The Restructuring of Canada's Automotive Industry, 2005–2014

BRENDAN A. SWEENEY
Automotive Policy Research Centre, McMaster University, Hamilton, ON

GREIGORY D. MORDUE
Department of Economics, McMaster University, Hamilton, ON

L'industrie automobile canadienne a fait l'objet d'une importante restructuration entre 2005 et 2014. Dans cet article, à partir de données recueillies au niveau des usines, nous examinons ces changements, liés à la fois à l'assemblage et à la fabrication des pièces. Nous montrons également les limites que pose l'utilisation des statistiques gouvernementales officielles pour étudier l'industrie automobile. En plus d'analyser les transformations dans la structure et la composition du secteur, nous démontrons, à partir de nos données, que celui-ci emploie beaucoup plus de gens que ne le rapportent les statistiques gouvernementales officielles. Nous en concluons qu'il est important d'améliorer les méthodes de collecte des données pour que les décideurs politiques puissent soutenir efficacement l'industrie automobile.

Mots clés : industrie automobile, restructuration, codes du Système de classification des industries de l'Amérique du Nord (SCIAN)

The Canadian automotive industry underwent substantial restructuring between 2005 and 2014. This article draws on establishment-level data to examine these changes as they relate to both automotive assembly and automotive parts manufacturing. It also elucidates the limitations of using official government statistics to study the automotive industry. In addition to analyzing changes to the structure and composition of the industry, our data demonstrate that the industry employs far more people than are reported in official government statistics. We conclude that improvements to data collection methods are important for policy-makers to develop effective supports for the automotive industry.

Keywords: automotive industry, restructuring, employment, NAICS codes

Introduction

The size, structure, and composition of the Canadian automotive industry changed considerably between 2005 and 2014. These changes were marked by a period of accelerating decline between 2005 and 2009 and one of modest recovery between 2010 and 2014. Amid this change, industry stakeholders called on governments to develop and implement public policies to support automakers and parts suppliers during the recession of 2008–2009 and to help ensure that Canada remains a viable and competitive location for automotive investment and production (see CAPC 2013; Ontario Auto Mayors 2015; Unifor 2015). Although debate persists regarding the nature and extent of policies necessary to support the industry, there is some consensus that such supports are necessary if Canada is to compete with other automotive-producing nations and regions for investment, jobs, and product mandates (Yates 2015).

This article assumes that well-designed public policy supports can benefit Canada's automotive industry. Moreover, it contends that it is important for policy-makers to have accurate information about the automotive industry to effectively design and implement such policies. However, policy-makers lack adequate information about the automotive industry. This is a result of the complexity of the automotive industry supply chain, the extensive restructuring that occurred between 2005 and 2014, and the lack of reliable industry statistics. The primary purpose of this article is to address this lack of information. The methodology used to do so departs from the use of official statistics published by Statistics Canada, which we argue are problematic for several

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reasons. Instead, it draws on an establishment-level database of automotive assembly and parts supplier plants to develop a more accurate profile of the Canadian automotive industry between 2005 and 2014.

The article also addresses a gap in the broader literature concerning the Canadian automotive industry. Several studies provide useful but general overviews of broader changes resulting from the recession of 2008–2009 (Anastakis and Van Biesebroeck 2010; Holmes 2015; Rutherford and Holmes 2014; Stanford 2010; Sturgeon, Van Biesebroeck, and Gereffi 2007). Other studies provide detailed overviews of both the assembly and the parts supplier industries in Canada during the late 1990s and early 2000s. Fitzgibbon et al. (2004) underscore changes to the parts supplier industry during the late 1990s and early 2000s, including the consolidation of suppliers and the increased average size of establishments in terms of output and employment. Sturgeon, Van Biesebroeck, and Gereffi (2007) emphasize the impact of the southward shift of production in North America and the increasing influence of Japanese original equipment manufacturers (OEMs) and parts suppliers in Canada. These studies are useful but outdated. More recent profiles of the automotive parts industry are perfunctory and overly focused on the contributions of Magna, Linamar, and Martinrea, Canada's three largest domestically owned parts makers (see Boothe 2015; Conference Board of Canada 2014) and pay little attention to the diverse network of domestic and international firms that make up the remainder of the Canadian automotive parts supplier industry. The data presented in this article address this gap.

The premise of the article and the analysis herein resonate with several scholarly public policy debates. There has been renewed interest in manufacturing policy in Anglo-American political economies since the recession of 2008–2009. However, and despite growing acceptance among politicians of the potential value of manufacturing policy, policy-makers' knowledge of manufacturing industries has not kept pace with changes to the structure, scope, and composition of those industries. In many cases, simply defining manufacturing has been a challenge for governments that have long eschewed industrial policy (Livesey 2015). Yet, and as Vanchan, Bryson, and Clark (2015) argue, to develop and implement public policy to help industries create or sustain competitive advantages at any scale, policy-makers must wield a nuanced (or at least a more than cursory) understanding of the complex and ever-shifting dynamics of those industries and their associated supply chains. They must also understand the political, economic, socio-cultural, and legislative environment in which policies are being introduced. Too often well-meaning policies fail because impatient policy-makers (and their politician bosses) are hasty in their efforts to get to the "fun stuff" (i.e., spending money) without ensuring that there is a good fit among policy, industry, and context (see Lerner 2009, 12). This is consistent with arguments put forth by Christopherson and Clark (2007), who note that the policy supports necessary to create competitive advantages for any given industry invariably differ from one geographic context to another. The latter points are consistent with the premise of this article: that it is important that Canadian policy-makers at all levels of government have a clear understanding of the size, structure, and composition of the automotive industry if they hope to maximize the effectiveness of policy supports aimed at creating and sustaining competitive advantages.

The methodology used in this article is inspired by the work of Klier and Rubenstein (2008, 2010), who provide detailed profiles of the North American automotive industry supply chain. Their most recent work examines the impact of the recession of 2008–2009 on the organization of the automotive industry in North America (Klier and Rubenstein 2013). According to them, an important result of recession-related restructuring was the concentration of production within a geographic corridor that they refer to as "auto alley," which extends from the US Southeast into southern Ontario. Although they include Ontario in their research, they do so obliquely, and place more emphasis on the United States. More germane to this article is their methodology, which, like ours, does not rely on government statistics, but instead uses establishment-level data to create a more accurate industry profile to better understand the size, structure, and composition of the automotive industry.

The remainder of the article proceeds as follows. The first section describes methodology and includes a critique of the use of the North American Industrial Classification System (NAICS) to profile the automotive industry. The second section presents and analyzes Canada's automotive assembly and parts manufacturing industries using establishment-level data, including analysis of several variables, such as employment, ownership, union density, and product category. The third section examines the policy implications of the data analyzed in the second section.

Methodology

Previous in-depth studies of the Canadian automotive industry rely primarily on data from Statistics Canada (Fitzgibbon et al. 2004; Sturgeon, Van Biesebroeck, and Gereffi 2007). This article departs from this practice, which we argue is problematic for two reasons: the potential misclassification of certain segments of the automotive parts industry that results from using NAICS codes and the reliability and availability of data from Statistics Canada.[1] Instead, and similar to Klier and

Table 1: Motor Vehicle Parts Manufacturing Six-Digit NAICS Codes

Category	NAICS Code
Motor vehicle gasoline engine and engine parts manufacturing	336310
Motor vehicle electrical and electronic equipment manufacturing	336320
Motor vehicle steering and suspension components manufacturing	336330
Motor vehicle brake systems manufacturing	336340
Motor vehicle transmission and powertrain parts manufacturing	336350
Motor vehicle seating and interior trim manufacturing	336360
Motor vehicle metal stamping	336370
Other motor vehicle parts manufacturing	336390

Note: NAICS = North American Industrial Classification System.

