapter 6 of the Economic Council of Canada's *Eighth Annual Review*. The data presentation and analysis performed by the author for the present chapter therefore owe much to the comments and suggestions of members of the Council staff -- particularly Dennis Maki, Darwish Wakid, and Sylvia Ostry. Access to their papers, notes, and data concerning training in Canada was most helpful in the preparation of the present chapter.

1/ For example, $72 million under the Vocational Training Co-ordination Act between 1946 and 1960.

widespread debate on the sources of unemployment was characterized by popular fears of the consequences of "automation" and growing academic conviction that "structural transformation" of the economy was overloading the labour market's allocative machinery.

The Technical and Vocational Training Assistance Act (TVTA) of 1960 is one reflection of the prevalence of the "structuralist" view. It provided for federal-provincial cost-sharing arrangements[2/] to cover capital expenditures on training institutions throughout the country, and also operating expenditures for the training of (a) youths still in technical and vocational high schools, (b) youths and adults requiring post-secondary education to qualify as technicians, and (c) adults, employed or unemployed, requiring training to find jobs or to improve their employment prospects. As shown in Table 1-2 of Chapter 1, total federal expenditures under TVTA amounted to about $900 million, and about half a million people per year were receiving training under the Act by the middle of the decade.

Further reinforcement of the growing use of manpower programs was provided in 1964 when the Economic Council of Canada intoned:

> "*We place a great deal of emphasis on the need for urgent and prompt improvement in the field of labour market policy....* Our educational and training system must both reflect and contribute to rapid adjustments to change which are an essential feature of dynamic industrial growth.... *It is vitally important that general education and training should be given a very high priority in our economic system.*"[3/]

2/ See Appendix to Chapter 1.

3/ Economic Council of Canada, *First Annual Review*, 1964, pp. 202-203. (Italics in original.)

The Council's concern was reiterated the following year, and in 1966 the federal Department of Manpower and Immigration (DMI) was established. It brought together a number of programs and services relating to labour supply[4/] which had formerly been administered by different departments, thus laying the groundwork for an integrated manpower policy.

One of the largest components of post-1966 manpower policy in Canada is the training undertaken under the provisions of the Adult Occupational Training Act of 1967, which is still in force today. The present training program is different from TVTA in four major respects. First, there are no cost-sharing arrangements. Second, it is confined to adults. Third, it contains only transitional arrangements for capital grants[5/] (carried over from TVTA) and a provision for long-term loans (which has not yet been put into effect). Finally, living allowances are paid to institutional trainees.

The qualifications to undertake training are that the candidate must be at least one year past the regular school-leaving age, *and* either (a) have been out of school for a year, or (b) be in an apprenticeship course. Further, although the candidate may be employed or unemployed at the time of his

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4/ Such as the immigration services of the Department of Citizenship and Immigration, and the National Employment Service offices, which became Canada Manpower Centres (CMC's).

5/ 14-15-16 *Elizabeth II*, chap. 94, An Act respecting the occupational training of adults, Part III, pp. 1214-15, 8th May, 1967.

referral to training, he must be considered likely, by the manpower officer, to improve his earning capacity or employment opportunities as a result of training.

The Department of Manpower and Immigration pays up to 100 per cent of the operating costs for the provision of training, and purchases training services from provincial technical institutions, private schools, and industry. Further, the department pays training allowances to institutional trainees with dependants and to single trainees who, prior to training, have been in the labour force for three years. Such training allowances have accounted for more than half of the operating costs since the program began. Allowances are adjusted annually, using an escalation formula based upon the annual rate of increase in national average hourly earnings in manufacturing.

As indicated in Chapter 1, training under the Adult Occupational Training Act is of two major types: institutional and training in industry. During the first few years under the new legislation, training in industry was almost exclusively of the "vestibule" variety -- that is, it had to be undertaken in a location separate from the actual work station, and resulting output could not be sold. On-the-job training per se was thus excluded. Then in December 1971 the federal government launched a new venture in industrial training as part of a package of direct employment programs. Private firms could qualify for reimbursement of 75 per cent of the wages paid to workers engaged

in a training scheme approved by a regional manpower office, provided the trainees were unemployed immediately prior to training and had been referred by a Canada Manpower Centre. This program was specifically on-the-job in nature and covered fractional wage reimbursement only.

The response from industry was so encouraging that the program was reintroduced for 1972-73 but this time as part of adult occupational training. Amendments to the AOT Act in June 1972 formally designated the new program the Canada Manpower Training on the Job Program (CMTJP) joining vestibule training as the two elements of Training in Industry. The latter and institutional training together constitute the Canada Manpower Training Program (CMTP).

Despite the initial enthusiasm for the new OJT program, however, its relative importance appears already to be declining. If institutional trainees in skill courses only (i.e., excluding language training and basic educational upgrading) are compared with on-the-job trainees, the latter account for 20 per cent of all skill-course trainees in 1971-72, as may be seen from Table 4-1 below. By 1973-74 the proportion had fallen to less than 5 per cent. Although the number of institutional trainees increased in each of the three years shown in the table, the drastic decline in the number of OJT trainees, coupled with a more modest diminution in numbers of vestibule trainees, was sufficient to decrease the overall number of skill-course trainees between fiscal years 1972-73 and 1973-74.

Table 4-1

PROPORTIONS OF SKILL-COURSE TRAINEES IN INSTITUTIONAL AND INDUSTRY TRAINING UNDER CMTP

	1971-72		1972-73		1973-74	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Institutional trainees in skill courses	143,828	65.6	163,674	68.0	170,439	79.8
On-the-job trainees	43,948	20.0	36,645	15.2	9,404	4.4
Training-in-industry ("vestibule")	31,520	14.4	40,487	16.8	33,670	15.8
Total industry training	75,468	34.4	77,132	32.0	43,074	20.2
Total skill-course trainees	219,296	100.0	240,806	100.0	213,513	100.0

Source: Department of Manpower and Immigration, *Annual Report*, 1971-72, 1972-73, and 1973-74 (Ottawa: Information Canada).

These figures contrast markedly with similar data for the United States' Manpower Development and Training Act. In fiscal year ending 1971, 38.9 per cent of trainees were in OJT and 61.1 per cent were in institutional courses. The following year, 50.1 per cent were in OJT; and in fiscal year 1973, 55.2 per cent were in OJT.

One possible reason for Canada's lack of emphasis on training in industry is that the existence of institutional capacity erected during the 1960's provides a compelling motivation to policy-makers to utilize the institutional setting. Further, there is the practical problem that Canadian industry, unlike that of some other countries, such as Britain, is rather heavily concentrated in a few geographical areas, so that in many places and for many occupations on-the-job training just

is not feasible. In addition, the direct payment of wage subsidies to employers invites the criticism that the federal government is simply substituting public money for private -- paying industry to do what it should be doing of its own volition.

2. The Orientation of Canadian Training Programs

Since no critical description of the Canadian training system can properly be undertaken without the aid of some evaluative criteria, the present section attempts to define the objectives against which the performance of the training authorities may be judged. For this purpose two types of information are drawn upon. The first part of the section examines official statements concerning the federal governments' training goals, while the second part looks at the available empirical evidence concerning the actual orientation of the programs.

(a) Official Statements of Objectives

Although there are a number of explicit statements by manpower officials on this subject, the aims of the CMTP appear by no means unequivocal. As suggested in Chapter 3, manpower training programs are often rationalized in terms of their potential contribution to the attainment of national economic objectives, and this appears to be true in the Canadian case, as the following quotations illustrate.

> "The main objective of the Department [of Manpower and Immigration] is to further the economic growth of Canada by endeavouring to ensure that the supply

> of manpower matches the demand qualitatively, quantitatively, and geographically."6/

Similar statements7/ suggest that economic growth is the major policy objective of Canadian manpower programs, including training. It is apparent, however, that the stabilization goal (which subsumes both price stability and full employment) is also regarded as an appropriate objective for training:

> "In the coming years, greater emphasis will be put on manpower as a selective instrument of economic stabilization policy to assist in the more effective trade-off between inflation and unemployment in periods of inflationary pressure and to assist in absorbing surplus labour in productive activities such as training or in selective employment-creating activities in periods of recession."8/

Training is also expected to help meet a third goal -- distributional equity. Thus the DMI brief to the Special Senate Committee on Poverty maintained that training expenditures "were distributed among the geographic regions of Canada on the basis of the size of the labour force in each region as well as their economic need as indicated by their unemployment and poverty rates",9/ and a later ministerial statement asserted: "We are

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6/ Hon. Allan J. MacEachen, Minister of Manpower and Immigration, Testimony before the House of Commons Standing Committee on Labour, Manpower, and Immigration, 28th Parliament, 2nd Session, *Minutes of Proceedings and Evidence*, February 11 and March 24, 1970, no. 1, p. 1:10.

7/ E.g., DMI, Planning and Evaluation Branch, Program Development Service, "The Canadian Adult Training and Retraining Program", Paper prepared for OECD, July 1968, p. 1.

8/ Dymond, W. R., "Manpower Policy in Canada as a Selective Instrument of Economic Policy" (talk to Economics Department, University of Massachusetts, Amherst, Mass., February 18, 1970), p. 5. See also Dymond, W. R., "The Canadian Experience", *Proceedings of the 1970 Annual Spring Meeting*, Industrial Relations Research Association, Albany, New York, May 8-9, 1970, pp. 544-545. (Dr. Dymond was, until recently, Assistant Deputy Minister in DMI.)

9/ *Proceedings of the Special Senate Committee on Poverty*, 28th Parliament, 1st Session, June 10, 1969, p. 375.

constantly striving to bring the policies of the Department within the reach of the underemployed and the working poor."10/

A particularly interesting statement, attributed to a senior official of the Department of Manpower and Immigration at a meeting of provincial ministers of labour and education, is quoted by Stefan Dupré *et alia* and is worth reproducing in full here:

> "It is a program which takes human resources that would otherwise be idle or not fully utilized and channels and recycles them into more productive and rewarding occupations. By the same token, by retraining men and women in skills which are in growing demand, it helps eliminate production bottlenecks and reduces the cost of producing and distributing the goods and services that Canadians and other nations want. [It] is thus an instrument that helps simultaneously to reduce unemployment, to fight higher costs and prices, to increase productivity and, in the process, to strengthen our international competitiveness.
>
> Equally important, it is an instrument that can be directed selectively to reduce regional disparities and to provide new hope for workers at the edges of the labour market in pockets of poverty and uncertainty. Indeed, the program has proved to be a major contribution in the federal government's program for achieving more balanced regional growth and a more equitable distribution of opportunity."11/

It is well known that national goals are likely to be interdependent and in this light, the apparently multifarious aims of Canadian training are at first confusing. That it has a predominant thrust, however, is apparent, for although "it is not oblivious to the problems of poverty and of the needs of marginal groups in

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10/ *Canadian Welfare*, vol. 46, no. 2, March-April 1970, p. 18.

11/ Quoted in S. Dupré, D. M. Cameron, G. H. McKechnie, and T. B. Rotenberg, *Federalism and Policy Development: The Case of Adult Occupational Training in Ontario* (Toronto: University of Toronto Press, 1973), p. 118.

the labour force and, recently, is moving heavily in this direction.... *Such objectives can be said to be secondary to the primary objective of facilitating economic growth."*[12/]

(b) Orientation in Fact

In the following pages a number of items of information are cited as evidence concerning the orientation of Canadian federally sponsored training in practice. For example, since skill bottlenecks may contribute both to inflation and to the retardation of growth, the orientation of CMTP to shortage occupations might be taken as evidence that training is directed to the goals of price stability and economic growth.

Tables 4-2 and 4-3 contain some information concerning the occupational goals of trainees authorized for full-time training under CMTP for the fiscal year ending March 31, 1970, while Table 4-4 shows percentage changes in employment of occupational groups in Canada over various time periods.

Table 4-2 shows numbers of trainees in some selected goal occupations. There appear to be no really heavy concentrations of trainees by occupation, but considering that approximately 220 separate occupations were stated as goals by trainees authorized in this period, the percentages in the Stenographer, "Clerical occupations not stated", Farmers and Stockraisers, Welders and Flame Cutters, and Automobile Repairmen classifications, respectively, are high. These five occupations, of the two hundred and twenty reported, represent the work aspirations of 35 per cent of trainees.

12/ Dymond, "The Canadian Experience", *op. cit.*, pp. 544-45 (emphasis added).

Table 4-2

DISTRIBUTION OF TRAINEES IN SOME OF THE MORE POPULOUS GOAL OCCUPATIONS

Occupation Division	Occupation	Number of Trainees			Division Total	Percentage of Division Total	Percentage of Total Trainees
		Male	Female	Total			
2. Professional and Technical	Mechanical Engineers	1,235	48	1,283	14,350	8.94	0.82
2. " " "	Electrical Engineers	953	9	962	"	6.70	0.62
2. " " "	Draughtsmen	1,466	96	1,562	"	10.88	1.00
2. " " "	Accountants and Auditors	1,071	142	1,213	"	8.45	0.78
3. Clerical	Bookkeepers and Cashiers	1,519	1,907	3,426	29,475	11.62	2.20
3. "	Stenographers	179	7,340	7,519	"	25.51	4.82
3. "	Clerical occupations not stated	5,336	10,891	16,227	"	55.05	10.41
4. Sales	Sales Clerks	776	1,167	1,943	4,400	44.16	1.25
5. Service and Recreation	Policemen and Detectives	1,514	24	1,538	18,035	8.53	0.99
5. " " "	Waiters	419	1,009	1,428	"	7.92	0.92
5. " " "	Nursing Assistants	613	3,123	3,736	"	20.72	2.40
5. " " "	Maids	1,533	1,319	2,852	"	15.81	1.83
5. " " "	Barbers and Hairdressers	1,101	2,828	3,929	"	21.78	2.52
6. Transport and Communications	Truck Drivers	1,307	1	1,308	4,029	32.46	0.84
6. " " "	Telephone Operators	3	173	176	"	4.37	0.11
7. Farmers and Farm Workers	Farmers and Stockraisers	12,001	46	12,047	13,738	87.69	7.73
8. Loggers and Related Workers	Lumbermen	1,042	3	1,045	1,688	61.91	0.67
9. Fishing, Trapping and Hunting	Fishermen	2,532	--	2,532	2,548	99.37	1.62
11. Craftsmen, Production Process and Related Workers	Butchers and Meatcutters	1,229	5	1,234	65,104	1.90	0.79
11. " " " "	Sewing Machine Operators	114	1,746	1,860	"	2.86	1.19
11. " " " "	Carpenters	5,466	7	5,473	"	8.41	3.51
11. " " " "	Machinists -- Machine-tool	4,176	24	4,200	"	6.45	2.69
11. " " " "	Plumbers and Pipe Fitters	2,892	4	2,896	"	4.45	1.86
11. " " " "	Welders and Flame Cutters	6,754	16	6,770	"	10.40	4.34
11. " " " "	Auto Repairmen	12,639	22	12,661	"	19.45	8.12
11. " " " "	Other Mechanics	2,384	38	2,422	"	3.72	1.55
11. " " " "	Electrical Fitters and Assemblers	3,356	39	3,395	"	5.21	2.18

Source: "Characteristics of Trainees in the Canada Manpower Training Program April 1, 1969 to March 31, 1970", Planning and Evaluation Branch, Program Development Service, Department of Manpower and Immigration, Ottawa, 1971.

