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Firm Entry and Exit in the Canadian Manufacturing Sector

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FIRM ENTRY AND EXIT IN THE CANADIAN
MANUFACTURING SECTOR

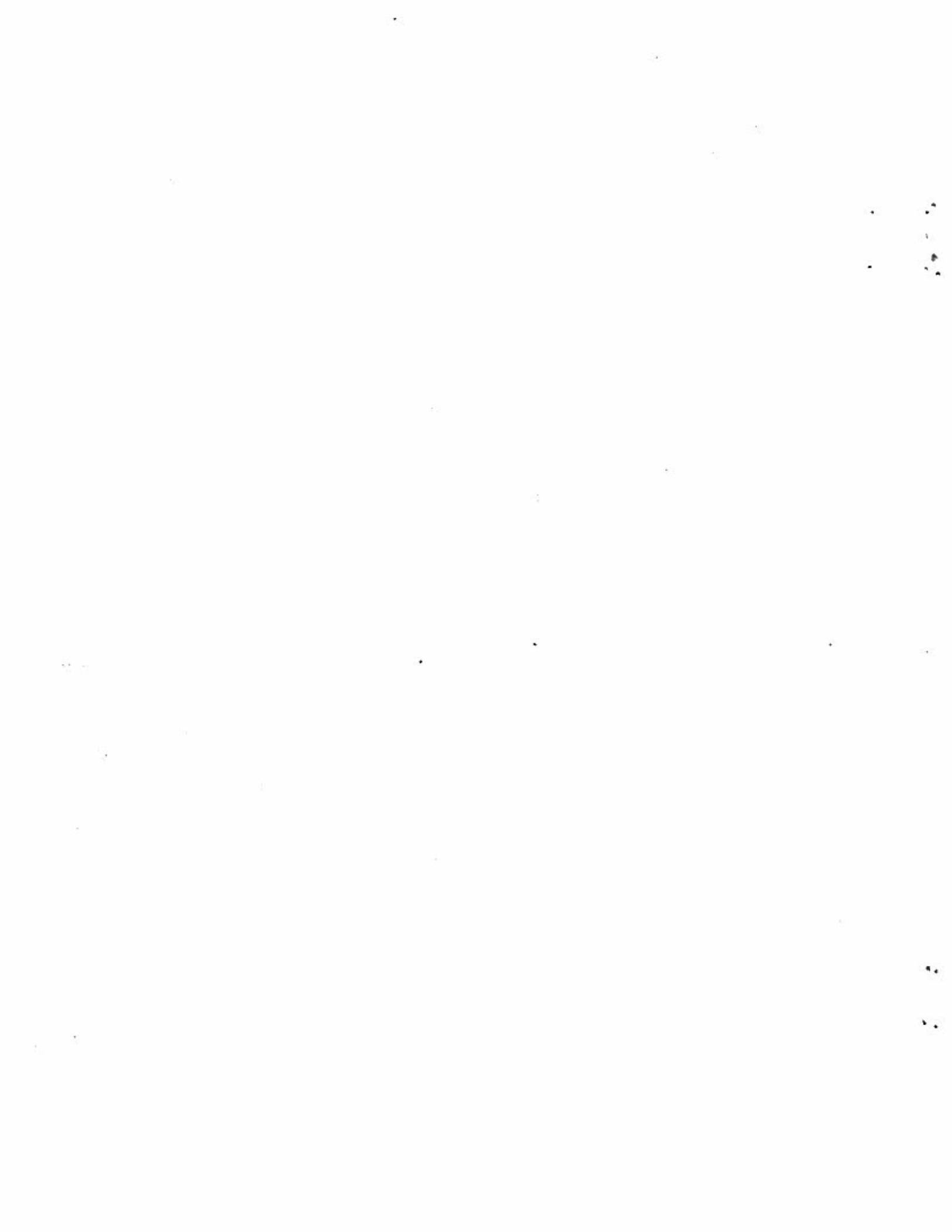
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FIRM ENTRY AND EXIT

INTRODUCTION

The process of entry and exit of firms and plants has long been held to play an important role in the evolution and adaptation of industry to change. In the simplest of expositions, it is the act of entry and exit that serves to equate above or below normal profits to competitive rates. In other models, potential rather than actual entry serves to limit monopoly power. Once included under the rubric of limit-pricing models, this argument has been given theoretical elegance by contestability theory. The turnover process that results from exit and entry is also seen as a conduit through which new ideas and innovations are introduced.

Alternatively, entry can be portrayed as an interesting, but irrelevant, curiosity. One such view portrays entrants as fringe firms that swarm into and out of an industry without having much impact. References to the entry and exit process as "hit and run" leave the impression, intentional or otherwise, of an unstable fringe, which makes no contribution to such indicators of progress as productivity. Shepherd (1984), in a criticism of contestability theory, stresses that entry as an external force is usually a secondary factor to internal conditions within an industry in determining the strength of competition within an industry.

Despite the potential significance of the entry process, it is only recently that it has attracted much attention in the empirical side of the industrial organization literature.¹ This newfound attention reflects a greater interest by industrial economists in the topic of market dynamics-how firms and industries behave over time and what effect this has on industry structure and behaviour.

Because of the dearth of empirical data on the entry process, the debate over the importance of entry remains unresolved. The picture that is presented by the few studies of entry that do exist is that it is relatively unimportant, rarely adding or subtracting more than a few percentage points to the population of firms or employment (e.g., Johnson, 1986); but this evidence may also be consistent with the first view that entry is important. There is nothing in the first view that requires entrants to be large at birth. Entrants have been depicted by some (Jovanovic, 1982; Pakes and Ericson, 1988) to start small and gradually to approach the size and productivity of incumbents. A limited number of case studies show how some entrants have been able to carve out a niche by concentrating initially on a limited geographic market or a particular product before expanding (e.g., Bevan, 1974). If entry is to be labelled as quantitatively unimportant, both its instantaneous and its cumulative effects need to be measured. The entry and exit process needs to be set within a more general context of firm growth and decline and the long-run progress of entrants needs to be charted.

One of the difficulties of evaluating which view of entry and exit is correct and of placing the process in the context of overall change has been a lack of longitudinal panel data that follow firms through time. The Canadian Census of Manufactures, as well as its counterparts in other countries, are designed to capture and report aggregate industry data at a point in time and until recently have not been able to follow the changes of individual micro units over time. Fortunately, the Canadian Census and related files contain individual estab-

lishment and firm identifiers that offered the potential of creating a longitudinal panel. The existence of identifiers does not by itself permit longitudinal studies--especially if the identifiers were not created with longitudinal studies in mind. After extensive evaluation, it was concluded that these identifiers could provide meaningful information in a number of areas -- in particular for entry and exit data.

The first part of this paper is devoted to the conceptual, theoretical, and empirical issues involved in measuring entry and exit and in building a longitudinal data set. The methodological issues are examined much more extensively in Baldwin and Gorecki (1990b). The second section describes and analyzes some aspects of entry and exit in the Canadian manufacturing sector in the 1970s and early 1980s. Attention is focused on the method of entry and exit. In particular, entry by acquisition and exit by divestiture are compared to entry by plant opening and exit by plant closing. In addition, the importance of entrants both in the year of birth and subsequently is presented so as to contrast instantaneous or short-run measures to cumulative or long-run measures of the intensity of entry and exit. As part of this, the paper focuses on the length of life, hazard rates, and the growth path of entrants.

This paper begins the process of resolving the aforementioned debate over the significance of entry and exit. It is one in a series of papers that are concerned with entry, exit, market dynamics and industry structure. Other papers compare the amount of turnover that arises from entry and exit to turnover in the continuing sector (Baldwin and Gorecki, 1990c); ask how the traditional views of structure are modified when mobility rather than concentration statistics are examined (Baldwin and Gorecki, 1988); quantify the impact of entry and exit on certain aspects of industry performance such as productivity (Baldwin and Gorecki, 1990d); and ask how mergers contribute to the turnover process (Baldwin and Gorecki, 1989a):

MEASUREMENT ISSUES

Many previous studies of entry have had to rely on data that were generated for other purposes and, as a result, yielded estimates of entry and exit that were imprecise, less than comprehensive, or were defective for other reasons.² Early studies had only the gross number of firms and could not distinguish between entry and exit (Orr, 1974; Deutsch, 1975). Subsequently, the pioneering work of Birch (1979) and others used Dun and Bradstreet data, which had several problems.³ More recently, studies have emerged that used national data bases, but they often were either cobbled together from several disparate sources⁴ or they used national census data without being able to evaluate fully the meaning attached to a birth and death by the census authorities or to modify it for the purpose of studying entry.⁵

This paper uses comprehensive Census of Manufactures data for Canada to overcome many of the problems that beset previous work. In order to generate entry and exit statistics from this potentially rich data source, several decisions relating to measurement issues had to be taken. The nature of the entry and exit statistics produced will depend on the level of industry aggregation used, the time period selected, the definition of a production unit adopted, and

the method of entry and exit chosen for measurement. Most of these are discussed at length in the methodology paper (Baldwin and Gorecki, 1990b). They are briefly summarized here.

- **Industry Level of Aggregation.**

Entry and exit can be measured either at the level of the manufacturing sector as a whole or for individual industries. In the first case, entry is defined as a new firm in the manufacturing sector; in the second case, as a new firm in a particular 4-digit industry.

Measures that are derived using different levels of industry aggregation capture separate aspects of entry and exit. Even when the individual industry measures are averaged to a mean value for the manufacturing sector as a whole, the two measures are unlikely to be the same. When defined at the level of the manufacturing sector, measures of entry catch only entry by outsiders. Entry to a particular 4-digit industry may come partly from firms already in other 4-digit manufacturing industries. The latter is not counted when the manufacturing sector as a whole is used to define entry, but is included when entry is measured at the individual 4-digit industry. In what follows, entry is examined first at the manufacturing level in order to provide a broad overview. The resulting measure, as mentioned, does not encapsulate all entry and, therefore, the first approach is supplemented with entry rates calculated at a more detailed industry level.

Other characteristics of the aggregate entry rate should be kept in mind. The value of the estimated entry rate, calculated at the level of the overall manufacturing sector, will depend not only on the individual industry entry rates but also on the relative importance of different industries. This means, for example, that over time the aggregate entry rate may change, even though entry rates in all the underlying industries stay constant, because of changes in the relative importance of these industries. Aggregation effects also hide the underlying distribution of entry rates across industries. Cross-sectional analyses require entry and exit rates calculated across a wide range of industries.

- **Time Period.**

Entry and exit can be measured by comparing two adjacent points in time using annual data, or by using endpoints that are further apart. The first procedure yields instantaneous rates of entry--short-run rates; the second provides measures of the cumulative effect of entrants--long-run rates. The two can be compared by using the annual equivalent value of the cumulative rate--the value which, when compounded, gives the cumulative rate.

A comparison of short- and long-run rates reveals the extent to which entry is ephemeral or longlasting in its effect. If the turnover process is essentially marginal in nature, if entrants operate at the fringe of each industry, and if they are relatively short-lived, then the entry rate derived from annual data will be small and the same as the cumulative rate when measured with end years further apart (and higher than the equivalent annual rate derived from the cumulative rate). Similarity between the instantaneous and the cumulative rates will occur in this instance if most entrants die shortly after birth and the survivors do not experience much growth. On the other hand, if some entrants have enough of an advantage over incumbents that they are able to survive and grow to be of substantial importance, and there

are enough such firms, then long-term cumulative entry rates (and possibly their equivalent annual values) for a particular group of entrants will exceed or equal short-term entry rates.

In order to investigate which characterization of the entry process is correct, both shorter- and longer-run periods are used for the calculations. Short-run rates are equated here with year-to-year changes; longer-run rates are derived from comparing years six, nine, and eleven years apart.

- **Choice of Production Unit.**

Interest in the firm and plant turnover process centres on its relationship to the evolution of industry profit, innovation and productivity over time.⁶ Such considerations suggest that the firm rather than the individual production unit--the establishment, the plant, or the factory--be used to define entry and exit. It is the firm, not the plant, that makes the decision to enter or exit an industry. Therefore, this paper concentrates primarily on firm entry and exit.

Despite this, plant birth and death rates for both entering, exiting, and continuing firms are also presented so as to place the firm entry and exit process in context. Plant entry rates are useful since they give a broad overview of the importance of **all** new plants. It is this variable, rather than just new firm plant births, that may have the greater influence on the equilibrating process that drives down supranormal industry profits or increases profits when they fall below average.

