Catalogue no. 11F0027M — No. 078
ISSN 1703-0404
ISBN 978-1-100-16319-2

Research Paper

Economic Analysis (EA) Research Paper Series

Market Expansion and Productivity Growth: Do New Domestic Markets Matter as Much as New International Markets?

by John R. Baldwin and Beiling Yan

Economic Analysis Division
18-F, R.H. Coats Building, 100 Tunney's Pasture Driveway
Telephone: 1-800-263-1136

Statistics Canada Statistique Canada

Canada

Market Expansion and Productivity Growth: Do New Domestic Markets Matter as Much as New International Markets?

by
John R. Baldwin and Beiling Yan

11F0027M No. 078

ISSN 1703-0404
ISBN 978-1-100-20366-9

Statistics Canada
Analysis Branch
Economic Analysis Division
18-F, R.H. Coats Building, 100 Tunney's Pasture Driveway
Ottawa K1A 0T6

How to obtain more information:
National inquiries line: 1-800-263-1136
E-Mail inquiries: infostats@statcan.gc.ca

March 2012

Authors' names are listed alphabetically.

Published by authority of the Minister responsible for Statistics Canada

La version française de cette publication est disponible (n° 11F0027M au catalogue, n° 078).

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, and Canada's businesses, governments, and other institutions. Accurate and timely statistical information could not be produced without the continued cooperation and goodwill of these partners.

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable, and courteous manner. To this end, the Agency has developed standards of service which its employees observe in serving its clients. To obtain a copy of these service standards, please contact Statistics Canada, toll-free, at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca. Under "Our agency": click on "About us > The agency" and select "Providing services to Canadians."

Economic Analysis Research Paper Series

The Economic Analysis Research Paper Series provides for the circulation of research conducted by the staff of National Accounts and Analytical Studies, visiting fellows, and academic associates. The Economic Analysis Research Paper Series is meant to stimulate discussion on a range of topics, including the impact of the New Economy, productivity issues, firm profitability, technology usage, the effect of financing on firm growth, depreciation functions, the use of satellite accounts, savings rates, leasing, firm dynamics, hedonic estimations, diversification patterns, investment patterns, differences in the performance of small and large firms and of domestic and multinational firms, and purchasing power parity estimates. Readers of the series are encouraged to contact the authors with comments and suggestions.

The primary distribution medium for the research papers is the Internet. These papers can be accessed for free at www.statcan.gc.ca.

All papers in the Economic Analysis Research Paper Series go through institutional and peer review, in order to ensure that they conform to Statistics Canada's mandate as a government statistical agency and adhere to generally accepted standards of good professional practice.

The papers in the series often include results derived from multivariate analysis or other statistical techniques. It should be recognized that the results of these analyses are subject to uncertainty in the reported estimates.

The level of uncertainty will depend on several factors: the nature of the functional form used in the multivariate analysis; the type of econometric technique employed; the appropriateness of the statistical assumptions embedded in the model or technique; the comprehensiveness of the variables included in the analysis; and the accuracy of the data that are utilized. The peer group review process is meant to ensure that the papers in the series have followed accepted standards, in order to minimize problems in each of these areas.

Publications Review Committee
Analysis Branch, Statistics Canada
18th Floor, R.H. Coats Building
Ottawa, Ontario K1A 0T6

Symbols

The following standard symbols are used in Statistics Canada publications:

.	not available for any reference period
..	not available for a specific reference period
…	not applicable
0	true zero or a value rounded to zero
0^s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p}	preliminary
^{r}	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E}	use with caution
F	too unreliable to be published
*	significantly different from reference category ($p < 0.05$)

Table of Contents

Abstract

This paper asks how market expansion contributes to productivity growth. It investigates whether entry to both new international markets and new domestic markets is associated with greater productivity growth. It also examines whether exit from export markets is necessarily associated with deteriorating performance or whether it too can lead to success when associated with movements to new markets. Finally, the paper examines the strategy of firms that move to new markets after they withdraw from export markets in order to examine the differences that set them apart from their counterparts that do not find themselves able to adapt because they simply withdraw to their home domestic markets.

Key words: market expansion, productivity growth, new markets, export

JEL No.: D2, F1, L2

Executive summary

The challenges and opportunities facing the Canadian manufacturing sector have evolved substantially over the last two decades. Canadian manufacturing firms adapted to these circumstances in different ways. This study examines the relationship between adaptation and success. It focuses on the extent to which productivity growth differed between those producers that adapted by finding new markets and those that were unable to do so. It finds that:

- Entry by Canadian manufacturing firms into two different types of new markets—both international markets and new provincial markets—was associated with increases in productivity growth. In both cases, the productivity performance of Canadian manufacturing plants that entered new markets was superior to the productivity of those that maintained the *status quo*. Entering new domestic markets is as beneficial as entering international markets. This confirms that the beneficial effects of entry accrue not just to entrants that cross international borders but also to other forms of expansion—in particular, to entrants that expand across provincial borders.

- Exiting the export market is not likely to be detrimental to productivity growth when it is followed by entry to new domestic markets. Firms that exit export markets but then explore new domestic markets perform as well as firms that continue exporting and perform better than those that simply retrench to their home markets. Once more, successful experimentation with new markets produces tangible benefits to the overall economy.

The paper also examines the strategic differences between firms that move to new markets and those that do not find themselves able to adapt. It finds that:

- Firms that make successful transitions exhibit differences in the strategic emphasis that they give to market innovation. Firms that start with a greater emphasis on being able to penetrate new geographic markets are the ones that successfully do so.

- Firms that perceive high levels of market competition tend to become more competitive and successful by experimenting with new markets.

- More importantly, internal organizational structure mattered. A flexible and decentralized organizational structure is an important feature that distinguishes plants that enter new markets from those that do not. Plants that find new markets typically have flexible job design, information sharing with employees, problem-solving teams, joint labour-management committees, and self-directed work groups.

1 Introduction

This study examines the relative success of the manufacturers that demonstrate the capability of adapting to change, the importance of finding new markets in which to do so, and the nature of the flexibility required in order to achieve this outcome.

The challenges and opportunities facing the Canadian manufacturing sector have evolved substantially over the last two decades. During the 1990s, declines in tariffs brought on by the *Canada−United States Free Trade Agreement* and the *North American Free Trade Agreement* led to a dramatic expansion of trade between Canada and the United States and to an increase in the export intensity of manufacturing plants. In contrast, the worldwide resource boom post-2000 led to higher prices for Canadian commodity exports, an increase in the Canada−U.S. exchange rate, a decline in the competitiveness of the Canadian manufacturing sector in U.S. markets, but new domestic opportunities in the domestic resource sector.

Canadian manufacturing firms adapted to these circumstances in different ways. Of those in export markets, some stayed, while others exited. Of those that exited, some took advantage of new opportunities in domestic markets. Others simply retrenched to their existing domestic markets. Of those firms serving only domestic markets at the beginning of the period, some found new export markets despite the appreciation of the Canadian dollar vis-a-vis the U.S. dollar, while others expanded within Canada to enter new domestic markets in other provinces/territories. Still others kept to their traditional markets.

This study examines the relationship between adaptation and success. It focuses on the extent to which productivity growth differed between those producers that adapted by finding new markets and those that were unable to do so. It also examines the strategic profiles of these different types of firms in order to understand the inherent differences in the activities and the strategies of firms that facilitate adaptation in a changing economy.

The study makes contributions in two different areas: the learning-by-exporting hypothesis in the international-trade literature and the dynamics-of-change studies found in the industrial organization literature. Ascertaining whether entry to export markets leads to productivity gains has been the focus of research since the study by Bernard and Jensen (1995). It has been observed that 'superior' firms self-select into export markets, while exporting exerts positive "learning" effects on productivity growth of exporters in Canada and several other countries.[1]

These studies, however, have focused almost entirely on the effect of entry to international markets—perhaps because data are more readily available to study this phenomenon. The interest of this paper is broader. Going beyond the traditional focus on export-led productivity growth, the paper examines the effect of entry to two types of new markets—domestic and foreign─and asks whether domestic firms that expand across provincial borders also benefit from a subsequent spurt in productivity growth and perform as well as those that expand across international borders.

