HAVE SMALL FIRMS CREATED A DISPROPORTIONATE SHARE OF NEW JOBS IN CANADA? A REASSESSMENT OF THE FACTS

by

G. Picot*, J. Baldwin and R. Dupuy***

No. 71

*Business and Labour Market Analysis, Statistics Canada
24F R.H. Coats Building, Ottawa K1A OT6
Voice: (613) 951-8214   FAX: (613) 951-5643

**Micro-Economic Studies and Analysis Division,
and Canadian Institute for Advanced Research
Voice: (613) 951-8588

November 1994

Presented at the Canadian Economics Association Meetings
June 9-13, 1994
Calgary, Alberta

This paper represents the views of the authors and does not reflect the opinions of Statistics Canada.

Aussi disponible en français.

Abstract

The statistical observation that small firms have created the majority of new jobs during the 1980s has had a tremendous influence on public policy. Governments have looked to the small firm sector for employment growth, and have promoted policies to augment this expansion. However, recent research in the US suggests that net job creation in the small firm sector may have been overestimated, relative to that in large firms. This paper addresses various measurement issues raised in the recent research, and uses a very unique Canadian longitudinal data set that encompasses all companies in the Canadian economy to reassess the issue of job creation by firm size. We conclude that over the 1978-92 period, for both the entire Canadian economy and the manufacturing sector, the growth rate of (net) employment decreases monotonically as the size of firm increases, no matter which method of sizing firms is used. The small firm sector has accounted for a disproportionate share of both gross job gains and job losses, and in that aggregate, accounted for a disproportionate share of the employment increase over the period. Measurement does matter, however, as the magnitude of the difference in the growth rates of small and large firms is very sensitive to the measurement approaches used. The paper also produces results for various industrial sectors, asks whether the more rapid growth in industries with a high proportion of small firms is responsible for the findings at the all-economy level, and examines employment growth in **existing** small and large firms (ie excluding births). It is found that employment growth in the population of existing small and large firms is very similar.

Introduction

The statistical observation that small firms have created the majority of new jobs during the 1980s has had a tremendous impact on public policy. Few other statistical facts could claim such influence. With persistently high unemployment during the 1980s and early 1990s, governments seeking employment growth have turned to the sector that was apparently the generator of most jobs.

This has resulted in a public policy orientation that has very actively promoted the development and expansion of small firms through various means, including differential tax treatment, the provision of information support services, the creation of sources of venture capital, and the exclusion of small firms from various legislation, such as the requirement in some provinces to equalize fringe benefits for full-time and part-time staff. (Industry Canada, 1994). There are a number of reasons why such a policy orientation may be desirable. One major rationale has been the belief that if the North American economies are to achieve a substantial growth in employment, it will be among small and medium sized firms.

The roots of this belief lie with work by the American economist David Birch (1979, 1987), in which he found that most of net new job creation was among small firms. In Canada, various publications, including the Annual Report on Small Business in Ontario (1987) and Small Business in Canada (1991), ascribed 80% to 90% of total net new jobs in Canada to small (under 50 employees) firms. Asking the somewhat more limited question of whether there has been a shift in the distribution of employment by firm size over the late 70s and 1980s, Wannell (1991) concludes that the answer is yes; small firms account for a greater share of all employment than in previous years.

These results are of interest for numerous reasons other than the concern with job creation. The shift in employment towards small firms also potentially bears on the rising earnings inequality observed in North American labour markets, and the quality of jobs produced. As noted in Morissette (1993), Brown, Hamilton and Medoff (1990), jobs in small firms pay less on average, even after controlling for differences in worker characteristics, have fewer fringe benefits, are shorter in duration, and are more likely to lead to permanent layoffs. (Picot, 1992) In addition, numerous explanations are developing to explain the job creation strength of small firms, such as the availability of flexible technologies that allow small firms to respond to market needs quickly. The more rapid employment growth in small firms is of interest for many reasons.

But recent research in the US is disputing this observation. Brown, Hamilton and Medoff (1990) suggest that both the share and quality of jobs created in small firms have been overstated. A more recent paper by Davis and Haltiwanger and Schuh (1993) goes further, arguing that in manufacturing in the US at least, small firms have not accounted for a disproportionate share of jobs. They argue that earlier findings were incorrect because of poor quality data, the use of cross-sectional data when longitudinal data are really required, and incorrect measurement techniques. This has cast doubt on the underlying premise that small firms have been the primary job creators.

3

Unlike the US, where the analysis could only be done for the manufacturing sector, in Canada the necessary longitudinal data exist for the entire economy. The 'LEAP'[1] data base is a longitudinal file of companies containing annual employment estimates for every company in the economy. New editing procedures have recently been put in place to improve upon earlier versions of this file for analyses such as those conducted here. More is said of this later. The goal of this paper is to use this longitudinal file to re-ask the question: "do small firms create a disproportionate share of new jobs in Canada?" In this and most similar studies, jobs are said to be created if there is the appearance of a new firm, or if an existing firm expands its employment from one year to the next. Jobs are said to be lost if a firm disappears, or if a continuing firm experiences an employment contraction.

This paper approaches the above question in a fairly narrow sense. We are asking what impact the type of data used and various measurement issues can have on the calculation of net and gross employment change by firm size. One could ask other questions, such as whether the appearance of jobs in small firms implies that they "created" them, what types of jobs are created in small and large firms, the role of small firms in developing large and medium sized firms, and their role in developing innovative approaches to product development, and other questions. This paper focuses on measurement issues.

More specifically, the topics addressed are:

(1) the suitability of the data used for this type of analysis;

(2) the impact on the results of alternative methods of establishing firm size, including those used by Davis, Haltiwanger and Schuh (1993);

(3) the difference in the results when using short-term (year to year) employment change or longer-term (over four years) change;

(4) whether the results apply to all major industrial sectors, and whether the rapid employment growth in industries with a high proportion of small firms (e.g. consumer services) partially accounts for the increasing importance of small firms; and

(5) whether existing small firms display more rapid employment creation than existing large firms. (Or put another way, how important are "newly created" firms in explaining the difference in employment growth between the small and large firm sector?)

---

[1] Longitudinal Employment Analysis Program, maintained in the Business and Labour Market Analysis Group of Statistics Canada

Our major conclusions follow:

(1) There is one consistent finding throughout the study. For both the entire Canadian commercial economy and the manufacturing sector we find that the growth rate of (net) employment decreases monotonically as size of firm increases, no matter which method of sizing firms is used. The small firm sector has accounted for a disproportionate share of both gross job gains and job losses, and in the aggregate, accounted for a disproportionate share of employment increase over the 1978-92 period. This is observed for all methods of determining firm size, whether using short run (year to year) or longer run (over three or more years) job gains and losses. It is also observed during a period of recession and recovery (1981-84), and expansion (1984-88).

(2) In Canada, the disproportionate role of small firms is particularly evident in the goods-producing and distributive services sectors, where employment growth has been the slowest. In the faster growing consumer and business services sectors, the differences in employment growth between small and large firms is less.

(3) But the method of sizing firms does has a significant impact on the findings. Compared to the traditional method of sizing used in most previous studies, the methods proposed and preferred by Davis et al (1993) decrease the observed gross job gain and increase the gross job loss in small firms. They do the opposite for large firms. Thus, the dominance of small firms in net job creation is reduced, but not eliminated, by these measures as compared to earlier findings. There are issues regarding the traditional measures of firm size, those proposed by Davis et al, and others applied here that render them imperfect. One might consider the results for the different measures as reasonable bounds. In particular, those proposed in Davis et al tend to classify growing firms as large (and declining as small) while others used here likely do the opposite. The qualitative conclusions are similar for all variants of the measure, however.

(4) The more rapid employment growth in industries where small firms account for a high percentage of employment, such as many consumer services industries, can result in apparently faster employment growth in small firms for the commercial economy as a whole, even if there are no differences in employment growth rates by size within industries. This changing industrial distribution of employment is estimated to account for perhaps one-quarter of the differences in employment growth between small and large firms observed for the economy as a whole.

(5) These results refer to the combined effects of births, deaths, and expansion and contraction of continuing firms. When turning to cohorts of firms that exist at any given time, the results suggest that employment in existing small firms is likely to expand at roughly the same rate as that in existing large firms. To some considerable degree, it is the fact that most "newly identified firms" are concentrated in the small firm sector that results in its higher overall rate of gross job gain and net employment gain.

Part I
The Data and Methodological Considerations

A.   THE NEED FOR LONGITUDINAL DATA AND THE 'LEAP' FILE

Change in the cross-sectional size distribution of firms is not, by itself, sufficient to determine if gross or net job growth differs by firm size. The annual size distribution could shift towards the small firm sector for many reasons; small firms can display no growth while large firms contract, there may be increasing numbers of small firms which exhibit little growth, or firms can migrate across size boundaries between years. Let us assume, for example, that small firms are defined as those with under 200 employees. A firm which has 250 employees in year 1 will be classified as large. If this same firm loses 100 employees, resulting in 150 the second year, its classification will change to small. If no other changes took place among other firms, the cross-sectional data on the distribution of employment by size would show a net increase of 150 in employment among small firms. This is true, but it does not reflect growth in small firms. What in fact occurred was a decline of 100 in a large firm. Of course, other cross-boundary migrations will also occur with similar distorting effects. A firm changing its classification from small to large will apparently reduce employment among small firms, and increase it among large, when in fact a small firm expanded. As noted in David, Haltiwanger and Schuh (1993), this effect can be significant. To prevent this distortion in the results, firms are allocated to a particular size class and remain there through time. This requires longitudinal data. It also raises the issue of how one measures the size of a firm when classifying it to a group from which it cannot exit through time. This is addressed later.