- **Gross and Net Entry Measures.**

Entry can be defined either gross or net of exits. Many previous studies (Orr, 1974; Deutsch, 1975) have used the net measure--partially because only data on the total number of firms were available, and entry was calculated as the difference in this total between two years. Such a definition measures expansion rather than entry. It understates entry by the amount of exit. For this study, gross entry rates and exit rates are calculated separately so as to evaluate the relative importance of the two, both over time and across industries.⁷

- **Unit of Measurement.**

The importance of entry and exit can be measured using the number of firms, or a measure of size such as shipments or employment. Since measures of market structure so often stress the importance of the number of firms in an industry, the importance of entry and exit is measured herein as a percentage of existing firm numbers. Size is also used. Choice of the measure of size is somewhat arbitrary. If entrants are less productive than average, focusing on an input like labour will increase the measured importance of entrants compared to a shipments-based measure. In fact, entrants go from being less productive to more productive than average over a ten year period (Baldwin and Gorecki, 1990d). Therefore, an employment-based measure overstates the importance of entry in its earlier years and understates its importance later on relative to a shipments-based measure. In its favour, a measure of the importance of entry using employment is of significance to those who are interested in the labour market effects of firm turnover. It is for the latter reason that employment is generally

chosen in this paper; but for longer-term measures of the cumulative importance of entry and exit at the 4-digit industry level, a shipments-based measure is also employed.

- Types of Entry and Exit.

Discussions of entry and exit often proceed as if distinguishing between different methods of entry and exit was unimportant. Entry can occur via the acquisition of existing capacity or the building of new capacity--what will be termed acquisition and greenfield entry, respectively; equally, exit can occur via the divestiture of existing capacity or the closure of capacity--divestiture and closedown exit, respectively. Changes in industry capacity via plant openings (entry) and closure (exit) have the potential to affect immediately and directly the industry supply curve and industry performance. The manner in which acquisitions and divestitures affect the supply curve is more difficult to predict because they do not affect capacity in the first instance. But such entry may disturb existing patterns of oligopolistic co-ordination and, at the same time, introduce innovative methods and products. On the other hand, it may reinforce oligopolistic co-ordination if the leading firms in an industry already meet in several other industries as the result of diversification (Scott, 1982). In view of the potential differences between the two methods of entry and exit, they are measured separately here.

DATA SOURCES AND DEFINITIONS

A) Measuring Entry and Exit

This paper makes use of establishment-based data that come from the Canadian Census of Manufactures. The period studied extends from the early 1970s to the early 1980s. The Canadian Census of Manufactures is discussed in detail in Statistics Canada (1979), while the measurement of entry and exit is detailed in Baldwin and Gorecki (1990b).

The data base used here has the advantage that it is comprehensive in that the Canadian Census of Manufactures is an annual census of virtually all manufacturing establishments in Canada. The Census collects details on inputs and outputs of individual establishments. Each establishment and enterprise⁸--defined as a group of establishments under common control--can be linked. Plants and firms have been assigned identifiers that stay with them over their lives. This means they can be followed through time, thus permitting entry, exit, and continuing firm activity to be tabulated. In addition, plants under common ownership can be linked together into firms at various levels. Thus, firms can be defined at different levels of aggregation. For industry analyses, the 4-digit level (all plants in a 4-digit industry under common control) is chosen here. For analyses at the aggregate level, a firm is defined as all plants in manufacturing under common control.

There is a unique identifier associated with a plant that is given when it first appears in the Census. It disappears only if the plant ceases operations in the manufacturing sector or if the plant changes its name, ownership, and location, simultaneously. The appearance of a new identifier is used here to define a birth. The disappearance of the plant identifier from the universe of all plant identifiers is used to define a plant death.⁹

Plant entry and exit are defined differently for each level of industry classification of plants. For some purposes, the manufacturing sector is used to define the universe; in others, the 4-digit industry is used. Exit rates, calculated at the individual 4-digit industry level, will not be the same as for the manufacturing sector as a whole because a plant may leave one manufacturing industry for another manufacturing industry--what is termed a switch or a transfer--and be an exit at the 4-digit level but not at the manufacturing sector level. Similarly, entry rates at the manufacturing sector as a whole will not contain plant switches that take place between 4-digit industries.

The appearance and disappearance of a firm-level identifier are used to define the birth and death of a firm, respectively. A firm is defined at the manufacturing level for the aggregate analysis, and hence, can own plants in several industries. For the analysis at the 4-digit industry level, only the firm's operations in that industry are considered. Firm exit rates will differ when estimated at these two levels, because exit from a particular 4-digit industry may not be accompanied by exit from manufacturing for a diversified firm. Similarly, entry can occur to a particular 4-digit industry by a firm already in another 4-digit manufacturing industry and this will not be counted as entry to the manufacturing sector as a whole.

Because the situation in which a plant identifier appears or disappears is narrowly defined, the meaning attached to a plant opening or closing is straightforward. This is not the case for the appearance or disappearance of an enterprise or firm identifier. The interpretation of firm entry and exit is less straightforward because the appearance or disappearance of a firm-level identifier in the Census is caused by a large number of quite different events.

The firm identifier may cease to exist because all of a firm's plants are closed. This is firm exit by plant closure. A firm's identifier may also disappear even though the plants associated with the original firm continue as part of another firm. In the latter case, the firm has exited as a result of a corporate reorganization -- a broad classification that generally involves divestiture of plants to another firm but on occasion also includes consolidations of several independent firms and other forms of corporate legal change.

Corporate reorganization that results in a new identifier can involve a major change in corporate structure or only a minor one, such as the adoption of a new name and/or a new location for the head office. The latter do not generally correspond to the emergence of new actors in an industry and need to be excluded if an estimate of the amount of significant change is to be generated. Therefore, the data base used here was created with special care to ensure that name changes, or other corporate reorganizations that did not involve a major change in corporate control, were excluded.¹⁰

The corporate reorganization category may involve more than entrants and therefore it is divided at the 4-digit industry level into changes that are caused by purely horizontal mergers and those that are associated with entry to an industry. A horizontal merger occurs when the firm code attached to a plant in an industry changes and the new owner already has at least one establishment classified in that industry. An entry merger occurs when the new owner has no plants classified previously in the industry in which the acquired plant is located. It may be that the new participant exists previously in some other industry or in some other

country. It may be that the new firm has evolved out of a corporate reorganization that created a new company. A management buyout would fall in the latter category. In both cases, a "new" firm has supplanted an old one.

The care exercised in defining the emergence of a "new" firm has implications for the interpretation of the entry and exit statistics produced. While the complete Census of Manufactures was available for use, only a subset of the larger firms was actually used herein. Checks on the validity of events occurring when an identifier was changed could only be carried out at reasonable expense with a subset. Firms in the subset chosen produced most of the output (over 95 per cent), but made up much less of the total population. The methodology paper (Baldwin and Gorecki, 1990b) discusses the extent to which this choice affects the rates of entry and exit reported. There is relatively little effect on the measures that use employment or output. The effect is greater when numbers of firms are used. Any comparisons, therefore, of the statistics produced herein, to those for other countries should use the rates based on size rather than the number of firms.

B) Defining Categories of Entry, Exit and Continuing Firms

A summary of the various entry, exit, and continuing firm classifications used at the 4-digit industry level is presented in Table 1. Establishments are classified as births, deaths, continuing, transferred, acquired or divested. Establishments are then aggregated into firms, which are defined to consist of all establishments under common control. This classification, in turn, allows firms to be grouped into new firms, exiting firms, and continuing firms on the basis of the status of their plants.

New firms are divided into three groups: those that entered by building new plant (23), by acquiring existing plant (22), and by switching plant from another industry (26). Similarly, exiting firms are divided into those that did so by divesting themselves of plant (31), by closing plant (34), and by switching plant to another industry (37). Finally, the plants of continuing firms are divided into those that were newly built (13), those that were transferred into an industry (16), those that were closed (14), those that were transferred to another industry (17), those divested (11), those acquired (12), and those that stayed continuously in the industry without a change in ownership status (15). Because of the classification scheme used, the plant creation and destruction process for continuing firms can be compared to that for the entering and exiting segment (e.g., 13 vs. 23 and 14 vs. 34). Similarly, the merger process for continuing firms (horizontal) can be compared to that which brings new firms into an industry via acquisition (e.g., 12 vs. 22).

All of the categories in Table 1 are used when measuring entry to and exit from a 4-digit industry. When entry and exit are measured at the level of the manufacturing sector as a whole, two main categories are chosen -- entry and exit by plant creation or closure ; entry and exit by acquisition or divestiture of plants. The transfer categories arising from switches -- 16, 17, 26, 37 -- are not considered at that level.

THE MAGNITUDE OF FIRM ENTRY AND EXIT

As important as the entry and exit process is to various debates about the efficacy of the market system and the strength of the competitive process, basic data on the characteristics of entry and exit are lacking. This section begins to correct this deficiency. It addresses the following questions. Is entry and exit limited to a competitive fringe? Is entry and exit confined solely to the smaller size groups? Is the primary method of entry and exit by acquisition or by plant creation and closure? What is the length of life of an entrant? Are short- and long-run results similar? Throughout, the emphasis is on understanding entry and exit as part of a dynamic process that needs to be described by examining the evolution of firms. In an accompanying paper, entry and exit is set in a broader context of change that takes place in the incumbent or continuing firm population.

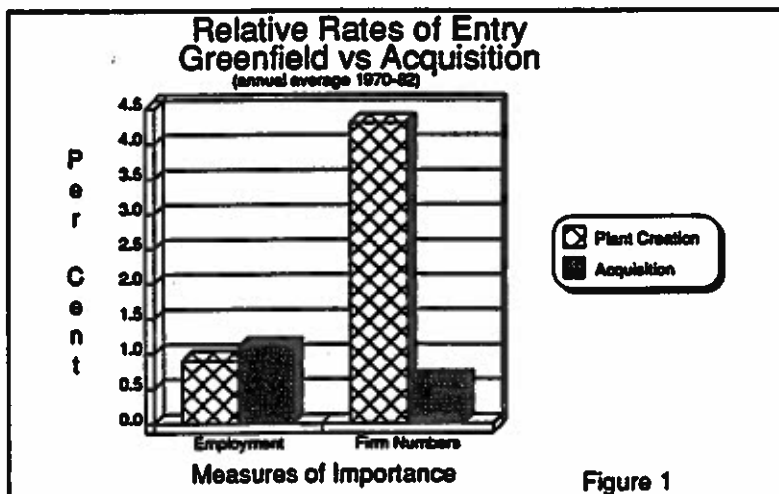
A) Entry and Exit Measured in the Short Run

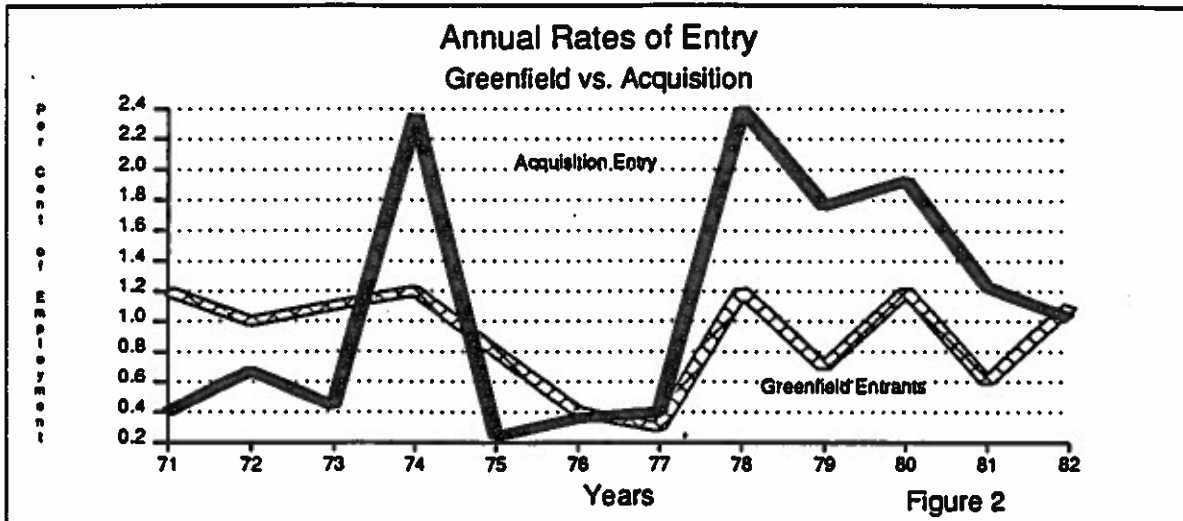
In order to portray short-run effects, the rates of entry and exit are calculated annually from 1970 to 1982 and reported in Table 2.¹¹ Entry is covered in panel A; exit in panel B. The first set of estimates (Total, columns 1 and 2) make no distinction as to the method of firm entry or exit--acquisition as opposed to plant opening--or the method of firm exit -- plant closure versus divestiture. The second set (columns 3 and 4) cover greenfield entry in Panel A and closedown exit in Panel B. The third set (columns 5 and 6) measure the intensity of entry by acquisition in Panel A and exit by divestiture in Panel B.