The paper also examines the fate of firms that exit export markets. Entry and exit accompany one another as firms experiment with their capabilities to serve new customers and use new technologies. While exit may signal failure, it may also be a precursor to regenerative activities that follow. This study examines firms that withdrew from export markets and divides them into those that retrench back into their home base and those that expand across provincial

1. A significant positive effect of exporting on a firm's productivity growth has been found for countries such as, Canada, Italy, Slovenia and sub-Saharan African countries. However, the opposite has been reported for countries such as Chile, China, Germany, and Mexico. Baldwin and Yan (2012) have explored the possible explanations for the cross-country variations. See Wagner (2007), López (2005), and Greenaway and Kneller (2007) for a survey of the literature.

boundaries into new markets. The latter outcome is suggestive of a flexibility that is associated more with growth than with long-term decline.

The main contribution of this paper to the existing literature is the finding that improvements in productivity are related to entry into new markets in general—that improvements are independent of whether the new markets are domestic or foreign. Entering new domestic markets in other Canadian provinces is as beneficial as entering international markets, and exiting the export market may not be detrimental if it is followed by entry to new domestic markets.

The paper also furthers understanding of the characteristics associated with firms' success. Micro studies have focused on how the competitive process that transfers resources from the less productive to the more productive contributes to aggregate productivity growth (Foster *et al*. 2001). This study asks how the growing and more productive firms differ from those in decline—in order to understand what is behind these differences.

Differences in success are related to the ability of firms to find innovative ways to adapt to change. One of the most emphasized capabilities of successful firms involves the introduction of new advanced processes and technologies (Mowery and Rosenberg 1989; Baldwin and Sabourin 2002). There has been less evidence adduced on the connection between success and the importance given by a firm to marketing. Yet, innovation surveys find that 'compleat' innovators not only are more likely to introduce new technologies; they are also more likely to place a greater stress on "introducing new products in new markets" or "introducing existing products into new markets" (Baldwin and Gellatly 2003). This paper is aimed at redressing this deficiency. It focuses on the extent to which productivity growth is associated with entry to new markets, in order to show the connection between success and firms' flexibility in adapting to change by entering new markets. The paper uses Statistics Canada's Workplace and Employee Survey (WES) in order to directly measure certain characteristics associated with market expansion. The WES survey contains information on firms' innovation strategies and practices with respect to products, processes, markets, and work organization. These data are used to ask how the growing and more productive firms that move from one market to another differ from those in decline.

This paper is organized as follows. Section 2 introduces data. Section 3 examines the link between new markets and productivity growth. Section 4 compares the strategic profiles between firms that grow into new markets and those that do not. Section 5 concludes.

2 Data and summary statistics

2.1 Data sources

The data used in this study come from Statistics Canada's Annual Survey of Manufactures (ASM) (formerly known as *Census of Manufactures*), which for this paper has been transformed into a longitudinal database that tracks Canadian manufacturing plants over time. The sample that is used here includes only plants for which information on shipments by place of destination is available. Information on place of destination is available in 1979, 1984, 1990, 1993, 1996, 1997, 1998, and 1999 for larger plants that filled out the long-form questionnaires, but is available annually from 2000 onwards for all plants.[2] The ASM database includes information on shipments, value added, employment, age of plants, exports, and industry affiliation at the six-digit North American Industry Classification System (NAICS). Labour productivity is defined as

2. According to a 1974 survey that collected export data for all plants, only 0.4% of plants that filled in the short-form questionnaires reported exports (Baldwin and Gu 2003). Therefore, the excluded plants are mainly small plants, accounting for a very small proportion of total industry output. Special edits to the file post 2000 were also made because of changes that turned the ASM from a census to a survey. These changes required the exclusion of some observations that had been imputed from tax records.

real value-added output per employee, where real value-added is calculated by means of plant-level nominal value-added output deflated by corresponding industry deflators. It also contains information on whether a plant ships to other provinces or territories outside the province or territory in which it is located.

2.2 Summary statistics

To examine the success of producers that find new markets, producers are first divided into four groups on the basis of their transitions into and out of export markets: continuing non-exporters (plants that export neither at the beginning nor the end of a period); entrants to export markets (plants that do not export at the beginning of a period, but export at the end of the period); exiters from export markets (plants that export at the beginning of a period, but do not export at the end of the period); and continuing exporters (plants that export at both the beginning and the end of a period). The productivity performance of two groups is compared: first, continuing non-exporters versus entrants into export markets; and, second, exiters from export markets versus continuing exporters. Non-export participants (continuing non-exporters or exiters) are then further divided into those that take advantage of new domestic markets by beginning to ship to other provinces/territories of Canada and those that do not.

The productivity performance of plants making these entry and exit transitions is compared over two periods: 1990−1996 and 2000−2006. The two periods vary in terms of the macroeconomic environment. In the first period, the Canadian manufacturing sector was presented with new export opportunities in U.S. markets as a result of the depreciation of the Canada-U.S. exchange rate, as well as the implementation of the *Canada−United States Free Trade Agreement* (FTA), in 1988, and of the *North American Free Trade Agreement* (NAFTA) between Canada, Mexico, and the United States, in 1994, which dramatically reduced Canada−U.S. tariff rates. By the late 1990s, most of the tariff reductions had been implemented. Post 2000, the worldwide resource boom led to a significant expansion of the resource producing provinces and an appreciation of the Canadian dollar relative to the U.S. dollar that reduced the profitability of serving U.S. export markets. Both rising commodity prices and the appreciation of the Canadian dollar led to gains in the terms of trade (lower import prices and higher export prices), which further stimulated the post-2000 resource-led domestic boom (MacDonald 2008).

Exports grew at an annual rate of only 0.5% during the 2000−2006 period, compared to 7.5% during the 1990−1996 period (Table 1). In contrast, real GDP grew at 2.6% per year in the 2000−2006 period, compared to only 1.7% in the 1990−1996 period. The post-2000 period also saw dramatic increases in real GDI due to increases in the terms of trade and resulting increases in domestic expenditure, in particular, personal expenditure on semi-durable goods and investment in residential and non-residential structures. GDI grew by 3.1% per year in the 2000-2006 period, but by 1.7% per year in the 1990 to 1996 period.

Table 1
Summary statistics of macroeconomic conditions

Average annual growth	1990 to 1996	2000 to 2006
	percent	
Exports (in chained 2002 dollars)	7.5	0.5
Nominal exchange rate	-2.6	4.5
Commodity prices		
Including energy	0.5	8.8
Excluding energy	1.3	5.7
Terms of trade – export price relative to import price	-0.3	1.7
Real gross domestic product	1.7	2.6
Real gross domestic income	1.7	3.1
Personal expenditure	1.5	3.3
Durable goods	1.4	4.9
Semi-durable goods	0.5	4.2
Non-durable goods	1.1	1.6
Services	2.0	3.5
Business gross fixed capital formation	-0.3	5.6
Residential structures	-2.6	6.8
Non-residential structures	-1.5	5.0
Machinery and equipment	2.6	5.6

Source: Statistics Canada, authors' compilation from CANSIM tables 176-0001,176-0064, 380-0002, and 228-0057.

Summary statistics of productivity performance across the plant groups being compared here are presented in Table 2. Three findings are noteworthy. First, export-participants are more productive than non-exporters at the beginning of a period and have more rapid productivity growth during the period (entrants versus non-entrants, and continuers versus exiters). Second, among firms that were not exporters at the beginning of the period, those breaking into new domestic markets enjoy both higher productivity levels before their entry and faster productivity growth after entry, compared to those remaining in their traditional domestic markets. Third, the productivity growth gaps between the groups (export-participants versus non exporters, as well as non exporters that entered new domestic markets versus non exporters that did not enter new domestic markets) narrowed in the post-2000 period compared to the pre-2000 period, when ample new export opportunities existed in U.S. markets because of tariff and exchange-rate reductions.

