

Report

Enterprise size class transitions in Canada

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Summary

This paper seeks to investigate enterprise dynamics in terms of employment in Canada. The tracking of changes in enterprise size over time can provide a useful overview of the trend in the performance of both the enterprises and the economy as a whole.

Using the Entrepreneurship Indicators Database for the years 2008 and 2014, this study divides enterprises into nine class sizes based on the number of employees. Then, enterprises that were active in 2008 with one or more employees were tracked to see in which size class they were in 2014. The analysis is based on an approach that consists of building transition matrices using enterprise size classes.

Results indicate that enterprise dynamics were diagonally dominant, since about 5 in 10 (47.0%) enterprises remained in their initial size class. However, almost 4 in 10 (37%) enterprises went to “Attrition” (i.e., had no employee, had ceased operations or had merged) and the rest migrated one, two, three or four size classes ahead or behind. Enterprise size class “Between 1 and 4” employees has the highest proportion of “Attrition”.

Similar patterns appear in service and manufacturing sectors. Though, manufacturing sector seems to be more volatile than the service sector as it reported a higher proportion of enterprises changing their size class. Furthermore, the proportion of enterprises that went to “Attrition” is lower in the manufacturing than in service sector.

Introduction

After a business starts operating, it can grow, stay the same size or shrink more than once, and in any order. It does not necessarily follow a linear path (Gupta et al., 2013). Business growth is often measured using financial variables (such as asset, revenue, profits, sales) or employment. Yet, financial variables may present some measurement problems; e.g. profit and sales measurement should take into consideration the inflation rate, while asset measurement may require both tangible and intangible assets. There is no such problem with employment (Coad and Hözl, 2010).

This paper seeks to draw a picture of enterprise dynamics in terms of employment in Canada. Tracking enterprise size over time can provide a useful overview of the trend in the performance of both the enterprises and the economy as a whole. It can also produce clear signals for the identification of the state of the economy. A growing enterprise can contribute to job creation and economic growth. A clear understanding of enterprises' employment growth could help stakeholders, business advisers, and policymakers in their decision process. For this purpose, enterprises that were active in 2008 with one or more employees were tracked to see in which size class they were in 2014 based on data from Statistics Canada's Entrepreneurship Indicators Database (EID).

This paper is structured as follows. Section 2 focuses on the data sources for the study. Section 3 shows the number of enterprises by size class in 2008 and 2014. Section 4 describes the directions taken by enterprises of 2008 in 2014. Section 5 analyses the transition matrix regardless of the sector and Section 6 presents the transition matrices for the service and the manufacturing sectors. Finally, Section 7 concludes the paper and suggests potential avenues for future research.

Data sources

This study is based on the Entrepreneurship Indicators Database¹ (EID) of 2008 and 2014. The objective of the EID is to provide comprehensive business demography statistics and performance indicators for enterprises in Canada. EID is derived from Statistics Canada's Business Register and the following existing administrative data sources: incorporated (T2), unincorporated (T1) tax declaration and payroll deduction accounts (PD7) from Canada Revenue Agency (CRA). EID contains a complete, up-to-date and unduplicated list of all businesses in Canada. EID provides government researchers and academics with integrated data to facilitate analysis. EID provides information on active enterprises with one or more employees. The 2008 and 2014 databases contain respectively 1,028,397 and 1,089,136 active enterprises with employees.²

Enterprise sizes

Table 1 presents the distribution of enterprises by employment size class. The total number of enterprises in Canada increased by 5.9% from 1,028,397 in 2008 to 1,089,136 in 2014. Overall, the distribution of size classes has not changed significantly from 2008 to 2014. Enterprises with "1 to 4 employees" have the highest share of enterprises in both years with 64.4% in 2008 and 64.9% in 2014. The highest relative increase in enterprise number comes from the size class of "50 to 99 employees" (+9.4%). The only decrease comes from the size class of "1000 and above" (-2.3%).

