SHORTAGES OF SKILLED BLUE COLLAR WORKERS IN THE MACHINING TRADES IN MONTREAL

BY

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ABSTRACT

The objective of this thesis is to examine the evidence of and responses to shortages of skilled blue collar workers in the machining trades - tool and die makers and machinists - in the Montreal metropolitan region. The period studied is 1974 to 1981 and the study focuses on employer behaviour.

It was found that data available from government sources documenting the supply and demand for these occupations are generally inadequate. The research underlines that one of the fundamental difficulties in compiling net supply and demand figures for these occupations is the pinning down of skill levels involved. Employers' definitions of skill are therefore analyzed.

This research indicates that organizational factors appear to influence the recruitment process as well as the choice of adjustment measures. It was found that employers dispose of and use many measures to respond to shortages. Specifically it was found that the adjustment process does not take place only through changes in wage rates. Rather employers will tend to favour adjustment measures that maintain existing arrangements within firms and preserve management discretion.

PRÉCIS

Cette thèse analyse les pénuries de main d'oeuvre qualifiée-outilleurs et machinistes - dans la région métropolitaine de Montréeal de 1974 à 1981. Cette recherche tente de déterminer la nature de ces pénuries et les stratégies d'ajustement mises en oeuvre pour y remédier.

Il est démontré que les statistiques officielles portant sur l'offre et la demande dans ces occupations sont inadéquates. Cette recherche souligne aussi le problème posé par la définition même des habiletés requises dans ces occupations et analyse les perceptions des employeurs.

Les facteurs organisationnels propres aux firmes, influencent autant le processus de recrutement que les stratégies d'ajustement. De plus le processus d'ajustement implique la mise en oeuvre de mesures autres que l'amélioration des conditions salariales. En fait, les employeurs tendent à privilégier les mesures qui provoquent le moins de changements dans les structures et pratiques existantes et qui assurent une plus grande liberté managériale.

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INTRODUCTION

Shortages of labour, especially skilled labour are a matter of general concern in industrialized countries since manpower bottlenecks hamper economic growth and reduce the competitiveness of firms (Shonfield 1965:3; Kaldor 1966:25,31; Dodge 1977:2; Canada 1978:5). They have been a persistent issue in Canada since World War Two in times of economic prosperity as well as in periods of high unemployment. Reports and studies commissioned by the Canadian government are evidence of the interest in this matter (Canada 1957; Canada 1981a; Betcherman 1982; Economic Council 1982).

Labour shortages have been studied mostly by economists. The theoretical underpinnings of these studies have usually been the assumptions of neoclassical economic theory. The data supporting the research are usually aggregated and there is an emphasis on wage movements. I suggest that such a perspective cannot fully account for the labour market processes at work and there is need for studies that focus on non economic factors and describe and analyze in more detail the actions of agents in the labour market.

Labour market processes involve many agents and institutions: employers, workers, governments, educational establishments and trade unions. In general because of the lack of firm level research it remains true that "we know very little about how a labour market operates and very little about how indivi-

dual firms react to particular labour market conditions facing them" (Robinson 1968:115). Canadian authors have also commented on the lack of empirical research on the decision making processes of managements that might be of use for forecasting shortages and choosing ways to alleviate them (Newton, Betcherman, Meltz 1981:99). This study involves a modest attempt to advance our understanding of the operation of labour markets in Canada by analyzing a body of firm level data. This study focuses on the actions of employers claiming shortages of skilled blue collar workers in the Montreal area. Emphasis is placed on managerial definitions of shortages, on the actions taken to recruit suitable workers, definitions of what constitutes a skilled worker and the adjustment measures adopted when shortages occur. In the process of such a research program one tries to gain some understanding of the dynamics of labour processes and the ways in which employers' actions may bring modifications in these processes.

The behaviour of employers is examined within the context of a local labour market. The sample was drawn from manufacturing firms in the Montreal metropolitan region, seventy four employers were contacted and interviewed. The study spans the period from 1974 to 1981. During this time unemployment in the province of Quebec was never below 6.5%. The repeated claims of shortages in the midst of fairly high unemployment suggests serious labour market malfunctioning. The study concentrates on reported shortages in the machining trades: specifically in the

occupations of tool and die maker, machinist and machine tool operators. A detailed analysis of the actions of employers required data that would allow an in depth look at how employers define and react to shortages. Such a study required the collection of qualitative kinds of data that are often not amenable to organization in neat statistical categories. This research therefore was exploratory (although, of course, that is to some extent true of all research). I felt however that much useful information could be generated by examining in detail the arrangements employers make to meet demand for skilled labour. There is, to my knowledge, very little research that has been done in Canada and Quebec on local labour markets concentrating on the demand side and concerned with the issue of shortages. The previous studies have either been national surveys or research using very small samples. This dissertation therefore constitutes a specific contribution to our knowledge of the processes in a local labour market. It also provides detailed information on the actions of employers attempting to adjust to labour shortages. The methodology chosen allows us to understand the context in which their decisions are taken and therefore provides an understanding of their actions. Little work has been done in Canada that chooses that kind of focus.

The first chapter of this thesis examines the issues raised in the literature on shortages, it draws on the work of economists and also on the writings of sociologists who have studied other issues germane to the study of shortages. The evidence on

shortages in Canada is reviewed in chapter two and it highlights the difficulties in obtaining unambiguous data about the presence of shortages and the problems associated with the very definition and measurement of shortages. In the third chapter I present and explain the method of enquiry I have chosen, describing the sample and providing background information on the occupations studied. Employers interviewed for this study appear in chapter four where I examine and assess their definitions of shortages and their comments about what constitutes a skilled worker in machining. The characteristics of firms in which shortages were reported are described in chapter five and the impact of variables such as size, age, technology of production and presence of unions on the incidence of shortages are examined. Chapter six details the recruiting and hiring practices of employers in this sample and it documents how these were modified with the oncoming of shortages. It also stresses the ways in which various recruitment channels may restrict the dissemination of information about job openings. The adjustment measures employers have implemented during these years are the subject of chapter seven. It stresses the importance employers give to non wage adjustments and examines how the specific circumstances of various firms will bring about the use of various measures at different times. This chapter also presents evidence on the behaviour of wages for these occupations during the time period studied. The final chapter brings together the findings of this study.

CHAPTER 1

REVIEW OF LITERATURE

The study of labour shortages has attracted relatively little attention from sociologists. Labour market studies in this discipline have focused on processes associated with unemployment and underemployment. The research on shortages of labour has therefore largely been conducted by economists working within the neoclassical tradition. However some evidence on shortages does not seem to "fit" this model too well. An alternative paradigm postulating segmentation and dualism in the labour market suggests different ways of examining shortages of skilled labour. Specific issues are also raised in a study of shortages of skilled labour: namely the reliability of available data for ascertaining the presence and extent of shortages, the definitional problem of what constitutes a shortage for a firm and finally what is a skilled worker today. This review of literature is concluded with a look at some specific studies of shortages.

A BRIEF LOOK AT THE ECONOMISTS

Within the neoclassical model labour market activities are the outcome of the actions of employers and workers disposing of the relevant information and committed to rational income

maximizing choices. Employers pressed by competition and seeking to maximize profit will look for specific resources to be deployed in the most efficient way while workers will choose occupations and jobs where their incomes are likely to be enhanced. The wages paid for labour depend on the skills and experience of workers and will reflect the demand and supply situation. Imbalances of supply and demand in the labour market are signalled by wage fluctuations and adjustments take place through the price mechanism.

Within such a model a labour shortage exists when the required number of workers of a given quality cannot be obtained at the going wage rate; that is the wage paid in the recent past (Blank and Stigler 1957:24). It is expected that relative wages will be adjusted to reflect the increased demand for certain skills, inducing a greater inflow of workers into the occupation and restoring equilibrium. Under conditions of free competition and barring major "imperfections" shortages of labour should be a transitory phenomenon and disappear quickly as wages are adjusted.

Reports of persistent shortages in the labour market for certain occupations are explained by stressing the distinction between short-run and long-run equilibrium (Arrow and Capron 1959:293). Their analysis sought to explain "not only the direction of price adjustment (i.e. towards equilibrium) but the rate of adjustment in the face of continued shifts in the short-run functions" (Arrow and Capron 1959:294). They draw

attention to the time lags in adjustments due to the length of time required by decision-making processes within the firm. They introduce the concept of a dynamic shortage to account for a situation where constant increases in demand combined with time lags in adjustments and the low elasticity of the supply of certain workers (in this case engineers) prolong a situation of shortage (Arrow and Capron 1959:301). There may be shortages in the short run but "by permitting the market to react to the rising demand" shortages will disappear in the longer run (:308).

It must be added that Arrow and Capron also attribute the slowness of reaction to increased demand in the form of price rises, to institutional factors such as:

> the prevalence of long term contracts, the influence of the heterogeneity of the market in slowing the diffusion of information and the dominance of a relatively small number of firms in research and development (Arrow and Capron 1959:303).

The recurring cycles of shortages and surpluses of lawyers and engineers in the United States led some authors to study the factors affecting the supply of these workers (Freeman 1971, 1975; Cain, Freeman, Hansen 1973). It is suggested that the presence of a "cobweb" effect could explain these cycles. Decisions to enter the lengthy training required of engineers and lawyers are related to salaries paid at the time of decision. However the increased supply a few years hence exerts a downward pressure on starting salaries leading to less new entrants in schools, and eventually a short supply exacerbated by the lagged

adjustments in salaries. As these fluctuations are cyclical they can be predicted and "If the cobweb is stable, the swings between shortages and surpluses decrease over time, and gradually the process works itself out" (Meltz 1982a:41).

However this model did not apply to the situation of skilled tool and die makers studied by Meltz in Ontario because supply, in this case, varied as a result of immigration which in turn is related to employment opportunities rather than wage levels (Meltz 1982a:43). It may be also that such a model is not well suited to occupations where workers cannot easily obtain information about wages and where the time required for training is more difficult to evaluate because part of it is done within the firm and there may be wide variations among firms.

Economists recognize the impact of non economic factors on the motivations of workers to enter certain jobs or training programs (Cain, Freeman, Hansen 1973:38) and of the institutional factors that may slow down the wage adjustments (Arrow and Capron 1959:303), as well as the possibilities of utilizing other modes of adjustments to shortages such as substitution of other kinds of workers or upgrading of the existing work force (Cain, Freeman, Hansen 1973:64-5). However they all conclude that at least in the "long-run" and it is not clear how long that must be, rising relative wages will be the mechanism that increases supply and allows a return to equilibrium, this despite the "perennial problem of determining the alternative

occupations which provide a suitable basis of comparison for the wage and salary movements" (Cain, Freeman, Hansen 1973:63).

SOME CRITICS

The neoclassical model has been repeatedly challenged. Some authors argue that it is:

> so malleable that it can "explain virtually any set of observations...In any situation there are alternative actions each of which is consistent with the postulates of economic rationality (Mackay et al 1971:16).

Yet upon completion of their study of labour markets in the United Kingdom, these same authors concluded that "the economists' model gets a pass mark" (Mackay and al 1971:388). What is suggested is that greater attention be given to non economic factors in the labour market because "the conventional view does seem to be a fairly accurate, albeit incomplete picture of the workings of the labour market" (Piore 1973:377). Specifically the neoclassical model is blamed for not taking into account the non-pecuniary motivations guiding workers' choices of occupations and jobs (Blackburn and Mann 1979:8; Mace and Wilkinson 1977:2). It also disregards the dynamics within a firm where decisions about wages are made, as the model supposes that the firm has:

> no complex organization, no problems of control, no standard operating procedures, no budget, no

> controller, no aspiring young executives (Cyert and March 1963: 8).

Other non economic factors should also be considered in discussions of wages, such as the set of norms that evolve in a particular work place and finally the impact of collective bargaining (Piore 1973:377-379), which reflects union militancy and power.

Some authors contend that there is an overemphasis on wage rates as the signal and the mechanism to reduce shortages (Franke and Sobel 1970:6). In particular, there appear to be some circumstances in which shortages are widely acknowledged but wage rate changes don't reflect that fact (Meltz 1982a:28; Mackay and al 1971:74,84). The conventional model also ignores the possibility that employers may rapidly implement temporary measures, other than wage increases, to alleviate shortages that will at times even conceal the extent of a shortage (Thomas and Deaton 1977:43). Generally it can be concluded that critics of the conventional economic model reject the perspective where the labour market is considered "in terms of such simple constructs as supply and demand schedules" (Holt and David 1966:74) and suggest rather that the labour market should be viewed as

> a complex stochastic process that involves interaction among many participants. Their actions are governed by fairly complex relationships arising from the objectives and constraints of firms and families (Holt and David 1966:74).

This kind of perspective requires of course, extension of the theoretical model of the labour market and the development of different methods of inquiry that can take into account these relationships between actors in the labour market.

AN ALTERNATIVE MODEL: DUALISM IN THE LABOUR MARKET

In recent years one of the major challenges to the neoclassical view of the labour market has originated with scholars attempting to explain the chronic unemployment and underemployment faced by American black workers in the labour market (Gordon 1972; Piore 1979a:xiii). While there has been little attention given to shortages of labour within this paradigm, the model has implications for these studies, it should provide alternate explanations about how shortages would occur, where they would be located and the kinds of responses they would elicit.

The central proposition of this model is that contrary to the assumption of the neoclassical argument of an homogeneous market, there would be clearly defined segments in the labour market and

> the argument is that the behavior of the critical economic variables changes systematically as one moves across market segments and that variation is a reflection of differences in the behavioral patterns of workers and employers (Piore:1979a:xiii).

In the simplest version of this analysis there are two segments: a primary and a secondary one and the characteristics of jobs and

workers are different in each. The jobs in the primary sector generally offer high wages, good working conditions, including fringe benefits as well as opportunities for a "career" through defined mobility ladders within firms. The secondary labour market jobs are unstable, wages paid are lower, working conditions less advantageous and there is little upward mobility. These different kinds of jobs are filled by distinct groups of workers. In the primary sector, workers possess or acquire more skills, exhibit greater commitment to the labour force and form a disciplined, stable group; they are usually white, male, often unionized workers. In the secondary sector, ethnic minorities, women and youth are disproportionately represented (Piore 1979a:xii; Edwards 1979:165-77).

Within the primary segment, various tiers are found: an upper tier composed of professional and managerial jobs and a lower tier composed of jobs requiring some degree of skill, usually acquired on the job (Piore 1975:127). In this segment one is also likely to find internal labour markets where administrative rules govern the pricing and allocation of jobs (Doeringer and Piore 1971:1-2). However the position of craft jobs is rather problematic in this formulation as they exhibit some of the characteristics of lower tier jobs as well as of the upper tier ones (Piore 1980:19). In the secondary segment there are no such subsegments that have been defined so far, most jobs being it seems, uniformly unskilled and closely supervised.

INTERNAL LABOUR MARKETS

As noted above, an internal labour market would be operative within the primary sector and it has been described as:

> an administrative unit...within which the pricing and allocation of labor is set by a set of administrative rules and procedures (Doeringer and Piore 1971:1-2).

Jobs in internal labour markets are insulated to varying degrees from the constraints of the external labour market and this aspect makes them particularly relevant to a study on shortages as labour market behaviour would be to some extent, structured by the practices within firms. Employers in such markets will hire new workers in ports of entry jobs and over time through on the job training will provide them with firm specific skills. Jobs in these firms are arranged along more or less predetermined ladders and vacancies in upper levels are filled from within the plant. Wage rates are set according to a classification system that takes into account the tasks included in the job and evaluates the relative value of each job within a firm (Piore and Sabel:1984:113).

Returning to the issue of shortages of skilled labour, what are the implications suggested by models of labour market segmentation or dualism and by internal labour market propositions?

1. Shortages of skilled workers could only occur in the primary sector as jobs in the secondary sector are on the whole unskilled. This however assumes a rather clearer and consistent distinction between primary and secondary than is actually found as will be shown later in this chapter. Of course if there are various understandings of what constitute skilled workers, shortages of these workers could be announced in the secondary sector too. As will be seen further on, the definition of skill can be problematic.

2. At first sight, one would expect few instances of critical shortages of skilled workers in the primary sector, where there are internal labour markets, and when this situation arises it should be of limited duration. One of the characteristics of internal labour markets in this sector is the arrangement of jobs in ladders and the possibility of mobility. Furthermore, employers are said to accept and even promote internal labour markets as a means to retain workers they have trained in firm specific skills (Doeringer and Piore 1971:14,27). One might conclude that these practices would ensure a supply of trained or partly trained workers to fill the vacancies even if unanticipated demand increases rapidly.

However, there are some grounds for an alternative conclusion. Not as much training as one might expect is done in the firms, and this combined with the wage rigidity in internal markets would account for shortages (Osterman 1984:4). Furthermore the very narrow job classifications often used in North

America might reduce training possibilities and inhibit mobility. The mobility patterns may also be rather unclear and not as open as expected (Blackburn and Mann 1979:26); upward movement through promotions may be partly due to "cronyism and favoritism" (Sabel 1984:61); discontinuities in skill may limit the training possibilities within firms and inhibit internal mobility into skilled jobs. (Mackay and al 1971:299). Finally the employer "has little control over who gets distributed where in organizations where layoffs and redistribution of jobs are done through strict seniority rules" (Piore 1980:43-4). In other words, in practice, internal labour markets are less obviously efficient devices for training workers than they are in many theorizations.

3. Adjustments to shortages would also be different in internal labour markets. The internal allocative structure is "a factor which inhibits the responsiveness of the internal wage structure to external competitive forces" (Doeringer and Piore 1971:97), and other types of adjustments such as over-time, subcontracting and/or changes in hiring standards, were preferred (Doeringer and Piore 1971:101-5). Furthermore as Osterman suggests in a thought provoking article, there is likely to be more than one internal labour market within a firm (Osterman 1984:166) and this would also introduce much more variation in the ways in which shortages would occur and how they would be resolved. For example, as Osterman explains, in the craft subsystem (or internal labour market) "firms have limited control

over training" (1984:169). If they do engage in training they may increase the mobility of these workers. Subcontracting may be a more efficient method of coping with shortages in this internal labour market while increased training would be more useful in an industrial subsystem where jobs are arranged along a ladder-like structure. If a secondary subsystem is also present (where jobs have few advancement opportunities and are not skilled), changes may be made in the design of work tasks (1984:168).

4. Doeringer and Piore linking the internal labour market model to queue theory suggest that there is movement from the secondary sector to the primary one especially in tight labour markets when "primary employers are forced to move down the queue and eventually reach those at the back" (Doeringer and Piore 1971:168-9). This of course would make wage increases unnecessary for a while anyway, providing there is a store of the requisite skills in the secondary sector, that is to say, that the secondary sector provides a "reserve army of labour" of sorts. This was the case in Canada in the 1950's when skilled immigrant workers hitherto confined to secondary jobs, provided such a pool (Canada 1957:23).

The dual labour market model as described above focuses on worker and job characteristics. One might ask, where are those jobs in the economy? In what kinds of firms? The issue is of particular relevance when examining shortages of skilled labour. Strategies for resolving shortages are initiated within

the firm and it cannot be assumed that only one strategy is possible. One would expect that different types of firms would on the one hand have different labour needs in terms of skill and on the other hand when faced with shortages would choose adjustments that are as effective as possible given the environmental conditions of the firm. Industry location may therefore be important and may help understand labour market strategies.

However as noted by Zucker and Rosenstein, researchers studying dualism in the labour market have, until lately, paid little attention to industrial differentiation (1979:869) which has been the focus of scholars interested in dualism in the economy. For this group the important distinctions are between firms in the core sector, usually large oligopolistic firms and those in the periphery usually small competitive firms. Much work went into assigning different industries in each sector (Wallace and Kalleberg 1981; Beck, Horan and Tolbert 1978). However an attempt to link sectoral differentiations to labour market characteristics as defined by labour market dualists yielded little (Zucker and Rosenstein 1979). These kinds of results lend credence to the warning that linkages between the usual dual economy typologies and labour market sector may be misleading. There are some "bad" jobs and disadvantaged workers in large core firms and some small firms offer very "good" jobs (Piore 1980:57). The question addressed is where are the secondary jobs and which firms offer primary jobs. Recent work suggests

that an answer may be provided through an analysis of the foundations of dualism (Piore 1980; Sabel 1982; Sabel and Piore 1984).

DUALISM IN THE ECONOMY, DUALISM IN THE LABOUR MARKET

It is argued that as mass production technology became the dominant mode of production, large stable markets were required to absorb the goods produced and justify the large investments in capital intensive equipment. Segmentation of markets became an appropriate strategy:

> The strategy was to divide the market, retain the base level of demand for the corporation's mass production plants and leave the rest for smaller producers (which presumably used more flexible production techniques whose cost characteristics approximated those of the craft technology) (Sabel and Piore 1984:56).

This of course would affect the skill requirements of workers in each sector. In the sector where mass production and specialized machinery is used:

> A few come to have jobs requiring ever more sophisticated and general knowledge, the rest are assigned increasingly routine and specialized tasks. Firms of the second kind are smaller, they face fluctuating demand and live in the shadow of the first group. They pursue short-term investment strategies requiring less-specialized use of labor and often employing techniques discarded by the larger firms (Sabel 1982:31).

This pattern can exist within every industry and "At the fringe of almost every industry, therefore, small firms survive by supplying a changing variety of oddments or responding to surges in demand" (Piore and Sabel 1984:27).

> The model thus suggests that each branch of industry or group of firms producing related goods can be divided into two sectors...A primary sector...will employ the technologically most advanced division of labor...The secondary sector composed of peripheral firms will use less-refined and less product-specific techniques of production; it will principally satisfy the fluctuating component of demand (Sabel 1981:35).

These two sectors do not merely exist side by side, rather they are complementary: in many cases, smaller firms are subcontractors for the larger ones. It appears that a

> second and contrary form of production is inherent in the logic of mass production...dualism interprets modern craft production as a necessary complement to mass production...Mass production is seen as the technologically dynamic form, and specialty production its subordinate (Piore and Sabel 1984:27-28).

Different technological bases for production would require a different mix of skills if not completely different ones. Sabel argues that two classes of workers will be found in the secondary sector.

> The first, which included the great majority, either have no skills or have informally acquired capacities that are taken so for granted that employers do not have to regard them as skill at all. The second kind of workers are broadly skilled craftsmen who install, maintain, and supervise the operation of capital equipment (Sabel 1982:48).

The secondary sector jobs are therefore not homogeneously "bad" jobs in terms of skills to be used and the opportunity they offer for autonomy and interest. Rather some "job tasks are split into a set of very complex operations that require craftsmen" (Piore 1979b:116) and other jobs (that are unskilled). What we have is a dichotomy in the skill structure with little or no possibility of bridging the gap between them.

In the primary sector, where mass production is the dominant technology there are three possibilities and they exist side by side. Firstly the increased division of labour will bring about deskilling in some jobs. Secondly it will also foster demand for new skills; older skills can be modified and semiskilled work can be upgraded. Thirdly there will be increased demand for what Sabel calls the "intermediate range of skills between those upgraded by advances in production techniques and those reduced to the point where they are not officially acknowledged as skills at all" (1982:57-9). Those skills would be the firm specific skills that are "indispensable to production" (1982:59) and that must be learned on the job through the training processes and mobility patterns characteristic of internal labour markets.

Returning to descriptions of secondary and primary sectors it may well be that in these smaller firms some characteristics of secondary jobs are found: greater instability while other characteristics such as skill levels and autonomy on the job are usually associated with primary lower tier jobs. The

implications of the above in a study of shortages would be as follows:

1. Shortages of skilled workers would be more likely to occur in those firms still using all purpose machinery and multi-skilled workers. These are the firms that are in a more competitive environment. It would follow that the adjustment measures they would choose would reflect this situation and be those predicted in the neoclassical model of labour market adjustment to shortages.

2. If shortages of skilled workers also occur in the primary sector, the rigidities associated with internal labour markets would constrain wage adjustments and lead firms to use a different set of adjustments.

3. Finally, if shortages of skilled workers are felt in the whole of an industry, given the interdependence of smaller firms and larger firms, as well as the different types of constraints we would expect competition between the two types of firm for labour. The ways this could be resolved raises questions not yet addressed specifically in the literature, although at least one author noted that in a labour market where large dominant firms coexist with smaller dependent ones, (often subcontractors), there will be an inevitable transfer of the practices of large firms to smaller ones as the latter try to remain competitive in the labour market (Freysinnet 1982:11). Furthermore if, as Osterman has suggested, there are many internal labour markets within a firm (1984:166) there may be variations in the ways

shortages for different kinds of workers are dealt with. However one would expect that even if there are different subsystems, there would be some rules and procedures that would apply to all as well as special provisions made for others (Osterman 1984:167).

WHAT IS SKILL?

Another contentious issue related to the perception of shortage as well as to discussions of adjustments is that of skill, especially in the blue collar occupations in manufacturing. In his influential book Labor And Monopoly Capital H. Braverman (1974) argues that the application of Scientific Management principles in American manufacturing firms brought the loss of traditional craft knowledge. The constant debasing of skills has led to the term skilled being applied to individuals who possess in fact only narrow partial skills (Braverman 1974:426-29). If one takes Braverman seriously it is difficult to see where shortages of skilled workers would come from. Other authors contend that to the contrary the level of skills required will constantly increase (Canada 1957:2) or that as traditional skills become obsolete emphasis will be on responsibility rather than technical skill (Blauner 1964:133; Mallet 1963:110-11,116). Yet again some authors provide evidence that there may have been some measure of deskilling in certain occupations but

increases in skill levels in others. (Bright 1966:208; Peitchinis 1978:88; Sabel 1982:57).

Whether or not the occupation of machinist - the one emphasized by Braverman - (1974:202) has been deskilled still generates controversy. His position is supported by Noble (1984:242-3) while other evidence is presented indicating that high level skills are still much needed (Sabel 1982:66;73-7). However the patterns of skill retention or skill debasing may vary widely (Hartmann et al 1983; Wilkinson 1984, Wilson 1984). In the latter studies management choices in work organization and the ensuing consequences for the maintenance of skill levels are always emphasized.

In fact it has been suggested that different definitions are applied to the term skill: a technicist one emphasizing cognitive abilities and a behavioural one stressing personal traits (Oliver and Turton 1982:195;). Radical theorists such as Edwards insist on the importance for capitalists to maintain control over their work force. (Edwards 1976:557). This would impel employers to seek workers who offer those traits that insure proper compliant behaviour and help resolve their problem of control. The skills in demand would refer to traits such as dependability and reliability. (Edwards 1976:54; Edwards 1979:150; Bowles and Gintis 1976:94-5). Survey evidence indicates that employers are vague when describing skill requirements, they insist on worker quality, but this does not necessarily imply possession of specific educational requirements, but would include

"initiative, motivation or a good job record" (Franke and Sobel 1970:196,200). Skilled workers would be those "good" workers possessing "blue collar virtues" to paraphrase O'Toole (1977:117). A technicist conception is reflected in the definition of skills as the "physical, perceptual and conceptual aptitudes and abilities required to perform a task" (Wilson 1986:7).

It has also been pointed out that skill within a plant refers to the place and status of certain groups of people and it therefore reflects more sociological aspects of skill. (Sadler 1970:22; Littler 1982:9). Indeed French studies have found that the distinction between skilled and unskilled workers is an artefact of the classification systems elaborated by management rather than a reflection of technical skills required by the task (Destefanis and Foucher 1979:23,47). British authors reached similar conclusions when examining the differences between skilled and semiskilled workers, (see the evidence reviewed in Blackburn and Mann 1979:27) while skilled workers were understood to be those who possessed technical knowledge and abilities acquired through formal training but would also show "a separate work ethos and attitude to life " (Blackburn and Mann 1979:39).

Moreover if the skills needed are increasingly firm specific, and there is some evidence that that may be so (Peitchinis 1978:39, Piore and Sabel 1984:23;86), the correspondence between a given set of skills and an occupation becomes blurred.

> As workers become more specialized, their earning ability depended increasingly on their industrial job: as machinery became more and more dedicated to

> the production of a particular product, skills came to mean familiarity with the idiosyncracies of a particular plant's equipment. A worker was thus paid for exercising discretion based on this familiarity, detached from this specialized job, he was suddenly an unskilled worker. (Piore and Sabel 1984:51)

Obviously the way employers define skills will influence their perceptions of shortages of skilled labour and determine to a large extent the types of responses to the problem. It also has important implications for the kinds of programs governments and other institutions will set up to provide an adequate supply of skilled workers.

DEFINING AND MEASURING SHORTAGES

The behaviour of wage rates may signal a disequilibrium between supply and demand of labour and increases in relative wages may indicate that a shortage exists. However the term shortage could have other meanings as pointed out in the lists provided by Folk (1970:3-4) and Denton and Spencer (1978:102-3). For instance the term shortage could refer to a situation where demand has increased more rapidly than supply, where projected supply is seen as falling short of projected demand, where employers cannot afford to pay salaries demanded; where supply is not as plentiful as might be "desirable" either to insure growth or facilitate adjustments. The pool of abilities in certain fields may be seen as limited or supply is inelastic and does not respond easily to increased wages or other measures

of adjustment. Shortages may be said to exist when the time required to find a worker is longer than usual (Franke and Sobel 1970:155).

Commenting on reports of shortages of machinists, Noble suggested that "Shortages, after all...are in the eyes of the beholder...a shortage might be perceived not for skilled machinists but for skilled machinists who look like what skilled machinists used to look like...a middle-aged, white, plaid-shirted male" (1984:337). Again there may be sufficient supply of workers in an occupation at the entrance level but inadequate supply of workers with experience (Trottier 1978:46-8). Indeed there appears to be "no clear operational definition of the term shortage" (Arrow and Capron 1959:290). It is also not known "how long must a shortage last before it is considered to be a serious imbalance between the demand for and the supply of a particular group of workers" (Ginzberg 1979:119), or is there "some critical level below which the labour supply is inadequate" (Denton and Spencer 1978:102). When defining a shortage too often no account is taken of the adjustments that can be made rapidly by employers (such as overtime) that conceal the extent of a shortage (Thomas and Deaton 1977:43).

There are also difficulties associated with measuring the presence and extent of shortages. While economists' emphasis on the behaviour of wage rates as a means to identify shortages has been criticized it must however be recognized that other methods of assessing the presence of shortages have not yielded

very encouraging results: "In view of all the discussion on the shortage problem, it is remarkable how little direct evidence is available" (Arrow and Capron 1959:296). This is not surprising since "there is little agreement as to the criteria to be used to assess the presence of a shortage" (Ginzberg 1979:119).

In Canada there have been constant laments about the lack of labour market data in general, data about job vacancies, or occupational skills in demand that would allow meaningful analysis (Newton et al 1981:95; Economic Council 1982:37; Meltz 1982b). The kinds of data available could be those related to job vacancies in certain occupations, to the ratio of job openings to number of unemployed in an occupation. Forecasting models may provide warning and measurement of an impending shortage. Employers could also be surveyed to obtain their assessment of the situation.

Data on job vacancies are often deemed dubious. Researchers in the United Kingdom estimated that official vacancy statistics understated demand (Mackay et al 1971:392) while an American author felt that official data rather tended to overstate the numerical shortage or at least did not provide data detailed enough to give reliable quantification of shortages (Rosenthal 1982:36). Even agencies responsible for gathering such data recognize its limitations:

> The definition of a job vacancy is itself a matter of considerable difficulty and is likely to depend ultimately on the development of a more complete theory of the labour market. This is even more true of the definitions of different classes of job vacancy

> (e.g. long duration, hard to fill, future starting date vacancies) (Canada 1972:11)

An upcoming chapter on evidence of shortages in Canada examines in detail these statistics.

Statistics on unemployment and vacancies examined together could provide some evidence of the presence of shortages if as expected they move in different directions (Gujarati 1972:195). However this does not seem to always be the case as some studies present data showing that vacancy rates increased in certain years with little change in unemployment rates (Cousineau and Green 1976:182-3; Skolnik and Siddiqui 1976; Economic Council 1976:123). "Choosiness" on the part of workers willing to tolerate longer periods of unemployment because of better benefits (Cousineau and Green 1978:185) as well as other changes in institutional arrangements may have modified the significance of the aggregate unemployment rate as a reliable indicator of supply (Economic Council 1976:24; Economic Council 1982:8-10). For another researcher the relationship between unemployment and vacancies is a recent phenomenon in Canada:

> Legislated changes in unemployment insurance and demographic changes in the age-sex composition of the labour force in the early 1970's made the unemployment rate an inadequate general indicator of capacity pressures and labour market tightness in the economy (Foot 1980:32-3).

Furthermore a situation of vacancies and unemployment may coexist given "the complex random process of job seeking, and the lack of perfect knowledge" (Holt and David 1966:94). It is also

suggested that "A further part of the explanation is that many of the supposed vacancies do not actually exist at present, but are highly dependent upon uncertain capital investment plans" (Skolnik and Siddiqui 1976:33). Another objection would be that the practice of using the ratio of job openings to the number of unemployed or even the number of applicants bypasses the question of suitability of workers. Finally vacancies reported to government agencies in the form of job orders in employment centers cannot provide an adequate picture since it is estimated that only 10 to 15% of all job openings are thus reported in the United States and Canada (Economic Council 1976:16,132; Meltz, 1982a:17; Rosenthal 1982:35;). At best then official statistics provide a rough measure of those occupations in demand and combined with unemployment statistics they describe approximately the employment conditions facing different groups.

> When one attempts to go any further than this, one rapidly reaches dangerous ground for as a cardinal measure of labour demand and as a statement of a plant's actual labour requirements, vacancy statistics contain some serious biases (Mackay et al 1971:410-11).

Other authors have drawn attention to the socially based biases in official labour statistics (Beardsworth et al 1982:45). Employers may decide to report or not vacancies, the government agency will determine how to register it and process it; potential employees will decide if the job is suitable or not. Decisions at each point determine the number of vacancies reported, how long they remain open and how many individuals hear about them.

If it has proven difficult to define and measure shortages adequately, it has also proven hazardous to rely on forecasting to signal impending shortages. Macroeconomic models in use, in Canada anyway, have not provided clear indications as to the demand and supply situation except in a very aggregated form and "none of the models explicitly incorporated the occupational demand dimension" (Economic Council 1982:13). Forecasting models also do not take into account adjustment by employers or by workers under different employment conditions (Canada 1981a:118). Forecasting exercises have also been performed too irregularly to be useful as a planning tool (Newton and al 1981:99). Forecasting labour demand and eventual shortages through the use of employment growth data may also be misleading. The Economic Council of Canada noted that the needs generated by rapid growth in certain occupations could be met by adequate supplies while even moderate growth in other occupations could mean increased unfilled vacancies and eventual shortages (Economic Council 1982:20). The factors that must be considered in employment forecasting exercises are numerous and may vary by economic region as well as by occupational group. "Social trends and expectations can be largely untractable and difficult to combine with other more conventional indicators. These unresolved difficulties may leave us with forecasts as educated impressions" (Dodge 1977:22). Finally the methodology used for employment projections is also problematic:

> The technique used...is based on the assumption of fixed occupational shares of employment within industry sectors...These shares are then simply applied to projections of employment for the various industries in order to estimate occupational projections. The difficulty with this approach stems from the absence of frequent, regular, and continuing observations, thus precluding the availability of time series data that would show, from year to year, the shifts in the patterns of occupational employment reflecting changes in technology for example (Economic Council 1982:13).

On a microlevel, it was found that "managements attached little importance to manpower forecasts" and where such exercises were done it covered at most a year ahead. (Mackay et al 1971:343).

Evidence of shortages could be obtained through employer surveys documenting their experiences and perceptions of staffing problems. While this method has provided useful data, it can be unreliable as employers do not keep detailed records of vacancies and often cannot even estimate them (Wingeard 1966:349; Franke and Sobel 1970:201; Newton 1981:99). This situation can be explained by the employers' lack of interest and lack of skills in manpower planning (Denton 1981:341). There may also be some incentive on their part to overstate demand in order to convince government to implement training programs or to increase supply and "hoard" labour. While it may prove quite difficult to obtain a definition of shortage that would satisfy all concerned it would appear that in order to measure adequately the extent of a shortage and its nature, data is needed about number of job vacancies in a given occupation, length of search, wages offered,

working conditions as well as the skill requirements; on the supply side knowledge is needed about the number of unemployed, suitable workers, levels of skills, pay requirements as well as patterns of mobility from occupation to occupation. This is a tall order in the present state of labour market data.

STUDIES OF SHORTAGES

There have been relatively few in-depth studies devoted strictly to labour shortages. From time to time surveys have been conducted and the results published along with narrative descriptions with little theoretical underpinning. These studies are discussed in the section on Canadian evidence of shortages.

Studies that do focus on the behaviour of labour markets where shortages have been announced either propose formal models to study imbalances of labour (Cain, Freeman, Hansen:1973) or they have sought to refute or complement some of the assumptions of the neoclassical model of the labour market (Franke and Sobel 1970; Mackay and al 1971; Folk 1971; Thomas and Deaton 1977; Meltz 1982). In the first case aggregate data are used while in the other there is some reliance on aggregated data and official statistics but data of a more qualitative kind, usually interviews have been extensively used.

In a study of shortages of engineers in the United States (Cain, Freeman and Hansen 1973) various methods for predicting demand and supply are examined and their shortcomings

explained. On the demand side, estimating production functions is seen as imprecise if the productivity of workers in the occupations studied cannot be evaluated precisely. This would be the case for engineers. (1973:27). Derived demand calculations use the number of workers as the dependent variable while " wage rates and different variables which shift the demand function are treated as independent variables" (1973:28). The major drawback of such an approach is that it "ignores the feedback effects of salary changes" (1973:29). Forecasting exercises only provide rough approximations (1973:31) and of course employer surveys are easily misleading; as the source of information may not be as reliable as wished, they can only yield "naive forecasts that provide a basis of comparison with other methods" (1973:32).

Estimating the supply side of the equation, these authors refer to theories of occupational choice and the motivations to enter into lengthy training. Beginning wages are obviously important here but there are difficulties associated with estimating the impact of psychological and sociological factors bearing upon career decisions (1973:40). This type of analysis would also neglect to examine the behaviour of the "existing stock of workers"(1973:45) who when contemplating job changes will also consider other aspects of the job situation along with wages (1973:43). This kind of study therefore concentrates on specifying the estimates of the parameters to be included in the demand-supply equation.

Other studies (Franke and Sobel 1970, Thomas and Deaton 1977) concerned with shortages have given priority to methods of appraising the existence and extent of shortages, to the non economic factors influencing supply of labour, and to the adjustment process. The theoretical framework used seeks to include those non-economic factors present in the labour market processes while usually falling short of presenting integrated, all encompassing models of the labour market.

It is noteworthy that in most studies the underlying causes of shortages have usually not warranted detailed empirical investigation. This could be explained by the difficulties associated with finding appropriate measures of shortages. Employment trends in the occupations studied are usually noted and increases in total employment are assumed to be related to greater demand which would be the primary cause of shortages (Franke and Sobel 1970:49; Mackay and al 1971:62). The role of government spending is noted as one factor bringing on increased rapid demand (Cain, Freeman Hansen 1973:33; Arrow and Capron 1959:302-3; Folk 1971:32-4). Failure to expand training facilities or make use of other sources of supply as well as delays in adjusting wages are seen as causes of shortages (Franke and Sobel 1970). In some cases a dwindling supply insufficient to provide replacements in the existing work force is the signal of an oncoming shortage (Franke and Sobel 1970:182).

The emphasis of most studies has been rather on the factors affecting supply of labour and/or those affecting responses. An example of the former is the study by Franke and Sobel of the labour markets for health care and industrial occupations in Chicago, St. Louis and Pittsburg. These authors set out to examine "the institutional arrangements through which workers are prepared for and employed in jobs...to identify barriers to entry...and how educational institutions react to shortages" (1970:7). This perspective yielded fruitful analysis and results in the case of occupations where entry requirements are fairly clearly defined and the route into an occupation is through formal training. This was the case for the health care occupations they studied: licensed practical nurses and medical technologists. They did find that the training facilities operated below capacity and were rather slow in responding to changed employment conditions (Franke and Sobel 1970:107). It is not clear however why there was so little responsiveness. Information about opportunities in these occupations and the availability of counselling (1970:83) or even general information given to the public (1970:86) was deficient.

In the case of industrial occupations (in metalworking) access routes are much more flexible and educational requirements not as strict. Examining enrollments in specific training programs would not allow a complete assessment of the potential supply. However Franke and Sobel found that vocational guidance and counselling were lacking mostly because counselors knew

little about the occupations (1970:195) and because of what the authors saw as the overemphasis in American high schools on the desirability of a college education (1970:213).

ADJUSTMENTS TO SHORTAGES

The adjustments used by employers to respond to shortages are the subject of more detailed study. The following paragraphs will only briefly outline the main thrusts of these studies and summarize the principal conclusions as a lengthy and detailed discussion of adjustment measures is included in a later chapter on responses to shortages.

Discussions of adjustments to shortages emphasize analysis at the microlevel, focusing on the factors influencing the decision making process at the plant level (Mackay et al 1971:9; Thomas and Deaton 1977:4). A suitable theoretical framework to understand these responses could be one stressing the cost minimizing behaviour of employers. However Doeringer and Piore did not find that kind of hypothesis sufficiently powerful (1971:95), while Mackay and al found it only moderately useful (1971:387-8). Thomas and Deaton however explicitly used a model postulating cost minimizing behaviour on the part of employers but important refinements were introduced. They argue that employers will base their decisions on cost considerations but these costs vary over time periods, they therefore suggest "adopting an investment type approach where the costs of various

possible sets of adjustments are discounted overtime." (1977:30). Secondly constraints, which may be organizational (competition between departments is an example) or institutional (the presence of a union) (1977:4;35) will also orient the course of action. Knowledge of these constraints and how they affect different adjustment possibilities is required (1977:37). Finally the distinction between temporary and permanent adjustments, which are related to constraints and uncertainties faced by firms must be made (1977:37).

Their analysis of adjustments in three occupations did indicate that costs are considered but without an understanding of constraints the first part of the model had little explanatory power (1977:192). Overall "the cost-minimizing hypothesis appears to work to a limited extent" (1977:195). The constraints under which employers must operate are varied and are related to the external environment of the firm as well as to its internal organization. The external environment imposes constraints in the following ways: quality standards may be set by governments or other regulatory agencies (for example in the case of the quantity and quality of education to be given;) (Thomas and Deaton 1977:108;111), supply may be limited by rigidities in outside training institutions (Franke and Sobel 1970:110-3;134-5); national programmes such as income policies will limit adjustment through wage increases (Thomas and Deaton 1977:92;156).

Organizational constraints may come from union policies and agreements restricting the use of part-time workers (Thomas and Deaton 1977:76) of overtime (1977:63) or of subcontracting (1977:166). Company wide policies concerning pay rates or mobility patterns may hamper adjustment in a local labour market (Thomas and Deaton 1977:59). The presence of internal labour markets make changes in the compensation and allocative structures extremely costly (Doeringer and Piore1971:98-9) while attachment to past practices also reduces the range of acceptable responses (Mackay et al 1971:397). Technical constraints may also be present. Capital substitution is often dependent on "the nature of the product and size of firm" (Thomas and Deaton 1977:172), as well as on the adjustments it requires in plant layout, deployment of the labour force and long term use.

Cost considerations are certainly an important element in choosing adjustments but the effects on organizational structure and practices are also important. It probably explains why often "adjustment is the sum total of different discrete small changes at the margin" (Franke and Sobel1970:297) and will "tend to involve small departures from the existing arrangements rather than major changes" (Thomas and Deaton 1977:36). This kind of pattern was also reported by Doeringer and Piore (1971:101).

The degree of constraint will influence the decision making process in another way: adjustments less likely to disrupt existing organizational arrangements can be made on a habitual basis (Doeringer and Piore 1971:101) and one supposes by lower

level managers, while other measures such as changes in compensation policy, in the job and mobility structure are "each...the subject of its own decision making process" (1971:97). Evidence presented in the study by Thomas and Deaton especially, supports a view that non economic variables exert a strong influence on the adjustment process and furthermore these measures can be interdependent while their impact in different time periods and in different firms may be different.

The importance of wage rates as a regulatory mechanism may have been overemphasized by economists but it cannot and has not been forgotten in these studies. Interviews with employers repeatedly highlighted their reluctance to increase wages as a means of adjustment (Franke and Sobel 1970:297). Yet

> Although considerable evidence existed of attempts to restrain wage increases through administrative arrangements among the hospitals, relative wage and salary movements were on that upward direction which would be anticipated in a situation of labor scarcity (Franke and Sobel 1970:290).

Thomas and Deaton report similarly (1977:159) and a Canadian study indicates that after overtime, wage increases were the most frequent response to scarcity of tool and die makers (Meltz 1982a:33).

It is the study by Mackay and his colleagues of labour markets in five different areas that examined the behaviour of wages most closely. They found that relative wages and differentials between occupations did not respond rapidly to changing labour market conditions. Interplant differentials were long

standing and "there are plants which in all or most periods are high or low payers" (1971:84). Furthermore there was not much labour mobility between these two types of plants, probably because of incomplete information and the benefits offered to "stable" employees (1971:86-7). Relativities between groups within plants were also quite stable and they suggest that "social pressures can affect wage settlements...and their influence is likely to be particularly powerful at the local, or plant level" (1971:100). In a situation of scarcity for a particular group of workers, adjustments to the internal wage structure could be made in "different guises" (1971:113) such as bonus payments or overtime without modifying the whole pay structure. In areas where recruiting difficulties brought about increases in wages, these were granted "across the board" or increases gained by one group of workers were soon granted to the other groups within the plant (1971:130). They also found that wage differentials related to skill varied greatly among plants concluding that:

> there is no such thing as a skill differential determined by market forces, nor is there an accepted relationship between the earnings of different groups which the employee carries with him as he moves from plant to plant (1971:118).

These authors concluded that the evidence they had collected indicated that the assumptions of a strict economic model were unrealistic (1971:387) and the impact of non-economic factors had to be taken into account. Specifically plant specific factors were important:

> an employee's increase in earnings over any substantial period will depend more on the plant in which he is employed than in the external employment conditions for the particular skill he possesses (1971:400).

There is rather convincing evidence that an understanding of the workings of the labour market requires the input of non economic variables, and that variables related to the particular organization of a plant are especially important but the literature on shortages of labour has as yet devoted little attention to identifying and specifying these variables.

CHAPTER 2

EVIDENCE OF SHORTAGES IN CANADA

> Canada pays millions every year to the superior artists and artisans of other countries every cent of which represents a foreign tax voluntarily paid in consequence of ignorance and want of skill at home.
>
> excerpt from a letter written in March 1899 by Cecil Bethune Secretary of the Ottawa Board of Trade to the Secretary of the Toronto Board of Trade.

INTRODUCTION

These comments would indicate that shortages of skilled workers have been a concern from early on in Canada. However the problem is still with us as evidenced by the numerous reports and studies on imbalances in the labour market that were published in the last few years as well as the cries of alarm that are voiced regularly by representatives of business in Canada. In response to this alleged problem the federal government introduced in 1982 the National Training Act updating the Adult Occupational Act. It was felt that despite the considerable sums spent on training adults[1] renewed emphasis must be placed on programs that would help reduce labour market imbalances and specifically labour shortages. A special program was set up: Critical Trade Skills Training (CTST) to alleviate the shortage of skilled workers. A pamphlet issued by Employment and Immigration states that the objective of the program is: "to encourage industry to

develop and expand the training of Canadian tradesmen or workers in skilled occupations which experience chronic shortages."

Financial support is provided for up to two years and a half, the time estimated to reach the proficiency level in a given occupation. A national list of eligible occupations (adjusted in each region) was drawn up focusing on these skills deemed in short supply. In the province of Quebec the designated occupations include tool and die makers and machinists[2]. The inclusion of these trades was based on information available about shortages in these occupations. As we will see in the following pages, while there is general agreement on the existence of shortages of skilled workers, it is remarkable how little reliable data is available to support those claims.

In this chapter I will review some of the claims and the evidence on shortages presented in various surveys and reports. I have restricted my comments to those studies presenting evidence on shortages in the 1970's (except in one case) and especially in the occupations of tool and die maker, machinist and machine operators. These studies include reports by government agencies such as Skilled and Professional Manpower in Canada, 1945-1965, prepared for the Royal Commission on Canada's Economic Prospects by the Department of Labour in 1957. More recent government studies are The Labour Market Development Task Force (known as the Dodge Report), sponsored by the Employment and Immigration Commission (1981) and the report done by the Parliamentary Task Force on Employment Opportunities for the 80's: Work For Tomorrow

(1981). The Economic Council of Canada commissioned the Human Resources Survey (Betcherman 1982) and then published In Short Supply: Jobs And Skills in the 1980's (1982). In Montreal specific attention was given to the claims of shortages of machinists (Trottier 1977) while a special study was done on the shortages of tool and die makers in Ontario (Meltz 1982a). Industrial associations sometimes publish the results of surveys done amongst their members: the reports published by the Machinery and Equipment Manufacturing Association of Canada (MEMAC 1979,1981) are particularly pertinent to this study.

