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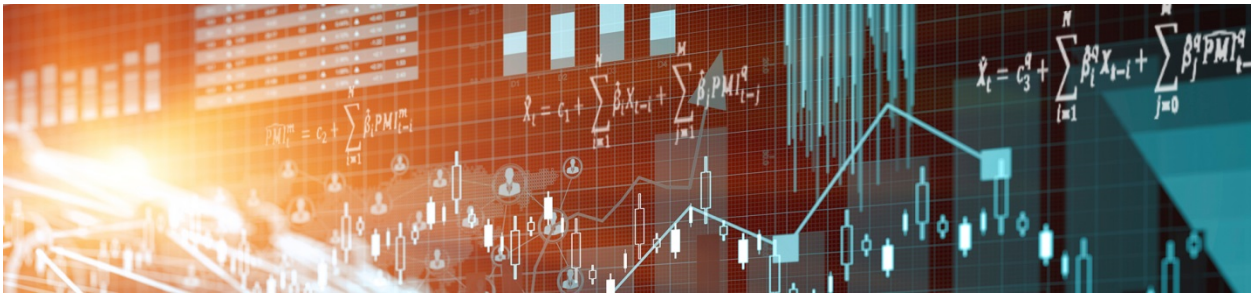
Decomposing Canada's Market Shares: An Update



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Abstract

Building on the shift-share analysis of Barnett and Charbonneau (2015), this note decomposes Canada's market shares in the United States, Europe and China for imports of non-energy goods into competitiveness, preference shifts and an interaction term. We find that, despite the depreciation of the dollar, Canada continued to lose market share over 2014–17 (around 0.4 percentage points lost per year on average over four years). Competitiveness losses are widespread among sectors and spread out over time. Losses from shifting preferences have stabilized since 2012 and are concentrated in motor vehicles and parts, forestry products, and building and packaging materials. Canada's share of European and Chinese imports of non-energy goods has been stable at around 2 and 1 per cent, respectively. However, in each case, one key sector offsets competitiveness losses in a broad range of sectors. Canada's exports in some markets have collapsed over recent years (e.g., small trucks, electrical apparatus for telephony), which suggests that some export capacity has been lost (or otherwise reallocated through a mandate change). In addition, we observe that Canada's market share in US imports of services has been eroded by stiff competition from emerging markets, such as India. Finally, relative price movements appear to partly explain Canada's lack of competitiveness in relation to Mexico and China for US imports of non-energy goods, more specifically in motor vehicles and parts and consumer goods.

Bank topics: International topics
JEL codes: F4, F10, F14

Résumé

En nous appuyant sur l'analyse structurelle résiduelle de Barnett et Charbonneau (2015), nous décomposons les parts de marché du Canada dans les importations américaines, européennes et chinoises de biens non énergétiques en trois parties : la compétitivité, l'évolution des préférences et un terme d'interaction. Nous constatons que, malgré la dépréciation du dollar, le Canada a continué de perdre des parts de marché de 2014 à 2017 (environ 0,4 point de pourcentage par année sur quatre ans). Les pertes de compétitivité touchent l'ensemble des secteurs et s'étalent dans le temps. Les pertes dues à l'évolution des préférences se sont stabilisées depuis 2012 et se concentrent dans les véhicules automobiles et leurs pièces, les produits forestiers et les matériaux de construction et d'emballage. La part du Canada dans les importations européennes et chinoises de biens non énergétiques est demeurée stable à environ 2 % et 1 %, respectivement. Toutefois, dans chaque cas, un secteur clé compense les pertes de compétitivité dans un large éventail de secteurs. Les exportations canadiennes sur certains marchés se sont effondrées au cours des dernières années (p. ex., petits camions, appareils électriques pour la téléphonie), ce qui donne à penser qu'une partie de la capacité d'exportation a été perdue (ou autrement réaffectée à la suite d'un changement de mandat). De plus, nous constatons que la part de marché du Canada dans les importations américaines de services a été érodée par la vive concurrence des marchés émergents, comme l'Inde. Enfin, l'évolution des prix relatifs semble expliquer en partie le manque de compétitivité du Canada par rapport au Mexique et à la Chine pour les importations américaines de biens non énergétiques, plus particulièrement les véhicules automobiles et leurs pièces et les biens de consommation.