1. For a description of the EID see: <http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=5290009&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=>

2. In the rest of the text, the term enterprise will mean enterprise with at least one employee.

Table 1
Active enterprises with one or more employees by enterprise size class, 2008 and 2014

Enterprise size class	2008		2014		Variation of number (%)
	number	share (%)	number	share (%)	
Between 1 and 4	662,589	64.4	707,075	64.9	6.7
Between 5 and 9	183,979	17.9	187,773	17.2	2.1
Between 10 and 19	97,574	9.5	102,493	9.4	5.0
Between 20 and 49	56,411	5.5	61,520	5.6	9.1
Between 50 and 99	16,991	1.7	18,596	1.7	9.4
Between 100 and 249	7,566	0.7	8,219	0.8	8.6
Between 250 and 499	1,770	0.2	1,893	0.2	6.9
Between 500 and 999	737	0.1	805	0.1	9.2
1,000 and above	780	0.1	762	0.1	-2.3
Total	1,028,397	100.0	1,089,136	100.0	5.9

Source: Entrepreneurship Indicator Database, Statistics Canada, Centre for Special Business Projects.

Size class transitions of 2008 enterprises in 2014

Table 2 presents the four possible directions that enterprises of 2008 could have taken in 2014. Overall, 47.5% of enterprises of 2008 kept their 2008 size, 8.2% increased their size, 7.1% decreased their size and 37.3% went to "Attrition" (had no employee, had ceased operations or had merged). Similar patterns can be seen for the service sector and the other sector except for manufacturing sector.³ The manufacturing sector seems to be relatively more volatile than the service and other sectors since 10.9% of enterprises of 2008 in the manufacturing sector increased their size and 11.8% decreased their size while the service and other sectors increased their size by about 8% and decrease by about 7%. Additionally, the proportion of enterprises that went to "Attrition" in the manufacturing sector (30.0%) is less than in the service sector (37.7%) and in the other sector (37.2%). Manufacturing represents only 5.0% of 2008 enterprises while the service sector and the other sector constitute 76.7% and 18.3% respectively.

Table 2
Directions taken by enterprises of 2008 in 2014

	All		Sectors					
			Service		Manufacturing		Other sector	
Global size class transitions	number	proportion (%)	number	proportion (%)	number	proportion (%)	number	proportion (%)
No transition ¹	488,326	47.5	375,276	47.6	24,217	47.3	88,833	47.2
Increase ²	84,347	8.2	63,271	8.0	5,589	10.9	15,487	8.2
Decrease ³	72,556	7.1	52,756	6.7	6,042	11.8	13,758	7.3
Attrition ⁴	383,168	37.3	297,741	37.7	15,390	30.0	70,037	37.2
Total	1,028,397	100.0	789,044	100.0	51,238	100.0	188,115	100.0

1. "No transition" means that the enterprise remained in its 2008 size class.

2. "Increase" means that the enterprise moved to a higher size class.

3. "Decrease" means the enterprise moved to a lower size class.

4. "Attrition" means that the enterprise is in one or more of the following situations: has no employee, has ceased operations or has merged.

Source: Entrepreneurship Indicator Database, Statistics Canada, Centre for Special Business Projects.

Transition matrix

Table 3 presents the transition matrix that indicates how size of enterprises changes between nine possible size classes from 2008 to 2014. Table 3 shows what happened to enterprises of 2008 in terms of enterprise size in 2014. Columns and rows in Table 3 give the proportions of enterprises belonging to a given size class in 2008 that transition to either a higher size class, remain in the same size class, or move to a lower size class in 2014. The transitions are from a given row to a given column, so that each row sums up to 100.0%.

The proportion of enterprises that stay in their 2008 size class is in the range of 38.0% to 66.0%. The size classes "1,000 and above", "Between 100 and 249", "Between 20 and 49" and "Between 1 and 4" have the highest proportion of enterprises that remain in the same size class with 65.9%, 52.7%, 51.5% and 50.0% respectively.

3. Other sector: NAICS(11, 21, 22, 23)

Manufacturing: NAICS(31-33)

Service: NAICS(41, 44-45, 48-49, 51, 52, 53, 54, 55, 56, 61, 62, 71, 72, 81).

This lack of transition can be explained by a number of factors. The enterprises could be in mature industries where growth opportunities are rare and difficult, or they could be well established enterprises which have been in business for a long time. Haltiwanger et al. (2013) found that the relative contribution of start-ups and young enterprises in new job creation is higher than mature enterprises. Some enterprises, especially small ones (e.g., family enterprises), may have little incentive to grow in order to take advantage of tax benefits (Finlayson, 2014; Chen and Mintz, 2011).