Table 2
Summary statistics of plant performance by group

Plant grouping	Number of plants	Share of plants	Labour productivity level at the beginning of the period	Labour productivity growth during the period (average annual rate)
	units		percent	
1990 to 1996				
All continuing plants	20,446	100.0	100.0	-0.7
Entrants to export markets	2,542	12.4	105.3	3.3
Non-exporters	12,361	60.5	81.6	-1.8
With new domestic market	1,159	5.7	111.5	1.7
Without new domestic market	11,202	54.8	78.5	-2.1
Continuing exporters	3,764	18.4	146.0	2.1
Exiters	1,779	8.7	122.6	-4.8
With new domestic market	150	0.7	145.9	-0.7
Without new domestic market	1,629	8.0	120.5	-5.2
2000 to 2006				
All continuing plants	19,553	100.0	100.0	1.4
Entrants to export markets	3,870	19.8	93.0	1.6
Non-exporters	6,418	32.8	87.8	1.3
With new domestic market	1,490	7.6	92.4	1.6
Without new domestic market	4,928	25.2	86.4	1.2
Continuing exporters	6,525	33.4	119.5	1.5
Exiters	2,740	14.0	92.1	1.2
With new domestic market	671	3.4	95.4	1.6
Without new domestic market	2,069	10.6	91.0	1.0
The two periods (1990 to 1996 and 2000 to 2006) combined				
All continuing plants	39,999	100.0	100.0	0.3
Entrants to export markets	6,412	16.0	101.1	2.3
Non-exporters	18,779	46.9	79.5	-0.7
With new domestic market	2,649	6.6	101.8	1.7
Without new domestic market	16,130	40.3	75.8	-1.1
Continuing exporters	10,289	25.7	134.1	1.7
Exiters	4,519	11.3	106.0	-1.2
With new domestic market	821	2.1	115.1	1.2
Without new domestic market	3,698	9.2	104.0	-1.7

Note: Calculations of summary statistics are based on continuing plants and use information on destinations of shipments. The average labour productivity level at the beginning of a period is set to 100. Average annual labour productivity growth is the unweighted average annual log growth of labour productivity across plant groups.
Source: Statistics Canada, authors' compilation from the Annual Survey of Manufacturers.

Productivity performance then is associated with the entrepreneurial capabilities that lead to entry to new markets, but the size of the benefits generated by this activity depends on the macreconomic environment. Plants expanding into new markets always perform better; but the magnitude of the difference is dependent on the macroeconomic environment. The latter was investigated by Baldwin and Yan (2012), who found that the size of advantage tends to be reinforced or attenuated by changes in the trading regime and that the appreciation of the Canadian dollar during the post-2000 period almost completely offset the productivity growth advantages enjoyed by new export-participants.

To examine whether there are differences in productivity growth across industries, the paper uses a taxonomy that divides four-digit industries into five major groups[3]: natural-resource- based industries, labour-intensive industries, scale-based industries, product-differentiated industries, and science-based industries. Each group is defined primarily on the basis of the factors influencing the process of competition. For resource-based industries, the primary determinant of

3. See Baldwin and Rafiquzzaman (1994) for a discussion of the methodology used to create these groupings following the Organization for Economic Cooperation and Development, 1987.

competition is access to abundant natural resources. For the labour-intensive sector, it is labour costs. For scale-based industries, competition depends on the length of production runs. In the product-differentiated group, competition hinges on an ability to tailor production to the demands of various markets. Competition in science-based sectors depends on the application of scientific knowledge. The latter two industries rely heavily on intangible brand and knowledge assets.

While there are some differences across industries in terms of performance post-2000 versus the 1990s, the general story is the same—firms that switched out of export markets did better than those that continued to serve export markets and firms that entered export markets did not do as well as those that continued to serve export markets (Column 3 of Table 3). In the natural resources sector and the scale-based sector, productivity growth is generally higher post 2000 compared to the 1990s, but the increases are greater in non-exporters than in entrants to export markets and in exiters from export markets as compared to continuing exporters. In the labour-intensive sector, there are declines in exporters and in entrants to export markets but increases for non-exporters and exiters from export markets. In the product differentiated sector and the science-based sector, non-exporters and exiters also did better than continuing exporters or entrants to export markets. The macroeconomic environment impacted on plant productivity performance in the same direction across a wide range of industries.

Table 3
Average annual labour productivity growth by manufacturing sector

Plant grouping	1990 to 1996	2000 to 2006	Difference
		percent	
Entrants to export markets	3.3	1.6	-1.7
Natural resources	2.6	2.8	0.2
Labour-intensive	3.5	0.4	-3.1
Scale-based	0.7	3.4	2.7
Product-differentiated	7.0	0.5	-6.6
Science-based	4.2	1.5	-2.7
Continuing non-exporters	-1.8	1.3	3.1
Natural resources	-1.5	1.4	2.9
Labour-intensive	-1.8	0.7	2.5
Scale-based	-4.5	3.6	8.1
Product-differentiated	0.7	-0.7	-1.3
Science-based	-0.6	1.5	2.1
Continuing exporters	2.1	1.5	-0.7
Natural resources	1.6	1.9	0.3
Labour-intensive	1.8	-0.3	-2.1
Scale-based	2.3	2.8	0.5
Product-differentiated	2.6	1.2	-1.5
Science-based	2.8	1.0	-1.8
Exiters from export markets	-4.8	1.2	6.0
Natural resources	-3.5	2.4	5.9
Labour-intensive	-5.6	0.0	5.6
Scale-based	-5.8	2.5	8.3
Product-differentiated	-4.8	-0.7	4.1
Science-based	-4.0	2.9	6.9

Source: Statistics Canada, authors' compilation from the Annual Survey of Manufacturers.

3 Productivity growth and new markets

3.1 Plant groupings

Two samples of continuing plants—one over 1990−1996 and the other over 2000−2006—are pooled; then, the 1990−1996 and 2000−2006 periods are divided into two equal length sub-periods in order to allow for a comparison of performance of plants both before entry and after

exit: the first pre-entry/exit periods of 1990−1993 and 2000−2003, and the second post-entry/exit periods of 1993−1996 and 2003−2006.

Plants are first divided into four groups according to their transition in export markets over the two sub-periods in order to avoid conflating the effects of export market entry and exit (Table 4). Plants that have changed export status in the first sub-period are excluded.[4] Export entrants (G1) and non-exporters (G2) are defined as follows: plants that did not export during the first sub-period but did start exporting during the second sub-period are classified as export entrants; non-exporters are those that did not export during either of the sub-periods. Similarly, exporter exiters (G4) and continuing exporters (G3) are defined as follows: plants that were exporters during the first sub-period, but stopped exporting during the second sub-period, are classified as export exiters; continuing exporters are those that exported during both sub-periods. If export participation is associated with more rapid productivity growth, then entrants' performance should be superior to that of non-exporters and exporters' performance should be superior to that of exiters from export markets.

Table 4
Plant groupings

Grouping	Market status over time			Total number of observations
	1990 (or 2000)	1993 (or 2003)	1996 (or 2006)	
Entrants to export markets (G1)	Non-exporters	Non-exporters	Exporters	5,570
Continuing non-exporters (G2)	Non-exporters	Non-exporters	Non-exporters	16,162
Continuing non-exporters with no new domestic markets (G21)	Non-exporters	Non-exporters	non-exporters that served the same domestic provincial markets	13,156
Continuing non-exporters with new domestic markets (G22)	Non-exporters	Non-exporters	non-exporters that expanded to other domestic provincial markets	3,006
Continuing exporters (G3)	Exporters	Exporters	Exporters	16,728
Exiters from export markets (G4)	Exporters	Exporters	Non-exporters	3,432
Exiters from export markets with no new domestic markets (G41)	Exporters	Exporters	non-exporters that served the same domestic provincial markets	2,628
Exiters from export markets with new domestic markets (G42)	Exporters	Exporters	non-exporters that expanded to other domestic provincial markets	804

Note: "G" numbering represents various plant grouping.
Source: Statistics Canada, authors' compilation from the Annual Survey of Manufacturers.