Rates are measured as first, the percentage of the number of firms in the particular entry or exit category; second, as the percentage of total employment. Entry and exit are defined as firm entry to and exit from the manufacturing sector as a whole. Thus, for the year 1970-71, entrants are those firms that possessed plants in manufacturing in 1971, but not 1970; exits are those firms that possessed plants in manufacturing in 1970, but not in 1971. All rates are estimated relative to the initial of the two years (e.g., 1970 for 1970-71).

On average, during the 1970s, entrants affected 4.9 per cent per year of the stock of firms in the manufacturing sector; exits affected 6.5 per cent per year. Entrants via plant birth were more numerous than entrants by acquisition. The average entry rate for the former was 4.3 per cent, but only 0.6 per cent for the latter. Similarly, most exits were by closedown. On average, 5.3 per cent of firms exited in this manner. Only 1.2 per cent exited via divestiture.

When measured in terms of employment, the two entry and exit categories were

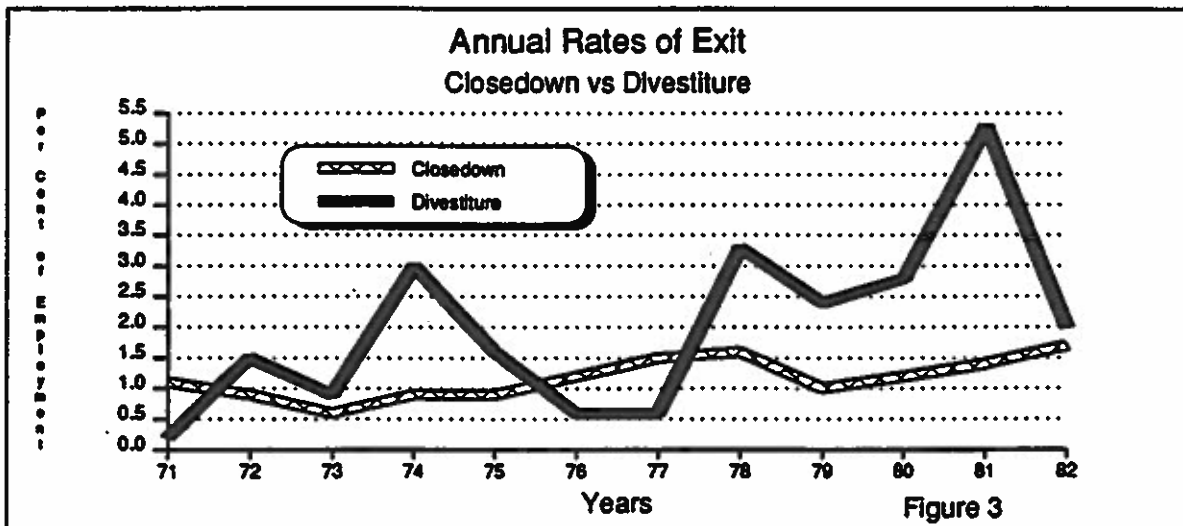




similar in importance. On average, greenfield entry contributed .9 per cent annually to total employment while acquired firms employed 1.1 per cent. Closedowns employed 1.2 per cent and exits via divestiture affected 2.2 per cent of the labour force.

Figure 1 presents a bar chart of average annual entry and exit rates over the period 1970-71 to 1981-82 that shows more clearly the difference between the firm number and the employment measures. The two measures differ in relative size because the average size of a greenfield entrant or a closedown exit is much smaller than the typical firm that enters via acquisition or that exits via divestiture. The annual average size of the firms exiting by plant closure over the period 1970-83 was 26 employees; the corresponding figure for exit by divestiture was 168 employees. Over the same period, the average size of entrants that built new plants was 20 employees. In contrast, the average size of firms that entered via acquisition was 223 employees.

Figure 2 charts the entry rates of each category expressed in terms of employment over the decade. Figure 3 does the same for the two exit rates. The acquisition entry rate is more volatile than greenfield entry rate. The divestiture exit rate is also more variable than the



firm closedown rate. It is often claimed that mergers come in waves. Whether this is the case or not, merger entry and exit is more volatile than greenfield entry and closedown exit.

It is clear from this evidence that annual rates of entry are not large. Moreover, while entrants by plant creation are more numerous than merger entrants, the former are small. When measured by employment affected, the two processes are about equally important. But neither is such as to suggest even moderate change is occasioned by entrants at birth.

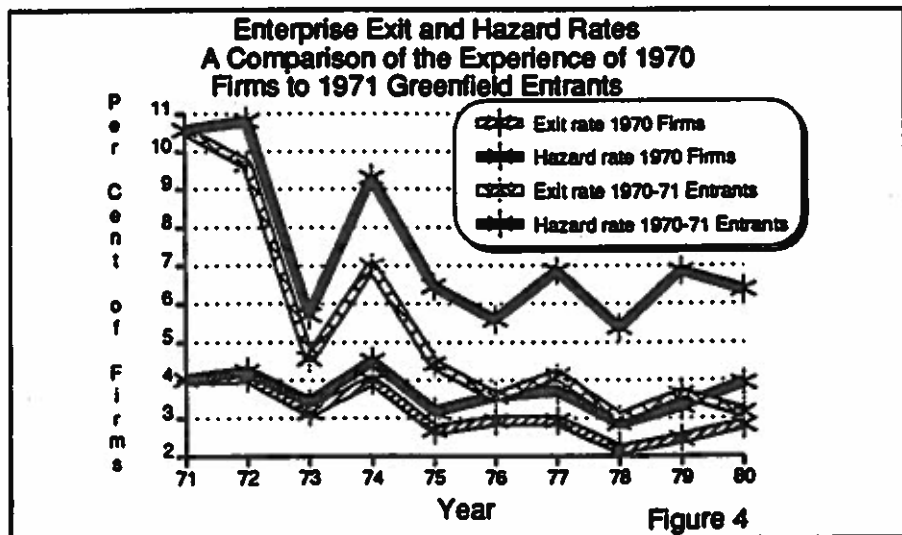
B) The Maturation Process for Entrants

The values that are derived for the short-run or instantaneous entry and exit rates are not surprising. They confirm the casual impression that entrants rarely come to dominate an industry in their first year of operation. They might be used to support the view that entry is unimportant. That would be unwarranted at this stage. Such a determination must rely on more than the instantaneous rate of entry. Whether these new firms manage to grow in the longer period and displace existing firms, and how rapidly this occurs must also be examined.

Long-run measures of entry are derived by counting the market share that has been accumulated by entrants since an initial year. The total share of all entrants will increase over time because more cohorts are being added; but this tendency may be offset if the market share of existing cohorts declines. If, on average, each cohort adds n per cent to employment starting in period zero and then declines by a constant m percentage points per year, the maximum cumulative value that entry can have is in the n/m 'th period.

The long-run share of a particular cohort of entrants will depend on the exit rate, the average length of life and the growth rate subsequent to birth of all entrants in that cohort. If entrants either experience a relatively short life due to high infant mortality rates or a relatively slow growth rate during adolescence, then the long-run or cumulative impact of entry may be unimportant. On the other hand, surviving entrants may grow enough to outweigh the effect of exits and allow a cohort's share to increase over a substantial period of time. In this case, the cumulative effect of entry will be greater.

Evidence on the length of life of new firms indicates that greenfield entrants have a high infant mortality rate. These entrants tend to fail at higher rates than the do older firms. The exit rates of firms that existed in 1970 are compared in Figure 4 to the exit rates of the 1971 cohort of greenfield entrants over the

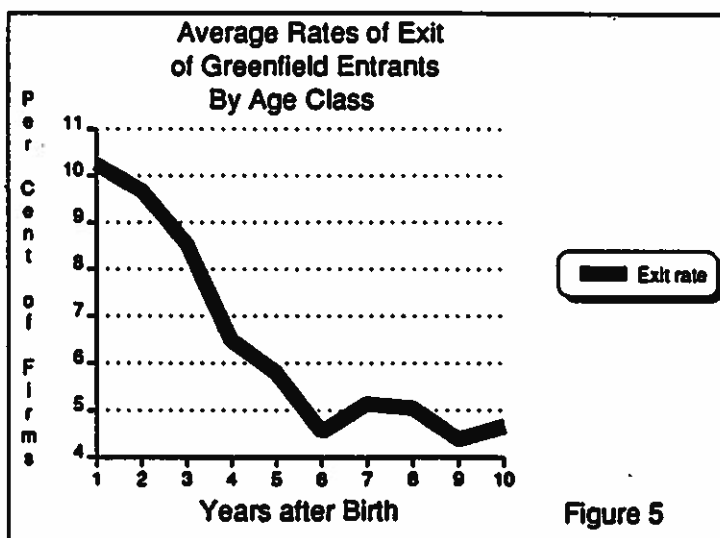


period 1970-71 to 1981-82. Once again, exit is defined at the level of the manufacturing sector as a whole. Exit rates are calculated as a percentage of the number of firms in the opening period--1970 incumbents and 1970-71 entrants, respectively. The hazard rate for each group is also included. The hazard rate is the percentage of remaining firms in each group that fail. It is the probability of death conditional on lasting to the particular period being examined. It provides a measure of the risk of death in any period for the group that has survived to that period.

The initial exit rate for 1970-71 greenfield entrants starts at 10 per cent. This is well above the exit rate calculated for 1970 incumbents, which is generally below 3 per cent. By the end of ten years, the exit rate for entrants is not much above the exit rate for incumbents, but there is still a substantial difference in the hazard rate and, therefore, in the risk of exit faced by those in each group who have survived to the end of the period. The hazard rate of a 1970-71 entrant falls only to between 5 and 7 per cent while the hazard rate of 1970 incumbents stays generally in the range of 3.5 to 4.5 per cent. Thus, while some progress is made in reducing risk in the remaining entrant population, this group cannot be said to have reached the same risk level as older firms at the end of their first decade of life.

The complete set of survival rates for all cohorts between 1970-71 and 1981-2 for both greenfield entrants and for merger

entrants is presented in Table 3. As with Table 2, the turnover process is evaluated at the manufacturing sector level. Table 3 follows each year's entrants between 1970 and 1981 and tabulates the number and percentage that exit in each subsequent year and that remain in existence in 1982. Of the 1,427 entrants by plant creation in 1970-71, 10.6 per cent exited within the first year; nevertheless, 40.2 per cent were still alive in 1982. The average exit rate for all cohorts declines over time as Figure 5

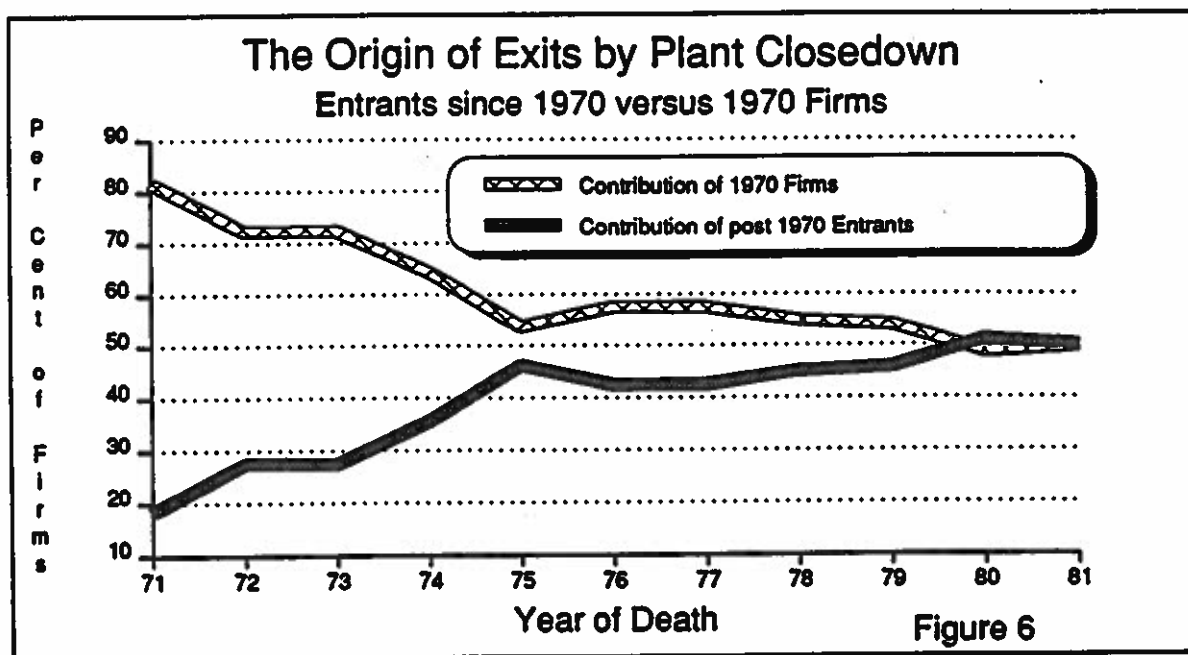


demonstrates.¹² These data then show that new firms die in large numbers. But equally, they show that some entrants in a given year have an impact that lasts well beyond that particular year. The data presented in Table 3 were used to estimate the implied average length of life of firms that entered by building plant. A Weibull function was used to estimate the hazard function that depicts the rate of exit as a function of age. The average length of life of a greenfield entrant implied by this distribution and the estimated parameters was about 13 years.