Many of these studies also address issues such as unemployment, vocational training, and government policy. However the aim here is to examine the evidence they present on shortages of tool and die makers, machinists and machine tool operators and the upcoming discussion is thus restricted to the comments and analysis offered in these studies on this topic and for these occupations. Comparisons with other trades would of course be interesting but in order to keep the study within manageable limits, this has not been done.

I will then examine the evidence gathered in the "operational" reports produced by the Canada Employment and Immigration Commission (CEIC) in Montreal. Finally the statistics provided by the Job Vacancy Survey are also examined.[3] These studies and reports should provide the evidence that would support and justify government policy and spending on vocational training in skilled trades.

A LOOK AT THE PAST

The Department of Labour at the request of the Royal Commission on Canada's Economic Prospects produced in 1957 a report on skilled and professional manpower in Canada covering the years 1945-1965. The researchers noted that "there were many periods in the past decade when available supplies in numerous occupations were not sufficient to match requirements" (Canada 1957:vii). The study examined past trends as well as proposing projections for the future. There were three periods of rapid economic growth between 1945 and 1955 and shortages were reported for two of these but the patterns of shortages vary and their resolution is due to slighly different factors.

The immediate post war expansion of 1947-1948 brought shortages in a number of occupations. However the occupations studied here: machinists, tool and die makers were not reported in short supply, but for the group labelled "other machine shop workers" there were shortages in some quarters of 1947 and 1948 but not on a continuous basis. Unfortunately no information is provided as to the occupations covered by the rather vague term "other machine shop workers". Rather the most severe shortages reported are in the construction trades such as bricklayers and cement finishers. This of course would be expected given the surge in residential and commercial construction following the war. The large numbers of army veterans recently demobilized

and the skilled workers released from war time industries facilited adjustment (:15) but this period was still the one when the most severe shortages existed as immigration was limited and the unemployment rate averaged 2% (:14).

With the expansion brought on by the Korean war defence buildup in 1950-1953, shortages of skilled workers become a concern again. From the last quarter of 1950 up to the first quarter of 1953 shortages are reported for machinists, toolmakers and diesetters, less prevalent were shortages for "other machine shop workers". Aircraft workers were also difficult to recruit. It will be noted that these categories of workers had not been in shortage during the previous period but given the fact that "defence contracts in the durable goods industries required elaborate tooling procedures and many short runs of complex military items" (:17), shortages of workers in metal-working occupations are not surprising. The authors note that immigration at that time helped ease the situation somewhat (:17). Economic activity declined by the end of 1953 and continued to do so in 1954.

The years 1955-56 witnessed a vigorous recovery and the employment expansion of 1955 was the sharpest recorded in the postwar period and was concentrated largely in industries employing relatively large numbers of skilled workers (:19). However there are no marked shortages in the machining occupations or in any others for that matter. This is explained

by the dramatic contribution made by immigrant workers: "In fact, had it not been for immigration on this very large scale, very intense countrywide shortages would undoubtedly have developed in many of the skilled occupations" (:20).

Immigration of skilled workers had increased dramatically; from 3,706 who entered the country in 1951, the numbers jumped to 25,942 in 1951 and remained at between 14,500 to 16,500 for the years until 1954[4]. In fact "it is estimated that in 1951... some 33% of all non farm immigrant workers were skilled" (:60). However "The large numbers of immigrants who entered the country in 1951 could not be into integrated into employment quickly enough to meet the great increase in requirements that occurred that year" (:17). Employers did take advantage of this increased supply of workers in later years: in the Working Conditions Survey of 1956, 35% of the firms reported that they met some of their requirements by hiring immigrants. The authors quite reasonably suggest that many of these skilled workers had probably accepted jobs at lower skills levels and became in fact a "reserve of labour" as "immigrant skilled tradesmen, can in effect, be stockpiled in jobs of lesser skill and be available to meet expanding requirements as they arise" (:23).

How were shortages assessed in this study? The researchers at the Department of Labour concluded there was a shortage if the vacancies listed by employers with the National Employment Service (NES) amounted to 50% or more of the number of people registered with the service. This measure was chosen

because according to the authors, market imperfections and especially the fact that employers are not required to report their vacancies to the NES leads to an underestimation of demand. They recognize that "The statistics on registrations are, on the whole, a more complete measure of labour supply than are vacancies of labour requirements" (:13). Still the 50% figure seems rather arbitrary as there is no estimation of what proportion of total vacancies were in fact reported to NES.

To assess the extent of demand the authors of this report considered the increases in investment expenditures, industrial production, and employment in various industries. There may not be an exact positive relationship between investment expenditures, industrial production and increases in employment, especially when looking at skilled workers since they usually form only a small part of the work force in any industry. There may be lags between the time expenditures are made and the hiring of new workers. Also these expenditures could have been for labour saving machinery or processes. To estimate supply the authors looked at enrollment in vocational programs and the extent of immigration. As they note, a large proportion of skilled workers are trained on the job and it is difficult to get detailed information on the numbers who become available this way. It is noteworthy that there is no estimate of unemployed workers who may become available for work.

The Royal Commission on Canada's Economic Prospects also requested that the Department of Labour study provide some

projections on prospective requirements and supplies of skilled workers for the decade 1956-1965. The authors caution that they did not provide a forecast since the statistical information available did not provide a sound basis for such an exercise and they based their projections on analysis of past trends (:68). The authors concluded that given estimated future needs, demand could be "fairly easily met by continued reliance on the traditional sources of such manpower particularly in view of the anticipated increases in the numbers of young people reaching working age" (:107).

The important increase in the 15 to 19 age group would mean more young people available for training. This conclusion was reached on the assumptions that the proportion of individuals entering and completing apprenticeship programs would remain at the same level and most likely increase, on the job training would continue and that immigration would decline somewhat but would still come from Western Europe and provide a substantial contingent of skilled workers. On the demand side the requirements generated by new products and industries would be balanced out by the increase of automation processes in manufacturing. All the data referred to in this study are national and there is no indication of how the situation may have varied according to regions. In some cases (as for apprenticeship training) the province of Quebec was not included. So what we really get is an overview of the situation at the national level. In summary between 1945 and 1956 claimed shortages of skilled

labour were associated with periods of economic expansion that spurred a greater demand for labour. Also periods of shortages coincided with low unemployment rates, a relationship that does not hold for the 1970's as will be seen further on. It is interesting to note that shortages in the machining trades were related to the demand generated by defence contracts which ultimately depend on government decisions. In the 1950's the shortages in these occupations were alleviated by immigration from Western Europe. Machine tool operators are not specifically referred to in this study, one must assume they are included under the general heading "other machine shop workers". It seems that these lesser skilled workers were also in short supply for parts of the immediate post war period and the early 1950's. Changes in the classification and definition of some of these occupations render any attempt at a strict comparison between that period and now rather risky. Suffice it to say that machining occupations were in short supply, requirements were not met by internal (native) sources of labour, and immigration was an important panacea. However this study does not tell us the magnitude of the shortages and leaves us with a rather vague view of shortages at that time. Also it would appear that the guarded optimism expressed in the Department of Labour report was not quite warranted as in the early 1960's there were again concerns about the adequacy of supplies of skilled workers. For instance the first annual review of the Economic Council of Canada issued in 1964 raises the problem of shortages of skilled

labour and cautions against the overeliance on immigration to fill requirements (Economic Council 1964:chap.4). The third annual review notes that critical labour shortages emerged in 1965-66, but no data supporting these comments were included in the reviews.

RECENT EVIDENCE

In response to the recurring claims of shortages of skilled workers throughout the 1970's, several government sponsored studies and reports were initiated in the early 1980's to examine the situation and in some cases propose solutions. This section reviews and comments on the evidence presented in the following studies: the Work for Tomorrow (Canada 1980b) monograph reports the outcome of the Parliamentary Task Force on Employment Opportunities for the '80's, the Human Resources Survey (Betcherman 1982), the Economic Council study In Short Supply (1982). This is followed by a review of industry generated reports by the Machinery and Equipment Manufacturers' Association of Canada (MEMAC). The shortages of tool and die makers in Ontario was the subject of a study by Professor Noah Meltz (1982a). Finally I examine the evidence contained in the reports emanating from the Employment and Immigration Commission, as well as a study on the characteristics of supply and demand for machinists in Montreal (Trottier 1978) and the Job Vacancy Survey conducted by Statistics Canada.

WORK FOR TOMORROW: THE PARLIAMENTARY TASK FORCE ON EMPLOYMENT OPPORTUNITIES FOR THE '80'S

On May 23, 1980 the House of Commons established the Parliamentary Task Force on Employment Opportunities for the 1980's, giving it the mandate: "to study the serious shortages of certain critical skilled trades in Canada and the mismatches in the labour market where these shortages and high unemployment exist side by side" (Canada 1980b:4). Readers are forewarned that "this is a report based on evidence from the grass roots. It is not an academic treatise or an article for a learned review" (:5). Individuals and organizations across the country, (342 of them), representing industry, educational institutions as well as special interest groups appeared before the Task Force. The emphasis of the report is on future requirements rather than a precise assessment of past shortages. However it is noted that certain skilled trades have always been in short supply, mostly those in metal fabricating in Ontario and Quebec (:29,45) tool and die makers and machining specialists are specifically and repeatedly mentioned (:5,28,66). But there is no indication of the time periods when such shortages were the most acute or which industrial sectors were most affected. The task force did not collect new quantitative data on shortages of skilled workers but relied on employers' statements and reports from industrial associations such as the Canadian Petroleum Association which drew attention to the existing and projected shortages in the

construction trades in Western Canada (:44). The Mining Association of Canada was reported to have claimed that 5,278 skilled tradesmen would be needed by that industry between 1979 and 1982 while training would only produce 3248 (:29). However they did not report shortages of tool and die makers and machinists for this industry. The task force also presented the evidence gathered by the Human Resources Survey (Betcherman 1982) which will be examined in more detail a few pages hence.

The primary cause of shortages is seen in the lack of training in the past, due to employers' reliance on immigration to fill requirements. In terms of future needs, Work for Tomorrow offers some projections of the labour force trends for 1990 but not on supply and demand in specific occupational groups, so there is no estimates of what the situation in the machining trades might be in 1990. Again the paucity and unreliability of existing data is blamed (:37). In the case of machining occupations they note that the introduction of computer assisted manufacturing would "be expected to replace some higher level skilled people in occupations such as drafting, machine and tool and die making" (:96). However no further evidence or analysis is done on the extent of the impact of increased automation for these trades. Finally the report concludes that there may be labour surpluses in general well into the 1980's but shortages in certain skills would continue and their extent would be determined largely by the needs of major projects (:47).

The Parliamentary Task Force served as a forum to gather

impressions from various groups and a tribune to voice some of their concerns but it does not provide clear evidence of the existence of shortages or their extent. A large number of recommendations were made by the parliamentarians involved and these range from specific suggestions for modifying government sponsored programs, to exhortations to employers to support more on the job training, as well as expressions of concern for minority groups' position in the labour market.

THE HUMAN RESOURCES SURVEY

The Human Resources Survey was carried out in 1979 by Gordon Betcherman for the Economic Council of Canada among 4012 establishments employing more than 20 people, excluding firms in agriculture, forestry, fishing and public administration. Returns from 1354 establishments were received: 33.7% of the initial sample (Betcherman 1982:6). The rate of response for Quebec was 33.3% representing 363 establishements. The manufacturing industry represents 32.6% of the Canadian sample and as such encompasses the largest number of establishments. In Quebec 132 establishments in manufacturing or 36.3% of the Quebec sample are included. Montreal establishments account for 50.4% (183 establishments) of the Quebec sample but there is no indication as to which industrial sectors those firms belonged to. The important presence (numerically anyway) of manufacturing firms

and the large number of Montreal firms included make the results of this survey particularly relevant to this dissertation.

Employers were asked to indicate if they had experienced shortages of labour during the years 1977-1979 and if they anticipated some for the years 1980-1984. The ensuing study indicates that 49% of the participants reported personnel shortages for 1977-1979, and 43% anticipated shortages of skilled workers for the years 1980-84. In the province of Quebec, we learn that 38% of establishments surveyed experienced shortages between 1977-79 and 29.5% expected hiring difficulties for 1980-84 (:13) while in Montreal 39.9% reported shortages and 31.7% anticipated some for 1980-1984. On the industry level, across Canada, the manufacturing sector was the most affected by shortages with 62% of firms reporting shortages in 1977-79 and 55.4% anticipating difficulties for 1980-1984. In Quebec 51.5% of manufacturing establishments reported past shortages and 39.4% expected continuing difficulties. Within the manufacturing sector across Canada, the highest proportion of firms claiming shortages was in the machinery sub industry. In the other industries of particular interest for this study the proportion of establishments reporting shortages were also high, (see table 2.1) transportation equipment, fabricated metal, primary metal and electrical equipment are among those industries where a substantial proportion of establishments claimed shortages.

TABLE 2.2

Shortage situations experienced or anticipated in machining, by unit occupational group, 1977-79 and 1980-84.

	Proportion of total in machining occupations	
	1977-79	1980-84
	(per cent)	
machinists (8313)	29.5	32.8
welders (8335)	19.8	21.8
tool and die makers (8311)	17.4	19.5
machine tool op. (8315)	8.7	6.3
other	24.6	19.6
all machining occupations	100.0 (n=207)	100.0 (n=174)

Source:HRS Betcherman 1982:23.

The three occupations studied in this dissertation account for a substantial proportion of the shortages within that occupational group with machinists ranking first. Furthermore employers expected these shortages to become more severe for the following period. However machine tool operators accounted for a much smaller proportion of the shortages in that occupational group and respondents estimated that by 1980 the shortages would be less numerous. For the province of Quebec Betcherman's data indicate that shortages were also more prevalent in product fabricating and repair as they represent 21.1% of all shortages examined on an occupational level. Shortages in machining accounted for 10.4% in 1977-79 and little change was expected

for 1980-84 with 10.6% (:26). Again there is no detailed information on which occupations within this group in Quebec would be scarce. It is quite remarkable that the percentages in terms of industrial and occupational shortages in Quebec are very close to the national ones. Other evidence which will be examined presently indicates also that the specific occupations declared in shortage at the national level correspond to those for which a similar situation was said to exist in Quebec.

Betcherman added a welcome organizational dimension to his study, including variables such as size of firm, age, presence of a union and level of pay. He found that there was a positive relationship between size of firm and incidence of shortages. The author commented that this "is not surprising since (if only because of the numbers involved) the personnel needs would tend to be simpler for a small organization than for a large one. Thus it is very likely that the latter would have experienced and/or anticipated problems in finding all the required skills" (:18). However no clear pattern emerged concerning the link between establishment age, collective bargaining coverage and shortages. Quite surprisingly (at least if one subscribes to the neoclassical economic theory on labour imbalances), establishments offering higher pay were more likely to report shortages. However when controlling for size the relationship disappears (:19) but Betcherman does not elaborate on this point. The Human Resources Survey also devoted much space to the adjustment measures used by employers to respond to shortages.

As a later chapter in this dissertation focuses on these measures, those results from the Betcherman survey will be examined then.

The Human Resources survey provides clear evidence that a substantial proportion of employers in Canada and in Quebec judged that the labour market in 1977-1979 could not provide sufficient workers to meet their needs. This was especially the case in the manufacturing sector and within this sector industries utilizing skilled workers in the machining trades, especially machinists faced shortages of these workers. Shortages of tool and die makers were less numerous but still significant whereas scarcities of machine tool operators were present but to a much lesser extent.

However the Human Resources Survey reports only a 34% return rate across Canada and 33.3% in Quebec, which is rather low. If one assumes that the propensity to respond is directly proportional to the level of problems due to shortages, the incidence of shortages may not be as widespread as one would believe at first glance. Also manufacturing establishments represent 32.6% of respondents being by far the largest group reporting. Does this overepresentation indicate more severe problems and then why? Still the survey presents data on shortages by occupation and by industry in a more detailed way than other national surveys available, and as such offers a base for more in depth analysis and comparison.

IN SHORT SUPPLY

IN SHORT SUPPLY

The Economic Council published in 1982 another analysis on imbalances in the labour market. In Short Supply focuses on "developments in the demand and supply of people and jobs in the past and their possible course in the future." (Economic Council 1982:1). The study focuses on broad developments in the Canadian labour market during the 1970's such as the changing composition of the labour force and the increase in unemployment rates and suggests policy measures for the government. On the subject of shortages the authors accept that: "skill shortages were both widespread and acute in the midst of generally high unemployment and in the context of job scarcity in many areas, sectors and occupations" (:2). At the same time they recognize that "Despite widespread claims of such shortages, however, we know of no analysis using detailed job vacancy data, nor have we seen any interpretation of future skill shortages in terms of job vacancies by occupation" (:16;37).

The Economic Council report examines unemployment rates versus job vacancy rates in Canada as a measure of the tightness of the labour market. As the unemployment rate falls, vacancies would be expected to go up. Comparing the movement of these two indicators for the period 1971-1978 they show that in some years that relationship prevails - in 1973-74 and in one quarter of 1978 - while in others it does not. In some years the job vacancy rate remained the same while unemployment has increased. This was the case in the two first quarters of 1972

and the last two of 1975 and in the middle quarters of 1976. Moreover in 1977 and 1978 the constantly higher rates of unemployment did not bring down the vacancy rate. Matching of jobs and workers may have been slow but we do not know why it would have been so particularly in that period. Was there an increase in structural unemployment? Or, as suggested by Cousineau and Green, is this scattered picture of the unemployment vacancy relationship due to "individual preferences" (1978:179)? Of course these are highly aggregated data and overall unemployment does not preclude shortages in specific occupations. Moreover if these occupations encompass a relatively small number of individuals their impact on aggregated statistics may be small.

Thus the Economic Council study presents data indicating that for the period 1971-78 the share in total vacancies for the machining group was only 2.1% of total while the vacancy growth in this group for that period was 18.7% (:17). Of course, as the authors caution :"The existence of vacancies does not necessarily indicate a shortage...and the growth of vacancies does not necessarily indicate a worsening shortage either since the labour market itself grows in size in time " (:16). Still the substantial vacancy growth for machining occupations lends some credibility to claims of shortages by the employers who participated in the Human Resources Survey examined previously. As a matter of fact the ensuing discussion on skill shortages in In Short Supply is a reporting of the results of the Human

Resources Survey which can be used "with some confidence to paint a "broad brush" picture of the shortage situation" (Economic Council 1982:38).

LABOUR MARKET DEVELOPMENT IN THE 1980'S: THE DODGE REPORT

The Task Force on Labour Market Development in the 1980's prepared a report for the Employment and Immigration Commission in which the trends likely to affect labour markets were reviewed and analyzed and some recommendations for policy were presented. The topic of shortages was introduced in discussions on training and with specific reference to immigration. Some evidence is also presented on labour market tightness in selected high skilled blue collar occupations including tool and die makers and machinists. This is what is looked at here.

Two indicators of labour market tightness were used: a capacity utilization index compiled from the Statistics Canada quarterly index and the changes in the vacancy/unemployment ratio calculated from Canada Employment Center and Unemployment Insurance data. In terms of industrial capacity utilization, following the peak of 1974 and the subsequent decrease in 1975, there is a constant increase through 1979 (see table 2.3).

The same pattern is found for the vacancy-unemployment ratios. However while the ratio for tool and die makers exceeds the 1974 one by 1979 this is not the case for machinists. They note that along with greater industrial capacity utilization

and higher ratios of vacancies to unemployment there were during those years for those two occupations, constant decreases in the availability of supply from immigration and apprenticeships.

TABLE 2.3

Indicators of cyclical influence on labour market tightness in selected higher skill trades 1974-1979.

year	capacity utilization index	tool and die makers	machinists
		(V/U RATIO)	
1974	90.3	70	93
1975	81.2	14	20
1976	82.7	44	15
1977	82.2	61	19
1978	86.0	118	37
1979	87.2	137	64

Source: CEIC, Labour market tightness in selected higher skilled occupations, August 1980.
Reproduced from Canada 1981b:161.

However the authors of this report do not conclude that shortages existed but merely point out the relative tightness of the labour market in these occupations. These data are of course national and the report does not indicate which provinces or regions were most affected. Comparing these data with the information by the Human Resources Survey and the surveys of the Machinery and Equipment Manufacturers Association, they conclude: "The findings from the employer surveys were consistent with other statistical indicators pointing to increased labour

market tightness in high skill trades occupations" (Canada 1981b:160-1).

EMPLOYER SURVEYS

Surveys conducted by employer's associations are useful sources of information since they expose in greater detail the problems encountered in a specific industry. However because the sample is usually drawn from the members of the association only, it is not necessarily representative of the whole industry unless a majority of firms in that sector do indeed belong to the association. In this section I will report and comment on the shortage situation as described in one of these surveys. Discussion of other aspects covered, such as responses to the problem are left to a later chapter. The Machinery and Equipment Manufacturer's Association of Canada (Memac) conducted surveys among its membership in the first quarter of 1979 and again in 1981 in an effort to assess requirements for skilled tradesmen. The first survey covers the period 1979 to 1982, the second one 1981 to 1984. The first survey polled 137 companies, the second 167. Quebec companies represented 19% of the sample in 1979 (26 firms) and 21% in the 1981 survey or 36 firms.

An overwhelming percentage of firms reported difficulties in recruiting skilled tadesmen, with some easing up of the situation by 1981 especially in Quebec.

TABLE 2.4

Percent of companies reporting difficulties in recruiting journeymen MEMAC surveys1

	CANADA	QUEBEC
1979	86% (n=137)	88% (n=26)
1981	78% (n=167)	69% (n=36)

[1] the term journeymen refers to fully qualified individuals in the various occupations.Source Memac surveys 1979,1981.

Respondents were asked to indicate which occupations were most difficult to find. In the province of Quebec machinists ranked first in the two surveys while tool and die makers ranked third in 1979 and fourth in 1981 see table 2.5). Nevertheless since tool and die makers are often machinists who developed a higher level of skills and competence, a severe shortage of machinists may forecast recruiting difficulties in tool and die making. However it must be remembered again that tool and die makers are not required in large numbers in most firms but their presence is indispensable when changes in production require retooling. Furthermore in the case of tool and die makers, Memac indicates the number of these workers over 55 years of age. In

the sample of firms surveyed in Quebec in 1979, 28% of tool and die makers on staff were over that 55 and in 1981 34% of these workers had passed that age thus pointing to the need for replacements in the near future.

TABLE 2.5

Number of companies reporting most difficult trade to recruit and ranking. MEMAC surveys.

	1979		1981	
	number companies	ranking	number	ranking
machinists	17	1	20	1
fitters	6	3	11	2
millwrights				
welders	1	5	11	2
mechanics	3	4	4	3
maintenance				
tool/die makers	6	3	3	4
fitters	11	2	3	4
electricians	1	5	-	-
patternmakers	3	4	3	4
other	3	4	2	5

source Memac surveys 1979,1981.

Table 2.6 summarizes some of the data describing the situation in 1979 and table 3.7 describes the results of the 1981 survey.

TABLE 2.6

1979 MEMAC, SURVEY (QUEBEC)
sample = 26 firms

	tool and die makers	machinists	machine op
1.journeymen on staff	25	406	1073
2.journeymen hired 77-78	2	84	na
3. vacancies survey time	4	35	100
4.trainees on staff 1979	0	10	40
5.numbers obtained from training 77-80	na	23[1]	138[2] (77-78)
6.trainees to be hired 78-80	2	12	631 (79-82)
7.projected ĩ to be hired 1979-82	16	178	581

[1] thedrop out rate from training is established at 20% but there is no indication if this is taken into account in the final number of workers obtained through training.

[2] 197 were hired in 1977-78 and the drop out rate was 29.2%.

The ratio of vacancies over total number of tool and die makers was 16% in 1979 and 2.4% in 1981. For machinists this ratio is 8.6% in 1979 and 3.9% in 1981 while for machine operators the ratio of vacancies to totals in that occupation are respectively 9.3% and 9.7%. However for machinists 20% of the workers

on staff in 1979 and 1981 had been hired in the two previous years when according to the respondents in the Human Resources Survey there were recruiting difficulties in these trades.

Unfortunately the Memac surveys do not tell us what proportion of vacancies were filled through those hirings. Still the high numbers of hires combined with the small number of apprentices on staff leads one to suppose that either much training had gone on in the past (and there is no evidence to suggest this was the case) or substantial numbers of machinists were available on the labour market and this supply may have been rapidly exhausted. Given that 88% of firms in 1979 and 69% in 1981 declared previously in the survey that they had experienced difficulties in recruiting machinists and tool and die makers it is surprising that no tool and die makers were being trained in 1979 or 1981.

However the numbers of tool and die makers needed are small and may not have warranted a full scale training effort. The 1981 survey estimates that only 10% of the requirements for tool and die makers in the Maritimes and Quebec would be met by training (Memac 1981:17). In the case of machinists there were only 10 trainees on staff in 1979 when requirements for the 1979-82 period were expected to be 178; with a drop out rate of 20% requirements for that upcoming period could certainly not be met through training in firms. In 1981 however the situation was different as machinists in training represented 29.4% of the projected requirements for 1981-1984. Scarcities may have

motivated employers to engage in more training, however it was still a relatively small percentage if indeed shortages were such a widespread problem!

TABLE 2.7

1981 MEMAC SURVEY (QUEBEC)
sample = 36 firms

	tool and die makers	machinists	machine op
1.journeymen on staff	41	1106	1223
2.journeymen hired 79-80	2	221	na
3.vacancies survey time	1	44	119
4.trainees on staff	0	69	na
5.numbers from training	2	68[1]	258[2] (79-80)
6.trainees to be hired 81-84	11	36	232
7.projected nos required 81-84	8	235	272

[1] the drop out rate for that year is established at 2.9% (?) but there is no indication if this is taken into account in the final figure on number of workers obtained through training.

[2] 381 were hired in 1979-80 and the drop out rate was 32.2%.

The situation appears to have been slightly different for machine operators. Despite a very high drop out rate of 29.2% 138 machine operators were obtained through training in

1977-80. Unfortunately there is no information as to the numbers hired in 1977-78 and we cannot know the extent to which training contributed to meeting these requirements, so again we have no "hard" evidence that there were shortages: 100 vacancies across 26 firms represent after all less than 4 vacancies per firm. Furthermore if shortages were expected for 1980 it is disturbing to notice that there are only 40 trainees on staff in 1979. However the much higher number of trainees to be hired in 1981-84 (232) could fulfill part of the requirements for 1981-84, even if a wastage rate of 32.2% was maintained 157 trainees would be left or 58% of the requirements for 1981-84.

The samples in the two surveys are different at least in terms of number of firms: 26 in 1979 and 36 in 1981. Since we do not know if the same firms were present in both samples useful comparison is impossible. Moreover the dates for the data relating to training prevent us from inferring very much about the extent to which training met future requirements.

Because the ratio of vacancies from 1979 to 1981 dropped, and relatively so little training was undertaken,[6] and because a substantial proportion of machinists were obtained on the labour market before 1979 (in times when shortages were said to be severe), it is difficult to accept, on the basis of the evidence in these surveys, that there were serious <u>shortages</u> of machinists and tool and die makers. If there was tightness in the labour market employers it seems, could alleviate their consequence through measures other than training. Finally the

greater percentage of expected vacancies for machine operators in 1979-82 as well as 1981-84 that could be filled from training compared to machinists raises another question. As the estimated training time for machine operators is much smaller (at least half of the occupations mentioned required less than a year (1979:17), one wonders if employers are willing to undertake short term training but shy away from the longer training programs such as those for tool and die makers and machinists, even when in the case of tool and die makers the drop out rate is zero. It might be that the basic skills such as knowledge of trigonometry that is required of tool and die makers and machinists cannot be transmitted in an industrial environment. This could explain the relatively smaller effort spent on training for these occupations.

MELTZ'S STUDY IN ONTARIO

Before concluding this section on the evidence of shortages in the 1970's presented in various reports and studies I will briefly comment on a study of shortages of tool and die makers prepared by Professor Meltz (1982a). While the study is restricted to Ontario it provides an empirical investigation of shortages and careful analysis and interpretation of the available statistics.

To ascertain the presence of shortages this study examines, as did the Economic Council study (1982) the data provided by the Job Vacancy Survey which ran from 1971 through 1978, together with unemployment statistics. Data from the Canada Employment Centers are examined concomitantly with unemployment statistics and compared to the first set. In both cases it was found that there are fluctuating periods of high vacancies and unemployment. The author notes that if the unemployed did not have the qualifications to meet the requirements of the job, and the evidence he gathered from employers indicates this to be so, shortages are likely underestimated (Meltz 1982a:11). The data provided by the Canada Employment Centers for the period 1969-1980 show the same fluctuating patterns but in a less pronounced manner. Since employment centers receive only a fraction of the job orders, their data would not necessarily reflect the full extent of demand. Vacancies were high from 1972 through 1973-74, there is a marked decrease in 1975 and 1976 then moderate increases in 1977 growing rapidly in 1978 and some slow down in 1979. Unemployment patterns among tool and die makers in Ontario did correspond to lower vacancy rates as shown in the Job Vacancy Survey and the Canada Employment Centers data. However not surprisingly the magnitude of net vacancies (vacancies minus unemployment) is smaller in the CEC data. While the relationship of high vacancy, lower unemployment held true for all of Ontario, the magnitude of the cycles varied according to localities (:22).

This study also looks at changes in wage rates as another method to assess the existence of shortages: data on hiring wage rates and average wage rates were examined. The results were inconclusive (:26). In some time periods the increase in vacancies did not coincide with increases in relative hiring wages - in fact there were declines in 1972-74, while in 1976-77 the hiring wage rates increased. "When average wage rates are examined in relation to gross and net vacancies, an even less clear picture emerges" (:28). In one locality only did average wage rates and gross vacancies increase together. In another locality (Toronto) there is no positive relationship. In the case of average wage rates and net vacancies (unemployment minus vacancies) no positive relationship is found "In fact, the regression of relative wages on net vacancies in the case of Windsor has a slightly negative slope" (:28). Meltz concludes that hiring wage rates are the proper indicator to use and they support the interpretation of the existence of shortages in the later periods only. However institutional factors such as unions and organizational ones such as size and the structure of pay in firms may inhibit increases in wages (:30). The analysis of official statistics was complemented in this study on tool and die makers by interviews with a small sample of 12 employers and it was found that "Over 40% of the firms surveyed were experiencing difficulties in obtaining tool and die makers" (:33).

To summarize: it appears that data on vacancies from the Job Vacancy Survey and the Canada Employment Centers "follow the same general patterns of regular upturns and downturns (:15). The discrepancies (in magnitude) between vacancy data from JVS, the CEC's and employers statements is explained by differences in the sample. The JVS "attempted to approximate the entire universe" (:15), the surveys in specific industries may oversample firms with hiring difficulties (and employers may also tend to exagerate their needs) while the Employment Centers rely on job orders received in their offices. Still Meltz concluded that "Regardless of the measure used, however, there do appear to be a large number of vacancies for tool and die makers in comparison to overall vacancies" (:18). In the case of wages, hiring wages at times respond to the presence of higher vacancies while average wage rates do not. This study shows that the vacancy unemployment relationship is a reasonable indicator of the tightness of the labour market as well as hiring wage rates at times but it becomes really useful when data by <u>occupation</u> on all variables can be obtained and for specific local labour markets. In other words data aggregated at the national level may give an indication of the tightness of the labour market but the conditions may vary significantly by occupation and by locality. Studies of local labour markets are then more likely to yield a "true" picture of the situation of firms and guide policy applications.

The reports examined in the above section do not allow one to state with any certainty that there were shortages of skilled workers in the machining trades in Canada. Rather there were periods of higher vacancies certainly in 1972-74 and again in 1977-78. The measures used to assess the presence of shortages vary; still, unemployment and vacancies series, hiring wage rates and vacancies, and capacity utilization indexes show similar broad fluctuations despite some discrepancies. Employers surveyed asserted that there were shortages but these are subjective judgments made within specific industrial and firm contexts, variables which are not caught in the more quantitative type of data. It remains that estimates of shortages or even of labour market tightness are difficult to interpret.

EMPLOYMENT AND IMMIGRATION COMMISSION DATA

The Department of Manpower and Immigration (now renamed the Employment and Immigration Commission) was established in 1966. Its primary objective is to elaborate policies and implement programs to ensure proper manpower adjustments in Canada. It offers placement services through the network of Canada Employment Centers where job seekers and job orders are matched. A mobility program also exists to assist workers in exploring and moving to job opportunities in other locations in Canada. A major thrust has always been on training programs to enable workers to take advantage of employment opportunities and provide

employers with an adequate supply of qualified workers. The federal government has contributed substantially to post secondary training since the Federal-Provincial Fiscal Arrangements Act of 1967 whereby costs of institutional training are shared with the provinces. The Adult Occupational Act of 1967 allowed the Department of Manpower and Immigration to purchase training from educational institutions (public and private) and some training in industry.

Comparing Canadian manpower policy with that of other countries Jeness found that in Canada the emphasis was on institutional training rather than apprenticeship and industrial on the job training (1977:104). The Dodge report noted that "industrially funded training programs still represent only 15 percent of total training dollars" (Canada 1981b:170). However the Canada Manpower Industrial Training Program of 1972 was designed to emphasize training on the job in industrial settings and finally in the fiscal year 1978-79 the Critical Trade Skills Training Program was set up with the specific objective of providing training in occupations where shortages were deemed critical. Throughout the 1970's and 1980's special job creation programs were implemented to help special groups: youth, the hard core unemployed and more recently women and native peoples. However these efforts have not yielded the expected results. The authors of the Dodge report commented that it was not clear:

> to what extent the largest component (in terms of expenditures) of federal institutional skill training is used to meet the needs of the labour market as opposed to improve the general employability of the unemployed, to simply take people off the unemployment rolls or to provide extended income maintenance given that training allocations were based to a considerable degree on unemployment rates (Canada 1981b:33-4).

This situation can be attributed in part to the multiple and sometimes conflicting objectives of manpower policy in Canada which have been noted by several authors. These goals were support of economic growth by ensuring an adequate supply of workers to match jobs; stabilization of wages and prices in inflationary periods and help in reducing unemployment in recessionary times as well as equity by assisting less privileged groups in the labour market[7].

The deficiencies in the collection and analysis processes of labour market information may also account for what is seen by some (especially the Parliamentary Task Force) as the disapppointing performance of the Manpower and Immigration Commission.

> This is a surprising and disappointing state of affairs since the Department of Manpower and Immigration was created for that reason (i.e. information and analysis of labour markets) and at a time when it was becoming clear that better information, research and systematic analysis could play a vital role in improved policy-making (Canada 1981a:51).

The need for and the difficulties in obtaining sound information on labour market indicators has been noted repeatedly and commented upon in a previous chapter. The same problems affect forecasting models.

An effective manpower policy entails an accurate knowledge of manpower needs; detailed projections of these needs are therefore essential. However none of the large macroecomic models of the Canadian economy such as Candide include the occupational dimension (Foot 1980:3). Occupational forecasting models were therefore developed by Employment and Immigration to correct this deficiency. COFOR the Canadian Occupational Forecasting Program, using Candide as a starting point, was designed to provide a medium-term forecast (six years)[8]. Another forecast FOIL: Forward Occupational Imbalance Listing provides a "quarterly, qualitative assessment of occupational imbalances in detail for up to two years based on listings at Canada Employment Centers and the Unemployment Insurance Commission" (Foot 1980:76)[9].

There were some difficulties associated with the efficient use of COFOR. On a theoretical level, because the model is based on the assumptions of the neoclassical model of the labour market, one commentator questions the "usefulness, realism and desirability of that model in view of certain aspects of dual labour market theory and the results of certain research" (Proulx 1982:3).

Other problems are also identified with the structure of COFOR. In the structure of the labour market in this model (as in the macroeconomic models) "both sides of the market are modelled largely independently and the occupational imbalance like unemployment is produced as the residual difference between supply and demand" (Foot 1980:64). This according to Foot neglects to take into account the dynamic interactions between various components of supply and demand and within the whole labour market (Foot 1980:100). Furthermore on the demand side the "use of fixed occupational coefficients by industry is a significant lacuna" (Proulx 1982:4). These coefficients are based on an industry occupation matrix worked out from the previous decennial survey and Foot points out that it would undererstimate the effect on occupational shares, of rapid technological changes in certain industries. The effect of major projects, the announcement and start up of which are often, at least partly, a response to political considerations are also not estimated. (Here one would remember the James Bay project). It also cannot take into account the market strategies of employers in response to changes in the competitive environment. These could significantly affect the mix of occupations in an industry [10]. In the same vein COFOR was also criticized because "it does not consider the adjustments employers make because of changes in wages" (Canada 1981a:116).

There are also problems related to the modelling of supply in COFOR: while mortality rates and retirements are included "all new supply components are ignored. As a consequence of this it is impossible to derive occupational imbalances from the results" (Foot 1980:76). Specifically turnover in occupations and industries is neglected and "little is available on interoccupational mobility" and substitution (Proulx 1982:5).

Another difficulty is that "the occupations listed are, to put it mildly, generalizations" (Dodge 1977:18). The level of aggregation used (the four digit codes) means that many occupations are included in one group (in the case of machining the four digit code subsumes some 58 occupations, see chapter 3 in this dissertation) It becomes impossible to distinguish the level of skill required in various occupations in that broad group. This is of course particularly relevant when the discussion focuses on demand for skilled occupations and would suppose some training as a remedy for shortages. This problem was still present in the analysis done for the Dodge report: "The macroeconomic analysis conducted in this paper does not permit us to examine in detail conditions in particular occupations" (Canada 1981b:65). Finally COFOR could supply projections on a national and provincial basis but these may be of little use for planners in local labour markets (Canada 1981b:230) especially when there is some evidence that there may be significant differences between these markets (Meltz 1982a).

In all fairness it must be stressed that good projection models are dependent on the data available to economists for injection in their forecasting models. An examination of the kinds of data available and of "the existing labour market intelligence systems" found them to be inadequate (Canada 1981b:83; Foot 1980:104). The short term forecast provided by FOIL is based on operational data emanating from Canada Employment Centers. This forecast was meant to complement COFOR and focus on the local level of the labour market. However there is reason to question the reliability of these data (as will be seen in the upcoming discussion on Canada Employment Center statistics). Moreover the Parliamentary Task Force noted that no evaluation of FOIL had been carried out (Canada 1981a:117).

Still the forecasting models commented upon here had predicted overall increased demand for tool and die making and machining occupations for the period 1974-1982. However these projections published in 1976 were not updated within the next two years as planned (Siddiqui 1984:35) therefore restricting their usefulness for planners. Similarly they could not establish if there would be <u>shortages</u> in certain skilled blue collar occupations.

Finally labour market projections are prepared to ensure, to some extent anyway, that what they predict will not happen. It is expected that they will assist governments and firms to set policies facilitating labour market adjustment. Should such policies be implemented rapidly, the predictions contained in

the forecasting exercise will most likely be wrong. Foot commented at length on the dilemma:

> It is apparent that all model projections that are relevant to policy planning face one insurmountable obstacle - that of credibility. Policy feedbacks which are often the reasons for the construction of the models in the first place, can destroy their credibility. The projection of high unemployment or an excessive occupational imbalance is an indication, in a policy environment, to implement policies that will correct the imbalance and hence invalidate the projection. In this sense model builders and users always prefer to be "wrong". A modelling of such policy responses, and the simultaneous feedbacks that they imply is only in its infancy - where it may stay for a long while to come! (Foot 1980:108).

It would appear then that methodological problems, as well as theoretical ones limit the potential use of occupational forecasting models. In the case of shortages of workers in tool making and machining occupations which are the concern of this dissertation, the models available during the time period studied could only provide information on broad trends and could not state if occupational shortages would exist.

EMPLOYMENT AND IMMIGRATION OPERATIONAL DATA

In this section I will examine the evidence gathered at the Canada Employment Centers in the Montreal region in an effort to assess the presence and extent of announced shortages for tool and die makers, machinists and machine operators. One might think that data on the day to day operations of employment centers

should provide a reliable source of information on the state of the labour market in various occupations since the Canada Manpower Centers' first mission is to match supply with demand. These data exist in the form of job orders from employers and the supply of workers can be calculated from the records of workers registered in these centers. However these data are sometimes not very reliable as will be seen in the next pages.

Firstly I will briefly describe the reports from which data were extracted. Then I examine in some detail the contents of each. Whenever possible comparisons between data are made. The focus of course is on the three occupational groups: tool and die making, machinist and machine tool setting up occupations and machine tool operating occupations. Usually the data is presented for the unit group identified by a four digit code: in this case they are respectively: 8311, 8313 and 8315. Some reports occasionally give information on the individual occupations using the seven digit code for example: tool and die maker 8311-110 or 8313-154 for a general machinist. Where possible and relevant these more detailed classifications are used. The data from the reports are presented on an occupational basis in the remainder of this section.

The first report consulted is known in the Employment and Immigration Commission as the MAN 757. It is a source of information often tapped by researchers in the field (Meltz 1976, 1982a, Trottier 1978). A monthly statement, it records the number of job vacancies reported by employers as well as

the number of individuals, unemployed or not who are registered with the employment center and are presumed available for work in a given occupation[11]. This information is gathered in each Canada Employment Center at the end of the month from the active files of manpower counsellors, then forwarded to the district office, (in this case Montreal) for a final compilation. I examined and consolidated, when necessary, these data.[12]

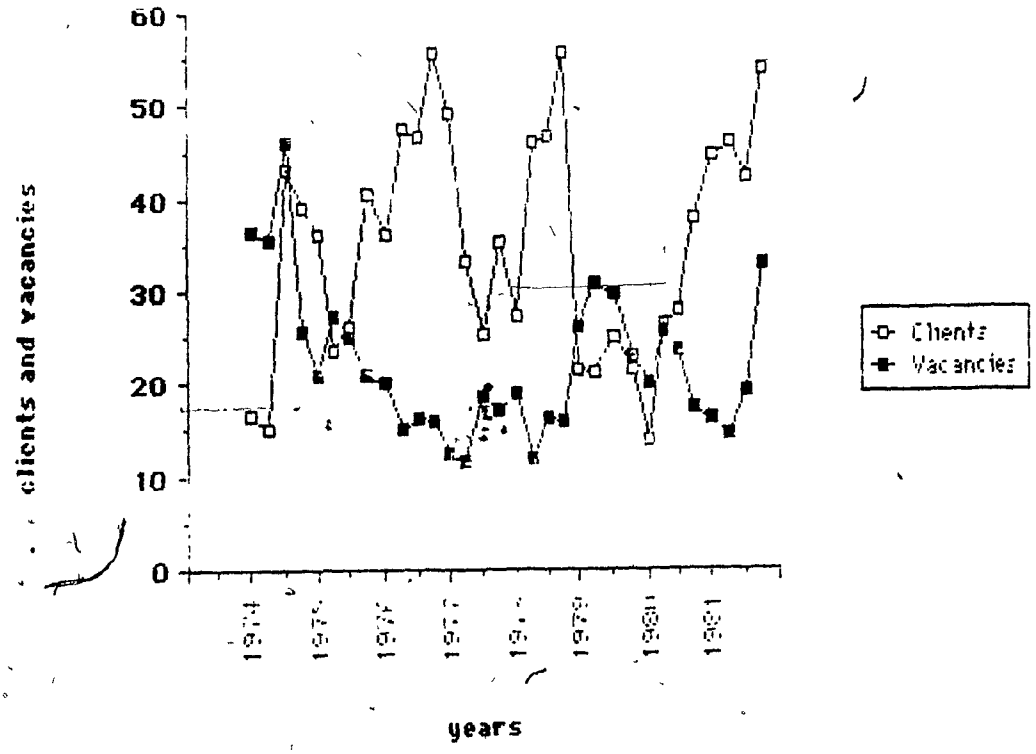
The second report discussed is the one on shortages "rapport de pénuries" which accounts for job offers remaining unfilled for 30 days or more. Again the information comes from each Canada Employment Center and is forwarded to the district office at the end of each month. It may also report on occupations in short supply as identified by employers in informal conversations, without a job offer being filed. This method of recording long term vacancies obviously does not increase the reliability of that report! The seven digit occupational code is used here but unfortunately the district office had kept copies of these reports from April 1976 on only. This series therefore can be compared to the data from the Man 757 only from that date onwards. From 1977 on a compilation of "job opportunities" in various occupations in Montreal was prepared at the district level. Taking into account the reports from Canada Employment Centers and the help wanted advertisements in city newspapers as well as information from any other source, formal or informal, it provides a rather impressionistic picture of demand in various occupations.

Tool and die makers: 8311. The number of tool and die makers is not very large; according to the 1971 census there were 1490 of them in the province of Quebec of which 970 were in the Montreal metropolitan region. The overwhelming majority is employed in the manufacturing sector; that is 1325 (or 89%) in the province and 885 or (91.2%) in Montreal. The 1981 census records a slight drop as there were 1400 tool and die makers in the province of which 1210 were in manufacturing. In Montreal in 1981 there were 840 tool and die makers employed in manufacturing which is a slight decrease from 1971.

The information provided by the Man 757's is shown graphically in figure 2.1; the detailed numbers on vacancies, clients registered, long term vacancies and net vacancies are provided in appendix A. Figure 2.1 shows that on average there were excess vacancies for tool and die makers in 1974-75 and 1979, in all the other years there was generally excess supply. Specifically there were more job offers than workers to fill them for the first three quarters of 1974 and in the second quarter of 1975. There were surpluses from the third quarter of 1974 throughout 1976, 1977 and part of 1978. It is only in June 1979 that vacancies overtake job seekers and except for December 1979 this situation persisted until June 1980. From then on the number of people looking for work as tool and die makers rises relatively to the number of vacancies. The highest number of vacancies reported were in the month of February 1974 with 41 job offers, in July 1974 with 46 and in August 1978 with 41. All

through 1977 and in the beginning of 1978 vacancies number less than 20 and in 1979 hover between 20 and 35. The number of vacancies are always small: the highest is 46 and the same comment applies to the number of registered applicants where the highest number is 60. In the case of tool and die makers there is a clear relationship between the increasing number of applicants and the diminishing numbers of vacancies.

Figure 2.1
Tool and die makers, vacancies and clients registered. Montreal CEIC. 1974-1981



Net vacancies. From this report we can calculate the number of net vacancies, that is the number of clients registered in Canada Employment Centers minus job offers submitted by employers (see Appendix A). In early 1974 there are 20 net vacancies but from the third quarter of 1975 there is a constant deficit in net vacancies until 1979 through 1980 when net vacancies are again positive but the numbers are always smaller than in 1974.

Long-term vacancies: the report on shortages. This series starting only in April 1976, identifies occupations by a seven-digit code, so I have added the numbers provided for all occupations in that group to obtain the number of long term vacancies for the 8311 group (tool and die makers). The vacancies that remained unfilled in Canada Employment Centers for over thirty days are the basis of this report. Those reports indicate that there were relatively important increases in long term vacancies at the end of 1977. They remained high for most of 1978. After a drop in 1979 they remain rather stable through most of 1981. The ratios of quarterly averages of long term vacancies to total vacancies are shown in table 3.8. There is however a very puzzling factor: at times the long term vacancies are greater than the total number of vacancies, a consequence no doubt of the way data on long-term vacancies are collected. As mentioned previously, a vacancy for which there was no job order could be included in that report! However because the data is disaggregated to the the specific occupation level

it is worth noting that almost all long-term vacancies were for the occupation of tool and die maker (8311-110) which is the one requiring the highest degree of skill according to the CCDO classifications.

TABLE 2.8

Ratio of long-term vacancies to total vacancies for tool and die makers 1976-1981.

Year	quarter	ratio long-term vacancies to total vacancies
1976	1	na
	2	.22
	3	.18
	4	.12
1977	1	.16
	2	.22
	3	.73
	4	1.25(!)
1978	1	.40
	2	1.00
	3	1.04(!)
	4	1.45(!)
1979	1	.73
	2	.18
	3	.41
	4	.53
1980	1	.56
	2	.51
	3	.47
	4	.47
1981	1	.75
	2	.72
	3	.58
	4	.21

source: Report on shortages and Man 757 CEIC.

Job Opportunities. A third but much more impressionistic report looks at job opportunities in Montreal that can be gathered from newspaper ads, informal reports from employers as well as data from Canada Employment Centers. It indicates that advertised or known job opportunities increased at the end of 1977, dropped in early 1978 and remained at a lower level until April 1979. From then on, despite fluctuations, job opportunities are lower than in previous years. It is noteworthy that in any given month from 1977 to 1983 there were always less than 20 want ads (and usually less than 10 for tool and die makers, while CEC's constantly announce more than 20. This would make it appear that employers relied more on CEC's than on newspapers to search for workers a fact that is not supported by comments gathered from employers in previous research (Canada 1981a:54; Economic Council 1976:132) and in my own (see chapter 6).