Table 4-3

DISTRIBUTION OF TRAINEES AND GOAL OCCUPATIONS
BY OCCUPATION DIVISION

Occupation Division	Number of Occupations	Number of Trainees			Percentage of Total Trainees
		Male	Female	Total	
1. Managerial	7	1,773	266	2,039	1.31
2. Professional & Technical	44	11,066	3,284	14,350	9.20
3. Clerical	9	8,139	21,336	29,475	18.90
4. Sales	10	2,660	1,740	4,400	2.82
5. Service & Recreation	24	8,796	9,239	18,035	11.57
6. Transport & Communications	14	3,838	191	4,029	2.59
7. Farmers & Farm Workers	5	13,674	64	13,738	8.81
8. Loggers & Related Workers	2	1,685	3	1,688	1.08
9. Fishing, Trapping, Hunting	2	2,547	1	2,548	1.63
10. Mining, Quarrying & Related	1	340	--	340	0.22
11. Craftsmen, Production Process & Related Workers	100	61,510	3,594	65,104	41.76
12. Labourers	2	164	6	170	0.11
All Occupations	220	116,192	39,724	155,916	100.0

Source: Same as Table 2, above.

Table 4-3 consolidates related occupations in 12 occupation divisions and shows the distribution of trainees in these divisions. It may be compared with Table 4-4, which shows the yearly percentage changes in employment in these occupation divisions over the period 1965-1969, plus the average annual percentage change for the whole period.

Inspection of Tables 4-3 and 4-4 reveals that the four occupation divisions in which there has been consistent employment expansion over the period 1965-1969 -- that is, positive net increase in each of the five years -- represent the occupational goal of 41 per cent of the trainees authorized for training in 1969-70. Some glaring anomalies do, however, appear -- particularly the number of trainees with the occupational goal of Farmers and Farm Workers, which manifested a decrease in

employment in four of the five years. The wisdom of government subsidization of the 12 per cent of trainees who aspire to what seem to be declining occupations, is questionable.

Table 4-4

ANNUAL PERCENTAGE INCREASE IN EMPLOYMENT BY OCCUPATIONAL GROUP, CANADA, 1965-69

Occupational Group	1965	1966	1967	1968	1969	Average Annual Increase
Managerial	4.6	5.0	3.6	3.0	4.8	4.2
Professional and Technical	11.4	12.0	4.7	6.9	5.9	8.2
Clerical	4.0	9.6	3.1	6.0	4.7	5.5
Sales	-1.8	-0.4	4.4	3.0	2.7	1.6
Service and Recreation	2.7	2.5	7.5	3.9	3.2	4.0
Transport and Communication	0.7	-6.7	2.2	0.2	0.5	-0.6
Transport	0.0	-8.6	2.1	-0.9	2.3	-1.0
Communication	7.1	5.0	3.2	6.2	-8.7	2.6
Farmers and Farm Workers	-5.2	-7.8	2.2	-2.8	-2.6	-3.2
Loggers and Related Workers	-14.5	0.0	7.5	-5.3	-5.6	-3.6
Fishermen, Trappers and Hunters	-8.0	17.4	-3.7	-3.8	-16.0	-2.8
Miners, Quarrymen and Related Workers	55.1	-17.1	-7.9	0.0	-3.4	5.3
Craftsmen, Production Process and Related Workers	6.3	7.7	3.2	-0.7	3.7	4.0
Labourers and Unskilled Workers (not Agricultural, Fishing, Logging or Mining)	2.4	3.0	-8.7	-1.0	1.9	-0.5
All Occupations	3.8	4.2	3.2	2.1	3.2	3.3

Source: *Canada Manpower Review*, vol. 3, no. 3, Third Quarter 1970, p. 12.

More up-to-date evidence, for the year 1973, is contained in a Manpower Department report which indicates that recent developments in the orientation of training may also have implications for shortage occupations:

> "... the concentration upon providing instruction to the younger members of the labour force, combined with the short duration of courses has seen a strong focus on training for lower skill levels."13/

13/ Training Review Task Force, "Training in Relation to the Present Socio-economic Environment", Manpower and Immigration, February 1975 (mimeo.). Note however, that this paper is described on the cover as "not necessarily reflecting departmental policy".

However, the results of a pilot study on skill training in Ontario and Quebec indicated that there was a much heavier concentration of skills requiring less than six months' specific vocational training than is reflected in the distribution of either total current job vacancies or long term job vacancies in the provincial economies. Moreover, the report indicates that while training was increasingly concentrated in the lower-skill occupations, severe shortages were appearing among the higher-level blue-collar skills, in nursing and secretarial occupations in the tertiary sector, and in skilled occupations in the logging and mining industries.14/ .

It is interesting however, that the importance of skill shortages was recognized specifically in the context of the orientation of the Canada Manpower Training On the Job Program (CMTJP). The initial expenditures on OJT in the fall of 1971 were part of an expenditure package which was clearly designed to be countercyclical in nature, as the following passage colourfully illustrates:

> "The ink was barely dry on the headlines trumpeting last month's stunning unemployment figures when the government rushed its latest budget into the Commons at least five days ahead of schedule.
>
> As a shocker, it easily matched the news that unemployment in September reached 7.1 per cent of the labour, its highest in ten years."15/

14/ *Ibid.*, p. 29.

15/ From article by Bruce Little in *Financial Times of Canada*, October 19, 1971.

This "mini-budget" included $20 million for on-the-job training of young people who are ineligible for regular manpower training and $15 million for expansion of the existing manpower training program. But then in September 1972 the Minister of Manpower and Immigration, Bryce Mackasey, announced two further extensions of OJT. The CMTJP would now have three components: training for the unemployed (which was introduced the previous winter), training for the disadvantaged, and training for skill shortages.[16/]

Since the requisite data are not available earlier than April 1969, it is difficult, as yet, to determine whether CMTP is being used countercyclically. However, the increases in training expenditures in the "mini-budget" of fall 1971, described above, are an indication of such an orientation, and as the Economic Council of Canada pointed out, "certainly the very rapid build-up of training expenditures in the late fall of 1970 and winter of 1971 suggest that the program is being used as a contracyclical instrument".[17/]

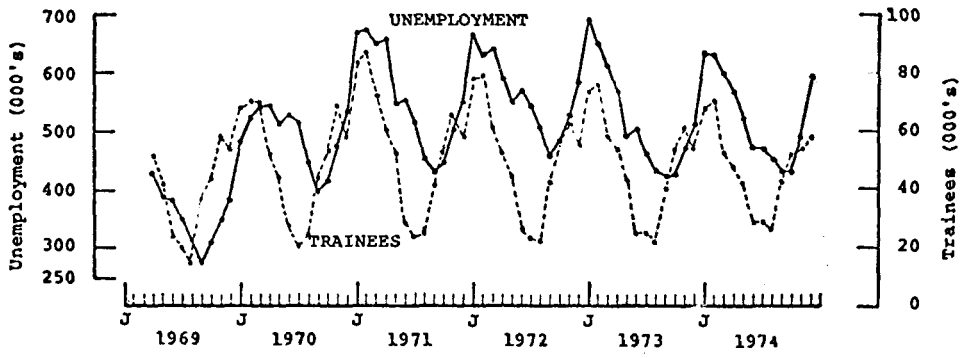
The available evidence does however indicate that CMTP is operated counterseasonally. Figure 1-1 shows how closely matched are the seasonal swings of the unemployment series and the trainee series:

16/ Reflecting the greater interest of the employer in training for shortages, the government was to reimburse 50 per cent of wages during the first half of training and 25 per cent during the second half. In training for the disadvantaged, by contrast, the public interest was perceived as paramount and the federal government agreed to pay 100 per cent of wages during the first four weeks of training, 90 per cent during the first half of the remaining period and 60 per cent during the final period.

17/ Economic Council of Canada, *op. cit.*, p. 98.

Figure 4-1

FULL-TIME TRAINEES AND UNEMPLOYMENT, CANADA, 1969-74



Source: Manpower and Immigration *Canada Manpower Review* (Ottawa: Information Canada), various issues; and Statistics Canada, *Historical Labour Force Statistics*, 1974, Cat. No. 71-201.

Training activity is greatest in those months when unemployment is greatest.[18/]

This section is concluded with an examination of some data referring to the redistribution or "equity" goal of training. As far as the regional dimension is concerned, the following table shows that training expenditures per labour force member are well above average for the poorer provinces --

18/ A regression of total trainees upon total unemployment in thousands, and three seasonal dummies, using monthly data for the period April 1969 through December 1974, using OLS produced the following results:

$$T = \underset{[4.731]}{50{,}521.450} + \underset{[1.994]}{33.465U} - \underset{[-7.226]}{26364.232D_1} - \underset{[-8.051]}{35944.935D_2} - \underset{[-2.321]}{9509.818D_3} \qquad \bar{R}^2 = 0.74 \qquad D.W. = 2.061$$

t-statistics are in brackets: the U and D_3 variables show significance at the 0.025 level, and all others at the 0.005 level. The dummies are defined as $D_1 = 1$ for April, May, June, zero for all other months, $D_2 = 1$ for July, August, September, etc.

Quebec and the Atlantic provinces -- and lower for the richer -- Ontario, the Prairies, and British Columbia.

Table 4-5

CMTP EXPENDITURES, FISCAL YEARS 1971 TO 1974

Region and Province	Expenditures 1970-71[1] Per Labour Force Member	Per Unemployed Person	Expenditures 1971-72 Per Labour Force Member	Per Unemployed Person	Expenditures 1972-73 Per Labour Force Member	Per Unemployed Person	Expenditures 1973-74 Per Labour Force Member	Per Unemployed Person
				(Dollars)				
Atlantic Region	69.07	928	68.89	780	68.13	741	74.19	823
Newfoundland	87.55	864	75.76	630	76.39	618	97.63	736
Prince Edward Island	88.78	1,643	102.03	1,020[4]	107.29	1,431[4]	99.60	1,394[4]
Nova Scotia	63.18	1,095	62.16	817	62.60	842	67.78	976
New Brunswick	60.00	752	65.95	846	61.63	665	59.94	694
Quebec	41.08	522	47.63	589	45.56	549	45.73	624
Ontario	26.11	610	30.66	606	32.63	709	29.41	724
Prairie Region	28.97[2]	677[2]	29.92	680	30.14	673	35.90	1,032
Manitoba	29.88	666	25.42	526	28.97	642	42.14	1,158
Saskatchewan	30.46	711[2]	28.06	698	27.44	607	30.59	996
Alberta	27.63[2]	665[2]	33.53	774	32.18	703	34.98	976
British Columbia	28.97[3]	319[3]	24.88	360	28.01	369	29.49	489
Canada	33.33	577	37.59	596	38.06	607	38.53	704

(1) Estimated by Department of Manpower and Immigration.

(2) Includes the Northwest Territories.

(3) Includes the Yukon.

(4) Number of unemployed estimated residually.

Source: Programs Branch, Department of Manpower and Immigration and Statistics Canada, *Historical Labour Force Statistics*, Cat. No. 71-201, 1974.

However, expenditures per unemployed person are actually higher than average for Ontario and (particularly) the Prairies, and lower than average in Quebec.

A second body of data refers to the characteristics of trainees in the institutional and industry training sections of CMTP, and is summarized in Table 4-6. It is apparent from the figures that there are no glaring differences between institutional and industry training as far as male-female proportions are concerned, though in institutional training the proportion of males has declined steadily since 1970-71. Furthermore, for those OJT clients taking training for the disadvantaged, the proportion of males is greater than for any other type of training.

The striking feature of the age statistics is that OJT programs have much larger proportions of trainees in the under 20 age bracket than do either the vestibule training-in-industry or institutional training programs. For all programs, however, the majority of trainees are in the age group 20-44. However, although OJT trainees tend to be relatively younger they tend also to be better educated: 40 per cent of them had 12-13 years of schooling in 1972-73, for example. Institutional courses, by contrast, include an emphasis on educational upgrading in addition to skill training and therefore attract larger proportions of the poorly educated.

In addition to these figures, a recent report indicates that more than half of the trainees in both the institutional and industry sections of CMTP are unemployed at the time of their referral to training.[19] Moreover, it is apparent that there is at least a growing recognition of the plight of what the department refers to as special needs clients, defined as those from low income families, social aid recipients, illiterate and poorly-educated persons, ex-prisoners, the mentally retarded, Indians, Eskimos, Metis, and immigrants.[20] Twenty per cent of CMPT expenditures are now directed to the disadvantaged.[21]

19/ Manpower Programs Information for presentation to Standing Senate Committee on National Finance: "Manpower Training", Department of Manpower and Immigration, February 1975, p. 13.

20/ *Ibid.*, and "Training in Relation to the Present Socio-economic Environment", *op. cit.*

21/ Manpower Programs Information..., *op. cit.*, Appendix I, Table 9.