Table 2: Non-Automotive NAICS Codes with Automotive Parts Production

Category	NAICS Code
Other textile product mills	3149
Plastic product manufacturing	3261
Rubber product manufacturing	3262
Glass and glass product manufacturing	3272
Steel product manufacturing from purchased steel	3312
Aluminum and alumina processing	3313
Foundries	3315
Forging and stamping	3321
Spring and wire product manufacturing	3326
Machine shops; turned products; and screw, nut, and bolt manufacturing	3327
Coating, engraving, heat treating, and allied activities	3328
Other fabricated metal product manufacturing	3329
Engine, turbine, and power transmission equipment manufacturing	3336
Other electrical equipment and component manufacturing	3359

Note: NAICS = North American Industrial Classification System.

Rubenstein (2008, 2010, 2013), we created an establishment-level database that permits analyses based on the end use of goods (in this case, the production of cars and light trucks by automotive OEMs) rather than the classification-based analyses common in studies that rely on government statistics. The database includes information about 23 automotive OEM and more than 900 independent parts supplier plants that operated in Canada between 2005 and 2014.

Fitzgibbon et al. (2004, 15) make three important observations regarding the use of NAICS codes for automotive industry analysis. First, the majority of automotive parts production falls under the four-digit NAICS code 3363 (motor vehicle parts manufacturing), which is further subdivided into eight five-digit codes (Table 1). Moreover, parts produced for heavy trucks, buses, military vehicles, motorcycles, motor homes, and the automotive aftermarket are captured in these subindustries. Second, establishments whose primary function is to supply parts to automotive OEMs or upper tier OEM suppliers are often categorized within NAICS codes other than 3363 or its derivatives. Examples include establishments that produce glass, rubber, or foundry products and are categorized as such. Table 2 lists 14 four-digit NAICS codes other than 3363 in which at least one automotive parts supplier establishment in our database is categorized. This article demonstrates that because these suppliers are categorized within non-automotive NAICS codes, government statistics tend to underreport the size of the automotive manufacturing industry in Canada. Third, many establishments dedicate only a portion of their capacity to producing goods for OEMs or upper-tier OEM suppliers, frequently move in and out of the automotive supply chain, or both. Included among these establishments in Canada are large globally competitive firms and a diverse network of locally based small- and medium-sized firms.

To provide a more accurate profile of the Canadian automotive industry, the article draws data from an establishment-level database. This database tracks several

variables over time, including geographic location, parent ownership, nationality of ownership, product classification, unionization, and number of employees. Establishments in the database are divided into three categories based on their ownership and function: OEMs, primary independent automotive parts suppliers, and diversified automotive parts suppliers. The OEM category includes automotive assembly, engine and powertrain, and parts plants owned by one of five OEMs that operated in Canada between 2005 and 2014. The primary automotive parts supplier category includes establishments whose exclusive or primary function is to supply OEMs or upper tier suppliers of OEMs. The diversified automotive parts supplier category includes establishments for which supplying OEMs or the upper tier suppliers of OEMs are a secondary or tertiary function. It is conceptually difficult (and practically impossible) to conclude with any certainty what proportion of the output of these establishments is destined for the OEM automotive supply chain or what proportion of their workforce should be categorized as being in the automotive industry. For the purposes of this article, we classify 15 percent of persons employed by diversified parts suppliers as automotive industry employees. This figure is approximately equivalent to the proportion of motor vehicle assembly and motor vehicle parts manufacturing employees in Ontario and Quebec relative to the total durable goods manufacturing workforce in the same provinces, in which virtually all of the Canadian automotive industry is located (Statistics Canada 2016). This, in the opinion of the authors, is a very conservative estimate, because it is likely that most of these establishments dedicate far more than 15 percent of their capacity to the OEM automotive industry.

The process of data collection involved two distinct but often concurrent activities, both of which are labour intensive. The first involved identifying establishments. This, as Klier and Rubenstein (2008) note, is a particular challenge for those researching the automotive parts industry (conversely, data for OEM establishments are quite easily accessible). Although it is a challenge to uncover suppliers we deem primary, it is even more difficult to find those we categorize as diversified.

We relied on several sources of information to identify parts supplier establishments to build this database. These sources include company websites, membership directories published by industry associations such as the Automotive Parts Manufacturer's Association and the Japan Automobile Manufacturers Association of Canada, industry and business directories published by government and quasi-government (e.g., chambers of commerce, economic development offices) agencies, unions, and media sources. We also used a database produced by ELM International, a US-based vendor of information about automotive parts suppliers that was central to Klier and Rubinstein's work.[2] On discovering an establishment, we confirmed whether it was actively in business. Although most were, many were not. We confirmed this information through company documents, company and union press releases, media reports, government documents, bankruptcy proceedings, company websites, and personal research networks.

The second stage involved collecting information about establishments. Some companies (e.g., Linamar) provide much of these data in a readily accessible format on their websites. In most cases, however, information was more difficult to obtain. Collecting employment data—a key variable in our analysis—was initially challenging. The majority of companies provide only aggregate Canadian or global employment figures (rather than establishment-level data) on their websites or in reports to shareholders, or none whatsoever. We therefore relied on a variety of non-company sources for these data. Data for unionized establishments are often publicly available from unions themselves or from collective bargaining notices published by the Ontario Ministry of Labour and the Gouvernement de Québec's Secrétariat du travail. Employment data are often found in reports and directories published by regional and municipal government agencies and in media sources.

A particularly valuable source of establishment-level employment information is mandatory environmental reporting programs. These programs include Environment Canada's National Pollutant Release Inventory and those required by Ontario's Toxic Reductions Act. The annual reports required of companies are publicly available and include the name of the parent company (where applicable); the number of employees; and two-, four-, and six-digit NAICS code information. With these data, we can track changes in employment and ownership over time at all OEMs and the majority of parts supplier establishments over time (including those that closed between 2005 and 2014).

Several limitations remain. First, and as mentioned, it is only possible to estimate the extent to which diversified parts suppliers contribute to the automotive industry. Second, small establishments—including many diversified suppliers—do not meet the threshold that requires them to submit annual environmental reports, and we may only have their current employment data. To address this, we calculate their annual employment between 2005 and 2014 by using an index based on the average annual change in employment that is itself based on aggregated information from those plants for which we have complete information. Third, we assume that companies provide accurate employment data in their environmental reports. Comparisons of employment data from environmental reports and data from

Table 3: OEM Vehicle Assembly Plants in Canada, 2005 and 2014

2005	2014
General Motors	
Oshawa 1	Oshawa Flex
Oshawa 2	Oshawa Consolidated
Oshawa Truck	CAMI (Ingersoll)
CAMI (Ingersoll)	
Ford	
Oakville	Oakville
Talbotville	
Fiat Chrysler Automobiles	
Brampton	Brampton
Windsor	Windsor
Toyota	
Cambridge (North)	Cambridge (North)
Cambridge (South)	Cambridge (South)
	Woodstock (West)
Honda	
Alliston 1	Alliston 1
Alliston 2	Alliston 2

Note: CAMI = Canadian Automotive Manufacturing Inc.; OEM = original equipment manufacturer.

other static sources are identical or nearly identical in most cases. Because there appears to be no implication for providing inaccurate or misleading information, it is possible that some companies may provide inaccurate data for various reasons (e.g. rounding up or down to the tenth or hundredth, union avoidance). Yet these concerns are similarly present in data provided by unions, governments, or media.