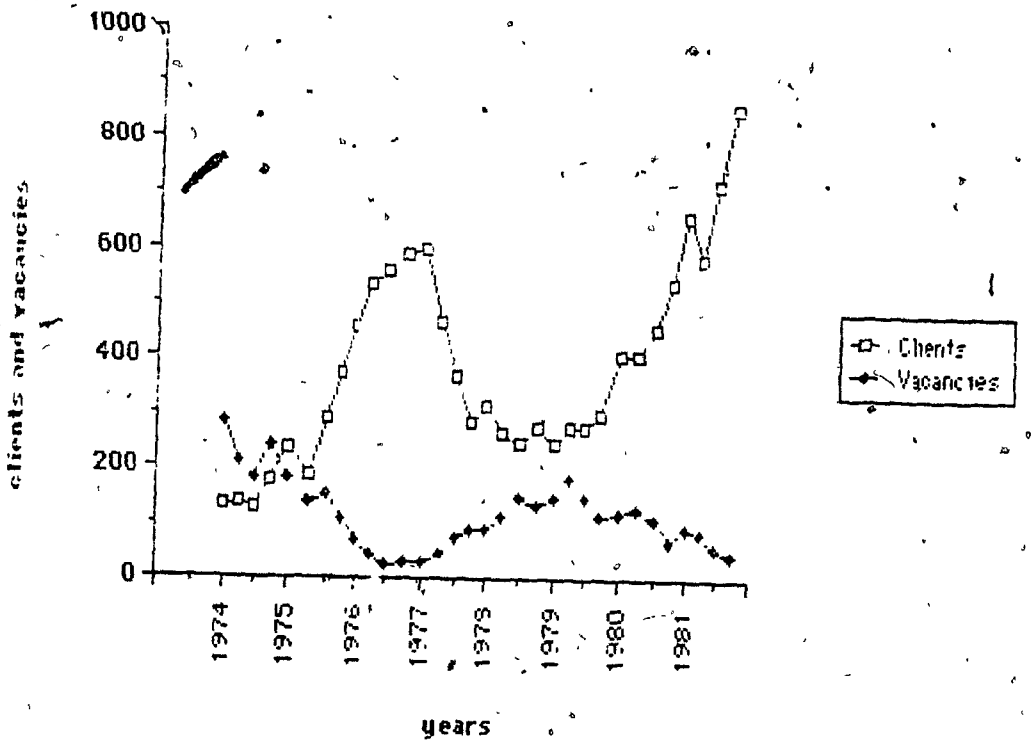
The data from the Employment and Immigration Commission indicate that there were fluctuations in the labour market for tool and die makers in Montreal, the trends being as follows: there were higher rates of vacancies than job seekers in 1974; a decrease in vacancies paralleled increases in registered applicants from 1975 through 1978 and renewed demand occured but at a lower level for 1979 and 1980. From the end of 1977 through the end of 1980 there were constantly high numbers of long-term vacancies. While these data are sometimes suspect the long-term vacancies are still the norm rather than the exception even when there are relatively large numbers of tool

and die makers registered. Since these long-term vacancies are for the most highly skilled occupation in that group it may be that the workers registered did not meet the requirements of the job or again that salaries offered were too low. Unfortunately I did not have access to the details of job orders that would have allowed me to verify this. Therefore one can only conlude that there was a tight labour market for tool and die makers in 1974, 1975 and again in 1979 but no comment on shortages can be made.

Machinists 8313. Another group often identified as being in short supply are machinists (Memac 1979-1981; Betcherman 1982). They are much more numerous than tool and die makers; in 1971 there were 10,625 in the province of Quebec, 8,020 of whom were employed in manufacturing. By 1981 employment had grown to 13,670 with again the vast majority in manufacturing: 11,010. In the metropolitan Montreal region the 1971 census tells us there were 5,645 machinists and 73% or 4,110 were employed in manufacturing. By 1981 there were 7,050 machinists registered in Montreal 5,595 of whom were in the manufacturing sector. So contrary to tool and die makers their numbers increased over the 10 year period.

The labour market for machinists as reflected in the Man 757 reports from the Employment and Immigration Commmission for the period 1974-1982 is illustrated in figure 2.2.

Figure 2.2
Machinists Vacancies and applicants registered.
Montreal CEIC 1974-1981.



In 1974 there were more job offers than applicants but from 1975 till the end of 1981 there were constant surpluses. The magnitude of these surpluses varies. In 1976 and 1977 they are quite large as the number of job seekers grows while vacancies dwindle dramatically especially in the last two quarters of 1976 and the first two of 1977 (see figure 2.2 and appendix A). Job offers rise from the last quarter of 1977 throughout 1978, 79, and 80 but because the supply of available workers remains quite stable there are still surpluses. After October 1980 vacancies drop and there is a surge in the number of individuals seeking employment. This is due, no doubt, to the lay offs brought on by the recession.

Of course if we look at net vacancies (see appendix A) the situation is just as dramatic. At no time from 1975 on were net vacancies positive and the deficit was often very large. From the first quarter of 1976 till the third quarter of 1977 net vacancies always exceeded 300. The situation improved somewhat in the second quarter of 1978 and especially in 1979, but by mid 1980, as the recession set in, the deficit in vacancies increased constantly. Except for 1974 one cannot speak of shortages in the case of machinists, there are only intermittent reductions of surpluses.

However these reports present aggregated data for all 56 occupations included in the minor group 8313. It would therefore be possible that some specific trade was in short supply despite surpluses in others. Some indication of this can be

gathered by examining the report on shortages which uses the seven digit occupational code. Examination of the report on shortages indicated that the long-term vacancies were greater for the occupation of machinist general (8313-154) which is according to the CCDO one of the higher skilled jobs in that occupational unit. This is the occupation referred to by employers seeking an "all-around" machinist.

Table 2.9 however shows that long-term vacancies for general machinists did not represent an important porportion of all vacancies for machinists. Still from the last quarter of 1978 there is an upward trend in the ratio of long-term vacancies for general machinists compared to vacancies for all machinists. It would appear that despite the large number of applicants, when vacancies increased there were still some difficulties in recruiting general machinists to fill the available positions. The data available do not allow one to offer a soundly based interpretation. One can only presume that either the matching process was too slow, that the "quality" of applicants did not match the requirements of the jobs, or that the available applicants did not want those jobs either because of poor pay or poor working conditions. The study on machinists done by Trottier (1978), which will be discussed presently, offers some explanations and it would seem that the second factor would provide the best explanation.

TABLE 2.9

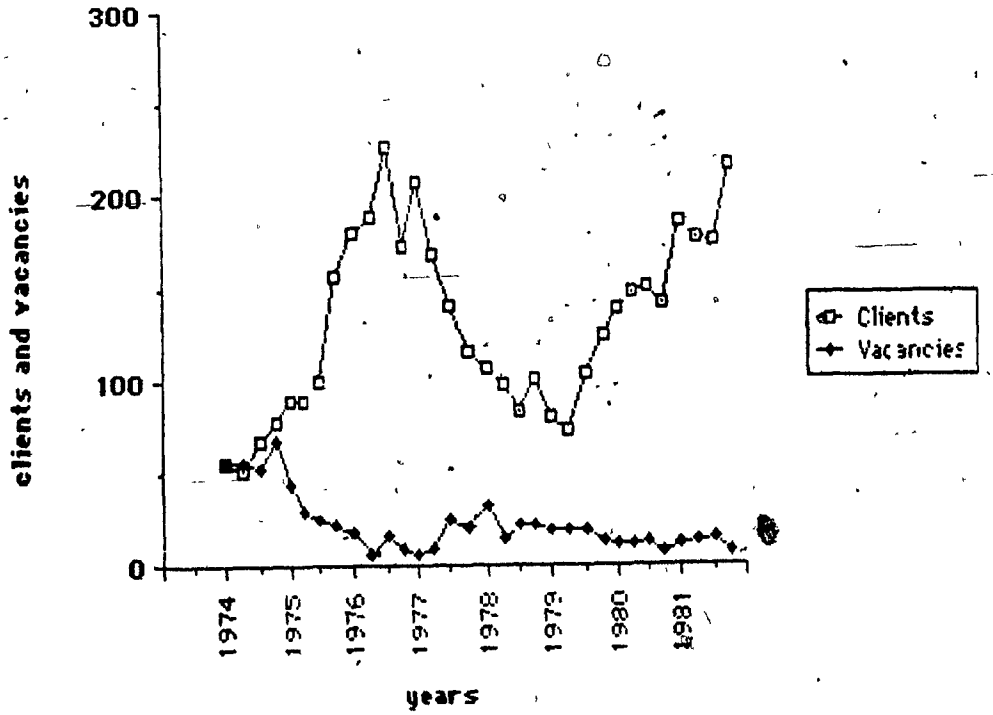
Ratio of Long term vacancies for general machinists to vacancies for all machinists. Montreal CEIC 1976-1981

Year	quarter	ratio long-term vacancies to total vacancies.
1974	1-4	na
1975	1-4	na
1976	1	na
	2	.15
	3	.08
	4	.06
1977	1	.03
	2	.03
	3	.14
	4	.18
1978	1	.07
	2	.08
	3	.14
	4	.16
1979	1	.17
	2	.15
	3	.19
	4	.26
1980	1	.18
	2	.25
	3	.26
	4	.20
1981	1	.16
	2	.11
	3	.15
	4	.14

Source: CEIC Man 757 and report on shortages.

However it is impossible to conclude from the operational data of the CEIC that there were extensive shortages of machinists after 1974. Demand as reflected in job vacancies increases in 1978, 1979, and 1980 but examining numbers alone, the overall supply in Canada Employment Centers was certainly adequate to meet the stated needs: the data presented above do not chronicle shortages but surpluses.

Figure 2.3
Machine operators: vacancies and clients registered Montreal CEIC 1974-1981.



Machine-tool operators:8315. The CCDO definitions for this group of occupations stress the tending and operating of machines "usually set up for repetitive work" while machinists would set up and operate machines. The skill level and the technical knowledge required of these machine operators would be lower than for machinists. However in industrial settings the boundaries between the two groups are unclear (see chapter 4 on definitions of skill). Furthermore some surveys have included machine operators amongst skilled workers (Memac 1979-1981; Trottier 1978). Also because, theoretically, a machine operator could, with some training, be upgraded and become a "specialized" machinist, or again these operators could be seen as substitutes for machinists in a tight labour market they are included in this study.

While the number of machinists increased during the 1971-1981 period, the number of machine operators declined from of total of 7,680 in all industries in 1971, to 3,805 in 1981. In the manufacturing sector there were 6,420 machine operators in 1971 and 3,485 in 1981. In the Montreal area, 3,805 individuals were classified as machine operators in 1971, of which 3,200 were in manufacturing. In 1981 we find some 1,520 machine operators of which 1,085 were employed in manufacturing. It is interesting to note that while the number of machinists had increased over the 10 year period, that of operators dwindled. The very magnitude of the decline is surprising and should warrant further investigation. It is also surprising that there are

more machinists than machine operators in 1971 as well as 1981. One would expect the contrary since automation, specifically the use of numerically controlled tools allows the utilization of workers with less technical knowledge and skill (or at least, that is what is commonly argued) and more of this equipment was introduced in the 1970's according to my respondents (see chapter 5).

The Man 757 reports indicate clearly that there were no shortages of machine operators (see figure 2.3). The beginning of 1974 saw equilibrium but from then on there were constant surpluses, from 1976 through 1977 very important ones. In 1978 and early 1979 vacancies rose slightly while the number of registered applicants decreased. Still the number of job offers was small. The fluctuation in number of job seekers was more pronounced. From 1976 to 1981 they were rare periods indeed when the supply of machine operators is less that 100. Net vacancies (see Appendix A) reflect the same situation: they are always negative and from the end of 1975 to late 1977 substantially so. The magnitude of the surpluses diminished only in 1978 and 1979.

is usually less than one year (Memac 1979:17). Also it is disturbing to notice that even as supply increases there is a conspicuous increase in long term vacancies. Advertised job opportunities for machine operators also show a rather dismal picture. For many months data were missing, but it is only in March 1978 that the 20 job mark is reached.

Machine tool operating occupations were not in short supply if one compares the figures relating to supply and demand. However for some years, (1978, 1979 and part of 1980) long term vacancies formed a large part of total vacancies. Still one cannot conclude that a shortage situation existed in machine tool operating occupations in Montreal.

Repeated claims of shortages in the machining occupations and the persistence of long-term vacancies prompted the Quebec regional office of the Canada Employment and Immigration Commission to sponsor a study of this occupational labour market in Montreal. The Enquête sur les caractéristiques de l'offre et de la demande des machinistes, Montréal métro was prepared by an economist from that office (Trottier 1978). The interest of this study lies in the detailed analysis it presents of the characteristics of a sample of workers registered in Canada Employment Centers and those of job orders placed in those centers during the week of November 14th to 24th 1977. For the purpose of the study two occupational units machinists (8313) and machine tool operators (8315) were combined in a single group. Information was extracted from the files of manpower counsellors and these

confidential data provide detailed information on the wages and working conditions offered by employers, as well as the training and experience requirements of these jobs. Similarly these files yielded relevant facts on applicants for jobs in machining occupations: age, training, years of experience and wages asked.

Most of the jobs were in three industries: 90% of them were in either metal fabricating (40.4%), transportation equipment (30.4%), and machinery (19.2%). This marked renewed demand for machinists from the lows of 1976 and it was due principally, according to Trottier, to the increase in activities in the aeronautics sector (1978:18). It was found that an important proportion of the job orders listed were long-term vacancies: 50% of jobs had been reported vacant for 5 to 19 weeks and only 22% for less than one month (Trottier 1978:6). Many workers in the sample had experienced long periods of unemployment: 36% had been without a job for more than six months, 65% for more than two months (:66). Clearly the matching process was not proceeding swiftly.

Trottier concluded that low wages did not explain the short supply of machinists for these jobs. Whereas 55% of employers were willing to pay hourly wages between $6.00-$6.99, only 22% of workers were asking for these wages and the majority, 70% to be precise, expected wages between $3.15 - $5.99 an hour. Even when controlling for years of experience it was found that the average wage expected by workers was $5.35 an hour while employers were offering on the average $6.08 an hour.

Vocational training was introduced as an independent variable. Fully 62% of job offers did not mention any educational requirements (:53), only one third specified some vocational training in machining. This is surprising when one considers that the demand is for skilled workers who should possess some theoretical knowledge of machining. However 48% of workers registered had received sufficient vocational training to qualify them as machinists.

The experience factor does seem to explain some of the mismatches. Almost half of the workers registered that week had 2 years or less of experience in machining, 11% had none at all, and 36% had 3 years or more of experience. On the demand side 81% of job orders specified the need for three years or more of experience and 50% of vacant jobs required 5 years or more of experience. Furthermore it appears that even older workers had not acquired as much experience as could be expected. Amongst workers over 35 years old, only 14% had stayed in the occupation for more than 10 years. Almost half (47%) of persons aged 25 to 34 had 2 years or less of experience (:68). This seems to point to a fairly important degree of occupational change which hindered the acquisition of experience. It appears that lack of relevant experience was the main factor preventing individuals registered in the Canada Employment Centers from filling the available positions. This study shows that there were not shortages of workers in terms of supply available, rather there was an imbalance in regard to the experience asked and

available. In this sample of employers skill was defined and measured by on the job experience rather than vocational training.

These data collected from the CEIC call for some comments. As noted before, the Canada Employment and Immigration Commission is the primary department responsible for implementing policy relating to the Canadian labour market. One would expect therefore, that it would be the privileged source of information on labour market activities in Canada. Through its network of Employment Centers, it can collect detailed information on the demand and supply of workers in various occupations. Indeed many of the programs implemented by the Commission seek their rationale in these very data. Such was the case for the Critical Trade Skill Training Program (CTST). Yet when one looks more closely at the evidence on vacancies in occupations that are included on the shortage list for CTST, such as machinists, it is clear that in Montreal the data emanating from Employment and Immigration do not describe a shortage situation.

Surely, the data I have just examined indicate that there are periods when demand for tool and die makers, machinists and welders is greater, specifically in 1974 and to a lesser degree in 1978, 1979 and part of 1980. But there is always at least a reasonable, in most times a formidable supply of available workers to fill the announced vacancies. One would be tempted to conclude that the data from Employment and Immigration do not reflect the situation accurately. An assesment of the reliability of

these data is in order and requires a) looking into the character of the data, the definitions used, and the kinds of phenomena they encompass, and b) determining how the information is gathered and processed.

The data available from the reports analysed previously are all collected in Canada Employment Centers. Individuals who are registered in these centers are classified according to their occupation; those persons have either had some working experience in the field or received pertinent training or both. There can be, of course, great differences in the experience and training accumulated and this is clearly demonstrated in the study done by Trottier (1978). Yet they are all classified under the same code. Since the assigning of an occupational code is partly based on self definition by the applicant, there may be many individuals who are not as qualified as they claim to be or even register in an occupation where they would like to work, rather than one in which they are proficient. Furthermore, Canada Manpower counsellors have not for the most part received training that would enable them to identify and then allocate the most pertinent occupational code to prospective employees. This may result in an overestimation of the number of individuals in a given occupational category. This has been noted in a study of tool and die makers in Ontario, the author commenting that CEC and Unemployment insurance records: "tend to overstate the number of qualified persons available

for work in a highly skilled occupation such as tool and die making" (Meltz 1982a:13).

As mentioned previously the individuals registered in Canada Employment Centers may be employed or not. The Task Force on Employment Opportunities for the 80's reports the findings of a survey saying that:

> About 60 percent of job seekers used the Canada Employment Centers. The figure included persons who must register if they are to maintain their eligibility for unemployment insurance benefits, so that the proportion of job seekers who actively use the Centers may be lower (Canada 1981a:114)

Furthermore, when an individual does find a job he does not necessarily report this information to the CEC where he is registered[13]. Unless there are frequent periodic follow ups (and this depends on each individual counsellor) the number of people registered as seeking employment in an occupation may be over estimated. There is reason to believe this is quite likely to happen. As a matter of fact it may be expedient for a counsellor to keep a high number of applicant files as it is one way his work load is assessed.

What about job vacancies? Normally at a CEC a job vacancy is reported by an employer specifying the requirements of a job, the wages paid, and starting date. There is, of course, no obligation for employers to register their job openings with CEC's and many do not. Again the Task Force on Employment Opportunities reports that employers stated that "They use the Centers only as a last resort or to recruit persons for low-skilled jobs" (Canada 1981a:114). The Economic Council of Canada had also noted in its study on the Canadian labour market entitled People and Jobs that the CEC's "handle only an estimated 25 to 30 percent of total hirings" (Economic Council 1976:16).

This situation is acknowledged at Employment and Immigration where a regional economist estimated that in Montreal CEC's may receive less than 20% of job offers in certain specialties, including machining trades. The vacancies indicated by job offers in CEC's represent therefore only a small proportion of all vacancies in Montreal. There are other problems with the definition of vacancies. Employers may leave a job order in the form of a standing order. Often this means that the employer would like to meet suitable applicants in a given occupation, but there may not be a job opening as such. The employer is then only accumulating lists of prospective employees. The report on job vacancies and clients registered (Man 757) does not of course distinguish between categories of vacancies. Analysis of these reports over the months will of course show a pattern and

give some indication of the tightness of the labour market, but the view is partial at best.

The report on shortages should be the prime source for assessing the extent of shortages. However, this is one report presenting serious problems of reliability. A vacancy should be reported as a shortage if the position remains unfilled for more than 30 working days. Analysts at Employment and Immigration feel that very often a vacancy will be included in this report before the end of these 30 working days. Also vacancies may be added to this report for which there are no job orders in the CEC. For instance, a counsellor visiting a firm and told that there are recruiting problems in an occupation will often enter this information on the report of shortages. This may account for the fact that at times, shortages exceed the total number of job offers... Finally this report was considered so unreliable that it was discontinued in early 1984. The fact that information contained in the files of the manpower counsellor had to be extracted every month, recorded and sent on to the district office, probably induced transcribing errors too. Finally, the data available from these reports do not tell us what were the wages offered by employers, nor the level of skill and experience they demanded. Information on this as well as the characteristics of clients registered is contained in employer and client files that are confidential.

To conclude, data based on operations in Canada Employment Centers can only give an indication of the labour market situation and do not provide a sound basis for evaluating shortages. On the one hand the numbers of qualified clients may be overestimated at times and does not necessarily give a representative picture of the work force available in various occupations. On the other hand, job vacancies reported to these centers are, it seems, only a fraction of total vacancies in the labour market which would lead to underestimation of vacancies, while the reporting procedures for long-term vacancies in CEC's might at times overestimate them. Using these data it is impossible to arrive at any conclusion on the presence and extent of shortages. Finally programs launched by the government to reduce shortages rest on rather shaky empirical evidence if the data from Employment and Immigration are used extensively.

THE JOB VACANCY SURVEY

This survey developed and administered by Statistics Canada ran from 1971 to 1978. A vacant job was defined as one:

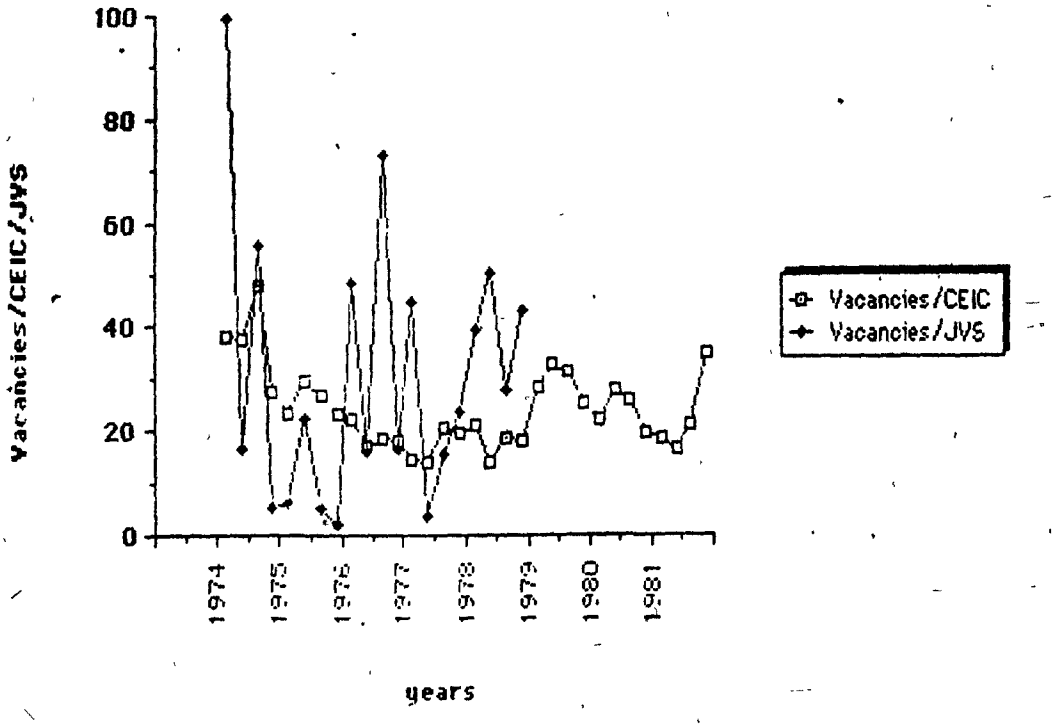
> vacant for the full reference day-for which some specific recruiting action was taken - was open to workers from outside the establishement and was either immediately available or available at a specific future starting date (Statistics Canada 1972:5).

The data collected through this survey was used to provide quarterly estimates on vacancies in Canada and could be disaggregated to the regional level. This was done for the Montreal area and I obtained these disaggregated data from Statistics Canada. I am using the data available from JVS as a means to corroborate the information gathered from the Employment and Immigration Commission for the years when these two series overlap - 1974 to 1978.

In the Montreal region, the Job Vacancy Survey describes the situation for the occupations studied in this dissertation as follows: Vacancies for tool and die makers were high in 1973 and remained so for most of 1974. 1975 saw an important drop in vacancies but they increase again in 1976, and from then on there is a marked "seesaw" pattern with important variations from quarter to quarter. The JVS data shows an upward trend in the end of 1977 and most of 1978.

Figure 2.4 charts the patterns of vacancies for tool and die makers from the CEIC and the JVS data. They are similar but there are less fluctuations in the CEIC data. The numbers are quite different however; they are larger in the JVS survey. As noted by Meltz (1982a) this can be explained by the fact that the Job Vacancy Survey taps a larger number of employers while the CEIC data reflect job orders received in Canada Employment Centers only.

Figure 2.4
Vacancies for tool and die makers. JVS/CEIC.

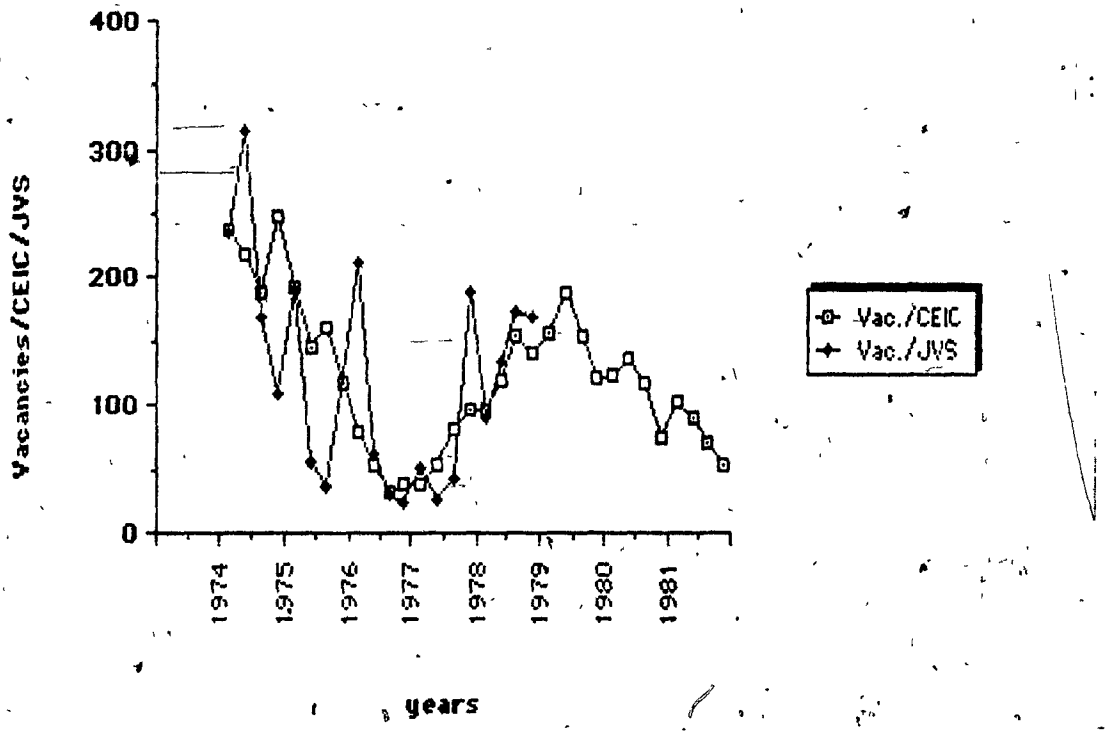


Long term vacancies were important especially in 1974 (see Appendix B) but they diminish dramatically in the other years except for at most one quarter per year. For some unknown reason data on long term vacancies is not available for 1978, for any of the occupations.

The pattern for machinists shows similar fluctuations. From a high in early 1974 they decrease constantly except for a sudden large increase in early 1976 and in the last quarter of 1977, while there is a constant rise in 1978. The long term vacancies fluctuate widely from quarter to quarter in 1974,

stabilize at over 40% of all vacancies in 1976 to fluctuate again in 1977. The pattern for overall vacancies in the CEIC and JVS data are again roughly similar between 1974 and 1978 (see figure 2.5).

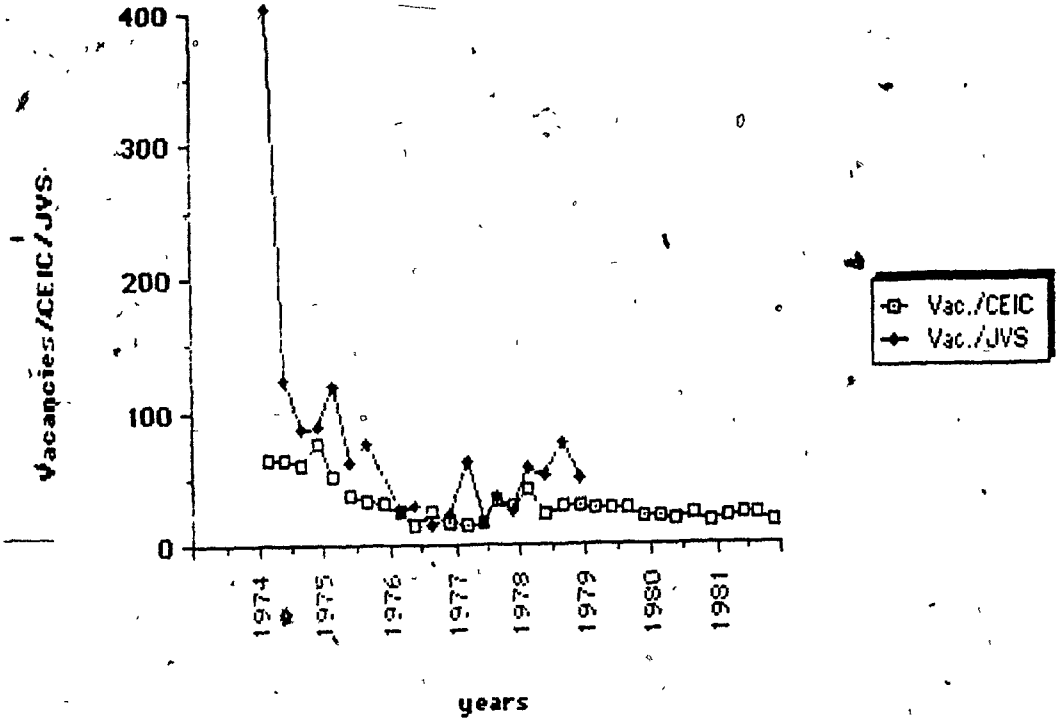
Figure 2.5
Vacancies for Machinists CEIC/JVS.



The situation is repeated for machine operators with early highs in 1974 followed by overall decreases especially in 1975-76 to fluctuate again through 1977 and with an increase in 1978 over 1977 (see figure 2.6 and Appendix B). As vacancies increase the number of long-term unfilled jobs increase. Comparing JVS and CEIC data for machine tool operators, one finds that the

number of vacancies is again much higher in JVS but the patterns of increases and decreases are similar over the years.

Figure 2.6
Vacancies for machine operators CEIC/JVS.



Comparisons of trends from JVS and CEIC data can be made only for the period 1974-78 as these are the years for which both series are concurrent. For tool and die makers, the trends registered by both sets of data are roughly similar. 1975 signalled a decrease in job offers and the subsequent increase is earlier according to JVS; that is in 1977, rather than 1978 as indicated by CEIC. Vacancies in machining occupations (8313) started declining in 1974 and remained lower through most of 1977 while 1978 saw some increase. For machine operators the

decline in vacancies was almost constant after 1974 until 1978 according to CEIC figures, while increases are noticeable in 1977 with JVS.

Despite some discrepancies, the overall trends illustrated by JVS and CEIC indicate periods of greater demand in the early 1970's and a general decline until 1977 when there was again a slight increase. But the vacancies never reach the level of the early years of 1970. It must be noted that the Job Vacancy Survey sample usually included as large a population of employers as possible. However the estimates at a finer level of disaggregation, as is the case here, are not as reliable, the sampling variations being larger.

CONCLUSIONS

The reports and studies reviewed in the preceeding pages reveal an overall trend: in some categories of skilled occupations there were periods of increasing demand in 1974 and again in 1978-79. On the whole, however, the evidence presented does not support an unequivocal statement of continuous, extensive shortages of tool and die makers, and machinists. There is no evidence at all that there was a scarcity of machine tool operators.

The very concept of shortage in the government reports (Canada 1957;1981a) and in the various studies (Betcherman 1982; Economic Council 1982; Memac 1979,1981; Meltz 1982a; Trottier

1978) is often defined differently, if it is defined. These definitional problems probably explain why some reports refer to "recruiting difficulties" as well as shortages: e.g. the Human Resources Survey and Memac surveys. This term may well refer to problems other than short supply such as time required by employers to find a suitable and effective recruitment channel. Lack of precise information on parameters such as wage rates and skill levels preclude, to a large extent, the use of such a definite term. In an upcoming chapter (4) the definitions of shortage and skill gathered from employers interviewed in the course of the investigation for this thesis are examined and it is found that they also vary widely at times. Also, it is very difficult to obtain precise measures of the extent or severity of shortages. One would assume this dimension to be of importance when designing remedial programs. Many of the studies are national in scope and are therefore of little help in trying to assess the situation in local and/or regional labour markets. The wide variations across the regions in Canada prevent any realistic transposition of these national trends to the provincial level. The weak response rate in one survey also invites caution in concluding that extensive, widespread shortages existed. At times, no clear data supporting a condition of shortages are presented; this is the case with the Parliamentary Task Force on Employment Opportunities for the 1980's. Finally, the information available from the Employment and Immigration Commission reports does not indicate a general condition of

shortages. In some cases there is evidence of a tight labour market in certain periods, but overall there are important surpluses. Nevertheless, there seem to have been constant long term vacancies even when the supply of workers was very large: This raises the question of qualification of job seekers. A detailed study of machinists in Montreal (Trottier 1978) does indeed suggest that here may lie part of the problem. If this was the case, one would expect that employers facing this situation would have taken measures, over the years, to ensure themselves of a reasonable supply of workers, possibly through training. Shortages should have then diminished. The Memac surveys however indicate that there was little in-depth training. In the late 1970's "recruiting difficulties" are reported again. Obviously the answer to this must be sought within firms employing skilled workers.

What we are faced with here, is on the one hand, employers and at times government agencies claiming that there are serious problems in securing an adequate supply of skilled workers, and on the other hand very little data to support these claims. The approach taken here is to use the data available as a starting point and pursue the investigation in those firms and industrial sectors that would employ skilled workers. In the following chapters I turn to such an inquiry.

NOTES CHAPTER 2

1. The major bulk of expenditures of the Canada Employment and Immigration Commission have usually been allocated to training. especially institutional training. From 1968 through 1976 these expenses represented from 50 to 60% of all funds (Goldman 1978:3,4). An in 1979-80 training programs amounted to almost two thirds of expenses (Canada 1981a:50).

2. The following list identifies the "designated occupations" in the province of Quebec in April 1982 when the CTST program was first implemented. This list of critical skills in shortage was based on previous years' information.

CCDO	Occupations
2117	Physical sciences technologist and technicians.
2163	Draughtpersons.
2165	Architectural and Engineering technologists and technicians.
2183*	Systems analysts, computer programmers and related occupations.
7713	Miners.
8137	Moulding, coremaking and metal casting occupations.
8165	Distilling, subliming and carbonizing occupations, chemicals and related materials.
8256	Inspecting, testing, grading and sampling occupations, pulp and papermaking.
8311	tool and die making.
8313	Machinists and machine tool setting up.
8319	Metal machining occupations others.
8331	Forging occupations.
8333	Sheet metal workers.
8335	Welding and flame cutting.
8337	Boilermakers, platers and structural metal
8351	Wood patternamaking.
8395	Patternmakers and mouldmakers.
8511	Engine and related equipment fabricating and assembling occupations.
8515	Aircraft fabricating and assembling occupations.
8533	Electrical and related equipment installing and repairing.
8573	Moulding occupations, rubber, plastic and related products.
8582	Aircraft mechanics.
8583	Rail transport equipment mechanics and repairmen.
8584	Industrial, farm and construction machinery mechanics and repairpersons.
8586	Inspecting and testing occupations, equipment repair.

8596 Precision instruments mechanics and repairpersons.
8731 Electrical power linemen and related occupations.
9533 Stationary engine and auxiliary equipment perating and maintaining occupations.

3. The Occupational Employment Survey was another report intended to gather statistics on shortages. however it published results only for the year 1975; flaws in its design account for the demise of that effort (Economic Council 1982:13).

4. The surge in immigration is explained by modifications in immigration policy which allowed a larger volume of unsponsored immigrants (Canada 1957:57) while in the previous period 1946-1950 sponsorship was preferred and restrictions towards "former enemy aliens" were in effect (Canada 1957:56).

5. When the Economic Council was contacted in the hope of obtaining more detailed information and the possibility of examining the original data, I was told that the tapes for the Human Resources Survey had all been lost.

6. Only 4 companies out of 26 in 1979 and 9 out of 36 in 1981 in the province of Quebec reported having a registered training program (Memac 1979:2;1981:3). A registered training program refers to those industrial training programs in firms that conform to some national or provincial norms such as the Red Seal program.

7. Some pertinent discussions of the implications of these objectives for manpower policy are to be found in Jain H.C. and R.J. Hines 1973; Sexton J.1973; Newton K. 1977.

8. The COFOR model is described in detail in Proulx P.P. 1977; and Foot D.K.; Meltz N. and F. Siddiqui 1984.

9. In 1983 the Employment and Immigration Commission presented another forecasting model: COPS the Canadian Occupational Projection Survey described in the monographies The Canadian Occupational Projection System published by the Strategic Policy and Planning, Labour Market Outlook and Structural Analysis Directorate of the Commission. However since the projections that might be available do not concern the time period studied in this dissertation I have not commented on it.

10. One company in the sample of firms I interviewed had faced repeated shortages of patternmakers. As there was no school in the Montreal area giving training in that field, and recruiting overseas had become too difficult and expensive, the company decided that it would be cheaper to have its molds and patterns done in Korea. The trade disappeared in this firm.

11. In order to receive UIC benefits claimants must be available for work; this was usually interpreted as looking for work. Registration at a Canada Manpower Center was one way to "prove" availability. In any case names of UIC claimants were sent to CEC counsellors who then contacted the unemployed person and registered him or her.

12. In 1981 a computerized system was introduced called MOPS (Metropolitan Order Processing System) which should allow a more accurate and up to date picture on any given date. The system would identify jobs by the seven digit code and would also give the wages offered. However at the time of this study the system was only just being implemented and the data recorded was considered reliable only from March 1981 on for vacancies and from April 1982 on for clients registered. The program had still too many "bugs". Because of these late dates I have not used that data.

13. Much of the information about actual practices of manpower counsellors comes from my own experience in that job during the years 1970 to 1972 in two different Montreal CEC's.

CHAPTER 3

METHOD OF ENQUIRY

INTRODUCTION

The aim of this study is to examine the evidence of and responses to announced shortages of skilled workers in one labour market. The decision to study a local labour market was made because it is at this level that the mechanisms and processes of the labour market are experienced by workers and employers. National level studies may reveal broad trends but they cannot take into account the specific contexts in which firms and workers make decisions. In a country as large and as diverse as Canada these contexts vary widely. Few in-depth studies on shortages have been done in Canada and except for Meltz's research (1970,1982a) there has been no research that I know of on shortages in local labour markets.

The unit of analysis in this study is the establishment because I am interested in the behaviour of employers and the context of that behaviour. The assumption I make is that employers have a considerable degree of freedom in determining their strategies in relation to labour. Decisions about the strategy to pursue and the various tactics employed in implementing it are made at the firm level within a local context; even in the case of a multi-establishment firm considerable discretion may be left to the establishment's management within the confines of general policies and guidelines. Furthermore since

> the organizational, institutional, and contractual determinants of labor force decisions made inside the firm tend to be both complex and highly specific to particular firms and industries...(Holt and David 1966:137-8).

it is important that some studies be devoted to analysis of the labour market process from the firm's perspective. In this chapter I will describe the sample studied and the methodology used to do so. I begin with a discussion of the labour market area and occupations chosen. I then proceed to examine how the sample was assembled and the characteristics of this sample are presented. The methodology used in this study is then explained.

THE LABOUR MARKET

The geographical labour market chosen includes the island of Montreal plus the towns of Longueuil which is situated on the "South Shore" of Montreal and Laval which is on the "Ile Jesus" immediately north of Montreal. These two suburbs are included because they can be considered part of the local labour market as defined by various authors. It is an "area within which workers can reasonably be expected to move from job to job" (Montague 1979:32). These towns are all within easy commuting distance and linked by an integrated public transportation system; information about jobs and wages in either of them would, in principle, be easily available to employers and workers: jobs in either location are advertised in the same newspapers and employment exhanges, the wages paid in either would be similar

for firms sharing otherwise the same features. These characteristics would meet the requirements of a definition of a labour market where "there is enough uniformity of behavior among certain workers and among certain employers to warrant generalizations about the actions of each" (Kerr 1954:92). Finally Montreal is the logical choice to study the patterns of shortages of skilled blue collar workers as it is the heartland of manufacturing in the province of Quebec.

The period studied was 1974 to 1981. It was not worthwhile to go beyond that date since it soon became apparent that conditions had drastically changed with the 1982 recession; from that year till the beginning of the study in 1984, firms had not faced shortages but important surpluses. The starting year 1974, was chosen because it matches the series on job vacancies that were readily available from the Employment and Immigration Commission. Furthermore as information from firms was gathered through interviews with individual respondents, it was felt that a ten year period was the limit to which memories could be stretched; that adopting a longer period of reference was too risky and would likely yield too much unreliable evidence. Also due to the normal mobility within and between firms it would have been more difficult to find respondents who had been with the firms for a longer period.

THE OCCUPATIONS

The following occupations were chosen for study: tool and die makers, machinists and machine tool operators. The following criteria guided this choice:

1. They are not "new" occupations that emerged as a result of rapid and unforeseen technological developments. (This of course does not mean that such developments have not affected the mix of skills required in these occupations). This is important in this study since I wanted to study the phenomenon of shortages where the sudden creation of the occupation cannot explain the deficiency in training or any other institutional factor that might hamper supply.

2. These occupations are considered important in manufacturing firms not because of their numbers but rather because of their role in the production process. Tool and die makers (and machinists as well) "are so essential to the many production processes that the well-being of the manufacturing sector may be said to depend on a sufficient supply of such workers" (Meltz 1982a:1). These workers are needed to prepare, operate and maintain the tools and equipment of many industries. Furthermore the machines and tools they help build are inputs in almost all phases of industrial activity.

3. They are occupations considered skilled (in the case of machine tool operators this is more debatable - but their inclusion increases the range of skill being studied) as they suppose a

certain body of knowledge and possession of skills that can be obtained only through investment in vocational school programs and/or considerable on the job training and practice.

4. They have repeatedly been identified as being in short supply or in shortage in various reports (those were examined in the previous chapter). Privileged informants such as labour market analysts at the Employment and Immigration Commission, employers involved in industrial associations and trade union officials in the Montreal area also felt that there was generally a short supply of these workers which at times became a shortage.

An occupation can be described as a group of related tasks similar in content and requiring similar skills and training. However occupational boundaries are often ill-defined especially when there is no official demarcation such as certification rules or precise entry requirements. In the first stage of the research I therefore relied on the classification and definition of occupations as described in the Canadian Classification and Dictionary of Occupations (CCDO) compiled by the Employment and Immigration Commission of Canada which is used by various government agencies when collecting data on the labour force. The CCDO proposes a classification structure "that consists of four levels of occupational categorization, each providing successively finer detail" (Canada 1986:23). A two-digit major code summarizes the occupational activities in the group: for example 83 is the code for machining and related occupations "concerned with using machines and hand tools to

shape or work various materials" (Canada 1971:523). The major groups are divided into 81 minor groups using a three-digit code such as 831: metal machining occupations. It specifies the material worked on and lists the major activities. The third group or level of aggregation, the unit, describes more closely-related occupations and uses a four-digit code, and is accompanied by more specific descriptions. It should be noted here that very often available official statistics will use this code. For the purpose of this study it is also the one I usually refer to. For metal machining six such unit groups are included: I list and describe the four groups used for this study.

8310: foremen, metal machining occupations[1]: describes supervisory and or coordinating activities of "workers engaged in shaping metal into parts or products by machining" (Canada 1971:523).

8311: tool and die making occupations: "includes occupations concerned with making and repairing custom-made, prototype or special tools, dies, jigs, fixtures and gauges that require working to close tolerances. Activities include: laying out, making mathematical computations, reading mechanical drawings, setting up work pieces and machines, operating hand-tools...and finishing work to specifications (Canada 1971:524).

8313: machinist and machine-tool setting-up occupations includes jobs "concerned with setting up and operating various machine-tools to shape metal into parts or products of speci-

fied dimensions requiring work to close tolerances. Activities include: measuring, laying out and setting up work pieces; making mathematical computations and reading mechanical drawings; machining work to specifications by boring, milling, turning ...and associated fitting, assembling and repairing of metal parts; setting up machine-tools for less skilled operators to perform repetitive work" (Canada 1971:526).

8315: machine-tool operating occupations: include "occupations concerned with operating or tending metal cutting machines normally set up for repetitive-type work. Workers in these occupations operate or tend one or more machines to perform machining operations" (Canada 1971:535).

Finally these groups are further subdivided into individual occupations identified by a seven-digit code. The description provided for each occupation may differentiate between industry setting, describes the nature and scope of the occupation and specifies the general educational requirements in terms of approximate years of schooling along with specific vocational requirements. Other aspects of the job are also noted such as environmental conditions, physical activities included, functions of the job and aptitudes expected. For instance a tool and die maker: 8311-110 should have 11 to 12 years of formal schooling, specific vocational preparation requires over 2 years and up to and including 4 years, and functions involve analyzing data and setting up machines while there are no significant "people skills" required.

Such a precise description is useful when examining jobs and attempting to place them in a structure; however most firms will not analyze jobs in such a detailed way and the term machinist for instance is used in a much "looser" way. The seven-digit code group is also rather awkward to work with in a study such as this one as there are so many titles included, in the case of machinists alone there are 58 sub-occupations. Finally as noted before official statistics on occupations are usually presented with the four-digit code.

It must be noted here that while there is general agreement as to the activities and skills required of a tool and die maker, this is not the case for machinists. During the interviews I conducted with employers I found that in many work environments, the boundary between the occupation of machinist and machine tool operator was often blurred. A French study examining industrial occupations suggested that there had been changes in the content of many industrial jobs and the traditional titles did not reflect the new reality: "l'éclatement des catégories professionnelles (est) dû à la transformation des processus de production dans l'industrie" (D'Hugues et al 1973:1). The widespread use of automatic machine-tools, the introduction of numerical control tools and then of computer-driven ones along with the continued use of conventional machines, has led to some confusion about the task content specific to machinists and machine tool operators. Furthermore, despite efforts at producing neat classifications, it remains

that there is not necessarily a neat break in levels of skills but rather a continuum.

> A machinist's skills can be separated into three interrelated components: conceptual skills such as planning the job, motor manipulative skills such as turning cranks and flipping levers, and feedback skills such as monitoring and controlling the actual cutting of metal (Shaiken 1984:81).

However one of the components could be omitted, planning for example, in firms where process planners are used, but the worker will still be called a machinist. Similarly another component could be transferred to a computer with again the worker retaining the job title.

Another factor to consider is the custom within a firm: in some companies, specialized machine operators are called machinists, this was the case in a very large Montreal firm where an informant explained: "What we call machinists here are often machine operators, they work only on a milling machine or a lathe, also most of the time they will not do the set up". Changes in job content, brought about by increased automation within that firm did not bring a change in the job title. Again in other firms, specialized machine operators did their own set ups. It was also found that requirements for these workers also varied to a surprising degree from industry to industry "often times in relation to the same technology and occupations" (Peitchinis 1978:39). The size of operations is likely to have an impact on the duties and eventually the titles assigned to workers: in smaller shops a machine operator is often expected

to do tasks required of someone classified as a machinist in a larger firm. Indeed job titles as used in different firms are "artefacts of the market rather than boundaries of it" (Thomas and Deaton 1977:144). The heterogeneity of the category complicates an analysis of shortages in these occupations, but it is less so in a study conducted in a local labour market involving interviews, where precisions can be obtained concerning various definitions, than it would be in an analysis of aggregate data.

Distinguishing in a precise and detailed way amongst the various categories of workers in this study would have required direct observation of the workers in each environment. This was not feasible. I therefore relied on descriptions given by each employer for each category. Despite these limitations the following patterns emerged: the number of tool and die makers employed in any given firm is usually very small, only three very large firms employed more than 50 and in many firms there were none. Machinists formed a larger category, in firms where repairs were the main service they might even be the largest category. But usually machine operators were the largest group, but again with some substantial variation in the range of tasks they would be assigned to.