Sujets : Questions internationales
Codes JEL : F4, F10, F14

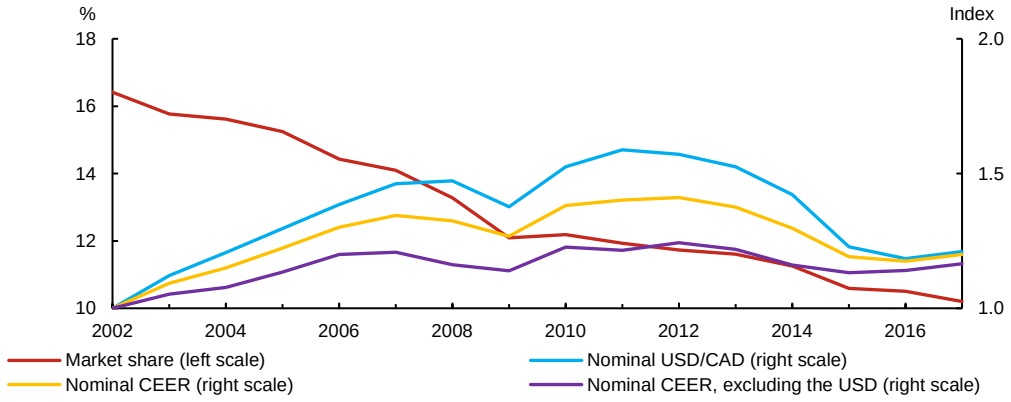
Introduction

Excluding services, overall Canadian non-energy exports have been largely flat since mid-2014 despite growing foreign demand and the depreciation of the Canadian dollar. Brouillette et al. (2018) examine the reasons behind this weakness by considering supply and demand factors. Their analysis draws partly on the work presented in this paper, which focuses on market share, a key outcome of export performance.[1]

In this context, Canada's market share in US imports of non-energy goods declined from 11.6 to 10.2 per cent between 2013 and 2017. This occurred despite the depreciation of the Canadian dollar (**Chart 1**). If we compare the Canadian dollar against the currencies of Canada's major trading partners (yellow line) and if we exclude the US dollar (purple line), the depreciation over 2014–17 drops from roughly 12 per cent to only 4 per cent.[2] Regardless, the exchange rate does not appear to be the cause of the continued loss of market share.

Chart 1: Canada has continued to lose market share over 2014–17 in US imports of non-energy goods despite the depreciation of the Canadian dollar

2002 = 1, annual data



Note: CEER is the Canadian effective exchange rate.

Sources: Haver Analytics and Bank of Canada calculations

Last observation: 2017

To better understand the factors behind Canada's market share losses, we update and expand the shift-share analysis of Barnett and Charbonneau (2015)[3] and decompose the losses relative to a reference year into three parts:

1. **Competitiveness:** changes due to shifts in product-specific market shares

[1] Canada's exports can be understood as the product of foreign demand, the propensity of foreign countries to import and what share of world imports (excluding Canada) Canada fulfills (i.e., its market share).

[2] Excluding the US dollar helps to compare the Canadian dollar against the currencies of other countries exporting to the United States. The Canadian effective exchange rate is a weighted average of bilateral exchange rates for the Canadian dollar against the currencies of Canada's major trading partners. For more details, see Barnett, Charbonneau and Poulin-Bellisle (2016).

[3] The Barnett and Charbonneau (2015) sample examines data from 2002 to 2014. We discuss the period from 2002 to 2017, focusing on 2013 to 2017. Market share losses or gains over 2014–17 refer to the difference in the level of the market share from 2013 to 2017.

2. **Preference:** changes due to shifts in product-specific import shares, i.e., total imports of a given product over total imports across all product categories considered
3. **Interaction:** the compound effects of shifts in competitiveness and in preference across products

Applying the shift-share analysis to US imports of non-energy goods from 2002 to 2017, we find that competitiveness losses are widespread across sectors and over time. Losses from shifting preferences have stabilized since 2012 and are concentrated in motor vehicles and parts, and forestry products and building and packaging materials. Canada's market share of European and Chinese imports of non-energy goods has been stable at around 2 and 1 per cent, respectively. In each case, however, one key sector offsets competitiveness losses in a broad range of sectors. For US imports of services, for example, Canada's market share has been eroded by stiff competition from emerging markets like India. Finally, relative price movements are helpful to understand some broad movements in market shares but are not sufficient to explain Canada's continued losses over the period examined.