The LEAP File

The LEAP file used in this analysis has existed for more than a decade, and is the primary source for previous studies on employment creation by firm size in Canada. It has the advantage of covering the entire economy. The approximately 760,000 companies in the commercial economy (excluding education, health, and government) that paid more than $1 in payroll to employees are included in this analysis.

LEAP is a longitudinal file of companies (legal entities in the taxation system), not establishments. For most businesses, particularly the smaller ones, this distinction is not important, as they are single establishment companies. Among the larger multi-establishment firms, it is employment change at the company level that is measured. The estimated employment for each company on LEAP is based on the payroll as reported to Revenue Canada for the company. The payroll is converted to employment (call ALUs or average labour units) using conversion factors derived from the Survey of Employment, Payroll and Hours. The results are compared to other estimates of employment for verification purposes. For more detail on this process and LEAP, see Statistics Canada (1989). Data for the years 1978 to 1992 are used in this paper. There were changes in the methodology used in creating and editing LEAP over this period. See the Appendix for more details.

Measuring Employment Change at the Company Level

Employment change can be measured either at the company or plant level. The latter focuses on a production unit, and asks whether there are differences in production facilities by size that may be differentially influencing job creation or destruction. One can then consider what these differences might be (e.g. differences in production processes). Using this approach, a small plant which is part of a larger company would be classified as small. When measuring job change at the company level, employment change in this plant would be assigned to a large firm. It is job gain and loss in companies that is being observed, which may be influenced by factors such as changing markets, technology, innovation, financing, and productivity. From a policy perspective, both levels are of interest. Policies are often applied at the company level, as they may involve differential treatment regarding taxation, the availability of capital, the application of labour legislation, and so on. But understanding job gain and loss at the level of the production unit is also important, given recent concerns regarding changes in technologies, human resource practices, and other factors often applied at the plant level.

The LEAP file measures change at the company level. This is a legal entity (in the taxation system). It is not the enterprise level; an enterprise like MacMillan Bloedel may consist of a number of companies (legal entities), and even more establishments.

Mergers or divestitures can influence the measurement of gross and net job change at the company level. If a division of a medium-sized company is sold to a large company, this will appear as job creation in the large category, job loss in the medium. Transactions among firms_within_ the same size class will not affect the measured net employment change by size class. An editing procedure based on tracking workers from company to company between years has recently been employed to minimize the effect of these transactions on the job gain and loss measures, particularly if the transaction involves the creation or loss of a new legal entity (see Appendix or Baldwin, Dupuy, Penner, 1993). The number of "phoney" birth and deaths in the file has been reduced as a result of this editing procedure.

We believe that medium or large firms are implicated in mergers and divestitures more often than small (as measured by the percent of employment involved, for example). Thus, any over-estimation of gross flows due to these transactions is likely to be greater in large than small firms. Since gross flows are higher in small than large firms, this over-estimation is likely to reduce the difference between small and large firms, not accentuate it.

Furthermore, the observation, reported later, that job loss and gain patterns in manufacturing are similar, no matter whether using establishment data from the census of manufacturing (Baldwin and Picot, 1994) or company level data from LEAP, also suggests that the impact of mergers and divestitures (which do not influence establishment-level flows) on the result is not in any way dominant.

B. MEASURING JOB GAIN AND JOB LOSS

Following the approach developed by Baldwin and Gorecki (1990), Davis and Haltiwanger (1991) and others, firms are classified as continuers (existing in two consecutive years) with increasing or decreasing employment and, newly identified or no longer identified in any given year. The latter two categories are often referred to as births and deaths. Considerable analysis and editing takes place to ensure that the concepts 'newly identified' and 'no longer identified' are as close as possible to births and deaths, but they remain proxies.

Let us consider gross and net job change between two years, t1 and t2. Gross job gain is simply the sum of the employment increase in all continuing firms with increasing employment between the two years, plus all employment in "newly identified" firms in year t2. Gross job loss is the sum of all employment losses in continuing firms with decreasing employment in the two years, plus all employment in firms which existed in t1, but were 'no longer identified' in year t2. Net employment change is simply the difference between the gross job gain and loss.

An example can clarify this approach. If one firm's employment increases by 100 between t1 and t2, this is called gross job gain. Similarly, employment of 50 in a newly identified firm in year t2 would also be considered job gain. If another continuing firm's employment fell by 75 between the same two years, and a firm which had 30 employees in year t1 is 'no longer identified' in t2, both of these are considered gross job loss. In this example, gross job creation in continuing and newly identified firms would be (100+50) 150, and gross job destruction would be (75+30) 105. Net job change would then be 45.

Dividing the above values (gross job gain and loss and net job change) by the total employment in year t1 results in the rates of job gain, loss and net job change. Thus the sum of the gross job gain and loss rates results in the net job change rate.

C. ALTERNATIVE MEASURES TO ESTABLISH FIRM SIZE

As noted above, firms cannot change size classes over the period of study because of the problems this introduces in the methodology. But the sizing of firms itself must confront a number of issues. One might think of employment change in a firm as consisting of two parts; a long-run and a transitory component. As noted in Davis, Haltiwanger and Schuh (1993) and in Baldwin and Gorecki (1990), many of the changes in the employment levels in firms are transitory; the observed gain (or loss) is reversed in the short-run. There may also be a longer run trend. Both the transitory and long-run trends can present issues in sizing firms.

First the transitory component. When observed at the peak of the transitory movement the firm will have a greater likelihood of being classified as a large firm than in other years, and it will tend to be facing a transitory decline. Similarly, when observed at the trough of this transitory movement, when it is more likely to be classified as a smaller firms, the firm will tend to be facing a (transitory) increase in employment. Because of this, firms which tend to be classified as large in the base year (t1), will tend to be facing an employment decline, and firms which tend to be classified as small will tend to be facing an employment increase. And to the extent that this is transitory, it is misleading, since the

long run employment level of the firm may not be changing. We would have observed, however, that the smaller the firm, the greater the tendency to create employment.

To estimate the impact of this phenomenon on the results, following Davis, Haltiwanger and Schuh, we produce estimates of gross job gain and loss and net job change by size using different methods of assigning firms a size class. The alternatives for continuing firms (those in existence in both t1 and t2) are as follows:

(1) **"Base Year"** : measures firm size in the base year (t1)...this is the traditional method, and has been employed in virtually all studies of job creation by size in Canada.
(2) **"Current Average Size"**: the average size in years t1 and t2. This measure was used by Davis et al. To the extent that the transitory employment movement is short-term, this would reduce its impact on the results, but not necessarily eliminate it.
(3) **"Prior Average Size"**: the average size in years t0 and t1. This measure was used by Baldwin and Picot (1994). It is similar to current average size, but differs in that it is the average size of the firm prior to the period of interest that is determined, not the size during the period.
(4) **"Long Run Average"**: the average firm size over the entire period being studied. If there was no movement of employment. But the long-run trend itself presents some difficulty in sizing firms long run trend in firm size this would be the superior measure to compensate for the transitory when using this measure. If a firm is growing or declining in the long run, this measure will ascribe that employment change to the middle of the size range covered by the firm over a, say, eight or ten year period. This means that small firms that grow rapidly to some plateau (say in the medium size class), and remain there would be classified as medium-sized firms. Thus the growth would be ascribed to medium sized firms, although the firm was small when the growth took place. Because of this, and the fact that there is a break in the longitudinal LEAP file in 1988-89 that prevents the calculation of this measure over the entire period, this measures is used infrequently. Some results are presented for comparison purposes, however.

The above measures refer to continuing firms. "Newly identified" (births) and "no longer identified" (deaths) firms are sized using their employment during the year they enter or exit. There are sizing issues regarding "newly identified" and "no longer identified" firms, as well, but they have little impact on this analysis.[2]

A Discussion of the Alternative Measures of Firm Size

---

[2] In particular, it is difficult to know how long a firm has been in existence in the year in which it is first observed. Since average annual employment levels are used, a company which has a part-year existence only may have its employment underestimated. If it is incorrectly sized in the first year, the employment growth between the first and second year may be overestimated. A similar problem exists when classifying "no longer identified" firms. The employment in the final year of operation may be underestimated because of a partial year existence. In this case, the gross job loss due to this death could be allocated to the incorrect size class. A fifth alternative measure of sizing was created to deal with these issues. A **"birth and death adjusted"** measure is employed. This is similar to the "current average size" measure (#2), except that "newly identified" and "no longer identified" firms have their employment doubled for the year of birth or death. If births are uniformly distributed during a year, they will, on average, exist for half the year, and their employment will be underestimated by one-half, on average. Doubling corrects for this. This applies to firms that are births (in t2) and continuing firms that are born in t1. It also applies to all "no longer identified" firms. This adjustment has relatively little effect on gross job gain or loss, or net employment change, by firm size, the main topic of this paper. The main effect of the adjustment is to shift growth from continuing firms to births. In the doubling process, births increase in size (and hence in their contribution to job creation), and the growth between the first and second year (among continuers) decreases. The adjusted employment levels are used both to classify the firms, and to calculate employment change between years.