THE SAMPLE

The first concern in preparing a sample of suitable firms was to locate the industries within the manufacturing sector, and then the firms where tool and die makers, machinists and machine tool operators would be employed. I relied on an industry/occupation matrix prepared by economists at the Montreal regional office of the Employment and Immigration Commission and which they kindly provided me with. This matrix is constructed on the basis of census data since the period studied is 1974 to 1981. I have of course used the matrix worked out from the 1971 census. The occupations are identified with the four digit code representing the unit group. Four occupational groups were investigated: tool and die making occupations identified by the code 8310 and 8311; machinists and machine tool setting up occupations (8313); machine tool operating occupations (8315).

Table 3.1 shows that the majority of workers in machining occupations in the Montreal region are employed in the manufacturing sector, furthermore within that sector the following five industries are the ones where workers in machining occupations were to be found: primary metal, fabricated metal products, which includes, for example, establishments manufacturing structural metal products and parts, engaged in metal coating, stamping and pressing metal products as well as the machine shop industry; machinery and equipment: includes firms fabricating operating equipment for various industries; in the transportation

equipment would be firms manufacturing aircraft and components as well as motor vehicles and parts; and finally the electrical equipment industry.

This distribution of occupations led me to seek a sample within these five industries in Montreal. To identify the firms I relied on Scott's Directory. This manual provides a listing of Montreal employers and supplies the following information: address of the company, name of the executives, products manufactured, industrial codes and number of employees. The industrial codes referred to are those of the Standard Industrial Classification of Statistics Canada. This classification has, within manufacturing, three levels of aggregation: the major group, for example 29 represents all primary metal industries, the second level using a three-digit code for example 291 identifies primary steel industries whereas at the third level and using a four-digit code: 2911 for instance are the establishments in the ferro-alloys industry.

TABLE 3.1

DISTRIBUTION OF WORKERS IN MACHINING OCCUPATIONS IN MONTREAL INDUSTRIES 1971.

INDUSTRY	OCCUPATIONS[a]			
	8310	8311	8313	8315
	number	number	number	number
all ind.	805	970	5645	3805
manufact.	660	885	4110	3200

	number	%[b]	number	%	number	%	number	%
primary metals	75	11.4	45	5.1	195	4.7	410	12.8
fab.metal products	300	45.5	315	35.6	1275	31.0	1270	39.7
machinery	65	9.8	45	5.1	360	8.9	320	10.0
transport equipment	105	15.9	195	22.0	795	19.3	555	17.3
electrical	15	2.2	140	15.8	355	8.6	260	8.1
total	560	84.8	740	83.6	2980	72.5	2815	87.9

a the occupations are identified by their four-digit code:
8310: foremen machining
8311: tool and die makers
8313: machinists
8315: machine-tool operators

b percentage of total workers in that occupation in manufacturing.

I chose randomly firms in the five groups identified above and especially in the machinery industry in order to capture those firms that would employ workers in machining occupations. More often than not each establishment has more than one industrial code, the practice in Scott's Directory is however to list the most pertinent code first; the area in which the firm is most active. As much as possible I chose firms whose codes were mostly within the five groups chosen and especially within the machinery industry. This led to oversampling in the machinery industry (see table 3.2), a deliberate choice as I was concerned with obtaining a sample of firms in industries where workers in the machining trades would be found in sufficient numbers as well as be involved in production rather than only maintenance. In the case of the fabricated metal industry there is an underepresentation of firms.

Again this was deliberate. This industry includes firms producing a very wide array of goods using very diverse methods. The job content of machinists and machine operators also varied extremely and in general machine operators were the most important group. The boundaries between the two occupations would also vary from subsector to subsector making any meaningful comparison impossible.

Seventy-four establishments were chosen and data collected for each. However during the ensuing coding phase some six cases were deleted from further statistical analysis because either too much information was missing or the data were unreliable.

TABLE 3.2

DISTRIBUTION OF SAMPLED FIRMS BY INDUSTRY.

industry	establishments	
	number	percentage
Primary metal	5	7.4
Fabricated metal products	13	19.1
Machinery	35	50.0
Transportation equipment	9	13.2
Electrical products	5	7.4
other industries	2	2.9
total	68	100.0

Table 3.2 shows the distribution of establishments by industry and table 3.3 the distribution of establishments by size. Possible indicators of size include volume of sales, total value of production, value of assets, and of course number of employees. In this study information on the first items was difficult to obtain in some firms, employers citing competition as the reason for their reluctance to furnish relevant data. Size of firms was defined therefore as the number of employees in the plant. In a cross sectional study this measure may obscure important variations. In addition, the interviews were conducted in 1984 and many establishments had had to severely curtail their work force in the 1982-83 recession and were then only slowly returning to their formal level of production. Respondents

were therefore asked to indicate the number of employees during "normal times".

TABLE 3.3

DISTRIBUTION OF SAMPLED FIRMS BY SIZE.

size	number of firms.	percentage of total firms.
5 to 49	31	45.6
50 to 199	19	27.9
200 to 499	11	16.2
500 +	7	10.3

n=68

The firms were divided in four groups according to the definitions suggested by Desjardins for classifying firms in the manufacturing sector in Quebec (1977:12). Firms employing 4 workers or less are labelled craft shops: there were no such firms in my sample. A small firm is one employing 5 to 49 workers, a medium-sized one: 50 to 199, a large one 200 to 499, and a very large one would employ 500 or more workers.

METHODOLOGY

Data used to study shortages of labour have often been collected through extensive surveys tapping information about firms and occupations in many industrial sectors and in different

geographical labour markets; the Betcherman study (1982) prepared for the Economic Council of Canada is an example. Economic studies show a preference for analysis of highly aggregated data examining series on unemployment, job vacancies, wages and number of entrants into an occupation. These kinds of studies yield an "overall" picture that could help document claims of shortages as well as their statistical relationship to other labour market processes on a macro-level and they are reviewed in a previous chapter.

However these studies cannot provide much information about the processes at work in a local labour market. Given that there can be much variation at that level, it seems reasonable that studies should be undertaken to examine the workings of local labour markets. There has also been relatively little attention paid to the decision-making processes that determine employers' responses, other than wage changes, to a situation of labour shortage. Notable exceptions are the studies done in the United Kingdom by Mackay et. al (1971) and especially Thomas and Deaton (1977). In Canada where there have been recurrent claims of shortages of skilled labour, there has been no detailed in-depth study of the behaviour of employers.[2]

Finally on a more general level it has been claimed that there is a need in sociology for "the development of direct methods for studying the realities of demand and for "decomposing" employers' ways (Berg 1981:4). This can be done by examining the manner in which employers in various firms and

industries structure and define occupations, how they choose recruiting channels and implement hiring practices, how they encourage or stifle mobility and how they reward workers. This kind of program would provide information on labour processes at a more micro level that can follow up on the work of authors such as Doeringer and Piore (1971), Sabel (1982), Piore and Sabel (1984), Osterman (1984) to name only a few.

This study sets itself apart by concentrating on a local labour market and by focusing on employers' perceptions and practices. It is based on a larger sample of firms in a local labour market than any other study done so far in Canada[3]. This line of enquiry requires a specific methodology to gather relevant data and proceed to its analysis. A wide-ranging survey of a representative sample of firms in Montreal according to rigid statistical sampling procedures could have been done. However to ensure a reasonable response rate, mailed or telephoned questionnaires must be rather short, also such a procedure would not have allowed a detailed probe into employers' reasons for choosing one type of response rather than others. Financial constraints also precluded choosing this strategy.

Rather it was decided that a more limited sample would be sought and information gathered through intensive interviewing. A crucial element in such a strategy is to obtain access to the firm and then to the respondent who really holds the information. To ensure this, the first person contacted in a firm was an executive at the highest level of the

organization: either the vice-president personel or the president. The purpose of the study was explained and then a request made to meet with the person who in his opinion, could best answer those questions. An interview was then arranged with that individual. Interviews lasting from one and a half to two hours were done according to a predetermined questionnaire. Some seventy-four establishments were visited and data collected in each. In each case background information about the firm, its work force, and usual personnel procedures was sought as well as data about the circumstances surrounding the decision making processes in solving the shortages. The results are basically case studies which are, I feel, relevant to the kind of enquiry made here since

> It is through the use of the case study particularly that the attempt can be made to explain social behaviour in terms of the ways in which participants define the situation. (Eldridge 1968: 5)

Another element in favour of using this social survey approach is that it might be more helpful in uncovering the specific labour market "imperfections" such as limited information that are merely assumed in more sophisticated statistical analyses.

It must be admitted however that the findings derived from a study using this more qualitative type of methodology, are difficult to generalize. Yet the number of firms and their concentration in certain industries allows some conclusions which describe accurately and represent to a reasonable extent

the major factors taken into account by firms in the manufacturing sector in Montreal when facing a scarcity of skilled workers in the machining trades. This kind of methodology also helps define and eventually specify within the context of a more rigidly defined model some of the variables to be included in an analysis of labour imbalances.

Prior to doing these interviews I had conversations with privileged informants such as economists in the labour market analysis section of the Montreal office of the Canada Employment and Immigration Commission, trade union officials and the president of the Machinery and Equipment Manufacturers Association of Canada. I also consulted, recorded and analyzed data on job vacancies as reported in the various reports of the Canada Employment Centers in Montreal. This involved careful perusal of the relevant reports which included data on job vacancies declared by employers in the form of job orders, number of individuals registered as seeking a job in the occupations studied, monthly reports on long term vacancies (30 days or more). The series from the Job Vacancy Survey for Montreal were also consulted. These data and especially the interviews are the basis for the discussion on evidence of shortages, perceptions by employers and responses to shortages contained in the following chapters.

NOTES CHAPTER 3

1. this category: foremen, metal machining occupations has been included because in many firms, especially the smaller ones, foremen duties do not include only supervision but also actual work "on the floor".

2. the study by Meltz of tool and die makers in Ontario (1982) analyzed aggregated data such as job vacancies, unemployment series and job orders in Employment Centers. He also interviewed employers but the sample is small, as twelve employers only were seen (Meltz 1982:33).

3. The Human Resources Survey included 132 establishments in manufacturing in the whole of the province of Quebec, but it is not said how many of these firms were in Montreal and the study by Meltz (1982) uses a sample of 12 employers.

CHAPTER 4

EMPLOYERS' PERCEPTIONS OF SHORTAGES AND SKILL.

INTRODUCTION.

The review of literature noted the uncertainty surrounding the definitions of shortages and skill. Moreover, the evidence presented in chapter two demonstrates that official statistics provide a weak basis for claims of shortages. It was also pointed out that the perceptions of what constitutes a shortage as well as of the attributes required of a skilled worker would likely determine the kinds of responses employers would choose to resolve problems in the recruitment of skilled workers. It would also certainly influence the programs (especially training) that governments create to solve these problems and would eventually affect their usefulness. In this chapter I will assess the perceptions of shortage and skill of employers interviewed for this study.

PERCEPTIONS OF SHORTAGES.

Some fifty-six employers out of a total sample of 68 reported that their firm had experienced shortages of skilled workers sometime during the 1974-1981 period. In the next chapter I discuss how I went about measuring quantitatively these claims

but for the moment the focus is placed on how they might identify and define the situation subjectively.

Tool and die makers were seen by everyone as a category of workers hard to come by in any time period. However the numbers required are small and the needs are not continuous, mostly the problem of recruiting these workers arose when replacements were needed. Generally machinists were scarce in certain time periods, while on the whole there were significantly less difficulties encountered when trying to fill vacancies for machine operators. As noted in the chapter describing the sample the task content of these occupations may vary widely and influence the level of skill required and therefore the relative difficulties in recruiting. This issue is taken up again in a later section of this chapter on skills.

The time required to recruit a worker would be a useful indication of the presence of shortages. Respondents were therefore asked: How much time was required in difficult years to recruit a tool and die maker, a machinist, a machine operator? An assessment of the impact of recruiting difficulties on the firm's operations would also provide an indirect but useful measure. During the interviews respondents were asked to indicate the consequences of these recruiting difficulties such as <u>delays in production,</u> the <u>loss of clients or contracts</u> or <u>foregoing planned expansion.</u>

In answer to the first question about the time required to recruit skilled workers, there was general agreement that

qualified tool and die makers were always difficult to find and long delays in recruiting and hiring were the rule. One frustrated employer recalled: "on a cherché un outilleur pendant huit mois en 76-77". Another candidly admitted: "Pour avoir un outilleur il faut le voler aux competiteurs". Still another stated flatly: "Il n'y a pas de bons outilleurs sur le marché, ces gens-là ont toujours un emploi". In a large multinational firm, the director of personnel said that they never laid off their tool and die makers, (or for that matter any of the better qualified workers in the tool room) some work was always found for them, even in periods of recession, because if you let them go, you might not be able to replace them.

In the case of machinists the delays to recruit a suitable worker were considered too long, especially in the 1976-79 period. Recalling their efforts a manager noted that "Nous avons placé une annonce dans les journaux pendant deux semaines et nous n'avons reçu que cinq candidatures valables". A large firm, fabricating aircraft instruments and fuel control systems for airplanes, undertook an intensive newspaper advertising campaign in 1977: after a month and a half only eight new machinists were hired. In general it was estimated that anywhere from three weeks to a month were needed to fill vacancies for machinists in "normal to good business times". This was considered too long by them.

It proved more difficult to obtain unambiguous estimates of the time required to recruit machine operators and this is

directly linked to their definitions of the skills to be expected of these workers. However if these operators were assigned to automated machines, doing repetitive work there were few difficulties in obtaining a suitable candidate rapidly: that is three to four days. One employer said that
"On les prend sur la rue, n'importe quel gars qui a un peu de bon sens". Another employer estimated that: " Nous pouvons engager quelqu'un et en une demi-heure il peut opérer un tour revolver automatique". However if a "specialized" operator was needed, someone who had some knowledge of one machine, a lathe or a milling machine, especially semi-automated or traditional ones, the delays would have been longer in the years when business was booming - extending to three weeks.

The second question sought to determine what were the consequences of shortages for these firms. Some twenty-six employers could not recall any serious consequences. Delays in production were the most frequently mentioned consequence. Thirty-six establishments admitted to such delays. Shortages of workers are obviously not the only cause of delays: difficulties in securing materials or parts required as inputs or machine downtime will also bring about delays. Yet shortages of workers were an important factor, even if vacancies were eventually filled, the added training time that had to be devoted to less experienced workers also caused delays. However it must be added that these delays were seen as a serious but not a critical problem by employers: "Il y en a toujours, on vit comme cela,

les délais sont acceptables pourvu qu'ils soient raisonnables, parfois ils devenaient trop fréquents".

TABLE 4.1

CONSEQUENCES OF SHORTAGES FOR FIRMS.

POSSIBLE CONSEQUENCES	NUMBER OF FIRMS WHERE IT OCCURRED	PERCENT OF FIRMS
delays	36	57.1% (n=63)
loss of contracts	9	14.1% (n=64)
subcontracting	27	43.5% (n=62)
foregone expansion	1	1.6% (n=64)

The n varies as some employers did not provide an answer.

Nine firms stated that shortages of workers forced them to turn down orders. Finally plans for expansion of production facilities were shelved because of shortages of workers in only one firm. Subcontracting work was done by 40 firms but in many cases it was not necessarily a consequence of shortages; much subcontracting is done on a routine basis because of cost or production considerations as will be discussed in an upcoming chapter on responses to shortages. However in 27 firms subcontracting was increased during the period studied because they could not recruit enough workers but also sometimes because they were operating at full capacity and did not wish to purchase the additional equipment necessary to meet increased demand that was likely to be temporary or for which they would not be

able to secure the needed workers.

Most employers in this study felt that there had been a shortage of tool and die makers and of qualified machinists in the 1970's. This was signalled by the longer than usual time lags between the decision to hire more workers and the actual hiring. This forced the implementation of adjustments that were beyond those normally used in their firm. Delays in production and the need for more subcontracting were also seen by employers as evidence of the presence of a shortage. Yet the plant manager of a very large engineering firm stated that there had not been shortages of machinists, merely a short supply which was a constant problem. For him a shortage would have been present if production was paralyzed which was not the case in his firm. The assessment of the presence of shortages obviously relies to a certain extent on subjective judgments on the part of employers such as what is the "normal" time period in which to recruit a worker, as well as the seriousness of consequences and the range of adjustments that had to be put into effect.

DEFINITIONS OF SKILL.

As noted previously there is some confusion about the task content of occupations such as machinists and machine operators while the occupation of tool and die maker was not the subject of such confusion. The term machinist seems to be applied to workers with slightly different jobs. In some companies

machinists are workers who possess an all around in-depth knowledge of machining. They are sometimes called general machinists or qualified machinists: they can work on various kinds of machines and equipment, they know and understand the properties of metals they work on, will work at close tolerances, they can do their own set ups and can plan the sequence of tasks required to produce a finished piece. Where there is a small volume of production as in job shops a machinist will usually plan his work. In firms where large batch production is the rule, process planners (and now programmers) will do this. In some firms machinists could be "specialized" machinists: these individuals have usually developed proficiency on one kind of machine for example an engine lathe, numerical control equipment or machining centers.

The type of equipment used certainly affects the skill requirements: workers using automatic or semi-automatic machines need less skill than those working on large specialized ones, while individuals working on manual or conventional machines are seen as the most skilled. Furthermore in some firms the range of tasks given to the same category of worker may vary: a machinist or operator may do his own set ups or not. Similarly the category machine operator can encompass various degrees of skill. While in some plants they do little else but monitor and attend the machine, reporting any irregularity or problem to be fixed by another machinist, in some companies they are expected to know how to operate more than one machine, solve problems

and even do their own set ups. The practices varied from firm to firm and the term machinist could be applied to a qualified machinist, a specialized machinist or a machine operator. Only perusal of job descriptions (and those are absent in many firms) or direct observation of work done in the plant would allow one to ascertain exactly what workers in various plants do and the level and range of skills required.

A skilled worker is often meant to be someone who has followed a clear training path through apprenticeship. Yet Eli Ginzberg notes that "U.S. manufacturing industries obtain a large proportion of their journeymen from routes other than formal apprenticeship" (1979:123). The same situation exists in Canada and especially in the province of Quebec where there is almost no formal apprenticeship outside the construction trades. Such a definition is therefore not very relevant in this case and it would explain why few employers referred to such a description of a skilled worker[1].

However the concept of skill does encompass for most people a training dimension or better a "job-learning time" (Littler 1982:7). The Machinery and Equipment Manufacturers' Association of Canada in a survey conducted among its members, asked the respondents to indicate the recommended training time for the occupations of tool and die maker, machinist and machine operator. In the 1979 survey 46% of the Quebec firms included in the sample volunteered an opinion. For tool and die makers 4 to 5 years of training are deemed necessary. In the case of

machinists there is an interesting spread: from 2 and 1/2 years to 5 years of training are recommended. For machine operators there is much variation: from 4 months to two years. The discrepancies between different Canadian regions are even greater. For example where Quebec employers recommended 24 months of training for a numerical control machine operator, Ontario employers suggested 14 months while in Western Canada 8 months were seen as sufficient (Memac 1979:17).

In the course of the interviews done for this study employers were also asked to state the length of training, within the firm, necessary for each occupational group. In the case of tool and die makers the length of time estimated necessary to bring a worker to a satisfactory level of proficiency varied between two and five years, for machinists anywhere from 16 months to 4 years. Machine operators could be trained fairly rapidly: the average was 10 weeks but a few employers felt that as much as 52 weeks or a year were required. Using training time as a measure of skill, tool and die makers and machinists would be more skilled than machine operators. There is, however, no clear consensus on this among employers. Obviously variations would occur if the initial entry requirements varied and some firms expected workers to have completed CEGEP, others were satisfied with a secondary school diploma with a vocational specialization and still others claimed that a few courses in machining were enough. Training time provides an indication of the relative skill levels in these occupations but it cannot

alone provide a sound basis for classifying occupations on a skill continuum.

Commenting on the relationship between claims of shortages and definitions of skills, Oliver and Turton state:

> In our view, the belief that the labour market is failing to resolve a shortage of skilled labour presupposes that the shortage is one of cognitive ability and manual dexterity. But this is only one of the aspects of the term "skill". This is the technicist concept of skill which, it will become clear, normally co-exists with a behavioural concept of skill...The "failure" of the labour market to operate may be a puzzle only if the technicist definition is relied upon...However it is possible that the skill shortages generally complained of are mainly of the behavioural kind...If much of the perceived skill shortage is of the behavioural kind then the problem takes a new and less obvious form and the public policies based on concepts of technicist skill shortages are open to challenge (Oliver and Turton 1982:195).

In order to elicit information about employers' conceptions of skill they were asked to define what was the first most important characteristic of those hard to find workers and then the second most important. The answers received were distributed along three dimensions: formal (or certified) technical competence, experience, motivation. Formal technical competence refers to the cognitive abilities usually acquired in a formal educational environment. program. The category experience comprises characteristics such as speed, manual dexterity, knowledge through practice of machining as well as experience on industry specific equipment. The motivation dimension relates to behavioural traits such as stability, willingness to work

hard, punctuality. The following table shows the pattern of responses.

TABLE 4.2

MOST IMPORTANT CHARACTERISTICS OF A SKILLED WORKER.

Characteristics	no 1 (%)	no 2 (%)
Formal technical competence	39.7	32.4
Experience	38.2	26.5
Motivation	17.6	25.0
All	1.5	na
No answer	3.0	16.1
	(n=68)	(n=68)

An almost equal proportion of employers judged that technical competence (39.7%) or experience (38.2%) is the most important characteristic of a skilled worker. Motivation is seen as the most important element by only 17.6% of the employers in this sample. A very small percentage of employers 1.5% answered that skilled workers should necessarily possess all three types of characteristics and only two employers had no ready answer. Respondents in larger firms, without exception, placed formal technical competence as the most important characteristic, experience followed and little importance seems to be given to motivation or any other behavioural trait. The personnel manager

of a large equipment manufacturing firm felt that what his firm required when hiring a tool and die maker or a machinist was: "Someone with a good solid technical background, with some math, especially trigonometry, sound knowledge of metalworking, it is up to the firm to see that they get experience and are motivated". The need for a good knowledge of mathematics as applied to shop work, blueprint reading and machining principles was very often emphasized. These are the kinds of skills dispensed in vocational school programs in Montreal.

It should be remembered that in firms where there is an internal labour market, (that is, where mobility is governed by administrative rules and where there is some form of job ladder,) it is important that workers possess at hiring some technical background in order to make future upgrading possible. As a manager in a large engineering firm explained: "Nous n'arrivons pas à trouver des outilleurs et des machinistes qualifiés, nous devons donc former nos meilleurs ouvriers pour qu'éventuellement ils puissent passer à l'atelier d'outillage, il faut donc qu'ils aient une formation de base. Au cours des derniers dix ans seulement deux outilleurs ont été recrutés à l'extérieur, nous avons formé les quatre autres, c'est souvent la même chose pour les machinistes qualifiés, on prend des spécialisés et petit à petit on les prépare". Respondents were also asked to state the educational level they felt was acceptable.

TABLE 4.3

LEVEL OF EDUCATION ACCEPTABLE FOR EMPLOYERS WHEN HIRING SKILLED WORKERS.

Level	Percent
not important	11.8
High school	22.1
HS vocational	52.9
Cegep	13.2

n = 68

The technical knowledge acquired through formal school programs is obviously of value to a majority of employers, even if they voiced strong criticisms of the present vocational programs lamenting their lowered standards[2]. Only 8 firms (or 11.8%) felt that "school learning" was not important and these firms were all small ones. Only 9 firms or 13.2% felt a Cegep education was useful and these were amongst the largest firms. Of course these data represent statements about what would be considered acceptable, in fact employers on the whole will not adhere stringently to an educational criterion when hiring. The general tendency was to expect some basic training, preferably but not necessarily a completed diploma, a few night courses were sometimes seen as sufficient. The following comment is representative of the position of many employers in medium and

small firms: "Il faut quelqu'un qui ait une formation de base, qu'il puisse lire les bleus, avoir eu quelques cours, ensuite on s'en occupe, on le forme sur nos machines". What is wanted is an acquaintance with the field so further training can proceed within the firm.

It would appear that in this sample of firms technical abilities including those normally acquired in school were important and were seen as different from experience or "good" behaviour. It is also possible that a diploma could be used as evidence of what Berg has called "stick-to-it-iveness" and of stability (1971:75). In three cases employers saw the willingness to take night courses as a measure of the "motivation" and eventual success of workers. In larger firms where a personnel department existed, the initial selection is usually done by personnel specialists who will be at first concerned with reducing the number of applicants. The requirement of a diploma is often a means to do this.

Experience was also highly valued as 38.2% of the firms ranked it as the most important characteristic and for 32.4% it was the second most important. For tool and die makers five to seven years of experience was commonly asked, for machinists three to five years was considered acceptable while for machine operators six months to a year were seen as sufficient. Work experience for many employers, insured a certain level of proficiency: "Le plus important c'est l'expérience, c'est ce qui donne la vitesse, la dextérité". For another, experience

had superseded formal training because: "Les plans et les dessins sont plus complets aujourd'hui, ils arrivent en indiquant le "speed" (vitesse) et le "feed" (l'alimentation) et parfois indiquent meïme quels sont les outils à utiliser. Quelqu'un qui arrive avec un Cegep est trop qualifié, on n'utilise pas ses compétences, ce qui amène des frustrations. Non le plus important c'est quelqu'un qui a de l'expérience"[3].

As there was some distrust of the training received in vocational schools, experience offered a better guarantee of competence: "L'expérience c'est important, la formation à l'école on ne peut s'y fier". School learning was deemed to be too superficial to enable an individual to perform adequately on the job in a short period of time. For another manager experience had become the most important criterion because it meant less training costs, you could know what an individual could do by his previous job record, experience was seen as an indicator of technical abilities[4]. Work experience would also have provided some socialization and ensure the presence of some attitudinal traits: "We want people with experience, not kids out of school, nowadays they often have a poor attitude and they are not realistic".

The context in which experience had been acquired was often important. In many small firms, relevant work experience is that acquired in another small firm. The reasons given were twofold. Firstly, employers especially in job shops or repair specialists, required skill versatility; they expected proficiency on different kinds of equipment. This was expressed in

comments such as: "J'ai besoin de personnes qui puissent travailler sur toutes nos machines". "Il me faut des gens débrouillards, qui ont assez d'expérience pour reconnaître les problèmes et les régler tout seuls". This versatility according to these employers could be acquired only over time in an industrial environment. School learning was deemed too superficial to provide an array of in depth skills.

In a large firm, according to respondents, work was too fragmented, too specialized and a worker developed skill in too narrow a range of tasks. "Un machiniste de chez Canadair ou Pratt et Whitney n'apprend à travailler que sur une machine, il ne sait rien d'autre et je ne peux pas l'utiliser à plein ici". Secondly these employers often felt that the aspirations of workers in large firms were too high in terms of salary and work conditions. "Dans une grande usine, ils travaillent moins forts, il y a plus de "breaks", ils sont protégés par le syndicat". Work experience gained in a small firm, fulfills two functions: it broadens the range of skills and provides proper socialization to that particular industrial environment. Yet the relative down-playing of school learning in some of these firms might mean that basic conceptual skills were not needed as much as extensive acquaintance with the running of various machines. Again these employers may expect that the conceptual skills could be acquired on the job. It must be stressed that where the acquisition of such skills through experience was mentioned, the skills referred to were not broad theoretical

ones, but rather abilities such as blueprint reading.

Employers also saw as a dimension of skill, experience acquired in the same type of industry or on the type of equipment used in their own firms. Obviously in these cases they were seeking to reduce the initial costs of acquainting a worker, who otherwise may have had the necessary basic, generic skills, with the intricacies of their own equipment.

Experience was greatly valued in all firms because it insured a certain level of ability and reduced the costs of training. It also meant that these workers had been socialized to some degree to the world of work. Technical abilities could be acquired or at least certainly enhanced through work experience, but it would also teach workers what kind of behaviour and attitudes were expected. The latter was very important in smaller firms; in larger ones experience was viewed rather as an indicator of increased proficiency: speed and dexterity as well as conceptual skills.

The percentage of employers stressing behavioural traits or certain attitudes as the most important characteristic of a skilled worker is, in contrast to what Oliver and Turton found, much smaller: 17.6%. In general these firms were smaller ones where the owner was very actively involved in shop floor activities. Employers emphasized a positive attitude and motivation as attributes of skilled workers: this was explained to be a desire to learn, to upgrade one's self. These qualities could be seen by a willingness to work overtime said one employer

and for others it was the acceptance of new tasks and initiative on the job. "C'est quelqu'un qui voit ce qu'il y à faire et le fait de lui-même, sans qu'on lui dise". The lack of previous formal training in the field was seen as less important in some cases than motivation. This led one firm to train as a machinist a young man who held a Cegep degree in Administrative Sciences, while in another case a Vietnamese man who had completed three years of medical school in his country was being trained to be a tool and die maker, because he was "so motivated".

Cooperation is another much appreciated trait, it included accepting suggestions, willingness to exchange information, accepting teamwork. One employer specifically stated that he hired people "qui se ressemblent, qui ont des choses en commun avec les employés déjà ici, ils sont alors plus portés à travailler ensemble". Again it was in smaller firms that a preference for homogeneity in the work force was expressed: this was arrived at by giving priority in hiring to workers of the same ethnic and/or age group. A "steady worker" meaning someone who is punctual and seldom absents himself from work was also mentioned. To insure this one employer hired as much as possible workers over thirty years old: "Ils sont plus stables, ils ont besoin de travailler et je peux compter sur eux tous les jours". Employers also expected skilled workers to be reliable ("fiable" they said in French) as the following statement illustrates: "Un bon ouvrier qualifié, peut vérifier son travail lui-même, il sait quand la pièce est bonne. Je peux me fier à

son jugement". This was expressed further through observations about the pride taken in their work by skilled workers. The ability to work with little supervision was seen as a measure of skill and was mentioned repeatedly. A high level of technical competence would enable a worker to understand the various aspects of the work process and he would need little guidance in solving day to day technical problems or in applying his knowledge to a new situation.

The following comments can be made upon examining these answers. Technical abilities and basic skills such as knowledge of trigonometry and blueprint reading are seen as essential by a majority of employers in this sample. This was clearly the case for tool and die makers and machinists. The requirement of some training in a vocational school program is also evidence of the importance of skill defined in a technicist sense. However these employers prefer someone with experience too and the content of this requirement is a bit more problematic. Obviously work experience will have allowed a skilled worker to encounter more situations and probably led him to devise innovative ways to solve problems and this should be seen as a technical skill, he may also have had the opportunity of working on a variety of machines therefore broadening his range of skills and gaining versatility. However the returns to experience are also greater speed which is not necessarily a measure of skill but rather an ability that increases his productivity and thus his value to the employer. Similarly work experience will certainly have had

a "socializing effect"; an individual will have become acquainted with the norms and rules, formal and informal, of the work place. Thus experience can have more than one function.

Finally behavioural characteristics as described in these interviews can hardly be seen as specific to skilled workers with maybe one exception. For some authors the capacity to work without supervision is linked with reliability and therefore is seen as a trait that "helps solve problems of management control" (Oliver and Turton 1982:197). In the same vein Edwards sees that a "sophisticated form of control grows out of incentives for the worker to identify himself or herself with the enterprise, for the worker to be "loyal," "committed," and thus self directed or self controlled" (1976:52). However, while reliability defined as punctuality and self control defined as loyalty are behavioural attributes not related to skill, they may also be seen as characteristic of a worker who because of technical expertise can do his tasks with little guidance, offer suggestions and judge the quality of a product he has worked on. The latter is then closer to a definition of skill in the technicist sense.

A clear distinction can be established between those firms stressing technical competence and experience and those emphasizing motivation, attitude and experience. In general the former are relatively more valued in larger firms while the latter are seen as very important in smaller firms. An explanation for this difference may be found in the different ways managements solve the problem of control.

In a small firm control rests in the hands of the owner manager who as much as possible tries to maintain some personal relationship with his workers. They are the employers who speak of their firm as a large family. Homogeneity of the work force, especially when workers share common backgrounds and ties of friendships will allow the employer to build upon these bonds (Edwards 1979:2527). Cooperation will be made easier. Furthermore in a smaller firm, constant interaction between workers is necessary. In such an environment tasks are not rigidly defined and segmented and the responsibilities are not routinized, problem solving occurs on the shop floor as work proceeds, coordination is ensured through interaction between workers and between workers and supervisors. This could be particularly important in machine shops as "In metalworking it is easier to provide guidelines than definitive solutions" (Shaiken 1984:27). Willingness to share in the work, to accept tasks beyond a job definition or description is necessary and this would explain the insistence on a positive attitude. Reliability is also important because much responsibility rests with the individual worker in a small shop, there is no specialized job given to quality control and this lack of resources augments the need for responsible, reliable individuals.

In larger firms, the complexity of production, the necessity for extensive coordination, the large number of employees, the presence of unions and the fact that work rules are often written down and applied in a less personal manner, bring about, according

to Edwards, a system of bureaucratic control typical of the internal labour markets described by Doeringer and Piore and which:

> is embedded in the social and organizational structure of the firm and is built into job categories, work rules, promotion procedures, discipline, wage scales, definitions of responsibility and the like (Edwards 1979:131).

This could then explain the greater emphasis placed on behavioural traits in smaller firms. Moreover as these firms will usually not use tests at hiring time to determine the level of skill and abilities of workers, there is probably a tendency to rely more heavily on attitude as judged in an interview, as a proxy for skill.

In this chapter employers' perceptions of skill and shortages were examined. It can be concluded that a shortage situation is deemed present if the time required to hire workers with given technical abilities and sufficient experience becomes longer. Some consequences such as increasing delays in production, the need for more subcontracting are also evidence of a tight labour market, however it appears that measures will be taken before other and more serious consequences occur. In terms of skill, employers do generally refer to a technicist conception. However they tend to expect the presence of certain kinds of behaviour and attitudes that come from work experience in larger firms or from personality and work experience in smaller firms. There tended to be a greater emphasis on behavioural traits in smaller firms while a technicist conception of skill

tended to prevail in larger firms.

The corrective most often advocated to resolve shortages of skilled workers is that higher priority be given to technical education (Betcherman 1982:70; Canada 1981a:7), and increased government funding be allocated to vocational training to meet industrial needs (Canada 1981a:7, Memac 1979:19). In response to this the federal government introduced a new National Training Program in 1982. Under the terms of this program approximately $1.2 billion per year would be directed to training in Canada. Will this outlay of public funds solve the problem and increase the supply of skilled workers and forestall shortages in the future? Some authors are skeptical, pointing to the limited success of these programs in the past (Economic Council 1982:79,81). The varying definitions of what constitutes skill may be a factor contributing to the disappointing results.

NOTES CHAPTER 4

1. This is in contrast to the practice in some European countries where formal apprenticeships still exist in many trades, including metalworking (e.g. in France, West Germany and the United Kingdom). However it has been pointed out that in the United Kingdom "time-served apprenticeship" may not necessarily reflect the extent of skill (Littler 1982:9; Oliver ô Turton 1982:196).

2. Following a major restructuring of the educational system in the province of Quebec in the 1960's, most of the vocational schools, "les écoles de métier" were integrated into the secondary (high school) schools and into the Cegep programs. It is generally felt that this has led to a depreciation of these programs. They must compete with other programs for resources and there is a tendency to view them as a stream reserved for students who do poorly academically.

3. Ivar Berg in Education and Jobs: The Great Training Robbery, provides evidence that dissatisfaction with jobs is related to higher education among blue collar workers (1971:124-125).

4. This emphasis on experience is noted in a study of the local labour market for machinists done at the Employment and Immigration Commission in November 1977. The majority of jobs announced in Employment Centers required 3 to 9 years of experience while unemployed machinists registered in these centers had usually less than three years of experience. (Trottier 1978:48).

5. This kind of work organization and the ensuing collaboration exists, according to Piore and Sabel in the craft sector: in construction, in the women's garment industry and in machine shops (1984:115-120).

CHAPTER 5

ORGANIZATIONAL CHARACTERISTICS AND THE INCIDENCE OF SHORTAGES

INTRODUCTION

The premise of this chapter is that the impact of shortages would be differentially experienced by different firms and that differences between firms could be explained by the structural characteristics of these firms. The first section describes the way in which shortages were measured for the eight year period studied 1974-1981. The second section describes the organizational characteristics treated as relevant to this research and provides a commentary on the possible relations between these characteristics and the experience of shortages. The last section more fully examines the characteristics of specific firms in the high shortage group, that is those reporting shortages for six years or more.

MEASURES OF SHORTAGES

Unambiguous evidence of the existence of shortages is often difficult to come by as was seen in a previous chapter. While being aware that the most reliable data to assess the presence and extent of shortages at the establishment level would be information about the ratio of vacancies in the job categories studied, to the total number of jobs in that category,

it proved impossible to collect such data. Most employers do not keep these records and if they do it is not for long periods of time. Personnel records and files are also considered confidential and employers do not easily grant access to them. In any case a detailed perusal of employers' records (when they are kept and should access be allowed) would have required resources beyond those available for this study.

This research therefore treated employers' statements about shortages in their firms as evidence of the existence of a shortage. There is always risk involved in any self-reported measure especially when one must rely on respondents' memory. The question was precise, it was: During the period 1974 to 1981, which were the years in which your firm experienced shortages of skilled workers in the following occupations: tool and die makers, machinists and machine operators? Most respondents were capable of providing answers as to the years in which they had encountered serious difficulties in recruiting skilled workers but the answers concerning each occupation were not precise. From their answers a direct measure of the number of years of shortages was elaborated. A scale with values from 0 to 8 was generated, an establishment's place on that scale being determined by the number of years it had experienced hiring difficulties for the 1974-1981 period[1].

Figure 5.1: NUMBER OF FIRMS REPORTING SHORTAGES BY NUMBER OF YEARS OF SHORTAGES.

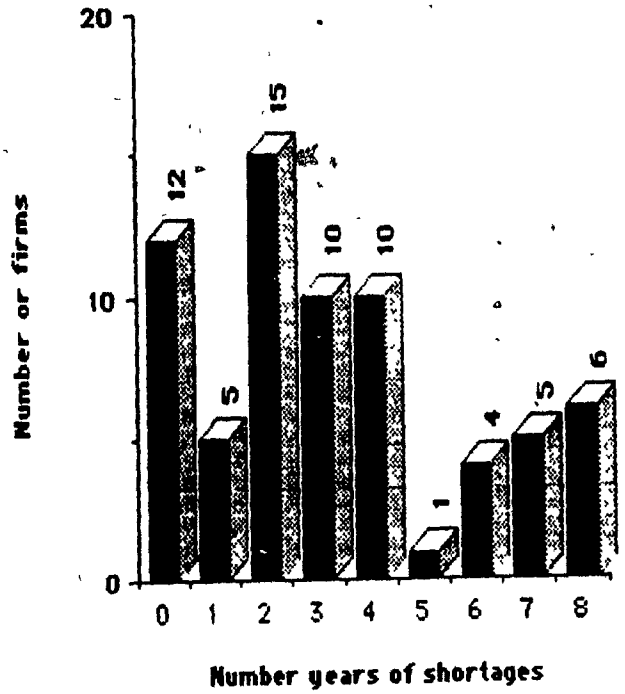


TABLE 5.1

% OF FIRMS DECLARING SHORTAGES
BY NUMBER OF YEARS OF SHORTAGES 1974-1981.

Number of Years	% of Firms	Number of Firms
0	17.6	12
1	7.4	5
2	22.1	15
3	14.7	10
4	14.7	10
5	1.5	1
6	5.9	4
7	7.4	5
8	8.8	6
total	100.0%	68

The average number of years of shortages for this sample of firms was 3.2 and the median set at 3. Twelve firms (17.6%) had no shortages in any year while twenty firms had two years or less (29.4%) and six firms (8.8%) claimed shortages for each year of the eight. As shown in Table 5.2 shortages were not equally prevalent during all the years of the study. From 1974 to 1976, 37% or less of the firms surveyed reported difficulties in recruiting skilled workers. The number of firms experiencing these problems increased sharply in 1977. By 1978 fully half the firms reported difficulties and a peak was reached in 1979. However reports of shortages dropped noticeably in 1980 and 1981. in the last year only 22% of firms still report shortages.

TABLE 5.2

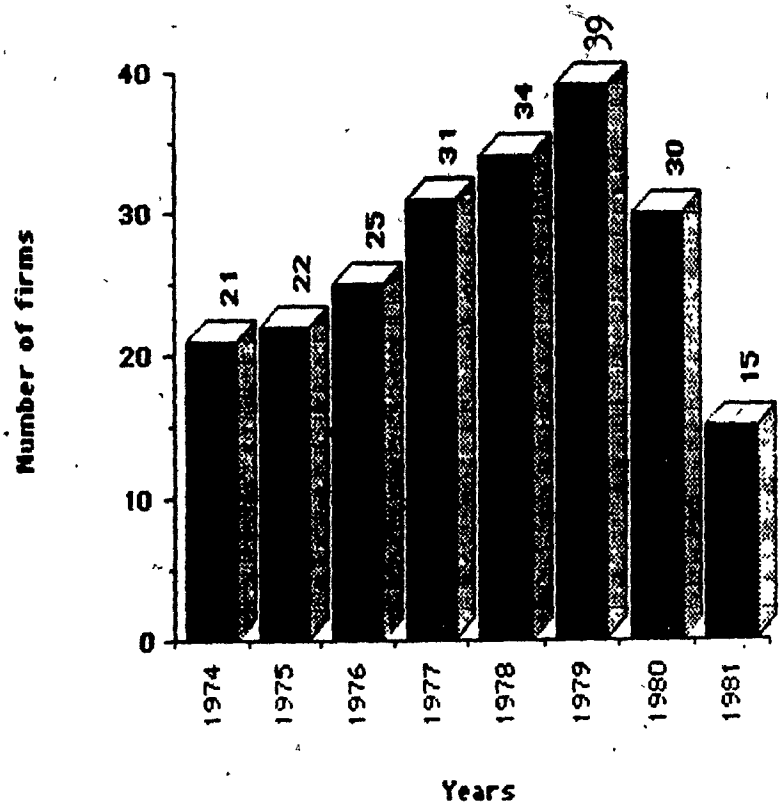
NUMBER OF FIRMS REPORTING SHORTAGES IN EACH YEAR AND UNEMPLOYMENT RATES IN MONTREAL AND QUEBEC 1974-1981.

Years	Number of firms	Unemployment rate in Montreal[1]	Unemployment rate in Quebec[2]
1974	21 (31.8%)	-	6.7%
1975	22 (33.3%)	6.1%	7.8%
1976	25 (36.7%)	6.7%	8.6%
1977	31 (45.6%)	9.1%	10.4%
1978	34 (50.0%)	9.9%	9.8%
1979	39 (57.3%)	8.8%	8.8%
1980	30 (44.1%)	9.3%	9.2%
1981	15 (22.0%)	12.9%	11.2%

[1] source: Statistics Canada. Labour Force Annual Averages. cat:71-529. The data on unemployment rates by metropolitan areas was published only from 1975 on.

[2] source: Statistics Canada. Historical Labour Force Statistics. cat.71-201 (annual)

FIGURE 5.2 NUMBER OF FIRMS REPORTING SHORTAGES IN EACH YEAR.



The pervasive increase in the proportion of firms declaring shortages could be explained by a rising demand for these workers or by a rapidly dwindling supply. Moreover the pattern of increases is erratic. Some years show an important change in the percentage of firms joining the shortages group, others much less (see table 5.2). Almost 9% more firms claim shortages in 1977 over 1976 and there is again a fairly large increase in 1979, whereas there was a negligible increase from 1974 to 1975

and a quite small one in 1976. Furthermore, increases in shortages are paralleled by increases in overall unemployment rates in Montreal and in the province of Quebec from 1975 to 1979. Small decreases in unemployment rates in 1978, 1979 accompany substantial increases in shortages. Only for 1980 and 1981 does unemployment rise as shortages drop, which is the expected relationship. Overall, in the midst of fairly high unemployment rates in the Montreal labour market, there were always some employers experiencing shortages of skilled workers. Of course these unemployment rates are not disaggregated by industry and it is possible that despite overall sluggishness in the labour market, some industrial sectors remained rather buoyant and demand for skilled workers in these sectors was high. Again the characteristics of supply may not have matched the requirements of employers. Some evidence presented in chapter 2 (Trottier 1978) supports such an explanation and so does the evidence presented in the last section of this chapter.

The data from this survey indicates that 1977, 1978, 1979, and 1980 were difficult years for an important proportion of this sample and one could label these years as tight labour market years. By contrast 1974, 1975, 1976 and 1981 could be called years of slack labour market conditions. A second measure of shortages was derived from these observations; it attempts to capture differences in patterns of scarcities. The pattern shown in Table 5.3 is puzzling for some years. While as expected

there is a larger proportion of firms reporting no shortages during the slack years, there is an almost equal proportion reporting three years of shortages in tight as well as slack years and surprisingly a higher proportion of firms report one year of shortages in slack years than in tight years!

TABLE 5.3

NUMBER OF YEARS OF SHORTAGES REPORTED BY FIRMS IN TIGHT AND SLACK LABOUR MARKETS.

no years of shortages	Tight years 1977-1980[1]		Slack years 1974-1976,1981[2]	
	no firms	%	no firms	%
0	17	25	32	47.1
1	10	14.7	12	20.6
2	13	19.1	3	4.4
3	14	20.6	13	19.1
4	14	20.6	6	8.8

[1] mean = 1.97 [2] mean = 1.22

Explanations for these patterns can only be tentative. These patterns can be affected by the characteristics of the contiguous years of shortages. Examining my data case by case, I found that the years of shortages were in almost all cases contiguous. Many firms with one year of shortages in the slack labour market period usually felt this problem in 1981: they might have lost workers to other firms in the tighter years. Those who claimed three or four years of shortages in the slack years only, may have found ways to solve the problem more rapidly. In general, however, there tended to be more firms with years of

shortages in the tight years only that were related to aeronautics as producers or subcontractors (and more will be said about this industry in the last section of this chapter) and those with shortages in the slack years only, tended to be in other industries.

Overall the majority of firms encountered difficulties for relatively few years. The problems were most felt in the 1977-1980 period while for some firms the difficulties extended over a longer period of time under different employment conditions. Severe shortage problems are located in some particular firms which will be identified in the last section of this chapter.

A comparison with evidence of shortages presented in chapter 2 indicates that the Human Resources Survey (Betcherman 1982) reported recruiting difficulties for some of the tight years in this sample, that is 1977-1979. Data collected by the Canada Employment and Immigration Commission indicates that in all the occupations studied here, there was a relatively tighter labour market situation in the early period: 1974,1975. Clearly this does not apply to the sample of firms studied here. There were almost constant surpluses, except for tool and die makers, from 1977 to 1980. However long term vacancies for these occupations tended to increase for a short time in 1977 and then again in 1978, 1979 and 1980.

Thus it appears that, while there are no shortages in terms of the numbers of workers available, there were increases in long-term vacancies for the very years during which employers in this study claim the most difficulties. This could mean that: i) the data from CEIC is not very reliable and certainly the data on long-term vacancies must be treated with circumspection; or ii) there is some matching problem: an imperfection in the labour market; iii) the workers who declared themselves available were misrepresenting their skills; or iv) they lacked some characteristic required by employers.

The evidence gathered for this dissertation can provide some answer to the second question and it does so in the chapter on recruiting practices. The previous discussion on the definition of skills as well as further evidence on adjustment measures further on substantiates the last hypothesis. First, however I will consider the extent to which organizational characteristics predict the presence or severity of shortages and explain the constant difficulties faced by some firms under different labour market conditions.

ORGANIZATIONAL CHARACTERISTICS

The organization of work within a given firm necessarily affects the nature and level of skills required of its workers. A firm may opt for greater or lesser degrees of job specialization, of standardization of work content and skill. The way

work is divided and coordinated, as well as the structuring of an organization is, to a certain extent, dependent on what have been called contingency factors such as age, size and technology (Mintzberg 1979:215).

In this section these organizational factors are related to the incidence of shortages. The question asked is: are there systematic relationships between organizational characteristics and recruiting difficulties? There are several mechanisms which might relate these factors to the incidence of shortages. They could affect demand for skilled workers (through technology of production) and/or flexibility of options in dealing with shortages (e.g. wage flexibility, capacity to subcontract, to reduce standards or control outside resources). These mechanisms can be at work in conjunction with each other and the data collected in this survey and examined presently can tell us if and which were involved.

ORGANIZATIONAL AGE

Organizational age in and of itself could hardly "explain" the distribution of shortages among firms. The literature suggests two possible and contradictory relationships between age of firm, its structure and its adaptive capability. One stresses the advantages of age the other its negative effects.