Table 4-6

CHARACTERISTICS OF TRAINEES IN CMTP, CANADA, FISCAL YEARS 1970-71 TO 1973-74

Type of Training	Sex							
	1970-71		1971-72		1972-73		1973-74	
	Male	Female	Male	Female	Male	Female	Male	Female
1. Institutional	78.3	21.7	74.4	25.6	70.3	29.7	64.1	35.9
2. Industry								
(a) Vestibule training-in-industry	72.0	28.0	72.2	27.8	69.7	30.3	71.8	28.2
(b) CMTJP*								
-- skill shortages	--	--	--	--	--	--	67.9	32.1
-- disadvantaged	--	--	--	--	--	--	83.0	17.0
-- job creation	--	--	--	--	72.7	27.3	73.0	27.0

	Age															
	1970-71				1971-72				1972-73				1973-74			
	< 20	20-24	25-44	45 +	< 20	20-24	25-44	45 +	< 20	20-24	25-44	45 +	< 20	20-24	25-44	45 +
1. Institutional	6.0	33.6	48.4	12.0	9.0	33.8	46.2	11.0	11.1	33.1	44.1	11.7	12.3	34.4	42.6	10.7
2. Industry																
(a) Vestibule training-in-industry	7.1	26.7	50.6	15.6	7.1	26.7	50.6	15.6	16.0	27.3	41.7	15.0	21.1	27.3	39.0	12.6
(b) CMTJP*																
-- skill shortages	--	--	--	--	--	--	--	--	--	--	--	--	34.6	33.9	26.1	5.4
-- disadvantaged	--	--	--	--	--	--	--	--	--	--	--	--	21.6	28.3	18.3	11.8
-- job creation	--	--	--	--	23.8	39.8	30.2	6.2	32.3	35.4	26.9	5.4	32.2	35.5	27.0	5.3

	Education																			
	1970-71					1971-72				1972-73					1973-74					
	1-7	8	9-11	12-13	14 +	1-7	8-11	12-13	14 +	1-7	8	9-11	12-13	14 +	1-7	8	9-11	12-13	14 +
1. Institutional	23.1	16.7	47.3	11.1	1.8	22.7	58.1	15.5	4.3	19.4	15.1	47.5	16.5	2.5	17.0	13.0	45.7	18.8	5.5
2. Industry																			
(a) Vestibule training-in-industry	11.7	12.0	43.0	23.5	9.7	5.8	50.7	28.8	14.7	14.7	15.0	46.6	23.7	0.0	n.a.	n.a.	--	--	--
(b) CMTJP*																			
-- skill shortages	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-- disadvantaged	--	--	--	--	--	--	--	--	--	--	--	--	--	--	n.a.	n.a.	n.a.	n.a.	n.a.
-- job creation	--	--	--	--	--	11.2	56.7	24.3	7.8	6.7	6.4	46.7	40.2	0.0	--	--	--	--	--

*The combination of these three components into CMTJP is described on pages 90-91, above. The "job creation" component grew out of the specifically cyclical OJT expenditures began in winter 1971-72 under which employers were subsidized to hire and train previously unemployed workers.

Source: Manpower Programs Information for presentation to Standing Senate Committee on National Finance: "Manpower Training", Department of Manpower and Immigration, February 1975.

The evidence presented in this section is inconclusive as to the orientation of training programs in practice. As far as equity is concerned the pattern of training expenditures per labour force member appears consistent with the goal of regional redistribution, though the picture is by no means so encouraging on the basis of expenditures per unemployed person.

The institutional courses take on a large proportion of the poorly educated. The growing numbers of women in the labour force and among the ranks of the unemployed are clearly mirrored in the proportion of female trainees in institutional courses, but only 17 per cent of disadvantaged trainees in CMTJP are women though women constitute 31 per cent of total unemployment in Canada. There is little solid evidence that training is directed towards alleviation of skill shortages that would promote economic growth and help to alleviate inflation. Indeed, manpower officials have concluded that:

> "it would appear that the emphasis upon training as an alternative to unemployment has placed some limitation upon the programs to respond to the more pressing occupational requirements of the economy. Given that training courses have an average duration of four months, the emphasis on training younger age groups and/or those with below average educational levels may well necessitate that training is of a general academic nature or else oriented towards lower skill occupations."22/

It is the countercyclical -- and more particularly the counterseasonal -- aspect of the stabilization goal which is most clearly illustrated by the data presented above.

22/ "Training in Relation to the Present Socio-economic Environment", *op. cit.*, p. 31. For further examples of conflicting goals see K. Newton, "Conflicts and Complementarities in the Objectives of Manpower Policy: An Illustration", *Industrial Relations Journal*, vol. 4, no. 2, Summer 1973, pp. 20-36.

3. Performance of the CMTP in Relation to Objectives

Evaluations of CMTP by Manpower and Immigration are framed in terms of two objectives: growth and redistribution. With regard to the latter goal the procedure is basically one of estimating the numbers of trainees who are brought above an arbitrarily-defined "poverty line"[23/] which depends upon trainee characteristics such as number of dependants. By far the largest amount of publicity, however, is devoted to the evaluations derived from the department's benefit-cost model,[24/] and this model is based squarely upon the primacy of the growth objective, inasmuch as benefits are estimated by comparison of trainees' pre- and post-training earnings.

The cost side of the model includes outlays on the processing and administrative procedures necessitated by the program, outlays on training courses and trainee travel grants, the extra personal expenses of trainees over and above the living allowance, and a measure of before-tax forgone earnings of trainees during the training period. Training allowances are a transfer payment and not included in the calculation of social cost. They *are* included in separate estimates of effectiveness from the *department's* viewpoint. Estimation of the opportunity

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23/ However, the latter part of this section presents some alternative estimates of the redistributive impact of the program.

24/ To date, such results are publicized only for the institutional portion of CMTP, though some partial indications of the success of the Industrial Training Program in furthering the goal of growth are given in the form of figures on earnings improvement later in this section.

cost of training involves problems: if the trainee would have been unemployed during the training period, had he not entered training, or if he would have been replaced by another unemployed worker, then there would be no cost to society as a result of his undergoing training -- no production is foregone. But if, in the absence of training, he would have been working on a job for which no replacement could be found, then society bears an opportunity cost in training him. Estimates of the probability of unemployment, and replacement, are therefore required to calculate output foregone.

The contentious issue of the appropriate rate of discount was handled in the DMI model by computing results separately for rates of 5, 10, and 15 per cent and comparing them for sensitivity to these arbitrary selections, though the most recent calculations are based solely upon the 10 per cent rate.[25/]

These estimates for institutional training under CMTP have been strongly positive; in recent years the benefit-cost ratio has ranged between 3.6:1 and 7.8:1 as shown in the following table.

25/ Manpower Programs Information, *op. cit.*, p. 14.

Table 4-7

BENEFIT-COST EVALUATION OF CMTP, CANADA, 1970-73[1]

Benefits and Costs by Training Type	1970	1971	1972	1973
BTSD[2]				
Total benefits ($)	3,167	5,115	5,611	9,126
Total economic costs ($)	891	1,086	1,321	1,474
Benefit-cost ratio	3.6	4.7	4.2	6.2
Skill				
Total benefits ($)	5,734	6,541	6,794	9,131
Total economic costs ($)	1,176	1,315	1,400	1,638
Benefit-cost ratio	4.9	5.0	4.9	5.6
Language				
Total benefits ($)	6,817	8,312	9,900	11,431
Total economic costs ($)	1,071	1,125	1,312	1,466
Benefit-cost ratio	6.4	7.4	7.5	7.8

(1) This analysis includes full-time institutional trainees who completed the course (approximately 80 per cent of the total institutional trainee population). Dollar figures are averages per graduate.

(2) Basic Training for Skill Development -- essentially basic academic upgrading to help workers remain employable under conditions of technical change and/or to benefit from further skill training.

Source: Manpower Programs Information, *op. cit.*, Appendix 1, Table 4.

These results must however, be viewed with some caution because of methodological and measurement problems inherent in the model. First, neither vacuum nor displacement effects[26] are

[26] The vacuum effect occurs when training loosens up a skill-bottleneck to open up complementary jobs for auxiliary workers, while the displacement effect occurs if the trained worker improves his own situation at the expense of non-trainees, who are displaced from their jobs and enter the poor of the unemployed. See D. O. Sewell, "A Critique of Cost-Benefit Analyses of Training", *Monthly Labor Review*, September 1967, p. 51.

explicitly taken into account. It seems likely that in periods of fairly high unemployment there may be relatively few bottle-neck occupations, so that many trainees would, in fact, displace workers who lack the training-course "seal of approval". Further, to the extent that the courses generally covered by CMTP concern sub-professional occupations, the scope for enjoyment of the benign "vacuum" effect would appear rather limited. Therefore the possibility exists that if displacement effects were taken into account, the benefit-cost results would be somewhat less sanguine.

The use of pre- and post-training earnings in the benefit calculation raises the well-known "attribution problem" of whether increased earnings are due only to the training or to improvement in the general economic climate, irrespective of training. It is frequently suggested that use of a control group would get around this difficulty.[27] However, the problem of selecting a control group has not been resolved.[28] On theoretical grounds random division of individuals qualified to enter the programme into two groups -- one to be participants and one to be the control group -- is the procedure with the highest probability of yielding uncontaminated estimates of the expected behaviour of trainees had they not entered training.[29] Such a procedure would raise grave practical difficulties for program

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[27] Economic Council of Canada, *Eighth Annual Review, op. cit.*, p. 114, and M. E. Borus and C. G. Buntz, "Problems and Issues in the Evaluation of Manpower Programs", *Industrial and Labor Relations Review*, vol. 25, no. 2, January 1972, pp. 234-35.

[28] Borus and Buntz, *op. cit.*, pp. 237-38.

[29] *Ibid.*

administrators: how does one justify the arbitrary exclusion from the program of one-half of a group of training candidates who are all qualified to enter the program? Finally, control group methodology does not, in any case, eliminate the impact of such factors as the level of economic activity upon earnings.[30] These comments serve to illustrate the caveats which must be borne in mind when interpreting the results of CMTP as judged by the benefit-cost model.

Similar data are not yet available for the industrial training portion of CMTP, but some partial indications of its performance may be gauged from the following figures. While the majority of trainees were unemployed before training, 79 per cent retained their jobs in the training firms upon completion of their courses, 14 per cent were unemployed, and 7 per cent withdrew from the labour market. Moreover, the following table indicates impressive wage gains for industrial trainees.[31]

30/ Suppose, to use an extreme example, we had a group of homogeneous candidates for training, half of whom become the control group. Although completely alike in every other respect, the groups may differ in two ways: one gets training; one will have a different *occupation* after training. The *occupation* characteristic may account for a differential impact of economic conditions upon earnings of the two groups. A differential may also occur due to the fact that the *occupation* of the trainees is one in which productivity increases faster than in that of the non-trainees. See Scott, L. C., "The Market, Productivity, and Training Effects of Retraining", *American Economist*, vol. XIV, no. 2, Fall 1970.

31/ Unfortunately, summary data on the OJT component of industrial training under CMTP are not yet available.

Table 4-8

AVERAGE WEEKLY WAGES OF MALES AND FEMALES BEFORE AND AFTER TRAINING*

(Industrial training 1973)

Sex	Average Weekly Wages		
	Before Training	After Training	Percentage Change
	(Dollars)		
Males	114	152	+33
Females	71	102	+44
Total	103	139	+35

*In 1973 about 90 per cent of the trainees had started training by the end of March and almost 80 per cent had completed training by the end of August. The follow-up survey was conducted in June 1974. Over roughly the same period of time average weekly wages in Canada (Industrial Composite) has increased by 16 per cent, that is from $153 a week in December 1972 to $176 in June 1974.

Source: Manpower Programs Information, *op. cit.*, Appendix 1, Table 8.

As far as the redistribution goal is concerned the available evidence is scanty indeed, but one recent paper suggests that for institutional trainees completing courses in 1973, three-quarters of clients in academic upgrading courses known as Basic Training for Skill Development, and two-fifths of those in skill courses had pre-training incomes below an updated poverty level based on Economic Council of Canada definitions. Post-training follow-up questionnaires indicated that of these clients, 40 per cent were raised above the poverty level after training.

This type of evidence concerning the program's poverty-alleviating role is suspect for at least two reasons. First is the fact, alluded to earlier, that -- at the time they are referred to training -- many CMC clients are in a *temporarily* disadvantaged position when viewed in the context of their potential *life-time* earnings streams. Thus, an income calculation based on a job held in their *recent* employment history may overstate the paucity of their "permanent income", by focusing what is essentially a "transitory" phenomenon. Second, the evidence is in any case *ex ante* in nature and does not indicate whether or not CMTP lifted these people *out* of poverty. Thirdly, the calculations do not take into account income other than from employment, nor the fact that, in some cases, the individual himself may be a dependant.

Another dimension of the distributional impact of the program concerns how much the taxpayers in each province contributed to its funding through taxes paid to the federal government, and how much each province recouped through federal training expenditures. The calculation procedure may be illustrated with the aid of a simple model:

Let

r_i = percentage of total federal taxes raised in each province

e_i = percentage of total federal training expenditures spent in each province

T = total expenditures on CMTP,

where the i's are provinces: $i = 1, 2 \ldots 10$.

Now, r_i represents that percentage of the federal revenues raised, and used for CMTP, which is *attributable to* each province, while e_i represents the percentage of CMTP expenditures being *returned to* each province.

The net gain from training may then be written

$$G_i = (e_i - r_i)\ T \qquad (1)$$

which may be either positive (in which case the province is a net gainer) or negative (in which case the province is a net loser).

Te_i is obviously the total amount *expended in* each province, and Tr_i the total amount of training funds *raised in* each province. Call these E_i and R_i, respectively, and equation (1) may be written

$$G_i = (E_i - R_i) \qquad (2)$$

$$\text{where} \quad \sum_{i=1}^{10} E_i = \sum_{i=1}^{10} R_i = T$$

$$\text{and} \quad \sum_{i=1}^{10} G_i = 0.$$

Using the notation developed above, the following table shows the net transfers of training funds between the provinces.[32/]

32/ It is assumed that each province contributes to each federal expenditure in the same proportion as it contributes to federal revenues.

Table 4-9

NET FISCAL TRANSFERS BETWEEN PROVINCES UNDER CMTP, 1969-70

i	e_i (%)	r_i (%)	T($ million)	G_i ($ million)
Newfoundland	4.45	1.26		+ 7.8
Prince Edward Island	1.27	0.28		+ 2.4
Nova Scotia	6.51	2.59		+ 9.6
New Brunswick	3.11	1.91		+ 2.9
Quebec	37.03	23.56	244,749,330 (1)	+33.0
Ontario	27.50	43.26		-38.6
Manitoba	3.77	4.45		- 1.6
Saskatchewan	3.12	3.93		- 2.0
Alberta	6.98	7.19		- 0.5
British Columbia	6.25	11.57		-13.0

(1) Yukon and Northwest Territories were excluded.