A second source of data on the birth and death process can be used to shed light on the average lifetime of a firm. Since births have a high infant mortality rate, there is a tendency to treat deaths as coming almost entirely from this source. To investigate whether this was

the case, the distribution of deaths by year of birth is tabulated for each period between 1970-71 and 1980-81 in Table 4 for firms that exited by closure and for firms that exited by divestiture. In 1970-71, 18.3 per cent of deaths by plant closure were entrants of the same year --and 81.7 per cent were from the population that existed at the beginning of the year. Even by the end of the decade, about 50 per cent of deaths came from the original 1970 population. It is true that there is a tendency for a slightly larger percentage of deaths in any one year to come from the immediately preceding years, but these years do not overwhelm the total.

Exits, then, are not restricted just to recent entrants. This is further illustrated in Figure 6, which contains plots of the percentage of deaths that are attributed to entrants as opposed to firms in existence in 1970, for years between 1970 and 1981. Figure 6 is derived from Table 4, the cumulative effect of entrants being the sum of contributions of all entry cohorts since 1970 to deaths in a particular year and the effect of incumbents being the contribution made by the 1970 group to deaths in that year. Figure 6 demonstrates that the cumulative effect of entrants to exit rates increases rapidly at first as the period of measurement is increased from one to five years. But, after five years, the contribution of entrants increases only slightly year by year. Conversely, the contribution of incumbents declines rapidly at first, but after five years levels out. After a decade, incumbents (firms in existence ten years previously) are contributing over half of all deaths.

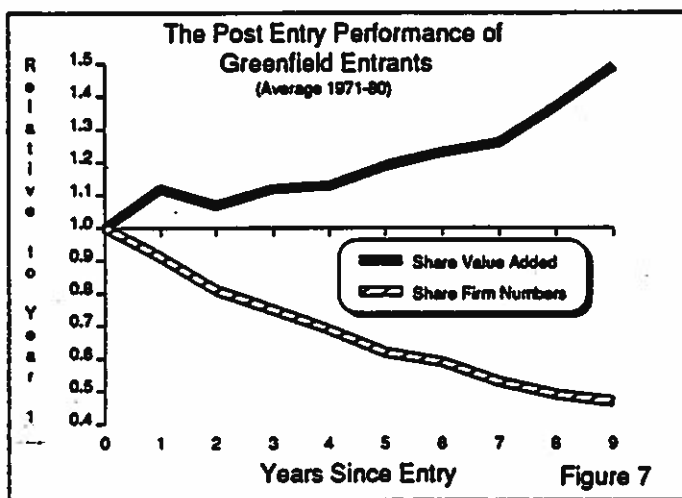


Finally, it should be noted from Table 3 that the exit rates of merger entrants are more variable than the exit rates of greenfield entrants. For most merger entry cohorts, the percentage still alive in 1982 is greater than for entry via plant creation--but often not by much. Acquisition of existing plants by new firms as a method of entry is no guarantee of success. The natural probability of failure also applies to this group--but in a much more complex fashion.

Equally, the contribution made by previous entrants to exit by divestiture, presented in Table 4, is not dissimilar to the pattern for exit by plant closure.

While many entrants then disappear after entry, this has all too frequently been interpreted to imply that entrants do not matter. The data presented to this point suggest that the matter is more complex. While entrants have a high mortality rate at birth, there are still many left a decade later. The ultimate effect of these entrants depends on the rate of growth of the survivors.

In order to characterize the experience of surviving entrants in the 1970s, the data on entry to and exit from the manufacturing sector as a whole were used to calculate the share of each entry cohort as it matured. Data for each entry cohort from 1971 to 1980 were used and the average share, both in terms of number of firms and value-added, was calculated for each age class of each entry cohort. The results are plotted in Figure 7 for entrants via plant birth.

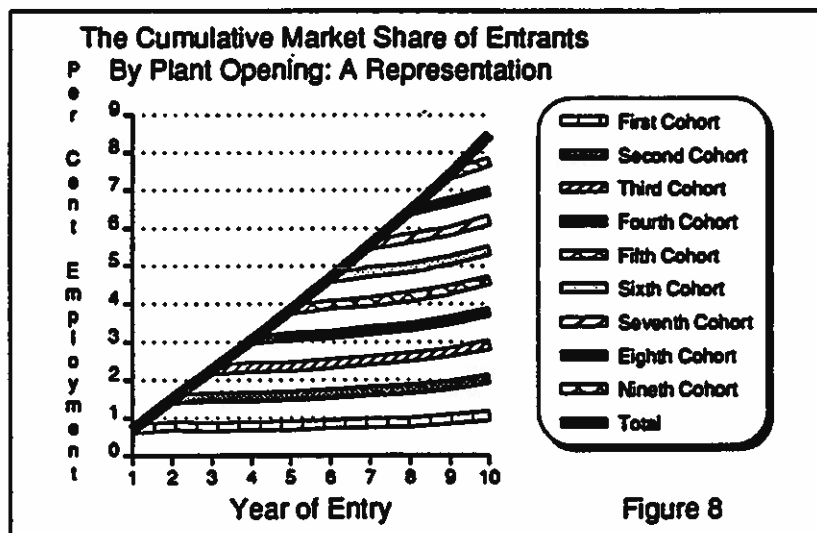


all shares, both in terms of number of firms and value-added, was calculated for each age class of each entry cohort. The results are plotted in Figure 7 for entrants via plant birth. All shares are expressed in index form as a percentage of the share as of the year of birth.

Because there is immediate exit from each greenfield entry cohort, the average percentage of all firms accounted for by each entry cohort declines continuously as the cohort ages. In contrast, the average value-

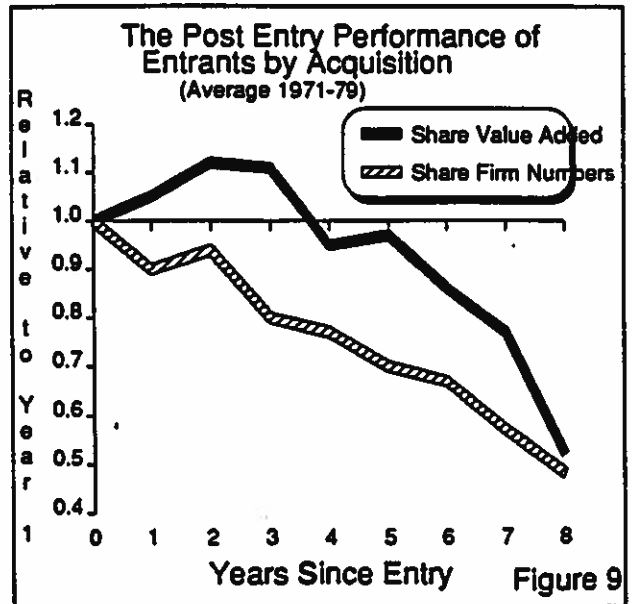
added share¹³ increases throughout the period--some ten years--studied here. The growth rate of surviving entrants then more than offsets the high death rate experienced by each cohort in the early years of its existence.

The cumulative effects of greenfield entry are plotted in Figure 8. The average market share, using value-added, of each entry cohort from 1970-71 to 1980-81 was used for the starting point. The average share trajectory corresponding to Figure 7 was then applied to each cohort. The resulting total market share captured by entrants is a representation of how the effect of entry accumulates on



average. Over the decade studied, there is no downturn in an average cohort's share and, therefore, the cumulative effect of entry continuously increases. Despite their high mortality rate, entrants remain to make themselves felt as a group.

The course of post-entry success of merger entrants depicted in Figure 9 is less dramatic than that shown for greenfield entrants. On the one hand, share in terms of number of firms also falls; on the other hand, the share in terms of value-added increases for the first three years after the merger; subsequently, it falls below its initial value. Entry by acquisition then serves to revitalize older and larger firms, though it does not arrest the natural aging process completely.¹⁴



The two groups of entrants do not experience the same post-entry success.¹⁵ This is not surprising in light of the differences between the two. Only greenfield entrants can be classified as true infants that have the potential for rapid growth towards maturation. Merger entrants are better characterized as mature firms looking for rejuvenation. Because of their larger initial size, there is less possibility for post-entry growth. Despite this, there is evidence of some initial success in the latter group after entry.¹⁶

The previous analysis describes how the importance of entry accumulates inexorably; but it is based on averages and on a definition of entry to the manufacturing sector as a whole that may understate the amount of entry that occurs because it misses movement by a firm originally in one manufacturing industry to another. More comprehensive measures of the cumulative effect of entry over a period of years can be generated. This is done first by measuring the cumulative amount of entry to and exit from the manufacturing sector as a whole over six- and eleven-year periods. Secondly, more detailed analyses at the 4-digit level that compare 1970 to 1979 are conducted to avoid the aggregation bias inherent in defining entry and exit to the manufacturing sector as a whole.

C) Cumulative Effects of Entry and Exit

- Using Measures of Entry to the Manufacturing Sector as a Whole.

Two six-year periods--1970-71 to 1975-76 and 1975-76 to 1980-81--and one eleven year period--1970-71 to 1980-81--are selected to examine longer-run entry and exit rates in the Canadian manufacturing sector. The long-run rates of change for each period are calculated by comparing the status of firms in the initial and terminal years. Thus, for the period 1970-71 to 1980-81, the entry rate is calculated as the 1981 employment in manufacturing firms that were not in the manufacturing sector in 1970 divided by 1970 employment in the manufac-

turing sector. This measure captures the cumulative effect of all entrants from 1971 to 1981 that were extant in 1981.

Table 5 summarizes the longer-run entry and exit rates and compares them to the average rates derived from measuring the instantaneous entry and exit rate within each of the six- and eleven-year periods. Long-run entry rates are presented in the first two panels of the first half of Table 5. The first panel (A) contains the cumulative rate of change. The second panel (B) contains the equivalent annual rate derived from these cumulative rates of change. For comparative purposes, the last panel (C) provides the corresponding average annual rates derived from the year-to-year comparisons.¹⁷ The first set of rates (columns 1 and 2) cover total entry, both by plant opening and via acquisition. The second set (columns 3 and 4) include just the former category. The third set (columns 5 and 6) detail the rates of entry due to acquisition. The second half of the table presents comparable information for the firm exit process.

It has already been demonstrated that, on average, the value-added share of each cohort that entered by plant creation did not diminish over the decade for which data are available (Figure 7). This is manifested in the close similarity between the annual equivalent rates of change (Panel B) and the average values of the year-to-year changes calculated within each period (Panel C) for greenfield entrants. At least within the decade used here, the total effect of entry will continually increase as each new cohort is added because the share of previous cohorts will not yet have begun to decline.

What has been said of greenfield entry is also true of closedown exits. Equivalent annual long-run rates of closedown exits from comparing end-points (Panel B) are just as large as the average of short-run rates calculated within each period (Panel C). This would not occur if exit just came from a fringe of new firms that are quickly eliminated. For then the cumulative long-run rate of exit would be equal to the average short-run rate and the equivalent annual rate derived from the cumulative rate would be below it. Like entry, the exit process cumulates over time as more and more firms disappear.