Finally, the data presented in this article do not include those employed by temporary agencies. Since 2000, this category of employees has represented between 12 and 18 percent of the manufacturing workforce in Ontario (Noack and Vosko 2012, 46) and as much as 25 percent of employees in some large automotive parts supplier firms (Lewchuk and Wells 2007). In short, and even though our analysis demonstrates that Statistics Canada under-represents the total number of persons employed in the automotive industry, it is likely that the conservative assumptions on which our methodology is based also under-represent the actual number of employees at any given point in time.

The Canadian Automotive Industry: 2005–2014

Official sources—namely Statistics Canada—under-represent the number of persons employed in the Canadian automotive industry. Although problematic in its own right, this leads to further under-representations in reports or publications derived from these data. Recent reports published by Unifor (2015) and the CAPC (2013) claim that direct automotive industry employment is between 115,000 and 120,000. The Province of Ontario's Investment and Trade Centre's website claims that direct automotive employment in that province is more than 104,000 ("Automotive" 2016). These data are consistent with (and most likely derived from) data available from

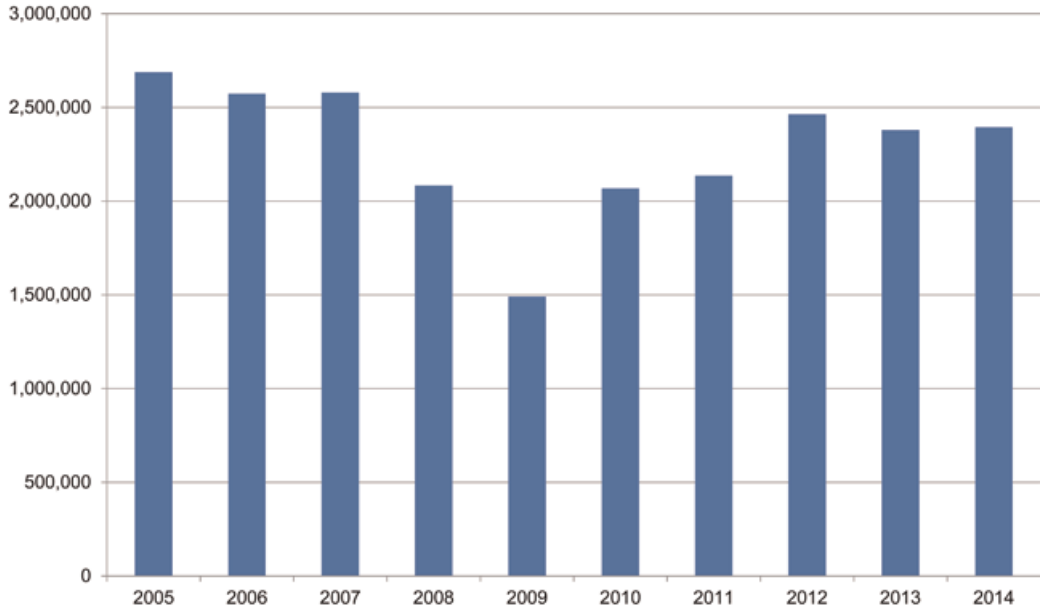

Figure 1: Motor Vehicle Production in Canada by Units, 2005–2014
Source: OICA (2016)

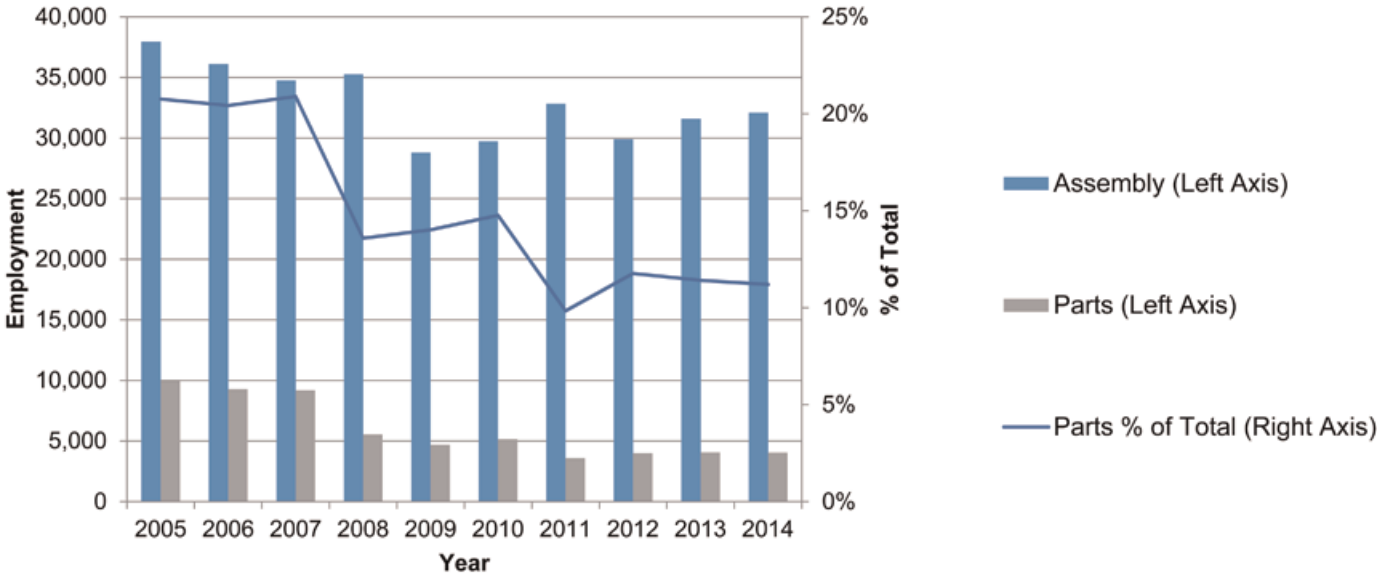

Figure 2: Original Equipment Manufacturer Assembly and Parts Employment in Canada, 2005–2014
Source: Primary data

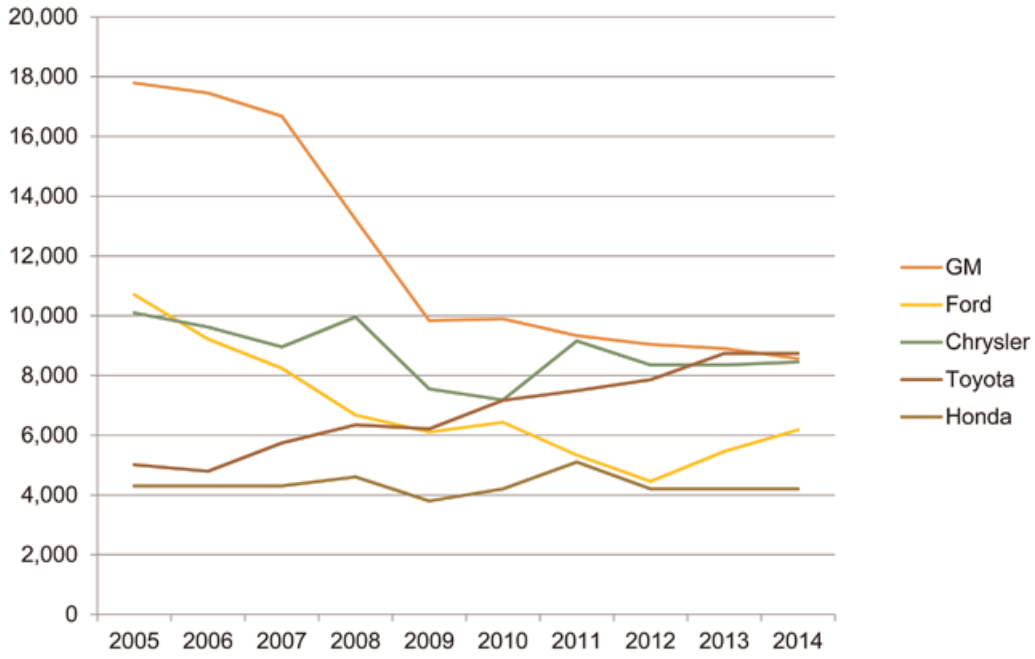

Figure 3: Original Equipment Manufacturer Employment in Canada by Company, 2005–2014
Source: Primary data