Source: The e_i are calculated from Department of Manpower and Immigration, *Annual Report 1969-70*, p. 16, Appendix 3, which is also the source for T. The r_i are from estimates by the Economic Council of Canada.

Apparently, CMTP *does* serve the purpose of transferring revenues in favour of the "poorer" provinces: Quebec and the Maritimes.

A similar exercise may be undertaken to determine the redistributive effects by income class. This time the subscripts refer to income class rather than province, so that

e_i = percentage of federal training funds *expended upon* income - class i;

r_i = percentage of federal training funds *raised from* income - class i;

and $g_i = (e_i - r_i)$ (3)

is a measure of the net gain (positive or negative).

The term $(e_i - r_i)$, of course, shows the net gain or loss of a particular income class as a percentage of total federal training funds. One way of making these figures more comparable is to express them as a *proportion* of the contribution of each income class to training revenue. In other words, we compute the figures

$$g_{i/r_i} = \frac{e_i - r_i}{r_i} \quad (4)$$

to produce Table 4-10.

Table 4-10

NET FISCAL TRANSFERS, BY INCOME CLASS, UNDER CMTP, 1969(1)

i ($000's)	e_i (%)	r_i (%)	g_i (%)	g_{i/r_i} (%)
Less than 1	10.8	0.7	+10.1	14.4
1-2	17.0	1.5	+15.5	10.3
2-3	20.6	2.6	+18.0	6.9
3-4	18.0	3.8	+14.2	3.7
4-5	12.0	5.1	+ 6.9	1.4
5-6	8.7	7.7	+ 1.0	0.1
6-7	5.3	8.8	- 3.5	-0.4
7-8	3.3	8.5	- 5.2	-0.6
8-10	2.4	16.5	-14.1	-0.9
More than 10	1.9	44.8	-42.9	-1.0

(1) It was assumed, for purposes of this analysis, that training expenditures per trainee were constant. This is because the e_i are simply the percentage of all trainees in each income class. If average cost of training were to differ as between income classes, the e_i could not be said to represent the percentage of *training expenditures* going to each income class.

Source: The e_i were estimated from Department of Manpower and Immigration data from their follow-up survey of graduates of training courses in 1969. The r_i are from estimates by the Economic Council of Canada, based on a background study by D. M. Paproski and J. Cousin, *The Incidence of Selected Taxes, by Province and Income Groups* (mimeo., 1971).

The figures indicate the progressivity of the program's inherent redistributive characteristics.

4. Some Additional Features of CMTP

A few comments seem appropriate at this juncture to impart some further qualitative dimensions of Canadian government training. First, a large proportion of the training is preparatory upgrading not directly related to a particular occupational skill. In 1973-74, for example, 20.6 per cent of all trainees, or 23.8 per cent of the institutional trainees were either immigrants receiving language training, or were enrolled in what is known as Basic Training for Skill Development (BTSD). This proportion has fallen in recent years, however. In 1970-71 it was close to two-thirds.

BTSD training is a way of meeting the need of many workers for an improved knowledge of language and other fundamental communicative skills, as well as a better grasp of elementary arithmetic and science if they are either to remain employable under conditions of increasing technological change or to benefit from subsequent skill training that will further improve their employability and earnings in the face of such change.[33/]

Such at least was the philosophy of BTSD in the context of the strong growth-orientation of the Canadian training

33/ Planning and Evaluation Branch, Program Development Service, DMI, "A Comparison of Selected Characteristics of Persons Authorized to Take Full-Time Training Under the General Purchase Agreements in 1968-69 and 1969-70", Ottawa, February 1971.

program in its early years. It seems, however, that the original orientation of BTSD has shifted since its inception and that this type of training may now be inappropriate for the role that has been thrust upon it. Rising cyclical unemployment has proved more of a problem than technological displacement. And it is precisely in periods of high unemployment, when skill vacancies are scarce and when training for particular occupational skills is therefore hazardous, that there exists the possibility that basic training may be used, as it were, simply as an absorbent. Moreover, in slack labour markets the ill-educated worker is forced to the back of the employment queue. Thus the very nature of BTSD, which in a sense fills in the gaps of the formal education system, has apparently given it a rather strong orientation towards the disadvantaged.

Now, equity appears, indeed, to be one of the goals of Canadian manpower policy, but it is questionable whether BTSD, originally designed to upgrade workers facing technological obsolescence, is the most appropriate vehicle with which to reach it. Educational upgrading certainly has a role to play in broadening the employment horizons of disadvantaged workers. But it cannot, alone, be expected to assume the task of fulfilling manpower policy's obligations to the equity goal.

One fundamental dilemma, of course, is that while BTSD courses are oriented to the poorly educated, they are exclusively institutional in nature. Many adults simply do not have the staying-power to sit in classrooms for extended periods and "the problem of sustaining trainee interest is likely to be

particularly acute in cases where the individual has had very little formal education".[34] What is required for such persons, according to the Economic Council, is "a *combination* of specialized and diversified programs adapted to their particular needs. These might involve special counselling; new motivational techniques; training through work experience; improved community participation; as well as educational upgrading."[35]

The second major feature of federal government-sponsored training in Canada is that, unlike the system of several other countries, it is conducted predominantly in institutions rather than in industry; 82.9 per cent of training expenditures in fiscal year 1973-74 went to institutional training, whereas in the United States, about 73 per cent of federal training expenditures go to programs involving training and "work experience" in industry.[36]

As noted earlier in this chapter, federally-sponsored in-industry training in Canada has suffered a relative decline in recent years. One of the major problems is probably the pervasively high cyclical unemployment which has been apparent during the period studied. Subsidies notwithstanding, it is difficult to persuade employers to hire, or

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34/ "The Effectiveness of Training Under the Canada Manpower Training Program", a report of the Review and Assessment Sub-Committee of DMI to the Federal-Provincial Committee of Deputy Ministers on CMTP, pp. 11 and 12.

35/ *Eighth Annual Review, op. cit.*, p. 109.

36/ See figures in Table 4-11, below.

even retain, workers during periods of slack. Further, it is conceivable that this training-in-industry may face the problem of having to cast off the old image, in many employers' minds, of a "welfare program". That is, employers, of their own volition, tend to hire the young rather than the old, the well-educated rather than the poorly-educated, and the physically strong rather than the handicapped. DMI has increasingly viewed industry training as a way of encouraging employers to hire and train disadvantaged clients.

The relative advantages and disadvantages of the work-place and the institution as the setting for occupational training constitute the subject matter of the next chapter. Our present purpose is simply to emphasize the comparative minuteness of training in industry in Canada.[37/] Further, however, it is apparent that there are cases of roughly similar occupational skills being imparted by both institutional and in-industry training. This suggests one of two things: either training-in-industry and institutional training are equally effective and perfectly substitutable alternative means of skill-acquisition, which is at least questionable; or some skills are presently being imparted by an inappropriate method. What is needed is careful study of the relative efficacy of each method of training for different occupations and/or workers. Suggestions for such a study are contained in Chapters 5 and 6.

37/ It is interesting that several of the provinces mount their own training in industry programs (including an OJT component) independently of the federal government, the Ontario effort being particularly large.

Table 4-11

A COMPARISON OF THE PROPORTIONS OF INDUSTRY-BASED AND INSTITUTIONAL TRAINING PROGRAMS FUNDED BY THE FEDERAL GOVERNMENTS OF CANADA(1) AND THE UNITED STATES(2)

	United States(3)		Canada(4)	
	Institutional Training	Industry Training	Institutional Training	Industry Training
Trainees	48.3	51.7	86.6	13.4
Expenditures	27.0	73.0	82.9	17.1

(1) 1973-74.

(2) 1972-73.

(3) In the United States most institutional training is conducted under the Manpower Development and Training Act, which also has a large OJT component. In addition to MDTA, however, the United States has a large number of training programs which involve work experience in industry, such as: Job Opportunities in the Business Sector (JOBS), Operation Mainstream, Work Incentive Program, etc.

(4) In Canada, under CMTP, the Canada Manpower Industry Training Program (CMITP) consists of Training in Industry (which is what was earlier referred to as "vestibule training") and the Canada Manpower Training on the Job Program (CMTJP). The latter is further divided into on-the-job programs for the disadvantaged, for skill shortages, and for job creation.

Source: American figures come from the U.S. Department of Labor, *Manpower Report of the President 1974*, Table F-1; Canadian figures are from Manpower Programs Information for presentation to Standing Senate Committee on National Finance "Manpower Training", Department of Manpower and Immigration, February 1975, Appendix 1, Charts 3 and 4.

5. Conclusions

With regard to stabilization, some of the data we have presented suggest that the program operates in a counterseasonal and (less certainly, given limited experience to date) in a countercyclical manner. But a nagging question remains: does CMTP, in this context, serve simply to rotate the faces in the

employment queue? Is it simply temporarily absorbing unemployed workers whose training may still fail to equip them for a job? Is its "stabilizing" effect no more than the artificial reduction of the unemployment stock during seasonally and cyclically slack periods? For this is what is suggested by the inordinately large emphasis on Basic Training for Skill Development: trainees acquire communicative skills but may still not have a "vocation". Moreover, in the skill courses per se many trainees are admitted to learn skills which are generally in declining demand.

Moreover, despite the evidence pointing to a strong and increasing orientation towards the disadvantaged, the model used to evaluate CMTP does not incorporate any method of weighting to take account of the redistribution objective. Further, although one of the stated purposes of the benefit-cost model is to permit a continual monitoring of the performance of the training system, the "learning feedback" function has not been particularly distinguished -- as the problems attendant to the BTSD and Industry Training components of the program attest.

The question of the most appropriate environment for occupational training -- the institution or the work place -- is the one to which we turn in the next chapter. It remains at this point to reaffirm an earlier allusion -- namely, that the ambiguous nature of CMTP's goals makes systematic evaluation of its performance very difficult. Since the goals to which the program is apparently oriented are not always completely complementary it is likely that in pursuing an array of objectives, it attains none of them fully. When the array of

alternative means to each of the ends is considered, the efficacy of the program is clearly questionable. The panacea-like aura which surrounded manpower training programs in the early '60's seems inappropriate applied to the economic realities of the last few years -- when the structuralist fears of a decade ago appear a luxury in the light of the labour market's current cyclical woes.

Political acceptability of the program (compared to "subsidizing people in idleness and sloth") helps account for its expansion to date, but clarification of objectives and greater flexibility in adapting to changing circumstances seem necessary to enhance its effectiveness.

CHAPTER 5

INSTITUTIONAL TRAINING OR OJT? -- THEORY AND EVIDENCE

1. Introduction

As a prelude to the presentation of some new evidence on the relative efficiency of on-the-job and institutional training programs in Canada, the purpose of the present chapter is to review the literature for *a priori* arguments, and empirical evidence, on the relative merits of the two methods of training.

There are, of course, a number of hybrid training systems which employ combinations of instruction and experience on the job with institutional training in varying measures. The apprenticeship system in many countries does, in fact, combine the two types of training. The present study does not address the apprenticeship system *per se*. Rather, OJT and institutional training are viewed as two broadly-defined alternative ways of imparting skills over a somewhat wider range of occupations than is generally served by the apprenticeship system -- recognizing, of course, that in some cases a combination of the two may prove superior to the exclusive use of one or the other training method above.

It will be seen that there is a relative dearth of comprehensive studies of the topic and that the scattered nature of the theoretical arguments and empirical evidence reflects the specific interests and problems of investigators in a particular place and time period, in addition to the

complexity of the problem as a whole. It is particularly apparent that the conclusions one attempts to draw depend critically upon such considerations as the standpoint from which the evaluation is conducted -- that of the individual worker, his employer, a sponsoring government agency, or society; the objectives of the training activity; its scale, location, clientèle, legislative provisions, and so forth.

It is nevertheless considered useful to survey the existing literature for background information germane to the present debate. Subsequent sections present a number of *a priori* propositions and theoretical arguments, followed by a description of some empirical studies.

2. *A Priori* Propositions and Theoretical Arguments

Many industrialized countries have accumulated a vast experience with alternative types of training for work. Very little of this experience has been systematically analysed for the purpose of assessing the relative efficiency of alternative systems. A later section will describe the few formal analyses which have been undertaken to date. The aim of this section is to raise a number of considerations which serve to illustrate the problem of choice between institutional and OJT programs.

It should be mentioned first that variants of OJT have a firm tradition of many centuries to recommend them, and we speculate that there exists today an extremely large body of human capital which owes its formation to some form of training

in the work place. Though few studies of the magnitude of the on-the-job training activities in the economy have been undertaken, a U.S. Labor Department survey suggests it is large. For this study blue-collar workers were asked to identify all the ways in which they had learned to do their current job, and then to select the way that had proved most helpful. In answer to both questions, workers in all occupations save tool-and-die makers specified some form of OJT more frequently than schools, the armed forces, or company classroom training. Only 40 per cent of the respondents declared that they were using skills that they had acquired in formal training programs or in specialized education. In addition, most of these reported that some of the skills that they were currently using had been acquired in informal on-the-job training. The remaining 60 per cent reported that they had acquired *all* of their job skills through informal OJT. Even among college graduates, over two-thirds reported having acquired cognitive job skills through informal processes on the job.[1/]

It may be argued, of course, that *some* degree of OJT is essential for almost all jobs. Familiarity with the actual work environment, physical plant, materials, co-operating personnel, the institutional rules of the work place, and the discipline and regimen of the job itself are required for satisfactory performance. Indeed, many managers rationalize

1/ U.S. Department of Labor, *Formal Occupational Training of Adult Workers*, Manpower/Automation Research Monograph, No. 2, December 1964, pp. 3, 18, 20, 43-45.

their dependence upon OJT as opposed to institutional training on these grounds. The ability to anticipate and diagnose trouble on a piece of operating equipment, for example, requires close association with that equipment over a prolonged period of time. Similarly, the physical co-ordination involved in rapid, efficient assembly requires practise with the components themselves. Such conditions are difficult to simulate in the formal classroom setting. In the work place, moreover, the relevance of the instruction to the job is more immediately apparent, which makes for a more attentive student.[2/]

Results of a recent company survey in the United States indicate that most of the firms under study felt that vocational education for particular jobs provides inadequate preparation for related company positions, and that the time required for on-the-job training is not significantly less for workers who have gone through a vocational school course than for workers promoted without preparation for the job.[3/]

Such arguments in favour of OJT are, however, by no means universally applicable. There are many occupations for which OJT cannot substitute wholly for some degree of institutional training -- in the higher professional classifications, for example, where many years of classroom instruction are

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2/ Piore, M. J., "On-the-Job Training and Adjustment to Technological Change", *Journal of Human Resources*, Fall 1968.