A significant proportion of the enterprises went to "Attrition" in all the size classes. The size classes with the highest proportion of "Attrition" tend to be the smallest and the largest size classes, i.e., "Between 1 and 4" (43.7%), "Between 5 and 9" (29.2%) and "1,000 and above" (25.9%). The enterprises of 2008 that have no employees or have ceased operation in 2014 may have faced intense competition or a lack of financial resources. In most cases, if an enterprise did not stay in its initial size class of 2008 or did not go to "Attrition" in 2014, it either goes one to two size classes ahead or one to two size classes behind. In certain cases, an enterprise moved up or down three or more classes.

Transition between certain size classes are very rare, especially between bottom size classes (small enterprises) and the top size classes (large enterprises). For example, the transitions between the large size classes "1,000 and above" and "Between 500 and 999" and the small size classes "Between 1 and 4", "Between 5 and 9", "Between 10 and 19" and "Between 20 and 49" are infrequent or even nonexistent.

The majority of enterprises in "Addition" i.e., the ones existed in 2014 but not in 2008 (or not in 2008 as an employer) were in the size class "Between 1 and 4" (74.9%). The size class "Between 1 and 4" may include many start-ups, retailers and family enterprises.

In general terms, the movements of enterprises that have been observed may be affected by macroeconomic conditions (GDP, inflation and taxation), business cycle shocks and microeconomic conditions (age, location, industry and target market of an enterprise) see for example Pugsley and Şahin (2014), Haltiwanger et al. (2013) and, Moscarini and Postel-Vinay (2012, 2016).

Table 3
Enterprise size class transition matrix for the period 2008 to 2014

Enterprise size class, 2008	Enterprise size class, 2014									
	Between 1 and 4	Between 5 and 9	Between 10 and 19	Between 20 and 49	Between 50 and 99	Between 100 and 249	Between 250 and 499	Between 500 and 999	1,000 and above	Attrition ¹
	%									
Between 1 and 4	50.0	5.3	0.8	0.2	0.0	0.0	x	x	x	43.7
Between 5 and 9	19.9	38.9	10.5	1.2	0.1	0.0	x	x	x	29.2
Between 10 and 19	5.1	15.5	43.5	12.1	0.6	0.1	0.0	x	x	23.0
Between 20 and 49	2.3	2.6	13.3	51.5	8.6	0.8	0.1	0.0	0.0	20.7
Between 50 and 99	1.6	0.9	1.7	16.8	47.7	11.4	0.5	0.1	0.0	19.3
Between 100 and 249	1.0	0.8	0.9	2.6	13.4	52.7	7.6	0.7	0.1	20.2
Between 250 and 499	0.6	x	x	1.4	1.7	13.8	45.9	11.1	0.9	24.0
Between 500 and 999	x	x	x	x	x	x	10.7	48.7	12.1	22.4
1,000 and above	x	x	x	x	x	x	1.4	4.6	65.9	25.9
Addition ²	74.9	14.4	6.3	3.2	0.8	0.3	0.1	0.0	0.0	...

... not applicable

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1. An enterprise belongs to the size class "Attrition" when it is in one or more of the following situations: has no employee, has ceased operations or has merged.

2. An enterprise belongs to the size class "Addition" if it did not exist in 2008 as an employer, didn't exist in 2008, but existed in 2014.

Note: 0 to 6: White, 6.1 to 20: Light pink, 20.1 to 32: Medium pink, 32.1 to 75: Dark pink.

Source: Entrepreneurship Indicator Database, Statistics Canada, Centre for Special Business Projects.