Of the alternatives proposed, the "base year" measure is the only one that does not attempt to dampen the effect of transitory movement of employment on the classification of firms by size, and hence on the results. This is a substantial weakness of the measure for the purposes at hand, as pointed out in Davis, Haltiwanger and Schuh. The "long run average" measure has already been discussed. Using this measure, in order for a firm to be classified as small in the long run, it cannot have experienced much growth. If it did, it would become larger and be classified as such. Small firms (at the beginning of the period) can only be classified as small over the entire period by displaying limited or no growth.

The "current average size" and "prior average size" measures are similar, but they differ in one important way. The latter sizes the firm just prior to (i.e. during t0 and t1) the period of interest, the former during the current period itself (t1 and t2). The shortcoming with sizing during the current period is that the outcome variable (the growth in employment) influences the classification variable (the size of firm). For example, if there are three firms of identical size at the beginning of the period, (the point at which one would ideally size a firm) and one doubles, one remains constant, and one declines, the "average current size" approach would classify the firm experiencing the growth as the largest, the one experiencing the decline as the smallest. The outcome influences the classification, and introduces a tendency for firms which grow to be classified as large, those which decline as small. The "prior average size" method may do the opposite. To the extent that the observed employment growth (or decline) represents a trend (as opposed to transitory movement), the "prior average size" approach would have a tendency to classify continuously growing firms as small, simply because the size during the year prior to the period influences the size classification. Similarly, continuously declining firms would tend to be classified as large relative to the "current size" method.

From a policy perspective, it is the size of firms (excluding transitory effects) at the beginning of a period which is important. This is likely somewhere between the "current" and "prior" size estimates. This is the size that would be used in the eligibility criteria of programs, simply because one cannot classify a firm by its size in the future. The results from the "current average size" and "prior average size" will be of the most interest.

D. SHORT AND LONG RUN CHANGE IN EMPLOYMENT IN FIRMS

Just as the transitory movement in employment in the short run can create issues in sizing firms, so too can it create problems in measuring employment change at the firm level. As before, let us think of the change in employment between two years as consisting of two components...a transitory component and a long term trend component. Between two years, if the transitory movement is large, and the long run trend displays little change, which is often the case (see Baldwin and Gorecki, 1990), the transitory component may dominate. Jobs created by a firm one year may disappear the next, and vice versa. This is still job creation, and is of interest. But it is also of interest to look at longer term job creation. This is done in the paper by selecting periods of three or four years, and measuring the change in employment between the first and last year for each firm. The long run trend in employment change for a firm will play a larger role, relative to the transitory component, in the measure of employment

change over this longer period[3]. Thus, both short run and longer run changes in employment (i.e. job gain and loss) are computed in this paper.

Part II   Results

There are three dimensions to the results presented here on employment growth by size class. They are: (1) gross versus net change; (2) employment growth over the short-run (between two consecutive years) and the longer run (3 or 4 year periods); and (3) the method of classifying firms by size. Results are presented for each of these dimensions, which, when taken together, are used to answer the question posed in the paper title.

As pointed out in Baldwin, and Gorecki (1990) and Davis, Haltiwanger and Schuh (1993), there has been a tendency to rely very heavily on the results of net employment change, and ignore the differences between small and large firms in terms of gross gains and losses. Both are presented in the paper.

A.   Gross Job Loss and Job Gain Rates in Small and Large Firms

The rate of **gross job gain** -- due to newly identified firms[4] and the expansion of continuing firms -- is much higher in the small than the large firm sector, no matter which method of sizing firms is used (Table 1). For the entire commercial economy[5] over the 1978 to 1992 period, the average annual gross job gain rates were in the 23% to 26% range for small firms (0-19 ALUs[6]), and the 5% to 7% range for firms with over 500 ALUs (Table 1).

The annual **gross job loss** rate is also higher among small firms, (under 20 employees) in the 18% to 20% rate on average, compared to 6% to 7% for large firms in the commercial economy. As is well known, jobs are both created and destroyed at a much higher rate in the small firm sector than the large.

---

[3] An even longer period was not selected because LEAP is a company, not establishment level file. Companies may change through time because of mergers, buy-offs,etc. It is difficult to know when a company ceases to be the same company and takes on a new form to become a new company as a result. The longer the period over which companies are tracked longitudinally, the more likely this is to be a problem. There is an editing procedure to reduce the impact of such changes, as discussed in the text,however.

[4] Newly identified firms are those that did not exist in the data base during the base year (t1), but do in the second year (t2). These consist mostly of new firms (ie births), but may include some firms that were a part of another firm in t0, but are a separate legal entity in t0. An editing procedure described in the appendix is used to identify most of these situations, and they would not be labelled "newly identified" in the file. It could also include some firms where a new BRID or "S" number (a firm identifier) was inadvertently assigned by the business register, thus creating a new firm. Again, the editing procedure captures most of these situations, at least among all but the very small firms.

[5] Excluding the health, education and government sectors.

[6] An ALU is an <u>Average Labour Unit</u>, which is an estimate of average annual employment, part-time plus full-time, in a firm. It is conceptually identical to the concept of average annual employment used in the Survey of Employment, Payroll and Hours. See Statistics Canada Catalogue 18501 for a more detailed description.

The difference between the job gain and loss rates represents the net growth rate of employment. This rate is higher for small than large firms, no matter which measure is used, although there is a significant difference in the results among the types of measures.

When sizing firms using the traditional base year method, this net growth rate is 8% among firms with under 20 employees, and -1.2% for firms with 500+ employees on average over the period. When sizing using the "current size", the net growth rate for small firms is reduced to 3.3%, and for large increased to 0.1%. The discrepancy between them diminishes, but small firms continue to have a substantially higher net job creation rate, and it falls monotonically with size.

The "prior average size" method produces results similar to the base year method, which attributes higher relative growth rates to small firms than does the "current average size" method. This difference may be because of the tendency for the "current size" method to classify growing firms as large, the tendency in the "prior average size" method to classify growing firms as small, or some combination of the two. (See earlier discussion). It is not the effect of transitory employment change on the classification of firms by size and their subsequent growth that distinguishes these two approaches, however, since they both address this issue by taking a two year average. Sizing firms by taking their average size over the entire period (long run average size) produces the results similar to those for the "current average size" (Table 2), although readers are cautioned that Table 2 refers to a different time period (1978-89) than other tables.[7]

There are then, essentially two different sets of results. The "base year" and the " prior average size" methods produces one set, and the "average current size", and "average over the entire period", a second set. Job gain and loss rates are higher among small than large firms in both sets, and the net employment growth rates are also higher in small firms, decreasing monotonically with size. The superiority of very small firms (under 20 employees) in net employment growth is much diminished, however, in the "current" as compared to the "prior" year sizing. These findings hold for both the economy as a whole, and for manufacturing (Table 3), which is included because much of the research in other countries, as well as Canada, is for this sector.

A monotonically declining rate of net employment growth by firm size, such as that observed here for the 1978 to 1992 period, no matter which measure is used, was not observed by Davis, Haltiwanger and Schuh (1993) for the US manufacturing sector. For the US, no discernible relationship between net employment growth rates and firm size was observed over the 1972 to 1988

---

[7] Results using the average size over the entire period had to be produced for a different period, 1978-89, not 1978-92 as in earlier results   This is because of a discontinuity in the LEAP file in 1989. Thus, the results over the two periods (for example, Tables 1 and 2) are not comparable. Table 2 is used primarily to compare the "current average size" and long-run average size results.

period, whether measuring employment change at the firm or plant level[8].This is analogous to observing that small firms do not account for a disproportionate share of the net employment increase in US manufacturing.

Our findings are consistent, however, with those reported by Baldwin and Picot (1994) for the Canadian manufacturing sector. Using a very different data source, the longitudinally linked Census of Manufacturers data for the 1970 to 1990 period, which produces results at both the establishment and firm level, they find that the net growth rate in employment decreases monotonically as plant size increases, no matter which sizing method is used, as we do. They
also find, however, that the differential between small and large firms is less when "current size" rather than "base year size" methods are used.

Have Small Firms Dominated Job Creation in Canada?

Given the above result, simple arithmetic indicates that smaller firms have accounted for a disproportionate share of employment gains, whether referring to gross job gains or net employment change. But large firms (over 500 employees) represent around 40% of employment, and hence even with lower **rates** of gross or net job creation, could still be producing a significant **share** of all new jobs. Such has not been the case according to previous studies. Reports such as "Small Business in Canada" have reported that from 80% to 90% of all net new jobs were created in small (under 50 employees) firms. This section asks whether this finding stands when the alternative measures and different time periods (short or longer run) are used.