Statistics Canada's Survey of Employment, Payroll, and Hours (Statistics Canada 2016). However, and as data presented in this section demonstrate, direct automotive industry employment in Canada is at least 130,000. The majority of these jobs—at least 124,000—are located in Ontario.

Original Equipment Manufacturers

Five OEMs operated a total of 13 vehicle assembly plants between 2005 and 2014 (Table 3). These plants produced an average of 2.3 million vehicles annually over this period (Figure 1; OICA 2016) and employed as many as 37,953 people and as few as 28,802 (Figure 2). In 2014, 11

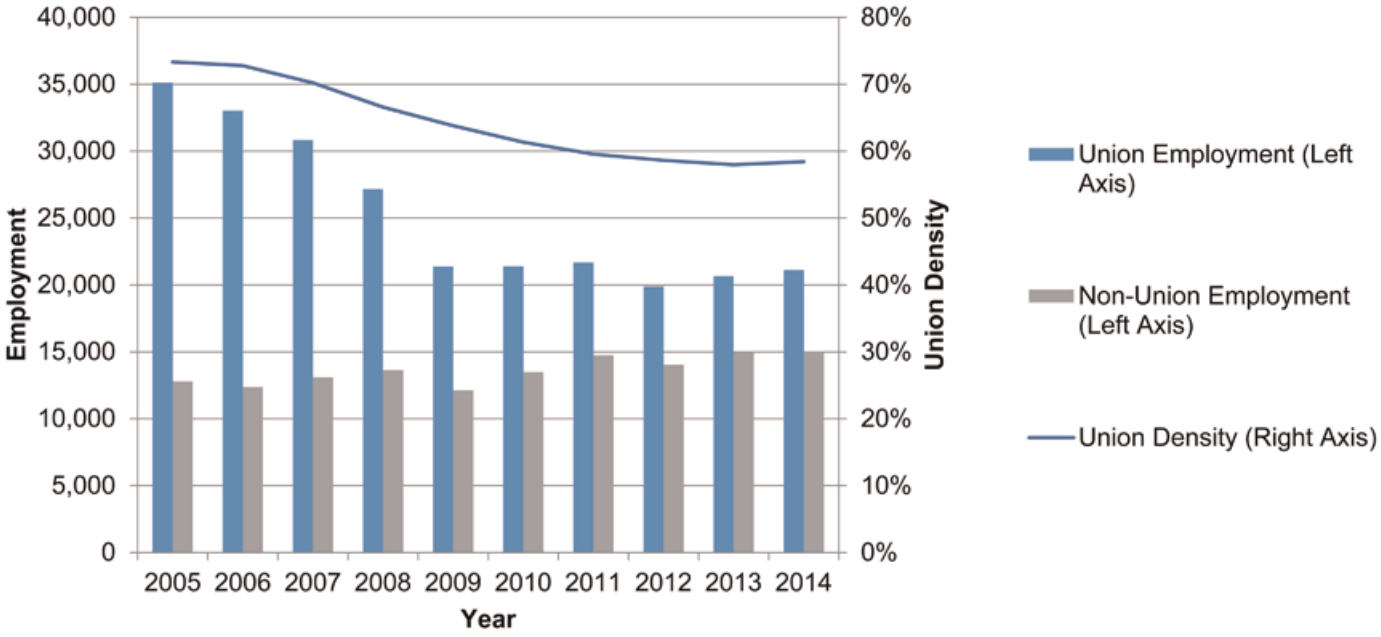

Figure 4: Union Density in Original Equipment Manufacturer Plants, 2005–2014
Source: Primary data

vehicle assembly plants remained, and those 11 produced 2,394,154 vehicles and employed 32,083 people. All vehicle assembly plants were located in southern Ontario. The same companies also operated 10 engine, powertrain, and casting (hereinafter parts) plants between 2005 and 2014, which employed as many as 9,945 (in 2005) and as few as 4,405 people (in 2014). All of these plants were located in southern Ontario, with the exception of one Toyota-owned wheel casting plant located in Delta, British Columbia. The proportion of employment in OEM parts facilities decreased relative to that in vehicle assembly plants between 2005 and 2014. Employment in OEM parts plants made up 21 percent of total OEM employment in Canada in 2005 but fell to 11 percent in 2014.

Of the five OEMs in Canada in 2005, General Motors (GM) was the largest employer, followed by Ford and Daimler-Chrysler (Figure 3). However, both GM and Ford underwent widespread restructuring before, during, and immediately after the recession of 2008–2009. GM closed one assembly plant (Oshawa Truck) and two parts plants, and Ford closed one assembly plant (Talbotville) and one parts plant. Daimler-Chrysler (now Fiat Chrysler Automobiles) did not close any plants, nor did it add any. Honda added a small engine production line in its Alliston, Ontario, assembly plants. Toyota added an assembly plant in Woodstock, Ontario, which began production in 2008. In 2014, Toyota was the largest OEM employer in Canada, followed by GM and Fiat Chrysler. Fiat Chrysler will likely surpass GM and Toyota in 2016 as a result of recent investments in its Windsor, Ontario, assembly plant (CBC News 2016).

Production and trades employees at GM, Ford, and Fiat Chrysler are almost exclusively unionized (by Unifor, formerly the Canadian Auto Workers). Production and trades employees at Honda and Toyota are not unionized, despite sustained organizing drives by Unifor. Union density in OEM manufacturing plants is much higher than the average in Canadian manufacturing industries. However, union density in OEM plants decreased from approximately 73 percent in 2005 to 58 percent in 2014 (Figure 4). This is the result of decreased employment by unionized OEMs and increased employment by non-union OEMs.