The rest of the paper is organized as follows. Sections 1 to 3 analyze Canada's losses in market share over 2003–17 in the United States, Europe (EU-28)[4] and China[5] for imports of non-energy goods. Section 4 examines Canada's market share in US imports of services. Section 5 discusses the potential role played by relative price movements in US imports of non-energy goods. Section 6 concludes.

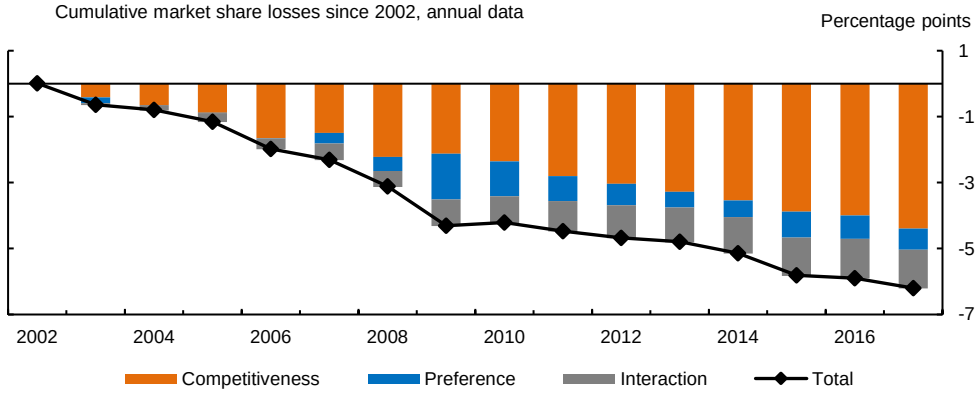
1. Canada has been steadily losing market share in US imports of non-energy goods

The United States accounted for 72 per cent of Canada's exports of non-energy goods in 2017, down from 85 per cent in 2002.[6] Canada's market share in US imports of non-energy goods gradually declined from 16 to 10 per cent from 2002 to 2017 (a loss of about 0.4 percentage points per year on average over 15 years, **Chart 2**). About 80 per cent of the loss over 2014–17 comes from competitiveness.[7]

[4] In the rest of this note, we refer to the European Union as Europe and EU-28 because since July 2013 the European Union includes 28 member states.
[5] The United States, Europe and China captured more than 85 per cent of Canada's exports of non-energy goods in 2017.
[6] The greatest shifts in export shares from 2002 to 2017 are China (+4 percentage points), Europe (+4 percentage points) and Mexico (+1 percentage point). This diversification took place due to US imports of non-energy goods growing less quickly than that of the rest of the world, including China and Europe, and Canada losing market share in the United States.
[7] For background information on the methodology of the shift-share analysis, see **Appendix 1**.

Chart 2: More than 70 per cent of Canada's market share losses in US imports of non-energy goods from 2002 to 2017 result from competitiveness losses

Cumulative market share losses since 2002, annual data



Example: The orange bar shows -4.4 percentage points for 2017, meaning that shifts in competiveness explain 4.4 percentage points out of the 6.2 percentage point drop in Canada's market share in US imports of non-energy goods from 2002 to 2017.

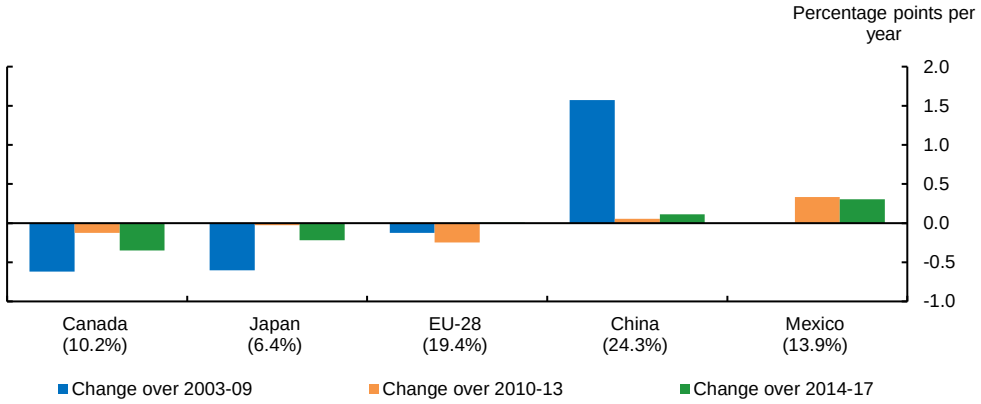
Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

Chart 3 compares Canada's loss in market share of US import of non-energy goods with other countries over three sub-periods. Canada's losses have accelerated over 2014–17 despite the depreciation of the Canadian dollar.[8] China mostly gained until 2009, while Mexico started to make larger gains from 2010 onward. Japan's losses are comparable to Canada's, and Europe's market share has been roughly stable over 2014–17.