3/ Perlman, R., "OJT in Milwaukee -- Nature, Extent, and Relationship to Vocational Education", Center for Studies in Vocational and Technical Education, University of Wisconsin, Industrial Relations Research Institute, June 1969.

unavoidable. Moreover, the relative appropriateness of the two methods depends upon a host of factors, including the aim of the training,[4/] and the characteristics of the personnel to be served, as well as upon the particular occupation in question. However, while it seems reasonable to suggest that many occupations require a fairly heavy concentration on theoretical concepts which may best be communicated in the classroom, this does not of course exclude the classroom-in-the-factory phenomenon. Indeed, it may be argued that experienced instructors in industry may be in a better position than their institutional counterparts to judge how *much* theory is required for a particular job, and what aspects of that theory are relevant and to be emphasized.

Proponents of institutional training have on occasion pointed to the economic advantages of utilizing the capacity of existing buildings more fully. But rental of space may not prove to be so significant a factor when compared to the advantages which OJT may enjoy with respect to the availability of skilled instructors and access to relevant machiney and equipment. In general, it probably "doesn't pay for schools to

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4/ Suppose, for example, that the two methods are, in all other respects, equally suitable means of importing a particular skill. If, then, the aim is to furnish "general" training the specificity of a particular firm's work place may be excluded in favour of a classroom setting.

invest in locomotives, earth-moving machinery, big computers, etc., especially since instructional equipment is used only a few hours per day."[5/]

Furthermore, OJT enjoys advantages for occupations in industries which experience a high rate of technological advance. In such instances the institution may find it inordinately expensive to prevent both teachers and equipment from becoming obsolescent.

One argument frequently levelled against OJT is that it tends to be "specific" in nature. That is, it tends to impart skills which are relevant to the peculiarities of the particular organization and production process of the firm in which it is undertaken, so that the trainee cannot readily apply his acquired skills in another firm. There is, indeed, evidence to support this contention in the case of OJT programs in Ontario[6/] and a similar criticism has been made of the system operating in the United Kingdom under the Industrial Training Act.[7/] However, the very specifity of his training may make the on-the-job trainee's employment prospects with his company better than those of his institutionally-trained competitor.

5/ Rivlin, Alice, "Critical Issues in the Development of Vocational Education", chapter 11 of Bowen, G., and Harbison, F. H., *Unemployment in a Prosperous Economy*, Report of the Princeton Manpower Symposium, May 13-14, 1965, p. 161.

6/ See Strang, A., and Whittingham, F., "An Analysis of the Characteristics of Trainees from Selected Government-Sponsored On-the-Job Training Programmes in Ontario", Research Branch, Ontario Department of Labour, March 1970.

7/ Lewis, D., and Chiplin, B., "The Economics of Industrial Training", *Lloyds Bank Review*, April 1970, pp. 29-41.

Indeed, one of the strongest points to be made in favour of OJT is simply that it places the trainee in the employ of a particular firm, so that he enjoys the financial and psychological rewards of income and employment during the training period. Of course, trainees may receive living allowances enabling them to undertake institutional courses, and counselling and placement services are frequently available to them upon completion. But in the case of OJT, "the employer's participation in such an arrangement supports a high expectation that the program will culminate in a job for the trainee."[8/]

Depending upon the aims of the training program with respect to the clientele to be served, OJT may again have advantages from the psychological point of view. Thus, if it is felt that the training program should in some degree be oriented towards the "hard core unemployed", the "disadvantaged", etc. -- those with educational deficiencies, low skills, and unstable employment history -- then there may be considerable psychological barriers associated with the attempt to undertake training for such persons in a classroom setting. The disadvantaged trainee may already have failed in such an environment and may respond more readily to OJT. As Weber notes, "a strong case can ... be made for slotting those workers with the

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8/ Weber, A. R., "The Role and Limit of National Manpower Policies", *Industrial Relations Research Association*, Proceedings, 18th Annual Winter Meeting, New York, December 28-29, 1965, p. 42.

least likelihood of finding jobs on their own initiative into those programs with the highest intrinsic probabilities of success".[9]

Institutional training is sometimes advocated on the grounds that it permits the enjoyment of "economies of scale". Certainly there is evidence that, where training is to be undertaken in industry, the small firm may be at a disadvantage compared to its larger neighbours.[10] Despite the help of government subsidization, the small firm may still not have the resources to establish a training scheme capable of meeting the requirements specified by the manpower authorities. To this extent there exists the possibility of inequitable distribution of training assistance as between small and large firms. However, there is some evidence from the British experience that this problem may be overcome by the formation of group training schemes undertaken by several small firms in concert.[11]

Government-funded on-the-job training is occasionally criticized on the grounds that recruitment and training are a normal cost of doing business, and that subsidization is merely a way of substituting (with a windfall gain to the employer) what would normally have to be undertaken anyway. It may be argued, however, that in essence the same reasoning applies equally to institutional training: to the extent that the government foots the bill, the employer enjoys a subsidy in the

[9] *Ibid.*, p. 43.
[10] Lees and Chiplin, *op. cit.*, pp. 35-36.
[11] *Ibid.*, p. 36.

attainment of the skills he requires. Surely, the point is that if the government, for whatever reasons, feels the justification for involvement in the training field, then the problem boils down to the question of which of the two methods is the more appropriate for fulfilling the particular objectives at hand, since substitution will occur anyway.12/

It is worth re-emphasizing that considerations of the kind outlined above must be set in the perspective of the aims of the training program under consideration. If, for example, the program is designed to operate in a countercyclical manner, then flexibility is a key criterion. The advantage of OJT in this context is that during a recessionary period the idle capacity of the firm can be put to good use: space, machinery and equipment, instructors, foremen, and skilled workmen can be utilized for training. It is well known that during cyclical downturns firms tend to "hoard" their skilled labour anyway, and in such periods they may, themselves, tend to do more training.

For institutional training, on the other hand, the capacity constraints appear somewhat more severe. Of course, it is sometimes argued that educational institutions carry some idle capacity: people point to empty classrooms and ask "why not a shift system?" While this may be feasible in some cases, many institutions already do have evening classes scheduled and

12/ Strictly speaking, the argument is more complex. The extent and distribution of subsidy will differ under the two types of training, as will the specificity of the training.

the limiting factor may in any case be complementary inputs such as teachers and support staff, and not the physical facilities.

However, the supposed flexibility of OJT is not entirely apparent, particularly if subsidies are paid. Where a government enters into contracts with firms to retain and train workers who might otherwise have been laid off, a sharp upturn in the level of economic activity could leave firms with, as it were, a built-in capacity constraint in the form of their training commitments. Efforts devoted to training by foremen and skilled workers might conflict sharply with the need to fill new orders. In view of the inflationary bottlenecks which could result in such circumstances the timing of contracts would have to be administered with a sharp eye on economic conditions. A further safeguard might be "escape" clauses for employers, so that sudden upswings in product demand would not simply be reflected in potentially inflationary order backlogs.[13/]

Thus, if stabilization is the major goal of a training program, there are reasons to believe that OJT may be a less inflationary method of absorbing the unemployment which might otherwise result from deflationary demand management. If redistribution is an important consideration, then, as argued earlier, OJT appears to lend itself rather more easily to the

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13/ See Newton, K., "A Countercyclical Training Programme for Canada?", *Relations Industrielles/Industrial Relations*, vol. 26, no. 4, December 1971, pp. 865-888.

problems of the disadvantaged. Rivlin, on the other hand, has suggested that institutional courses may supply the potential dropout with motivation for staying on in school and learning more than a specific job skill. It may be easier in a school context to ensure that opportunities are open to students from all backgrounds and that young people with special handicaps (including a background of poverty and poor previous education) get the help they need.[14/] Finally, if the perspective of the training program is long term in nature and takes into account the fact that in modern industry many workers will require *further* retraining at a later point in their working lives, it may be argued that institutional training provides a firmer basis for retraining than does OJT.

This section is concluded with the description of a recent theoretical view of the workings of the labour market which is interesting and germane to the present debate because of the central role which it ascribed to the process of on-the-job training and experience. It is advanced by Thurow and Lucas[15/] in a study for the U.S. Joint Economic Committee of Congress which was concerned essentially with income distribution. The authors address themselves to an explanation of why the phenomenal growth in postwar education expenditures has not

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14/ Rivlin, *op. cit.*, pp. 161-162.

15/ Thurow, L. C., and Lucas, R.E.B., *The American Distribution of Income: A Structural Problem*, Joint Economic Committee, Congress of the United States (Washington, D.C.: U.S. Government Printing Office, March 17, 1972); see especially pp. 15-46.

had the hypothesized salutary effects upon the distribution of income. Very briefly their argument is as follows.

The neoclassical wage-competition view of the labour market would justify supply-side policies of education and training to equalize incomes on the grounds that (i) some individuals would be raised from low- to high-income jobs, (ii) wages for low-income jobs would rise, and (iii) wages for high-income jobs would fall. In the event, however, while education in the United States has become noticeably more equally distributed, income has become more unequally distributed. The usual explanation is that earned incomes derive from two sources -- income from "pure human labour" and income from human capital. Therefore equalizing the distribution of education should equalize the earnings from human capital, but if the variance in human capital returns is greater than that for pure labour income, there will not necessarily be a more equal distribution of *total* earnings (even if the variance in human capital returns is decreasing) because pure labour income becomes an increasingly smaller proportion of total income. Eventually, however, the decreasing variance in human capital income, combined with its greater weight in total income should produce greater equalization in total incomes. The authors, however, refute such contentions. They point out, first, that the variance in returns to pure labour are, if anything, greater than the variance in returns to human capital. Second, if the earnings of labourers with zero years of education are used as the measure of pure labour income, over three-quarters

of the earnings of college graduates are a return to their human capital. Thus, they contend, the United States has already reached the point where education should have entered into the equalizing phase of its impact.16/

They suggest, rather, that the implicit view of standard labour theory -- that wage competition is the most important method for equilibrating labour demands and supplies -- is at fault. Standard theory suggests the establishment of equal wages for "equally productive" workers. In reality, however, there is not a "college wage" and a "high school wage", but distributions of wages for each group -- distributions which are wide and with considerable overlap. Even when "the data are broken down by IQ, occupation, industry, region, hours of work, or by even finer methods of classification, the same wide differences seem to exist".17/

According to Thurow and Lucas, government education and training policies have to a great extent been based on a "wage competition" view of the labour market and have not had the predicted impact because they have ignored the "job competition" elements in the market. Rather than groups of essentially homogeneous workers competing on a wage basis in such a way as to eliminate intra-group differentials there exist, in the authors' view, heterogeneous workers who compete

16/ *Ibid.*, p. 17.

17/ *Ibid.*, p. 19.

for jobs on the basis of certain background characteristics. Given the state of technology and of aggregate demand there exist a set of jobs each of which is characterized by a unique marginal product. In the job competition model labour skills *per se* do not exist in the external labour market. Rather, new workers enter the market with a variety of background characteristics and are selected on the basis of the on-the-job training costs which must be incurred to generate the desired marginal products of the jobs in question. "Most cognitive job skills", in this view, "are acquired either formally or informally through on-the-job training after a worker finds an entry job and the resultant promotional ladder."[18] Workers are therefore ranked in a "labour queue" based on their training costs which, in turn, are determined by their background characteristics.

But earnings, in this model, are determined by the distribution of job opportunities, and their associated incomes. The process of equalization of education would result, in the job-competition view, in the following effects. The most preferred group (i.e., based on the education dimension of background characteristics) might be, say, "college labourers". As it expanded in size it would filter down the job distribution into lower paying jobs. This would lead to a fall in wages relative to the national average. But as this preferred group took what had previously been the best high school jobs,

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[18] *Ibid.*, p. 20.

college incomes would rise relative to high school incomes. As the least preferred group (grade school labourers) contracted in size, the job competition observer would expect it to move out of the denser regions of the job (income) distribution and to become more and more concentrated in the lower tail of the distribution.

While the authors stress that, in fact, the American economy is probably a mixture of wage- and job-competition elements, to the extent that the latter are important, the role of OJT is enormously significant in the private sector. The potential labour market impact of education and of institutional vocational training depends crucially upon the relative weight which is attached to them by employers when background characteristics are assessed. If valid, however, the job-competition model suggests that formal education and training may become a defensive necessity to the private individual. "Education becomes a good investment not because it would raise an individual's income above what it would have been if no one increased their education, but because it raises their income above what it will be if others acquire an education and they do not."[19/]

It does, moreover, raise the whole question of the propriety of publicly financed training-in-industry, which in the job-competition view is unequivocally and inexorably undertaken by industry itself. Thurow and Lucas, indeed, maintain

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19/ *Ibid.*, p. 38.

that their framework leads to substantial doubts about the feasibility of altering the structure of American incomes with government programs focused on the supply side of the labour market. "Given the on-the-job nature of most skill acquisitions it is very difficult to design government training programs for altering the skills actually used. Even if skills can be taught in formal training programs, workers find that labour markets are not able to absorb them since normal entry jobs are not skilled jobs."[20/]

In conclusion, however, the model does suggest the possibility of catering to the needs of specific groups. For if the employer ranks job candidates on the basis of estimated on-the-job training costs in the light of background characteristics, then workers who might otherwise never aspire to certain jobs might have their chances improved by a combination of training subsidies and selective demand stimulus.

3. Empirical Evidence

Quantitative evidence as to the relative merits of institutional and on-the-job training is somewhat fragmentary, equivocal, and of doubtful relevance to the Canadian situation. However, a brief review of foreign evidence is made in order to lend some perspective to Canadian approaches.

20/ *Ibid.*, p. 39.

One rather limited piece of information referring to the United States was offered by Gerald Somers[21] to the U.S. Congress Subcommittee on Employment and Manpower in the late 1960s: federal expenditures per trainee in OJT projects were often as much as one-third below costs in comparable MDTA institutional training programs. Moreover, the job-placement ratio of OJT graduates was substantially higher than that of institutional trainees (94 per cent as opposed to 72 per cent, in 1964). Furthermore, a survey of employers to elicit attitudes to government-subsidized OJT found that "a decided majority of the surveyed employers who have hired MDTA trainees, as well as a cross-section of managerial personnel in the training field, favour government-sponsored training; and of these the number who prefer OJT projects is only a little smaller than those who prefer the more traditional area of government aid through vocational schools."[22] From these considerations Somers concluded that the OJT provisions of the Manpower Development and Training Act had considerably greater potential than might have been inferred from the small numbers enrolled in such projects at that time.