Focusing on job creation between consecutive years (averaged over the 1978 to 1992 period), we find that the small firm sector's share of (gross) job gains declines, and of (gross) job losses increases when one moves from the traditional "base year" method or the "prior average size", both of which give very similar results, to the "current year" sizing (Table 4). With 24% of employment, small firms accounted for 48% of gross job gains under the traditional and prior size measures, 42% under the current year sizing. Their share of job losses rose from 37% to 40%. As indicated above, small firms account for a very large share of both job gains and jobs losses, no matter which measure is used. With 40% of employment, large firms accounted for 17% to 20% of job gains, and 22% to 24% of job losses on average over the 1978 to 1992 period. With a smaller share of gross job gain and a larger share of job loss under the "current size" measure, the role of small firms in **net** job creation, the measure most frequently cited, is reduced.

The influence of small firms on employment creation has traditionally been measured using shares of net employment, but this measure itself presents some difficulties, as is well known.

---

[8] There are differences between this study and Davis et al that render them not exactly comparable. It is likely that the definition of a firm differs; it is a legal entity in this work. It is also likely that births and deaths are measured in different ways.   Finally, the growth rate in employment is calculated in a slightly different manner. In this work, the growth rate is $\Delta E/E t_1$ x 100 where ΔE is the employment change between t_1 and t_2. In Davis et al, the growth rate is $\Delta E/((E t_1 + E t_2)/2)$. A test indicated little difference in the results between these two methods. The comparison between the American and Canadian results are more precise in Baldwin & Picot (1994).

Since net job creation can be negative, small firms are often seen to account for over 100% of net job creation, while others contribute a negative percentage (say -25%). These statements are impossible to interpret. We do not attempt to calculate shares of net employment creation, but rather report only the **level change** in net employment, as in Table 4.

The differences between the traditional "base year" and the "current size" measures are very large, particularly in the smallest and largest size categories, but small firms dominate net job creation in both cases. The net employment change in small firms is estimated to be an average annual gain of 156,000 jobs over the 1978 to 1992 period under the traditional measure, and 63,000 jobs under the "current year" measure. Large firms, on the other hand, are estimated to have lost 38,000 jobs annually (on average) using the base year method, and to have gained 4,000 annually under the "current year" method. The differences are great, but small firms are estimated to have accounted for the majority of net employment gain in both methods. As before, the "prior year sizing" method produces results similar to the base year measure.

Similar results are observed for manufacturing (Table 5). The average annual net job gain in small firms (which account for only 9% of employment in manufacturing) falls from 21,000 to 6,000 under the two measures, but this still exceeds that attributable to large firms, which is estimated at -32,000 annually under the traditional measure, and -21,000 under the "current size" method. In manufacturing, only small firms under 20 employees are seen to have registered any substantial net employment gains, no matter which method is used.

Job Loss and Gain Over the Longer Run

The previous results refer to job change between consecutive years. In such a short time span, transitory employment movements can influence the results significantly, not only in the sizing of the firms as discussed earlier, but also in the calculation of the employment change. By measuring employment change over a longer period of three or four years, the influence of the transitory component on employment change is reduced and that of the longer term trend component is increased.

In this work, firm size is established in two ways, average over the entire period, and average over the first two years of the period. Both reduce the effect of transitory movements on the sizing of firms. The average over the entire period suffers from the shortcoming outlined earlier, in that the outcome (the amount of employment growth) influences the classification of firm size. Both sets of results are presented for comparison purposes, but those reported here use the "average of the first two years" method.

The employment change is simply that between the first and last year in the period. The periods used were 1981 to 1984 (recession and recovery), 1984 to 1988 (expansion), and 1981 to 1988 (a complete business cycle).

Rates of Job Loss and Gain

The results are similar to that reported using consecutive years, no matter which method of sizing is used (Table 6).

Both job loss and job gain rates are higher among small than large firms, in all periods. For example, during 1981-84, gross job gain and loss rates in small firms were 48% and 37% respectively (the gain rate higher than the loss), among large firms they were 7% and 16% respectively (the loss rate higher than the gain). The growth rate in net employment declined monotonically as firm size increases, as before. During the 1981-84 period, only small firms (under 20 ALUs) had positive net employment growth (12%). During the same period, employment in firms of 500+ declined by 9%.

In the expansionary period, net employment in small firms grew by 48%, and in large firms by 3%. When sizing using the average over the entire period is used, these growth rates for the 1984 to 1988 periods are 34% for the small firms sector, 6% for the large.

Net Employment Change

Between the two years of 1981 and 1984, the recession and recovery, only small firms registered any net employment gain (205,000 jobs when firms are sized by the average of the first two years in the period, 97,000 when sizing over the entire period) . Employment in large firms declined by 250 to 306 thousand jobs. Over the expansionary period of 1984-1988, net employment increased in all categories, but the expansion was greatest among small firms (growing by 843,000 or 56% of total net employment gain), compared to a net growth of 101,000 among large firms. Similar results are observed for manufacturing (Table 8).

Thus, over two very different periods, and using two different methods of sizing, net employment growth rates decline monotonically as firm size increases. Net employment change is larger among small than large firms. This result is also observed for the manufacturing sector. But is this result observed across the entire commercial economy, or is it unique to particular sectors?

Job Creation Rates and Net Employment Growth in Six Major Industrial Sectors

The LEAP file covers the entire economy and hence one is able to determine the robustness of the findings just presented. We return to using short-run employment changes between consecutive years, averaged over 1978 to 1992. In the results presented here, the size of the firm is established using the "current average size" method, the approach which produces conservative estimates of the role of small firms in job creation, for the reasons given earlier. Results using the "prior average size" are reported in Tables 10 and 11 as well. They present a picture in which small firms are more dominant than is described here.

Small Firms Account for a Larger Share of Growth in the Goods Sector

As for the economy as a whole, both job gain and loss rates are higher in small than large firms in all six major industrial sectors used in this work. The growth in net employment...the difference between the job gain and loss rates...is clearly greater among small than large firms in the goods sector, including the primary industries, manufacturing and construction, and declines monotonically with size (Table 10). In fact, net growth in employment over the 1978 to 1992 period was negative (in the -1% to -3% range) among large firms in all the goods sectors and distributive services, which includes wholesale trade, transportation and communications, industries that are closely tied to the goods producing sector. In these sectors, net employment in small firms (under 20 employees) grew in the 1.5% to 3.2% range.

Distinctions among Size Classes are Less Evident in the Services

Among the consumer[9] and business[10] services the pattern is somewhat different. There is less decline in the rate of employment growth by firm size, although it is still evident. Large firms in these sectors displayed substantial positive growth over the period, in the 2.2% range. Employment among small firms grew at 3.8%. These have been the fastest growing sectors of the economy in terms of employment, and large firms have contributed significantly to this growth.

The consumer services sector contributed 80,000 ALU's (employment) per year on average over the period, about 20% of which was in firms with over 500 employees (with 30% of employment), and 42% in firms with under 20 (with 35% of employment). In the business services sector, about 38% of the employment increase was accounted for by larger firms (with 40% of employment), and 36% by smaller (with one quarter of the employment). Thus, net employment gains were found in both the large and small firm sector in these fastest growing industries. This higher rate of net employment gain in these service sectors appears to be related to a higher rate of job gain among large firms in those industries (as compared to the total economy), rather than the lower rates of job loss (Table 10). However, using the "prior average size" method, small firms demonstrate a higher level of job creation than reported here (Tables 10 and 11). Nonetheless, it is in the goods and the distributive services sectors, those with the slower overall growth in employment, in which small firms clearly dominated employment growth.

Does the Changing Industrial Structure of Employment Contribute to the View that Small Firms Dominate Employment Growth?

Only the consumer and business services sectors had substantial rates of employment growth over the period under study, 3.1% and 2.6% respectively. The other major sectors of the commercial economy had growth rates in the -0.8% to 0.7% range. As is well known, the industrial distribution of employment is shifting towards the consumer and business services sector. But small firms are disproportionately represented in the consumer services sector in particular, accounting for 35% of employment compared to 24% for the economy as a whole. The rapid growth in this sector, combined with an above average share of small firms, would contribute to the view that for the commercial

---

[9] which includes retail trade, personal services, food and accommodation services and other personal services.

[10] including finance, insurance and real estate and services to business management.

economy as a whole, small firms are dominating employment growth. Even if the size distribution of employment within industries did not change, there would be a tendency for the aggregate share of employment in small firms to rise, simply because of the changing distribution of employment among industries.

To test this, a straightforward standardization or decomposition was performed. The period 1978 to 1988 was used so that the end points would be in roughly the same position in the business cycle. We are interested in assessing the effect of the structural, not cyclical, change in the industrial distribution of employment. Firms were sized according to the "average current size" in 1978-79[11]. Two digit industries were used in the analysis.