Transition matrices for the service and manufacturing sectors

The transition matrix for the service sector follows the same pattern as the transition matrix for the whole economy since enterprises of the service sector constitute the majority of all the enterprises. Table 4 is the transition matrix that indicates the proportions of service sector enterprises that migrate to another size class or remain in the same size class from 2008 to 2014. The largest proportion of enterprises lies on the main diagonal for all size classes. These are the proportions of enterprises that maintain their initial employment size class of 2008. Employment size classes in which more than 50.0% of enterprises keep their 2008 size are the following: “1,000 and above”, “Between 500 and 999”, “Between 100 and 249” and “Between 20 and 49”. Most of other important transitions among the nine employment size classes occur around the diagonal. This means that enterprises move away from the diagonal by up to one, two or three size classes in any direction, either to more employees or less employees. A substantial number enterprises went to “Attrition” for all size classes. The size class with the highest proportion in “Attrition” is the “Between 1 and 4” with 44.0%. Moreover, the size class “Between 1 and 4” constitutes the largest proportion of enterprises in 2014 service sector that did not exist in 2008 service sector, for a proportion of 74.0%.

Table 4

Enterprise size class transition matrix for the service sector for the period 2008 to 2014

Enterprise size class, 2008	Enterprise size class, 2014									
	Between 1 and 4	Between 5 and 9	Between 10 and 19	Between 20 and 49	Between 50 and 99	Between 100 and 249	Between 250 and 499	Between 500 and 999	1,000 and above	Attrition ¹
	%									
Between 1 and 4	49.9	5.2	0.7	0.2	0.0	0.0	x	x	x	44.0
Between 5 and 9	18.6	39.6	10.4	1.2	0.1	0.0	x	x	x	30.1
Between 10 and 19	4.8	15.0	43.8	11.7	0.6	0.1	0.0	x	x	23.9
Between 20 and 49	2.2	2.5	12.8	51.8	8.3	0.8	0.1	x	x	21.5
Between 50 and 99	1.5	0.8	1.7	16.2	48.6	11.4	0.5	0.1	0.1	19.2
Between 100 and 249	0.8	0.7	1.0	2.5	12.9	54.9	7.7	0.6	0.1	18.9
Between 250 and 499	0.7	x	x	1.3	1.8	13.3	48.2	11.9	0.9	21.3
Between 500 and 999	x	x	x	x	x	x	9.4	52.1	12.5	20.3
1,000 and above	x	x	0.0	x	x	x	1.1	4.1	67.4	25.7
Addition ²	74.0	14.6	6.7	3.4	0.9	0.3	0.1	0.0	0.0	...

... not applicable

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1. An enterprise belongs to the size class “Attrition” when it is in one or more of the following situations: has no employee, has ceased operations or has merged.

2. An enterprise belongs to the size class “Addition” if it did not exist in 2008 as an employer, didn’t exist in 2008, but existed in 2014.

Note: 0 to 6: White, 6.1 to 20: Light pink, 20.1 to 32: Medium pink, 32.1 to 75: Dark pink.

Source: Entrepreneurship Indicator Database, Statistics Canada, Centre for Special Business Projects.

An enterprise belongs to the size class “Addition” if it did not exist in 2008 as an employer, didn’t exist in 2008 or was not in service sector in 2008, but existed in 2014 as service provider. An enterprise belongs to the size class “Attrition” when it is in one or more of the following situations: has no employee, has ceased operations or has merged.

Table 5 is a transition matrix that indicates the proportions of manufacturing sector enterprises that migrate to another size class or remain in the same size class from 2008 to 2014. Similar to the service sector, the largest proportion of enterprises lie on the main diagonal for all size classes. The proportions of enterprises that keep their 2008 employment size class is greater than 50.0% for only “1,000 and above” and “Between 20 and 49”. Analogously, enterprises in employment size class “Between 1 and 4” have the highest proportion of “Attrition” (41.4%) and the highest proportion of enterprises (61.6%) that did not exist in the manufacturing sector as employer enterprises in 2008.

Table 5
Enterprise size class transition matrix for the manufacturing sector for the period 2008 to 2014