In order to examine whether productivity gains are not limited to entry to export markets but instead are associated with market expansion in general, non export participants (non-exporters and exiters) are further divided into two subgroups of plants according to whether they take advantage of new domestic provincial markets in the subsequent periods (1993−1996 and 2003−2006). That is, non-exporters (G2) are further divided into those that continue to serve the same domestic markets (G21) and those that take advantage of new markets in other parts of Canada by beginning to serve other provinces/territorities (G22). Similarly, export exiters (G4) are further divided into those with no new provincial or territorial markets (Group 41) and those with new provincial or territorial markets (Group 42). The performance of export non-participants (G2 and G4), along with their sub-categories (G21, G22 and G41, G42), will be compared to that of export participants (G1 and G3), respectively.

If a productivity gain is associated with market expansion in general, there should be no significant difference in terms of productivity growth between plants that expand into domestic

4. In other words, only continuing exporters and non-exporters during the first sub-periods are included in the analysis. Plants that export at both the beginning (1990 and 2000) and the end (1993 and 2003) of the first sub-periods are classified as exporters; plants that do not export at either the beginning or the end of the first sub-periods are classified as non-exporters.

markets and those that expand into foreign markets. In addition, plants that find ways to serve new markets, whether domestic or foreign, should experience faster productivity growth than plants whose market remains essentially unchanged. Similarly, exporters that cease exporting but find new provincial domestic markets should do better than those that just retreat to those provincial markets that they were already serving.

3.2 Methodology and results

The following equation is used to examine whether productivity growth is higher in plants that find new markets:

$$Y_{p,t} = \alpha_i + \alpha_t + \beta_0 + \beta_1 T + \beta_2 G + \beta_3 T * G + Z_{p,t0}\gamma \quad (1)$$

where Y_{pt} is plant *p*'s labour productivity growth over period *t*. *T* is a time period dummy where *T=0* indexes the first sub-period and *T=1* indexes the second sub-period. *G* is a group dummy where *G=0* indexes export participants (G1 or G3) and *G=1* indexes export non-participants (G2 or G4, or their sub-groups, G21, G22, G41, or G42). *T*G* is the interaction of the period dummy and the group dummy. The regression also controls for period-specific fixed effects (α_t), four-digit NAICS industry-specific fixed effects (α_i), and a vector of plant characteristics ($Z_{p,t0}$); these plant characteristics include relative productivity (relative to the mean productivity of plants in the same NAICS four-digit industry), relative employment (relative to NAICS four-digit industry mean), age, nationality of ownership, and share of non-production workers at the start of a period (i.e., 1990 or 2000).

Figure 1 displays the interpretation of the β coefficients. β_1 captures changes that are common to all groups; β_2 captures possible permanent group differences; and the coefficient of interest, β_3, measures the true difference between the two groups under comparison. β_3 removes biases in the second sub-period group comparisons that could be the result of permanent differences between groups, as well as biases from comparisons over time for one particular group that could be the result of common time trends.

Figure 1
Interpretation of coefficient estimates of equation

$\hat{y}_{gt}$	First sub-period	Second sub-period	Difference [1]
Export participants (G=0)	$\hat{y}_{00}$	$\hat{y}_{01}$	β_1
Export non-participants (G=1)	$\hat{y}_{10}$	$\hat{Y}_{11}$	β_1 plus β_3
Difference[2]	β_2	β_2 plus β_3	β_3

1. Second sub-period minus first sub-period.
2. Export non-participants minus export participants.

Note: Figure 1 displays the interpretation of the β coefficients. β_1 captures changes that are common to all groups; β_2 captures possible permanent group differences; and the coefficient of interest, β_3, measures the true difference between the two groups under comparison.

Source: Statistics Canada, authors' calculations.

Table 5 reports β_3 *coefficients* from eight comparisons.[5] There are two important findings. First, export participants (G1, G3) have higher productivity growth than non-participants (G2, G4). Annual labour productivity growth is about 2.6-percentage-points higher for export entrants than for non-exporters (statistically significant) and 1.6-percentage-points higher for exporters than export exiters (though not statistically significant).

Table 5
Labour productivity growth differentials

Comparison	Difference in labor productivity growth	
	coefficient	standard error
Panel A – Compared to entrants to export markets (G1)		
Non-exporters (G2) (G2 minus G1)	-2.6 *	1.1
Non-exporters with no new domestic market (G21) (G21 minus G1)	-3.6 *	1.1
Non-exporters with new domestic market (G22) (G22 minus G1)	1.6	1.4
Panel B – Compared to continuing exporters (G3)		
Exiters from export markets (G4) (G4 minus G3)	-1.6	1.2
Exiters from export markets with no new domestic market (G41) (G41 minus G3)	-2.5 *	1.3
Exiters from export markets with new domestic market (G42) (G42 minus G3)	1.3	2.4
Panel C – Additional comparisons		
Non-exporters with new domestic market versus non-exporters with no new domestic market (G22 minus G21)	5.1 *	1.2
Exiters with new domestic market verus exiters with no new domestic market (G42 minus G41)	3.9	2.6

* significantly different from reference category ($p < 0.05$).

Note: "G" numbering represents various plant grouping. The table reports the coefficients for the interaction term of the time dummy and the group dummy in equation (1). For full regression results for the eight comparisons, see Appendix. Results are obtained by pooling data over two periods: 1990 to 1993 or 1993 to 1996 and 2000 to 2003 or 2003 to 2006. All estimates control for period-specific fixed effects, fixed four-digit North American Industry Classification System industry-specific fixed effects, and plant characteristics (relative labour productivity, relative employment, age, foreign ownership, and share of non-production workers at the start of a period, i.e., 1990 and 2000).

Source: Statistics Canada, authors' compilation from the Annual Survey of Manufacturers.

Second, not all non-participants lag behind participants in export markets. Non-exporters that enter new domestic markets are as successful as those that enter new foreign markets, and plants that stop exporting but start serving new domestic markets perform as well as those that continue exporting. These findings are confirmed by a statistically insignificant difference between the groups under comparison (see β_3, Table 5). Plants with the worst performance are those that maintain the *status quo*, with neither new foreign markets nor new domestic markets.

The results reveal a pattern that goes beyond the traditional focus on export-led productivity growth. Productivity improvement is associated generally with entry into new markets. Plants that take the risks associated with expanding into new markets, whether domestic or foreign, have a

5. For full regression results, see Appendix Table 11.

superior productivity performance. For example, compared to similar plants with no new markets, non-exporters that subsequently enter new domestic or foreign markets enjoy a productivity growth advantage of 5.1 percentage points and 3.6 percentage points, respectively (Table 5). Entry into new markets, whether domestic or foreign, is associated with subsequent improvements in productivity.

The acceleration of productivity growth associated with entry into new markets may arise from a number of sources. On the one hand, it may arise from the so-called 'Verdoorn' effect. Verdoorn (1980) and Scott (1989) have emphasized the connection between the growth of a firm and increases in its productivity performance, arguing that growth involves both exploiting economies of scale and learning about new processes at the margin and their application to inframarginal production. Entry involves expansion of production for many of these plants and therefore the type of growth that may allow for the application of more, and superior, capital. Baldwin and Gu (2004) found that the entrants to export markets begin to apply more advanced manufacturing technologies after they move into these markets. On the other hand, it is possible to argue that entry may accelerate productivity growth if entry involves an options contract that pays off with growth (Caves, 1998): successful entrants can be regarded as having bought an option on their abilities to master the technology required for new and more complex markets; and once having received information on their capabilities, these entrants expand and exploit technologies that permit growth and productivity gains.

4 The strategic emphasis of entrants—the importance of plant flexibility

The previous section has shown how manufacturing firms that found new markets enjoyed the most success. This may arise from a random process associated with the development of new markets that rewards firms that have fortuitously chosen the correct products, or it may be the result of firms deliberately choosing strategies that allow them to exploit opportunities when they arise.

This section examines whether there are discernible differences between the firms that adapted and found new markets and those that did not. The focus is on the strategy adopted by firms—with regard to both their emphasis on innovation and the type of flexibility that allows for the development of new products and the pursuit of new markets. Use is made here of Statistics Canada's Workplace and Employee Survey (WES), a longitudinal survey that links the characteristics of workers and producers for the period from 1999 to 2005.[6] The annual WES data (1999−2005) is linked with the annual ASM data (1999−2006). The former provides a set of plant characteristics on flexibility, while the plant characteristics (export intensity, size) in the latter allow plants to be assigned to different groups. The linked annual dataset produces a total of 6,542 observations over the pooled sample periods.