Entry and exit by acquisition and divestiture are also characterized by this relationship between the long- and the short-run rates. But this is less surprising. Acquired firms are mature firms and are not likely to exit or to decline markedly in size after acquisition. Indeed, it was demonstrated that these firms initially enjoyed an increase in market share. Therefore, the effect of merger entry and exit also accumulates over the period of time being used here.¹⁸

The longer-run rates of entry and exit presented in panel A indicate that, when cumulated over periods of six to eleven years, entry and exit are processes of considerable magnitude. For example, in the period 1970-71 to 1980-81, 43.6 per cent of the 1970 population of firms had exited the manufacturing sector by 1980-81, either because of plant closings or the divestiture of assets. These exits accounted for 28.1 per cent of sector employment in 1970. Entrants to the manufacturing sector via plant openings or acquisitions between 1970-71 to 1980-81 also had a substantial effect. The number of entrants equalled 39.9 per cent of the

1970 firm population. Their employment in 1981 was equal to 25.5 per cent of total employment in 1970.

In the short run, acquisition entry was slightly more important than greenfield entry in terms of employment affected (see Table 2). This is usually the case over the six- and eleven-year periods being used here for estimation of the cumulative impact of both processes. The 1981 employment in all firms entering during the period 1970-1 to 1980-1 was equal to 25.5 per cent of 1970 employment; for greenfield entry, it was 10.9 per cent; for entry by acquisition, it was 14.6 per cent. The same relationship holds for exit. Closedown exits over the period 1970-71 to 1980-81 accounted for 10.5 per cent of employment in 1970; exit via divestiture accounted for 17.7 per cent of 1970 employment.

- **Using Measures of Entry at the 4-digit SIC level.**

While the data for entry to the manufacturing sector show that decadal turnover is not insignificant, they may understate the importance of entry because they focus only on entry by firms outside the manufacturing sector. Therefore, more detailed estimates of longer-run entry and exit rates were made using the categories presented in Table 1 and by measuring this process at the finer 4-digit industry level scheme using 1970 as the initial year and 1979 as the terminal year. The importance of the various cells of Table 1 is presented in Table 6, first in terms of the proportion of the number of establishments involved, and second by the relative proportion of the new, acquired, divested, and closed plants' shares of industry shipments. In each case, the proportion is the mean taken across 167 4-digit industries.

The individual 4-digit industry level data confirm the importance of the entry and exit process that was found using turnover data for the manufacturing sector as a whole. The cumulative effect of entry and exit over the decade of the 1970s was large. As of 1979, firms that were new to the industry since 1970 accounted for, on average, 33 per cent of all establishments and 27 per cent of shipments in that year. Firm exits over the decade accounted for, on average, 40 per cent of the number of establishments in 1970 and 31 per cent of shipments.

A large portion of firm entry and exit involved plant births or deaths. If the number of establishments affected is used to measure relative importance, the entry process is dominated by plant creation. In 1979, 19 per cent of establishments were owned by firms that had entered since 1970 via plant birth. Only 9 per cent were owned by entrants via acquisition. In contrast, when shipments are used, entry by new plant creation and by acquisition are more equally split -- accounting for 12 and 11 per cent of 1979 shipments, respectively. The difference in importance, using employment as compared to firm numbers, is the result of two factors. First, in 1979, new plants created by greenfield entrants between 1970 and 1979 were only about one-third the size of the plants acquired by firms new to an industry. Secondly, the former enterprises rarely built more than one plant; the latter acquired, on average, 1.5 plants per firm.

As was the case with entry, the importance of the two exit processes (divestiture versus plant closure) differs, depending upon whether it is measured by the number of establishments affected or by their share of shipments. In terms of establishment numbers, exit via plant

closure was more important. In terms of percentage of shipments affected, exit via closure and via divestiture were about equally important. On average, firms with small establishments tended to die via closure, while firms with larger establishments were divested to other firms.

Finally, it should be noted that transfers of plants from one industry to another also contributed to the firm birth and death process. About 5 per cent of establishments were switched from one 4-digit manufacturing industry to another in a process that led to firm exit and entry. These plants contributed about 5 per cent to industry shipments in both 1970 and 1979.

While a separate paper focuses on comparisons of the entry and exit process to turnover and change within the sector of continuing firms, several points can be made at this stage. The various entrant and exit categories outlined in Table 6 were more important than the same categories for continuing firms. For example, the new plants of continuing firms accounted for only 5 per cent of shipments in 1979, while the new plants of entering firms (both plant births and switches) accounted for about 15 per cent of shipments in 1979. Acquisitions that led to entry are more important than horizontal acquisitions. The 1979 share of shipments of plants acquired by firms in the same industry was, on average, 3 per cent; it was, on average, 11 per cent for plants acquired by firms outside the industry.

In summary, the long-run data reveal that the cumulative effect of successive waves of entry over a decade is considerable. On an annual basis, entry is not large. Moreover, a considerable proportion of recent entrants exit the industry. These two stylized facts should not be used to infer that the entry process is generally unimportant. When entrants are tracked longitudinally, the story changes. Those entrants who do not die in early childhood grow sufficiently to offset the departures.

It is also important to note the relative importance of the two forms of entry. Most models of entry focus largely or exclusively on entry via plant creation and ignore entry by acquisition. Yet, in terms of sales or employment in each category, the two forms of entry and exit are about equally important in both the short and the long run. Studies of the effect of entry on performance are likely to miss part of the story if only greenfield entry is modelled.

ENTRY AND EXIT BY SIZE CLASS

The previous sections have focused on aggregate measures of change at the industry level. They ignore how entrants and exits are distributed across size classes. An examination of the importance of entry and exit by size class provides information on the extent to which these processes are restricted to the fringe or whether they have a more general effect across the size distribution of all firms. To answer this question, it is necessary once again to distinguish between the short and the long run. Firms that exit may be small immediately before exit but have been in decline for some time. In these circumstances, measurement of size in the year of death will leave the incorrect impression that large firms do not decline and then die. Similarly, entrants may achieve substantial size after several years growth, but

nevertheless have started out quite small. Use of the entrants' size at birth then would understate the eventual importance of these firms.

A) Short-run Firm Exit by Size Class

To investigate differences in firm exit across size classes, the yearly exit data on firms at the level of the manufacturing sector as a whole were used. Since firms that exit via plant closure were much smaller than those doing so via divestiture, it is important, when examining the intensity of firm exit by size class, to treat each of the components separately.

The importance of the two components of exit by firm size class are compared in Table 7. The average distribution of shares for each exit category, by size class, for all years from 1970-71 to 1981-82 is presented in columns 1 and 2, along with the average distribution of firm employment for the period (column 3). The relative importance of firm exits by closure as opposed to exits by divestiture, when measured by employment affected, is given in column 4.

The percentage of employment in exits by closure that is located in the three smallest classes is greater than the percentage of employment in these classes. In this sense, exits by closure are concentrated in small firms. The same cannot be said of divestitures. The importance of divestitures increases by size class. It accounts for only some 1.8 cent of all employment in the smallest class; but it accounts for 47.7 per cent of employment in the largest class. However, even though the largest size class has the highest percentage of employment affected by divestiture, the percentage is still less than the percentage of total employment in this class. It is in the middle two size classes where divestiture is more heavily concentrated than is employment.

Considered by itself, exit by plant closure decreases the importance of the smallest size class--though to the extent entrants cause these exits and entrants generally first appear in the smaller classes, the actual effect of plant openings and closings on the importance of a particular size class cannot be determined by examining closedowns alone.¹⁹

It is certainly the case that the effect of exit by divestiture on firm size distribution cannot be inferred without knowledge of the distribution by size class of the acquirer. When the size class of the acquirer is considered, the divestiture and acquisition process is found to favour the larger classes. For this purpose, both the origin and destination of all acquisitions within manufacturing during the 1970s were classified using three size classes (0-99, 100-499, and 500+). The smallest and the middle size class lost employment as a result of redistribution due to exit and entry, and the largest gained employment (Baldwin and Gorecki, 1986). If there is an inevitable rise and decline of firms due to natural tendencies, the merger process will tend to ameliorate this process and to cushion the decline of large firms.

Average exit rates by size class for firm closedowns and divestitures employing the same data base used to generate Table 7 are presented in Table 8. Annual rates are calculated from employment in exiting firms divided by employment in the size class. The average is then

calculated for the years 1970-1982. Exit rates by plant closure are largest for the smallest size classes and decline as the size class increases. Firm exit rates by plant divestiture do not follow a similar monotonic relationship. They are lowest for the smallest size class and highest for the third size class; but there is little difference between the second and fourth classes. The yearly divestiture rates of the largest size class underlying these averages are the most variable -- when measured by the standard error of the mean. It is large-firm divestiture, rather than small-firm divestiture, that causes the high variability in the aggregate divestiture series.

B) Longer-Run Firm Exit By Size Class

The pattern of exit across size classes in the long run need not be the same as in the short run. Long-run exit rates here are calculated by comparing the status of firms in two periods separated by several years. In the short run, the smallest size classes may dominate exits but in the longer run, this will be less noticeable to the extent that once large firms decline to the point where they begin to exit.

In order to investigate the distribution of longer-run exit rates by size class, exit rates are calculated at the detailed 4-digit industry level using the years 1970 and 1979. Use of the finer level of industry detail also reduces the aggregation bias inherent in the more aggregate statistics--when calculated across all industries, exit rates may be higher in smaller size classes if exit rates are higher in industries with smaller average firm sizes. Quintiles are chosen to define the size classes with firms ranked on the basis of shipment shares. The exit rates reported in Table 9 are averages calculated across 167 industries.

The cumulative and implicit annual firm exit rates over the 1970-79 period, for each size class, are reported in panel B. Also reported for comparative purposes are: the average short-run annual firm exit rates in panel A, and the size distribution of firms in rows 1 and 3 for the short and the long run, respectively. The equivalent annual firm exit rates derived from the cumulative rates are 4.9 per cent, 4.0 per cent, and 3.2 per cent for the middle three quintiles. It is 2.3 per cent for the quintile with the largest firms. While there are differences across size classes in the long run, they are less than the annual exit data suggest.

Another comparison for a later time period--1978-86--between short- and long-run exit rates is contained in Table 10. These data come from a different source to those used previously and have not been completely purged of all entry by acquisition and exit by divestiture.²⁰ Nevertheless, they use the same definition of size classes for comparison of the short and long run, which Table 9 does not. The cumulative exit rates and their equivalent annual values calculated by comparing 1978 to 1986 are above the short-run rates for all but the largest size class, where they are the same. Exit, then, is a process that accumulates over time.

In conclusion, the data show that, while exit is a small firm phenomenon, it is not restricted just to small firms. In the short run, the proportion of employment in closedown exits in small size classes is greater than the proportion of employment contained therein. But several caveats must be added if this is not to be misinterpreted. First, closedown exit rates are not

zero for the larger size classes. Over 33 per cent of all such exits over the decade occurred in firms that had over 100 employees. Secondly, the fact that the equivalent annual values of the cumulative rates are generally above short-run rates indicates that over the longer run, larger firms have had the opportunity to decline and exit. Finally, measuring exit by closedown alone leaves a different impression than when both forms of exit are considered. Large firms are more likely to exit by divestiture. Figure 10 contains a plot of the closedown exit rate by size class and also the total exit rate. Both are expressed in terms of percentage of firms exiting. When both forms of exit are taken together, the rate of exit does not decline as much across size classes as does the closedown exit rate.