Primary Automotive Parts Suppliers

The size, structure, and composition of the primary automotive parts supplier industry changed considerably between 2005 and 2014. The most notable changes are the decrease in the number of establishments and in employment. In 2005, 128,595 people were employed at 539 primary parts supplier establishments (Figure 5). By comparison, 89,536 people were employed in 396 establishments in 2014. This was the result of 197 establishment closures and only 54 new establishments (2 of which subsequently closed by 2014). Not surprisingly, the sharpest decreases occurred in 2008 and 2009, during which time 105 establishments closed and employment fell to a low of 81,415. Employment increased in

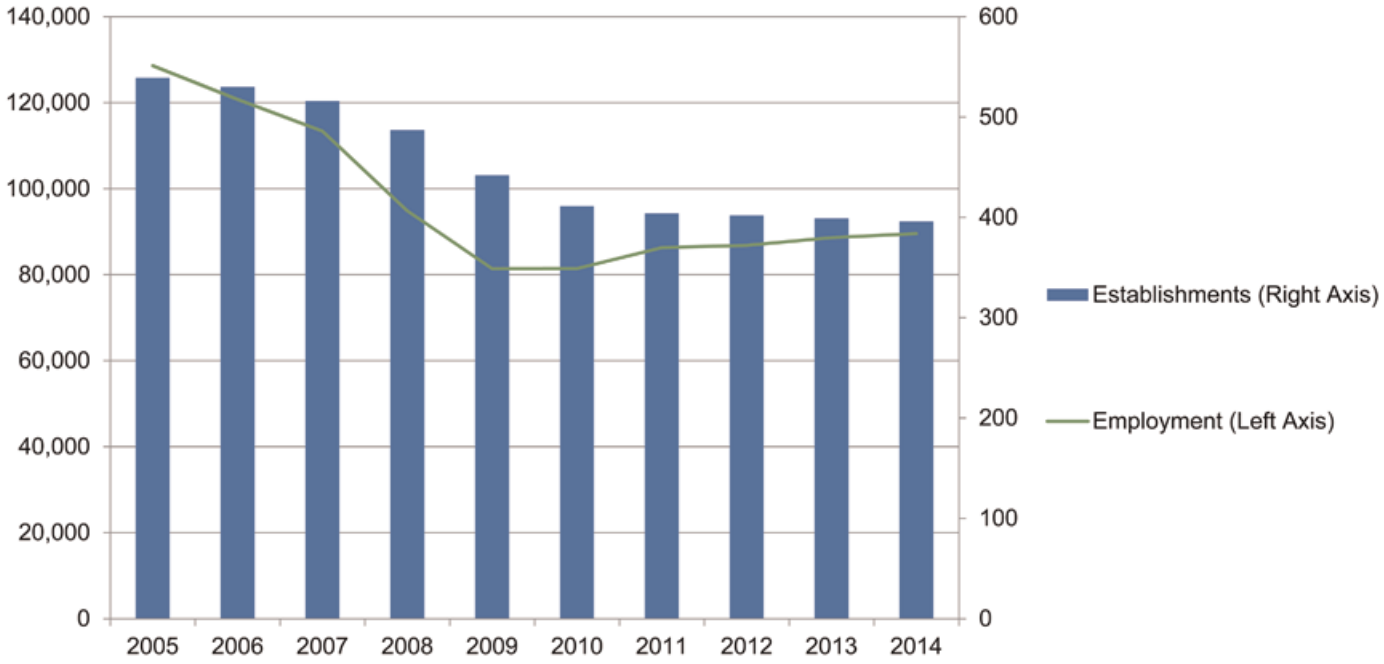

Figure 5: Primary Automotive Parts Supplier Establishments and Employment, 2005–2014
Source: Primary data

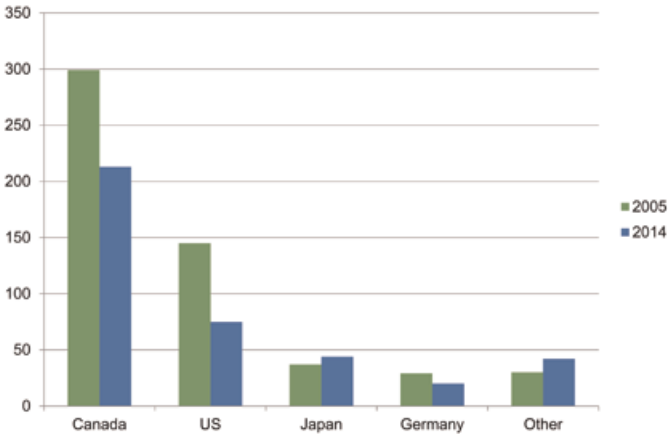

Figure 6: Primary Automotive Parts Supplier Establishments by Nationality, 2005 and 2014
Source: Primary data

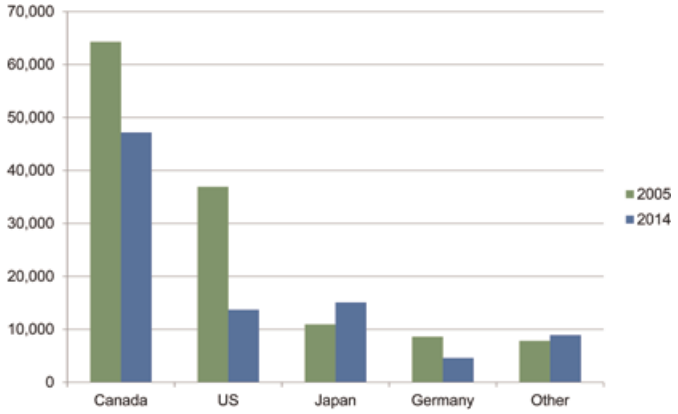

Figure 7: Primary Automotive Parts Supplier Employment by Nationality, 2005 and 2014

every year since 2009, with the majority (60 percent) of this increase occurring in 2011.

The data herein show several important changes in the composition of primary parts supplier establishments and employment when measured by nationality. These changes occurred as a result of new establishments, establishment closures, and merger and acquisition activity. Prominent examples of the latter include the acquisition of formerly German-owned ThyssenKrupp Budd Fabco by Canadian-owned Martinrea in 2006 (Martinrea International Inc. 2013), the acquisition of formerly Canadian-owned Wescast by Chinese firm Sichuan Bohong in 2013 (Miller 2013), and the acquisition of formerly US-owned TRW Automotive by German-owned ZF Friedrichshafen in 2014 (Sedgwick 2014).

Figures 6 and 7 compare the number of establishments and employment by nationality of ownership among primary parts suppliers in 2005 and 2014. Despite an absolute decrease, Canadian-owned companies make up the majority of the industry. In 2005, Canadian-owned companies employed 64,285 people (50 percent)

Table 4: Top 10 Primary Automotive Parts Suppliers by Employment, 2005

Company	Employment	Plants	Nationality	Top 100?
Magna	19,962	53	Canada	Yes
Linamar	5,968	22	Canada	Yes
Flex-n-Gate	4,010	16	United States	Yes
Collins and Aikman	3,534	11	United States	Yes
Dana	3,202	13	United States	Yes
Johnson Controls	2,899	8	United States	Yes
GDX Automotive	2,439	4	United States	Yes
Progressive Molded Products	2,400	10	United States	No
Lear	2,330	5	United States	Yes
Toyoda Gosei	2,265	4	Japan	Yes

Table 5: Top 10 Primary Automotive Parts Suppliers by Employment, 2014

Company	Employment	Plants	Nationality	Top 100?
Magna	18,092	43	Canada	Yes
Linamar	6,997	21	Canada	Yes
Toyoda Gosei	2,487	5	Japan	Yes
Flex-n-Gate	2,462	12	United States	Yes
Martinrea	2,385	11	Canada	Yes[a]
ABC Group	1,701	8	Canada	Yes
Multimatic	1,540	5	Canada	Yes
Cooper-Standard	1,372	6	Canada	Yes
Stackpole	1,355	5	United States[b]	No
F&P Manufacturing	1,199	2	Japan	Yes

[a] Martinrea was a Top 100 supplier in 2013, but not in 2015.