The first formulation posits that "adaptive responses must be learned and learning takes time" (Starbuck 1965:481). The length of time a firm has been in operation should bring about refinement in internal practices and easier relations with its environment. Older firms, barring important changes in product or technology, would see their production process stabilized, they should better assess their manpower requirements; the mix of skills best suited to their production, the various ways skills and production could be harmonized, (including possible substitutions), and should have a clear understanding of job specifications, often documented in job descriptions. These kinds of actions would make it easier to recruit a satisfactory work force. In Mintzberg's words "As organizations age, all other things being equal, they repeat their work with the result that it becomes more predictable and so more easily formalized" (1979:228). In short operational problems in every aspect of management are better known and solutions found and embedded in regular practices.

Also "as an organization gets older it learns more and more about coping with its environment" (Starbuck 1965:420). The markets served are likely to be well-defined, the process of obtaining outside resources better established and in this case channels of recruitment would have been identified and appraised. Older firms are also likely to know how to use to their advantage the industrial training programs available in Quebec through the two levels of government. Their networks of

communication and information would be more extensive and would allow them to counter scarcities of skilled workers more quickly, more efficiently while encurring lower costs.

Younger organizations, those in the "entrepreneurial phase"[2] are still learning to cope with internal and external problems. As Starbuck notes: "Young organizations have little experience in distinguishing important problems from unimportant ones, and few mechanisms for dealing with routine problems 'routinely" (1965:481). Younger firms are likely to encounter more recruiting problems, at least until they have developed internal mechanisms to recognize them and deal with them. They are more likely to devote a relatively larger proportion of their time and efforts to the day-to-day running of the firm and in dealing with any difficulty that arises over time. Planning is more likely in older firms whereas in younger firms "adhocracy" may prevail (Mintzberg 1979:455).

In contrast the other view stresses the rigidities that accompany growth and formalization in organizations. Hannan and Freeman note the "inertial pressures" that arise within organizations from investment and commitment to certain operating technologies, from the complex and sometimes confusing communication networks and the playing out of internal politics (1981:178). The latter was also identified as a constraint in dealing with shortages by Thomas and Deaton as different parts of the organization (for example finance versus personnel) define the situation differently (1977:150). The history of an

organization also imposes constraints: "Once standards of procedure and the allocation of tasks and authority have become the subject of normative agreement, the costs of change are greatly increased" (Hannan and Freeman 1981:178). The weight of past practices in personnel management was pointed out by Mackay et al (1971:397). Starbuck and Dutton similarly claim that "A substantial portion of managerial behaviour is based on doing things either as they have been done or as other organizations do them" (1973:21). These considerations suggest that older firms would have become less adaptive and the constraints they face may, by slowing down the adoption and implementation of new labour market strategies, contribute to longer periods of shortages.

TABLE 5.4

NUMBER OF YEARS OF SHORTAGES AND AGE OF FIRMS OVERALL PERIOD, TIGHT AND SLACK LABOUR MARKET YEARS.

	Pearson's r	p
shortages over 8 years	-.1142	p=.177
shortages tight markets	-.1181	p=.169
shortages slack markets	-.0771	p=.266

Neither view is confirmed in this sample of firms. There is surely a constant negative relationship between the incidence of shortages (defined as the number of years of shortages) and the age of a firm; as organizational age increases, the number of years of shortages would tend to diminish, but the

relationships as witnessed by the correlation coefficients (see table 5.4) are so weak as to be insignificant. If we examine the relationship within years of tight or slack labour markets the relationship remains negative but they are still insignificant.

Considering the sample in a more detailed and "qualitative" manner by examining the content of interviews, the following can be said: Firms that were less than ten years old (there were six) generally had more years of shortages, they were also smaller as they all had less than 50 employees. Also the younger firms displayed much less formalization. The owner-managers describing their operations often stressed the interchangeability of jobs in their plants: "There is no special worker assigned to cleaning here, everybody gets to do everything, as needed" stated the owner of a specialized shop founded in the early 1970's. This could facilitate operations in times of shortages, workers would be assigned to different tasks and answer the most pressing need. However this may hamper the systematic training of would-be machinists for example. Furthermore, these firms, because they were newer and still uncertain of their market position, often could not predict future needs.

Amongst firms sampled for this study, the well-established ones seemed to possess much better information and control over their environment. In terms of government subsidy programs for example, these older firms were very aware of them and most had made use of them and found them helpful. Younger and usually

smaller firms found them cumbersome and confusing. Many small employers found that the paperwork involved, the effort required to prepare submissions for training grants was such as to greatly diminish their value for them. Yet it is managers in older firms who commented on the impossibility of substituting one group of workers for another because of either tradition: "ça s'est toujours fait comme cela ici" or because of collective agreements that confirmed long-standing classifications. Some of the older firms were engaged in repair work and respondents' comments indicate that they were less subject to wide fluctuations in activity. When the business climate was good they were kept busy repairing, often on an urgent basis, any breakdown in equipment in the companies they serviced, in slower business times, firms would proceed to major repairs or overhauling of equipment taking advantage of slower production. This may partly explain the lower incidence of shortages among older repair firms in this sample.

In short, younger firms may have the potential for more flexibility but incomplete knowledge of their environment and the lack of resources may not have allowed them to make use of that flexibility to prevent shortages. Older firms were more likely to have relatively rigid classifications and internal procedures for allocating jobs which constrained their ability to react rapidly to a shortage situation. Nonetheless the more complete information they had concerning their environments as well as the presence of personnel specialists (in older and

larger firms) would allow some planning and the means to predict shortages and obtain resources to help resolve them, which of course does not mean that they necessarily did plan or act on their planning. Still the evidence I obtained does not allow a firm conclusion in either direction. It may be that age must be examined along with other variables to obtain a satisfactory explanation.

ORGANIZATIONAL SIZE

Everyone (or almost) agrees that size is important (Scott 1981:235) but how and why is unclear, in part because of the sheer range and diversity of the literature on size as a structural component in organizations[3].

The numerous studies that have been completed also use different indicators of size, so further complicating the issue. As noted in chapter 3, size was defined in this dissertation as the number of employees in a plant. The research literature postulates a number of relationships between size and features of an organization which may affect a firm's success in fulfilling its needs for skilled workers. For example, Kimberley (1976) has identified three levels of analysis where size is relevant:

> The first level draws attention to the implications of different aspects of size for transactions within the organization. The second level...focuses on the implications of different aspects of size for transactions between the organization and its environment...The third level is socio-technical and concentrates analysis on the implications of

> different aspects of size for those dimensions of organization which revolve primarily around the core technology (:592).

The impact of size on the structure of work, (the socio-technical level) and on internal aspects of organizations has been well documented in studies showing that specialization, standardization and formalization are all likely to be greater in large organizations (Pugh et al 1969:98). In terms of human resources management this means that a larger firm would offer more specialized jobs, requiring a narrower range of skills. The procedures specifying how the job should be done would also be firmly set down, often in a formal job description. For example, a large firm would be more likely to employ engine-lathe set-up operators, milling machine set-up operators whereas a small firm would prefer a worker who can work on these two machines. Skill versatility was also seen as very important. Small employers repeatedly stressed that they needed an all around machinist: "quelqu'un qui peut travailler sur toutes les machines". A different kind of specialization also occurs when a large firm breaks down components of jobs, and employs a quality control inspector to look at the work done. In a small shop the worker is often expected to know how to produce an item meeting the set standards and there is little rigid quality control, or quality control is done by the worker himself. A high proportion (77.4%) of firms employing less than 50 employees were subcontractors to larger firms. This placed these smaller firms in a more vulnerable dependent position especially when

recruiting in a tight labour market. Their environment is more competitive and they often had few outlets for their production.

Differentiation between units is also linked to greater size, and necessitates supervision and coordination, but in a small firm the supervisory tasks are not so clearly delineated and they are not separated from production: the supervisor would also work on production. Thus there would be a need for more experienced and skilled employees who can "work on their own". The previous chapter on definitions of skill cited comments by employers confirming this. Experience in dealing autonomously with numerous situations and solving problems was often mentioned in interviews with employers in smaller shops. For all these reasons one would expect that the requirements of smaller firms may be more difficult to meet hence more recruiting difficulties.

At another level of analysis, size is seen as facilitating relations between the organization and its environment as "Large firms have more leverage over their environments than small organizations do" (Starbuck 1965:468). Some of the arguments presented when examining the possible effects of age would be pertinent here also. A larger firm is often a better known firm. This would make recruiting easier. Many representatives of large and well-known firms commented that they received many unsolicited applications. Finally within a larger organization it is more likely that there will be a unit or at least a specialist in personnel or human resources management who will elaborate policies, implement procedures and possibly engage in

some manpower planning. A larger firm usually disposes of greater financial and organizational resources which could translate for instance in the availability of training. All of the above suggests that larger firms should encounter less difficulties in recruiting skilled workers.

However this may not always be the case. The Human Resources Survey reported a "positive link between the number of employees and the incidence of shortages," (Betcherman 1982:18) where 35.6% of firms with 20 employees or less claimed difficulties in the 1977-1979 period with this proportion increasing with the size of firms, with finally 75% of firms employing over 500 people reporting difficulties. These results were commented as thus:

> This strong positive relationship between establishment size and the incidence of hiring difficulties is not surprising, since (if only because of the numbers involved) the personnel needs would tend to be simpler for a small organization than for a large one. Thus it is more likely that the latter would have expecienced problems in finding all the required skills (Betcherman 1982:18).

Obviously large firms may have more vacancies to fill possibly in a greater range of occupations than smaller ones. However this does not necessarily bear on the incidence of shortages but rather reflects the level of scarcities.

TABLE 5.5

YEARS OF SHORTAGES BY SIZE OF FIRM

YEARS OF SHORTAGES	SIZE OF FIRM 0-49	50-199	200-499	500 +	
0 - 2	15 (48.4%)	11 (57.9%)	3 (27.3%)	3 (42.9%)	32
3 - 5	8 (25.8%)	6 (31.6%)	4 (36.4%)	3 (42.9%)	21
6 - 8	8 (25.8%)	2 (10.5%)	4 (36.4%)	1 (14.3%)	15
	31	19	11	7	68

CORRELATIONS: SIZE OF FIRM AND NUMBER OF YEARS OF SHORTAGES

	r	p
Shortages: 8 year period	.0696	.286
Shortages: Tight years	.0577	.320
Shortages: Slack years	.0619	.308

n=68 firms

TABLE 5.6

YEARS OF SHORTAGES
BY INCIDENCE OF TRAINING

YEARS OF SHORTAGES	TRAINING YES	NO	
0 - 2	23 (42.6%)	9 (64.3%)	32
3 - 5	17 (31.5%)	4 (26.8%)	21
6 - 8	14 (25.9%)	1 (7.6%)	15
	54	14	68

n=68 firms

There is no relationship between size of firm and number of years of shortages whether the whole period is considered or only the tight or slack labour market years. The crosstabulation table (table 5.5) can only show tendencies as again the statistical relationships were not significant. A larger proportion of smaller and medium size firm (6 to 49 and 50 to 199 employees) had shortages for less than 2 years. A greater proportion of large firms (200 to 499 employees) had shortages in the 3 to 5 years and 6 to 8 years groups. But there is a smaller proportion of very large firms in the high shortage group. On the whole, smaller firms and the very large firms have less years of shortages and larger ones rather more. There is a suggestion of non-linearity here but as the number of cases is so small interpretations are risky.

It was noted previously that the greater resources of larger firms might encourage training. Furthermore if as often suggested in the literature, internal labour markets are more likely to exist in large firms, training may be a necessary practice to ensure a supply of skilled workers in the higher classifications of the blue collar hierarchy in a firm. In this sample, an overwhelming majority of firms (see table 5.6) did some training and all very large firms did. However as will be seen in a forthcoming chapter on responses to shortages, the type of training varied: from very informal on the job efforts (usually in smaller firms) to structured programs. In firms where some training was done, there might be lesser years of

shortages but the information in table 5.6 indicates a greater proportion of non training firms in the group facing less years of shortages! Presumably, what this shows is that firms that have experienced shortages were more disposed to train.

TECHNOLOGY

Technology is understood here as the technical system of production (or operating system) that combines resources to perform work in an organization. The operating system in a firm will, to a great extent, determine the composition of the labor force in terms of the occupations needed and the level of skill and knowledge required. Therefore, knowledge of the technical system and of the constraints it may impose should help understand the incidence of recruiting difficulties among firms in the manufacturing sector. This led me to examine the relationship between the technical system of production and the relative importance of skilled workers in a plant, as well as the use and impact of a technology such as numerical control.

A large number of sociological studies of technology have focused on the links between formal organizational structures and production technology. Woodward (1965) in fact concluded that technology was a determining factor. Subsequent studies questioned the importance and strength of that link (notably Hickson et al 1969). However despite controversies about the definition, the measurement, and the impact of technology,

organizational scholars would, it seems, agree with Mintzberg that "technology is clearly a major factor in the design of organizational structures" (1979:249). For our purposes, knowledge of the technical system of production should provide indications of the mix of skills required in a firm, of the need for skilled workers, and the potential impact of these factors on recruiting difficulties.

CLASSIFICATION OF TECHNICAL SYSTEMS

At the onset of this study Woodward's classification was used. She classified systems of production according to three general groupings: unit and small batch production: (including firms who produce units to a customer's requirements: jobs shops); those that produce large equipment in stages and those that produce in small batches. Large batch and mass production: include firms that fabricate products in large batches and those that use mass assembly production; and process production: or continuous production (Woodward 1965:38).

It must be noted that different technical systems of production can coexist within a firm. This was the case in many of the firms I visited. One could find units where production was of a one-off type (often making prototypes or retooling at the beginning of a new production run), other items were made in small batches, usually highly specialized items used in only one industry (this was the case in aeronautics), and the bulk

of production was large batch. In other firms some production was done on a small batch basis and some was done on a large batch one. Yet in others there was some repair work done along with one-off production. Finally many companies were mostly job shops but they could occasionaly produce on a small batch basis. Preliminary data analysis revealed that if the firms in this sample were grouped according to Woodwards's classification, the great majority would fall within the first group.

It was therefore decided to revert to what Woodward calls the production engineering classification based on the distinctions between intermittent process (or jobbing), repetitive process (batching) and continuous process. Intermittent process is that "in which very small lots, or even single products are made in response to separate customers orders" and repetitive process being that "in which the product (or products) is processed in lots, each item of production passing through the same sequence of operations"(Wild 1980:5)

In the intermittent or jobbing category, the firms that did mostly repair work, jobshops and those that fabricated equipment in stages, were grouped together while small batch systems were placed with large batch ones under the term batching processes. No special category was reserved for process production since it does not apply here. This classification can be defended given that it is rather difficult to determine exactly the cut off point between small and medium and then large batch production in this group of firms. Also many of the firms surveyed who

operated with small batch systems were on the whole trying to standardize and enlarge their production runs and their management practices reflected this. In turn, in some firms where large batch production predominated there was often some production done on a smaller batch basis. Three categories emerge: intermittent process or jobbing, repetitive or batching and a mixed category which included firms where the two systems were present to an almost equal degree (see table 5.7). The jobbing firms are on the whole smaller ones (72.2%), are in the 6 to 49 employees category), mixed firms and some batching ones are usually small and medium sized firms and large and very large firms are in the batching a mixed technology categories.

TABLE 5.7
DISTRIBUTION OF FIRMS BY TECHNICAL SYSTEM OF PRODUCTION: NUMBERS AND PERCENTAGES.

Technical system	number of firms	Size of firms 5-49	50-199	200-499	500 +
jobbing	18 (26.5%)	13 (72.2%)	3 (16.7%)	1 (5.6%)	1 (5.6%)
mixed	22 (32.3%)	7 (31.8%)	7 (31.8%)	4 (18.2%)	4 (18.2%)
batching	22 (41.2%)	11 (39.3%)	9 (32.1%)	6 (21.4%)	2 (7.1%)

n = 68

However the technical system of production in use in a firm is not significantly related to the incidence of shortages (see table 5.8). There is a tendency to find a greater proportion of

firms where mixed systems are in place in the high shortages group (6 to 8 years of shortages) while half the jobbing firms faced 3 to 5 years of shortages and the greater proportion of batching firms had 2 years or less of shortages. The following pages explain how the characteristics of the different technical systems of production could affect the need for skilled workers and how numerical control and its use in different systems could help explain patterns of shortages.

TABLE 5.8

TECHNICAL SYSTEM OF PRODUCTION AND THE INCIDENCE OF SHORTAGES.

Years of shortages	Technical system of production			
	jobbing	mixed	batching	
0-2	6 (33.3%)	9 (40.9%)	17 (60.7%)	32
3-5	9 (50.0%)	6 (27.3%)	6 (21.4%)	21
6-8	3 (16.7%)	7 (31.8%)	5 (17.9%)	15
total	18 (100.0)	22 (100.0%)	28 (100.0%)	68

The technical system of production adopted by a firm to produce goods or services destined to specific markets, requires a mix of skills and a pattern of work organization that is suitable to this system. The characteristics of workers sought by various firms should therefore reflect the contingencies of

the technical system of production. Job shops and any firm which offer specialized services or products to a variety of clients have small production runs and must adapt continually to new demand and/or new clients. Firms where batching process is the core technology will have longer production runs or at least will manufacture a standard product (either in small or large batches) and are less likely to face as frequent changes in demand. Commenting on the needs of jobs shops, Starbuck and Dutton (1973) observed that:

> They install simple, basic machines that are easily adaptable to many uses, because specialized machines are likely to be made obsolete by changing customers' orders. However this adaptability depends on two things: buffer inventories between machines to accomodate varying machine speeds, and highly skilled machine operators, who can understand the requirements of different products and understand basic machines to different purposes (:25)

Woodward had also noted that unit production (and process) firms "employed a large number of skilled workers in comparison to large batch and mass production" (1965:61). The requirements of the jobs are also different:

> Plants on one-off or small batch production demand a highly skilled labour force capable of working to fine tolerances and adapting to changes in the work mix...while in large batch production...the repetitive nature of the work enables the unit to employ large numbers of semi-skilled workers (Mackay et al 1971:54)

The type of production demands higher skills in job shops and the variety in production affects the organization of work. In many firms with special order production a greater degree of planning and control over the work is left with the production operator. Again Woodward noticed that "In many firms he (production worker) was responsible for determining the method and sequence of operations as well as for the quality of the finished product" (1965:157). Workers thus retain greater control and autonomy over their work. Studying the job shops servicing the automobile industry in Detroit, one author noted that "without high volume, important aspects of skill and control remain with the worker" (Shaiken 1984:28). All in all "special order firms rely on the effectiveness of the individual" (Woodward 1965:159).

The role of supervision is also different. In batch firms standards and procedures can be established more easily, as there is usually greater standardization of production. Supervisors are more numerous, since the work force also tends to be larger, and their span of control carefully delimited but "In the outside job shops, the layers of supervision and many of the petty work rules were absent" (Shaiken 1984:43). In repair and job shops the non routine aspects of much of the production precludes the elaboration of rigid rules and the specialization of tasks.

The evidence from the interviews done for this study supports the comments and observations of the authors cited above. Owners and managers of job shops, repair firms and

generally of smaller firms where production was more unpredictable, repeatedly stressed the need for highly skilled versatile workers. "On a besoin de personnes qui peuvent travailler sur toutes nos machines" "Je veux des gars qui peuvent régler toutes sortes de problèmes" were typical comments heard. These managers expected their skilled workers to understand and solve many of the problems of everyday production in a changing environment. They also wanted them to be able to work effectively with a minimum of supervision and control because the supervisor or foreman was himself involved in the production. Much of the coordination of work would be left to workers.

Managers in firms where production was more standardized and mechanized and where markets were also more stable or at least better identified, said that skill was also important but more often these skills would be linked to knowledge and experience on one machine or process. The range of skill needed was narrower. They also preferred workers who had developped dexterity and speed on firm or industry specific machines: "Ils doivent connaître les machines que l'on utilise ici". They also relied more heavily on close supervision, smooth well established operational practices and special quality control procedures to obtain productivity and efficiency. In the cases where more than one technical system was used the differences between units were sharp: "Les gens dans la salle d'outillage ce sont de 'vrais' machinistes, c'est différent" or again "Il y a machinistes et machinistes, ceux de l'entretien et de l'outillage sont plus

qualifiés que les machinistes de production". However these highly skilled workers would usually form a much smaller proportion of the total work force in the plant.

It would appear that jobbing processes would require highly skilled and versatile workers. They need responsible reliable workers since supervision is provided differently, rules are not so rigid and a greater proportion of final control on the product is left with the worker. Technical skill is a must often to be complemented by experience which promises more certainty in processes where different kinds of problems are encountered. These factors would lead us to think that "higher quality" workers are wanted in jobbing firms and hiring standards would therefore be more stringent. One would expect that there would be proportionally more skilled workers in jobbing plants and in a tight labour market these plants would be more likely to experience shortages. The next paragraphs examine this.

After asking how many tool and die makers, machinists and machine operators were usually on staff, I then asked how many of these could be called skilled[4]. I calculated the ratio of skilled workers to non skilled workers in each plant. This variable being continuous and the variable technical system of production ordinal, a oneway analysis of variance was used to verify if there were any significant differences in this ratio among jobbing, batching or mixed systems of production (see table 5.9 below). Jobbing firms on average have a ratio of 57.14 skilled workers, the mixed group 39.62 and the establishments

using batching processes have the lowest with 28.26. The observed differences appear to reflect true differences between these groups as an F statistic of 8.665 is obtained at a significance level of .000.

TABLE 5.9

RATIO OF SKILLED WORKERS BY PRODUCTION SYSTEM AND INCIDENCE OF SHORTAGES.

	count	mean ratio of skilled workers
jobbing	18	57.14
mixed	20	39.62
batching	27	28.26

variance	df	sum of squares	F
between groups	2	9011.470	8.665
within groups	62	32237.745	8.665
total	64	41249.215	

CORRELATION: RATIO OF SKILLED WORKERS AND SYSTEM OF PRODUCTION.

Pearson's r - .4640

p = .000

CORRELATION: RATIO OF SKILLED WORKERS NUMBER OF YEARS OF SHORTAGES.

	Pearson's r	p
shortages over 8 years	.0662	.300
shortages in slack years	.0253	.421
shortages in tight years	.0882	.242

(n=65 there are three missing cases in the ratio of skilled workers variable).

Similarly the relationship between ratio of skilled workers and technical system of production as demonstrated through correlation analysis shows that the ratio of skilled workers diminishes as one goes from jobbing process systems to batching ones.

However the relationship between the ratio of skilled workers and the incidence of shortages described as the number of years of shortages is zero whether we look at the total eight-year period or during the tighter or slacker labour market years. These results seem to indicate that the relative importance (numerically) of skilled workers does not seem to bring about increased years of shortages.

NUMERICAL CONTROL

It is widely held that increased automation brings about deskilling of the work force and in some cases the demise of traditional craft jobs such as those in metalworking: tool and die makers and machinists (Braverman 1974:197-208). Numerical control is described as "a means of information processing and machine control. An NC machine is controlled by precoded information while a conventional machine is guided by the machinist" (Shaiken 1984:66-67). The introduction of numerically controlled machine tools is likely to reduce the numbers of skilled workers as well as modify the content of existing jobs.

> Since NC machines tend to have significantly greater productive capacities than the machines they replace (ratios of between 3:1 and 5:1 are reported), they might be expected to displace labour. Secondly the additional production information available from the machines that are linked to computers might be expected to enchance management control and thus cause some qualitative changes in workplace relationships. Finally, because they introduce new technology (electronics) they might be expected to dramatically alter maintenance skill requirements and to alter requirements for traditional workshop skills (Rothwell and Zegveld 1979:114).

However these authors found that numerical control did not affect overall levels of employment in firms in the United Kingdom and in West Germany when it was introduced in these countries (ibid:116). Technology historian Noble (1984:40-41) argued that automation generated shortages of skilled workers in the United States because it inhibited institutional training and on-the-job training as it was wrongly assumed that numerical control would make machinists' traditional skills redundant.

TABLE 5.10

NUMERICAL CONTROL AND TECHNICAL SYSTEM.

Numerical control	Technical system: jobbing	mixed	batching	
Yes	9 (60.0%)	15 (71.4%)	13 (54.2%)	37
No	6 (40.0%)	6 (28.6%)	11 (45.8%)	23
	15	21	24	60

(n=60 as there are 8 missing cases on numerical control).

Thirty-seven, slightly more than half the firms surveyed for this study, had some numerical control machines. The earliest year of installation was 1967, but fully 1/3 of the firms who bought such equipment did so between 1974 and 1976. The first establishments to buy this equipment were very large firms, actually the dominant ones in their sector in Montreal. Table 5.10 tells us that a greater proportion of firms in the mixed category had numerical control equipment while surprisingly it is in the batching group that the lowest proportion of numerical control equipment is found. The reverse was expected since numerical control is usually considered useful for larger and more standardized production runs. However there are eight cases missing (or almost 12%) as these respondents did not answer that question. This may account for these puzzling results. The question asked may explain these results. It only asked if there was numerical control equipment; very often there was few such machines and they were not used extensively. Many respondents could not say precisely what proportion of their production required the use of NC equipment. Fully 52.4% of those who did give an estimate said that NC equipment accounted for less than 50% of their machining work.

Some of the managers I interviewed said that the few NC machines they had, had been bought to fill the requirements of a special contract: this situation was encountered especially among firms which were subcontractors to larger firms in the aircraft and aeronautics industry. The stringent quality control

in that industry required the precision of numerical control equipment[5], but this was not the case for all their production. In another interesting case, numerical control machines were bought because the firm could obtain a government training grant if it was associated with the introduction of new equipment. The subsidy covered part of its cost. The company used the equipment for one contract which was for a large volume of a given product. At the time of the interview the manager stated that these machines had not been used since. However in some firms, usually the very largest ones, numerical control machines accounted for an important part of the equipment and they were used for the large batch production in the plant.

The presence of numerical control machines bears no relationship to the number of years of shortages (see table 5.11).

TABLE 5.11

NUMERICAL CONTROL AND INCIDENCE OF SHORTAGES.

Years of shortages	Numerical control		
	Yes	No	
0-2	16 (43.2%)	11 (47.8%)	27
3-5	12 (32.4%)	8 (34.8%)	20
6-8	9 (24.3%)	4 (17.4%)	13
	37 (99.9%)	23 (100.0%)	60

The lack of relationship between numerical control and the incidence of shortages is not surprising given the comments reported above. Furthermore NC was introduced too late in the period under study to have a very strong effect on manning levels. Except in the firms where longer production runs represented an important and constant proportion of production, NC was introduced on a small scale, in a piecemeal fashion so to speak, and it did not at that time affect the number of skilled workers needed and could not have a significant effect on the incidence of shortages of skilled workers.

NC, like any other kind of technology, is not used in the same way in all firms and it was often utilized at first to supplement work on conventional machines or for special, occasional, types of production, thus adding greater flexibility. Finally it is not unreasonable to assume that there is a time lag between the introduction of new equipment and learning how to use it to its full capacity for smooth operation (one has only to remember the innumerable "bugs" that attend the introduction of any kind of computerized equipment). The effects on the manning levels and the skills required of machinists would be felt only later on. Indeed in some firms when numerical control machines were introduced, it was often the most skilled machinists that were assigned to them. Further discussion on the utilization of NC as an adjustment to shortages will be forthcoming in a later chapter.

SHORTAGES OF SKILLED BLUE COLLAR WORKERS IN THE MACHINING TRADES IN MONTREAL (CONT'D)

BY

IRENE LEPINE

UNIONS AND SHORTAGES

In a much talked about book, authors Freeman and Medoff comment thus on the impact of unions.

> Our most far-reaching conclusion is that, in addition to well advertised effects on wages, unions alter nearly every other measurable aspect of the operation of workplaces and enterprises, from turnover to productivity to profitability to the composition of pay packages. The behavior of workers and firms and the outcomes of their interactions differ substantially between the organized and unorganized sectors (1984:19).

Some interpretations suggest that unions have a detrimental effect on the operations of a firm. Thus, a situation of short supply of workers would be aggravated because unions hamper management flexibility and narrow the range of adjustments available through practices such as the insistence on rigid apprentice-journeymen ratios (Dodge 1977:15). Training then becomes very expensive and its impact limited. However the evidence on this point is inconclusive. In a study conducted in the United States it was found that:

> In a small minority of the firms the employer said that the number of tool and die apprentices was limited by the journeyman-apprentice ratio negotiated in the collective agreement. On the other hand, there were firms which indicated that the union was helpful through its role of assisting in the selection of apprentices, and emphasizing the value of apprenticeship training (Franke and Sobel 1970:285).

In Canada analysis of data on training from the Human Resources Survey concludes that unionization did not have a significant affect on the incidence or duration of training in that sample. The author cautions however, that the effect of unions may be more complex and could be understood only in refering to the technological and organizational changes they may have motivated, such as greater specialization, which would necessitate an increase in firm specific training (Simpson 1984:441). Even in Quebec where the rate of unionization and minimium wages are relatively high compared with the rest of Canada and where the HRS survey indicated the lowest rate of training, Simpson found that the low rate of employment growth provided a better explanation for less training (:450).

It could be argued that unions could indirectly restrict the supply of skilled workers since they tend to bring about a reduction in pay differentials between skilled and non-skilled workers (Ashenfelter 1985:246). If the decision by individuals to enter certain trades or to upgrade their skills through night school, is motivated by expectations of larger wages, this reduction of differentials may act as a disincentive to investment in training and eventually reduce the supply of skilled workers. Another aspect would be the less flexible wage structures in unionized firms preventing employers from responding to scarcities in one occupation by raising wage rates for this group only without eventually raising rates for all groups. Given the

preceeding arguments one could expect a greater incidence of shortages in unionized firms.

However unions can have beneficial effects for the following reasons:

> Industrial relations experts have long stressed the ways in which collective bargaining can induce better management and higher productivity. These specialists note that unions can increase the development and retention of skills, provide information about what occurs on the shop floor, improve morale and pressure management to be more efficient in their operations (Freeman and Medoff 1984:3).

Shortages of workers should be reduced if unions reduce quit rates since "reductions in turnover raise productivity by lowering costs of training and recruitment" (Freeman and Medoff:164). The presence of unions should, according to these arguments be associated with a lower incidence of shortages or at least a shorter duration of the problem. Finally the positive effect of unionism on wages, from the point of view of the worker, should give an advantage to unionized firms recruiting workers under tight labor market conditions.

Let us examine the evidence for this group of firms. Thirty-nine firms out of 68 (57.4%) were unionized[6]. Relatively few of the smaller firms had a union while only one firm along the large ones was not unionized, and 68.4% of the medium sized ones were unionized (see table 5.12). The workers in most of these firms were represented by strong well-established unions such as the International Association of Machinists and Aerospace Workers, the United Steel Workers, the United Auto Workers, and

the International Union of Electrical, Radio and Machine Workers, all of which are affiliated to the Fédération des Travailleurs du Québec (FTQ), the provincial federation that includes most "American" craft based or large industrial unions. The Conseil des Syndicats Nationaux (CSN) was represented in only 10.2% of firms while in 7.4% of firms the unions were non affiliated, independent ones. There was a tendency to find smaller firms in the last two groups.

TABLE 5.12

UNIONIZATION BY SIZE OF FIRMS.

Union	Size of firms				
	0-49	50-199	200-499	500 +	
No	22 (71.0%)	6 (31.6%)	-	1 (14.3%)	29 (42.6%)
Yes	9 (29.0)	13 (68.4%)	11 (100.0%)	6 (85.7%)	39 (57.4%)
total	31 (100.0%)	19 (100.0%)	11 (100.0%)	7 (100.0)	68

Table 5.13 shows that a smaller proportion of union firms: 20.5% to 24.1% reported difficulties for six years or more. At the other end of the "scale of difficulty" 51.7% of non unionized firms declared two years or less of shortages while 43.6% of

unionized ones did. Closer analysis indicates that of the 12 firms reporting no shortages at all, 7 were unionized and 5 were not. The situation is reversed in the 3 to 5 years of shortages with a higher proportion of unionized firms in that group. The relationship between the presence of unions and the incidence of shortages was not significant.

TABLE 5.13

UNIONIZATION AND THE INCIDENCE OF SHORTAGES.

Years of shortages	Unions Yes	No	
0-2	17 (43.6%)	15 (51.7%)	32 (47.1%)
3-5	14 (35.9%)	7 (24.1%)	21 (30.9%)
6-8	8 (20.5%)	7 (24.1%)	15 (22.1%)
total	39	29	68

None of the employers cited the presence of unions as a major factor in bringing about shortages. There was no opposition from unions (except in one case) to training but, rather, much support. In some cases their enthusiasm for training went beyond that of employers, one of whom commented: "If it were only for the union, we should have had to start a school here". An interview with an official of the International Association of Machinists and Aerospace Workers confirmed this union support

for training. He stated "Nous encourageons la formation, nous croyons que les entreprises devraient en faire plus, c'est ce qui sauvera des emplois". In only one instance did training on the job programs lead to hard bitter negotiations between management and the union with the result that no training was implemented. Labor-management relations in that firm were poor and the difficulties coming to some agreement on training merely reflected the climate of distrust. The presence of unions at times constrained flexibility in adjustments such as overtime as will be seen in the chapter on adjustment measures.

Much has been written about the impact of unions on wages. It is generally agreed that wages are on average higher in the unionized sector of the economy. Within a specific sector conventional wisdom has it that wages in unionized firms would be higher than in non union firms. Employers were asked where they situated themselves in their industry as far as wages paid their skilled workers was concerned. Assuming that their perceptions were in line with reality and there is no reason why they should not be, we find no relationship between the levels of pay : below average, above or average and unionization (see table 5.14).

TABLE 5.14

WAGE LEVELS BY UNIONIZATION.

Wage level	Unions		
	Yes	No	
higher	9 (23.0%)	7 (24.1%)	16
average	26 (66.7%)	18 (62.1%)	44
lower	4 (10.3%)	4 (13.8%)	8
total	39	29	68

Higher paying firms were just as likely to be unionized as not, but there were more low paying firms that were not unionized. An employer in a medium sized (50-199 employees) firm remarked: "On sait ce que ca vaut un machiniste sur le marché, donc on le paie ce prix là . Il peut y avoir des différences mais ce n'est pas important". However in another non-unionized firm, the manager felt that part of the problem of shortages did stem from lower wages in that firm. In general, however, employers felt that there was not much wage competition between firms in their industries, as they felt differences in wages were offset by other factors such as working conditions or employment security.

Insufficient pay differentials between different levels was seen as a deterrent for workers to undergo outside training that might lead eventually to higher classifications and generally as a factor that contributed to shortages. Since "compression of pay differentials is partly the result of the successful

unionization and bargaining leverage of the unskilled and semi-skilled" (Littler 1982:11), this is one area where unionization could have an impact on shortages.

This was the case in one large firm where the respondent explained that tool and die makers were underpaid compared to welders if one took into account the level of skill and training required. The following explanation was given for this situation: firstly tool and die makers along with machinists, machine operators and welders belonged to the same bargaining unit. Welders were by far the larger group. In order to arrive at a settlement with the union it was crucial that the demands of welders be satisfied, the tool and die makers and higher skilled machinists, comprising but a small proportion of the work force, did not have much clout. The employer analysed the situation thus: "C'est autant notre faute que celle du syndicat. Nous voulons une convention et le syndicat aussi, dans le court terme si les soudeurs sont satisfaits, on pourra ratifier la convention collective. Les problèmes que ceci peut engendrer ne deviennent évidents que plus tard".

If large enough pay differentials were not possible in a firm, employers found other ways to compensate higher skilled workers they wished to keep on staff: isolating them in a slightly different classification (in some cases they isolated them physically too) and granting informally some privilèges. But employers recognized that these measures were not always effective. Another alternative was to subcontract as much of

the detailed skilled work that would have gone to tool and die makers. The chapter on responses examines in more detail the measures used by employers to get around the problem of pay differentials between workers.

However many employers cited differentials between occupations in different industries as a factor that may explain shortages. An often repeated comment was along the following lines: "Pourquoi un jeune voudrait-t-il être machiniste, qui est un travail difficille et sale quand il peut faire plus d'argent à emballer ou charger des caisses dans un magasin d'alimentation". It could be suggested that the employment expansion in the services sector which occured in Quebec as everywhere else in North America may have provided opportunities for jobs offering more stability, and levels of pay comparable, at times better, (the jobs referred to by employers were in large food store chains) than those in the manufacturing sector. What we have here is not a union effect but rather the consequence of important shifts in the location of economic activity and the ensuing impact on employment levels.

The presence of unions is not significantly associated in this sample of firms with the incidence of shortages either positively or negatively, the tendency being that there may be less in unionized firms. Furthermore unions encouraged and supported training within the firm and were not accused of unduly restricting supply through high journeyman-apprencticeship ratios. Still unions may have had some impact on the recruiting

practices of firms, on the adjustments chosen in response to shortages and in these ways may have aggravated or mitigated the impact of short supply of skilled workers. Again it is by analyzing within firm processes that one can comment realistically on the relationship between the presence of unions and the incidence of shortages, a task left to the next two chapters.

To summarize: the attempt to uncover significant quantifiable links between organizational characteristics and the incidence of shortages did not yield clear results. The relatively small sample size and its distribution among many industries may account to a large extent for the scattered pattern of results. However considering the qualitative and quantitative evidence together, there seems to be a slight tendency for older firms to have less years of shortages, especially in the case of older firms facing stable environments, such as repair shops. Similarly, size is not a significant predictor of the likelihood of shortages in this group of firms but larger firms do have slightly more years of shortages than small or medium sized firms.

Firms where one-off production dominates tended to declare more years of shortages, followed by firms where batching and jobbing systems of production co-existed, while a lesser proportion of batching firms are found to have as many years of shortages. This relationship was not statistically significant but the pattern is certainly a plausible one when it is further found that the ratio of skilled workers to all plant workers is

higher in the jobbing firms and lowest in firms where production is done mostly in batches. The presence of numerical control machines in a plant was just as likely in all the technical systems and it bears no statistical relationship to shortages. However a qualitative appraisal of the data indicated that the extent of use of numerical control varied from occasional in jobbing plants to almost constant use in large batch production plants.

Larger firms were more likely to be unionized and again it can only be said that in unionized plants there tended to be less shortages despite the fact that employers recognized that reduced pay differentials, a consequence of collective bargaining may have contributed to shortages. However unions were not seen as restricting supply through barriers to training.

It appears that explanations linking organizational characteristics and shortages should be sought instead in practices wthin firms that are the result of employers' perceptions of the problem and decisions about how to recruit, deploy and retain their skilled workers. These decisions must take into account outside environmental factors: they are probably constrained by organizational characteristics yet managers' options are much more varied than a narrow deterministic approach based on structural organizational variables would lead one to believe. In the next section a more detailed and qualitative approach is used for looking at the specific firms who declared many years of shortages.

THE HIGH SHORTAGE GROUP

For some firms recruiting difficulties were a persistent problem, during years of tight labor market conditions as well as in years when, to all appearances the labor market was more favourable to employers. Special attention is given in the next pages to companies who reported six years or more of shortages. Some 15 firms belong in that group. As we shall see there are important differences between these firms but also interesting similarities.

Firstly there is an overepresentation of firms from the transport industry, specifically from the aeronautics sector. Eight of the fifteen firms are classified within transport, seven of which either manufacture components and systems or act as subcontractors for the aeronautics industry. The remaining firm in that group repaired parts for trucking and rail companies. The seven other firms however are manufacturers in areas unrelated to each other or to aeronautics. I shall examine the situation for the firms related to aeronautics first.

As the interviews progressed, it became evident that there were an important number of firms in the sample related to the aeronautic-aerospace industry: some 20 firms out of the 68 or 29% of the total sample. It must be noted that many firms classified as belonging to machinery or metal fabricating, produced parts for the aeronautics industry. The prevalence of firms connected to this sector is not surprising, since it is a

major one in the Montreal region and an important employer of skilled labour of the sort examined here. Almost 50% of the aeronautics industry in Canada is located in the province of Quebec and in 1976 for instance, 46% of the total employment in that industry in Canada was concentrated in Quebec. It is an industry prone to fluctuations as noted in a profile of the sector prepared by the federal Department of Industry Trade and Commerce:

> The industry has been characterized by sharp fluctuations in the level of business which has led to unstable levels of employment. As a result, Canadian aerospace companies have experienced difficulties in recruiting professional and technical staff (Canada no date:14).

These problems extended to skilled workers as documented in reports published by and about the industry in Montreal. These reports emphasized the "poor quality" of manpower available (Conference on the Aerospace Industry 1983) or the scarcity of skilled workers. (Camaq 1983). However, the level of activity in the aerospace industry was not constant over the 1974-1981 period. It is therefore not surprising that many of the firms in that sector reported shortages, but it is a bit unexpected that as many as seven would be included in the six years or more of shortages because of the very fluctuations in business levels. Following a buoyant business climate in the late 1960's there was a rather severe downturn. It was estimated that employment in that industry in Canada fell from a high of 50,000 in 1968 to 38,000 in 1971. The industry stagnated until the end

of 1975, then, at the beginning of 1976 contracts for military and civil aircraft were finalized and some industry restructuring was done. From then on there was a swift upturn and very vigorous growth in employment through 1981.

> Ainsi chez les entreprises de vingt employés et plus en novembre 1978 par rapport au même mois de 1977, on estime qu'il y a deux mille emplois de plus chez les fabricants d'aéroplanes et de leurs pièces...Dans le secteur de l'aéronautique, la hausse de l'emploi est imputable au fort taux de recrutement exigé par les retombées au Québec des ventes récentes d'appareils militaires (l'Aurora de Lockeed) et civils (le Challenger de Canadair) (Quebec 1978:57).

The activity in aeronautics remained strong in 1980 with the two major firms in that sector obtaining important contracts, this activity had spin-off effects on other firms in the industry. Commenting on the performance in that sector in 1980 it was noted:

> La construction de matériel militaire réalise de bonnes performances. Les nombreux contrats privés et publics accordés depuis deux ans en Amérique du Nord gonflent en 1980 les carnets de commande des industries du matériel de transport fortement représentés au Québec dans les secteurs des équipements ferroviaires, aéronautique, naval et transport urbain...Les compagnies Canadair et Pratt and Whitney sont les grandes responsables de la vigoureuse croissance de cette industrie depuis quelques années (Quebec 1981:96).

The aerospace industry is highly structured and sometimes described in terms of a three tier pyramid. The firms at the top of the pyramid are the major aircraft and engine producers. Almost all of their production is exported. The second tier is composed of firms "which design, test and manufacture systems and subsystems: navigation equipment, flight simulators, engine controls" (Conference on the Aerospace Industry 1983:1). The third tier consists for the most part of subcontractors to firms in the other two tiers. They are generally "small businesses providing machining, sheet metal, casting, heat treatment plating and other services" (Canada n.d:3). In Montreal some 70 firms belonged to that tier and "half of these are machine shops" (Conference on the Aerospace Industry 1983:1). Some of these firms may be engaged in activities for other sectors while some are extremely dependent on contracts from firms in the upper tiers as a very important proportion of their production is done for them. Firms in the first and second tier are much larger than those in the third one. Companies from all tiers are represented in the 6 years or more of shortages group.

Respondents from the larger upper tiered firms I interviewed stressed their need for additional tool and die makers and machinists during that period. These firms had need of highly skilled workers for building prototypes and for testing. These workers were employed in parts of the firms where the production was of the jobshop type, that is one-off production. When recruiting specialized machinists and machine operators, who

worked in the plant where production was of the small batch or large batch type, they wanted workers with industry specific skills: "L'aéronautique est un domaine spécial, le contrôle de la qualité est très rigide, il faut qu'un travailleur connaisse l'environnement". Because the numbers required were important they could not find enough people.

In the past many of these firms had had relatively easy access to workers from Europe but by the mid 1970's less European workers were coming over and tighter immigration regulations curtailed recruiting drives in Europe. Furthermore one possible response to this situation: more in-house training was begun rather late. For example one firm started an extensive two year training program for machinists but only in 1978. Yet in the case of at least one firm it is difficult to conclude that there was a serious shortage since in the beginning of the period serious labor disruptions occured through a protracted strike and little recruiting could go on. However after the strike much recruiting had to be done to replace non returning workers who had found other jobs. Since no other consequences of short supply was mentioned by these firms, except for the need for overtime, it is difficult to assess the severity of the scarcities.

Within the group of aeronautics establishments reporting persistent shortages, the others were small subcontractors, It is noteworthy that these small firms had not succeeded in diversifying their markets and their production despite declared

efforts to do so. As much as 70% or more of their production was dependent on subcontracts from firms in the upper tiers of the industry. The competition among these smaller subcontractors was fierce and their position as subcontractors entailed much insecurity. The level of employment in these firms was determined directly by the activity in larger firms who awarded subcontracts to handle excess demand.

Firms which rely on subcontracts are in an unfavourable position since their search for skilled workers starts only after larger firms have been recruiting for a while. As one such employer commented: "les contrats sont toujours donnés à la dernière minute et il faut commencer la production rapidement. Si nous n'avons pas les ouvriers nécessaires nous sommes coincés parce que les meilleurs ont déjà été embauchés par les grandes compagnies". If the production of these subcontractors was for a few, special items destined to one or two firms only they had little recourse when these larger firms curbed their own production. It was therefore difficult to maintain a stable work force in the plant. Furthermore most of them either had not implemented any kind of training program because "we don't have the people to do the training," or "mes besoins en main d'oeuvre ne sont pas constants, je dépends de contrats qui peuvent varier d'une fois à l'autre". The results of their training endeavors were generally rather poor as they lost most of their trainees to other firms or other occupations. Another similarity between these smaller firms was the rather high entry standards

they insisted upon. They wanted applicants who had completed a vocational training program and had had extensive experience. Other establishments may have foregone the higher educational requirements but there was still much importance attached to experience and versatility, because in the words of one respondent they were rather poorly equipped: "Notre outillage est plutôt rustique,il nous faut des gars d"expérience qui peuvent travailler avec ce que l'on a". For small firms the short supply of skilled workers generally brought important delays in meeting production and delivery deadlines, endangering the possibility of obtaining other contracts in the future.

The remaining seven firms in this high shortage group are quite varied in terms of the kind of production they were engaged in. Changes in the product manufactured brought problems for at least three firms which had to adjust to new markets and new productions. In one case the changes were wide ranging and their impact still unknown so management alternated between lay offs and recalls. This combined with a company policy to keep overtime to a minimum exerted pressure on recruiting. For another firm there was a temporary reduction in production due to the unavailability of trained skilled workers. Unforeseen competition in their product market forced a firm to ameliorate their own product and more tool and die makers were needed. Failure to persuade their own machinists to undertake training on the job forced the firm to go to the outside market. Surprisingly the respondent who was personel director did not know why their own

workers refused training and didn't try to find out why it was so. However the need for additional tool and die makers was by then pressing and delays in recruiting and hiring were costly.

Incomplete and poor information about the labor market, the firm not realizing that there were few tool and die makers available, created a situation of short supply within the firm. This was compounded by the fact that wages in this firm tended to be rather lower than average and management was perceived as virulently anti-union according to the respondent. Firms who had had a steady level of operations for many years and a stable work force found it difficult to adjust when changing conditions required that they resort to outside recruiting. It would seem that in a very stable environment training is not pursued in a systematic way, so there is not a sufficiently large pool of workers ready to step into new positions as they open up.

Of the other establishments, one manufactured machine tools and required very highly skilled toolmakers. Demand for their product was increasing constantly in the 1970's and quality standards were becoming more rigorous.

> La consommation des machines-outils et la comlexité des machines utilisées augmentent rapidement. Les fabricants améliorent constamment la qualité et la productivité des machines par l'automatisation et par l'augmentation de la précision et de la vitesse de travail...La concurrence est basée sur l'innovation bien que les facteurs de robustesse, de fiabilité et précision demeurent très importants (Somenzi and Tanguay 1984:1)

look at those firms who reported almost constant difficulties revealed that there are similarities in terms of industrial sectors, position of firms within an industry (mostly subcontractors) and also in the strategies pursued. It becomes evident that what distinguishes firms the most are the manpower practices they apply in recruiting skilled workers and the kinds of responses they find to short supply. The next chapters will concentrate on their recruiting practices and their responses to scarcities.

NOTES CHAPTER 5

1. This scale was created using the Spssx Count procedure which for each case counts the occurence of the same value, in this case 1 for a year when shortages occured.

2. Firms in the entrepreneurial phase would adopt an intuitive strategy focusing on the short term and oriented to the needs of clients. In terms of human resources management they would emphasize flexibility and reliance on the experience and technical skills of their workers to adjust to changes in demand (Miller 1985:69-72).

3. Kimberley (1976) identified 80 empirical studies published between 1950 and 1974 focusing on organizational size.

4. The job titles assigned to various groups of tasks may vary from firm to firm as was seen in chapter 3 and chapter 4. By asking how many were skilled without referring to job titles, it was felt that an assessment would be made on a comparative basis and force distinction between levels of skill within a firm. Intra-firm comparisons of skill levels remain less clear and less reliable.