21/ Somers, G. G., "Government-Subsidized On-the-Job Training: Surveys of Employers' Attitudes", University of Wisconsin Center for Studies in Vocational and Technical Education (Reprinted from Hearings Before the Subcommittee on Employment and Manpower, 89th Congress of the United States, September 1965; February 1966), p. 24.

22/ *Ibid.*, p. 28.

One of the most elaborate comparative studies of the two training methods, in a benefit-cost framework, was prepared by the Planning Research Corporation under a contract with the U.S. Department of Labor. Its conclusions, however, are by no means unequivocal. Thus, with regard to the value of OJT and institutional training *as federal investments* the study found that the average benefit-cost ratio (defined as the direct and indirect benefits[23] to society -- exclusive of increased taxes paid -- compared to federal investment per trainee) was 3.28:1 for OJT and 1.78:1 for institutional. Such ratios would lead to the opinion that OJT may be considerably more effective than institutional courses. However, more than 50 per cent of *total* OJT costs were borne by employers, and when this was taken into account *total* per trainee costs for institutional training were less than half those for OJT. Thus, as the authors point out, the results can be interpreted in either of two policy frameworks: "We can either minimize the total cost to society; or we can minimize the federal cost and thus stretch the federal dollar."[24]

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[23] Direct benefits included increased earnings and employability, and indirect benefits included cost-savings from other government programs such as unemployment insurance, and from reduced crime. See Planning Research Corporation, "Cost/Effectiveness Analysis of On-the-Job and Institutional Training Courses", prepared for U.S. Department of Labor, Manpower Administration, Office of Manpower Policy, Evaluation, and Research, June 1967.

[24] *Ibid.*, p. 4.

A second U.S. study explicitly designed to examine both training methods was undertaken by the Bureau of Indian Affairs in Oklahoma.[25] Both types of training were conducted by the same agency, over the same period (1960-66) and the trainees all resided, and were trained, in the same area. All were American Indians with comparably low pre-training earnings positions. The study indicates that the institutional method of training resulted in somewhat greater *private* (individual trainee) benefits than the OJT method. On average, institutional trainees worked 4.1 more months per year and took home $140 per month more after training than in their pre-training period. Comparable figures for OJT are 3.4 months and $131 per month, respectively. The author's model suggested that there were no private costs involved in either program. From the societal standpoint, however, the high social costs of institutional training caused that program to have a lower benefit-cost ratio than OJT. With a 10 per cent discount rate and a 40-year time horizon the benefit-cost ratios were 3.6:1 for institutional training and 19.7:1 for OJT.

The only Canadian study[26] to date which is addressed directly to the institutional versus on-the-job choice examined government-subsidized manpower training schemes in Ontario in

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25/ Scott, L., "The Economic Effectiveness of OJT: The Experience of the Bureau of Indian Affairs in Odlahoma", *Industrial and Labor Relations Review*, vol. 23, no. 2, January 1970.

26/ The study is described in two publications: Mehmet, O., "Evaluation of Institutional and On-the-Job Manpower Training in Ontario", *Canadian Journal of Economics*, vol. IV, no. 3, August 1971, pp. 362-373; and "Efficient Allocation of Public Resources in Manpower Training", *Socio-Economic Planning Sciences*, vol. 5, 1971, pp. 295-306.

the fiscal year 1966-67. The author employs a linear programming model in which the objective function is set up to maximize the contribution of a set of training schemes (activities) to social real income subject to three resource constraints: (i) trainee allowances paid during the course of training; (ii) instruction costs, and (iii) administrative overhead expenses. In addition to these resource constraints, an upper boundary was fixed for each training activity on the basis of estimated requirements of employers collaborating with the administering agency.

The model is written as follows:

$$\text{Maximize} \quad R = \sum_{k=1}^{s} \sum_{n=1}^{t_k} P_k^n X_k dY_k^n (1 + i)^{-n}$$

$$\text{subject to} \quad \sum_{k=1}^{s} a_{rk} X_k \leq \bar{Z}_r (r = 1,\ldots,q)$$

$$H_k \geq X_k$$

$$X_k \geq 0 \ ,$$

in which

R = the present value of the total contribution to social real income of a system of training T_k $(k = 1,\ldots,s)$ accruing over a maximum of t_k years $(n = 1,\ldots,t_k)$;

X_k = the number of graduates of the k-th activity;

p_k^n = the proportion of X_k employed after graduation in any year n;

$dY_r^n(1 + i)^{-n}$ = the present value, at interest rate i, of the cumulated stream of average additional earnings per graduate at the end of each of n years;

a_{rk} = the amount of the r-th resource required to produce one graduate of the k-th training activity;

$\bar{Z}_r$ = the given quantity of the r-th resource;

H_k = the upper bound of the k-th training activity.

The study examines institutional courses administered by the Department of Education and on-the-job courses administered by the Department of Labour, for both unemployed and underemployed persons. In the latter case, training is referred to as "occupational upgrading". Unfortunately, however, although the author mentions that both methods are employed to impart essentially similar occupational skills, no direct comparison of the relative efficacy of the methods for particular occupational goals was possible. This is because the OJT activities were examined on the basis of an industrial rather than an occupational classification since the latter were not available.

The estimation of dY_k^n presented some difficulties. Essentially, the method was based on the calculation of post-training minus pre-training earnings. In the case of unemployed

persons pre-training earnings were imputed on the assumption of the then prevailing minimum wage-rate, plus a 40-hour week and a 50-week man-year. For institutional trainees, moreover, lack of follow-up records necessitated the estimation of additional earnings on the basis of independent occupational earnings data.

Four basic models were solved: for institutional courses training unemployed and underemployed clients, respectively; and for OJT courses training unemployed and underemployed clients, respectively. A fifth compared the efficiency of the two sets of OJT courses, and a sixth attempted to examine whether economies could be reaped by integrating OJT and institutional activities under a single administering agency.

Since the single consideration of the model, implicit in the objective function, was maximization of the net present value of additional earnings, upper bounds on activity levels resulted in a number of courses disappearing from the optimal solutions. "Suboptimality in the case of on-the-job training originated primarily from the fact that a considerable volume of such training was conducted in generally low-wage industries ... which, of course, did not appear in the optimal solutions. The policy implication of this finding is that given resources should be diverted from such industries in

order to expand further the more efficient training activities, generally those in relatively high-paying industries...."[27/]

Resource optimization for both types of OJT increased the benefit-cost ratio by more than 100 per cent, while for institutional courses the improvements were more modest. Ratios for OJT were, however, about twice as high as for institutional training: 13.4:1 compared to 6.2:1 for unemployed clients and 12.0:1 compared to 6.1:1 for underemployed clients.

The Mehmet study constitutes one of the few published analyses of institutional and on-the-job training programs in Canada and is noteworthy on that account. Inevitably, however, it is characterized by a number of limitations concerning data. Historical and follow-up information on earnings, for example, were not available, and, owing to the short life of the programs, nor was information on the probability factor, P_k^n : it was simply assumed equal to unity. Furthermore, the evaluation relates to the fiscal year 1966-67 and in the latter year manpower training in Canada underwent a major change with the introduction of the Adult Occupational Training Act, so that, while the conclusions are not invalidated, some of the findings may not necessarily be applicable to the new situation. Finally, what the study does not do is to compare the relative

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[27/] Mehmet, O., "Evaluation...", *op. cit.*, p. 369.

merits of the two training methods in preparing clients for particular occupational goals, which is the major thrust of the next chapter of the present study.

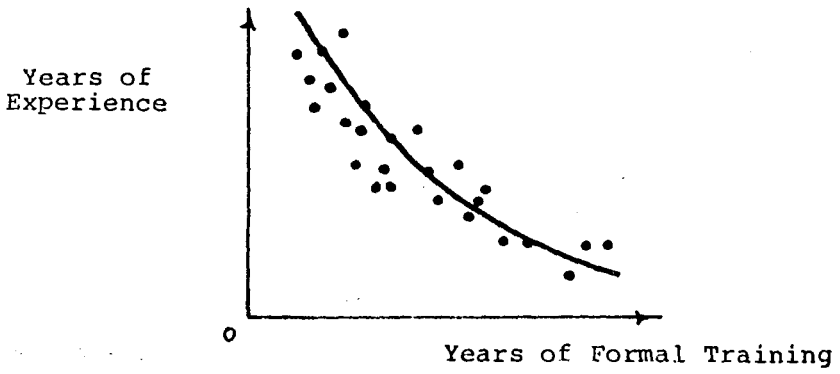
This section is concluded with a brief outline of an interesting attempt to assess the "trade-offs" between formal vocational education and on-the-job training for a number of occupation skills in Belgium and Argentina. The study, by J. Maton,[28] of the International Labour Organization, is exploratory but suggests a potentially fruitful means of shedding light on the relative efficacy of the two means of imparting technical skills. The basic premise is that, in acquiring their productive competence, skilled workers in a number of occupations may, to some extent, substitute formal training and on-the-job learning experience. Maton surveyed three levels of workers in engineering occupations[29] in Belgium and Argentina to produce, for each occupation in each country, a scatter of points representing the various combinations of the two methods of skill acquisition which workers had actually experienced. The axes of the substitution curves are measured in years as shown in the following illustration:

28/ Maton, J., "Experience on the Job and Formal Training as Alternative Means of Skill Acquisition: An Empirical Study", *International Labour Review*, vol. 100, no. 3, September 1969, pp. 239-255.

29/ Skilled mechanics and electricians, draughtsmen, laboratory technicians, and assistant engineers.

Figure 5-1

COMBINATIONS OF FORMAL TRAINING AND ON-THE-JOB EXPERIENCE FOR A PARTICULAR OCCUPATION



Such an approach, given appropriate cost data, could provide useful information on the trade-offs involved. Examination of the data for various occupations would reveal which skills have been acquired *predominantly* by one or other of the two methods, and given a "price-line" indicating their relative costs, optimum combination might be indicated. Maton's results are interesting in suggesting (a) that a typical trade-off curve may, indeed be convex to the origin, (b) that there is typically an intercept on the vertical axis (suggesting that, given sufficient OJT, formal training may be dispensed with completely), and (c) that the lower reaches of the curve become asymptotic at a positive intercept (indicating that, at least for the occupations in question, some minimum amount of on-the-job experience is required).

The basic approach is extremely simple but it suggests some useful avenues for research in Canada. Estimation of the relative costs of the two methods, for various occupations, is obviously a major undertaking, but useful data on combinations of formal training and on-the-job experience undoubtedly exist. Personnel records of large organizations employing substantial number of workers in given occupations could furnish large samples of data of this kind and job-evaluation forms in particular (which are in widespread use) could be a richly rewarding object of study. Indeed, the Canadian Classification and Dictionary of Occupations, which lists ranges of occupational requirements for years of formal education and "specific vocational preparation", would provide a useful benchmark.

4. Conclusion

In the light of the rather scant evidence that it has been possible to assemble on the relative merits of institutional and on-the-job training it does appear that *a priori* arguments can be made in favour of OJT on a number of grounds. Moreover, the empirical studies surveyed also indicate, in some instances, the relative superiority of training on the job.[30/]

30/ Note, however, that the U.S. evidence is conflicting in this regard. The Bureau of Indian Affairs Study cited in footnote 25 above, for instance, shows higher social costs for institutional than for on-the-job training, which contradicts the findings of the Planning Research Corporation's Study cited in footnote 23, above.

CHAPTER 6

INSTITUTIONAL VERSUS ON-THE-JOB TRAINING IN CANADA: AN EMPIRICAL ILLUSTRATION

1. Introduction

Previous chapters have noted a number of interesting characteristics concerning the training activities of the federal Department of Manpower and Immigration.[1/] The important points for our purposes are the following.

First, two major types of training, distinguished by the locus where training activity is undertaken, are utilized: institutional training conducted in the classroom setting, and industry training conducted on the premises of the employer. The latter type is further divided into two types: "training-in-industry", in which training is conducted on the employer's premises but in a "vestibule" located separate from the actual work-place, and on-the-job training in which the employee acquires training and experience through the performance of his work-place tasks. It is this on-the-job variant of subsidized training in industry with which we are particularly concerned.

Second, it is known that in the many courses included in the department's activities, clients are trained for a significant number of occupations by either institutional or on-the-job methods. Third, it was indicated in Chapter 4 that, for a number of reasons, training in industry -- and particularly the on-the-job variety -- has been undertaken on an extremely small

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[1/] Henceforth referred to as "the department".

scale compared to the volume of institutional training. This was seen as somewhat surprising in view of a fourth point which emerged in Chapter 5 -- namely that there are certain *a priori* indications that, at least for some occupations, on-the-job training (OJT) enjoys certain advantages over institutional training.

Finally, in Chapter 4 it was pointed out that the department's training efforts are conducted in the light of certain stated objectives. These were examined in some detail and an attempt was made to assess the conformance of the training operations to these various goals. It was apparent, moreover, particularly in the light of the formal evaluation models employed by the department, that the growth objective is of major importance among these objectives.

The aim of the present chapter is to take these points, collectively, as the foundation for an empirical exercise designed to illustrate the relative efficacy[2/] of on-the-job and institutional training for some selected occupations which are trained for by both methods. It will be seen that an essential feature of the exercise is that it is conducted in the spirit of the department's own evaluation procedures: the data, and the inherent assumptions underlying their calculation, were kindly supplied by officials of the department itself, and the objective function we employ is consistent with that of the department's benefit-cost models.

[2/] The exercise is undertaken from the standpoint of departmental allocative efficiency.

2. The Analytical Approach

The framework employed for the analysis of training programs in this chapter is inspired by the work of Ozay Mehmet,[3] outlined in Chapter 5. While the linear programming structure is essentially consistent with the spirit of Mehmet's model, however, there are a number of important differences. First, and most obviously, the present model applies to Canada as a whole, rather than to provincial programs. Second, it refers to programs covered by the present legislation (the Adult Occupational Training Act) rather than the former Technical and Vocational Training Act and, to that extent, is more relevant to the current situation.