[b] Stackpole was acquired by Hong Kong–based Johnson Electric in August, 2015 (Canadian Manufacturing 2015).

in 299 establishments (55 percent), whereas in 2014 they employed 47,150 people (53 percent) in 213 establishments (54 percent). This is due in part to the continued presence of Magna and Linamar. The number of establishments owned and persons employed by Japanese-owned firms increased in both relative and absolute terms. In 2005, Japanese-owned firms employed 10,944 people (9 percent) in 37 establishments (7 percent). By 2014, they employed 15,065 people (17 percent) in 44 establishments (11 percent). This has much to do with the growth of Toyota and the relative stability of Honda in Canada during this time.

Conversely, the presence of US-owned suppliers decreased substantially. In 2005, US-owned firms employed 36,891 people (29 percent) in 145 establishments (27 percent), whereas in 2014 they employed only 13,696 people (15 percent) in 75 establishments (19 percent). This is the result of the closure of assembly plants owned by Ford and GM and the greatly diminished role (often due to bankruptcy) of large firms such as Dana, Lear, and Collins and Aikman. The presence of German-owned firms also decreased, although this is related just as much to Martinrea's acquisition of ThyssenKrupp Budd Fabco as it is to establishment closures and employment reductions. Concomitantly, establishments owned and persons employed by companies from all other nations (notably Italy and China) increased slightly. This is related primarily to acquisitions of formerly Canadian- and US-owned firms rather than organic investment.

Tables 4 and 5 compare the 10 largest companies in terms of employment in 2005 and 2014. Magna persists as the largest automotive industry employer in Canada. In 2005, Magna employed 19,962 people in 53 establishments.[3] In 2014, it employed 18,092 people in 43 establishments. This is more than double the number of employees in the Canadian manufacturing operations of Toyota, GM, or Fiat Chrysler. Employment at Linamar increased in absolute and relative terms between 2005 and 2014. In 2005, it employed 5, 968 people in 22 establishments. This increased to 6,997 people in 21 establishments in 2014. Linamar currently employs more people in its automotive divisions than two of the five OEMs operating in Canada (Ford and Honda).[4] Other large

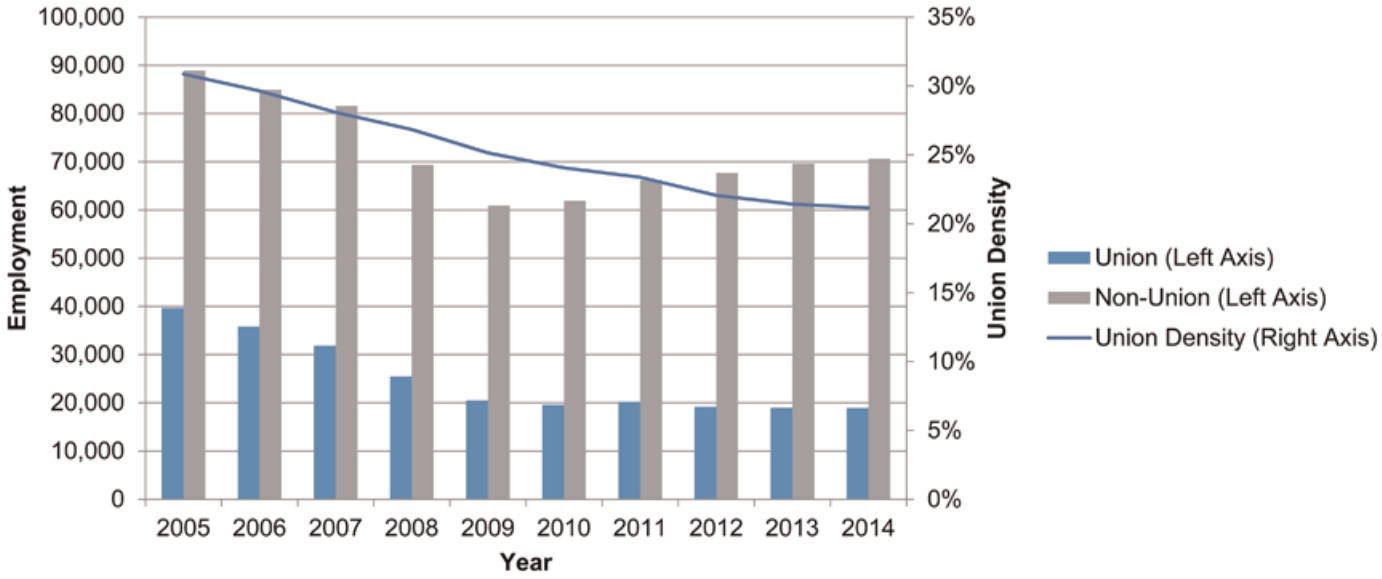

Figure 8: Union Density and Union and Non-Union Employment in Primary Parts Suppliers Establishments, 2005–2014
Source: Primary data

employers include Toyoda Gosei, Flex-n-Gate, Martinrea, ABC Group, Multimatic, Cooper-Standard, Stackpole, and F&P Manufacturing. Taken together, these companies operated 118 establishments and employed 39,590 people in 2014. As a proportion of the total primary automotive parts supplier industry, they represented 30 percent of establishments and 44 percent of employees.

These and other large internationally competitive companies make up the majority of the primary automotive parts supplier industry in Canada. We use the *Automotive News*' 2013 and 2015 Top 100 supplier lists as a means to classify firms as large and internationally competitive (*Automotive News* 2013, 2015). In 2014, firms listed as Top 100 global or North American suppliers operated 153 establishments in Canada and employed 54,002 people. As a proportion of the primary automotive parts supplier industry, they represent 39 percent of establishments and 60 percent of employees. Moreover, several large firms with important production bases in Canada are not included in the Top 100 category. These firms include Woodbridge Foam, Matcor-Matsu, and Bend-All Automotive, all of which belong to companies with international production footprints. In short, and although the definition of a large company in the automotive parts supplier industry remains elusive (see Rutherford and Holmes 2008), the majority of persons working in Canada's primary automotive parts supplier industry are employed by large, internationally oriented companies.

Union density in the primary automotive parts supplier industry decreased between 2005 and 2014 (Figure 8). In 2005, nearly 40,000 primary automotive parts supplier employees were unionized, and union density across the industry was approximately 31 percent. By 2014, the number of unionized employees fell by more than half to just under 19,000, and union density decreased to 21 percent. Just over 80 percent of all unionized primary automotive parts supplier employees are members of Unifor, and another 12 percent are members of the United Steelworkers. The rest belong to the International Brotherhood of Teamsters, United Autoworkers, International Association of Machinists and Aerospace Workers, or several smaller unions. The decrease in union density is the result of the closure of 78 unionized establishments (many of which were operated by large US-owned companies), employment reductions in the unionized establishments that have remained, limited success in organizing new or growing establishments, and growth in employment within non-union establishments, particularly since 2009.