5. The aerospace industry in the United States was the first to use numerical control technology extensively (Noble 1984:213). In fact much of the development of this type of equipment had been sponsored by the United States Air Force and is documented in Noble's Forces of Production (1984). Shaiken also notes the heavy use of numerical control in this industry.

6. I am comparing the level of unionization within this sample of firms with the level of unionization in the salaried work force in Quebec. Levels of unionization of the salaried work force in Quebec hovered between a high of 41.3% in 1974 to 36.4% in 1981.

CHAPTER 6

RECRUITING PRACTICES

Textbook treatments of labour imbalances assume that adjustment takes place through the wage mechanism. However empirical studies have uncovered a much more complex process of adjustment in which non wage responses such as overtime, increased recruiting, reduction of hiring standards, and training play an important role (Franke and Sobel 1970; Mackay et al 1971; Thomas and Deaton 1977; Betcherman 1982). Employers will resort to many arrangements, drawing on organizational resources and their own expertise and inventiveness to alleviate the effect of shortages. This chapter examines the recruiting practices of employers included in this study and other adjustments to shortages are discussed in chapter 7.

Success in hiring quality manpower depends on the ability of a firm to tap the best sources of workers. The channels used to announce vacancies are important as judicious choices will enable employers to meet their manpower needs in an efficient, cost-effective way. Furthermore recruiting strategies differ in their effects on the dissemination of information to prospective job holders. It is therefore important to analyze how employers translate their labour needs into recruitment practices, to determine why certain recruitment channels are chosen as well as the consequences of such practices for the allocation of labour. On a more general level, analysis of

recruitment practices will yield information about the processes linking the supply and demand of labour. The first intimations of a shortage in any category of workers will be felt in the recruiting process: it therefore seemed appropriate to start a discussion of responses to shortages by Montreal employers with a detailed examination of their recruitment methods.

There is a diversity of recruiting channels available to employers. Some methods are utilized on a regular basis but one would expect that as the labour market tightens recruitment efforts would be intensified and new channels utilized. If, as has been suggested, employers are "cost minimizers in their adjustment behaviour" to labour shortages (Thomas and Deaton 1977:30), one would expect firms to resort only progressively to more costly recruitment channels. Yet there is some evidence that some recruitment sources are preferred, not only because they are less costly but also because they minimize selection risks (Manwaring 1984). In view of this the following questions are asked: what were the recruiting channels used by employers, how did they use them, what was the relative effectiveness of each of them? Were strategies modified in response to perceived shortages and did employers favour some methods over others and why?

The recruiting channels used by employers are identified and each method examined noting the advantages and disadvantages employers found in each of them. I also look at the combination of methods used. It was found that while some

recruiting channels are used extensively, their effectiveness is limited, especially as the labour market tightens. Some methods are more likely to be used by certain categories of firms and the reason for this lies in the degree and type of control available to employers, in the kinds of skills sought as well as the resources available. Finally I conclude that while my data show that external labour market conditions affect the choice of recruiting methods, employers dispose of enough alternatives to choose a recruiting strategy which, combined with other responses, conforms to the specific labour force deployment they prefer and internal imperatives.

No unique overall pattern is uncovered but there are some recurring configurations linked to various firm types.

The firms surveyed here used five major recruiting methods as shown in table 6.1.

TABLE 6.1

RECRUITING CHANNELS USED BY EMPLOYERS.

Recruiting channels	% of firms	n
Newspaper advertisements	89.1	64
Referrals from employees	80.6	64
Govt. employment centers	78.1	64
Educational institutions	43.1	65
Immigration	27.0	63
Other regions in Canada	1.5	66

(The n varies as there were missing answers to the various questions.)

Some methods are extensively used. Local newspaper advertisement is the most popular method, 89.1% of firms used it. An important proportion of employers (80.6%) rely on recommendations from their employees. In 78.1% of firms vacancies were announced to government employment centers, especially the federal Canada Employment Centers and occasionally to the provincial one: the Centre de Main d'Oeuvre du Qubec. Schools and Cegeps offering vocational programs were contacted by 43.1% of establishments, some 27% of firms resorted to immigration while only 1.5% extended their search to other areas in Canada.

Comparing these results with those of the Human Resources Survey (Betcherman 1982), which asked similar questions one finds some variation. Betcherman found that 67.2% of firms searched for employees in the local labour market (1982:44); the channels used are not mentioned but one can reasonably suppose these would include newspaper advertising and government employment centers. It is, as in this study, the most widely used method. Betcherman does not mention informal referrals from employees. The employers he surveyed used various educational institutions: 31.9% went to community colleges and Cegeps and 29% went to vocational secondary schools, together these represent a greater proportion of firms seeking workers from educational institutions than what is found in my sample. A rather greater proportion, 11.4% of employers extended their search in other parts of Canada, while only 7.5% tried obtaining workers outside of Canada. In the firms I studied, little effort

was spent attempting to recruit workers from other regions in Canada or Quebec. The language barrier accounts for the lack of recruiting from other provinces and generally employers supposed that there were too few skilled workers outside of Montreal to make recruiting drives in other parts of the province worthwhile. I next examine each recruiting method, and examine the advantages and inconveniences various employers found with them.

NEWSPAPER ADVERTISING

In North America when an individual looks for job it is most likely that the "help wanted" section of the daily newspapers is the first source consulted. American studies show that advertising in the mass media is extensively used (Franke and Sobel 1970:201; Malm 1954:510). British studies also note the importance of newspaper advertising as a means to announce job vacancies and attract potential employees (Beardsworth and al 1982:49). In tight labour markets advertising of job vacancies increased (Mackay and al 1971:348; Thomas and Deaton 1977:74,177). For employers it is an attractive method as it reaches a wider audience: it can attract workers already employed in other firms who may otherwise not be informed of job openings. The widespread use of this method found amongst the firms in this survey may be partly explained by the minor importance of union hiring halls in Quebec (except of course in the construction industry). Moreover, in the group of firms studied there were no collec-

tive agreements imposing closed shops and unions did not seem to be involved in the recruiting process. Secondly as we shall soon see, the other likely sources of workers, the government employment centers were almost universally seen as offering poor services.

However, recruiting through newspapers imposes a time-consuming screening process on the employer. Many persons, especially those cumulating the functions of owner, manager, and occasionally machinist too, felt that vacancies announced through the media brought forth too many calls and they could not cope in a rapid and effective way. Efforts also had to be stepped up when the labor market was tighter, either by extending the length of time an advertisement appears, or by advertising in more newspapers. This of course raises costs. In 1977 when skilled machinists were hard to find, one firm estimates it spent close to $15,000.00 for a newspaper advertising campaign. Since many skilled machinists in the Montreal area are of European origin the campaign was extended to ethnic weekly newspapers. After one month and a half, only 8 machinists had been hired. Media advertising to recruit skilled workers is rapidly exhausted, it seems, in a tight labour market. It is efficient in a "normal" market and unnecessary in a slack labour market because then firms receive enough unsolicited applications to fill their needs and in some cases, as in 1982-83 in Montreal, to set up waiting lists. These limits of newspaper advertising applied to skilled workers only, because it yielded satisfactory results

for firms recruiting workers with some general industrial experience. It was also an effective channel to obtain candidates if employers were willing to accept workers with less specific experience. For one employer newspaper advertising brought workers "qui ont une idée du travail dans l'usinage, un an d'expérience ça peut aller, je préfère les former à ma manière". The owner of a firm employing some 25 employees was satisfied with newspaper advertising: "Je vais chercher des gens ayant moins d'expérience parce que je les place avec des gens plus qualifiés qui sont ici depuis longtemps". The presence of a core of well trained workers allowed him to lower standards and use newspapers as an effective means of recruiting additional employees.

REFERRALS FROM EMPLOYEES

Many studies of recruiting practices note the prevalence of this method (Malm 1953:512; Lester 1954:38; Mackay et al 1970:358) and the studies reviewed by Beardsworth et al (1982;1984) and Manwaring (1984) confirm it. Studies sponsored by the Quebec Ministry of Education on the job search of young graduates from vocational secondary schools also noted the importance of informal referrals to obtain a job. It was found that students of the 1974-75 promotion "ont plus de deux fois plus de chances de réussir à se dénicher un emploi en faisant appel à des relations personnelles...qu'en faisant appel à des organismes ou à des moyens dont les fonctions sont de permettre

à l'offre et à la demande de travail de se rencontrer" (Québec 1978:11).

While most authors recognize that this method does not involve any direct costs to employers and probably provides some assurance as to the "suitability" of workers, Manwaring extends these observations by proposing that this practice could be "termed an extended internal labour market" (1984:161), the operation of which offers advantages to management and workers. It provides management with a fairly secure supply of workers possessing "tacit skills" defined as the "feel and discretion vital in even formally non-skilled production processes" (:167). The extended internal labour market also functions as an informal apprenticeship system because the "candidate is already integrated into the social relationships which exist within the work group" (:166). It also becomes a means of social control as "the person who recommends the friend or relative is under pressure to ensure that the recruit lives up to expectations" (:166).

However to achieve a high degree of effectiveness (that is to provide an adequate supply of "suitable" workers) extended internal labour markets must meet certain criteria. They will function best in a social community where ties between members and between the firm and the community are relatively strong and stable (:171). This is more likely if the firm has been present in the community for a long time and is an important employer in the area (e.g this would happen in mining and

steelworking areas for instance). The firm must be able to provide relatively stable employment and offer acceptable wages, conditions easier to meet if the firm has a certain degree of product and labour market power (:171). High unemployment, by reducing other job opportunities will also allow a firm to rely more on the extended internal labour market as a source of workers. The extended internal labour markets described by Manwaring appeared to be especially useful to recruit unskilled and semi-skilled workers (:179) (those with "tacit skills"). Craft workers were presumably recruited through other channels which Manwaring does not discuss.

The concept of the extended labour market in Manwaring's article is linked to dual labour market and internal labour market theorizations. According to Manwaring the presence of extended internal labour markets indicates that "the processes of closure which characterise the internal labour market are extended into the external labour market" (:184). The distinctions between processes in the internal labour markets and the external labour markets are not as clearly demarcated as was usually assumed. As a result there may be more closure in the external labour market where information about job openings is available on a "priority basis" so to speak to members of certain social communities through the informal referral system. Access to jobs, even those that may be labelled secondary, is not necessarily the outcome of the competitive workings of the external labour market. The evidence gathered from my data

confirms the presence of similar extended internal labour markets (or informal referrals by employees), but the firms using it and the type of workers thus recruited are quite different from those described in Manwaring.

Most firms did accept candidates recommended by their employees, but especially smaller firms, 90% of those with less than 50 employees used it as did 85.7% of firms with less than 200 employees compared with 72.7% of large firms in the 200-499 employees group and only 42.9% in the very large firms.

TABLE 6.2

RECRUITING THROUGH REFERRALS BY SIZE OF FIRM.

Informal referrals	Size of Firm				
	5-49	50-199	200-499	500 +	
Yes	27 90%	12 85.7%	8 72.7%	3 42.9%	50
no	3	2	3	4	12

n= 62 as there were 3 missing cases.

It is noteworthy that managers in larger firms were on the whole more circumspect about accepting referrals from their employees. Some employers found this recruitment method risky, fearing that it would promote the formation of "cliques" within a plant and eventually lead to discipline problems, or more mundane annnoyances such as "group absenteeism".

The personnel manager in a large firm (approximately 250 workers in the plant) recalled that he had hired many workers from the same newly arrived ethnic group, many of whom were related: "Si quelqu'un dans la famille est malade ou décéde, ils s'absentent tous, je me retrouvais avec la moitié de mon équipe." However when confronted with shortages of workers, some of the larger firms did accept referrals from their employees, in one case paying the sponsor $50.00 for each referred candidate subsequently hired. But this was seen as a temporary, exceptionnal measure and was used to recruit qualified skilled machinists not operators. Some smaller firms on the other hand relied heavily on referrals from current employees. One employer said it was the only source he trusted.

The preference for selection and hiring through referrals was found in the same firms stressing the importance of the behavioural traits that make a "good" worker (see chapter 4). It has already been noted that the way control is exercised in smaller firms may account for this emphasis on behavioural characteristics. The need for cooperation and ability to work autonomously in these firms was also discussed when examining the relationship between technical systems of production and shortages in chapter 5. One way of ascertaining the presence of these characteristics is by hiring workers already known to present employees.

It must be recognized that the selection of employees entails much uncertainty even when sophisticated entrance tests are administered. In smaller shops such tests are just about unknown therefore referrals from employees whose performance and attitude are satisfactory would alleviate some of that uncertainty for an employer. To some extent he can be assured that these applicants have the "right" skills as judged by his peers. The manager can also assume that they will probably have the "right attitudes". This was seen as important, again because much responsability rests with the individual worker in a small shop. As one employer explained: "Si un bon machiniste me recommande un autre machiniste, je suis plus sûr. For another: "Il me faut des gens qui savent travailler, qui ont à coeur que l'ouvrage soit bien fait quand ça sort, parce que je peux perdre ma réputation rapidement".

Furthermore as one employer commented, a tight labour market paradoxically may make careful recruiting an even more important factor, a militant new worker in the shop may quickly be spearheading demands for better wages and conditions and in a context of scarcity the employer would have to give in. Large firms select and hire applicants through their personnel offices which can verify the technical abilities of prospective employees and check behaviour through references from past employers. The systematic selection procedures can, to an extent, ensure that future employees are acceptable. The enforcing of bureaucratic

rules within the plant allows less reliance on personality traits and the good will of workers to get the work done.

Personal recommendations were especially valued in smaller establishments where many of the skilled workers came from Europe. It was often asserted that the best way to get a good worker was through "contacts". The prevalence of this form of recruiting points to the existence of an informal occupational network of individuals in the metal working trades. One employer attributed his success in preventing shortages to his knowledge of this network. He claimed that he knew every good machinist in Montreal, especially those trained in Europe and could always get the employees he wanted. This network also provided information about wages and work conditions offered by competitors and he did use this knowledge to "raid" other companies. He claimed to be ready to pay as much as $1.00 more per hour for a skilled trained employee; however he had to be sure of the worker's qualifications. The network provided that information. Another manager commented that one Portuguese machinist he had hired had brought three of his friends, all skilled and experienced. In addition to reliance on referrals from employees it was also important to maintain links with other firms: "It's important to have contacts with various companies, competitors or not; you know when there is a lay-off coming you can take on some of their workers, and also you get realistic references."

Apart from being an inexpensive way of recruiting workers, some employers mentioned that it insured a certain homogeneity in their work force as people brought individuals who usually shared the same background and training. One plant owner commented that this method helped him recruit workers who were recent arrivals in Canada and friends or relatives of his present staff. The arrangement, according to this respondent was favourable to both parties. "Ils sont travaillants, prêts à faire des sacrifices, ils travaillent bien ensemble et ils préfèrent un environnement plus familial comme ici". They also accepted below average wages in this case... It is also possible that the newly arrived workers had little choice as they might have faced some discrimination in hiring in the labour market, but I could not verify this. However one employer in a very small shop commented that it was always preferable "si les travailleurs se ressemblent et se comprennent", he used this as a rationale for giving preference to employee referrals who brought workers from the same ethnic group.

The network also provides workers with first hand information about working conditions and benefits in a firm. In the course of this study I spoke with a Tunisian born machinist trained in France, who despite ten years of continuous employment in the repair machine shop of a large firm could comment knowledgeably on the conditions in many firms where he had never worked: "Les copains vous racontent ce qui se passe, les bonnes

boîtes sont connues, on sait quand des postes sont ouverts et le genre de travail qui est demandé".

It would appear that in Montreal this "extended internal labour market" was used on a consistent basis by employers in small and medium sized firms. It is a way to screen employees as to their suitability in terms of skills as well as attitudes and therefore reduces the problems of control once they are in the job. It may also be a way to "raid" other firms. Given that managers in smaller companies almost universally insisted that they preferred workers who came from other small companies, this network also acted to disseminate information about job openings to selected targets. However in contrast to the results from the Manwaring study, this method was used primarily to recruit skilled workers. The relatively stronger influence and tradition of craft unions in the United Kingdom may account in part for this difference; the union may be a more important point of reference for members and can act as a hiring hall. In Montreal, craftsmen such as machinists and tool and die makers are likely to belong to a union including workers of many different skill levels and occupations and the union is not as likely to foster strong social ties between members. It does not serve as a social community nor as a hiring hall. A representative of the International Union of Machinists and Aerospace Workers in Montreal confirmed that firms very seldom went to them to recruit skilled workers.

Furthermore if a tight labour market reduces the effectiveness and use of such a method in the United Kingdom (Manwaring 1984:171,173), it seems to have been the reverse here. Firms previously reluctant to hire employees' friends and relatives would relent and sometimes actively encourage employees to recommend them when short supply of skilled workers became a problem. Manwaring stressed the presence of a stable social community as necessary for an effective extended internal labour market and he appears to define such a community as one in which certain industries have been long standing. In Montreal, the network the recruits participated in appears essentially to be an occupational and ethnic based one. Finally, Manwaring found that firms with a strong product and labour market position, that is firms who are dominant in their markets could make the most effective use of this method of recruiting. In Montreal, it was firms in the most competitive environment and the smaller ones that made the most use of the extended internal labour market. Of course if larger and stronger firms had used it, they might have been more successfull in recruiting through this method than the smaller firms but as it was, it was the smaller firms that generally did use it. These firms did not necessarily offer better wages, but they did try to provide stable employment by transferring workers to other jobs in a downturn, and a congenial atmosphere as trade offs. It appears to have been especially attractive to immigrant workers who

found a job more easily this way and a work environment where adaptation was less difficult.

GOVERNMENT EMPLOYMENT AGENCIES

The federal and provincial governments in Quebec offer free employment services to employers and job seekers. Applications are received from individuals looking for a job, they are screened and matched with incoming job orders from employers. A majority of firms, 78.1%, listed their vacancies with these government centers, most often it seems with the federal Canada Employment Centers, CEC's (formerly Canada Manpower Centers). The service of course is free and the network of centers is extensive, there are twenty eight (28) such centers in the Montreal area. However most employers were very critical of them, citing poor screening and deploring the generally low quality of candidates sent to them. Employers also felt that since the recipients of unemployment insurance benefits must register with employment centers and accept referrals to prospective jobs, many individuals would go for interviews without any intention to take a job. Conceivably employers' attitudes may rest partly on prejudices about people receiving unemployment benefits; yet given the relatively generous unemployment benefits available in Canada, it is quite possible that some people prefer a few weeks of leisure and benefits to a job[1]. The employment centers are often the subject of unfavourable comments; the

Parliamentary Task Force on Employment Opportunities reported that:

> Canada Employment Centers received numerous criticisms. Witnesses appeared unsatisfied with the job referral and counselling services offerd by the CEC's...Employers viewed the CEC's as a source of last resort for their labour because they felt that they could not get the highly qualified employees they needed. However it was recognized that many professional and skilled trades people simply will not register with Canada Employment Centers (Canada 1981:35).

If there is a quite efficient information network among machinists and other skilled workers, knowledge of job openings would be available to them without resorting to government employment centers, and this would explain partly the fact that "skilled trades people" are not on CEC lists. An employer asked about their services exclaimed: "Manpower, forget it, they can't send us good skilled workers, they don't have any, it's a waste of time calling them". The Economic Council of Canada in a study on the Canadian labour market noted that the jobs available through Canada Employment Centers often were less skilled ones and offered low wages. (Economic Council of Canada 1976:16). This would discourage highly skilled people from registering with the government employment centers. It seems the better qualified individuals could find more attractive jobs by means other than government employment centers. The study conducted by an Employment and Immigration economist (Trottier 1978) indicates clearly that machinists with the skill and experience levels required by employers were not available in the Canada Employment

Centers in the Montreal area despite the fact that there were large surpluses of machinists registered in these centers (see chapter 3).

Given this rather dismal portrayal of government agencies' services, one may ask why so many employers claim to have used it. A likely answer would be that to qualify for government training subsidies employers must make their needs for skilled workers known to CEC's in the form of a job order. They must also as much as possible choose trainees from the pool of registered unemployed. Another reason may be that applications to bring workers from abroad are granted by the Immigration Department only after an employer has demonstrated that workers with these qualifications are not available in Canada. Part of the search across Canada is conducted through the CEC network. Finally, since the service is free, employers can with no loss (and no gain either it seems) list their vacancies with the government centers. Still, some employers, although very few, expressed satisfaction with the government centers' services. However these firms generally required less skilled workers; furthermore they tended to be the ones facing stiff competition in the product market and paying lower wages. They prpvided less stable employment too. Employment centers apparently could furnish them with employees who were suitable although most of these employers noted that they had some upgrading to do and this was inevitable since they could not afford the better qualified or experienced workers.

There was however one interesting exception to this pattern provided by a medium sized firm, long established, specializing in repair work where the respondent commented that generally he received very good service from the CEC's. He mentioned that over the years he had developed good working relationships with the counsellors who often visited his firm and were aware of his manpower needs. Changes in the organization of the CEC's disrupted these relationships, as job offers were posted at the center instead of remaining with a counsellor. As a result of this practice candidates were referred to him without proper screening. Contacts with the CEC became more impersonal. He felt counsellors did not have the opportunity to get to know employers in their area and this reduced the effectiveness of government employment centers.

SCHOOLS AND TECHNICAL INSTITUTIONS

Frustration with the previously cited methods is often the factor that led to recruiting in the schools. Direct contacts with schools offering technical programs in the machining trades proved fruitful for some employers and 43.1% of firms recruited students from these programs at one time or another. The students thus recruited dispose of no or very little work experience and employers must devote some time to familiarizing them with the job. Two patterns are discernible among employers who recruited from schools. Managers knew a teacher or administrator in a

vocational program who referred students to them on a regular basis. One employer who recruited strictly from that source was teaching an evening course in a secondary school and filled some of his vacancies with graduates of his class. In another firm the director of production also a part-time instructor in a vocational program in a Cegep, regularly hired graduating students. However these graduates formed only a small proportion of workers hired. The initial contact with the school then often came through a personal acquaintance with someone in the school. This may explain why the five employers who recruited periodically in schools usually mentioned the name of one school only as their source.

Surprisingly, only one employer mentioned the Comités Industrie-École that came into existence around 1970. They were created by school commissions to encourage closer links between vocational schools and industry. They are, unfortunately, little used. An official of the Catholic School Commission in Montreal reported that the one set up for machining trades never worked very well as employers were on the whole not very interested in getting involved. It appears that very few companies had regularly used schools as a source of apprentices in the machining trades providing on the job training and experience to a young worker taken on in an entry level position.

Whereas the larger firms who had used the school system as a recruiting source reported satisfactory results, some of the smaller firms who had occasionaly obtained workers in this

way were not enthusiastic about taking on young people straight out of school. This was because the young people involved tended to frequently quit, attracted to larger firms offering better wages and promotions. They also displayed, according to one employer "moins de discipline". One might expect this recruiting choice to work better in firms possessing the incentives embodied in internal labour markets and this was clearly the case here. However, poor knowledge of the resources of schools, at times ignorance of the very existence of these schools led to an underutilization of them as a source of workers. Two employers claimed that there were no schools offering vocational programs in machining trades in Montreal. In other cases employers claimed that the programs were not very good as the graduates were not well trained. Many employers commented that the old system had worked better. Before the reform of the school system in the 1960's there had been trade schools in Montreal: the "écoles de métiers" specializing in vocational programs. This was changed and the vocational programs were integrated into the secondary schools and Cegeps, however they are seen as the "poor parent" in the system, receive less resources and attention from administrators. An official of the Catholic School Commission in Montreal, responsible for some of these programs confirmed that there was a tendency to orient towards these programs the students who were doing poorly academically, the standards he conceded were not as high as they had been, furthermore little financial resources were available to upgrade the machines and

equipment in these programs, as a result the equipment was not up to date and in some cases it was downright obsolete.

The other instance of recruiting in schools was done on a more formal basis. Employers explained that once the decision to implement a formal training program was taken, new recuiting sources for trainees were considered and schools offering vocational programs were a likely source. Recruiting drives were initiated by these firms especially in 1978 and 1979. The timing of these recruiting efforts indicates that formal training programs were a response considered only when shortges had been evident for at least a year and other measures had proved insufficient to solve the shortages problem. Establishments that organized a systematic, well developed program including usually classroom instruction and on the job practice, were larger firms and they sometimes entered into semi formal arrangements with the schools. Specific training programs are discussed in the next chapter. When an extensive in-house training program was set up, it was certainly worthwhile for a firm to hire into it graduates who had received some basic instruction in math and trigonometry for example and build on from them. This solution appears to have been acceptable as respondents in that group expressed great satisfaction with the trainees they received.

Vocational programs in secondary schools and Cegeps were a source of workers regularly tapped by only a minority of employers. But increasing scarcities led to an increase of

recruiting from these sources and it was combined with training within the firm.

IMMIGRATION

Canada has historically benefitted from the immigration of skilled workers. The authors of In Short Supply a report published in 1982 by the Economic Council of Canada asserted that "In many respects, the industrial progress of the post-Second World War era depended heavily on the skills of the nearly five million people who have come to this country since 1945." (:42). Firms employing tool and die makers and machinists in the Montreal area repeatedly acknowledged this source of qualified manpower entering the country in the 1950's and 1960's. They also lamented the changing conditions and the obstacles in gaining access to European workers. The reduced flow of skilled immigrants was seen as a major factor accounting for short supply. In the 1970's there was a constant dwindling of immigrant workers who came to enter occupations in machining. A report examining labour market imbalances published by the Economic Council of Canada presents the following evidence:

TABLE 6.3

IMMIGRANTS DESTINED TO THE LABOUR FORCE
MACHINING OCCUPATIONS 1973-1980

Year	workers (thousands)
1973	5.5
1974	7.6
1975	5.2
1976	3.0
1977	2.2
1978	1.7
1979	2.3
1980	2.9

(source: In Short Supply Economic Council of Canada 1982:44)

However only 27% of firms surveyed cited immigration as a source of skilled workers. It must be remembered that more restrictive immigration policies taking effect in 1973, made it much more difficult to go abroad to fill vacant positions in Canadian firms. An employer must demonstrate to Manpower and Immigration officials that he cannot find suitable workers in Canada to fill his vacant positions. The wages offered must of course be competitive and vacancies must be widely advertised through Canada Employment Centers across Canada. Only when these measures prove useless can he bring in workers from another country, usually on a temporary work visa[2]. The costs of overseas recruitment are high as an agent must be paid to travel and interview these applicants in their home country and usually some relocation package must be offered to induce a prospective worker to come to Canada. The administrative procedures are lengthy and delays are long. The owner of a small (60 employees)

successful firm explained that he had to wait one year between the first contact with Employment and Immigration and the arrival of two tool and die makers recruited in Spain in 1979.

Traditionally, skilled workers from Europe who came to Canada originated from the United Kingdom and after World War Two from Western European countries such as Germany. However, by the mid-1970's wages and working conditions for skilled workers in Western Europe were as good if not better than those offered by Canadian firms, reducing the attractiveness of immigration. A production manager, native of Germany, attempted to recruit workers from this country in 1979. he recalled: "I couldn't get the very skilled ones to come over. Working conditions, and especially benefits such as vacations and pensions are better there. Wages were just as good." This may not have been the case for the United Kingdom, but workers from the United Kingdom usually preferred going to English speaking provinces. Two firms recruited English workers in the early 1970's, but they all left for Ontario and the Western provinces within a few months of their arrival in Montreal.

Rising standards of living in Europe combined with more restrictive immigration policies in Canada made European recruitment a very expensive and tedious process and this avenue has become limited to only a very few firms, usually the large ones recruiting a substantial enough number of workers to amortize the recruiting costs. It appears also that some industrial sectors deemed strategic, such as aeronautics for example, could more

easily obtain clearance to recruit overseas. For the smaller firm overseas recruitment was a time consuming and expensive process, often not worth the expense.

However some firms could gain access to skilled foreign workers through more informal, less official channels. Firms already employing neo-canadians as workers or managers could arrange immigration of a foreign worker, either a friend or a relative, by promising employment on arrival. Here again, informal networks appear to be important. Of course the immigrant worker had to submit an application on his own for entry into Canada as a landed immigrant or sponsored by a close relative. The point system used by the Immigration Department after 1967 to screen potential immigrants was actually favourable to skilled workers. Out of a maximum of 100 points that could be obtained, up to 15 points could be allocated on the basis of demand in the occupation, and machining trades were deemed in demand. Another 1 to 10 points could be accumulated for "professional competence". Finally up to an additional 10 points could be given to an applicant depending on the labour market situation in the region he intended to move to.

In these cases the costs to the employer are nil. However once in Canada as a landed immigrant, the new employee could also leave his first employer at will and seek better wages and conditions elsewhere which is not the case of workers in Canada on employment visas. In the group of firms studied here, the second method was the one by which most small and medium sized

firms obtained skilled immigrant workers, while larger firms used the official channels to import workers on employment visas.

Of the seventeen companies that included immigration as a source of skilled workers, only ten had actually placed advertisements in European newspapers or in Canadian consulates abroad. Five of these did so only in the early 1970's, before the modifications in immigration laws. Once the more stringent regulations were applied, these five firms abandoned that method and by the late 1970's three had organized extensive training programs. This was one of the objectives of the regulations - encourage training of skilled workers in Canada. Two firms continued to recruit overseas occasionally and even intensified their training efforts. Two smaller companies were allowed to search for skilled workers in Europe and the training provided in their plants remained limited. The numbers of workers required in these last two cases were extremely small. The other firms in this group obtained workers from Europe through the less formal channels described above.

It appears that overseas recruitment lost its attractiveness by the mid 1970's. From a fairly routine method for some firms it became a highly expensive and "red tape heavy" measure directly tied to the increasing non-availability of skilled workers.

Almost all employers utilized a combination of recruiting channels (see table 6.4). However recruiting methods vary as to the amount of effort they require on the part of the firm and

the costs they involve. Referrals and the services of government agencies are the least costly financially. Newspaper advertising can become very expensive and time consuming, but it is a conventional method of seeking out job applicants in this country. Contacts with schools entail a greater outlay of time and effort as the firm is entering new "territory" so to speak, interacting with institutions very different in outlook and operations from a commercial venture. Finally the recourse to immigration is often an expensive method and the time lag between the decision to recruit overseas and the placement of an individual in a job is much longer than with other methods and this in itself is an hindrance. One can place these various methods on a scale of 1 to 4 reflecting ascending difficulty or effort and expense required, with referrals and government agencies at the lowest or 1, adding newspaper advertising for a value of 2 then schools and immigration as 3 and 4 respectively. Because I expected larger firms to utilize a greater number of recruiting channels and also be more willing to expend more financial resources on recruitment I examine the distribution of various combinations of recruiting methods according to firm size.

TABLE 6.4

COMBINATION OF RECRUITING METHODS
BY SIZE OF FIRM

Methods	Firm size				
	5-49	50-199	200-499	500 +	
1	8 26.7%	-	1 9.1%	-	9
2	15 50.0%	7 41.2%	1 9.1%	1 14.3%	24
3	2 6.7%	7 41.2%	4 36.4%	3 42.9%	16
4	5 16.6%	3 17.6%	5 45.5%	3 42.9%	16
Total	30	17	11	7	65

legend: 1=referrals and govt agencies
2=referrals and/or govt agencies + newspapers
3=1 and/or 2 + schools
4=1 and/or 2 and/or 3 + immigration

N= 65 only as there are missing cases on some questions.

The size of firms tends to have some impact on the extent of recruiting methods used. The firms restricting their recruiting efforts to referrals and newspaper advertising are usually the smaller ones, while there is a greater proportion of large firms using schools and immigration. However size of firm alone cannot be the factor that dictates the choice of recruiting methods, albeit it is easier for a larger firm, disposing of more important resources to extend its search patterns.

Table 6.4 tells us that almost half the sample used three or four methods of recruiting workers. Very few firms could meet their manpower needs by using only personal referrals or government agencies. Some twenty-four firms combined personal and government agencies referrals with newspaper advertising and these were the smaller firms.

When recruiting through educational institutions is added, somewhat larger firms become included but as we have seen there is a difference there, the firms with upwards of 200 employees are likely to go to schools to recruit graduates to further their training with a systematic program within their firms. Others recruit in schools once a link has been established with a specific school. Immigration is added to other recruiting channels and the ways offshore workers are obtained varied with the size of firms.

The pattern of use of various recruiting channel appears to have been the following. In smaller firms employers called the government employment centers to list their vacancies; in most cases the results were disappointing. Advertising in the media is a suitable alternative if less experienced or less skilled workers are needed. Personal recommendations were relied upon to bring forth workers with the qualities deemed most valued. Educational institutions are resorted to in only a few cases and immigration is a source of workers if the firm has established contacts. For larger firms the pattern is slightly different. They do not rely exclusively at any point on personal

referrals and the government centers, but rather will go to newspaper advertising immediately. Educational institutions are tapped especially if a training program is set up within the firm and immigration through official channels becomes a source of highly skilled workers especially in times of scarcity for the very large firms.

CONCLUSIONS

Media advertising, personal referrals and government agencies are almost universally cited as recruiting channels for securing skilled workers. However while advertising and job centers are very "open" channels of recruitment, they do not bring much hiring, especially in a tight labour market. Immigration taps a different pool of workers and this "open" channel allows a better return but its costs restrict its use to firms willing and able to invest time and money. Personal referrals are widely used and employers report much satisfaction with workers recruited this way. Smaller firms prefer it because they can thus reduce uncertainty in selection, gain some access to overseas workers and recruit employees who can take on a job with a minimum of adjustment. It is a channel that restricts dissemination of information, is dependent on the existence of an informal network among individuals in the occupation and on the ability of the employer to take advantage of it. Larger, more structured firms will also accept referrals when there are

difficulties in finding an adequate supply of skilled workers, but it is not a routine method for them. Vocational programs are another less open channel for recruiting. The information about job openings is given only to certain schools it appears, and this is tied to processes within the firm such as the presence of a systematic training program. It is noteworthy that there is no close correspondence between the channels used to advertise job openings and the likelihood of hiring through them. The more open channels, the ones that allow the information to be disseminated to a wide population are often the least effective: job centers and newspapers in a tight labour market. Offshore recruiting is an open method but to a different labour market. The use of less open channels such as personal referrals and educational institutions is linked in the case of smaller firms to processes that do extend the internal labour market and brings some closure, while in larger firms they are responses to external labour market conditions.

NOTES CHAPTER 6

1. This is one of the arguments put forward by Cousineau and Green in Unemployment in Canada: The Impact of Unemployment Insurance a study done for the Economic Council of Canada 1976. Also in "Structural Unemployment in Canada 1971-1974 (1978).

2. A temporary employment visa can be issued to a foreign worker to enable him to take up employment with a specified employer. The employer must have shown that no Canadian worker or landed immigrant could be found to fill the vacancy. the visa is valid for a period of one year but it is renewable. However should the worker accept a job with another employer his visa becomes void.

CHAPTER 7

RESPONSES TO SHORTAGES

INTRODUCTION

This chapter examines the responses of Montreal employers to shortages of skilled workers in the machining trades. I will show that firms adjust to shortages in a number of ways often using a combination of measures. The factors accounting for choice of adjustment measures and the criteria upon which decisions are based are best understood within the context where such decisions are made, that is the firm. One can examine in detail the organizational and environmental factors that facilitated or hindered adjustment to shortages. Decisions leading to the choice of various adjustment measures are, to a large extent, the outcome of a "trial and error" process, and generally employers prefer strategies that provoke as little disruption as possible in the existing arrangements of the firm. Costs, of course, are also a concern but employers often cannot systematically assess them and in many cases can only provide general estimates of the relative costs of various measures.

The first section below reviews the evidence available from other studies on choice of adjustment instruments. It is followed by an examination of the overall pattern of responses adopted by employers in this study. Recruiting activities are not included in this chapter as they have been dealt with in

the previous one. I then analyze each of the adjustment instruments utilized, focusing on the factors that may account for choices, such as perceived effectiveness, as well as costs and constraints attached to the use of various measures. To complement the information on wage adjustments I also present data on hourly wage behaviour in some machining trades as provided by the Department of Labour of Canada. The last section summarizes the conclusions reached.

SOME PREVIOUS STUDIES OF RESPONSES

The following are the methods for dealing with shortages of specific skills that previous studies have uncovered.

-overtime (Franke and Sobel 1970, Mackay et al 1971, Doeringer and Piore 1971, Thomas and Deaton 1977, Memac 1979,1981 Betcherman 1982, Meltz 1982a).

-training of existing employees occurred in all the studies mentioned above but Meltz noted that only 20% of the firms he sampled had done so (1982:33).

-increased recruitment and search activities were undertaken almost everywhere except in the case of toolmaking occupations in the Franke and Sobel study.

-immigration provided some workers in the Betcherman sample as well as in Meltz's, and the Memac surveys but it is not noted in the British or American studies.

-reduction of hiring standards occurred in most studies, but not for all occupations: for instance shortages of teachers in Britain did not bring about reduction of entry standards.

-subcontracting is widely used in manufacturing firms in all the studies, but not in the other sectors such as in educational or health care establishments.

-capital substitution was also used as a measure of adjustment but not to any great extent in the Memac and Betcherman surveys. In the Thomas and Deaton study it is not only an adjustment to shortages. The other studies have not commented on this particular measure.

-wage increases were not an important measure of adjustment in most studies except in the Meltz study.

-changes in work organization or job redesign were found in the studies of nurses (Franke and Sobel 1970) of teachers, bus drivers and draughtsmen (Thomas and Deaton 1977) but is seldom mentioned in other studies.

The evidence shows that some methods are more likely to be used than others. In the Pittsburg St-Louis and Chicago labour markets for toolmaking occupations, Franke and Sobel found that:

> Changes in relative wages played only a minor role in bringing adjustment to the shortage situation. . . rather the sample firms generally found it more economical to pay premium rates for overtime (1970:170).

Subcontracting some of the work was routinely done and increased when extra production was required. Recruiting activities were not extended significantly, as most employers in these cities "confined their recruiting efforts to the local labor market area" (:204) and in the case of toolmakers "very few employers planned any changes in recruitment practices in the face of short supply and such changes that were considered were minor" (:204).

Only half the firms surveyed by Franke and Sobel had on-going training programs; usually well-established formal apprenticeship ones under the auspices of labour-management committees and the Bureau of Apprenticeship and Training. Very few engaged in new training efforts to increase their supply of tool and die makers as they feared high turnover amongst newly trained workers. Generally there was little dilution of entry requirements as a response to recruiting difficulties.

However, employers of tool and die makers in that area did not face severe shortages but a tight labour market as evidenced by the longer delays needed to recruit and hire suitable candidates. Therefore a combination of overtime and contracting out proved sufficient to meet the problems brought on by a short supply of workers. In occupations where shortages were more acute (medical technologists and nurses especially), employers did hire workers who did not meet the standards previously required and then redesigned jobs to assign some tasks to lower level personnel (:136-141). In a tight labour market American

employers in that area extended practices already entrenched rather than adopt adjustment measures that were a departure from regular procedures.

The authors of a British study found that some adjustments are less likely or will be resorted to only after shortages have been felt for a certain period of time:

> In a number of instances, plants which had experienced difficulties in recruiting specific types of labour had refrained from attempting to adjust the wage structure in favour of these groups for fear of provoking a general increase in earnings...and there is a considerable time lag before a change in labour market conditions is reflected in the internal wage structure (Mackay and al 1971:112).

And indeed when wages did go up, as they eventually did in areas where the short supply of workers was most critical, the differentials between various categories of workers remained stable (:123).

Higher wages were paid to reduce labour wastage rather than to attract new workers. Overtime work was a widespread practice, but the extent to which it is a specific adjustment measure is not clear since "overtime working is widely accepted in Britain as a means of increasing the relative attraction of employment in a particular plant" (:69). No anti-pirating agreements between firms appear to have existed and a tight labour market brought on more "poaching" of workers from other firms (;349). In the area where tight labour market conditions prevailed firms engaged in more training, but only after a relatively long period of shortages and when government

legislation supported training and penalized firms that didn't do it (:344). Such training efforts may not have proved to be very effective for the firms engaging in it since the drop out rate was great: apprentices quit to take a better paying job halfway through their training (:342).

The pattern exposed by the Mackay study seems to have been: more overtime, extension of recruiting activities and more "poaching" (the authors do not describe the inducements that may have been used to poach). Active measures to increase the total supply of skilled workers, such as training, were implemented at a later stage and were encouraged by government legislation. Wage increases, a largely defensive measure, brought up pay rates for all workers and did not reduce differentials between various groups of workers in a significant way.

Studying responses to shortages of bus drivers, teachers and draughtsmen, Thomas and Deaton (1977) hypothesize that in choosing adjustment measures, firms follow a cost-minimizing strategy, qualified or tempered by constraints within the organization, such as the competition for resources between various departments, the existing job classifications and wage structure. Institutional constraints brought on by the presence of a union, the quality norms in place, in education for example, also affected the use of various measures. There were legal constraints, such as the limits on hours of work in the case of bus drivers, and technical ones: quality standards, availability of equipment, sequencing of work for bus drivers and draughtsmen.

> One of the major factors in the choice of instruments is the set of constraints which impinge upon the decision makers. these constraints will act in different ways: some will affect the timing of response, some the nature of the response, and some both. They will also vary in which instruments they affect (1977:108).

Yet the authors found that "in none of the markets was overall cost minimization apparent" (:195), for instance there was "lack of evidence that the choice between varying recruitment activity and other adjustment instruments was made on cost-effectiveness grounds" (:179). For example the authors report that "Where firms had to choose between subcontracting and overtime, the relative costs of the two adjustment instruments played a minor role in the choice" (:162). Indeed employers could not tell which was cheaper. As well "constraints by themselves do not provide an explanation of the choice of adjustments" (:15). The authors concluded "that a substantial part of the explanation of the choice of instruments depends on employer-specific factors" (:4).

Thus, for example, while overtime is an acceptable instrument in the case of draughtsmen and to a lesser degree for bus drivers it is not suitable for dealing with shortages of teachers. The rationale underlying overtime is different in the two cases. For bus companies, constrained in their ability to increase wages by a national negotiating structure, it was a way of raising relative earnings as well as increasing output. In engineering firms, overtime was seen as contributing to added output. Firms employing draughtsmen found that subcontracting

was an effective way to respond to shortages of workers and being less constraining than wage increases it was used extensively. However it was not a feasible measure for transport companies or schools.

The engineering firms also extended their recruiting and modified their hiring standards by accepting draughtsmen from other industries. According to the evidence provided in the interviews with employers, the introduction of computer aided design was chosen if it was estimated that the shortage of draughtsmen would persist over a long time and if such capital substitution brought other benefits such as better design and greater efficiency. Its introduction was not motivated primarily by shortages of labour. In the case of engineering firms pay increases were granted reluctantly and were used to reduce unacceptable levels of turnover.

In the case of bus drivers some job redesign was possible by combining the positions of conductor and driver, this allowed pay increases as well as permitting upgrading of conductors. It is hard to adopt such measures to deal with shortages in the case of teachers. Again the centralized negotiation structure made pay adjustment in a specific school or region almost impossible. Education policy also precluded substantial reduction of entry requirements and lowering of standards. Administrators therefore had to increase supply primarily through accelerated training in the teachers' colleges and the use of part-timers - often married women (:119).

Doeringer and Piore in their influential Internal Labor Markets and Manpower Analysis (1971) examined the responses of employers to labour imbalances. The focus, of course, is on the practices of firms where an internal labour market existed. They postulated that "the instruments of adjustment would fall into a clearly defined cost hierarchy" they also expected to find some recurrent pattern of adjustment (Doeringer and Piore 1971:95). However their results did not allow confirmation of these hypotheses. Rather they found that

"variations in labor supply are frequently met with unplanned and often ad hoc policies designed to overcome immediate labor shortages" (:96). Moreover the implementation of various responses is the outcome of different decision-making processes within the firm, the key factor being the constraints imposed by various measures. For instance the less constrained instruments such as increasing recruiting efforts, overtime and training were the "principal instruments of labor force adjustment" (:96) because these "are more amenable to management discretion" (:97). The more constrained instruments involving changes in "the compensation structure, the job structure, the internal allocative structure and many written managerial procedures - (are) the subject of separate decision processes" (:97). Some minor adjustments may be made e.g. adding new classifications "such as machinist "B" and "C" (:98) but important in-depth changes are highly expensive and the processes that determine these structures are as much the outcome of custom and previous

investment decisions within the firm than of external labour market conditions. These changes implied important structural rearrangements that would upset the internal labour market structure and were not part of the usual responses to labour shortages.

The Canadian studies (Meltz 1982, Betcherman 1982, Memac 1979,1981) also report a wide array of responses. Meltz (1982a) confined his analysis to tool and die makers in Ontario and interviewed the representatives of twelve firms in Southern Ontario. He found that the most frequent response to short supply of workers was overtime followed in order, by improvement in wages and recruiting outside Canada (1982:33). In this case it is not surprising that wage increases are mentioned more often as a response than in other studies since the lower paying firms were also the ones experiencing shortages (:34). So there was probably some "catching up" done in these firms. Implementing training programs specifically as a response to shortages appeared to be less frequent. Some firms reporting shortages that already had an apprentice program made sure they "had the maximum number of apprentices permitted them under Ontario regulations" (:33). He also found that larger firms, which were also the higher paying firms, responded to shortages by subcontracting work and recruiting abroad (:35). Lower paying firms increased training. In both groups overtime was the most extensively used measure.

Betcherman's study of responses to shortages by employers indicates that various strategies were used, depending on the

type of worker in demand and the industries affected. Training was the measure most used when dealing with shortages of workers in product fabricating and repair: these workers would be generally less skilled and the jobs are likely to be firm specific and involve machine operating, tending and also assembly work. In machining trades Betcherman found that overtime was used more extensively (:35). There were also industry variations: in manufacturing for example, overtime was more likely to be used than in other industrial sectors with the exception of mining. Training was also a measure used by the majority of employers, but lowering qualifications was used less in machining than in other industries. It may be so because many workers in this industry are expected to have the kind of generic skills associated with a trade. Subcontracting was an important adjustment mostly in mining, manufacturing and the transportation, communications, utilities group. Capital substitution seems to have been possible or feasible in those three industries mostly.

The Memac surveys (1979, 1981) report that overtime was the most widely used adjustment to shortages, the use of less skilled labour was next followed by subcontracting. Automation is the fourth most often used method while in 1979 the next method was lowering qualifications, but in 1981 more recruiting abroad occurred. There is a remarkable similarity in the ranking of various adjustments for the two years, this probably indicates that patterns of adjustments are quite consistent within an industrial sector: the Memac surveys were conducted, of course,

only amongst members of the association in machinery and equipment manufacturing.

To summarize: overtime, whenever possible is the first response in all the studies. The only situations where it is not used are those where the market served (such as education) has rigid rules as to how the service should be provided. Extending recruiting activities is also a fairly routine practice, but it takes various forms: to other industries in the British studies or to other regions in Canada. Attempts to recruit individuals from previously neglected groups are made in Britain (in that case, women) in the Canadian studies, less skilled labour was hired. Subcontracting appears to be especially suitable for manufacturing industries. Of course the industrial structure must make it possible: a certain division of labour between firms would be a prerequisite so that some companies can farm out some of their production and there must be some excess capacity in the industry.

All these responses entail added activities and costs for a firm but they will not force extensive changes in arrangements existing within the firm. Training, except in the Betcherman and Meltz study is not a routine response: where such programs exist they can be used to the utmost. However implementing new ones is done cautiously, it would seem that the "poaching complex" (Oatey 1970:16) or fear of losing newly trained employees to other firms may explain the reluctance to engage in extensive training. It is a response turned to at a later stage and in

some cases, government sponsored incentives must spur such efforts. Similarly increasing wages is not a preferred method of resolving shortages in any of the studies (except Meltz's), and it takes on a defensive aspect.

Because so little information about the relative costs of responses is available little can be said about the relevance of that criterion in employers' choices. They certainly are a factor but their estimation is at best partial. However the evidence from these studies makes it clear that firms will rely firstly on measures that require little departure from "normal" procedures and will not upset internal arrangements. Responses which may bring permanent changes in the structure of remuneration or upset classifications within the plant are the last chosen.

EVIDENCE FROM THIS STUDY

This section examines the responses of Montreal employers to their shortages of skilled workers. I begin with an overview of the general pattern of adjustment and then proceed to examine each measure focusing on the reasons given by employers for their choices and their comments about the relative effectiveness of each method. In the last section I summarize these findings and propose some interpretations.

A variety of mechanisms to alleviate the effect of shortages of skilled workers were used, eight such measures (excluding recruitment activities) were mentioned by employers in this study. Table 7.1 shows the percentage of firms using each adjustment. It is clear that some instruments are much more likely to be used than others, with overtime being by far the most widely used. Implementing some kind of training was the next most widely used method of responding to shortages. However as will be seen later on in this chapter the extent of training could vary among different types of firms. Fully half the employers in this study reduced hiring standards and lowered qualifications somewhat in a tight labour market.