Third, and more important, the present study focuses attention on the training activity levels for selected occupations for which both OJT and institutional training methods were used. Whereas the Mehmet model calculated activity levels in training courses of a given type, the present approach, by contrast, is based on the proposition that where a particular occupation is trained for by both methods of training, one method may prove so superior as to exclude the other method altogether. Finally, there are in addition a number of differences in the quality of the data for the present study which represent an advance over those available at the time of Mehmet's investigation. These will receive attention in the discussion of the data inputs in the next section.

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[3] Mehmet, O., "Efficient Allocation of Public Resources in Manpower Training", *Socio-Economic Planning Sciences*, vol. 5, 1971, pp. 295-306; and "Evaluation of Institutional On-the-Job Manpower Training in Ontario, *Canadian Journal of Economics*, vol. IV, no. 3, August 1971, pp. 362-373.

The simple linear programming framework utilized in this chapter is of the following structure:

maximize

$$Y = \sum_{i=1}^{4} \sum_{j=1}^{2} E_{ij} T_{ij} \qquad (1)$$

subject to

$$\sum_{i=1}^{4} \sum_{j=1}^{2} \alpha_{ij} T_{ij} \leq I \qquad (2)$$

$$\sum_{i=1}^{4} \sum_{j=1}^{2} \beta_{ij} T_{ij} \leq L \qquad (3)$$

$$\sum_{i=1}^{4} \sum_{j=1}^{2} \gamma_{ij} T_{ij} \leq A \qquad (4)$$

$$\sum_{j=1}^{2} T_{ij} = H_i \text{ (for } i = 1,2,3,4) \qquad (5)\ldots(7)$$

where

Y = present value of the contribution to social income of the specified set of training activities,

E_{ij} = present value of the stream of average annual additional earnings attributable to training in occupation i trained by method j,

T_{ij} = number of clients trained for occupation i by method j,

α_{ij} = cost of instruction per trainee in occupation i, method j,

β_{ij} = cost of living allowances per trainee in occupation i, training method j,

γ_{ij} = administrative overhead cost per trainee in occupation i, training method j,

I, L, A = total, given amounts of federal resources expended upon instruction, living allowances, and administrative overhead, respectively, for the four occupations considered,

H_i = total number of trainees actually trained in occupation i.

Constraints (5) through (7) are based upon the premise that the manpower authorities have been able to forecast the number of trainees required for each occupation -- this is given by manpower needs. The important question is then one of determining the optimum method of producing the forecast requirements in each occupation.

The relevance of the linear programming approach may be argued on a number of grounds. First, the department explicitly espouses the 'growth' objective of raising clients' earnings through training, and itself incorporates the maximand of the present model in its benefit-cost evaluations. Secondly, the practice of producing the same outputs (clients trained for a particular occupation i) by different methods (institutional training, training-in-industry, and OJT) suggests the propriety of determining the most efficient mix of training activities for effective resource utilization. The linear programming approach appears well suited to such an optimization problem since it yields as a solution the optimal allocation of resources and enrolments in the training activities evaluated.

It should be noted, however, that the nature of the framework employed, while following the linear programming approach, is highly restrictive in terms of its structural characteristics. That is, while the objective function is set up to maximize the contribution to income of the activities as a whole, the side conditions are premised on the notion that the manpower officials spend no more, under each cost category, than was actually expended on the various occupations in fiscal year 1971-72 and that the total number of clients to be trained in each occupation is accurately foreseen. The optimal solution is therefore one in which, in each occupation, the training method with the largest difference between benefits and costs will be the method chosen to train all clients in that occupation. An alternative approach would therefore be to examine each occupation in turn and, on the basis of the benefits-minus-costs differences, determine which method is the more efficient. The linear-programming approach simply provides a convenient framework in which the problem may be viewed, and, in addition, yields simultaneous information on the value of the objective function and on cost-saving.

3. The Data

Statistical inputs for the present analysis refer to courses funded by the department in institutions, under the Canada Manpower Training Program (CMTP), and on-the-job, under the Canada Manpower Training-on-the-Job Program (CMTJP) in the fiscal year 1971-72, the latest period for which follow-up information was available.

Selection of appropriate occupations for the purpose at hand was a major consideration, which was dealt with according to the following criteria. First, it was necessary to select occupations trained for by both institutional and on-the-job methods. Second, there needed to be occupations with a good representation of clients in both methods of training -- in fact, the analysis addresses four of the more populous occupations covering 5,687 trainees, with a minimum of 49 trainees in any one 'course'. Third, it was necessary to select occupations in the two programs which could be closely matched in order to achieve, as nearly as possible, identity of the training outputs of the two training methods for each occupation. This was done at the three-digit occupational level with the aid of special tables prepared by the department for the conversion of the codes from the Dictionary of Occupational Titles (which apply to CMTJP data) to the codes for the Canadian Classification and Dictionary of Occupations (which apply to the CMTP data). Eventually, four occupations were found to meet the criteria outlined above.

Four basic sets of statistical inputs were utilized for the analysis, relating to (i) the additional trainee earnings parameters, E_{ij}, in the objective function, (ii) the per-trainee cost parameters, α_{ij}, β_{ij} and γ_{ij} in the constraint functions, (iii) the given levels of government budgetary resources expended upon instruction costs, I; living allowances, L; and administrative overhead, A; and (iv) the numbers of clients trained in each occupation, H_i (for i = 1,2,3,4). These sets of data were furnished by the department in accordance with the

procedures followed for the purposes of their own evaluation exercises,[4] and are displayed in Table 1. Considerable disparities in benefits and in costs are apparent from this table -- as, for example, with the additional earnings figures for trainees in stock clerk and related occupations. Although course duration in both the institutional and OJT courses is similar, E_{ij} is more than twice as high for OJT trainees. Moreover, this is only partly attributable to a longer working life over which additional earnings are accumulated, since the average ages of institutional and of OJT trainees in this occupation are 29 and 23 years, respectively.[5]

The figures in Table 1 permit the basic structure of the allocation problem to be set out in Table 2.

The data are derived from three sources. Pre-training information comes from the trainee authorization form MAN500, while post-training information is derived from the results of a three-month follow-up survey in the CMTP Training Questionnaire form MAN454 (for institutional) and the CMITP Training Questionnaire form MANTEMP363 (for OJT). Finally, with respect to costs,

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[4] This was considered important in so much as the results of the present study would then be based upon assumptions compatible with federal officials' own approach to the analysis of training programs. It should be noted that it is precisely because the exercise is undertaken from the departmental standpoint that living allowances (which, being a transfer payment, would not enter costs from a social perspective) are included as a cost item.

[5] OJT trainees do, in fact, appear to be slightly younger than their institutional counterparts in each of the four occupations studied. The average age of OJT trainees in occupations 411, 415, 856 and 878 was 24, 23, 25, and 28, respectively. For institutional training the corresponding figures are 29, 29, 31, and 33, respectively.

Table 6-1

BASIC DATA FOR CANADA MANPOWER TRAINING PROGRAM (CMTP) AND CANADA MANPOWER TRAINING ON THE JOB PROGRAM (CMTJP) FOR OCCUPATIONS 411, 415, 856, AND 876 (CCDO)*, CANADA FISCAL YEAR 1971-72

	411		415		856		876		
	CMTP	CMTJP	CMTP	CMTJP	CMTP	CMTJP	CMTP	CMTJP	Total
Number of Trainees, T_{ij}	3,222	49	109	122	737	433	931	84	
Number of Trainees in Occupation Group, H_i	3,271		231		1,170		1,015		5,687
Per Diem Instruction Cost/Trainee (CMTP) (dollars)	6.50	--	8.21	--	8.47	--	8.43	--	--
CMTP Course Duration (days)	114.6	--	82.7	--	106.4	--	87.0	--	--
CMTP Course Duration (weeks)	25.5	--	18.4	--	23.6	--	19.3	--	--
Average Weekly Wage Subsidy (CMTJP) (dollars)	--	59.05	--	66.88	--	48.21	--	74.25	--
CMTJP Course Duration (weeks)	--	16.6	--	16.9	--	11.6	--	14.0	--
α_{ij} (dollars)	744.90	980.23	678.97	1130.27	901.21	559.24	733.41	1039.50	--
β_{ij} (dollars)	1207.68	--	1,133.62	--	1166.08	--	1361.04	--	--
γ_{ij} (dollars)	100	90	100	90	100	90	100	90	--
I (dollars)	2,400,067.80	48,031.27	74,007.73	137,892.94	664,191.77	242,150.92	682,804.71	87,318.00	4,336,465.14
L (dollars)	3,891,144.96	--	123,565.02	--	859,398.01	--	1,267,124.52	--	6,141,232.51
A (dollars)	322,200.00	4,410.00	10,900.00	70,980.00	73,700.00	38,970.00	93,100.00	7,560.00	561,820.00
E_{ij} (dollars)	6,440.71	5,243.76	2,569.37	6,174.67	3,905.62	5,073.05	8,219.82	1,418.21	6,141,232.51

*Secretarial Occupations, Stock Clerk and Related Occupations, Sewing Machine Operators, and Carpenters and Related Occupations, respectively.

Source: All data supplied by Department of Manpower and Immigration.

information on instruction costs comes from the Course Purchase Notice form MAN1057 in the case of institutional training, and from the Employer Contract for Training, form MAN514, in the case of OJT. Data on living allowances are obtained from the trainee authorization form, MAN500.

The pre- and post-training earnings data constitute an advance over the type of information available to Mehmet, who estimated pre-training earnings on the basis of the prevailing provincial minimum wage, a forty-hour week, and post-training earnings of institutional trainees on the basis of independent occupational wage-rate data. Furthermore, the E_{ij}'s in the present study incorporate departmental calculating procedures such as the estimated employability rate of trainees in each course (based on the expected number of working weeks per year), the working life over which discounting must be undertaken (based on average trainee age in each course) and the 10 per cent discount rate employed in official benefit-cost studies.[6/]

Accurate estimation of administrative overhead costs appears as difficult now as it did at the time of the Mehmet study, in which constant per-trainee costs were assumed in each course. We have employed the federal department's (arbitrary) assumption of 100 dollar average costs for institutional courses and 90 dollar average costs for OJT courses.

6/ The estimation of pretraining wage is based on the trainee's earnings in his last job lasting one month or more. The earnings differential is adjusted by an estimated inflation factor for fiscal 1971-72 of 3.4 per cent and is then assumed constant over the remaining years of working life up to age 65.

Table 6-2

THE STRUCTURE OF THE PROBLEM

Maximize: $Y = 6440.71SEC1+5243.76SEC2+2569.37CLK3+6174.67CLK4$
$+3905.62MCH5+5073.05MCH6+8219.82CRP7+1418.21CRP8$

Subject to: $744.90SEC1+980.23SEC2+678.97CLK3+1130.27CLK4$
$+901.21MCH5+559.24MCH6+733.41CRP7+1039.50CRP8$
$\leq \$4,336,465.14$

$1207.68SEC1+1133.62CLK3+1166.08MCH5+1361.04CRP7$
$\leq \$6,141,232.51$

$100.00(SEC1+CLK3+MCH5+CRP7)+90.00(SEC2+CLK4+MCH6+CRP8)$
$\leq \$561,820.00$

$SEC1+SEC2 = 3271$

$CLK3+CLK4 = 231$

$MCH5+MCH6 = 1170$

$CRP7+CRP8 = 1015$

Mnemonics: SEC = Secretarial Occupations (CCDO 411)
CLK = Stock Clerk and Related Occupations (CCDO 415)
MCH = Sewing Machine Operators (CCDO 856)
CRP = Carpenters and Related Occupations (CCDO 878)
Odd-numbered variables represent the number of trainees in that occupation trained in institutions, and even-numbered variables represent the number trained on the job.

Living allowances are paid only to clients in institutional courses and are recorded directly on the trainees' authorization forms. Total allowance costs are the product of the average weekly living allowance and the course duration in weeks. Instruction costs, for institutional trainees, are calculated on the basis of the fixed per diem per trainee cost and the course duration in training days. For OJT, instruction costs consist of a 75 per cent wage subsidy paid to the employer. In this case the cost calculation is based upon the average weekly wage during training, and the course duration in weeks.[7/]

4. Findings

The major findings of the exercise are set out in Tables 3 through 6, and may be summarized as follows.

First, as far as activity levels are concerned, the concentration of training activity, within each occupation, in the more efficient training method, results in a shift of the training locus from institutions to the work-place. Whereas the actual distribution of trainees was 4999 in institutional training and 688 on the job -- or 87.9% and 12.1% of the total, respectively -- the optimal distribution is 4,286 institutions and 1,401 on the job -- 75.4% and 24.6%, respectively. The proportion of clients trained on the job, in other words, is more than doubled.

7/ It should be noted that while total instruction costs for institutional courses are the product of per diem instruction costs per trainee and course duration in days, living allowances are the product of average weekly allowances and course duration in weeks. The latter figure, however, is arrived at by dividing course duration in days by 4.5, rather than 5, since it is estimated that, although allowances are paid for the full week, half a day per week is used for activities other than direct instruction.

Table 6-3

THE OPTIMAL AND ACTUAL SOLUTIONS COMPARED AT THE AGGREGATE LEVEL

	Optimal	Actual	Difference	Percentage of Actual
		(Dollars)		
Instruction Costs	4,096,382.12	4,336,465.14	-240,083.02	5.54
Living Allowances	5,331,776.88	6,141,232.51	-809,455.63	13.18
Administrative Overheads	554,690.00	561,820.00	-7,130.00	1.27
Total Costs	9,982,849.00	11,039,517.65	-1,056,668.65	9.57
Net Present Value of Additional Earnings	36,772,496.98	34,889,137.58	1,883,359.40	5.40

From Table 3 it may be seen that this reallocation results in an increase of the objective function, the net present value of additional trainee earnings, of close to $2 million, an improvement of 5.4 per cent for the occupations studied. Total cost savings amount to $1.06 million, or over 9½ per cent of actual expenditures in fiscal year 1971-72.

The largest single item of cost saving is living allowances, since two occupations in the optimum solution (as may be seen from Table 4) are trained for by the on-the-job method, which entails no expenditures for living allowances. Close to a quarter of a million dollars are saved on instruction costs, though the saving on administrative overhead is small since the overall number of trainees remains the same and average overhead costs differ only minimally between the two methods of training.