Chart 3: Canada's market share loss of US imports of non-energy goods re-accelerated over 2014–17 and is worse than other countries

Average change in market share by country, annual data



Note: Percentages indicate the market share in 2017.

Sources: UN Comtrade and Bank of Canada calculations

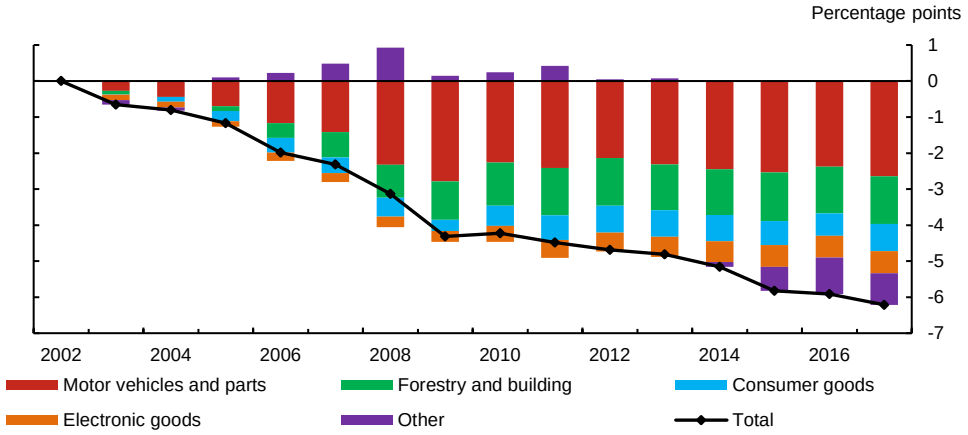
Last observation: 2017

[8] We discuss the role played by the exchange rate in Section 5 (see **Chart 25**).

Chart 4 decomposes the same loss presented in **Chart 2** by sector.[9] Almost two-thirds of the loss over 2003–17 can be explained by two sectors: motor vehicles and parts, and forestry products and building and packaging materials. The bulk of the loss took place over 2003–09. Over 2014–17, the 1.4 percentage point loss is mostly due to basic industrial chemical, plastic and rubber products, motor vehicles and parts and metal and non-metallic mineral products.[10] In 2017, losses in motor vehicles and parts were the worst since the 2008–09 crisis period. This sector alone explained the decline of 0.3 percentage points in Canada's market share. Losses in motor vehicles (excluding parts) explain 0.2 percentage points due to the net loss of product mandates in 2017.

Chart 4: Two sectors explain most of Canada's market share loss in US imports of non-energy goods from 2002 to 2017

Cumulative market share loss since 2002 by sector, annual data



Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

As can be seen in **Chart 5,** loss in competitiveness (**Chart 2,** blue bars) has remained widespread across sectors and continues to build up gradually over time. Motor vehicles and parts explain 37 per cent of the loss over 2014–17, consumer goods and metal and non-metallic mineral products explain around 19 and 11 per cent, respectively, while forestry products and building and packaging materials explain 8 per cent. All these sectors continued to lose competitiveness on average over 2014–17. In 2017, the decline was most pronounced for motor vehicles and parts (-0.2 percentage points) and consumer goods (-0.1 percentage point).

As shown in **Chart 6**, shifts in preferences (**Chart 2,** orange bars) offset some of the competitiveness losses in all sectors except in motor vehicles and parts and forestry products and building and packaging materials.[11] Losses due to shifts in preferences in these two sectors have recovered and stabilized since

[9] The sectors discussed in this note are based on Statistics Canada's North American Product Classification System Canada 2007. See **Appendix 2** for more details.