The approach is as follows. For any year t, the share of employment in size class s (for the entire commercial economy) is P_{st}. But this can be expressed as:

$$$$
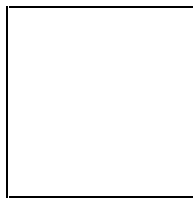
where F_{it} is the share of employment in   industry i in year t, and D_{ist} is the share of all employment in industry i that is in size class s in year t. Note that D_{ist} is determined using the longitudinal size class of the firm established in 1978-79, (which does not change over the period), not its cross-sectional size as of any given year. To control for changes in F_{it} on P_{st}, one simply holds F_{it}, the distribution of employment by industry, fixed at its 1978 value, and calculates P^*_{s88}, which is:

$$P^*_{s88} = \Sigma_i \, D_{is88} \, F_{i78}$$

The difference between P_{s88} and P^*_{s88} represents that due to changes in $F_{(it)}$ (the share of employment by industry).

It is found that the changing industrial structure of employment does tend to increase the share of employment accounted for in small firms, and reduce that accounted for in large in the commercial economy as a whole. Or looked at another way, it does tend to result in growth rates in net employment by size class (computed using longitudinal sizing of firms) that are overestimated for small and underestimated for large classes for the commercial economy as a whole. Some of this difference in growth rates is due to an industry effect, not to differences in the gross job gain and loss rates within industries.

But this industry effect is fairly small. The dissimilarity index[12] can be used to measure the change in the distribution of employment by size between 1978 and 1988. The total change as

---

[11] Firms do not change size class over the period, for reasons discussed in the introduction. This is not an exercise in explaining the change in the cross-sectional distribution of employment by size class. Rather, it relies on longitudinal data to assess the impact of the more rapid growth in sectors with larger shares of small firms on the overall distribution of employment by size.

[12] The dissimilarity index is 0.5 $\Sigma_i \mid P_{i78} - P_{i88} \mid$ where P_{it} is the share of employment in size class i in year t.

measured by the index is 10.4 (between P_{s78} and P_{s88}). When controlling for the changing industrial structure of employment, the change fell to 7.7 (between P_{s78} and P^*_{s88}). Thus, the industry composition effect accounted for one quarter of the observed change in the distribution of employment by size class over the decade (i.e. (10.4 - 7.7)/(10.4) = .26)

In terms of growth rates in net employment, the result can be expressed as follows: assuming no increase in total employment over the period, net employment in firms which were small in 1978-79 or "born" small over the period would have increased by 43%. Controlling for the effect of the changing industrial structure of employment, this would be reduced to 33%. Among large firms, the comparable results are -20% and -14%. Thus, the discrepancy between small and large firms in growth rates of net employment is somewhat overstated for the economy as a whole when the industry effect is not accounted for, but the differential remains.

Growth in Existing Small and Large Firms

The employment growth measured in this work -- both gross and net -- cannot be interpreted as a reflection of growth in individual firms, particularly individual existing small firms. It is the change in <u>aggregate</u> employment in the small (or large) firm sector that is the focus. This is influenced by the incidence and size of births and deaths, and changes in continuing firms. A complete analysis of the importance of each of the components is beyond this paper, but the point can be made by referring to one particular group of firms, those that exist in a given year.

As noted in Brown, Hamilton and Medoff (1990), employment growth in **existing** small firms will not necessarily outstrip that of existing large firms. As has been observed, job loss due to the disappearance (death) and contraction of firms is greater among small than existing large firms. Thus, if one defines two cohorts of firms, all existing small firms at any given time, and all existing large, employment will tend to decline, or at least grow very slowly (in the aggregate) in both groups. This is because the birth process has been excluded, which accounts for much of the expansion (in the aggregate) of employment in small firms.

For example, let us consider the growth between 1981 and 1984 for the cohort of firms which existed in 1981. We will size firms by their average size during 1981 and 1982. Net employment growth among this cohort of <u>existing</u> small firms (under 20 employees) is -14% over the period, and among large (over 500 employees) -11%. Much of the decline in the small firm sector is due to firms disappearing; among the larger firm sector it is due largely to the decline in continuing firms. It is the new firms (excluded here) that result in the small firm sector displaying more rapid employment growth than the large; when the "newly identified" firms are added the growth rates become +12% among small firms, and -9% among the large.

The results are similar between 1984 and 1988. Among firms which existed in 1984, the employment growth rates are +3% for small firms, (under 20) and 0% for large (over 500+); rates which are not that dissimilar. When employment in "newly identified" firms over the period is added, the rates become 48% and 3%. The results for **existing** small and large firms are not that dissimilar, it is the fact that new firms tend to be small that makes the difference. This is important when considering policies which are oriented towards existing firms, or the creation of new firms.

Conclusion

This work indicates that in Canada both gross job gain and job loss, as well as net employment increase, is disproportionately located in small firms, no matter which measure is used, and whether it is evaluated over the short or longer run. This is true for most industrial sectors, although the effect is more pronounced in the goods sector and the distributive services than in the more rapidly growing business and consumer services sector. This is unlike the results reported for the manufacturing sector in the US, but it is similar to the results found from another study based of employment change in the Canadian manufacturing sector (Baldwin and Picot, 1994) using very different data. These results are also consistent with the observation that the share of employment found in small firms in Canada has been increasing through the 1980s (Wannell, 1991).

Measurement issues are important. The application of different measures influences the magnitude, although not the overall direction, of the results. Davis, Haltiwanger and Schuh (1993) identify a number of measurement issues...related to the regression of the mean phenomenon and the classification of firms by size...that cast uncertainty on the usefulness of earlier measures in determining the growth in employment in small and large firms. It seems likely that the proposed solutions, including some proposed here, are not themselves free of weaknesses, as discussed in the text. A reasonable approach may be to interpret the measures used here (e.g. the prior and current average size) as bounds. None of this negates the basic finding given above, however.

The paper does not address many other very important issues about job creation in small and large firms. We have demonstrated that when the small and large firm sectors are taken as aggregate units, gross job gain, gross job loss, and net employment changes are higher in the small than large firm sector. But there are a large number of different processes or growth/birth/death scenarios that could lead to the outcomes reported here. A lack of understanding of the underlying processes and their causes severely inhibits appropriate policy development. It is difficult to focus policy if one is unsure of the underlying causes of the outcomes. For example, is it that the rate of new (small) firm creation increased, and growth patterns have remained unchanged? Has the optimal size of firms and/or establishments declined as a result of new technologies? And what are the patterns of growth of small and large firms that are leading to the observed results? Cohort studies of growth paths of firms, where the analysis is motivated by some notion of what the paths are likely to be, could lead to such better understanding.

Another approach is to directly identify firms which experience rapid employment increases. One could then try to determine what is associated with such expansion? Baldwin et al (1993) have started this process of isolating factors associated with growth.

There are other issues regarding the characteristics of jobs created in small and large firms that have received some attention. Morissette (1993) demonstrated that even after controlling for differences in worker characteristics that are associated with wage levels, small firms paid lower wages than large companies. He also noted the lower incidence of fringe benefits such as pension coverage. Picot (1992) reported that the probability of being permanently laid off was twice as high in small as in large firms, again after controlling for characteristics associated with layoffs. With higher separation

rates, job tenure is on average shorter in small firms. There is more employment instability. There is also the issue of what exactly is driving the more rapid expansion of employment in small firms. Is it more rapid response to changing market conditions through more innovative use of technology, or is it associated with the lower wages being paid to entry level workers through the 1980s, allowing employment to expand but labour productivity to fall in the small firm sector?

Numerous other such questions persist. With respect to the issue of where employment growth is observed, the results indicate that even after accounting for the measurement issues raised in this and earlier studies, gross job losses and job gains are higher in the small firms sector. In the aggregate, net employment has been expanding faster in the small than large firm sector.

TABLE 1
JOB GAIN AND LOSS RATES BETWEEN
CONSECUTIVE YEARS
AVERAGE; 1978-92
TOTAL COMMERCIAL ECONOMY

FIRM SIZE	JOB GAIN RATE	JOB LOSS RATE	NET JOB CHANGE RATE	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS
BASE YEAR				
0 - 19	26.7	-18.6	8.1	24.0
20 - 49	14.9	-14.6	0.3	11.9
50 - 99	13.0	-13.8	-0.7	8.3
100 - 499	11.1	-11.9	-0.8	16.0
500 +	5.9	-7.1	-1.2	39.7
TOTAL	13.4	-12.1	1.3	100.0
AVERAGE CURRENT SIZE				
0 - 19	23.4	-20.2	3.3	24.2
20 - 49	15.9	-14.2	1.7	11.9
50 - 99	14.4	-13.0	1.4	8.3
100 - 499	12.2	-11.2	1.0	16.0
500 +	6.8	-6.6	0.1	39.6
TOTAL	13.4	-12.1	1.3	100.0
PRIOR AVERAGE SIZE				
0 - 19	26.5	-18.4	8.0	24.3
20 - 49	14.9	-14.7	0.2	11.9
50 - 99	13.0	-13.8	-0.8	8.2
100 - 499	11.1	-11.9	-0.8	15.9
500 +	5.9	-7.1	-1.2	39.5
TOTAL	13.4	-12.1	1.3	100.0