4.1 Data and measurement of plant flexibility

The WES questions focus on innovation strategies and outcome, types of technologies, workplace practices, and the competitive environment—each of which captures different characteristics that have been hypothesized to affect the flexibility of firms (De Toni and Tonchia 1998). The list of the variables on plant flexibility characteristics is summarized in Table 6, along with the coefficient alphas, means, and standard deviations. The alpha coefficients are all very near, or above, the generally accepted threshold value of 0.70, thereby demonstrating strong internal consistency for the scales attached to the flexibility variables.

6. See Picot and Wannell (1997).

Table 6
List of variables on firms' flexibility characteristics

Variables	Codes	Summary statistics				
		number	measurement	coefficient	mean	standard deviation
Innovation						
Innovation strategy – overall	I1	7	1-to-5 scale	0.96	1.64	1.59
Undertaking research and development	I11	1	1-to-5 scale	...	1.32	1.69
Developing and improving products/services	I12	3	1-to-5 scale	0.92	1.83	1.75
Developing and improving processes	I13	2	1-to-5 scale	0.88	1.57	1.58
Expanding into new geographic markets	I14	1	1-to-5 scale	...	1.51	1.74
Innovation outcome – overall	I2	4	4 categories	0.82	1.61	1.58
New and improved products/services	I21	2	2 categories	0.73	0.83	0.87
New and improved processes	I22	2	2 categories	0.77	0.78	0.88
Technology						
Installation of a major new software or hardware	T1	1	binary	...	0.25	0.43
Installation of computer-controlled or computer-assisted technology	T2	1	binary	...	0.11	0.31
Other major implementation of other technologies	T3	1	binary	...	0.09	0.29
Workplace practices						
Strategy on labour-management cooperation, employees' skills, and employee participation	WP1	3	1-to-5 scale	0.96	1.71	1.67
Percentage of employees that received classroom training	WP2	1	percent	...	0.35	1.21
Percentage of employees that received on-the-job training	WP3	1	percent	...	0.45	2.20
Training in group decision making/problem solving and team-building/leadership/communication	WP4	4	4 categories	0.83	0.79	1.29
A flexible organizational structure	WP5	5	5 categories	0.79	0.70	1.26
Competitive environment						
Intensity of competition	C1	4	1 to 5 scale	0.75	1.16	1.33
Number of competitors	C2	1	1 to 5 scale	...	1.95	1.07

Source: Statistics Canada, Workplace and Employer Survey.

4.1.1 Innovation variables

Several variables are included to test whether firms that enter new markets are more innovative. The first set of variables (*I1*) comes from strategy questions that ask a firm to rank the emphasis it gives to a set of strategies related to innovation. Each strategy is ranked using a five-point Likert scale ranging from *not important* (1) to *crucial* (5). These innovation strategies cover four areas—1) the performance of R&D 2) developing and improving products/services (the mean score derived from the categories: developing new products/services, total quality management, and improving product/service quality); 3) developing and improving processes (the mean score from: developing new production/operating techniques and reorganizing the work process); and 4) expanding into new geographic markets. In addition, an overall score is created that is the mean score on all four innovation-related strategies.[7]

The second set of variables (*I2*) comes from questions on activities. These variables capture whether the firm introduced new products/services, improved products/services or new processes, or improved processes in the survey period. Each response is considered separately using a binary variable where *1* is assigned for an affirmative answer and *0* is assigned

7. Where it was appropriate, the relatedness of the categories was tested and confirmed with Cronbach's alpha.

otherwise. In addition, an overall score is created as the sum of these binary variables across all categories.

4.1.2 Technology variables

One of the primary benefits of advanced manufacturing technology is the flexibility that it gives to firms. This flexibility allows these technologies to be used for a wider variety of products than is the case using more traditional and dedicated equipment. The advent of information-communication technology, for example, has allowed manufacturing firms to become responsive to customer needs that are communicated in real time. Technology automation enhances flexibility by decreasing customer response time and increasing the ease of switching from one product to another. Several variables on the survey capture whether new technologies are being introduced into the plant.

The first variable (*T1*) is a binary variable that takes a value of *1* if a major new software or hardware installation occurred in the survey year.

The second variable (*T2*) is a binary variable that takes a value of *1* if major computer-controlled or computer-assisted technology (i.e., retail scanning technologies, manufacturing robots, optical, laser, audio, or photographic technologies, hydraulic or other mechanical technologies) was introduced in the plant in the survey year.

The third variable (*T3*) is a binary variable that takes a value of *1* if any other major implementations of other technologies occurred in the survey year.

4.1.3 Workplace practices

Flexibility also allows firms to reorganize themselves when circumstances warrant. In particular, it requires an ability to develop new products and new processes and to find the type of organization that will facilitate flexibility. It entails the choice of the appropriate organizational structure that allows a firm to coordinate different divisions in a world of just-in-time production and flexible manufacturing processes. It requires the use of human-resource practices that produce a workforce that can adapt to changes in products and processes (Upton 1995). Several variables are included to test whether flexibility in entering new markets is associated with well trained workers and with workplace practices that are seen to enhance the ability of firms to respond to new opportunities.

The first variable (*WP1*) is the mean score on a question that asks a firm to rank the emphasis it gives to a number of strategies involving workplace practices that are seen to improve the flexibility of organizations—enhancing labour/management cooperation, developing employee skills, increasing employees' involvement/participation. The emphasis that firms give to the importance of each of these strategies is scored on a five-point Likert scale. An overall score is derived by taking the mean score across the categories.[8] This score measures the average importance assigned to strategies that emphasize a flexible workforce and a flexible work organization.

The second variable (*WP2*) is the percentage of employees that received classroom training.

The third variable (*WP3*) denotes the percentage of employees that received on-the-job training.

The fourth variable (*WP4*) captures whether the workplace gave either classroom or on-the-job training in either group decision making/problem solving or team-building/leadership/ communication.

8. The relatedness of the categories was tested and confirmed using Cronbach's alpha.

The score on this variable ranges from *0* (indicating *none of the above*) to *4* (indicating the introduction of the two types of training by means of both delivery methods).

The fifth variable (*WP5*) measures aspects of the workplace organization that are seen to enhance workplace flexibility—whether the workplace had implemented flexible job design, information sharing with employees, problem-solving teams, joint labour-management committees, and self-directed work groups. This variable takes on a value corresponding to the number of these aspects that were embraced in the workplace for non-managerial employees.

4.1.4 Competitive environment

Two variables are included in order to capture the intensity of the competitive environment, since external forces in this area may affect the degree to which firms develop the capacity to adapt to uncertainty in final-product markets. While the competitive environment varies across industries, it also differs within industries because of intra-industry groupings of firms that compete more among themselves than with other groupings—for example, where competition varies by product type (homogeneous products where competition is based on price versus niche products where competition is based on services or originality). Therefore, industry fixed effects are included, and tests for differences in the competitive environment within industries are also performed.

The need for flexibility comes from the environment that firms face. Flexibility is necessary in an environment that generates uncertainty—uncertainty about the macroeconomic environment, about shifts in consumer preferences, about the emergence of competitors, and about changes in technology. Flexibility enables firms to plan for expected events or to adapt, after the fact, to events that are difficult to envisage.

The first variable (*C1*) measures the score given to the level of competition from locally owned firms, Canadian-owned firms, American-owned firms, and other internationally owned firms. The influence of each was ranked on a scale of *1* (*not important*) to *5* (*crucial*). *C1* is created by summing the scores given to each source of competition.

The second variable (*C2*) is the number of firms that offer products or services that directly compete with the plant. *C2* takes on a value of *1* if the number of competitors is 0, a value of *1* if the number falls between 1 and 5, a value of *2* if the number is between 6 and 20 a value of *3*, and a value of 4 if the number is over 20.