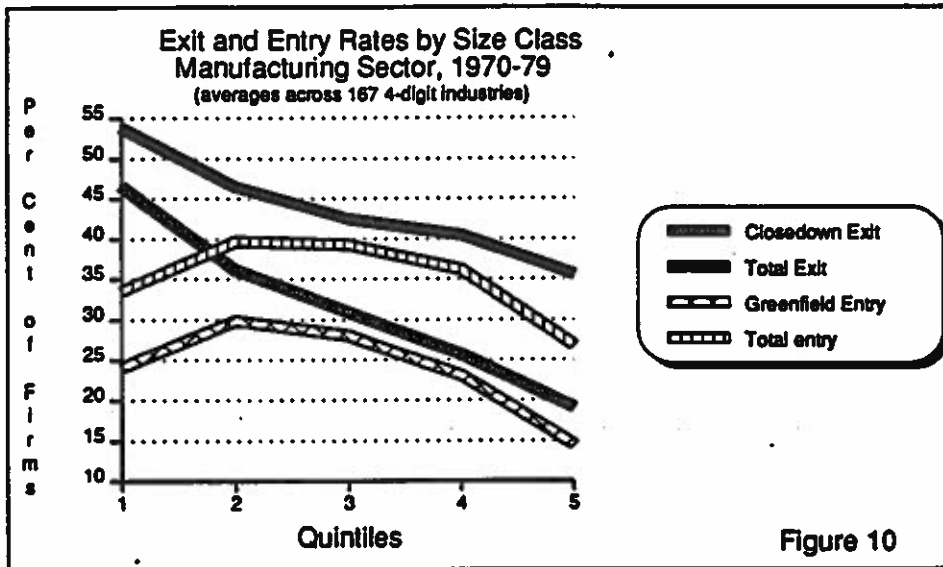


Figure 10

C) Longer-Run Entry Rates By Size Class

Just as exit is not restricted to small size classes, entry too affects all size groups. In order to show this, long-run greenfield entry and closedown exit rates, by size class, are both graphed in Figure 10. These rates come from the 1970 to 1979 comparison at the 4-digit level and were generated in a similar fashion to those in Panel B of Table 9. Exits are assigned to the size class in which they fell in 1970; entrants are assigned to their size class as of 1979. The cumulative long-run entry rate generally declines across size classes and closely follows the pattern of the exit rate, except for the smallest classes. Here entry rates increase while exit rates decline. This reflects the fact that firms in the smallest size classes have an opportunity to move upward over time and rates are being calculated using 1979 status.

The progression that entrants follow is best seen in Table 10, which includes a comparison of short- and long-run greenfield entry rates by size class for the period 1978-86. Long-run entry rates are derived by assigning each entrant to the size class occupied upon birth rather than at a subsequent date as was done in Figure 10. Then the long-run entry rate is calculated as the 1986 employment of all entrants in a particular size class over the employment of that size class in 1978. Cumulative entry rates are higher than short-run rates but the equivalent annual rates are only above the short-term averages for the smallest size classes. It is here that entrants grow relatively rapidly and move up size classes over time.

In summary, the entry, like the exit process, is ubiquitous ; but it is not equally concentrated across the spectrum of firm size classes. The largest size classes are relatively immune to greenfield entry, but not to acquisition entry. While greenfield entrants start off being small and having high infant mortality rates, the survivors grow sufficiently to begin challenging larger firms by their teen years.

CONCLUSIONS

Controversies about the efficacy of the entry process are not going to be resolved just by measurement of the size of entry and exit. Despite this, the debates are furthered by provision of basic data on its importance. This has been the goal of this paper.

The importance of entrants depends upon the probability of entry, on the size of entrants, and on their growth rate after birth. The data here show that all three have to be examined to appreciate fully the role that entry and exit play. If year-to-year data on entry and exit are examined and a narrow definition of entry is used, the process appears to be insignificant. Greenfield entrants, at birth, rarely account for more than one per cent of employment. Moreover, these entrants are initially small on average and, therefore, of little immediate threat to large firms.

However, to quote these figures alone is to provide an incomplete picture of the change that is occurring as a result of entry. Not all firm entry involves new plant creation. At the small end of the firm size distribution, the identity of participants primarily changes because of entry and exit due to plant opening and closure. For large firms, exit and entry occur more often via the sale and acquisition of assets. Corporate reorganization is the more prevalent means by which failures in the large firm population are disciplined. When this form of entry and exit is added to the greenfield entry and the closedown exit categories, the share of employment in entrants and exits doubles. Moreover, the size class distribution changes; large firm classes are no longer as immune to change.

Despite this, the annual figures on total entry and exit are still small--some 2 to 3 per cent of total employment. In terms of firm numbers, entrants are slightly more important--running from 6 per cent for the reduced sample used here to double this figure when all firms are included.²¹ Entrants are relatively numerous at first but not very large.

Entry turns what is latent or potential into actual competition. The arrival of real plant and machinery serves to make the reality of potential competitors that much more substantial. But entrants are not instantaneously successful. The maturation process is often slow and painful. The infant mortality rate is high. Upwards of 50 per cent of births die by the end of the decade. Nevertheless, the survivors grow sufficiently to offset the deaths of their siblings. As a result, the share of each greenfield entry cohort increases slowly over time and, as more and more cohorts of entrants are born annually, the importance of new firms accumulates.

The data on the firm turnover process indicate that it is not a phenomenon confined to a group of small firms that constantly churn at the margin. Over a decade all new firms accounted

for, on average, 27 per cent of existing shipments per 4-digit industry in the terminal year; all exiting firms, for 33 per cent of shipments in the initial year. Moreover, firm entry and exit begin to influence the whole firm size distribution.

It is true that post-entry growth matters. But to refer to this as internal competition rather than competition from entrants is to place too narrow an interpretation on entry. If an industry is regarded as being divided into classes and having mobility barriers that reduce movement between different size classes, then post-birth growth is synonymous with entry and exit into and out of the larger size classes. It is still the case that models that rely on internal rivalry, rather than latent rivalry from potential entrants may be more appropriate for some purposes. But it is not the case that industries remain static over time. The conventional industrial economics literature with its focus on large firm shares and concentration ratios, all too easily gives the impression of minimal change and, therefore, of static markets. The gradual accumulation of entry and exit depicted herein should begin to dispel this mistaken impression.

While the data presented in this paper reveal much about the entry and exit process, they only tell part of the story. Entry is just one of the forces at work that determines the strength of the competitive process. The importance of entry and exit needs to be set within the context of change that is occurring within the population of existing firms. In addition, the importance of the process needs to be measured not just in terms of share of firms added or removed or the contribution made to shipments, but also by the extent to which entry and exit serve to enhance productivity growth or to facilitate the equilibration process when prices and profits move away from long-run equilibrium. Accompanying papers (Baldwin and Gorecki, 1990c, 1990d) deal with these issues.

NOTES

1. See, for example, the special issue of the International Journal of Industrial Organization, 1987(5) and Geroski and Schwalbach, forthcoming.
2. See the discussion in Baldwin and Gorecki (1990a) of problems, particularly with respect to the use of Dun and Bradstreet data. For a study using national census data for the United States that avoids most of the problems in the literature and is comparable to our own study, see Dunne, Roberts and Samuelson (1989).
3. See Johnson and Storey (1985) for a discussion of Dun and Bradstreet studies.
4. See Storey (1985) for a set of studies for the U.K. using specially constructed data bases.
5. See the OECD (1987) for a cross country study that tries to reconcile the different definitions and coverage in France, West Germany, Japan, Sweden, Canada, and the United States.
6. See Baldwin and Gorecki (1990d) for a study that relates entry, inter alia, to productivity growth.
7. Plant entry and exit rates are also useful for job creation and destruction studies that focus on the relationship between change at the industry level and its effect on the labour force. This topic is covered extensively in Baldwin and Gorecki (1990a), where plant data were used.
8. Statistics Canada uses a number of different terms such as business unit, corporation, or consolidated enterprise to refer to a firm. For ease of reference, the term "firm" is used throughout as a generic term and, where necessary, the particular meaning used is defined for the reader.
9. The validity of using this rule is discussed at length in Baldwin and Gorecki (1990b).
10. See Baldwin and Gorecki (1990b).
11. Several corrections to the raw data were made because of a change in coverage, amongst other things. For a discussion of the changes required, see Baldwin and Gorecki (1990a).
12. Not all years decline immediately. The exceptions occur for entry in the late seventies. Part of this occurs because the entry data for 1978 included firms previously missed that were older and, therefore, did not die as quickly.
13. The use of employment rather than value-added leads to a decline in share after several years and would, therefore, give a misleading impression of the importance of entry.

14. See Baldwin and Gorecki (1990c) for a description of the natural regression process of large firms in the Canadian manufacturing sector.

15. See Baldwin and Gorecki (1989a) for a more detailed comparison of the differences between entry by plant birth and by acquisition.

16. See Baldwin and Gorecki (1989a) for a more detailed analysis of the success of mergers.

17. Panel C was derived from the uncorrected raw data on entry and exit (see fn. 11) and therefore does not correspond exactly to the results reported in Table 2.

18. There are two separate reasons why long-run equivalent annual rates for mergers are equal to short-run annual rates. For the five year periods, it is because share increases for the first five years after entry. For the ten-year period, it is because of the merger wave in the late 1970s which impacts heavily on the ten-year average.

19. The relationship between entrants and exits is examined more fully in Baldwin and Gorecki (1990d).

20. See Statistics Canada (1988) for a discussion of this data file and Baldwin and Gorecki (1990b) for an evaluation of the file.

21. See Baldwin and Gorecki (1990b) and (1990a, ch4.)

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Table 1
Plant and Firm Classification Matrix Used to Study
Entry and Exit in Canada's Manufacturing Sector

| Plant Status | Firm Status | | |
|---------------------------|--------------------|--|------|
| | Continuing | New | Dead |
| Divested | 11 | n.a. | 31 |
| Acquired | 12 | 22 | n.a. |
| Births | 13 | 23 | n.a. |
| Deaths | 14 | n.a. | 34 |
| Continuing | 15 | n.a. | n.a. |
| Transfer In | 16 | 26 | n.a. |
| Transfer Out | 17 | n.a. | 37 |
| <u>Definitions</u> | <u>Cell</u> | | |
| Entrants | 22 | Firms that entered the industry by acquiring one or more plants between t and $t + n$ | |
| | 23 | Firms that entered the industry by opening one or more plants between t and $t + n$ | |
| | 36 | Firms that entered the industry by transferring one or more plants from one industry to the given industry between t and $t + n$ | |
| Exits | 31 | Firms that left the industry by divesting one or more plants between t and $t + n$ | |
| | 34 | Firms that left the industry by scraping one or more plants between t and $t + n$ | |
| | 37 | Firms that exited the industry by transferring one or more plants out of the given industry to another between t and $t + n$ | |
| Continuing | 11 | Continuing firms that divested themselves of one or more plants between t and $t + n$ | |
| | 12 | Continuing firms that acquired one or more plants between t and $t + n$ | |
| | 13 | Continuing firms that built one or more plants between t and $t + n$ | |
| | 14 | Continuing firms that scraped one or more plants between t and $t + n$ | |
| | 15 | Continuing firms that owned at least one plant that existed in both t and $t + n$ | |
| | 16 | Continuing firms that transferred plants into of the given industry | |
| | 17 | Continuing firms that transferred plans out of the given industry | |

n.a. = not appropriate

Table 2

Annual Firm Entry and Exit Rates, Measured Using Number of Firms and Employment, Manufacturing Sector, Canada, 1970-71 to 1981-82

| Period | Entry Rates | | | | | |
|----------------|------------------|------------|------------|------------|-------------|------------|
| | Total | | Greenfield | | Acquisition | |
| | Number | Employment | Number | Employment | Number | Employment |
| | (% of base year) | | | | | |
| Panel A | | | | | | |
| 1970-71 | 4.2 | 1.6 | 3.4 | 1.2 | 0.8 | 0.4 |
| 1971-72 | 5.1 | 1.7 | 4.6 | 1.0 | 0.4 | 0.7 |
| 1972-73 | 5.0 | 1.5 | 4.8 | 1.1 | 0.2 | 0.4 |
| 1973-74 | 6.0 | 3.6 | 5.7 | 1.2 | 0.3 | 2.4 |
| 1974-75 | 6.2 | 1.1 | 5.9 | 0.8 | 0.3 | 0.2 |
| 1975-76 | 3.6 | 0.8 | 3.4 | 0.4 | 0.2 | 0.4 |
| 1976-77 | 2.1 | 0.6 | 1.7 | 0.3 | 0.4 | 0.4 |
| 1977-78 | 5.3 | 3.6 | 4.4 | 1.2 | 0.9 | 2.4 |
| 1978-79 | 4.5 | 2.5 | 3.4 | 0.7 | 1.1 | 1.8 |
| 1979-80 | 5.8 | 3.1 | 4.7 | 1.2 | 1.1 | 1.9 |
| 1980-81 | 3.8 | 1.9 | 2.9 | 0.6 | 0.9 | 1.2 |
| 1981-82 | 7.3 | 2.2 | 6.3 | 1.1 | 1.0 | 1.0 |
| Mean | 4.9 | 2.0 | 4.3 | 0.9 | 0.6 | 1.1 |
| Period | Exit Rates | | | | | |
| | Total | | Closedown | | Divestiture | |
| | Number | Employment | Number | Employment | Number | Employment |
| | (% of base year) | | | | | |
| Panel B | | | | | | |
| 1970-71 | 5.8 | 1.3 | 5.6 | 1.1 | 0.2 | 0.2 |
| 1971-72 | 6.2 | 2.4 | 4.8 | 0.9 | 1.4 | 1.5 |
| 1972-73 | 6.1 | 1.5 | 5.5 | 0.6 | 0.6 | 0.9 |
| 1973-74 | 5.2 | 3.9 | 4.3 | 0.9 | 0.9 | 3.0 |
| 1974-75 | 7.4 | 2.5 | 6.3 | 0.9 | 1.1 | 1.6 |
| 1975-76 | 5.7 | 1.8 | 5.1 | 1.2 | 0.6 | 0.6 |
| 1976-77 | 6.2 | 2.1 | 5.3 | 1.5 | 0.9 | 0.6 |
| 1977-78 | 6.7 | 4.9 | 5.0 | 1.6 | 1.7 | 3.3 |
| 1978-79 | 5.4 | 3.4 | 3.8 | 1.0 | 1.6 | 2.4 |
| 1979-80 | 6.4 | 4.0 | 4.6 | 1.2 | 1.8 | 2.8 |
| 1980-81 | 7.0 | 6.7 | 5.5 | 1.4 | 1.5 | 5.3 |
| 1981-82 | 10.1 | 3.7 | 8.3 | 1.7 | 1.8 | 2.0 |
| Mean | 6.5 | 3.2 | 5.3 | 1.2 | 1.2 | 2.0 |