One unique aspect of our database is that it provides insight into the NAICS codes that are assigned to individual establishments. More than two-thirds of the employees of primary automotive parts suppliers were employed in establishments that were categorized as motor vehicle parts manufacturing (NAICS 3363). However, nearly one-third were employed in establishments that were categorized as something else. A small number (3 percent) of employees of primary automotive parts suppliers were employed by establishments categorized as motor vehicle manufacturing (NAICS 3361). Ten percent were employed in establishments categorized as plastic product manufacturing (NAICS 3261); 4 percent were employed in establishments categorized as rubber

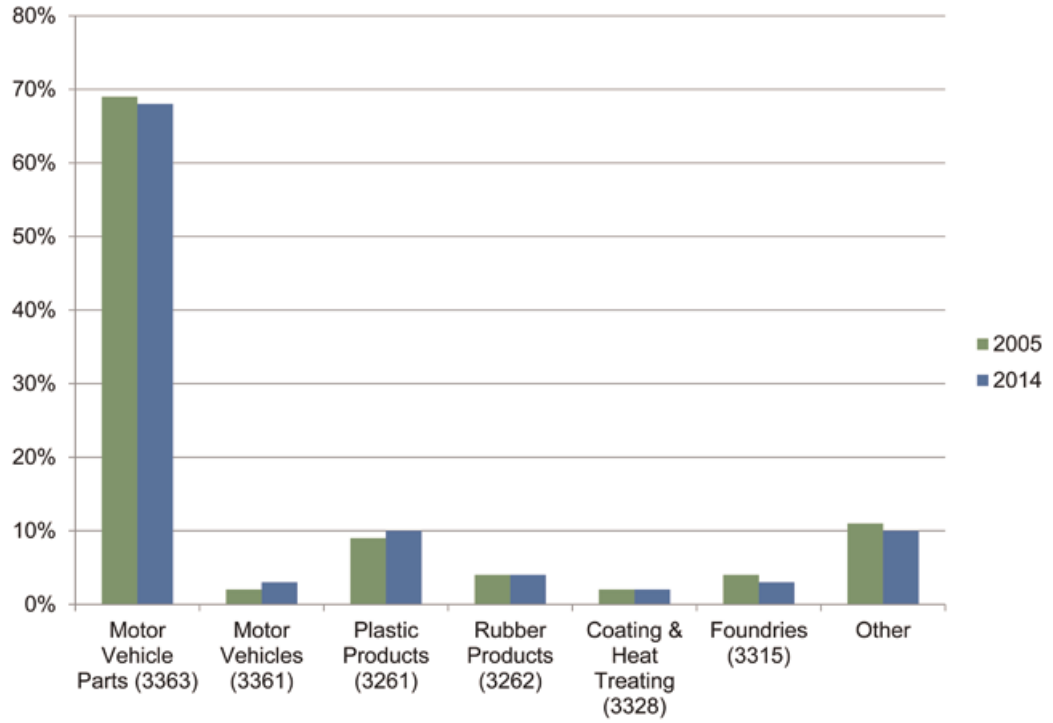

Figure 9: Proportion of Employment by Four-Digit North American Industrial Classification System Code, 2005 and 2014
Source: Primary data

product manufacturing (NAICS 3262); 2 percent were employed in establishments categorized as coating, engraving, heat treating, and allied activities (NAICS 3328); 3 percent were employed in establishments categorized as foundries (NAICS 3315); and 10 percent were employed in establishments categorized in other NAICS codes. None of the establishments in our database reported being in the category motor vehicle body and trailer manufacturing (NAICS 3362). These proportions differ only slightly between 2005 and 2014 (Figure 9).

Our data therefore demonstrate that official government statistics categorize nearly one-third of all persons employed by primary automotive parts suppliers as non-automotive employees. This occurs because of limitations in any system of data collection that relies on NAICS codes. The categories established by this system of industrial classification include "downstream" activities that produce finished goods, such as motor vehicle manufacturing (NAICS 3361) or recognizable components of those goods, such as motor vehicle parts manufacturing (NAICS 3363). However, categories that capture "upstream" activities based on industrial processes also exist, such as foundries (NAICS 3315) or coating, engraving, heat treating, and allied activities (NAICS 3328), in which establishments produce intermediate goods that are not necessarily recognizable to consumers on their own but that are important components of finished goods. For example, a particular foundry may produce transmission housings for an OEM customer or a chrome plating establishment may rely entirely on contracts from upper tier OEM suppliers. However, and despite supplying the OEM automotive supply chain exclusively, the persons employed and the gross domestic product generated from these establishments would not be included in automotive-related NAICS codes. There is nothing nefarious about this, nor is there an element of human error. Rather, it is simply a limitation of the prevalent system of industrial classification that leads to underrepresentation of automotive industry employment in official government statistics.

There have also been changes among establishments that report as motor vehicle parts manufacturing. Figure 10 illustrates the proportion of employees within the eight six-digit NAICS codes that fall under motor vehicle parts manufacturing. The proportion of employment at establishments that report as motor vehicle parts manufacturing increased slightly in four subcategories: engines and engine parts (336310), transmission and powertrain parts (336350), seating and interior trim (336360), and metal stamping (336370). Steering and suspension (336330) employment changed little. Employment in other motor vehicle parts (336390), which includes establishments that manufacture closures, exhaust systems, wheels, and vehicle frames, decreased as a proportion of overall

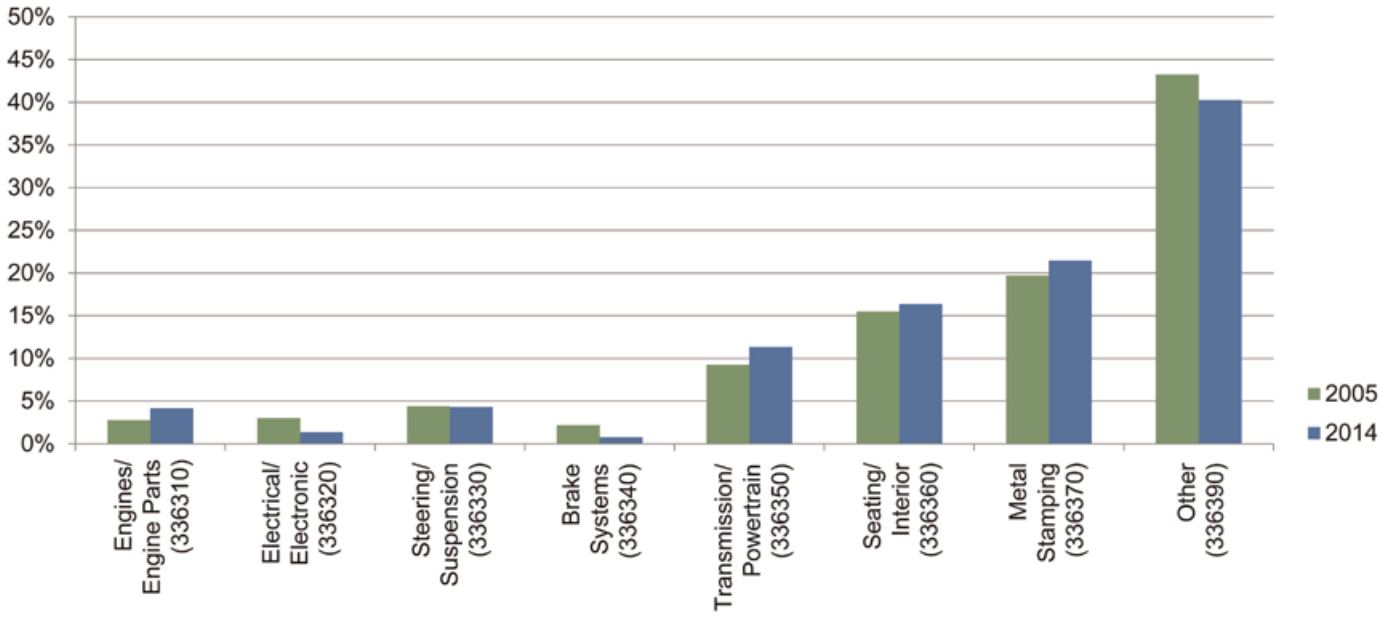

Figure 10: Proportion of Employment by Six-Digit NAICS Codes within NAICS 3363 (Motor Vehicle Parts Manufacturing), 2005 and 2014
Note: NAICS = North American Industrial Classification System.
Source: Primary data

motor vehicle parts manufacturing employment. Employment in the electrical and electronic equipment (336320) and brake systems (336340) categories did not make up a large proportion of the industry in 2005 and fell to negligible levels in 2014.[5]

Diversified Automotive Parts Suppliers

The diversified automotive supplier category includes 390 establishments that, in 2014, employed a total of nearly 37,000 people. Within this category are large steel mills that ship door and body panels directly to OEM assembly plants, contract electronics and printed circuit board manufacturers, software companies, general industrial and consumer product manufacturers, plastic product manufacturers, fastener manufacturers, and machine shops. The majority of these establishments (85 percent) employed fewer than 100 people. However, 25 (6 percent) of these establishments employed more than 200 people. Our estimation suggests that (at least) 15 percent of all diversified automotive parts supplier employees (5,550 people) should be added to total automotive industry employment in Canada.