TABLE 2
JOB GAIN AND LOSS RATES BETWEEN
CONSECUTIVE YEARS, AVERAGE, 1978-89
TOTAL COMMERCIAL ECONOMY

SIZING USING AVERAGE OVER ENTIRE PERIOD			
FIRM SIZE	**JOB GAIN RATE**	**JOB LOSS RATE**	**NET JOB CHANGE RATE**
0 - 19	23.5	-18.4	5.1
20 - 49	17.0	-12.6	4.5
50 - 99	15.1	-11.2	3.8
100 - 499	12.2	-9.9	2.3
500 +	6.1	-5.4	0.6
TOTAL	13.1	-10.5	2.6
SIZING USING "CURRENT AVERAGE SIZE"			
0 - 19	24.6	-19.1	5.6
20 - 49	16.3	-12.3	3.9
50 - 99	14.5	-11.2	3.2
100 - 499	12.3	-9.8	2.5
500 +	6.1	-5.4	0.7
TOTAL	13.1	-10.5	2.6

TABLE 3
JOB GAIN AND LOSS RATES BETWEEN
CONSECUTIVE YEARS
AVERAGE; 1978-92

MANUFACTURING

FIRM SIZE	JOB GAIN RATE	JOB LOSS RATE	NET JOB CHANGE RATE	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS
BASE YEAR				
0 - 19	28.4	-17.4	11.0	9.0
20 - 49	14.7	-14.0	0.7	9.4
50 - 99	11.7	-12.4	-0.7	8.9
100 - 499	9.3	-10.6	-1.3	22.0
500 +	4.8	-7.8	-3.1	50.7
TOTAL	9.4	-10.3	-0.8	100.0
AVERAGE CURRENT SIZE				
0 - 19	23.2	-20.0	3.2	9.1
20 - 49	14.4	-14.4	-0.1	9.5
50 - 99	12.1	-12.0	0.1	8.8
100 - 499	9.8	-10.3	-0.5	22.0
500 +	5.4	-7.5	-2.0	50.5
TOTAL	9.4	-10.3	-0.8	100.0
PRIOR AVERAGE SIZE				
0 - 19	28.0	-16.9	11.1	9.2
20 - 49	14.5	-13.9	0.7	9.5
50 - 99	11.7	-12.5	-0.8	8.8
100 - 499	9.2	-10.7	-1.4	21.9
500 +	4.8	-7.8	-3.0	50.6
TOTAL	9.4	-10.3	-0.8	100.0

TABLE 4
DISTRIBUTION OF JOB LOSSES AND GAINS
BETWEEN CONSECUTIVE YEARS BY SIZE CLASS
AVERAGE, 1978-92
TOTAL COMMERCIAL ECONOMY

| FIRM SIZE | DISTRIBUTION OF: | | | |
	JOB GAINS	JOB LOSSES	NET NUMBER OF JOBS GAINED OR LOST ANNUAL AVERAGE	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS
			IN THOUSANDS	
BASE YEAR METHOD				
0 - 19	48%	37%	155.9	24%
20 - 49	13%	14%	3.0	12%
50 - 99	8%	9%	-4.8	8%
100 - 499	13%	16%	-10.6	16%
500 +	17%	23%	-38.2	40%
TOTAL	100%	100%	105.3	100%
AVERAGE CURRENT SIZE				
0 - 19	42%	40%	63.4	24%
20 - 49	14%	14%	16.3	12%
50 - 99	9%	9%	9.2	8%
100 - 499	15%	15%	12.2	16%
500 +	20%	22%	4.2	40%
TOTAL	100%	100%	105.3	100%
PRIOR AVERAGE SIZE				
0 - 19	48%	37%	156.5	24%
20 - 49	13%	15%	1.6	12%
50 - 99	8%	9%	-5.3	8%
100 - 499	13%	16%	-10.6	16%
500 +	17%	23%	-36.9	40%
TOTAL	100%	100%	105.3	100%

TABLE 5
DISTRIBUTION OF JOB LOSSES AND GAINS
BETWEEN CONSECUTIVE YEARS BY SIZE CLASS
AVERAGE, 1978-92
MANUFACTURING

DISTRIBUTION OF:				
FIRM SIZE	JOB GAINS	JOB LOSSES	NET NUMBER OF JOBS GAINED OR LOST ANNUAL AVERAGE	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS
			IN THOUSANDS	
BASE YEAR METHOD				
0 - 19	27%	15%	20.5	9%
20 - 49	15%	13%	1.4	9%
50 - 99	11%	11%	-1.3	9%
100 - 499	22%	23%	-5.8	22%
500 +	26%	39%	-32.0	51%
TOTAL	100%	100%	-17.2	100%
AVERAGE CURRENT SIZE				
0 - 19	22%	18%	6.0	9%
20 - 49	14%	13%	-0.1	9%
50 - 99	11%	10%	0.2	9%
100 - 499	23%	22%	-2.2	22%
500 +	29%	37%	-21.1	51%
TOTAL	100%	100%	-17.2	100%
PRIOR AVERAGE SIZE				
0 - 19	27%	15%	21.1	9%
20 - 49	15%	13%	1.3	9%
50 - 99	11%	11%	-1.4	9%
100 - 499	21%	23%	-6.4	22%
500 +	26%	39%	-31.7	51%
TOTAL	100%	100%	-17.2	100%

TABLE 6
JOB GAIN AND LOSS RATES
OVER LONGER RUN , 1981-84, 1984-88, 1981-88,
TOTAL COMMERCIAL ECONOMY

SIZING BY AVERAGE OF FIRST TWO YEARS IN PERIOD					SIZING BY AVERAGE OVER ENTIRE PERIOD				
FIRM SIZE	JOB GAIN RATE	JOB LOSS RATE	NET JOB CHANGE RATE	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS	FIRM SIZE	JOB GAIN RATE	JOB LOSS RATE	NET JOB CHANGE RATE	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS
1981-84					**1981-84**				
0 - 19	48.8	-37.7	12.0	22%	0 - 19	44.1	-38.5	5.6	23%
20 - 49	27.9	-30.4	-2.5	10%	20 - 49	28.8	-30.2	-1.4	10%
50 - 99	22.3	-28.7	-6.4	8%	50 - 99	24.0	-28.2	-4.2	8%
100 - 499	17.3	-27.0	-9.7	16%	100 - 499	18.9	-26.1	-7.2	16%
500 +	7.7	-16.7	-9.0	44%	500 +	8.5	-16.0	-7.5	43%
TOTAL	21.5	-25.1	-3.6	100%	TOTAL	21.5	-25.1	-3.6	100%
1984-88					**1984-88**				
0 - 19	85.2	-36.9	48.3	24%	0 - 19	74.3	-39.6	34.7	23%
20 - 49	55.4	-26.9	28.5	11%	20 - 49	59.9	-26.6	33.3	10%
50 - 99	48.9	-24.6	24.3	8%	50 - 99	54.3	-23.7	30.6	8%
100 - 499	38.4	-22.0	16.4	16%	100 - 499	43.3	-21.3	22.1	16%
500 +	16.9	-13.7	3.3	42%	500 +	19.2	-12.8	6.4	42%
TOTAL	43.0	-22.7	20.3	100%	TOTAL	43.0	-22.7	20.3	100%
1981-88					**1981-88**				
0 - 19	117.5	-50.8	66.7	22%	0 - 19	94.3	-54.7	39.6	23%
20 - 49	67.5	-43.3	24.2	10%	20 - 49	76.3	-43.0	33.2	10%
50 - 99	53.9	-40.5	13.4	8%	50 - 99	67.8	-39.3	28.6	8%
100 - 499	42.2	-38.0	4.2	16%	100 - 499	49.5	-37.1	12.4	16%
500 +	17.9	-24.8	-6.9	44%	500 +	21.6	-23.0	-1.4	43%
TOTAL	51.7	-35.8	16.0	100%	TOTAL	51.7	-35.8	16.0	100%

TABLE 7
JOB GAIN AND LOSS RATES OVER
LONGER RUN, 1981-84, 1984-88, 1981-88
MANUFACTURING

SIZING BY AVERAGE OF FIRST TWO YEARS IN PERIOD				SIZING BY AVERAGE OVER ENTIRE PERIOD			
FIRM SIZE	JOB GAIN RATE	JOB LOSS RATE	NET JOB CHANGE RATE	FIRM SIZE	JOB GAIN RATE	JOB LOSS RATE	NET JOB CHANGE RATE
1981-84				**1981-84**			
0 - 19	48.6	-35.0	13.6	0 - 19	40.6	-37.8	2.8
20 - 49	24.1	-29.9	-5.8	20 - 49	23.7	-30.9	-7.2
50 - 99	18.8	-28.0	-9.2	50 - 99	19.8	-27.8	-8.0
100 - 499	15.8	-26.1	-10.3	100 - 499	15.7	-25.9	-10.2
500 +	7.0	-19.6	-12.5	500 +	7.9	-18.9	-11.0
TOTAL	14.7	-23.8	-9.0	TOTAL	14.7	-23.8	-9.0
1984-88				**1984-88**			
0 - 19	95.0	-32.0	63.0	0 - 19	77.8	-36.8	41.0
20 - 49	53.4	-24.3	29.1	20 - 49	53.7	-26.0	27.7
50 - 99	42.2	-23.9	18.3	50 - 99	46.3	-22.9	23.4
100 - 499	33.3	-22.1	11.2	100 - 499	35.2	-22.1	13.1
500 +	14.9	-14.5	0.3	500 +	16.6	-13.7	2.9
TOTAL	31.5	-19.3	12.2	TOTAL	31.5	-19.3	12.2
1981-88				**1981-88**			
0 - 19	133.6	-45.9	87.7	0 - 19	91.9	-52.5	39.4
20 - 49	59.4	-40.2	19.2	20 - 49	64.1	-42.4	21.7
50 - 99	45.7	-39.3	6.4	50 - 99	54.1	-39.7	14.4
100 - 499	35.0	-37.9	-2.9	100 - 499	38.3	-38.0	0.3
500 +	15.3	-27.9	-12.6	500 +	18.0	-26.2	-8.2
TOTAL	35.5	-33.5	2.0	TOTAL	35.5	-33.5	2.0