4.1.5 Principal components

In addition, principal components of the flexibility variables are created for the analysis (Table 7). The first principal component (*PRN1*) explains about 37% of the total variance. It is a composite index of strategic and environmental flexibility, since the first eigenvector has similar loadings on innovation strategies (*I11*−*I14*), on workplace strategies (*WP1* and *WP5*), and on the competitive environment (*C1* and *C2*). The second, third, and fourth principal components are indices that capture innovation outcome, workplace training, and technology adoption, respectively. Kaiser's (1958) selection rule is adopted, and the first four principal components in the regression are used as composite measures of different aspects of flexibility.[9]

9. Kaiser (1958) argues that the number of principal components should be selected by retaining components with associated eigenvalues greater than the average eigenvalue.

Table 7
Principal-component analysis for flexibility characteristics – Part 1

Flexibility variables	Codes	Principal component 1	Principal component 2	Principal component 3	Principal component 4	Principal component 5	Principal component 6	Principal component 7	Principal component 8
					Eigenvector				
Innovation strategy									
Undertaking research and development	I11	0.34	-0.02	0.00	-0.09	0.02	-0.05	-0.04	-0.46
Developing and improving products/services	I12	0.39	-0.09	0.01	-0.04	0.05	-0.03	0.00	-0.17
Developing and improving processes	I13	0.38	-0.07	0.02	-0.02	0.03	-0.01	0.01	-0.17
Expanding into new geographic markets	I14	0.35	-0.09	0.00	-0.06	0.08	-0.04	0.00	-0.26
Innovation outcome									
New and improved products/services	I21	0.10	0.47	-0.20	-0.49	0.02	-0.13	0.01	0.09
New and improved processes	I22	0.10	0.53	-0.17	-0.35	0.00	-0.06	0.05	0.10
Installation of a major new software or hardware	T1	0.04	0.29	-0.07	0.44	0.39	-0.36	-0.66	0.02
Installation of computer-controlled or computer-assisted technology	T2	0.04	0.30	-0.09	0.51	0.07	-0.35	0.71	-0.08
Other major implementation of other technologies	T3	0.03	0.25	-0.10	0.17	0.48	0.80	0.09	-0.07
Strategy on labour-management cooperation, employees' skills, and employee participation	WP1	0.38	-0.08	0.02	0.03	0.01	0.00	0.00	-0.08
Percentage of employees that received classroom training	WP2	0.02	0.19	0.67	-0.03	0.03	0.00	0.03	-0.02
Percentage of employees that received on-the-job training	WP3	0.01	0.16	0.67	-0.11	0.19	-0.05	0.04	0.07
Training in group decision making/problem solving and team-building/leadership/communication	WP4	0.07	0.36	0.07	0.28	-0.68	0.23	-0.20	-0.11
A flexible organizational structure	WP5	0.27	0.12	0.03	0.20	-0.32	0.15	-0.05	0.19
Intensity of competition	C1	0.34	-0.08	0.00	0.05	0.00	0.03	0.01	0.47
Number of competitors	C2	0.32	-0.13	0.00	0.06	0.07	0.00	0.06	0.60

	Principal component 1	Principal component 2	Principal component 3	Principal component 4	Principal component 5	Principal component 6	Principal component 7	Principal component 8
Diagnostic statistics								
Proportion of total sample variability accounted for by principle component	0.37	0.12	0.09	0.07	0.06	0.06	0.05	0.04
Eigenvalue	5.91	1.96	1.50	1.05	0.95	0.91	0.81	0.57

Source: Statistics Canada, Workplace and Employee Survey.

Table 8
Principal-component analysis for flexibility characteristics - Part 2

Flexibility variables	Codes	Principal component 9	Principal component 10	Principal component 11	Principal component 12	Principal component 13	Principal component 14	Principal component 15	Principal component 16
					Eigenvector				
Innovation strategy									
Undertaking research and development	I11	0.02	0.01	0.20	0.57	-0.51	0.02	0.11	0.15
Developing and improving products/services	I12	0.02	0.02	-0.05	-0.20	-0.05	-0.07	0.09	-0.87
Developing and improving processes	I13	-0.01	0.03	-0.16	-0.31	-0.10	-0.14	-0.78	0.23
Expanding into new geographic markets	I14	0.12	0.02	0.04	0.18	0.75	0.40	0.03	0.12
Innovation outcome									
New and improved products/services	I21	0.04	-0.10	0.61	-0.28	0.00	0.02	-0.01	0.03
New and improved processes	I22	-0.06	0.06	-0.69	0.23	0.01	-0.01	0.03	-0.02
Installation of a major new software or hardware	T1	0.00	-0.02	0.01	-0.01	0.00	0.00	-0.01	0.00
Installation of computer-controlled or computer-assisted technology	T2	0.03	0.01	0.07	0.00	0.01	-0.02	0.00	-0.01
Other major implementation of other technologies	T3	0.04	-0.01	0.06	-0.02	-0.01	0.00	0.00	0.00
Strategy on labour-management cooperation, employees' skills, and employee participation	WP1	-0.04	0.01	-0.18	-0.49	-0.07	-0.19	0.61	0.40
Percentage of employees that received classroom training	WP2	0.14	-0.70	-0.07	0.01	-0.01	0.00	0.00	0.00
Percentage of employees that received on-the-job training	WP3	-0.14	0.66	0.10	0.00	0.01	0.00	0.01	0.01
Training in group decision making/problem solving and team-building/leadership/communication	WP4	0.42	0.20	0.04	-0.06	0.01	0.02	0.00	-0.02
A flexible organizational structure	WP5	-0.80	-0.13	0.11	0.08	0.04	0.15	-0.02	-0.02
Intensity of competition	C1	0.17	-0.01	0.15	0.35	0.23	-0.66	-0.02	0.02
Number of competitors	C2	0.29	0.02	-0.03	-0.01	-0.31	0.57	-0.01	0.02

	Principal component 9	Principal component 10	Principal component 11	Principal component 12	Principal component 13	Principal component 14	Principal component 15	Principal component 16
Diagnostic Statistics								
Proportion of total sample variability accounted for by principal component	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.00
Eigenvalue	0.52	0.48	0.36	0.30	0.26	0.24	0.09	0.07

Source: Statistics Canada, Workplace and Employee Survey.

4.2 Methodology and results

The following regression is estimated in order to examine how firms that adapted and found new markets differ from those that did not:

$$X_p = \alpha_i + \alpha_t + \beta_1 G + Z_p \gamma \quad (2)$$

where X_p is a set of variables measuring a plants' flexibility characteristics; variables G and Z_p are defined in the same way as in equation (1).

Regression results using the individual flexibility variables first and then the principal components are reported in Table 8. Five different findings point to a strong connection between several different aspects of flexibility and the firms that managed to adapt to new markets. First, plants with new markets, whether domestic or foreign, place more strategic importance on market expansion. They also introduce more process innovation.