TABLE 7.1

% OF FIRMS USING EACH RESPONSE.

Responses	% of firms	total no of firms
overtime	86.8%	68
training	63.2%	68[1]
reducing hiring standards	50.7%	67
subcontracting	43.5%	62[2]
raiding	28.6%	63
modification of work organization	28.4%	67
wage increases	27.9%	68
capital substitution	17.9%	67

[1] This refers to training as a response to shortages, some respondents indicated that there was always training going on and it was not a response to shortages.

[2] 58.8% of firms in this sample were subcontractors, but in 43.5% of cases subcontracting was a response to shortages.

Subcontracting some of the work was done by almost 40% of the establishments but again the extent could vary. While other studies sometimes mention the incidence of raiding, there is little evidence of how widespread the practice was. The employers in this study were specifically asked about it and it appears that for some firms this was one way to obtain skilled workers. Work organization could be changed to accomodate employees who were often less skilled or experienced that those whom the firm usually hired. Wage increases were somewhat less favoured by most employers and there was finally little capital substitution as a response to shortages.

TABLE 7.2

RESPONSES USED BY EMPLOYERS IN CANADIAN STUDIES.
RANKING BY PROPORTION OF EMPLOYERS USING EACH.

Responses	Betcherman	Memac	Meltz	This study
overtime	2	1	1	1
training	1	-	3	2
reducing standards	4	2	-	3
subcontracting	3	3	4	4
raiding	-	-	-	5
modification of work org	-	-	-	6
wage increases	5	-	2	7
capital subst.	6	4	-	8

The pattern of responses found in this study is broadly similar to that found in other Canadian studies (see table 7.2). Overtime and training appear to be generally the most

favoured modes of adjustment to shortages, while capital substitution is the least prevalent. There is much more variation in the use of wage increases as a means to alleviate shortages but the evidence from these studies cannot explain why this may be so.

Some adjustment measures were applied simultaneously. In other cases if the problem persisted new measures were tried. Table 7.3 shows that overall 2 to 5 different measures were utilized.

TABLE 7.3

NUMBER OF MEASURES USED AS RESPONSE TO SHORTAGES.

Number of measures	Percent of firms
0	2.9%
1	8.8%
2	16.2%
3	25.0%
4	23.5%
5	14.7%
6	7.4%
7	1.5%

n = 68

number of measures used by number of years of shortages:

r	p
.20901	.0458

There was a small, but by customary standards, significant correlation between the number of measures used and the number of years of reported shortages. The smallness of the associa-

tion is not surprising as one would expect that some firms may have immediately applied the most efficient measures to resolve their manpower problems whereas for others the process of finding the best combination was much longer or the measures applied were not as effective in their case.

The combination of adjustment measures used by firms was awesome; compiling these various combinations I found 52 different ones. This underlines the specificity of firms' responses to shortages. Furthermore it must be stressed that employers may not be immediately aware of the onset of a shortage. Responses to this situation will be tentative until the conditions of the labour market are well assessed and strategies developed to respond to them. Also as noted in chapter 5 employers tend to cling to past practices and new methods are implemented cautiously:

> Employers may react slowly to changes in their environment and may cling to traditional policies when the conditions which justified them no longer exist. The adjustment process in the market may then be slow and strewn with errors of judgment (Mackay et al 1971:397).

The next sections of this chapter examine each adjustment measure, much as was done with recruitment practices. The aim is to understand the reasons underlying their use by employers, the organizational and environmental contexts which enhanced or restricted their effectiveness, including the role of government policies, as well as the overall strategies that various types of firms found most useful for resolving shortages of

skilled workers. It will be seen that the same measure could be used in different ways by firms and combinations of measures which proved successful in some situations were not as effective in others as constraints and priorities varied among firms. The timing of implementation of various measures is also taken into account. The evidence presented in the next pages is drawn from the interviews done with employers and is of a qualitative nature. While this kind of method does not allow for the presentation of neat, clear cut hypotheses and the straighforward testing of them, its interest lies in the insights it provides into employers decision making processes in the labour market.

OVERTIME

Overtime is a widespread practice but is not necessarily a response to a shortage of workers. Many employers noted that a certain amount of overtime was expected by employees and part of the attraction of work in smaller firms such as job shops was the possibility of substantial overtime pay. Overtime, then, becomes a way to increase earnings and it was seen as such. The difficulty in predicting much ahead of time the volume of production made overtime a necessary adjustment not only to shortages but to unstable demand. If this increased demand was seen as a short term condition, many smaller employers would prefer extensive overtime and would not even attempt to recruit

new employees. Firms using only one adjustment method in this sample, used overtime.

Of course there are some costs associated with such a strategy. Starbuck noted that "Having too few employees leads to a heavy dependence on overtime and a higher per man-hour wage" (1965:458). It can become very costly especially: "quand ça devient du temps double nous ne sommes plus compétitifs"1. Furthermore, if heavy overtime work becomes necessary for long periods of time, the increased output does not match the increased overtime. In some establishments, there were periods when overtime work almost doubled the number of hours worked weekly. The president of a small company lamented: "Je paie 150% mais finalement je ne reçois que 135% de productivité". The director of personnel in a large national firms noted that constant extensive overtime had the effect of raising absenteeism: "Quand les travailleurs jugent qu'ils ont gagné un salaire suffisant pour la semaine ils en profitent pour prendre des journées de congé". Finally, working long hours for long stretches of time eventually brings fatigue and the possibility of mishaps increases: "Il y a plus d'accidents, plus de rejets aussi."

The very effectiveness of overtime as a means to raise earnings eventually becomes a problem thus explained by an employer: "Les employés s'habituent à recevoir un certain salaire chaque semaine, leur mode de vie s'ajuste en fonction de ce revenu accru, lorsqu'on doit diminuer le temps supplémentaire ils sont insatisfaits de leur revenu régulier." The salary

expectations having risen, employers are faced with a work force demanding a permanent readjustment in wages to maintain the standards set with overtime pay. Unionized firms were especially aware of this potential rise in expectations which sets new pay norms, and they knew very well that it would translate into increased demands at the bargaining table. The employers in larger firms seemed especially aware and weary of such a possibility. Sometimes the use of overtime and its effectiveness is restricted by the the attitudes of workers. It was mentioned that older workers are more likely to refuse overtime than younger workers. However older workers are often the most qualified and the most proficient and therefore will yield the best quality output. To insure productivity will cover the costs of overtime pay employers prefer that the best employees only do overtime. "Je préfère donner le temps supplémentaire aux employés les plus qualifiés, à ce moment ça vaut la peine, ils produisent vite et mieux."

The problem of course was that the most desired workers often won't do it. Yet, in other cases the assigning of overtime can also lead to dissension and resentment among workers. Because it is a means to increase pay, it is expected that everyone should have an oppportunity to put in some extra hours. In unionized firms, the collective agreement sometime specifies that overtime should be offered to employees according to seniority. When there is no union, the foreman decides who will

get overtime and he may be seen as favouring some employees over others in this matter.

Overtime was however an adjustment measure utilized by almost all employers, firstly to meet sudden increases in demand and then maintain output when it was difficult to hire suitable candidates. It is a flexible measure as it can be implemented rapidly. Furthermore overtime simply means a higher utilization of existing equipment and does not entail the administrative overhead costs that new hires impose. Moreover, if the plant is operating at full capacity and all equipment and machines are in use, hiring new employees necessitates either opening up an extra shift or buying new equipment. One employer who was using his work force at full capacity and could not ask more overtime of them, recruited workers from a nearby firm, where there was a no overtime policy, and employed them on a night shift at overtime wages (time and a half) rather than recruit new employees. Overtime can and was combined with all other measures, especially training. This practice of combining overtime with training is common as noted by an author who examined the relations of production in a machine shop in the United States:

> Because of relatively full employment, machine operators were not easily recruited, and management was hesitant about increasing the strength of the plant with inexperienced employees. The choice was between on the one hand, spending time and energy in training new employees, with the possibility of having to lay them off if demand declined, as seemed likely, and on the other hand, a generous allocation of overtime. Management, in fact, adopted both strategies (Burawoy 1979:125).

My evidence suggests that employers were in many cases willing to hire less qualified workers, usually less experienced ones, and spend some time upgrading them on the job. But overtime continued to be necessary as there is some time lag between the start of training and the point where trainees will reach a certain level of proficiency.

It should be clear that overtime is not a panacea. In some firms it is a normal practice expected by employees. In these firms, the possibility for additional overtime was limited. This often seemed to be the case in smaller subcontracting firms where it is difficult to predict production volume and manpower needs over the mid-term. In most firms overtime is a fundamental method for adjusting to greater demand. However if the need for increased production continues over a long period of time (more than 3 months one employer estimated), it becomes subject to constraints: rise in wage expectations which may force a permanent readjustment in wages, increased absenteeism, more wastage and fatigue, all factors that reduce productivity. It is at this point that employers will resort to other adjustment measures. For the firms in this sample overtime was the first response to a tightening labour market and could be constantly used without requiring important modifications within a plant. The constraints on its use were also different in different types of plants.

TRAINING

Training can be part of the ongoing manpower programs in a firm and be only weakly related to the conditions of the external labour market, (this would be the case in firms where there is an internal labour market). Of course in times of shortages of specific skills these programs can be extended. Training programs can also be instituted as a specific response to a short supply of certain skills. In this sample 77.9% of companies reported training activities but it became a response to scarcity of workers for only 63.2% of them (see table 7.1). This is a greater proportion than that found in the Human Resource Survey where only 43% of Quebec firms reported training (Betcherman 1982:50) Meltz found a much smaller percentage of firms training skilled workers: only 20% (1982a:83). Part of the discrepancy is related to the very definition of training. Meltz seems to have considered formal programs such as apprenticeships while for Betcherman training is "the worker's acquisition of vocational skills to directly improve future productivity" and he adopted: "a wide definition of training that encompasses informal as well as formal activity" (1982:49) When he considers establishments that instituted programs of one year or more (and these are likely to be more formal ones), the incidence of training falls to 6.7% in Quebec (:50)[2]. The respondents in this study were asked what type of training was instituted in their firms.

Their responses could be grouped as follows: formal training programs, on the job training programs and informal on the job training. In some firms two or more different types of programs may be used.

TABLE 7.4

TYPES OF TRAINING IN FIRMS.

Type of training	% of firms	no. of firms
formal training	11.3%	6
On-the-job program	45.2%	24
informal training	52.8%	28
total	109.3%[1]	

n = 58

[1] the total adds up to more than one hundred percent as some firms had more than one type of training program going on.

-Formal training programs usually combine classroom instruction and on the job training and a curriculum is established and followed. It is often designed and managed through a training division in a firm. Only 6 firms had such a program. These programs are the closest equivalent to apprenticeship training defined by Weiermair as those "yielding transferable and adaptable skills which can be utilized in different firms and/or different jobs within an organization...containing theoretical instruction...with clearly defined and uniform objectives...(and providing) a viable career alternative to young labour market entrants" (1982:557-8). There may be much variation in the amount of class instruction

involved. All the firms in this sample devoted only 25% or less of total training time to classroom type instruction. The instruction was provided either by specially hired instructors within the firm, or through arrangements with a vocational school whereby the trainees attended some classes in the school. In the case of one firm theoretical instruction was given by an engineer from the firm. In most cases tests were given to measure the level of knowledge and proficiency acquired but these tests were not uniform across firms. In class training alternated with on the job practice, sometimes directly in the plant, less often in specially equipped training locations in the firm. Furthermore these programs, except in one case, were not registered with an industrial or educational body external to the firm and as therefore they could not be considered "real" apprenticeship programs[3]. The one exception was a program to train machinists that was approved by the Ministry of Education in Quebec.

- On the job training is done according to a predetermined program of instruction but without any classroom instruction and 45.2% of the firms engaged in such training. If theoretical training was needed, the trainees were expected to acquire it through evening classes in vocational schools. Training is provided in the plant and is tied to existing jobs or positions. Trainees are assigned to supervisors to receive gradual sequenced training. Their progress is assessed by either the number of hours spent on each machine or doing certain tasks and/or the formal evaluation of the supervisor. In a few firms,

tests also measured the level of skill acquired. The length of training varied from firm to firm and it was of course dependent on the skills to be learned and the characteristics of traineees at entrance.

-Finally there is on the job, informal, sometimes almost ad hoc training. It was the most prevalent in this sample as 52.8% of the firms who claimed that they trained employees, did it this way. It appears that an employee is assigned to an experienced worker or supervisor and he learns the job as he goes along. The training sequences are not formally determined beforehand and the instruction received will tend to follow the immediate needs of production. The evaluation of the progress of a trainee is done by the supervisor and this too may be very informal. Of course there is no theoretical instruction given, the emphasis is on learning by doing and the order in which tasks or skills are taught is left up to the trainer at all times.

The kind of training program implemented is linked to the characteristics of firms. Each type of program provided skills in different ways and often different skills. Factors motivating the choice of training as a response measure also varied among firms. The following pages examine these issues and describe how these various kinds of programs were implemented in firms.

The more elaborate programs of the first type were implemented in firms where a large number of machinists were required and where resources, financial as well as technical, were plentiful. The six firms that undertook this kind of program were all large firms (over 200 employees) and can be considered leaders in their fields. Four of these firms were in the field of aeronautics and had faced high levels of demand in the mid 1970's and increased need for machinists. They had (except one) received government subsidies for training. Their training programs were approved by the funding government department, the Employment and Immigration Commission but as noted previously these programs were not part of a network of apprenticeship programs such as Red Seal which exists in the rest of Canada. In one case as noted before the program was approved by the provincial Ministry of Education. However their objective was to provide workers with a comprehensive occupationally related package of skills.

Formal training programs in these firms were a definite response to shortages of both machinists and tool and die makers, as all these programs were geared to producing machinists that could eventually be upgraded to higher classifications, including tool and die making. However the first objective was to produce machinists. These programs were implemented following unsuccessful attempts to obtain suitable workers in the external labour market and when other responses such as subcontracting proved insufficient. It was especially an alternative to seeking skilled

workers abroad. As discussed earlier, changed immigration regulations made overseas recruiting very difficult. The Canadian government made it very clear that they wished employers to engage in more training of Canadian workers rather than obtaining them from other countries. One employer explained: "Au début des années 70 nous avions recruté 8 à 10 machinistes en Angleterre, puis c'est devenu trop coûteux et difficille, à la fin de 1978 nous avons décidé que nous devions former nous-même".

The costs associated with this type of training are very important: instructors, classrooms, materials are needed. Government subsidies were certainly of help although some employers insisted that they would have done it anyway: "Les subventions ça aide toujours dans le court terme, mais je pense qu'on le paie en impôts plus tard, je crois que nous aurions formé quand même, peut-être d'une manière moins approfondie"[4]. It must be remembered that larger firms benefited from economies of scale since a sufficiently large number of trainees were hired and the programs were intended to be on-going for a few years. In most of those firms training on this large scale started after 1978, that is once the scarcity of machinists was well established. The advent of training programs allowed firms to recruit workers from new sources: these six firms hired graduates from Cegep's and secondary school vocational programs. In general, firms obtained full cooperation from the schools and Cegeps involved. In two cases a school modified its curriculum to align it more closely to the specific needs of the firm, in return

many of its graduates were guaranteed a place in the company's training program.

All the respondents expressed satisfaction with the programs, as they provided workers who became productive rapidly. The personnel manager in a large firm admitted that he was pleasantly surprised : "Les jeunes que nous avons pris du Cegep ont appris rapidement, et aussi mieux que les personnes qui n'avaient aucune base; ça été une bonne expérience". Drop outs were not a problem in any of the firms and they did not lose an excessive number of trainees to "raiding" from other companies. The personnel director in one firm noted that "C'est normal de perdre 10% de nos apprentis, parce que certains s'aperçoivent qu'ils n'aiment pas ce genre de travail, mais il n'y a pas eu de problèmes de "vol" par d'autres compagnies à ce que je sache".

The trainees formed a cohort separated to some extent from other workers and there were only minor disruptions to production. Sometimes a new job classification was added that of trainee, this in accordance with provisions in collective agreements already in existence or following agreements worked out at the time of the program. However the recession of 1981-1982 brought an end to these training programs as the trainees were laid off. In one case some efforts were made to protect this category of workers and some agreement had been worked out with the union. However, as the recesssion deepened and lay-offs became more widespread and lengthier they had to let them go. At

the time of the interviews, in 1984 no formal training was ongoing in any of the firms.

The second category of program: on the job training, emphasized hands-on learning. Trainees would have obtained the basic skills (in maths for example) in formal school programs or were encouraged to enroll in evening classes[5]. However the progression and sequencing of tasks to be learned was worked out before training started, and control measures were used. Two general models can be found when examining on the job training programs.

In the first instance, such training was firmly established. In general this was in unionized firms, and/or where firm specific skills were required. A manager explained: "Il nous faut toujours former parce que nos équipements sont vieux et différents", or again: "Nos machines sont spéciales et il faut toujours former nos travailleurs", "La production est très spécialisée ici, nous n'avons pas le choix, il faut former". In another case it was the scale of the machinery used that made training necessary: "Un machiniste conventionnel connaît les machines dans la plupart des compagnies, mais ici c'est une autre histoire, quand nous avons fait les turbines pour un barrage géant aux Etats-Unis, nous avons utilisé des tours énormes, et avec des aciers diffférents de ce qu'on rencontre habituellement. Il n'y avait pas de machinistes qui avaient travaillés dans ces conditions. Il fallait former".

Where union rules governed promotion, training was more likely to be provided in a fairly systematic way and according to certain rules: training opportunities were posted, so many hours of on the job training and the satisfactory evaluation of performance from the foreman or supervisor marked each step. This could lead to a new classification and a higher grade in pay. But the opportunities for promotion to supervisory type jobs were few it seems. The personnel manager of a large national firm noted that they always systematically trained new people. However when I asked how long it could be for a "typical" worker to become a supervisor, the answer was: "C'est long, peut-être 12 à 15 ans". To go from one category to another within the same classification was fairly rapid: "Pour passer de la catégorie de base à la plus haute ça peut prendre 4 à 5 ans". The training thus provided allowed employees to move within a given job category, but did not however insure passage from one category to another: for example training for machine operators and specialized machinists could lead to higher classification within that cluster of jobs but not to the category of all around machinist or toolmaker. This pattern is similar to the mobility clusters described by Doeringer and Piore as "the groupings of jobs within which an employee is upgraded, downgraded, transferred and laid off" (:1971:50).

These groupings in many firms are clearly established in the collective agreement. One employer explained: "Les machinistes sur tour peuvent "bumper" les ajusteurs au banc, les coupeurs

et les finisseurs. Mais ils ne peuvent pas "bumper" dans la salle d'outillage. Le recrutement et la formation se font en fonction de ces règles, il faut vivre avec ça".

However, faced with shortages in the machinist and toolmaker categories, some firms would step up training programs, extend them and sometimes create new ports of entry to these jobs from the lower category. In one medium sized firm the personnel director explained: "Nous avons réévalués les emplois d'outilleurs et créé de nouvelles classes, la filière est devenu plus longue, nous pouvons à partir des machinistes former des outilleurs". Even if entry in new occupations was not available, many companies stepped up training to upgrade the skills of workers already in the plant and reduced hiring standards whereby workers with less experience or less formal training were hired in entry jobs and upgraded more rapidly than usual.

In the second instance, it appears that shortages and government grants probably had some effect on the incidence of systematic on-the-job training. A training program had to be submitted to the government department for appraisal before a grant would be allowed. This led some firms to systematize informal training and elaborate programs for the first time. Therefore both the difficulty in recruiting trained experienced workers and the incentive provided by government subsidies encouraged employers to set up more formal on the job training programs. It is impossible to state with any certainty which of the scarcities or the subsidies was the greater incentive.

Evidence on this is mixed; some employers stated that without government help they would not have trained. Rather said one: "J'aurais essayé de recruter chez mes compétiteurs, et il y aurait eu plus de temps supplémentaire". Others claimed they would have trained less: "Bien sûr si le gouvernement paie une partie des salaires, on prend plus de monde, ça coûte moins cher et si on en perd un ou deux c'est moins grave". This would indicate that maybe some "hoarding" of labour was made possible by training subsidies, or some firms kept on workers whose employment was due only to these subsidies and was terminated when the grants came to an end.

The cost of training may have been reduced by grants and subsidies but employers were aware that training required increased supervision time, caused delays in production, and wastage of material. Because on the job training is conducted in the plant, and not in separate locations as is the case in some formal training programs, these factors were important. These costs were especially burdensome for a small firm or one that operated with little manpower "slack"[6]. Moreover, employers preparing training sequences for the first time often found it a tedious exercise that in a small firm could not be delegated. Training with the help of subsidies also increased the paperwork load as reports had to be given periodically. The time spent on these tasks was too costly according to one respondent. "Il y avait trop de paperasse, j'ai perdu trop de temps, je ne crois pas que ça ait valu la peine". Some resented

the interference of government in their practices: "De tels programmes nous soumettent à trop de contrôle de la part du gouvernement". Another employer assessed the programs thus: "En fin de compte nous rendons les subventions en impôts, le temps perdu à rencontrer les agents du gouvernement et à remplir des rapports est difficille à évaluer, mais c'est certainement coûteux. Les subventions pour former des travailleurs, c'est bon pour les compagnies qui doivent en embaucher un grand nombre ou pour des compagnies moins profitables, c,a leur donne des travailleurs pas chers." Yet some companies were pleased with the results, it made some training possible and helped solve staffing problems.

One alternative to extensive on the job training could have been job redesign (Oatey 1970:8). However, managers in this sample introduced job redesign as a corollary to training, not as an alternative. This issue will be discussed further on. It is clear that systematic on-the-job training was increased as an adjustment measure to scarcities of workers. The extent of training undertaken above usual levels is however due in part to training grants available from governments. On-the-job training was particularly effective to upgrade operators and to provide machinists with specialized skills (the machinists who learn how to work on one machine). The provision of training allowed firms to reduce hiring standards and draw workers from a wider pool of candidates. It was especially effective in establishments where qualified experienced foremen could supervise

supervise the training closely. The vice-president of a large firm commented: "La formation de machinistes tourneurs, fraiseurs a été possible et valable parce que dans ce service la qualité de la supervision et de l'encadrement étaient très élevés".

The third form of training is informal, no training program is elaborated in a systematic way. It is learning by doing. A worker will be assigned to work alongside a supervisor or another workerfor a period of time that can vary widely depending on the skills to be learned, and the practice in firms. It is this "trainer" that determines what the new recruit will learn and how. There is no theoretical component included as would be in formal training programs and no clearly marked out sequences in the learning process as is the case in systematic on the job training programs. Tests or other control measures are not used to monitor progress. This is evaluated by the supervisor. The majority of firms in this sample, 52.8%, reported that this is the kind of training that went on in their firms. The training thus provided was determined by the immediate production needs of the firm. This may lead one to assume that informal training could only provide certain types of skills: namely the kind related to adaptation to the environment, work procedures, and basic knowledge of equipment. It could include specific skills such as mastering a series of tasks to operate or tend a machine. The acquisition of a trade, such as machinist, through informal training may be more problematic. The authors of a British study found very little mobility from semi-skilled to

skilled occupations through informal training even in tight labour markets. The reason given for this by Mackay et al, is that while it is fairly easy to upgrade unskilled workers to semi-skilled jobs through informal training, it is not "adequate to bridge the gap between skilled and other employments" (1971:285-6).

Most firms engaging in informal training in this sample sought to provide their employees with very specific skills: "Ils doivent apprendre à opérer une machine, rien de compliqué, les set-up sont faits par les plus qualifiés". Informal training was a means to upgrade workers rapidly; they were expected to take on more tasks and not necessarily learn a new trade. They provided training in order that workers would become more versatile. Yet in some cases employers in this sample claimed that they were training machinists and in one case a tool and die maker. The training methods used were informal: the worker was expected to pick up information on a day to day basis, when a new contract brought the opportunity to gain new knowledge or practice the worker would be exposed to it. The results are difficult to assess. However some employers interviewed noted that workers who had learned the trade of machinist in small shops (where usually the training was informal) were often very good as they had acquired a wider range of skills since tasks were not broken down as much as in large firms. Also because production was more varied employees could broaden their experience by doing various tasks and solving different problems.

Furthermore barriers between jobs in smaller, non unionized, plants were not as clear cut as they would have been in a unionized environment where strict rules governed the content of each job, and this contributed to gaining a variety of skills. In one very small firm (12 employees) the owners were both tool and die makers of European origin, and they were actively involved in all phases of production. They demanded of all employees a great degree of flexibility with respect to task allocation. "There are no big titles here, everybody pitches in, when there is less work they do maintenance or repairs such as painting the shop. But they learn to work on all the machines here: after 5 years they could get a job anywhere". I specificallly asked what could they do with someone who did not know how to read blueprints or do math. The owner answered that he would show him, "After all the math are not that complicated, it's often the same kind of thing, we don't need mathematicians here, and if you take the time to explain, anyone can learn to read blueprints". The diversity of equipment in that small company was rather amazing, from conventional machine tools, to semi-automated ones, numerically controlled equipment and, finally, a new computer driven machine. The informal training received in such an environment could presumably lead to the acquisition of extensive skills. This was a fairly special kind of operation, but this kind of attitude towards training was found in other small firms. However the type and extent of training received in an informal setting was directly dependent on the

kind of production done at the time, the qualifications of the owner-manager, and his perceived needs for the future.

The incidence of informal training is much greater in smaller companies, it is about the only kind available in the very small firms of less than 20 employees. The high incidence of informal training was related to shortages of workers but it also reflected the special problems of small firms. Owners of small shops who could not offer competitive wages for machinists and machine operators had to hire people with less experience and formal training and upgrade their skills. In periods of scarcity, the need to train became even greater, for subcontractors especially, as their manpower needs are tied to contracts obtained. These are granted by large firms once their planning is done and they have done much of their own recruiting. This means, of course, that by the time smaller subcontractors go on the market to recruit skilled workers, there is likely to be less choice. Thus the necessity to hire what you can get and train.

Informal training can be regulated easily in a firm. It can be readily scaled down or stepped up. Little in the way of formal agreement is required between workers and management, since promotions and wage increases are not necessarily tied to it. These features make it an attractive response for management. But, at the same time, it may increase the likelihood of a turnover problem. In a tight labour market, even partially trained employees will sometime leave to work for a

competitor able to offer a slightly higher wage. Some smaller firms did complain of such a problem and the president of a very large corporation felt that "Smaller firms often do the training, or some training and the larger firms eventually get these workers". Unionized firms saw their training investment better protected as seniority in these firms meant advantages for workers in terms of money, promotion, and especially job security and other benefits such as vacations which inhibit mobility.

Training appears to have been in many firms a direct response to shortages of skilled workers but the type of training engaged in and the type of skills an employee would gain were dependent on the resources of firms, the type of production and the organization of work within the firm. Formal training prgrams including in-class intruction complemented by systematic practice was used to increase the supply of qualified machinists. These training programs provided generic, transferable skills. Large firms, requiring large numbers of skilled workers, and disposing of greater resources implemented these programs. But there were few of them. On the job systematic training was a feature in many firms as a means to upgrade workers and ensure a supply of specialized machinists. The training was stepped up in response to shortages. Other firms turned to this type of training in times of shortages, to be able to take advantage of training subsidies. Specialized machinists and machine operators could be obtained this

way. Informal training, done in a less systematic way, without clear instructional objectives, was widely used to train inexperienced workers in less skilled jobs. It was also a convenient way to upgrade workers already in the firm and occasionally it was a means to train machinists, but this occurred in smaller firms.

It is sometimes argued that training efforts are thwarted by unreasonable union demands about journeymen/apprentice ratios and by the reluctance of unions to allow much training for fear of producing an oversupply of workers which would undercut wages and threaten jobs. This study uncovered no evidence of this kind of attitudes, but as noted previously the union consistently supported training efforts in firms. The unions were sometimes involved in some aspects of training, their concern being directed to how the training opportunities were distributed in the firm and how tests to measure skills were applied. In most cases, the union was not involved in discussions concerning the content of training.

Firms that did not train indicated that they did not have the resources: "On n'est pas assez grand pour faire l'école". Costs and the non availability of instructors were cited most often as a deterrent to training. Two managers mentioned that training programs were difficult to implement in their plants because the older workers resented spending time training younger workers. Older workers did not fear eventually losing their jobs to those they trained but, rather, they were concerned

that the existence of more trained workers would reduce the amount of overtime available to them. Other firms did not train because they had been able to recruit workers in the external labour market. This was possible because either the skills required were not extensive or because they relied on very specific and selective recruiting techniques. One employer cited his knowledge of networks of immigrant skilled machinists as a means to obtain workers (at a higher wage rate). Another employer took much care in the selection and then rewarding of employees: "I do not have many workers, but I make sure that they will fit in, that they will be productive and I pay them well and offer very good conditions, so I do not lose my machinists". Some of the conditions offered included 5 weeks of paid vacation after 5 years, which is extremely generous and unusual in Montreal. His production was also very stable, his markets secure with little fluctuation in demand.

REDUCING HIRING STANDARDS

Doeringer and Piore distinguish between hiring standards on the one hand, which refer to job related attributes, and selection criteria on the other, which are measures or indicators of the presence of such job related attributes (1971:102-104). Hiring standards would in the case of a machinist for instance specify that the incumbent be able to read blueprints, do the set ups on various machines, be able to work

at a certain tolerance level and so on. Selection criteria are screening procedures, they are the predictors of success in a job. They may include educational requirements, years of experience or they could be tests. I found that standards were poorly defined in most cases. When employers were asked what the job of machinist in their firms entailed, the answer often offered a list of attributes some of which were attitudinal or behavioural as was seen previously or a description of how one could identify a machinist: that is through screening procedures. Generally employers relied more on selection criteria as predictors of future performance and as proxies to assess the level of skill. Experience in the occupation and vocational training courses were the indicators most used. While there were variations, in general the ideal candidate for a tool and die job would have 8 to 10 years of experience, and have completed a vocational training program, either in Cegep or more often in the secondary school system. Five years would be required of a machinist and for an all around qualified machinist some vocational training was preferred. Operators needed 2 or 3 years but in this category the experience criterion was subject to much more variation. This is related no doubt to the rather broad definition of operator. Employers could also ask for past experience within the same industry as evidence of qualification. This was important for 22 firms in the sample.

It would be expected that in a tight labour market these criteria would be relaxed and, in fact, they were. However, any reduction in hiring requirements was accompanied by other measures, usually training and overtime. Where training programs were instituted on a large scale the entrance requirements were redefined in favour of school certificates and the recruiting of trainees was done in educational institutions. In other instances, the inability to recruit workers with the desired experience or formal school training led to a reduction in hiring requirements and then increased training or supervision. "On n'avait pas le choix en 1977-1978, on ne pouvait plus en trouver des machinistes avec 5 ans d'expérience; alors on a pris ce qu'on trouvait de mieux et on leur donnait ce qui leur manquait ici sur place". If little time could be given to training, reduced hiring standards were implemented grudgingly as other costs were associated with these practices. "On a réduit nos critères en prenant des gens ayant moins d'expérience, mais nous avons dû augmenter le temps supplémentaire parce que souvent les nouveaux ne travaillaient pas aussi vite, ni aussi bien." Reducing hiring standards could also be a way of bypassing wage increases: "Dans ces années là, c'est devenu trop cher que d'embaucher des gens d'expérience alors on a diminué nos exigences, on a pris ceux que nous pouvions payer". Reducing hiring standards necessitates in some cases some job redesign: "Dans l'usine on a utilisé plus de set-up men pour la production parce que les plus nouveaux ne pouvaient pas le faire, dans l'atelier

d'outillage on a remanié les taches, on les a simplifiés parce qu'il était impossible de trouver des outilleurs vraiment qualifiés."

Short supply did bring about modifications in selection criteria and lowered entrance requirements. Whereas industry specific experience was preferred, this requirement was soon abandoned as any kind of experience in machining was accepted. "Nous préférons des gens qui viennent de l'aéronautique, mais quand il n'y en avait pas sur le marché j'ai pris des gens qui venaient des compagnies de transport, ils semblent avoir une bonne expérience". However the reduction of hiring standards had always to be accompanied by some other method to reduce its negative effects.

Firms unwilling to reduce standards, relied on overtime work and tried recruiting workers away from other firms. If very few skilled machinists were required and if there were some employees already well qualified some job modification might render reduction of standards unnecessary. For one employer the objection to reducing hiring standards was related to the job classification arrangements in his firm. He worried that reduction in entry standards would bring about demands from present employees for higher classifications and hence higher wages.

SUBCONTRACTING

A shortage of skilled workers could be countered by contracting out some of the work to be done. Thomas and Deaton found that almost all the engineering firms they studied had used subcontracting as a short-run adjustment to shortages of draughtsmen (1977:160). Sabel suggests that subcontracting is one of the employers' answers to the constraints on organization of production brought by trade unions seeking to restrict employers' freedom to set salaries, deploy their work force and bring in new equipment (:1982:45). Piore also noted that in the United States after World War Two, management faced with union rules they had agreed to during the war resorted to subcontracting as "an effort to avoid permanent hiring in tight labor markets where the seniority system would freeze into the employment structure substandard employees" (:1980:47). The rigidities in internal labour markets which have "transformed labor from a fully variable factor, which can be laid off and hired at will in response to economic fluctuations, to a quasi fixed factor" (Osterman 1984:4), would encourage employers to use subcontracting. This kind of practice is according to Osterman "essentially a strategy that moves the work outside the firm's internal market" (:4) Similarly Piore suggests that there is some evidence that subcontracting was one of the ways employers in France attempted to restore some flexibility to management practices after the reforms following the May 1968 events. The

unstable component of demand was shifted to subcontractors. Of course jobs in the subcontracting firms would be less stable. According to Piore subcontracting became one of the factors that would contribute to the rise of dualism in the labour markets.

In this sample of firms I found that subcontracting was used as a means to meet shortages of skilled workers but for most firms this was not the principal motivation for subcontracting. A large proportion of firms (58.8%) subcontracted some of their production. Forty-three percent (see table 7.1) had used subcontracting at least partially as a means to resolve shortages.

But the main reasons for subcontracting were often unrelated to shortages of skilled workers; rather production considerations and costs were the factors underlying this practice. Where a strategy of greater product standardization and increased automation was adopted, there was a parallel decision to subcontract those tasks that would slow down production or require the skills of very few but highly qualified people; for example jobs where many set ups were necessary or in the case of one of a kind production. These would have slowed down production. Furthermore, as such jobs became more incidental the costs of keeping on highly skilled and well paid employees were too high. "C'est devenu plus simple de faire faire l'outillage à l'extérieur dans de petites compagnies plus spécialisées, la production ici avait trop diminuée, c'était moins régulier, on

ne pouvait pas garder des outilleurs tout le temps". The per unit cost of their work was too expensive and the work was done more cheaply by subcontractors. This seems to have been particularly the case for tool and die making jobs. Some tooling sections were phased out: "Nous avons un outilleur ici, qui est très qualifié, il est plutôt agé et il ne veut plus faire de temps supplémentaire, lorsqu'il quittera, nous ne prévoyons pas le remplaçer, ça ira en sous-contrat". The production manager of a firm where the production had been increasingly automated and whose markets were larger firms producing defense related equipment, promptly fired all the toolmakers and machinists in the tool room when they attempted to form a union. All that work was farmed out: "It costs less, it's less trouble, and I won't have to go recruiting new people in a few years, people who are sometimes difficult to get."

In other firms, the larger ones, subcontracting some work was routinely done. There appeared to be a tendency for specialized, one of a type, jobs to be sent out and this may mean that craft-type jobs would be increasingly found in small jobshop firms that are mostly subcontractors. It could also explain the need often expressed by employers in the small firms, for all around, skilled machinists and tool and die makers. A production manager, himself an ex-machinist felt that there was a growing trend developing whereby the most skilled jobs would be found in small shops. He also commented that this would mean relatively lower wages for highly skilled machinists and tool

and die makers. In a unionized firm lower costs justified subcontracting: union rates were high and the employer felt that productivity was not what it should have been because of union rules: "we can't push them". Subcontracting provided an answer and it also reduced overhead costs. One would expect that unions would object to a large volume of production being subcontracted. In the case of draughtsmen studied by Thomas and Deaton in the London area, subcontracts had to be approved by the union (1977:162). Respondents in this sample indicated that the amount of subcontracting and the type of work that was to be sent out was sometimes limited by provisions in the collective agreement. But in the period studied none of the firms had encountered opposition from the unions to subcontracting. This may be because either the work subcontracted was different from that done in the firm, or it was done only in times of increased demand when the firm operated at near capacity and there was no threat to existing jobs.

Larger companies subcontract some of their work on a regular basis, managers feel that it allows them to meet peak periods in production without hiring new people, but also in a downturn the work is brought back in, preventing lay offs. One personnel director specifically mentioned that this also allowed you to keep on your most qualified people during a downturn. An engineer in a large firm noted that it also allowed the firm to keep on supervisory and management personnel. As demand diminishes and production falls off, production workers would be normally laid

off. If the cutbacks were severe, it can become difficult to justify the jobs of managers. By bringing back into the firm the work that was usually sent out, a firm could protect the jobs of production workers and production supervisors and managers.

Subcontracting was also an adjustment measure to shortages of skilled workers or sometimes an alternative to paying the high wages they commanded. Some firms subcontracted work for the first time because there was an increase in demand and a shortage of workers. Other firms already farming out some of their work increased the volume of production subcontracted. A firm operating at full capacity would otherwise have to buy new equipment as well as hire new employees. Subcontracting is especially useful if there is a temporary increase in demand and overtime becomes insufficient to meet production targets, but a tendency could be noted towards more subcontracting as a routine practice.

There are some constraints to subcontracting as pointed out by a manager: control over production is weaker and there is a need for quality control when the jobs or products are received. Yet in a French study on the division of labour between firms, the author notes:

> La firme donneuse d'ordre n'assure pas le contrôle direct du travail mais détermine plus ou moins étroitement le procès de travail: fourniture des machines, définition des méthodes, assistance technique, contrôle de qualité (Freyssinet 1982:134).

Some subcontractors in this sample had had to obtain specific equipment according to the specifications of the contract. This is how at least five firms acquired their first numerical control machines. It was mentioned that contracts will sometime specify that, to insure uniformity and precision, workers must not use their own tools. Apparently, defence related contracts especially, included very precise specifications for subcontractors.

For some firms subcontracting is not a suitable measure to resolve labour shortages. Companies who are themselves subcontractors cannot use this measure to meet peaks mostly because they cannot afford it and "Si nous n'avons pas assez de travailleurs, si la pénurie est sérieuse, personne n'en a." Increasing the amount of subcontracting was a measure available to employers to alleviate shortages of skilled workers. However the trend towards more subcontracting was not a direct response to shortages of labour but rather reflected management strategies to stabilize production and manning levels.

RAIDING

It could be expected that a labour shortage would bring about an increase in raiding. Firms unable to recruit workers in the labour market would try to "steal" workers from neighbouring firms. A member of the Parliamentary Task Force on Employment Opportunities for the '80's claimed that "one particularly acute problem in Canada was pirating journeymen"

(Canada 1981:81). This argument is also invoked to explain the reluctance to train workers (Canada 1981:5).

Respondents in this sample were first asked if there was much raiding and then whether they had to do it. Almost 27% of the firms acknowleged the practice. Generally, smaller firms complained of it and it is also smaller firms that admitted poaching. The problem seemed to be more acute for subcontractors in aeronautics. This is understandable since firms in the first and second tiers in that industry had probably started recruiting and hiring before the subcontracts were awarded leaving a depleted market for these smaller firms. "En 1976, 1977, 1978 c'était effrayant, il y avait une surenchère constante, les hommes changeaient de boite pour .25 ou .50 cents de l'heure de plus". Another employer stated that he had little choice: "Je venais d'obtenir un contrat de un demi million de dollars, surtout de l'outillage et je devais sortir cette production en cinq mois, j'avais deux outilleurs, c'était nettement insuffisant. J'ai été en chercher chez les autres et j'ai dû les payer plus cher, beaucoup plus cher, quand le contrat a été terminé, je les ai mis à pied, à ces prix-là, je ne pouvais pas les garder".

Firms relying on subcontracts cannot plan manpower needs over the mid or long-term. They will maintain a core of workers, as small as possible to avoid heavy overhead costs.
A major contract forces them to find workers rapidly when they also have little time for training. It is not surprising that in a context of heavy demand and scarcity of workers they would

turn to raiding and the concommitant wage raises as an effective temporary adjustment measure.

The informal networks among skilled workers in the machining trades could then be put to very efficient use. One respondent claimed: "J'arrive toujours à recruter les outilleurs et les machinistes dont j'ai besoin, je les connais, je sais où ils sont mais il faut les payer". His plant never faced a serious shortage of skilled workers... Larger firms, especially the most important in the field acknowledge that there was some pirating and mostly accepted it as inevitable: "Dans un marché serré, nous perdons quelques employés parce qu'on leur offre de meilleurs salaires ailleurs, durant les pires années c'était un peu moins du tiers, mais c'est normal; de toute manière les plus vieux restent, s'ils partent ils perdent les avantages de la sénioritè". The protection seniority gives in unionized environments therefore offers protection, to some extent, from pirating.

In principle, employers could enter in a non raiding agreement to prevent a spiral of overbidding for skilled workers that would drive wages up as well as increase recruiting costs. Such semi formal agreements were present in the Trenton, New Jersey area in the early 1950's; a sort of code of ethics prevailed among firms and was usually adhered to (Lester 1954:62-5). However Thomas and Deaton found that the contrary was more likely: "From our survey it appeared that breaking or rescinding a non-poaching agreement was a more common reaction

to a labour shortage than the creation of a new one" (1977:85). This was not quite the way things happened in Montreal. Firms in the aeronautics sector formed the Center for Aerospace Manpower Activities in Quebec (CAMAQ) in June 1978. The mandate of the organization was to implement manpower planning at the industry level and one of the objectives was to counteract widespread raiding. But the larger, more established firms were better able to come to some agreement than smaller firms in fierce competition with each other. There are other examples of employers getting together to discuss and harmonize their manpower strategies as will be discussed in the section on wage increases. Respondents from firms that were mostly repair companies commented also that there was little raiding or poaching from other firms as one employer explained: "There are no new arrivals in this business, the companies have been here a long time, we all know each other and have our own share of business, raiding other firms for employees would not do". It appears that industrial stability would reduce raiding, in more mature industries market segments are fairly well established, competition among firms is less fierce and recruiting needs and patterns are known. If the environment of these firms is fairly stable, and it is probably so for repair firms, recruiting practices reflect the stabilized manpower needs. These were the firms that also had developed good working relationships with agencies such as the Canada Employment Center. Newer firms, in

a competitive environment would need to be more aggressive in their tactics to obtain skilled workers.

Raiding was an effective response to shortages mostly for firms that needed only a few skilled workers. If large numbers of workers were required it could not become the main recruiting source. Effective raiding requires that a firm offer a higher wage to lure employees away from another firm. If a collective agreement is in place, wages cannot be modified very easily for new entrants only; in addition, seniority rules must be followed for the allocation of jobs. This could also explain why raiding was more likely by smaller non union companies. Larger firms that did offer better wages and conditions could certainly obtain workers from smaller firms in times of high demand but the respondents in these firms noted that they did not aggressively seek them. A personnel agent in one very large firm felt that :"Il y a des travailleurs qui déménagent souvent pour des petites augmentations de salaire, mais ce sont les plus jeunes, les moins expérimentés, souvent les moins qualifiés; les plus vieux machinistes et outilleurs dans la région de Montréal savent très bien, que nous offrons de meilleurs salaires, mais l'emploi ici est moins stable, les cycles sont de quatre ans environ, nous embauchons beaucoup, mais quand les contrats diminuent, nous avons des mises à pied massives. Les plus vieux ne sont pas intéressés, ils restent où ils sont". This firm had seen its labour force cut by fully half in the last year, going from almost six thousand employees to barely three thousand. On the

whole, raiding is an alternative adopted once overtime proves insufficient, if training is ruled out, and other recruiting channels do not yield suitable candidates.

MODIFICATION OF WORK ORGANIZATION

Employers encountering difficulties in recruiting people with the requisite set of skills to be matched to a job or an occupation could modify the organization of production so that either some of the hard to find skills would be integrated in the process of production or the machine, or the jobs could be redesigned so that the task content could be more closely aligned to the skills available. In the first instance, employers would introduce new automated equipment and I discuss this under the section about capital substitution. It is the second instance I discuss here. Employers could redesign jobs, simplifying them through greater specialization or fragmentation: or they could extend the content of some jobs requiring the incumbents to take on additional tasks.

Both types of measures were taken, the choice being directed by constraints present in the firm such as union rules, availability of skills, and type of production. On the whole, I found that modifications were minor and were the by product of other measures such as reduced hiring requirements and training. If the production runs were long enough (in medium or large batch firms) and the production standardized,

firms having hired less skilled workers would leave set ups to more skilled and experienced employees, leaving the operator to feed and monitor the machine. In one firm, for example, machinists had previously been responsible for verifying the quality of their own output: as less knowledgeable machinists were hired the quality control component of the job was transferred to a machinist whose prime responsability it became. New, less experienced or skilled employees were given narrowly specialized tasks to speed up their training time.

These kinds of arrangements were easily implemented where there was no strict union regulation of job content and where production was quite standardized. Such task specialization was also possible in one-off shops or units too but it became more costly. For example a company unable to recruit highly qualified tool and die makers for the tool room had broken down jobs into easier, more manageable components and assigned them to machinists. The task content of each job was less than that of a fully qualified tool and die maker, could be learned more easily, and required less overall knowledge. The sequencing of a job would then also have to be modified, and of course costs increased: "Nous avons seize personnes dans la salle d'outillage, dont un seul outilleur; les autres sont des machinistes qui ne font qu'une partie du travail. Si nous avions pû trouver des outilleurs, il y aurait dix personnes tout au plus".

In other firms the trend was reversed, faced with recruiting difficulties, the employer had reduced the entry requirements and inexperienced high school graduates were hired. To keep up production machinists from the maintenance section were pressed into service in the plant in addition to their other duties. The union opposed this scheme and it was not put into effect as rapidly as the employer had hoped. In other cases the training of new hires was designed to increase job flexibility by giving them a wider range of skills and eventually of tasks. Again, these measures were the subject of intense labour management negotiations. The decision to broaden classifications made increased training necessary. In one firm that took this route, the changes were extensive, they were long to implement: the personnel director emphasized that it involved the engineering department, the production department and the labour relations and personnel departments. "It was a major reorganization, the decision had to be approved by head office in Toronto and it took over a year to get going, and it was quite a job to persuade the union that it had to be done". This firm however was faced with shortages in certain occupations as well as a dwindling market for its products, so shortages were not the only factor that motivated these changes, rationalization of production necessary in order to survive was the main reason for such a program. While job flexibility could be construed as a means to alleviate eventual scarcities it was also a way, as another employer noted, to simplify classifications, reduce the problems

brought on by "bumping" during lay offs and eventually reduce costs.

In non union environments management had and took advantage of the freedom to simplify jobs, assign new duties and eventually in some cases introduce greater flexibility. But in smaller shops it was done on a routine basis as they preferred multi-skilled workers who could be placed wherever the most pressing job was and could solve problems alone. However, it must be stressed that job redesign (except in the one case described above) was not all that extensive and in many cases it was a temporary measure until new employees in training could produce according to norms.

CAPITAL SUBSTITUTION

In a previous chapter (5) I discussed the possible effects of automated equipment, mostly numerically controlled machine tools, on the shortages of machinists in the firms surveyed. No significant statistical relationship between the presence of shortages and the utilization of numerically controlled equipment was found. Yet research in the application of computer based or numerically controlled machine tools tells us that it came about for the purpose of "replacing skilled machinists by skilled machines" therefore reducing the power of strong craft unions and strengthening management control of the shop floor (Shaiken 1979, Noble 1984). This kind of strategy would be even more

attractive in times of scarcity of skilled workers and Noble gives many examples of manufacturers of N/C machines pointing out this advantage when advertising their product (Noble 1984:335-6). But despite the promises, Noble notes that "there is no real evidence that a perceived skilled labor shortage is actually an important motivation behind the drive to automate" (:337).

During the period under study, 1974 to 1980, 37 firms, or slightly more than one half of the sample, had acquired automated or semi-automated machining equipment. However, respondents insisted that the decision to buy the equipment was not motivated by shortages or recruiting difficulties, although 18% of the firms felt that the introduction of these equipment had had or would likely have some impact on the number of machinists they employed and the level of skills required. Yet employers were unwilling or unable to comment with any precision on the impact of this equipment on manning levels.