TABLE 8
DISTRIBUTION OF JOB LOSSES AND GAINS
OVER THE LONGER RUN BY SIZE CLASS
TOTAL COMMERCIAL ECONOMY

SIZING BY AVERAGE OF FIRST TWO YEARS IN PERIOD					SIZING BY AVERAGE OVER ENTIRE PERIOD				
	DISTRIBUTION OF:					DISTRIBUTION OF:			
FIRM SIZE	JOB GAINS	JOB LOSSES	NET NUMBER OF JOBS GAINED OR LOST	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS	FIRM SIZE	JOB GAINS	JOB LOSSES	NET NUMBER OF JOBS GAINED OR LOST	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS
			IN THOUSANDS					*IN THOUSANDS*	
1981-84					**1981-84**				
0 - 19	50.2	32.4	205.3	22%	0 - 19	46%	35%	97.0	23%
20 - 49	13.5	12.6	-20.3	10%	20 - 49	14%	13%	-11.0	10%
50 - 99	7.8	8.6	-37.3	8%	50 - 99	8%	9%	-24.0	8%
100 - 499	12.8	17.1	-119.0	16%	100 - 499	14%	16%	-88.0	16%
500 +	15.7	29.3	-305.9	44%	500 +	17%	27%	-250.0	43%
TOTAL	100%	100%	-277.2	100%	TOTAL	100%	100%	-277.0	100%
1984-88					**1984-88**				
0 - 19	46.6	38.2	843.8	24%	0 - 19	40%	41%	600.0	23%
20 - 49	13.9	12.8	228.0	11%	20 - 49	15%	13%	265.0	11%
50 - 99	8.9	8.5	140.7	8%	50 - 99	10%	8%	179.0	8%
100 - 499	14.1	15.3	192.0	16%	100 - 499	16%	15%	260.0	16%
500 +	16.6	25.3	101.9	42%	500 +	19%	24%	199.0	43%
TOTAL	100%	100%	1506.4	100%	TOTAL	100%	100%	1506.0	100%
1981-88					**1981-88**				
0 - 19	50.4	31.5	1138.6	22%	0 - 19	41%	35%	688.0	23%
20 - 49	13.6	12.6	194.1	10%	20 - 49	15%	12%	265.0	10%
50 - 99	7.9	8.5	77.8	8%	50 - 99	10%	8%	168.0	8%
100 - 499	13.0	16.9	51.6	16%	100 - 499	16%	17%	154.0	16%
500 +	15.2	30.5	-232.0	44%	500 +	18%	27%	-48.0	43%
TOTAL	100%	100%	1229.2	100%	TOTAL	100%	100%	1229.0	100%

TABLE 9
DISTRIBUTION OF JOB GAINS AND LOSSES
BY FIRM SIZE OVER THE LONGER RUN
MANUFACTURING

SIZING USING AVERAGE OVER FIRST TWO YEARS IN PERIOD					SIZING USING AVERAGE OVER ENTIRE PERIOD				
	DISTRIBUTION OF:					DISTRIBUTION OF:			
FIRM SIZE	JOB GAINS	JOB LOSSES	NET NUMBER OF JOBS GAINED OR LOST	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS	FIRM SIZE	JOB GAINS	JOB LOSSES	NET NUMBER OF JOBS GAINED OR LOST	EMPLOYMENT DISTRIBUTION % OF ALU'S IN SIZE CLASS
			IN THOUSANDS					*IN THOUSANDS*	
			1981-84					**1981-84**	
0 - 19	27.7	12.4	24.6	8%	0 - 19	24%	14%	5.0	9%
20 - 49	13.6	10.5	-10.5	8%	20 - 49	14%	11%	-13.0	8%
50 - 99	9.9	9.1	-15.3	8%	50 - 99	11%	9%	-13.6	8%
100 - 499	23.1	23.7	-48.0	22%	100 - 499	23%	24%	-47.6	22%
500 +	25.7	44.4	-145.5	54%	500 +	29%	42%	125.4	53%
TOTAL	100%	100%	-194.6	100%	TOTAL	100%	100%	194.6	100%
			1984-88					**1984-88**	
0 - 19	26.8	14.7	109.5	9%	0 - 19	21%	16%	69.0	9%
20 - 49	14.4	10.7	48.5	9%	20 - 49	14%	11%	45.0	8%
50 - 99	11.1	10.2	29.5	8%	50 - 99	12%	10%	38.0	8%
100 - 499	23.0	24.9	47.6	22%	100 - 499	24%	25%	56.0	22%
500 +	24.8	39.5	3.3	53%	500 +	28%	38%	29.8	53%
TOTAL	100%	100%	238.4	100%	TOTAL	100%	100%	238.4	100%
			1981-88					**1981-88**	
0 - 19	31.6	11.5	158.6	8%	0 - 19	22%	13%	71.7	9%
20 - 49	13.9	10.0	34.3	8%	20 - 49	15%	11%	39.0	8%
50 - 99	10.0	9.1	10.7	8%	50 - 99	12%	9%	24.8	8%
100 - 499	21.3	24.4	-13.4	22%	100 - 499	24%	25%	1.5	22%
500 +	23.2	45.0	-146.4	54%	500 +	27%	41%	-93.0	53%
TOTAL	100%	100%	43.8	100%	TOTAL	100%	100%	43.8	100%

TABLE 10
JOB GAIN AND LOSS RATES BETWEEN CONSECUTIVE YEARS,
AVERAGE 1978-92, BY INDUSTRY

USING THE CURRENT YEAR METHOD OF SIZING FIRMS							
FIRM SIZE	TOTAL COMMERCIAL ECONOMY	PRIMARY	MANUFACTURING	CONSTRUCTION	DISTRIBUTIVE SERVICES	CONSUMER SERVICES	BUSINESS SERVICES
JOB GAIN RATE							
0 - 19	23.4	27.6	23.2	24.4	20.8	23.1	25.5
20 - 49	15.9	18.0	14.4	15.9	13.8	16.1	20.2
50 - 99	14.4	16.8	12.1	17.9	12.6	14.7	18.2
100 - 499	12.2	13.6	9.8	16.6	10.7	13.7	14.8
500 +	6.8	6.4	5.4	14.1	5.7	8.5	7.7
TOTAL	13.4	12.7	9.4	20.2	10.9	15.9	15.1
JOB LOSS RATE							
0 - 19	-20.2	-24.9	-20.0	-22.9	-18.2	-19.3	-21.7
20 - 49	-14.2	-16.9	-14.4	-16.2	-13.1	-12.8	-17.6
50 - 99	-13.0	-17.6	-12.0	-18.0	-12.0	-11.5	-16.6
100 - 499	-11.2	-14.9	-10.3	-17.4	-10.0	-10.5	-12.8
500 +	-6.6	-7.7	-7.5	-16.9	-5.9	-6.2	-5.5
TOTAL	-12.1	-13.1	-10.3	-19.9	-10.2	-12.7	-12.5
NET JOB CHANGE RATE							
0 - 19	3.3	2.7	3.2	1.5	2.7	3.8	3.8
20 - 49	1.7	1.0	-0.1	-0.4	0.8	3.3	2.5
50 - 99	1.4	-0.7	0.1	-0.1	0.6	3.2	1.6
100 - 499	1.0	-1.3	-0.5	-0.8	0.8	3.2	2.1
500 +	0.1	-1.3	-2.0	-2.9	-0.2	2.3	2.2
TOTAL	1.3	-0.4	-0.8	0.3	0.7	3.1	2.6
USING PRIOR YEARS AVERAGE SIZING							
FIRM SIZE	TOTAL COMMERCIAL ECONOMY	PRIMARY	MANUFACTURING	CONSTRUCTION	DISTRIBUTIVE SERVICES	CONSUMER SERVICES	BUSINESS SERVICES
JOB GAIN RATE							
0 - 19	26.5	32.9	28.0	26.9	24.0	25.5	29.5
20 - 49	14.9	17.3	14.5	14.9	13.0	14.5	18.3
50 - 99	13.0	14.4	11.7	15.9	11.2	12.7	16.8
100 - 499	11.1	12.6	9.2	13.9	9.7	13.1	12.2
500 +	5.9	5.5	4.8	9.5	5.1	7.2	7.0
TOTAL	13.4	12.7	9.4	20.2	10.9	15.9	15.1
JOB LOSS RATE							
0 - 19	-18.4	-22.5	-16.9	-21.1	-16.4	-18.0	-19.9
20 - 49	-14.7	-17.4	-13.9	-17.8	-13.5	-13.6	-17.8
50 - 99	-13.8	-17.3	-12.5	-18.8	-12.8	-12.6	-17.5
100 - 499	-11.9	-14.7	-10.7	-18.9	-10.6	-11.5	-13.6
500 +	-7.1	-8.5	-7.8	-20.1	-6.2	-6.6	-6.0
TOTAL	-12.1	-13.1	-10.3	-19.9	-10.2	-12.7	-12.5
NET JOB CHANGE RATE							
0 - 19	8.0	10.4	11.1	5.7	7.6	7.5	9.7
20 - 49	0.2	-0.1	0.7	-2.9	-0.5	0.8	0.5
50 - 99	-0.8	-2.9	-0.8	-2.9	-1.6	0.1	-0.7
100 - 499	-0.8	-2.1	-1.4	-5.0	-0.8	1.6	-1.4
500 +	-1.2	-3.0	-3.0	-10.6	-1.1	0.6	1.0
TOTAL	1.3	-0.4	-0.8	0.3	0.7	3.1	2.6