Note: An entrant is defined as a firm present in manufacturing in the second, but not the first period; an exit as the reverse. Rates are calculated relative to base year firm and employment numbers. Greenfield entry occurs when the appearance of a firm corresponds to the appearance of its first plant assigned to an industry. Closedown exit occurs when a firm no longer has a plant classified to manufacturing.

Source: Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Table 3

Length of Life of Firms that ENTER the Manufacturing Sector(a) by Method of Entry, 1971-1981

| YEAR OF EXIT(c) | YEAR OF ENTRY(b) | | | | | | | |
|---------------------|----------------------|--------------------|----------------------|--------------------|----------------------|--------------------|----------------------|--------------------|
| | 1971 | | 1972 | | 1973 | | 1974 | |
| | Acquisition of plant | Building new plant | Acquisition of plant | Building new plant | Acquisition of plant | Building new plant | Acquisition of plant | Building new plant |
| 1971 | 21 (15.33) | 151 (10.58) | --- | --- | --- | --- | --- | --- |
| 1972 | 1 (0.73) | 138 (9.67) | 1 (1.43) | 118 (14.32) | --- | --- | --- | --- |
| 1973 | 8 (5.84) | 65 (4.56) | 1 (1.43) | 71 (8.62) | 5 (17.24) | 64 (7.38) | --- | --- |
| 1974 | 12 (8.76) | 100 (7.01) | 1 (1.43) | 66 (8.01) | 1 (3.45) | 100 (11.53) | 3 (5.26) | 110 (10.69) |
| 1975 | 5 (3.65) | 63 (4.41) | 5 (7.14) | 41 (4.98) | 0 (0.00) | 59 (6.81) | 5 (8.77) | 101 (9.82) |
| 1976 | 9 (6.57) | 51 (3.57) | 5 (7.14) | 40 (4.85) | 0 (0.00) | 52 (6.00) | 2 (3.51) | 94 (9.14) |
| 1977 | 50 (36.50) | 59 (4.13) | 6 (8.57) | 42 (5.10) | 1 (3.45) | 54 (6.23) | 4 (7.02) | 88 (8.55) |
| 1978 | 17 (12.41) | 43 (3.01) | 3 (4.29) | 31 (3.76) | 1 (3.45) | 31 (3.50) | 7 (12.28) | 34 (3.30) |
| 1979 | 0 (0.00) | 52 (3.64) | 6 (8.57) | 40 (4.85) | 1 (3.45) | 54 (6.23) | 1 (1.75) | 53 (5.15) |
| 1980 | 0 (0.00) | 45 (3.15) | 2 (2.86) | 33 (4.00) | 3 (10.34) | 49 (5.65) | 4 (7.02) | 54 (5.25) |
| 1981 | 3 (2.19) | 87 (6.10) | 3 (4.29) | 51 (6.19) | 0 (0.00) | 48 (5.54) | 3 (5.26) | 69 (6.71) |
| Still alive in 1982 | 11 (8.03) | 573 (40.15) | 37 (52.86) | 291 (35.32) | 17 (58.62) | 356 (41.06) | 28 (49.12) | 426 (41.40) |
| Total | 137 (100.00) | 1427 (100.00) | 70 (100.00) | 824 (100.00) | 29 (100.00) | 867 (100.00) | 57 (100.00) | 1029 (100.00) |
| | 1975 | | 1976 | | 1977 | | 1978 | |
| 1971 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1972 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1973 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1974 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1975 | 7 (14.29) | 101 (13.20) | --- | --- | --- | --- | --- | --- |
| 1976 | 4 (8.16) | 95 (12.42) | 0 (0.00) | 32 (7.60) | --- | --- | --- | --- |
| 1977 | 2 (4.08) | 72 (9.41) | 3 (7.89) | 35 (8.31) | 3 (4.48) | 31 (13.84) | --- | --- |
| 1978 | 2 (4.08) | 29 (3.79) | 4 (10.53) | 28 (6.65) | 5 (7.46) | 17 (7.59) | 4 (2.96) | 126 (7.22) |
| 1979 | 4 (8.16) | 44 (5.75) | 3 (7.89) | 18 (4.28) | 8 (11.94) | 10 (4.46) | 4 (2.96) | 116 (6.65) |
| 1980 | 2 (4.08) | 32 (4.18) | 3 (7.89) | 28 (6.65) | 3 (4.48) | 20 (8.93) | 16 (11.85) | 106 (6.07) |
| 1981 | 1 (2.04) | 48 (6.27) | 0 (0.00) | 24 (5.70) | 4 (5.97) | 21 (9.38) | 6 (4.44) | 145 (8.31) |
| Still alive in 1982 | 27 (55.10) | 344 (44.97) | 25 (65.79) | 256 (60.81) | 44 (65.67) | 125 (55.80) | 105 (77.78) | 1252 (71.75) |
| Total | 49 (100.00) | 765 (100.00) | 38 (100.00) | 421 (100.00) | 67 (100.00) | 224 (100.00) | 135 (100.00) | 1745 (100.00) |
| | 1979 | | 1980 | | 1981 | | | |
| 1971 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1972 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1973 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1974 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1975 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1976 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1977 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1978 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1979 | 53 (28.96) | 50 (6.35) | --- | --- | --- | --- | --- | --- |
| 1980 | 6 (3.28) | 73 (9.26) | 16 (8.84) | 86 (10.87) | --- | --- | --- | --- |
| 1981 | 13 (7.10) | 93 (11.80) | 19 (10.50) | 103 (13.02) | 14 (9.59) | 51 (10.49) | --- | --- |
| Still alive in 1982 | 111 (60.66) | 572 (72.59) | 146 (80.66) | 602 (76.11) | 132 (90.41) | 435 (89.51) | --- | --- |
| Total | 183 (100.00) | 788 (100.00) | 181 (100.00) | 791 (100.00) | 146 (100.00) | 486 (100.00) | --- | --- |

(a) The manufacturing sector is defined using the 1970 SIC for the years 1971-81.

(b) The first year that the enterprise's code appeared attached to an establishment that filed on Annual Census of Manufactures questionnaire.

(c) The last year that the enterprise's code appeared attached to an establishment that filed on Annual Census of Manufactures questionnaire.

Source: Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Table 4

Length of Life of Firms that EXIT the Manufacturing Sector(a) by Method of Exit, 1971-1981

| YEAR OF ENTRY(b) | YEAR OF EXIT(c) | | | | | | | |
|------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|
| | 1971 | | 1972 | | 1973 | | 1974 | |
| | Plant divesting | Plant destruction | Plant divesting | Plant destruction | Plant divesting | Plant destruction | Plant divesting | Plant destruction |
| 1971 | 29 (11.60) | 143 (18.31) | 8 (7.48) | 131 (14.70) | 13 (8.90) | 60 (8.70) | 23 (12.30) | 89 (9.03) |
| 1972 | --- | --- | 4 (3.74) | 115 (12.91) | 6 (4.11) | 66 (9.57) | 3 (1.60) | 64 (6.49) |
| 1973 | --- | --- | --- | --- | 5 (3.42) | 64 (9.28) | 8 (4.28) | 93 (9.43) |
| 1974 | --- | --- | --- | --- | --- | --- | 7 (3.74) | 106 (10.75) |
| 1975 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1976 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1977 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1978 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1979 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1980 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1981 | --- | --- | --- | --- | --- | --- | --- | --- |
| Alive in 1970 | 221 (88.40) | 638 (81.69) | 95 (88.79) | 645 (72.39) | 122 (83.56) | 500 (72.46) | 146 (78.07) | 634 (64.30) |
| Total | 250 (100.00) | 781 (100.00) | 107 (100.00) | 891 (100.00) | 146 (100.00) | 690 (100.00) | 187 (100.00) | 986 (100.00) |
| YEAR OF ENTRY(b) | 1975 | | 1976 | | 1977 | | 1978 | |
| | Plant divesting | Plant destruction | Plant divesting | Plant destruction | Plant divesting | Plant destruction | Plant divesting | Plant destruction |
| | 1971 | 7 (6.73) | 61 (7.65) | 20 (13.99) | 40 (4.93) | 60 (22.39) | 49 (6.03) | 29 (10.78) |
| 1972 | 1 (0.96) | 45 (5.65) | 7 (4.90) | 38 (4.69) | 12 (4.48) | 36 (4.43) | 9 (3.35) | 25 (3.97) |
| 1973 | 3 (2.88) | 56 (7.03) | 2 (1.40) | 50 (6.17) | 3 (1.12) | 52 (6.40) | 6 (2.23) | 26 (4.13) |
| 1974 | 2 (1.92) | 104 (13.05) | 2 (1.40) | 94 (11.59) | 14 (5.22) | 78 (9.61) | 10 (3.72) | 31 (4.93) |
| 1975 | 5 (4.81) | 103 (12.92) | 3 (2.10) | 96 (11.84) | 4 (1.49) | 70 (8.62) | 9 (3.35) | 22 (3.50) |
| 1976 | --- | --- | 5 (3.50) | 27 (3.33) | 6 (2.24) | 32 (3.94) | 8 (2.97) | 24 (3.82) |
| 1977 | --- | --- | --- | --- | 5 (1.87) | 29 (3.57) | 8 (2.97) | 14 (2.23) |
| 1978 | --- | --- | --- | --- | --- | --- | 19 (7.06) | 111 (17.65) |
| 1979 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1980 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1981 | --- | --- | --- | --- | --- | --- | --- | --- |
| Alive in 1970 | 86 (82.69) | 428 (53.70) | 104 (72.73) | 466 (57.46) | 164 (61.19) | 466 (57.39) | 171 (63.57) | 345 (54.85) |
| Total | 104 (100.00) | 797 (100.00) | 143 (100.00) | 811 (100.00) | 268 (100.00) | 812 (100.00) | 269 (100.00) | 629 (100.00) |
| YEAR OF ENTRY(b) | 1979 | | 1980 | | 1981 | | | |
| | Plant divesting | Plant destruction | Plant divesting | Plant destruction | Plant divesting | Plant destruction | Plant divesting | Plant destruction |
| | 1971 | 6 (2.01) | 46 (5.97) | 12 (4.72) | 33 (3.61) | 12 (4.23) | 78 (5.81) | --- |
| 1972 | 7 (2.35) | 39 (5.06) | 4 (1.57) | 31 (3.39) | 10 (3.52) | 44 (3.28) | --- | --- |
| 1973 | 8 (2.68) | 47 (6.10) | 10 (3.94) | 42 (4.60) | 3 (1.06) | 45 (3.35) | --- | --- |
| 1974 | 8 (2.68) | 46 (5.97) | 9 (3.54) | 49 (5.36) | 12 (4.23) | 60 (4.47) | --- | --- |
| 1975 | 11 (3.69) | 37 (4.80) | 9 (3.54) | 25 (2.74) | 6 (2.11) | 43 (3.20) | --- | --- |
| 1976 | 7 (2.35) | 14 (1.82) | 2 (0.79) | 29 (3.17) | 3 (1.06) | 21 (1.56) | --- | --- |
| 1977 | 5 (1.68) | 13 (1.69) | 7 (2.76) | 16 (1.75) | 8 (2.82) | 17 (1.27) | --- | --- |
| 1978 | 24 (8.05) | 96 (12.45) | 26 (10.24) | 96 (10.50) | 28 (9.86) | 123 (9.16) | --- | --- |
| 1979 | 59 (19.80) | 44 (5.71) | 8 (3.15) | 71 (7.77) | 12 (4.23) | 94 (7.00) | --- | --- |
| 1980 | --- | --- | 26 (10.24) | 76 (8.32) | 20 (7.04) | 102 (7.59) | --- | --- |
| 1981 | --- | --- | --- | --- | 19 (6.69) | 46 (3.43) | --- | --- |
| Alive in 1970 | 163 (54.70) | 389 (50.45) | 141 (55.51) | 446 (48.80) | 151 (53.17) | 670 (49.89) | --- | --- |
| Total | 298 (100.00) | 771 (100.00) | 254 (100.00) | 914 (100.00) | 284 (100.00) | 1343 (100.00) | --- | --- |

(a) The manufacturing sector is defined using the 1970 SIC for the years 1977-81.