"On a acheté de l'équipment pour permettre plus de précision, moins d'ajustement et une plus grande qualité mais pas pour solutionner des problèmes de main-d'oeuvre". The majority of managers offered similar comments. One firm had bought N/C machines because their use in the production of certain parts was a mandatory pre-requisite to obtain a subcontract from an aircraft manufacturer. In another a larger contract led the firm to buy automated equipment. "En 1978, nous avons eu un contrat pour 800 pièces semblables, donc du travail répétitif,

le controle numérique était alors un bon choix, le contrat et les subventions du gouvernement pour former les travailleurs sur ces machines ont permis de payer les machines, heureusement car elles n'ont pas été utilisées depuis". Shortages of skilled workers was clearly not a factor here.

The decision to increase automation in a plant often follows the development of an expansion strategy either towards new markets where product specialization will permit a niche or towards increased penetration of an existing market through increases in sales volume. Investment in N/C and computer driven machine tools is also justified by the greater quality of production it allows. Reduction in skilled workers is an outcome of automation (and not an unwelcomed one to be sure), but it is not the prime factor when considering such capital investments. However, it was admitted that as well as allowing more precision and speed N/C would eventually bring about a reduction in the number of all around machinists or at least increase the proportion of operators. One production manager estimated that where you needed 10 workers, with N/C you would be able to get the same production using only 2 workers: "si vous faites de la production en série". It would also make quality control easier and require less supervision, "after the part has been mounted and the machine set up, the first few parts are checked then the operator just monitors the machine." Management gains better control: "You know exactly how many parts can be machined in a given period of time". He added that operators could be trained

within six months, that is if they were expected to make minor adjustments, but needed no special conceptual knowledge. In a company that was an important subcontractor to a large aircraft firm, numerically controlled machines had been installed to respond to the stringent requirements of the aircraft industry. The machinists that were assigned to these machines were the higher skilled ones, the classification assigned to NC machinists was the highest in the plant. The reason this was done, according to the foreman, was that they expected the machinists to be able to modify a program if necessary. This required he felt a sound knowledge of machining principles.

Numerically controlled machines, at least when they were first installed, did not bring about a reduction in the numbers of skilled machinists needed, but might have forestalled the need to hire additional ones in the future as the production was greater, faster and of better quality with the same numbers of machinists. In this firm, the decision to introduce this equipment was not due to shortages, and management was not sure yet if it would help alleviate future shortages. In another firm where there was a constant rise in the number of subcontracts from aircraft firms, and a movement towards increasing specialization in its production, the introduction of numerically controlled machines was seen as a major factor in reducing the number of skilled workers they required. The production manager specified that this was so because all the programming was done by a newly hired programmer and that the input from

machinists would be progressively diminished. This was a way to: "become less dependent on skilled workers, be able to hire less qualified and cheaper workers, but this is not done all at once, it will happen little by little as our production changes, so I don't think we will fire any of our machinists".

Another group of employers felt that N/C or any other kind of automated equipment would not help alleviate their recruiting difficulties because these machines were not useful in their firms. "Le contrôle numérique, c'est utile seulement si vous avez une production en grande série, pour les petites séries c'est inutile et trop cher". Or again: "Ces machines sont un bon investissement si vous avez une production standardisée, si vous produisez la même chose en grande quantité, il faut que ces machines soient opérées de façon constante, au moins deux équipes de production sinon ce n'est pas rentable. Pour une production par petits lots ou pour de l'outillage le travail doit se faire sur des machines conventionnelles". Shops where one off jobs or the small batch type of production predominated did not need greater automation. Furthermore one manager pointed out that this equipment is costly and when you don't know when or what the next contract will be, a small firm will not choose automation as a response to shortages. Therefore capital substitution was a suitable solution in certain kinds of firms only and in those, because it reduced the need for machinists' skills and training on the job was easier and more rapid. The way in which a firm would choose to organize

production with numerically controlled machines also determined to a certain extent the kinds of skills it would require of its workers. A firm could choose to use numerically controlled machines in such a way as to maintain the need for skilled machinists, or in a way that would do away with some of their skills. If machinists were not involved in planning and preparing programs, programmers were needed, at that time they were difficult to find and the costs involved could not be justified by the desire to reduce dependency on relatively rare skilled people. Overall it was clear that increased automation was not primarily a response to shortages, although it was recognized in many firms that it may help alleviate the problem in the longer run.

The above is congruent with the findings of Thomas and Deaton that only in two of the ten engineering firms they visited could it be said that "the lack of available technical labour had been an important factor in introducing CAD (computer aided design)" (1977:168). Despite the fact that numerical control could reduce the need for skilled workers, it is not clear that this happens quickly. Managements can be cautious about doing away with skilled workers and relying solely on the capabilities of automated equipment. Shaiken quoted an executive:

> If you have a $500,000. machining center, you don't want some clown pressing the wrong button, even if the machine has all the fail-safe devices in the world built into it. I don't see us getting to the level where the untrained worker can set up and run the equipment by pushing a button (1984:92).

Thomas and Deaton insisted on the constraints attached to this kind of response:

> The nature of the product and size of firm limit its applicability and the administrative, training and installation time make CAD a long-term adjustment only. It is more likely to be employed as an adjustment to a large projected shortage than a current one (1977:172).

The same kind of arguments could be applied to the introduction of numerically controlled equipment in a plant. The evidence from other studies and that gathered for this study support the opinion that "in the long run, it is probably the nature of the product and the product market that is the most important determinant of the character and the rate of introduction of new technologies" (Abbott: 1980:30).

WAGE INCREASES

A full discussion of the incidence of wage increases as a response to shortages should be based on the commments and explanations of employers as well as detailed data on the evolution of wages in each firm for each occupation under study. The principal research strategy chosen for this project was intensive interviewing. This did not yield the detailed wage series that one would like to have. Employers agreeing to one and one half to two hour interviews could provide interesting information about the process of responding to shortages and comments on the reasons why they chose one set of alternatives

rather than another. However in such a context they could not furnish precise information about wages paid some years back without looking up this information in their past payroll files (if such files still existed). These files were not readily available in their offices and they were not willing to take the time to look them up nor allow me to sift through these documents. Employers did give "ball park" averages of the wages they paid but obviously these are fairly unreliable.

In view of these limitations I adopt the following strategy for the following discussion. Firstly I present and analyze the comments of employers about factors accounting for their use or non use of wage increases as an adjustment measure. Then I examine the data available from the wage survey conducted by the federal Department of Labour in manufacturing firms in Montreal. These data allow some analysis of the evolution of wages in various occupations and industries in the years 1974-1980 and provide a good, and quite reliable, bench mark against which employers' comments can be interpreted.

It is usually assumed that employers ask the maximum of skill or productivity for the lowest possible wage, while workers ask the maximum of wages for the lowest skill or productivity. Long periods of unemployment bring down aspirations of workers and long periods of high vacancies bring employers to either raise wages or accept workers with lower skills (Holt and David 1966:92-94). The behaviour of wage rates is seen as the symptom of either shortage or surplus and increases in wage rates are

supposed to be the most effective way to bring about an increase in supply of workers and therefore resolve shortage situations. Evidence of this kind of behaviour is not always conclusive. For example, in examining data on wages for tool and die makers for the Toronto area, Meltz found that

> The increase in vacancies in 1972-74 was not accompanied by an increase in relative wages, in fact, relative wages declined slightly...The data for 1976-77 however, meet our expectations for the direction of change; the increase in both gross and net vacancies was associated with an increase in relative hiring wage rates (1982a:26).

Other evidence indicates that increases in rates of pay brought no reduction in turnover nor in levels of shortages, this was the case for bus drivers in London (Thomas and Deaton 1977:53). The employers interviewed by Doeringer and Piore also "seem to consider wage changes a relatively ineffective means of accomodating to labor scarcities" (1971:98). In the establishments studied by Mackay and his colleagues, a higher pay policy was introduced to reduce labour wastage rather than attract new hires (1971:94). Increases in wage rates may largely be a defensive measure. This was found to be the case in general in the Thomas and Deaton study

> In general, pay has not been used aggressively as a means of reducing shortages, but defensively in the sense of setting earning levels comparable with those prevailing in the local labour market (1977:59).

Commenting on the wage increases given draughtsmen in the same study they note that "increasing wage rates for the group where quit rates are most likely may improve flow position but it is not very effective if there is a stock shortage" (1977:156). Doeringer and Piore included changes in the wage structure among the more constrained adjustment instruments to labour imbalances. Employers are reluctant to disrupt existing wage structures sanctioned by a collective agreement or "customary law" (1971:97). However employers could make marginal changes "especially when they can be concealed within the existing compensation structure" (:98). These minor adjustments include reclassification and rapid upgrading. Yet in another american study wage increases were used as a means to reduce shortages of nurses and medical technicians (Franke and Sobel 1970:290).

Wage increases were an adjustment measure for 27.9% of firms in this sample, and in only one case was it the only measure implemented, so it certainly was not the most widespread response to a perceived shortage of skilled workers. Wage increases were used in an effort to attract new workers to the firm. The section on raiding indicates that some employers in this sample increased hourly wages in an attempt to lure employees from competitors. In most cases increases in pay rates were a defensive measure to retain workers. "Il y a eu des augmentations de salaire importantes en 1976, 1977. On a dû donner $30.00 par semaine de plus à tout le monde dans l'usine, l'année suivante ce fût $40.00 d'augmentation, ce qui a réduit les écarts entre les compagnons

et les apprentis. Mais on était pris, nous ne voulions pas de grève et le syndicat le savait. Au moins ces augmentations ont prévenu le piratage et maintenant nos salaires sont au-dessus de la moyenne". A personnel director explained "Une année, nous avons accordé une augmentation de 10 pour cent au-dessus de ce qui était prévu dans la convention collective; ces augmentations nous permettaient de garder les ouvriers que nous avions, mais pas d'en recruter d'autres. De plus en donnant une augmentation immédiatement, nous n'avons pas rouvert la convention, ça s'est passé rapidement avec le minimum de problèmes". Employers repeatedly commented that wage increases had been a means to retain workers, to prevent turnover as more aggressive, often smaller, non-unionized firms were trying to attract skilled workers through higher rates of pay. For many firms wage increases were given to match the offers made on the outside. "Si j'augmente les salaires, les compétiteurs le feront aussi, nous revenons donc au même point, on augmente pour rester compétitifs, pour garder notre monde, on ne peut aller en chercher de nouveaux sur le marché, il n'y en a pas."

The raises that could be granted during these years were limited theoretically anyway by the wage and price controls in effect in Canada from October 1975 to October 1978.

> The program provided for a stepping-down of wage increases in each of the three years. Subject to certain exceptions depending on the level of wage settlements prior to controls, the guidelines called for maximum wage increases of 10 percent in the first year of the program, 8 percent in the second, and six percent in the third (Barber and McCallum 1982:16).

Surprisingly, none of the employers singled out controls as a constraint on wage increases. It may be that employers did not remember the anti-inflation program; the interviews were conducted five years after the end of controls. Still, if these government measures had been a serious obstacle to solving shortages, it is likely that some employers out of the 68 visited would have noted them.

Employers did not favour granting increases to specific groups they had identified as being hard to find: tool and die makers and machinists. The majority of employers in firms where a union was present stressed that any increase conceded to one group would incite other groups to ask that their wages be increased to re-establish previous differentials therefore defeating the purpose of the increase. This was a concern especially in unionized firms. Employers recognized that wage differentials between groups did not reflect the level of demand. There was almost unanimous agreement that machinists and tool and die makers were underpaid compared to other occupations in their firms and in the labour market in general. "Les machinistes sont sous-payés si on les compare aux ouvriers de la production, qui eux sont bien payés. Mais je ne peux payer plus et c'est le même problème partout où il y a un syndicat". A high ranking manager in a large firm attributed part of this lack of differentials between occupations to the politics of collective bargaining. His comments reported in chapter 5 in the section on unions, emphasized the low numbers of tool and

die makers and machinists in the firm and their weaker bargaining position within the union. Employers also commented that wage increases were not a very good solution to shortages because their effect was long lasting. He stressed that wage increases raise the "floor" of the payment structure and given the difficulties in lowering it, barring a severe recession, this kind of adjustment has long lasting, costly effects. Companies in a competitive environment were especially concerned with this inability to lower wages. "Si j'augmente les salaires quand les affaires vont bien, ça peut aller, mais quand j'ai moins de contrats je dois continuer à payer ou faire des mises à pied, je n'ai pas de travailleurs en surplus et alors je n'ai pas assez de main d'oeuvre" Still, as will be seen shortly, despite employers' reluctance to use wages as a measure to resolve shortages, wages for these groups of workers increased substantially in those years.

Non unionized firms were not as restricted by prevailing wage structures and as noted before it is the smaller firms that were more likely to raise wages to attract other firms' employees. However in many of these firms too the alternative to increasing wages was to accept labour of lesser "quality" by reducing hiring standards and engaging in some upgrading. As elsewhere the total number of hours worked were also increased through overtime before adding increases in pay. Since layoffs and dismissals were not generally governed by collective agreement provisions, they could readily let these "extra" workers go

when demand slackened or simply refuse wage increases in years ahead or even reduce wages. At the time of the interviews in 1973, respondents in larger firms, those with more than one hundred employees noted that their work forces were much smaller than in the 1970's. In some firms the work force in the plant was cut by more than half. In some smaller firms, especially the very small ones, employers indicated with pride that they had kept on their best employees. But wages had been cut. Still for most employers wage increases were not the first response considered.

This did not prevent employers constrained by rigid rules or long standing custom from resorting to other less visible and less permanent ways to increase the earnings and benefits of specific groups. They used measures such as assigning new titles, introducing new classifications or modifiying pay systems. "Nous avons donné à nos travailleurs les plus qualifiés, les titres de chef de groupe, ce qui nous permettait de leur donner un bonus horaire." Elsewhere: "Nous avons créé une nouvelle classe, plus élevée et mieux payée pour les outilleurs". This last strategy would also protect these workers in the case of future layoffs since these were done by classification and seniority. In another firm a merit rating system was introduced, the criteria justifying merit pay were loose and subjective enough (attendance, punctuality, work attitude, quality of work), to allow management to grant increases selectively. In yet another firm efforts to attract new graduates from vocational schools were made: "A

l'embauche nous avons accepté que les années de scolarité dans un programme professionnel soient comptabilisées en partie comme des ané'es d'expérience, ce qui nous permettait d'offrir un salaire un peu plus élevé aux nouveaux qui avaient reçu une base en usinage dans une école". Another respondent in a very large firm explained that the representatives of at least five large firms in his industry (they were all included in this study) consulted each other periodically to find ways to prevent raiding, to maintain wages and to keep their skilled workers. They tried to harmonize their practices especially to prevent mobility of workers from one firm to another. One of the measures adopted was to provide the possibility of more vacation time: any employee who had been with the firm five years or more could include in the calculations of vacation time due, periods of work interruptions due either to lay offs or other employment. This obviously favoured older skilled workers. Some complicated systems to increase productivity by giving a bonus for all work done according to schedule also allowed increases in earnings. Wage increases were accompanied by other measures, mostly overtime and training. As seen before, overtime was the first measure adopted and was typically retained. Training, especially if government subsidies covered some of the costs was also used before and then in conjunction with wage increases. By reducing their hiring standards employers could employ machinists with less years of experience. As there is evidence that there was a reasonable supply of these less experienced people (Trottier

1978) employers could upgrade them through partly subsidized on the job training. Larger, generally unionized, firms were more likely to ask for and to obtain subsidies and it is not surprising that they should have also chosen training as a complement and part alternative to wage increases.

It proved rather difficult to obtain from employers, clear statements about the level of wage increases that did occur during those years. Again there is a problem of recollecting details over a long period of time. However some data on the behaviour of wages for workers in the machining trades for that period in Montreal is available in the yearly survey Wages, Salaries and Hours of Work published by the federal Department of Labour. Analysis of these data could complement the information provided by employers in this research and allow one to verify if wages for the occupations studied had risen during the 1974-1981 period and if so in which kinds of firms.

The data from the Department of Labour is especially useful in this regard because of the way the data is collected and presented. The federal department conducts a yearly survey (in October) in a random sample of establishments with 20 or more employees. Occupational wage statistics are collected on an industry basis and special reports prepared for major urban areas including Montreal. Average wage rates are given and sometimes the information is presented by establishment size. These data allow a comparison of wage rates for a specific occupation across a few industries. The occupational descriptions

are based on the Canadian Classification and Dictionary of Occupations (CCDO) and can be arranged on the basis of skill levels for each occupation. The occupations selected are the following: machine tool operator (production), engine lathe set up operator, general machinist and tool and die maker. In this case engine lathe set up operator serves as an exemplar for the wide category of specialized machinist. Wages for other occupations in that category may have been at some variance from those in this one as there is a large number of occupations within that category. However the figures do provide a useful guideline.

Moreover these occupations can be classified in a skill hierarchy along two categories described in the CCDO, general educational requirements and specific vocational preparation. This places tool and die makers and general machinists at the top of the hierarchy followed by engine lathe set up operators and finally machine tool operators (production) at the bottom. Employers interviewed for this study agreed that highly skilled general machinists, tool and die makers especially, and to a lesser extent, specialized machinists (such as engine lathe set up operators), were in short supply. Machine tool operators for production are needed in great numbers in large batch production plants but the limited training time required to produce such workers made it easier to obtain an adequate supply. I have chosen for comparison the hourly wages paid in three industries: machine shops, machinery and equipment, and aircraft,

because it is from these industries that most of my sample was drawn.

The salient data are presented in table 7.5. The period covered is 1974 to 1981. It must be noted that the survey was not conducted in 1978 because of a strike in the public service. The average hourly wage rates are given for the industry in general. Sometimes more detailed information is given: within industry the data distinguishes between establishment size. A small firm is one employing less than 100 employees, a medium one would employ 100 to 499 persons and a large one has 500 or more employees. However information for each of the three size categories within an industry is not always given. The reason for this is that in any given year the establishments surveyed are chosen randomly; if however there are too few establishments in any industry or size category, the data are not reported to prevent identification of the firm. In the case of machine tool operators (production) wage data is available for the aircraft industry only.

Traditional economic arguments predict that increases in wages paid workers in these different occupations would reflect the level of demand. Machinists (with general and versatile skills) and tool and die makers should then be receiving greater increases in pay because the demand for these occupations was particularly strong. It would also follow that wage differentials between occupations would also reflect the varying degree of

demand with tool and die makers and then machinists receiving greater increases and obtaining higher wages.

Despite the statements of most employers I interviewed, stressing that wage increases were one of the least preferred and the least effective ways of adjusting to a labour shortage, the data from the Department of Labour shows that there were important increases in wages for occupations in the machining trades in Montreal between 1974 and 1981. The average percentage increases for these occupations across industries are always over 100 percent (see table 7.5).

TABLE 7.5

AVERAGE HOURLY WAGES AND INCREASES IN SELECTED MACHINING OCCUPATIONS IN MONTREAL 1974-1981.

	Average Wage 1974	Average Wage 1981	% increase 1974-81
Machine tool op. prod aircraft industry	4.62	9.78	111.6%
Machinist engine lathe			
machine shop industry	4.38	9.10	107.7%
machine shop medium	4.51	9.03	100.0%
machine shop small	4.31	9.11	111.4%
machinery industry	4.61	9.48	105.6%
machinery large	4.63	9.71	109.7%
machinery medium	4.61	9.91	115.0%
machinery small	4.42	8.85	100.2%
General machinist			
machine shop industry	4.45	9.76	115.0%
machine shop medium	4.74	10.76	127.0%
machine shop small	4.23	8.97	112.0%
machinery industry	4.54	9.49	109.0%
machinery medium	4.62	10.08	118.0%
machinery small	4.01	9.56	138.4%
aircraft industry	4.74	9.55	101.5%
aircraft large	5.78	9.61	66.3%[1]
aircraft medium	4.78	9.61	101.6%
aircraft small	4.30	8.11	88.6%
Tool and die maker			
machine shop industry	5.17	9.86	90.7%
machine shop small	5.16	9.98	93.4%
machinery industry	4.99	10.41	108.6%
machinery large	5.01	10.17	103.0%
machinery medium	4.97	10.60	113.3%
aircraft industry	5.15	10.99	113.4%
aircraft large	5.15	10.99	113.4%

[1] this series started only in 1975.

source: Wages, Salaries, Hours of Work. Department of Labour Table A. catalogs: 1974 to 1981.

It also appears, at first glance, that the magnitude of the percentage increases does not reflect the level of skill or demand. Machine tool operators working on production, the least skilled group, gained the highest increases, while the highest skilled and most rare group obtained the smallest percentage increases overall.

TABLE 7.6

AVERAGE PERCENTAGE INCREASES IN WAGES IN SOME SOME MACHINING OCCUPATIONS MONTREAL 1974-1981.

Occupations	Percent increases
Tool and die makers	104.2%
General machinists	108.5%
Machinists engine lathe set up	106.3%
Machine tool operator (production)	111.6%

Examining hourly wage rates and taking into account only size of firm one finds that in 1974 wage rates in smaller shops are always lower for all the occupations. In 1978 the pattern is not so clear as engine lathe set up machinists, general machinists in machinery and tool and die makers in small machine shops and in medium sized machinery companies receive on average, higher wages than their industry average. It would seem that there had been some catching up done in small firms for some groups. This convergence may be partly explained by the fact that smaller firms, more sensitive to market forces had increased wages for certain groups. Still one cannot make too much of this pattern since the changes in wages paid from year to year

to various groups varied. Furthermore, the category small in the Department of Labour data refers to firms employing 100 employees or less. It also does not include firms with less than 20 employees. In the machine shop sector there are quite a number of firms in that group. I have also used a quite different classification, small firms being those with less than 50 employees. The Department of Labour data may therefore obscure the pattern of wages in small firms.

Comparisons on a strictly occupational basis indicate that in 1974 tool and die makers were receiving the highest hourly wage rates of any occupation in all industries; they are almost identical in the machine shop and aircraft industry and slightly lower in the machinery industry. By 1981 tool and die makers are still the highest paid group across industries and as in 1974 it is in the aircraft industry that wages are highest. It is also in this sector that percentage increases were most pronounced. Wages increased by 113.4% between 1974 and 1981. It appears that by 1981 tool and die makers in the machine shop industry had relatively lost some ground, the percentage increase is the lowest in this industry which caused them to be the lowest paid of tool and die makers. Unfortunately the data available on tool and die makers does not provide information that allows a comparison between industries, controlling for size. It can only be said that in machine shops, the wages in smaller establishments were higher than the average for the industry, in the machinery industry the best wages were

in medium sized firms. An explanation of this pattern in light of the comments of employers I interviewed can only be tentative. It confirms the statements by large firms in aircraft and aeronautics who claimed that the most difficult group to recruit was tool and die makers and they had made attempts to insure keeping the ones they had. On the other hand, if indeed as some other respondents claimed, more and more of the highly specialized work done by tool and die makers was sent out to small shops and that many firms were phasing out their tooling sections and sending out the work to smaller shops, it could mean that tool and die makers had less choice as to the firm they could go to for employment. One respondent had specifically noted that this trend would probably mean lower wages for tool and die makers.

The average hourly wage rates across industries for general machinists in 1974 and 1981 were always lower than those for tool and die makers, and generally just a little higher than the wages paid the specialized engine lathe machinist. The percentage increases across industries for that period were always over 100% and there is a little less variation in increases from industry to industry than for tool and die makers. The highest increases were given in the machine shop industry but that is where wages were lowest at the beginning of the period. The increases they received in machine shops made them the highest paid of general machinists in 1981. There seems to have been a process of "catching up" in the machine shop industry where

general machinists are concerned. Again this is in accordance with statements by respondents in my study. Machine shop managers constantly insisted that their greatest need was for general, all around machinists, workers who were versatile and experienced. General machinists did somewhat less well in the aircraft industry; in 1974, their wages were higher in that sector, but the smaller increases made them the lowest paid by 1981. In all the medium sized firms as good or greater increases were granted to general machinists than the industry average increase.

The occupation of engine lathe set up machinist refers to a specialized machinist, one who usually has a less extensive range of skills than a general machinist. In 1974 the average hourly wage rates for this occupation in Montreal was lower than for tool and die makers but the differentials between the specialized machinists and the general machinists are not consistent. In the machine shop and aircraft sector in 1974 they are paid less than general machinists but not in the machinery industry where except in small firms, the wages are very similar for both groups. In 1981 the wages for specialized machinists were lower than for general machinists in the machine shops except in the small ones and in the machinery industry they tend to be higher for engine lathe set up machinists than for general machinists. In the machinery industry, there are likely to be relatively large numbers of specialized machinists because of the production technology. The production is more

likely to be done on a batch basis than in machine shops, this type of production can employ more specialized machinists than general machinists which are preferred in machine shops where production is more likely to be of the one off type.

The last occupational category and the least skilled is that of machine tool operator, production. The only industry for which information is reported is aircraft. It is also in large aircraft firms in Montreal that one is most likely to find large numbers of these workers. The average hourly wage rate for this group in 1974 is higher than the wage rate paid to engine lathe set up machinists in aircraft as well as in the other industries. By 1981 the average wage rate for these production workers is higher than for specialized machinists and general machinists. This is puzzling, since they are obviously less qualified. However what we may have here is an "industry effect". They are required in large numbers in the aircraft firms and they probably represent a larger proportion of the work force which would give them a stronger bargaining position of the type described by one respondent in my interviews.

Comparing industries one finds that tool and die makers did best in terms of wages in the aircraft industry and worst in the machine shops. General machinists did best in medium establishments in the machine shop sector. Engine lathe set up machinists obtained the highest wages in the medium sized firms of the machinery industry. In a general way this pattern is consistent with the needs expressed by employers in my sample. The

variation according to size is however not clearly confirmed but because I used a different description of small firm comparisons must be made with caution.

Finally the percentage increase in wages in the manufacturing sector in Montreal for the 1974-1981 period was 100% according to the series published by Statistics Canada in Employment, Wages and Hours of Work. Overall then the workers in the machining occupations studied here received greater increases (see table 7.6). However in the machine shop industry tool and die makers had lower increases:90.7% overall and 93.4% in the small firms (see table 7.5) and general machinists in small aircraft firms received an increase of only 88.6%. These two occupations were according to respondents the most difficult to recruit. In terms of nominal wages, the average in the manufacturing sector in 1974 was $3.89 per hour which is markedly lower than the hourly wages paid any of the occupations in the machining trades. By 1981 the average wage in manufacturing in Montreal was $8.34, again lower than the average hourly wage paid the workers in the occupations studied here except for general machinists in the small aircraft firms. It would appear that workers in the machining trades did on the whole receive greater increases than those in the rest of the manufacturing sector in Montreal. Employers obviously did respond to a perceived shortages of these workers by increasing wage rates, but it may be that, to some extent, these increases reflect the general behaviour of wages in these years and employers saw themselves

as following the trend rather than using wage adjustments as a deliberate measure to alleviate shortages of skilled workers.

CONCLUSION

In this last chapter I have examined the responses of employers to shortages of skilled workers. Some measures are used much more extensively than others. Thomas and Deaton (1977) and then Betcherman (1982) classified adjustments to shortages as supply related or demand related, the former including measures designed to increase the flow of workers in the firm and retaining already employed ones, the latter intended to reduce personnel needs. There are only three methods of adjustment among those chosen by employers that could influence demand: reducing and delaying production, subcontracting and capital substitution, all the other measures are supply related. In both these studies supply related adjustments predominated. The same pattern is found in this study (see table 7.1).

Delays in production were inevitable in most firms and employers constantly attempted to reduce them. These were not seen so much as a response as a consequence of shortages and it has been determined in chapter 4 that most employers did not consider them critical. Subcontracting was increased but mostly as a result of decisions concerning organization of production and costs rather than manpower considerations. Similarly capital substitution, while having a mid or long term effect on the

type and quantity of labour, is not primarily a response to shortages. The kind of product manufactured and the technology best suited to it determine the relevance of capital substitution.

Supply related measures are generally favoured by employers in this sample. This could be explained partly at least by the relatively lesser constraints on most supply related responses as well as the rapidity with which they can be implemented and then rescinded. In other words they are more suitable for short term purposes and they do not entail long lasting consequences. Conversely, the demand related adjustments (except maybe subcontracting) require extensive changes that affect the core activities in a manufacturing firm: this would be the case for capital substitution. They also require important financial outlays.

Various supply related responses are used to different degrees by firms. The patterns of responses do not break down into neat configurations, rather responses did tend to be almost firm specific. Yet some broad trends can be mapped out. The clearest distinctions in responses are between smaller and larger firms. Size in itself may not be the explanatory variable; intervening variables give it its explanatory power such as type of product, which to a large extent influences technology of production. The resources a firm disposes of to implement various measures are certainly linked to its position in the product market, its share of the market and its size. The evidence

gathered for this study indicates that similar measures may be used in various firms but larger, more resource rich firms, will be able to use them more extensively. This was the case with training programs for instance.

In this sample many of the smaller firms doing one off jobs or small batch production were subcontractors. Their production cannot be planned much in advance and the production itself may vary from year to year. A core of versatile qualified workers are needed to insure flexibility. In a tight labour market these firms will firstly increase overtime. Limited manpower and financial resources will restrict the degree of formal training they can undertake. Rather when demand is high and short supply of workers continues, these firms will more likely buy some skills on the market, often aggressively raiding other firms and if necessary increase wages. They will then lay off these extra workers. They will also, and these methods are not mutually exclusive, reduce hiring standards which will enable them to pay less but more informal training, overtime and some reallocation of tasks will be necessary. This will enable them to forestall wage increases. Smaller firms did not buy new equipment to solve labour shortages mostly because these automated specialized equipments did not suit their production.

The larger firms in this sample (over 500 employees) were in many cases, dominant in their markets, often international ones. Production technology was to a greater extent large batch. Many of the other large firms also operated with medium

or large batch production. While they also required highly qualified workers such as tool and die makers and general machinists, the majority of their workers were specialized machinists. Firms in these categories are also more likely to be unionized and constrained by rules governing job classifications, seniority and pay.

Overtime was also the first response to short supply but they were more likely to then turn to some form of formal training program to provide them with highly skilled manpower as well as specialized machinists. Government subsidies supported their efforts generously. While some subcontracting was done on a regular basis they did farm out more work in times of greater demand. Reorganization of work, reallocation of tasks was also tried but met with resistance from the trade unions. Selective wage increases were not favoured because of the ensuing disruption of the plant's wage structure. Minor changes in the classification systems made some increases possible. There is also evidence that some large firms did enter into informal agreements to align their wages and benefits and prevent industry wide raiding of workers.

The evidence gathered here indicates that there are interdependencies among firms, smaller subcontractors depending on the work from larger firms and sometimes modifying their procedures to meet the requirements of contracts. However these interdependencies did not extend to labour. The very type of production smaller firms provide requires workers with diffe-

rent mixes of skill. They also prefer to hire workers who have acquired industrial experience in firms similar to theirs. Competition for labour is more between firms of similar size and production type than between large and small.

While costs are an important consideration, employers could not furnish precise estimations of the costs of various measures, including the costs of training. This makes a cost minimizing hypothesis difficult to document because the costs of some the adjustements are difficult to measure and there are interdependencies between measures: for example reductions in hiring standards often made training on the job necessary. Rather it did appear, that as Franke and Sobel noted (1970:200) and as Doeringer and Piore expected (1971), employers first used adjustments that were less disruptive of existing practices and it is only slowly that they will resort to other measures of adjustments that entail changes in the way the firm related to its employees.

NOTES CHAPTER 7

1. The overtime rate is time and one half after the normal working hours, which may be counted on a weekly or daily basis. Sundays and holidays overtime pay is double the normal hourly wage. Again there may be instances where double pay becomes effective after so many hours of work during the week.

2. It is generally agreed that apprenticeship in Canada has never been as widespread as in European countries (OECD 1979). It is especially rare in Quebec (Betcherman 1982:57).

3. In Quebec there are few apprenticed trades, construction is the only industrial sector where one finds an important number of apprenticeship programs (Paquet et al 1982:31). However in some trades such as specialized types of welding, tests are required of workers to do certain jobs. This will be the case for welding on nuclear reactors for example, the work is inspected and must meet certain standards and it must be performed by welders who have obtained certification from the Canadian Bureau of Welding Standards. However in many cases the worker is expected to acquire the relevant training in a school program or informally on the job. In some case employers mentioned that workers could get some training in the firm specifically to prepare the certification tests.

4. The federal government through the Employment and Immigration Commission set up many programs over the years providing subsidies for training on the job. The subsidies could amount to anywhere from 25 to 50% and sometimes to 75% of a trainee's wage. Some subsidy programs may cover not only the wages of workers but also part of the wages of instructors and some materials. The time frame for receiving subsidies may also vary greatly from 3 months to 24 months.

5. Many employers paid the tuition and sometimes materials such as books for their employees who took evening classes in vocational programs. In some cases the tuition was paid in full in others only 50%. However most employers noted that relatively few employees took advantage of these.

6. There is organizational slack "when there is a surplus of resources over what is required to maintain equilibrium in an environmental niche" (Cyert and March 1963).

CHAPTER 8

CONCLUSIONS

SUMMARY OF FINDINGS

The context of this thesis is a series of government reports published in the late 1970's and early 1980's treating shortages of skilled workers as a major issue in Canada. Employers voiced their concerns at the hearings of a Parliamentary Task Force on Employment Opportunities (Canada 1981a), and in industry specific surveys (Memac 1979,1981). The Economic Council of Canada sponsored a survey of firms across Canada (Betcherman 1982) in an attempt to evaluate the extent of the problem. In Montreal a detailed study of the situation in the occupation of machinist was undertaken (Trottier 1978). All these reports noted the persistent difficulties in obtaining skilled workers in the machining trades, especially tool and die makers and machinists.

In this thesis I have shown through a detailed examination of data available at the Canada Employment and Immigration Commission in Montreal, that the data collected by government departments documenting the supply and demand for these occupations are generally inadequate. These data do not firmly support the contention that major shortages of workers in the machining trades existed. The sources of inadequacy are related to the way Canada Employment Centers collect these data. On the

supply side, self identification by prospective workers may lead to an overestimation of the numbers and the qualifications of workers in these trades. On the demand side, vacancies reported by employers to the Canada Employment Centers probably represent only a small proportion of total job openings in machining occupations at any one time. Furthermore for the period studied: 1974 to 1981 data on wages offered and levels of qualification were not available to the public. This information was contained in clients' files which are confidential. These kind of data would have provided another approach to determining the existence of labour shortages as well as a means to evaluate the kinds of job vacancies reported to Employment Centers. Finally reports issued by this department on long term vacancies were deemed rather dubious even by Employment and Immigration officials. These inadequacies certainly account, in part, for the finding that government data tends to show almost constant surpluses in the occupations studied in Montreal for that period. The best source of data on demand for skilled tradesmen was the Job Vacancy Survey conducted by Statistics Canada. But it was ended in 1978 and did not in any case, provide reliable estimates when disaggregated to the local level - in this case the Montreal metropolitan area.

The research undertaken for this thesis underlines that one of the fundamental difficulties in compiling net supply and demand figures for workers in the machining trades is the pinning down of the skill level involved which can vary widely within a

single occupational category. This was the case especially for machinists as the job titles and work content for these jobs were far from standardized across firms. The changes in the content of the job due to the introduction of new technologies, increased specialization, variations in production processes in different industries, are not reflected in job titles and the term machinist refers to various levels of skill as well as different job content. New jobs are classified under the existing titles in many firms using classification systems that are the outcome of past union-management agreements. However it must be noted that this problem was not as acute for tool and die makers as there was much more consensus on what the job entailed and the qualifications attached to it.

Government data notwithstanding, the in-depth interviews conducted in the context of this study clearly show that employers in Montreal encountered difficulties recruiting adequate numbers of tool and die makers and machinists during the 1974-1981 period. For employers, a shortage of some category of workers exists when there are increased time lags in finding and hiring a suitable person. The consequences for firms of such time lags are often increased delays in production. Shortages of workers in machining trades did not however bring about serious consequences in the firms involved such as foregone expansion or loss of markets. My data suggests that this is because employers have a variety of ways of adjusting at their disposal and implement one or another form quite rapidly.

This research also provides some understanding of the way these shortages arise and what employers do about them. There was no evidence of a simple bivariate relationship between organizational characteristics (such as age, size of firm, type of production process used, the presence of a union), and the occurence of shortages (see tables 5.4 to 5.12). However when some of these characteristics are combined there is a tendency for some kinds of firms to be more affected by shortages. Younger, smaller firms tended to experience more years of shortages, most probably because on the one hand the employers in these firms preferred more experienced and multi-skilled workers. This was due to the fact that their product markets were more unstable and to increase their adaptability they had adopted production technologies that required multi-skilled workers. On the other hand they were also reluctant to undertake extensive training within their firms. Such a long term commitment was not warranted and also they often lacked the resources to do so.

However organizational characteristics appear to influence the recruitment process. Small firms placed greater reliance on networks to obtain skilled workers. The range of recruiting methods used also increased with firm size, in all likelihood with the availability of resources. Recruitment methods in larger firms involved a coming to terms with the drying up of immigration sources. These larger firms therefore turned to the educational system to obtain candidates for further in-house training.

Modifying recruiting practices or increasing recruiting efforts is only one response to shortages. Employers have at their disposal and make use of other adjustment methods. They could increase the supply of suitably trained workers through overtime, which is widely used, training employees, reducing hiring standards, modifying the organization of work, increasing wages and benefits. Or they could reduce their demand for skilled workers by subcontracting work or substituting capital for labour. All of these adjustments are used, but, principally, the responses involved affect supply rather than demand. In most cases several adjustment techniques are implemented together.

The pattern of use of adjustment techniques in this sample of firms appears to be affected by the sequence in the defence contract cycle and by the reluctance of unionized employers, in particular, to increase wages where doing so would disrupt the existing pay scale. Specifically, subcontractors recruited last. The uncertainty surrounding their operations led them to prefer multi-skilled experienced workers, this at a time when the availability of these workers was much reduced as the major distributors of contracts had already hired on the labour market. Subcontractors were more likely then to increase wages to attract workers from competitors or to modify entry requirements and reorganize the work. Of course when subcontracts became scarce, these new workers would be laid off. The employers in unionized firms, often also larger firms, did not want to implement adjustment measures which would disturb existing

manpower practices and procedures within the firm. Important modifications of existing occupational classifications, wage increases for groups in short supply entailed structural rearrangements in the firm which would have long-lasting effects.

There was no specific effort in my research to identify those firms where internal labour markets, as described in the literature, existed. However as the above discussion suggests there were firms in this sample where some of the characteristics associated with such internal labour markets were present. These firms were mostly unionized ones and formal job classifications existed, ranking jobs in a hierarchy. However my data do not show ongoing training programs in these firms nor any evidence of systematic mobility from one category of qualification to another. Training programs to provide a supply of skilled workers were implemented as a response to shortages and usually only a few years after the onset of shortages. Training was not restricted to these type of firms but rather it was used as a response in a great number of firms of all types. However the presence of internal labour market type of arrangements appears to have constrained the use of wage increases as a means of increasing the supply of workers. It is in the smaller firms where no such arrangements existed that employers were more willing to increase wages to attract workers in time of high demand. Of course they laid off these surplus workers when demand slackened.

However, my data do suggest that there is some kind of segmentation between categories of firms. A few larger firms dominate the market and subcontract a significant proportion of their work to a large number of firms who compete for these contracts. These subcontractors indicated their preferences for certain types of workers: multi-skilled and preferably trained in other small shops rather than former employees of the large firms trained in specific skills. This pattern had implications for the recruiting strategies of these firms and the kinds of adjustment measures implemented as was seen above.

GENERAL IMPLICATIONS

Employers are clearly concerned with costs but there was no evidence that their recruitment and adjustment decisions were based on any sort of detailed costing of alternative strategies. On the contrary, their inclination was to deal with problems using routine techniques rather than by energetically reviewing alternatives. The concern with maintaining existing arrangements in the firm and retaining as much management discretion as possible was paramount. The decision making process revealed by my research is much closer to the "satisficing" model laid out in Herbert Simon's work rather than to the optimizing model of orthodox economics. Employers were content to implement measures that would satisfactorily resolve the problem: there was no evidence that they sought to optimize. In

the long run decisions may converge towards the outcome predicted by economic models that assume optimization. However my research seems to suggest that the short and medium run can last a long time and this may be the relevant time period for policy purposes. This point is illustrated by the apparently slow coming to terms with the need to replace immigration with extensive training and to some extent with increased subcontracting in larger firms, and the importance given to recruiting through networks and reorganization of some jobs in smaller firms.

My evidence suggests that the skill shortages of the 1970's originated in external events or in the actions of governments (rather than deficiencies in the educational system - although there are no doubt plenty of them). Shortages of workers in the machining trades in Montreal during this period were caused by the cycle of defence contracting which originated in the procurement decisions of the United States government and about which Canadian policy could, presumably, do little. Shortages could also originate with the onset of mega projects as was noted in the Parliamentary Task Force on Employment Opportunities. However, while the Task Force stressed the importance of these projects for the demand for skilled workers, most of them never took place, at least on the scale envisioned. Shortages are also caused by the effects of cyclical instability (about which the Canadian government might be able to so something) on training schemes. The recession of the early

1980's brought an abrupt end to all training programs initiated as a response to shortages of skilled machinists. These trainees did not therefore acquire sufficient expertise and experience to form a pool of skilled workers from which to draw from in later years. (On September 5 1987, the Montreal Gazette reported on its first page the growing shortages of machinists in the Montreal area).

Shortages of skilled workers in the machining trades would have probably been less of a problem had the government not changed its immigration regulations in the early 1970's or at least if some of the specific programs put forward in the early 1980's to support training in skilled trades had been conceived and implemented along with the changes in the immigration policy.

Finally my research suggests that there is some complementarity between firms in a given industry as analyzed by Piore and Sabel (1984) with firms in each segment requiring different kinds of workers and relying on different patterns of recruiting and adjustment measures in responses to imbalances in the labour market.

APPENDIX A

QUARTERLY AVERAGES VACANCIES AND CLIENTS REGISTERED MONTREAL CEIC

TOOL AND DIE MAKERS

c = clients registered ltv = long term vacancies
v = total vacancies lt/v= ratio long term/total vacancies
v-c= net vacancies

	C	V	V-C	LTV	LT/V
1974					
1	16.6	36.3	+19.6	na	na
2	15	35.5	+20.5	na	na
3	43	46	+3	na	na
4	39	25.5	-13.5	na	na
1975					
1	36	21	-15	na	na
2	23.6	27.3	-1.3	na	na
3	26.3	27.3	+3.7	na	na
4	40.6	21	-19.6	na	na
1976					
1	36	20	-16	na	na
2	47.6	15	-31.6	3.3	.22
3	46.6	16.3	-30.3	3	.18
4	55.6	16	-39.6	2	.12
1977					
1	49.3	12.6	-36.7	2	.16
2	33.3	11.6	-21.7	2.6	.22
3	25.3	18.6	-6.7	13.6	.73
4	35.3	17.6	-18	21.6	1.25 (!)
1978					
1	27.5	19	-8.5	7.6	.40
2	46	12	-34	12.3	1.00
3	46.6	16.3	-30.3	17	1.04(!)
4	55.6	16	-39.6	23.3	1.45(!)
1979					
1	21.6	26.3	+10.6	19.3	.73
2	21.3	31	+9.7	5.6	.18
3	26	29.6	+3.6	12	.41
4	21.6	23	+2.6	12.3	.53

	C	V	V-C	LTV	LT/V
1980					
1	14	20	+6	11.3	.56
2	26.6	25.6	+1	13	.51
3	28	23.5	+4.5	11	.47
4	38	17.6	-20.4	8.3	.47
1981					
1	44.6	16.3	-28.3	12	.75
2	46	14.6	-31.4	10.3	.72
3	42.3	19.3	-23	11	.58
4	54	33	-21	7	.21

MACHINISTS

1974					
1	132	228	+96	na	na
2	139	209	+70	na	na
3	125	180	+55	na	na
4	176	239	+63	na	na
1975					
1	233	183	-50	na	na
2	187	137	-50	na	na
3	291	152	-139	na	na
4	375	109	-266	na	na
1976					
1	454	71	-383	na	na
2	534	45	-489	7	.15
3	558	23	-535	2	.08
4	587	31	-556	2	.06
1977					
1	576	29	-567	1	.03
2	466	45	-421	1.5	.03
3	370	72	-298	10	.14
4	285	87	-198	15.6	.18
1978					
1	313	87	-226	6.3	.07
2	263	112	-151	9.3	.08
3	246	146	-100	20.6	.14
4	275	132	-143	21	.16

	C	V	V-C	LTV	LT/V
1979					
1	244	148	-96	25	.17
2	276	179	-97	26.6	.15
3	274	145	-129	27	.19
4	297	114	-183	30	.26
1980					
1	408	116	-292	20.6	.18
2	408	129	-279	33	.25
3	455	110	-345	28.5	.26
4	540	67	-473	13.6	/20
1981					
1	660	94	-566	15.6	.16
2	583	82	-501	9.3	.11
3	723	61	-662	9.3	.15
4	858	45	-813	6.3	.14

MACHINE TOOL OPERATORS

1974					
1	56.3	55	-1.3	na	na
2	50.5	56	-5.5	na	na
3	67	52	-15	na	na
4	78	68	-59.7	na	na
1975					
1	88.6	43.6	-45	na	na
2	89.3	29.6	-59.7	na	na
3	99.3	25	-74.3	na	na
4	156.6	22.6	-134	na	na
1976					
1	180.5	17	-163.5	na	na
2	189	5.3	-183.7	2.6	.49
3	226.6	15.6	-211	2	.13
4	172.6	9	-163.6	1	.11
1977					
1	208	5.3	-202.7	1	.19
2	168.3	8.3	-160	2	.24
3	140.3	24.3	-116	6.5	.27
4	116.3	20.6	-95.7	13	.63

	C	V	V-C	LTV	LT/V
1978					
1	106.3	32.6	-73.7	27.3	.83
2	98.6	15	-83.6	17.6	1.17 (!)
3	83	21.6	-61.4	13.3	.62
1979					
1	81	19.3	-61.7	7.6	.39
2	73.6	18.3	-55.3	7.3	.40
3	104.3	18.6	-85.7	4.6	.25
4	124	13.3	-110.7	6.6	.50
1980					
1	139	12	-127	6.6	.55
2	147.3	11.3	-136	5	.44
3	151	13.5	-137.5	5	.37
4	142.3	7.6	-134.7	4	.53
1981					
1	185.6	12.3	-173.3	3	.24
2	177	13.6	-163.4	3.3	.24
3	176.3	14.3	-162	9	.63
4	217	8	-209	1.3	.16

Source: Man 757, CEIC Montreal region 1974-1981
Report on shortages, CEIC Montreal region 1976-1981

APPENDIX B

JOB VACANCY SURVEY
MONTREAL REGION.

legend:
TCV = total current vacancies (estimated)
LT = long term vacancies (estimated)
LT/TV = ratio long term vacancies/all vacancies

TOOL AND DIE MAKERS

	TCV	LT	LT/TV
1974			
1	97.2	83.7	.86
2	14.6	6.2	.42
3	53.8	50.9	.95
4	2.9	2.1	.74
1975			
1	4.0	4	1.00
2	20.0	2.2	.11
3	3.2	1.2	.37
4	na	na	na
1976			
1	46.3	6.8	.15
2	14.0	9.2	.66
3	71.0	4.9	.07
4	14.6	11.2	.77
1977			
1	42.9	10.3	.24
2	1.8	1.4	.77
3	13.4	4.4	.33
4	21.9	6.6	.30
1978			
1	37.7	na	na.
2	48.5	na	na
3	26.0	na	na
4	41.1	na	na

MACHINISTS

	TCV	LT	LT/TV
1974			
1	227.2	178.1	.78
2	306.7	79.7	.25
3	160.2	104.1	.65
4	100.6	39.7	.39
1975			
1	181.2	72.8	.40
2	46.4	26.8	.58
3	27.1	20.5	.76
4	na	na	na
1976			
1	202.2	17.8	.08
2	53.7	30.9	.57
3	22.2	16.0	.72
4	14.6	11.2	.77
1977			
1	42.8	13.9	.32
2	17.4	14.3	.82
3	33.7	8.2	.24
4	179.4	106.0	.59
1978			
1	80.9	na	na
2	126.9	na	na
3	163.7	na	na
4	160.3	na	na

MACHINE OPERATORS

1974			
1	395.9	272.6	.69
2	115.9	91.1	.78
3	79.3	62.1	.78
4	79.4	26/6	.34
1975			
1	110.6	96.1	.87
2	53.0	17.8	.33
3	67.5	36.6	.54
4	na	na	na

	TCV	LT	LT/TCV
1976			
1	15.9	3.4	.21
2	21.2	8.5	.40
3	5.9	na	na
4	14.4	na	na
1977			
1	52.6	39.2	.74
2	8.8	na	na
3	27.0	10.3	.38
4	17.0	8.9	.52
1978			
1	49.8	na	na
2	42.4	na	na
3	67.4	na	na
4	41.3	na	na

Source: Job Vacancy Survey. Quarterly report on Job Vacancies.

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