TABLE 11

NET GROWTH RATE IN ALU'S BETWEEN
CONSECUTIVE YEARS, AVERAGE
1978-92, BY FIRM SIZE AND INDUSTRY

FIRM SIZE	TOTAL COMMERCIAL ECONOMY	PRIMARY	MANUFACTURING	CONSTRUCTION	DISTRIBUTIVE SERVICES	CONSUMER SERVICES	BUSINESS SERVICES
DISTRIBUTION OF ALU'S BY SIZE (AVERAGE 1978-92)							
0 - 19	24.0	16.1	9.0	48.2	19.3	34.8	24.0
20 - 49	11.9	8.5	9.4	18.1	11.3	14.3	10.0
50 - 99	8.3	5.9	8.9	9.4	7.9	8.7	7.2
100 - 499	16.0	16.0	22.0	15.2	15.1	12.3	15.2
500 +	39.7	53.4	50.7	9.1	46.5	29.9	43.6
TOTAL	100%	100%	100%	100%	100%	100%	100%
AVERAGE ANNUAL NET NUMBER OF JOBS CREATED BETWEEN CONSECUTIVE YEARS, IN THOUSANDS, 1978-92 SIZING USING CURRENT AVERAGE							
0 - 19	63.4	1.0	6.0	3.7	7.2	33.7	11.7
20 - 49	16.3	0.2	-0.1	-0.3	1.2	12.1	3.2
50 - 99	9.2	-0.1	0.2	-0.1	0.7	6.9	1.5
100 - 499	12.2	-0.5	-2.2	-0.6	1.6	10.0	4.0
500 +	4.2	-1.6	-21.1	-1.3	-1.2	17.1	12.3
TOTAL	105.3	-1.0	-17.2	1.5	9.5	79.8	32.6
AVERAGE ANNUAL NET NUMBER OF JOBS CREATED BETWEEN CONSECUTIVE YEARS , IN THOUSANDS, 1978-92 SIZING USING PRIOR AVERAGE SIZE							
0 - 19	156.5	4.0	21.1	14.0	20.6	67.0	29.8
20 - 49	1.6	0.0	1.3	-2.6	-0.8	3.0	0.7
50 - 99	-5.3	-0.4	-1.4	-1.4	-1.7	0.2	-0.6
100 - 499	-10.6	-0.8	-6.4	-3.7	-1.7	4.8	-2.7
500 +	-36.9	-3.8	-31.7	-4.7	-6.9	4.8	5.5
TOTAL	105.3	-1.0	-17.2	1.5	9.5	79.8	32.6

TABLE 12
CHANGE IN NET EMPLOYMENT BETWEEN
THE BEGINNING AND THE END OF THE PERIOD
1981-84, 1984-88, 1981-88
BY SIZE CLASS AND INDUSTRY

SIZING USING AVERAGE FIRM SIZE OVER THE ENTIRE PERIOD							
FIRM SIZE	TOTAL COMMERCIAL ECONOMY	PRIMARY	MANUFACTURING	CONSTRUCTION	DISTRIBUTIVE SERVICES	CONSUMER SERVICES	BUSINESS SERVICES
1981-84							
0 - 19	97.4	2.4	5.2	1.2	3.2	64.6	20.8
20 - 49	-11.0	-1.2	-13.1	-7.6	-7.9	10.7	8.3
50 - 99	-24.5	-2.6	-13.6	-7.9	-9.4	5.4	3.6
100 - 499	-88.5	-6.8	-47.6	-19.4	-12.7	7.2	-9.2
500 +	-250.5	-19.1	-125.4	-21.8	-56.5	-21.9	-5.9
TOTAL	-277.2	-27.3	-194.6	-55.6	-83.4	66.1	17.6
1984-88							
0 - 19	600.6	14.5	69.0	107.2	73.6	223.1	113.2
20 - 49	265.4	4.2	45.2	30.1	35.5	100.8	49.3
50 - 99	179.7	3.6	38.3	17.6	23.1	59.3	37.8
100 - 499	260.9	-0.5	55.9	18.8	46.5	78.9	61.4
500 +	199.8	-7.3	29.8	5.0	7.4	70.1	94.9
TOTAL	1506.4	14.4	238.4	178.6	186.2	532.1	356.7
SIZING USING AVERAGE FIRM SIZE DURING FIRST TWO YEARS OF THE PERIOD							
1981-84							
0 - 19	205.3	5.3	24.6	14.3	19.1	103.2	38.7
20 - 49	-20.3	-1.5	-10.4	-8.5	-11.2	0.2	11.1
50 - 99	-37.3	-1.9	-15.3	-10.7	-9.7	-0.2	0.7
100 - 499	-119.0	-5.2	-47.9	-24.5	-17.6	-8.9	-14.7
500 +	-305.9	-23.9	-145.4	-26.1	-63.8	-28.2	-18.3
TOTAL	-277.2	-27.3	-194.6	-55.6	-83.3	66.1	17.6
1984-88							
0 - 19	843.8	22.4	109.5	137.3	111.4	299.9	163.2
20 - 49	288.0	4.9	48.4	22.3	29.1	81.2	42
50 - 99	140.7	1.8	29.5	10.2	24.4	42.2	32.6
100 - 499	192.0	-2.3	47.5	12.5	35.8	57.8	40.6
500 +	101.9	-12.5	3.3	-3.6	-14.3	50.9	78.8
TOTAL	1506.4	14.4	238.4	178.6	186.2	532.1	356.6

References

Baldwin, J., Chandler, W., Le, C., Papailiadis, T., (1994) Strategies for Success, A Profile of Growing Small and Medium-Sized Enterprises in Canada, Statistics Canada Publication No. 61-523RE, Ottawa.

Baldwin, J. and Gorecki, P.K. (1990); Structural Change and the Adjustment Process; Perspectives on Firm Growth and Worker Turnover, Economic Council of Canada, Statistics Canada, Ottawa.

Baldwin, J., Dupuy, R., and Penner, W., (1993) Development of Longitudinal Panel Data from Business Registers: Canadian Experience, the Statistical Journal, UN Economic Commission, Autumn.

Baldwin, J. and Picot, G., (1994) Employment Generation by Small Producers in the Canadian Manufacturing Sector. Mimeo, Analytical Studies Branch, Statistics Canada, Ottawa.

Birch, David L. (1987); Job Creation in America: How our Smallest Companies Put the Most People to Work, New York: The Free Press.

Birch, David L. (1979); The Job Creation Process, 1979, Unpublished Report, MIT Program on Neighborhood and Regional Change.

Brown, C., Hamilton, J., Medoff, J., (1990); Employers Large and Small, Harvard University Press, Cambridge, Mass.

Davis, S.J., Haltiwanger, J., Schuh, S. (1993); Small Business and Job Creation: Dissecting the Myth and Reassessing the Facts, Unpublished Report, University of Chicago, University of Maryland, Federal Review Board.

Davis, S.J., Haltiwanger, J., (1993); Gross Job Creation, Gross Job Destruction and Employment Reallocation, Working Paper No. 3728, Cambridge, Mass., National Bureau of Economic Research, June.

Industry Canada, (1994), Growing Small Businesses, Communication Branch, Industry Canada, Ottawa.

Industry, Science and Technology Canada (1991), Small Business in Canada, Minister of Supply and Services, Ottawa.

Ministry of Industry, Trades and Technology (1987); The State of Small Business in Ontario; Ontario Government, Toronto.

Morissette, R. (1993); Canadian Jobs and Firm Size: Small Firms Pay Less?, Canadian Journal of Economics, February, XXVL, No.1

Picot, G, (1992); <u>Workers on the Move: Permanent Layoffs; Perspectives on Labour and Income</u>, Autumn, Statistics Canada, Ottawa.

Statistics Canada (1989), <u>Developing a Longitudinal Database on Businesses in the Canadian Economy</u>; An Approach to the Study of Employment, Publication No. 18-501, Ottawa.

Wannell, Ted (1991); <u>Trends in the Distribution of Employment by Employee Size: Recent Canadian Evidence</u>; Research Paper No. 39, Analytical Studies Branch, Statistics Canada.