Enterprise size class, 2008	Enterprise size class, 2014									Attrition ¹
	Between 1 and 4	Between 5 and 9	Between 10 and 19	Between 20 and 49	Between 50 and 99	Between 100 and 249	Between 250 and 499	Between 500 and 999	1,000 and above	
	%									
Between 1 and 4	49.5	7.7	1.2	0.2	x	x	0.0	0.0	0.0	41.4
Between 5 and 9	20.8	39.5	11.9	1.6	x	x	0.0	0.0	0.0	26.0
Between 10 and 19	4.2	17.4	46.4	13.1	0.6	x	x	0.0	0.0	18.2
Between 20 and 49	1.7	2.1	14.3	53.6	9.0	x	x	0.0	x	18.6
Between 50 and 99	1.1	0.7	1.6	18.1	47.9	10.2	0.3	0.0	0.0	20.0
Between 100 and 249	x	x	x	x	14.8	49.0	7.0	0.5	x	23.4
Between 250 and 499	x	0.0	x	x	x	16.9	42.3	6.1	x	31.1
Between 500 and 999	0.0	0.0	0.0	0.0	0.0	x	19.1	36.9	x	29.8
1,000 and above	0.0	x	0.0	x	0.0	x	x	13.4	53.7	22.4
Addition ²	61.6	19.8	9.6	5.7	1.8	1.1	0.3	0.1	0.1	...

... not applicable

x suppressed to meet the confidentiality requirements of the Statistics Act

1. An enterprise belongs to the size class “Attrition” when it is in one or more of the following situations: has no employee, has ceased operations or has merged.

2. An enterprise belongs to the size class “Addition” if it did not exist in 2008 as an employer, didn’t exist in 2008, but existed in 2014.

Note: 0 to 6: White, 6.1 to 20: Light pink, 20.1 to 32: Medium pink, 32.1 to 75: Dark pink.

Source: Entrepreneurship Indicator Database, Statistics Canada, Centre for Special Business Projects.

An enterprise belongs to the size class “Addition” if it did not exist in 2008 as an employer, didn’t exist in 2008 or was not in manufacturing sector in 2008, but existed in 2014 as manufacturer. An enterprise belongs to the size class “Attrition” when it is in one or more of the following situations: has no employee, has ceased operations or has merged.

The comparison between Table 4 and Table 5 shows that the proportion of enterprises that remain in their employment size class of 2008 is higher in the service sector than in the manufacturing sector for enterprises in the size classes with at least 50 employees. This difference may be the result of industrial automation in the manufacturing which reduces demand for labour (Cross, 2015), and the negative impacts of the 2008-2009 worldwide economic recession in the manufacturing sector, which is known to have accelerated many job losses (LaRochelle-Côté and Gilmore, 2009). To these explanations, one can add the rising of the Canadian dollar due to the rising commodity prices and the depreciation of the United States dollar (Coulombe, 2013; Beine et al., 2012). Moreover, the proportion of “Attrition” is higher in the service sector than the manufacturing sector for enterprises in the size classes with less than 50 employees. This may be attributable to higher competition in the service sector more broadly.

Conclusion

Using data from the Entrepreneurship Indicators Database, this paper tracks active enterprises of 2008 with one or more employees to see in which size class they were in 2014. It presents the distribution of enterprises by size class and the transitions matrices using enterprise size classes. The changes in size class have many economic implications. For example, when an enterprise moves to a higher size class, this may contribute to unemployment reduction; while when an enterprise moves to a lower size class, this may lead to an increase in unemployment. Of course, employment can move up or down even if enterprises remained in the same size classes, given the range of classes – particularly those which are quite wide, e.g. “Between 50 and 99”, “Between 100 and 249”, etc.

The results indicate that enterprise dynamics were diagonally dominant, meaning that a significant number of enterprises remained in their initial size class. On the other hand, many enterprises also migrated to “Attrition”

and the rest migrated one, two, three or more size classes ahead or behind. Enterprises in size class “Between 1 and 4” have the highest proportion of “Attrition”. The same patterns appear in service and manufacturing sectors, but the manufacturing sector seems to be more volatile than the service sector. For size classes with at least 50 employees, the proportion of enterprises that remain in their 2008 size class is higher in the service sector than in the manufacturing sector. Further, the proportion of “Attrition” is higher in the service sector than in the manufacturing sector for enterprises size classes with less than 50 employees.

Though this work highlights some interesting and useful patterns of the transition matrices, it does not explain the endogenous and exogenous factors that affect enterprise size class transition. It is therefore important to focus on the following questions in the future research:

What are the characteristics of enterprises that grow in terms of employment? What are the key drivers of these transitions and in cases where no transition takes place? Can we explain the movements in enterprises size by the movements in macroeconomic variables? Can we explain the dynamics of national economy by the transition that occurs in enterprise sizes?

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