(b) The first year that the enterprise's code appeared attached to an establishment that filed on Annual Census of Manufactures questionnaire.

(c) The last year that the enterprise's code appeared attached to an establishment that filed on Annual Census of Manufactures questionnaire.

Source: Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Table 5
Cumulative Firm Entry and Exit Rates in Canadian Manufacturing
Between 1970 and 1981

| Period | Total Entry Rate | | Greenfield Rate | | Acquisition Rate | |
|----------------|---|------------|-----------------|------------|------------------|------------|
| | Number | Employment | Number | Employment | Number | Employment |
| % | | | | | | |
| Panel A | Cumulative change from comparing endpoints | | | | | |
| 1970-76 | 25.4 | 9.8 | 23.7 | 5.1 | 1.8 | 4.7 |
| 1975-81 | 25.2 | 15.1 | 21.6 | 6.1 | 3.6 | 9.0 |
| 1970-81 | 39.9 | 25.5 | 35.5 | 10.9 | 4.5 | 14.6 |
| Panel B | Implicit annual rates of change from panel A | | | | | |
| 1970-76 | 3.9 | 1.6 | 3.6 | 0.8 | 0.3 | 0.8 |
| 1975-81 | 3.8 | 2.4 | 3.3 | 0.9 | 0.6 | 1.4 |
| 1970-81 | 3.1 | 2.1 | 2.8 | 0.9 | 0.4 | 1.3 |
| Panel C | Average of annual rates within each period | | | | | |
| 1970-76 | 5.6 | 1.5 | 5.2 | 0.7 | 0.4 | 0.7 |
| 1975-81 | 5.3 | 2.4 | 4.5 | 1.0 | 0.8 | 1.4 |
| 1970-81 | 5.7 | 2.0 | 5.1 | 0.9 | 0.6 | 1.1 |

| Period | Total Exit Rate | | Closedown Rate | | Divestiture Rate | |
|----------------|---|------------|----------------|------------|------------------|------------|
| | Number | Employment | Number | Employment | Number | Employment |
| % | | | | | | |
| Panel A | Cumulative change from comparing endpoints | | | | | |
| 1970-76 | 26.6 | 12.6 | 22.5 | 5.3 | 4.2 | 7.3 |
| 1975-81 | 30.3 | 20.5 | 23.7 | 7.8 | 6.6 | 12.7 |
| 1970-81 | 43.6 | 28.1 | 35.0 | 10.5 | 8.6 | 17.7 |
| Panel B | Implicit annual rates of change from panel A | | | | | |
| 1970-76 | 5.0 | 2.2 | 4.2 | 1.0 | 0.7 | 1.3 |
| 1975-81 | 5.8 | 3.7 | 4.4 | 1.3 | 1.1 | 2.2 |
| 1970-81 | 5.1 | 3.0 | 3.8 | 1.0 | 0.8 | 1.8 |
| Panel C | Average of annual rates within each period | | | | | |
| 1970-76 | 5.7 | 2.3 | 4.9 | 0.9 | 0.8 | 1.3 |
| 1975-81 | 6.1 | 3.8 | 4.8 | 1.3 | 1.3 | 2.5 |
| 1970-81 | 6.0 | 3.1 | 4.9 | 1.1 | 1.1 | 2.0 |

Note: Entrants are defined as those firms that were not in any manufacturing industry in the base year (i.e., 1970 for 1970-71) but were there in the final year (i.e., 1976 for 1975-76) exits are the reverse. All rates are expressed as a percentage of base year firm numbers or employment in the manufacturing sector.

Source: Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Table 6

Average Share of Number of Establishments and of Shipments Across 167 4-digit Canadian Manufacturing Industries for Various Categories on Entry and Exit, 1970 and 1979

| Firm Category | Share of Number of Establishments ¹ | | Share of Shipments ² | |
|--------------------------------------|--|-------|---------------------------------|-------|
| | 1970 | 1979 | 1970 | 1979 |
| 1) All Firms ³ | 100.0 | 100.0 | 100.0 | 100.0 |
| 2) All Entrants ³ | | 33.2 | | 26.8 |
| i) By Plant Birth | | 18.8 | | 11.5 |
| ii) By Acquisition | | 8.7 | | 10.7 |
| iii) By Plant Switch | | 5.6 | | 4.6 |
| 3) All Exits ⁴ | 39.8 | | 30.8 | |
| i) By Plant Closing | 24.6 | | 13.3 | |
| ii) By Divestiture | 10.0 | | 12.7 | |
| iii) By Plant Switch | 5.2 | | 4.9 | |
| 4) All Continuing Firms ⁵ | 60.2 | 66.8 | 69.1 | 73.2 |
| i) Continuing Est ⁶ | 55.3 | 59.2 | 63.4 | 65.0 |
| ii) Divested | 0.6 | | 1.1 | |
| iii) Acquired | | 2.2 | | 3.0 |
| iv) Plant Closures | 3.8 | | 3.8 | |
| v) Plant Births | | 4.6 | | 4.4 |
| vi) Plant Switches | 0.5 | 0.7 | 0.8 | 0.9 |

¹ The average is calculated across all 167 observations.

² The sample consists of a reduced set of plants that report extensive information to the Canadian Census of Manufactures. A discussion of the data base can be found in Baldwin and Gorecki (1989a).

³ Firms that entered a 4-digit industry between 1970 and 1979 by plant birth, acquisition or by switching a plant from another industry.

⁴ Firms that exited an industry between 1970 and 1979 by closing a plant, divesting themselves of plant or switching plant to another industry.

⁵ Firms that existed in both 1970 and 1979.

⁶ Continuing establishments are those that existed in the 4-digit industry in both 1970 and 1979 and did not undergo a change in ownership.

Source: Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Table 7

Distribution of Annual Employment Loss Associated with Firm Exits for Canadian Manufacturing, by Size Class, 1971-1982

| Employment Size Class | Method of Exit | | All employment in continuing firms ¹ | Percentage of employment in exiting firms accounted for by divestitures |
|---|---------------------------|----------------------------|---|---|
| | By divestiture (1) | By closing (2) | | |
| Mean per cent value of distributions calculated annually 1971-1982 | | | | |
| 1-19 | 1.8 (0.3) ² | 21.8 (1.6) ² | 4.2 (0.1) ² | 11.0 (1.2) ² |
| 20-99 | 17.8 (2.8) | 41.7 (1.7) | 14.8 (0.1) | 38.0 (2.6) |
| 100-499 | 32.7 (3.9) | 22.4 (1.3) | 18.9 (0.1) | 68.0 (3.0) |
| 500+ | 47.7 (6.2) | 14.1 (3.0) | 62.1 (0.3) | 79.0 (7.2) |
| All Size Classes | 100.0 | 100.0 | 100.0 | 60.0 (5.0) |

¹ Employment in firms continuing between adjacent years.

² Standard error of mean in brackets

Source: Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Table 8

Annual Average Rates of Job Loss from Firm Exit via Establishment Closure and Divestiture in the Canadian Manufacturing Sector, By Size Class, 1971-1982

| Employment Size Class | Rate of job loss due to firm exit by closedown ¹ | Rate of job loss due to firm exit by divestiture ² |
|-----------------------|---|---|
| 1-19 | 6.50 (0.46) ³ | 0.70 (0.09) ³ |
| 20-99 | 3.20 (0.23) | 2.00 (0.22) |
| 100-499 | 1.40 (0.14) | 3.00 (0.30) |
| 500+ | 0.40 (0.06) | 2.10 (0.60) |
| All Size Classes | 1.20 (0.09) | 2.20 (0.42) |

¹ Jobs in closedowns divided by employment.

² Jobs in divestitures divided by employment.

³ Standard error of mean in brackets.

Source: Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Table 9

Short-Versus Long-Run Exit Rates of Firms in the Manufacturing Sector, By Size Class, Canada, 1970's

| | Employment Size Class | | | | | All Classes |
|---|-----------------------|------------|------------|------------|------------|------------------|
| | 1-19 | 20-99 | 100-499 | 500+ | | |
| Panel A: Short-run | | | | | | |
| 1) Distribution of Employment in Continuing Firms | 4.2 | 14.8 | 18.9 | 62.1 | | 100.0 |
| 2) Mean Annual Exit Rate | 6.5 | 3.3 | 1.4 | 0.6 | | 4.7 |
| | quintile 1 | quintile 2 | quintile 3 | quintile 4 | quintile 5 | All Size Classes |
| Panel B: Long-run | | | | | | |
| 3) Distribution of Employment | 0.9 | 2.8 | 6.2 | 15.4 | 74.6 | 100.0 |
| 4) Cumulative Exit | 46.6 | 36.2 | 30.9 | 25.7 | 19.1 | 31.9 |
| 5) Equivalent Annual Rate | 6.7 | 4.9 | 4.0 | 3.2 | 2.3 | 3.1 |

1 Exits are by plant closedown.

2 The short-run rates were calculated between adjacent years with averages taken across the period 1971-82 for row 1 and 1971-81 for row 2. The rates were estimated using the manufacturing sector as the level of aggregation. Continuing firms exist between adjacent years; exits, via the closure of establishments, are classified in the manufacturing sector in one year but not the next. Size classes are based on the firm's employment.

3 The long-run rates are averages across 167 4-digit manufacturing industries, using 1970 and 1979 for comparison. Exits are firms that had plants in a given industry in 1970 but not in 1979. The quintiles were obtained by ranking firms on the basis of 1970 shipments.

Source: Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.

Table 10
The Difference Between Long and Short-Run Rates¹ of Entry and Exit, Canada
1978-1986

| | Size Class | | | | | | All Classes |
|-----------------------------------|----------------|--------|---------|---------|-----------|------|----------------|
| | Less than 5 | 5-19.9 | 20-49.9 | 50-99.9 | 100-499.9 | 500+ | |
| <u>Exit Rates</u> | | | | | | | |
| 1) Annual Average | 5.9 | 3.1 | 2.7 | 2.5 | 2.3 | 0.8 | 1.6 |
| 2) Cumulative 78-86 | 42.0 | 33.0 | 30.9 | 31.3 | 23.8 | 6.2 | 15.9 |
| 3) Equivalent Annual ² | 6.6 | 4.9 | 4.5 | 4.6 | 3.3 | 0.8 | 2.1 |
| <u>Entry Rates</u> | | | | | | | |
| 4) Annual Average | 8.6 | 3.8 | 2.1 | 1.7 | 1.4 | 0.6 | 1.3 |
| 5) Cumulative 78-86 | 220.1 | 59.1 | 23.2 | 15.2 | 9.3 | 3.5 | 13.9 |
| 6) Equivalent Annual ² | 15.7 | 6.0 | 2.6 | 1.8 | 1.1 | 0.4 | 1.6 |

¹ Rates of change are all calculated relative to base year size. Entrants are assigned to a size class as of birth date.

² The equivalent annual rate (rows 3 and 6) is the rate that, when compounded over the period of measurement, equals the cumulative rate.

Source: The source of this table is described in Statistics Canada (1988) and differs from all others in this paper that use the Census of Manufactures. For further discussion of the differences, see Baldwin and Gorecki (1990).
Special Tabulations, Business and Labour Market Analysis Group, Statistics Canada.