Table 9
Differences in flexibility characteristics by plant group

Variables	Codes	Compared to – entrants to export markets				Compared to – continuing exporters			
		Non-exporters without new domestic markets		Non-exporters with new domestic markets		Exiters without new domestic markets		Exiters with new domestic markets	
		coefficient	standard error	coefficient	standard error	coefficient	standard error	coefficient	standard error
Innovation variables									
Innovation strategy									
Overall	I1	-0.04	0.04	0.08	0.06	-0.05	0.04	-0.10	0.09
Undertaking research and development	I11	-0.07	0.07	0.08	0.10	-0.14 *	0.07	-0.14	0.13
Developing and improving products/services	I12	-0.02	0.05	0.06	0.07	-0.01	0.04	-0.10	0.09
Developing and improving processes	I13	-0.01	0.05	0.12	0.07	-0.01	0.04	-0.12	0.09
Expanding into new geographic markets	I14	-0.13 *	0.06	0.02	0.09	-0.12 *	0.06	-0.04	0.11
Innovation outcome									
Overall	I2	-0.20 *	0.09	0.00	0.14	-0.03	0.09	-0.27	0.16
New and improved products/services	I21	-0.08	0.05	-0.02	0.07	-0.02	0.05	-0.10	0.09
New and improved processes	I22	-0.11 *	0.05	0.02	0.08	-0.01	0.05	-0.17 *	0.09
Technology variables									
Installation of a major new software or hardware	T1	0.01	0.03	-0.01	0.04	-0.02	0.03	-0.04	0.04
Installation of computer-controlled or computer-assisted technology	T2	-0.01	0.02	0.00	0.02	-0.02	0.02	-0.01	0.03
Other major implementation of other technologies	T3	-0.02	0.02	0.00	0.03	-0.01	0.02	-0.04	0.02
Workplace practices									
Strategy on labour-management cooperation, employees' skills, and employee participation	WP1	0.06	0.05	0.05	0.07	0.01	0.04	-0.05	0.08
Percentage of employees that received classroom training	WP2	-0.01	0.02	-0.01	0.03	-0.05 *	0.02	0.02	0.07
Percentage of employees that received on-the-job training	WP3	0.01	0.02	0.04	0.04	0.39	0.36	-0.06	0.13
Training in group decision making/problem solving and team-building/leadership/communication	WP4	-0.05	0.06	0.00	0.07	-0.13 *	0.06	-0.08	0.11
A flexible organizational structure	WP5	-0.20 *	0.06	-0.04	0.09	-0.11 *	0.06	-0.14	0.11
Competitive environment									
Intensity of competition	C1	-0.14 *	0.05	-0.05	0.07	-0.13 *	0.05	0.07	0.09
Number of competitors	C2	-0.11 *	0.04	-0.04	0.06	-0.04	0.04	-0.07	0.06
Principal components									
Innovation, flexible organizational structure, and competitive environment	P1	-0.17 *	0.06	0.04	0.09	-0.15 *	0.06	-0.16	0.12
Innovation outcome	P2	-0.14 *	0.07	-0.02	0.11	-0.07	0.09	-0.23	0.12
Training	P3	0.04	0.03	0.01	0.04	0.10	0.11	0.06	0.06
Technology adoption	P4	0.05	0.06	-0.03	0.09	-0.11	0.06	0.00	0.11

* significantly different from reference category ($p < 0.05$).

Note: The regression specification includes period-specific fixed effects, four-digit North American Industry Classification System industry-specific fixed effects, and plant characteristics (relative labour productivity, relative employment, age, foreign ownership, and share of non-production workers).

Source: Statistics Canada, Workplace and Employer Survey.

Second, there are no significant differences between plants with new markets and those without in terms of technology adoption. There could be several explanations for this. It should be noted that the technology questions are relatively limited in the WES survey compared to specialized technology surveys—since the WES survey is focused on human-resource practices. In addition, the implementation of new technology may itself not be directly associated with flexibility—but, rather, with cost reductions. It could also be that the technology categories do not sufficiently distinguish between cost-reducing technologies and flexibility-enhancing technologies. Finally, the technological profile of a company may not be well captured by answers to questions on whether new technologies are being introduced in a particular year.

Third, a flexible and decentralized organizational structure is an important feature that distinguishes plants that enter new markets from those not doing so. Plants that find new markets typically have flexible job design, information sharing with employees, problem-solving teams, joint labour-management committees, and self-directed work groups. These organizational attributes reflect managerial style and an emphasis on flexibility. When the pace of change in a firm's environment is high, a flexible organizational infrastructure is able to handle different products and volumes.

Fourth, plants with new markets perceive much higher competitive pressure than those maintaining the *status quo*. The perceived level of competition is no different between plants that enter foreign markets and those that enter only domestic markets. A firm's actual or perceived environment influences its flexibility. A more competitive environment pushes firms to act more nimbly. This corroborates other findings that innovators perceive that they face a more intensely competitive environment than do non-innovators and that successful entrants who innovate typically indicated that they face more competitors, less predictability of demand, and more rapid product and technological obsolescence (Johnson *et al*. 1997).

Fifth, using principal components that summarize the flexibility dimensions yields similar results. The features distinguishing plants that enter new markets from those not doing so arise from the business environment and strategies (the first principal component), more than from actual business activities (other principal components). What matters is the perceived level of competition that the firm faces, management's commitment to innovation, and managerial emphasis on having a more organic, flexible, and decentralized organizational structure.

An alternative way to distinguish plants that enter new markets from those that do not is to estimate a probit model of the correlates associated with a plant's entry into new markets. The probability of entry is estimated as a function of a vector of the flexibility characteristics of a plant (X_p), a vector of other characteristics (Z_p), as well as time-specific (α_t) and industry-specific fixed effects (α_i). The estimating equation is:

$$\Pr(ENTRY_{p,t} = 1) = \Phi(\alpha_i + \alpha_t + X_{p,t-1}\varphi + Z_{p,t-1}\gamma), \qquad (3)$$

where Φ is the standard normal cumulative distribution. The entry indicator, $ENTRY_{p,t}$, equals *1* if non-exporters enter new markets, either domestic or foreign, between time *t-1* and time *t*, and equals *0* otherwise (i.e., non-exporters with no new domestic market). The results confirm the finding that process innovation, a flexible organizational structure, as well as a perceived high level of competitive pressure are important characteristics that distinguish plants that enter new markets from those that do not do so (Table 9).

Table 10
Probit coefficients: marginal effects

Flexibility variables	Codes	Probability of entering into a new market		
Innovation strategy		coefficient		standard error
Undertaking research and development	I11	0.00		0.01
Developing and improving products/services	I12	-0.01		0.02
Developing and improving processes	I13	0.02		0.02
Expanding into new geographic markets	I14	0.02		0.01
Innovation outcome				
New and improved products/services	I21	0.00		0.02
New and improved processes	I22	0.04	*	0.02
Installation of a major new software or hardware	T1	-0.05		0.03
Installation of computer-controlled or computer-assisted technology	T2	-0.02		0.04
Other major implementation of other technologies	T3	-0.01		0.04
Strategy on labor-management cooperation, employees' skills, and employee participation	WP1	-0.04	*	0.02
Percentage of employees that received classroom training	WP2	0.02		0.03
Percentage of employees that received on-the-job training	WP3	-0.03		0.03
Training in group decision making/problem solving and team-building/leadership/communication	WP4	0.00		0.01
A flexible organizational structure	WP5	0.03	*	0.01
Intensity of competition	C1	0.01		0.02
Number of competitors	C2	0.05	*	0.02
Relative labour productivity	...	0.00		0.01
Relative employment	...	0.00		0.00
Age	...	0.00		0.00
Foreign control	...	-0.04		0.05
Share of non-production worker	...	0.03		0.09

	Probability of entering into a new market
Diagnostic statistics	
Number of observations	1,801
Log pseudo likelihood	-1,041
Pseudo r-squared	0.12

* significantly different from reference category ($p < 0.05$).

Note: The regression specification includes time-specific and four-digit North American Industry Classification System industry-specific fixed effects.

Source: Statistics Canada, Workplace and Employer Survey.

5 Conclusion

This paper examines how entry by Canadian manufacturing firms into two different types of new markets—international markets and new provincial markets—was associated with increases in productivity growth. In both cases, the productivity performance of Canadian manufacturing plants that entered new markets was superior to the productivity performance of those that maintained the *status quo*. As well, the productivity growth of entrants increased after entry.

Previous articles have focused almost entirely on the entry of firms into international markets—perhaps because data are more readily available to study this phenomenon. This paper shows that entry to new domestic markets has a similar effect—thereby confirming that the beneficial effects of entry accrue not just to entrants that cross international borders but also to other forms of expansion—in particular, to firms that expand across provincial borders.

The paper also focuses on the associated impact of exit from export markets. The latter is often associated with failure by new firms. However, it is also a method of adaptation. It is generally difficult to investigate the reason that a firm goes out of business, because the subsequent activity of the firm that has closed down is not readily tracked. In this paper, those firms that exit export markets are tracked in order to investigate whether those that simply retrench to their home provincial Canadian markets perform differently than those that set out to explore new domestic markets in other provinces and territories. The paper finds that the latter perform better than the former. Once more, successful experimentation with new markets produces tangible benefits.