Discussion and Policy Implications

It is important for policy-makers to gain clarity regarding the size and composition of the Canadian automotive industry. The preceding pages demonstrate that Canadian policy-makers and researchers interested in the Canadian automotive industry have been constrained by truncated and at times incorrect or misleading data. If data are the foundation for policy-making, faulty data establish a framework for inferior policy. The effect is this: incorrect impressions can be built, ineffective policies can be implemented, and opportunities may be lost. Here we identify four overriding issues and opportunities: the effect of underreporting the number of persons employed in the automotive industry, new prospects related to the large indigenous automotive parts manufacturing industry, the benefits of recognizing and embracing emerging trends, and the importance of developing a sustainable system of data collection and analysis.

This article demonstrates that Canada's automotive manufacturing industry employs more people than the existing data suggest. Some may argue that it is simply convenient to set such matters aside: If we already know the industry is large, does it really matter if official statistics underreport employment by a few thousand people? The reality, however, is that insufficient data cause important but subtle, nuanced, and easy-to-miss problems for industry stakeholders and those charged with developing and implementing policies to support the industry.

For example, once the automotive industry (and manufacturing more generally) slipped from the Canadian public's consciousness as a critical source of gross domestic product and manufacturing employment, it became more convenient for politicians to focus their attention on other sectors of the economy. Concomitantly, it became more difficult for automotive industry stakeholders and sympathetic policy-makers to be heard by senior bureaucrats. The result was that automotive

manufacturing became, in the eyes of many politicians, something that other countries were better equipped to do. It became increasingly convenient for politicians and policy-makers to shift their focus away from an industry that was already underrepresented by official statistics and also on the decline. For example, Fiat Chrysler was unable to obtain government funding of the redevelopment of its Windsor and Brampton assembly plants, and employment at GM's once-massive Oshawa production complex fell from more than 10,000 in 2005 to 3,753 in 2014 with no long-term production commitments to date. Imperfect data may have contributed to subtle but important shifts in attention, resources, and political capital.

Beyond the aggregate statistics and the delicate shifts that they engender, practical reasons exist for having access to better data. This article demonstrates that the ownership profile of the Canadian automotive industry changed substantially over the past decade. Without the data provided herein, those shifts may have eluded policy-makers. For example, Canadian-owned companies dominate the automotive parts manufacturing landscape; of the 10 largest automotive parts suppliers in Canada, 6 are indigenous. This is up from just 2 in 2005. In 2005, 7 of the 10 largest automotive parts suppliers were US owned; by 2014, that number had shrunk to 2 (and to 1 by 2015) as a result of US firms' disinvestment in Canada. The literature has long suggested that research and development and other high value-added activities are clustered in close proximity to companies' corporate headquarters (see Carlsson 2006). This means that in 2005, efforts to encourage most large parts suppliers to locate research and development in Canada, to convince them to engage in research partnerships with Canadian colleges and universities, or to persuade them to place high value-added production divisions in Canada would have fallen on deaf ears. Yet on the basis of changes to the ownership profile of upper tier parts suppliers over the past decade, several important industry stakeholders are likely to be receptive to such overtures. Policy-makers should therefore be encouraged to develop bespoke programs for large indigenous parts suppliers to help them leverage any supports that exist.

Analysis of the ownership profile of the Canadian automotive parts industry also demonstrates that companies are emerging whose parent owners are located in countries not previously considered an important part of the fabric of the industry. For example, two of the largest automotive parts suppliers in Canada are now Chinese owned (Stackpole and Yanfeng-Johnson Controls). Rather than viewing Chinese-owned parts suppliers as a long-term threat to the Canadian industry, it may be time for policy-makers to shift their approach, deepen ties, and leverage their interests. Taking action sooner rather than later can only make Canada a more attractive location for this emerging source of foreign direct investment.

Finally, this article demonstrates that it is essential to have good data and a clear understanding of the automotive industry. The policy underpinnings of the Canadian automotive industry have to date been built on deficient data and statistics. The process used to reconstruct the data on which this article is based reveals important new information, and this information has the potential to alter public perceptions and adjust policy-makers' priorities. Unfortunately, the methods used to develop these data have been time intensive and are difficult to replicate. The data are based largely on one person's knowledge and experience and that individual's ability to triangulate disparate records, documents, and files (mind you, all of which are publicly available). Going forward, this task is best completed by policy-makers who could use their resources to develop a comprehensive, consistent, and regular survey, one that could build from the list of primary and diversified automotive parts suppliers identified here and then explore the nuances of those companies' profiles and experiences. Doing so will give Canadian automotive policy-makers a powerful tool to understand the profile of the industry and improved capacity to respond to emerging trends. Moreover, and although the article focuses on the automotive industry, the methodology may be usefully employed to analyze other advanced manufacturing industries with complex supply chains (e.g., aerospace).

Far from confirming a precipitous decline followed by a small recovery, the data in this article should provide observers of the Canadian automotive industry cause for optimism. Canada's automotive industry is—and always was—large than several analyses of prior data suggest. This fact should cause some to reconsider the industry's long-term significance and trajectory. The article also demonstrates that the composition of the industry has changed substantially over the past decade. This may cause policy-makers to shift resources and modify their approach to the automotive industry. However, and more important, the article demonstrates that the fundamental basis on which to build the necessary capacity to recognize shifts and influence trends is the development of a sustainable system of data gathering and analysis. Insofar as developing policy to support and leverage the Canadian automotive manufacturing industry is concerned, taking that next step is essential.

Notes

1 The article does not dwell long on this point, but Statistics Canada's data often leave something to be desired. Several important data sources have been discontinued or modified in such a way that they are far less useful to researchers than in the past (e.g., the *Annual Survey of Manufacturers*

no longer provides employment data). Yet even if these data were available, challenges related to the use of NAICS codes would remain.

2 Similar to Klier and Rubenstein (2008, 2010), we made substantial revisions to the data provided by ELM International. However, our revisions were more extensive than Klier and Rubinstein's, as were our additions. This is because ELM is a US-based organization whose focus is primarily on the United States, and it may not have access to the same data as our research centre, which is based in Canada.

3 Data include employment at Magna's production facilities only. They do not include corporate or research and development activities.

4 Data include employment at Linamar's automotive production facilities only. They do not include corporate, research and development, or non-automotive divisions (e.g., SkyJack).

5 However, a large motor vehicle electronics manufacturing facility owned by Autoliv employs nearly 400 people but reports its production as semiconductor and other electronics manufacturing (NAICS 3344), thus falling outside of motor vehicles parts manufacturing or transportation equipment manufacturing (NAICS 336) more generally.

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