The distribution of these aggregates among courses and among occupations is shown in Tables 4 and 5. It will be noted that for the two occupations which were already heavily weighted towards institutional training (CCD0411 -- secretarial occupations, and CCD0878 -- carpenters and related occupations) optimal allocation indicates concentration of training activities in this method. For stock clerks and related occupations (CCD0415), where activity levels in the actual situation were more or less evenly balanced, concentration in the on-the-job method is indicated. Finally, in the case of sewing machine operators (CCDO 856) a reversal of the weighting is indicated: from a majority of trainees in institutional training in the actual situation to concentration in on-the-job methods in the optimum case.

Table 6-4

ACTUAL AND OPTIMAL SOLUTIONS COMPARED BY COURSE

		411		415		856		878		Total
		CMTP	CMTJP	CMTP	CMTJP	CMTP	CMTJP	CMTP	CMTJP	
Number of Trainees	O	3,271	--	--	231	--	1,170	1,015	--	5,687
	A	3,222	49	109	122	737	433	931	84	5,687
	Δ	49	-49	-109	109	-737	737	84	-84	0
Instruction Costs ($)	O	2,436,567.90	--	--	261,092.37	--	654,310.80	744,411.05	--	4,096,382.12
	A	2,400,067.80	48,031.27	74,007.73	137,892.94	664,191.77	242,150.92	682,804.71	87,318.00	4,336,465.14
	Δ	36,500.10	-48,031.27	-74,007.73	123,199.43	-664,191.77	412,159.88	61,606.34	-87,318.00	-240,083.02
Living Allowances ($)	O	3,950,321.28	--	--	--	--	--	1,381,455.60	--	5,331,776.88
	A	3,891,144.96	--	123,565.02	--	859,398.01	--	1,267,124.52	--	6,141,232.51
	Δ	59,176.32	--	-123,565.02	--	-859,398.01	--	114,331.08	--	-809,455.63
Administrative Overhead Costs ($)	O	327,100.00	--	--	20,790.00	--	105,300.00	101,500.00	--	554,690.00
	A	322,200.00	4,410.00	10,980.00	10,980.00	73,700.00	38,970.00	93,100.00	7,560.00	561,820.00
	Δ	4,900.00	-4,410.00	-10,900.00	9,810.00	-73,700.00	66,330.00	8,400.00	-7,560.00	-7,130.00
Total Costs ($)	O	6,713,989.18	--	--	281,882.37	--	759,610.80	2,227,366.65	--	9,982,849.00
	A	6,613,412.76	52,441.27	208,472.75	148,872.94	1,597,289.78	281,120.92	2,043,029.23	94,878.00	11,039,517.65
	Δ	100,576.42	-52,441.27	-208,472.75	133,009.43	-1,597,289.78	478,489.88	184,337.42	-94,878.00	-1,056,668.65
Net Present Value of Additional Earnings ($)	O	21,067,562.41	--	--	1,426,348.77	--	5,935,468.50	8,343,117.30	--	36,772,496.98
	A	20,751,967.62	256,944.24	280,061.33	753,309.74	2,878,441.94	2,196,630.65	7,652,652.42	119,129.64	34,889,137.58
	Δ	315,594.79	-256,944.24	-280,061.33	673,039.03	-2,878,441.94	3,738,837.85	690,464.88	-119,129.64	1,883,359.40

Note: O and A refer to values in the optimal and actual solutions, respectively, while Δ is the difference between them.

Table 6-5

ACTUAL AND OPTIMAL SOLUTIONS COMPARED BY OCCUPATION

		411	415	856	878	TOTAL
Instruction Costs (dollars)	O	2,436,567.90	261,092.37	654,310.80	744,411.05	4,096,382.12
	A	2,448,099.07	211,900.67	906,342.69	770,122.71	4,336,465.14
	Δ	-11,531.17	49,191.70	-252,031.89	-25,711.66	-240,083.02
Living Allowances (dollars)	O	3,950,321.28	--	--	1,381,455.60	5,331,776.88
	A	3,891,144.96	123,565.02	859,398.01	1,267,124.52	6,141,232.51
	Δ	59,176.32	-123,565.02	-859,398.01	114,331.08	-809,455.63
Administrative Overhead Costs (dollars)	O	327,100.00	20,790.00	105,300.00	101,500.00	554,690.00
	A	326,610.00	21,880.00	112,670.00	100,660.00	561,820.00
	Δ	490.00	-1,090.00	-7,370.00	840.00	-7,130.00
Total Costs (dollars)	O	6,713,989.18	281,882.37	759,610.80	2,227,366.65	9,982,849.00
	A	6,665,854.03	357,345.69	1,878,410.70	2,137,907.23	11,039,517.65
	Δ	48,135.15	-75,463.32	-1,118,799.90	89,459.42	-1,056,668.65
Net Present Value of Additional Earnings (dollars)	O	21,067,562.41	1,426,348.77	5,935,468.50	8,343,117.30	36,772,496.98
	A	21,008,911.86	1,033,371.07	5,075,072.59	7,771,782.06	34,889,137.58
	Δ	58,650.55	392,977.70	860,395.91	571,335.24	1,883.359.40

Note: O and A refer to values in the optimal and actual solutions, respectively, while Δ is the difference between them.

Where the optimal solution indicates concentration in the institutional method total costs are raised for the occupations in question (though only slightly since, as already mentioned, activity levels were already heavily weighted to institutional training in these occupations) and where concentration in OJT is indicated substantial cost savings are achieved, mainly because of the role of living allowances which are zero for OJT. But precisely because occupations 411 and 878 were already heavily weighted towards institutional training, concentration in that method has a relatively minor upward impact on the objective function for those groups.

These findings are reflected in the benefit-cost ratios[8/] shown in Table 6. The ratios in those occupations for which institutional concentration is indicated in the optimal solution are raised only moderately by such concentration -- from 3.12:1 to 3.14:1 in the case of secretarial occupations and from 3.64:1 to 3.75:1 in the case of carpenters. The switch in concentration for sewing machine operators, by contrast, yields a spectacular rise in the benefit-cost ratio, from 2.70:1 to 7.81:1. The overall ratio for all occupations is increased from 3.16:1 to 3.68:1 as a result of the reallocation of training activities.

8/ Simply net present value of additional earnings divided by total costs.

Table 6-6

BENEFIT-COST RATIOS BY OCCUPATION: OPTIMAL AND ACTUAL SOLUTIONS

	411	415	856	878	TOTAL
ACTUAL					
Net Present Value of Additional Earnings (dollars)	21,008,911.86	1,033,371.07	5,075,072.59	7,771,782.06	34,889,137.58
Total Costs (dollars)	6,665,854.03	357,345.69	1,878,410.70	2,137,907.23	11,039,517.65
B/C Ratio	3.12:1	2.89:1	2.70:1	3.64:1	3.16:1
OPTIMAL					
Net Present Value of Additional Earnings (dollars)	21,067,562.41	1,426,348.77	5,935,468.50	8,343,117.30	36,772,496.98
Total Costs (dollars)	6,713,989.18	281,882.37	759,610.80	2,227,366.05	9,982,849.00
B/C Ratio	3.14:1	5.06:1	7.81:1	3.75:1	3.68:1

The results presented here, which relate to just a very few of the department's many occupational training courses, serve to point out, first of all, the considerable disparities in benefits and costs which exist among them. Next, the concentration of training activity in the most efficient training method is reflected in the increased benefit-cost ratios in each occupation. Moreover, with a given number of trainees in each occupation, the effects of such reallocation are to increase the net present value of additional trainee earnings and to reduce the size of the required total expenditures, for the occupations as a whole.

5. Conclusion

The findings reported here are subject to a number of limitations emanating from deficiencies in statistical inputs and methods which, in the absence of better alternatives, had to be used. While the 'name of game' was to conduct an exercise in conformance with the department's own evaluation procedures, and while, as pointed out in section three, the data inputs represent an advance over earlier studies of a similar nature, a number of shortcomings nevertheless remain.

First, as in the Mehmet studies,[9] externalities are ignored due to identification and measurement problems. Second, the estimates of per trainee overhead costs are set according to a rather arbitrary rule-of-thumb. Third, the present study employs the single discount rate of 10 per cent which is now conventionally used in the department's evaluation studies;

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[9] *Op. cit.*

different rates would alter the magnitude of the objective function, if not the direction of reallocation. Fourth, earnings gains due to training were estimated on the basis of pre- and post-training comparisons, rather than with the use of control groups. Fifth, the data refer to the fiscal year 1971-72, the last year for which follow-up survey material was available. Since that time, as outlined in Chapter 4, the Canada Manpower Industry Training Program, of which on-the-job activities are a part, has undergone considerable reorganization, so that the findings of the present analysis need to be interpreted in the light of the current framework and regulations of the federal government training activities.[10/] Finally, as pointed out in section 2, the analytical approach is restrictive in the sense of leading to the concentration of training activity, in each occupation, in one or other of the two methods of training. A more elaborate, and realistic, framework might allow for a "mixed" solution.

It is hoped, however, that what has emerged from the foregoing analysis is that, where training is undertaken for a number of occupations by more than one method, sufficient differences in benefits and costs may arise as to clearly identify the superiority of one method for certain occupations.

10/ It must be pointed out, in addition, that the present exercise has attempted to incorporate only the growth objective. An attempt was made, for example, to determine the number of trainees in each course who are brought above a "poverty line" as a result of training. At the present time, however, departmental statistics (which ignore other income sources and which do not take account of the possibility of a trainee's being, himself, a dependant) obviate any meaningful analysis of this nature.

The result of the reallocation of training resources into the more efficient training methods for the various occupations, is an increase in the training authority's maximand, and a decrease in the value of its resource inputs. The direction of such reallocation in the present exercise is toward a greater emphasis upon on-the-job training at the expense of institutional training.

CHAPTER 7

CONCLUDING COMMENTS

Federal government expenditures on manpower training in Canada, which grew rapidly in the late 1960's, have levelled off in recent years. This may in part be a reflection of the Department of Manpower and Immigration's relatively greater emphasis upon direct employment programs such as LIP, LEAP, and OFY. Nevertheless the absolute magnitudes involved in the training effort are impressive -- expenditures were between $300 million and $400 million in each year from 1968 to 1974, and projections for 1975 and 1976 fall in the same range. Moreover, the continuing importance of manpower training may be anticipated (quite apart from bureaucratic inertia) for at least two reasons.

The first is that the poor growth performance and high unemployment levels of 1975 may, in the absence of massively efficient policy measures in the near future, be expected to increase the numbers of potential clients of the training authority in the coming winter and at least until well into 1976. Secondly, there is growing agreement that the Canadian economy is experiencing increasing amounts of unemployment which stem from sources other than the deficiency of aggregate demand, and it is to such unemployment that manpower policy has traditionally been addressed.[1/] The propriety of

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1/ Economic Council of Canada, *Labour Market Study*, Chapter 10 (forthcoming).

economic analysis of training programs would therefore seem well warranted, and the relative dearth of published studies surprising.

As shown in Chapter 4, however, the Canada Manpower Training Program appears to be oriented towards a number of goals, some of which may be complementary but some of which may prove conflicting. Thus the evaluative criteria by which an economic analysis may be undertaken are difficult to define. The growth, stabilization, and equity objectives are all officially attributed to CMTP and our empirical evidence permitted some assessment of the degree to which training is oriented to these goals in practice. The program does appear to redistribute revenues in favour of the poorer provinces and also appears progressive with respect to income classes. A strong contraseasonal pattern is apparent and there is some evidence of contracyclicality. Moreover, the benefit-cost ratios claimed for CMTP suggest some success with respect to the growth objective. It is this latter goal which appears to be the dominant one and the one in terms of which subsequent analysis in this study was undertaken.

The two broad, popular categorizations of training -- institutional and OJT -- are both utilized by federal training authorities in Canada, but the insignificance of the volume of OJT relative to institutional training invites investigation of the relative efficacy of these two training types. From the

foregoing chapters a number of explanations of the overwhelming emphasis on institutional training may be conjectured.

First of all, the analysis of Chapter 2 suggests that, conceptually, a certain amount of OJT is inevitable. An important variant, learning from experience, may be regarded as a joint product of the production process itself. Thus there may be a reluctance to spend public money to subsidize a type of training which may be expected to take place anyway. An allied point is that OJT is more likely to be specific in nature, so that the skills imparted at public expense may prove useful to only a small number of employers. Institutional training, by contrast, shares more of the characteristics of general education, which has long been regarded as an appropriate domain for public intervention.

Secondly, the heavy capital expenditures on vocational education in the early 60's created a large number of institutions whose fuller utilization was an incentive to favour the institutional variety of training. Thirdly, it is apparent that despite the ubiquity of OJT very little empirical analysis has been devoted to it -- at least in comparison with institutional training and with formal education in general. Hence there are few sound empirical studies which can bear witness to the economic efficiency of OJT, while myriad studies (particularly under the MDTA in the United States) claim impressive benefit-cost ratios for institutional training.

As described in Chapter 4 the response by employers to the initial OJT programs was enthusiastic and it is difficult to explain why the proportion of OJT activity has declined again in recent years. No official statements are forthcoming on this subject. Perhaps OJT was seen as being a more specifically job-creating dimension of training -- a function which is now being performed by newer and more popular programs of the LIP and LEAP variety.

In any event, the paucity of the OJT component of CMTP does seem at odds with the *a priori* arguments concerning the relative merits of OJT and institutional training, and with some of the few available items of empirical evidence, advanced in Chapter 5.

While these considerations suggest that an examination of the efficiency of the two training methods would prove interesting and useful, one further point supports this view. In a number of occupations covered by CMTP, trainees may be trained either by OJT or by institutional training, so that identification of the most efficient method for each occupation may yield significant improvements in the allocation of departmental resources.

An illustrative approach to this problem was set out in Chapter 6. The exercise covered four populous occupations in which some trainees received instruction in institutions and others received it on the job. The 5,687 trainees covered in the analysis were trained at a total cost of over $11 million

in fiscal year 1971-72, and collectively enjoyed total benefits (in the form of the net present value of additional earnings due to training) of close to $35 million. When trainees, in each occupation, are all trained by the method distinguished as the most efficient for that occupation the department's objective function is increased by 5.4 per cent, and its total costs reduced by over nine and one-half per cent. The analysis suggests the potential gains which might be achieved from simply distinguishing, and using exclusively, the more efficient training method in those occupations in which both methods (separately) are presently employed.

Finally, the reallocation indicated in the analysis of Chapter 6 is in the direction of greater emphasis upon OJT -- the proportion of trainees in OJT is more than doubled.

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