Finally, the paper looks inside those firms that successfully make the transition to new markets, in an attempt to delineate the differences in strategies and activities that set these firms apart from those that did not transition into new markets. It profiles the differences that are associated with activities on the one hand and with organizational structure on the other hand. It finds that firms that make successful transitions exhibit differences in the emphasis they place on market innovation. Firms that start with a greater emphasis on being able to penetrate new geographic markets are the ones that successfully do so. It also finds that firms that perceive high levels of market competition tend to become more competitive and successful by experimenting with new markets.

More importantly, internal organizational structure mattered. A flexible and decentralized organizational structure is an important feature that distinguishes plants that enter new markets from those that do not. Plants that find new markets typically have flexible job design, information sharing with employees, problem-solving teams, joint labour-management committees, and self-directed work groups. These organizational attributes reflect managerial style and an emphasis on flexibility. When the pace of change in a firm's environment is high, a flexible organizational infrastructure is necessary in order to handle new products and customers. Entrepreneurship in continuing firms is associated with a managerial emphasis on having a more flexible, and decentralized organizational structure.

Appendix

Table 11
Coefficient estimates of labour productivity growth

Independent variables	Compared to entrants to export markets (G=0)[1]						Compared to continuing exporters (G=0)[1]					
	Non-exporters (G=1)[2]		Non-exporters without new domestic markets (G=1)[2]		Non-exporters with new domestic markets (G=1)[2]		Exiters from export markets (G=1)[2]		Exiters without new domestic markets (G=1)[2]		Exiters with new domestic markets (G=1)[2]	
	coefficient	standard error	coefficient	standard error	coefficient	standard error	coefficient	standard error	coefficient	standard error	coefficient	standard error
Time dummy (T)	0.6	0.9	0.6	0.9	0.5	0.9	0.6	0.4	0.6	0.4	0.6	0.4
Group dummy (G)	0.7	0.6	0.7	0.7	-0.1	0.9	-0.5	0.7	-0.6	0.8	0.5	1.5
Time × group (T×G)	-2.6 *	1.1	-3.6 *	1.1	1.6	1.4	-1.6	1.2	-2.5 *	1.3	1.3	2.4
Relative labour productivity	-1.2	0.7	-1.1	0.7	-5.4 *	0.6	-4.7 *	0.8	-4.6 *	0.8	-4.4 *	0.8
Relative employment	1.0 *	0.1	1.1 *	0.2	0.4 *	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Age	-0.1	0.1	-0.1	0.1	-0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1
Foreign control	-0.7	0.6	-1.0	0.7	1.1	0.7	0.8 *	0.4	0.9 *	0.4	0.7	0.4
Share of non-production worker	-0.2	1.0	-0.3	1.1	-1.4	1.5	1.9	1.0	1.9	1.0	1.8	1.0

	Compared to entrants to export markets (G=0)[1]			Compared to continuing exporters (G=0)[1]		
	Non-exporters (G=1)[2]	Non-exporters without new domestic markets (G=1)[2]	Non-exporters with new domestic markets (G=1)[2]	Exiters from export markets (G=1)[2]	Exiters without new domestic markets (G=1)[2]	Exiters with new domestic markets (G=1)[2]
Diagnostic statistics						
R-squared	0.0299	0.0307	0.0907	0.0655	0.0649	0.0654
Number of observations	14,801	12,603	5,556	16,620	16,083	14,869

* significantly different from reference category ($p < 0.05$).
1. G=0: export participant.
2. G=1: export non-participants.
Note: Results are obtained by running equation (1) and by pooling data over two periods: 1990−1993/1993−1996 and 2000−2003/2003−2006. All estimates control for period-specific fixed effects, fixed four-digit North American Industry Classification System industry-specific fixed effects, and plant characteristics (relative labour productivity, relative employment, age, foreign ownership, and share of non-production workers at the start of a period, i.e., 1990 and 2000).
Source: Statistics Canada, Annual Survey of Manufacturers.

References

Baldwin, J.R., and G. Gellatly. 2003. *Innovation Strategies and Performance in Small Firms*. Northampton, Massachusetts. Edward Elgar Publishing.

Baldwin, J.R., and W. Gu. 2003. "Export-market participation and productivity performance in Canadian manufacturing." *Canadian Journal of Economics*. Vol. 36. No. 3. p. 634−657.

Baldwin, J.R., and W. Gu. 2004. "Trade liberalization: Export-market participation, productivity growth, and innovation." *Oxford Review of Economic Policy*. Vol. 20. No. 3. p. 372−392.

Baldwin, J.R., and M. Rafiquzzaman. 1994. *Structural Change in the Canadian Manufacturing Sector: 1970-1990*. Statistics Canada Catalogue no. 11F0019M. Ottawa, Ontario. Analytical Studies Branch Research Paper Series. No. 61.

Baldwin, J.R., and D. Sabourin. 2002. "Advanced technology use and firm performance in Canadian manufacturing sector in the 1990s." *Industrial and Corporate Change*. Vol. 11. No. 4. p. 761−789.

Baldwin, J.R., and B. Yan. 2012. "Export market dynamics and plant-level productivity: The impact of tariff reductions and exchange-rate cycles." *Scandinavian Journal of Economics*. Forthcoming.

Bernard, A.B., and J.B. Jensen. 1995. "Exporters, jobs, and wages in U.S. manufacturing: 1976–1987." *Brookings Papers on Economic Activity: Microeconomics*. Vol. 1995. p. 67−119.

Caves, R.E. 1998. "Industrial organization and new findings on the turnover and mobility of firms." *Journal of Economic Literature*. Vol. 36. No. 4. p. 1947−1982.

De Toni, A., and S. Tonchia. 1998. "Manufacturing flexibility: A literature review." *International Journal of Production Research*. Vol. 36. No. 6. p. 1587−1617.

Greenaway, D., and Kneller, R. 2007. "Firm heterogeneity, exporting and foreign direct investment." *Economic Journal*. Vol. 117. No. 517. p. F134−F161.

Foster, L., J.C. Haltiwanger and C.J. Krizan. 2001. "Aggregate productivity growth: Lessons from microeconomic evidence." *New Developments in Productivity Analysis*. C.R. Hulten, E.R. Dean, and M.J. Harper (eds.). Chicago, Illinois. The University of Chicago Press. National Bureau of Economic Research. Studies in Income and Wealth. Vol. 63.

Johnson, J., J. Baldwin and C. Hinchley. 1997. *Successful Entrants: Creating the Capacity for Survival and Growth*. Statistics Canada Catalogue no. 61-524-X. Ottawa, Ontario.

Kaiser, H.F. 1958. "The varimax criterion of analytic rotation in factor analysis." *Psychometrika*. Vol. 23. No. 3. p. 187−200.

López, R.A. 2005. "Trade and growth: Reconciling the macroeconomic and microeconomic evidence." *Journal of Economic Surveys*. Vol. 19. No. 4. p. 623−648.

Macdonald, R. 2008. *The Terms of Trade and Domestic Spending*. Statistics Canada Catalogue no. 11-624-M. Ottawa, Ontario. Insights on the Canadian Economy. No. 18.

Mowery, D.C., and N. Rosenberg. 1989. *Technology and the Pursuit of Economic Growth*. Cambridge, U.K. Cambridge University Press.

Picot, G., and T. Wannell. 1997. *An Experimental Canadian Survey that Links Workplace Practices and Employee Outcomes: Why it is Needed and How it Works*. Statistics Canada Catalogue no. 11F0019M. Ottawa, Ontario. Analytical Studies Branch Research Paper Series. No. 100.

Scott, M.F. 1989. *A New View of Economic Growth*. Oxford, U.K. Clarendon Press.

Upton, D.M. 1995. "What really makes factories flexible?" *Harvard Business Review.* Vol. 73. No. 4. p. 74−84.

Verdoorn, P.J. 1980. "Verdoorn's law in retrospect: A comment." *The Economic Journal.* Vol. 90. No. 358. p. 382−385.

Wagner, J. 2007. "Exports and productivity: A survey of the evidence from firm-level data." *The World Economy*. Vol. 60. No. 1. p. 60−82.