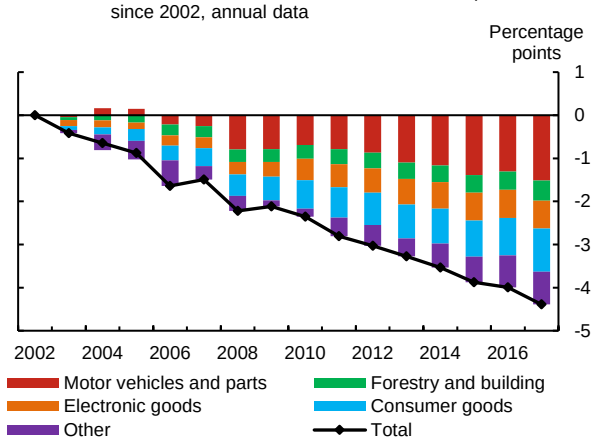
[10] Losses from basic industrial chemical, plastic and rubber products over 2014–17 (-0.4 percentage points) come from preference effects, half of which from light petroleum oils and preparations. Half of the losses from metal and non-metallic mineral products over 2014–17 (-0.2 percentage point) are explained by volatile gold and silver shipments.

[11] And to a lesser extent aircraft and other transportation equipment and parts.

the trough of 2009. Outside these two sectors, the composition of US imports of non-energy goods has helped support Canada's market shares, most notably in metal and non-metallic mineral products.

Chart 5: Losses in competitiveness in US imports of non-energy goods since 2002 are ongoing and widespread across sectors

Cumulative market share losses due to competiveness since 2002, annual data

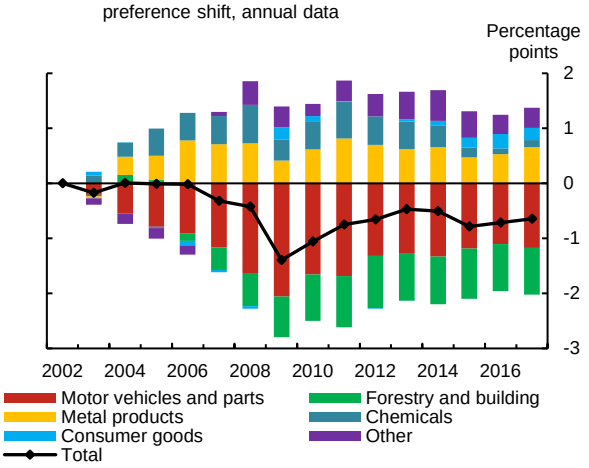


Note: This is a decomposition of the orange bars from Chart 2.

Sources: UN Comtrade and Bank of Canada calculations Last observation: 2017

Chart 6: Shifts in preferences among US imports of non-energy goods offset losses in competitiveness for most sectors

Cumulative market share losses since 2002 due to preference shift, annual data



Note: This is a decomposition of the blue bars from Chart 2.

Sources: UN Comtrade and Bank of Canada calculations Last observation: 2017

Motor vehicles and parts

As highlighted in Barnett and Charbonneau (2015), since the 2008–09 crisis, most of the loss in market share of motor vehicles (excluding parts) can be attributed to Mexico (**Chart 7**). A reallocation of production seems to have occurred over 2013–15 and more recently in 2017. In fact, Mexico is the only country that recovered fully from the break in preferences that happened during the crisis: Mexico is shipping to the United States product categories within motor vehicles that occupy a greater share of US imports of non-energy goods. This is consistent with a reallocation of production.

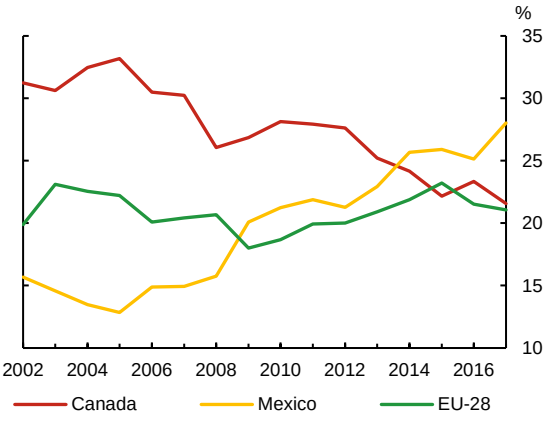
Two product categories illustrate this reallocation of production from Canada to Mexico.[12] First, US imports of passenger vehicles started to shift away from Canada in 2013[13] while Mexico made gains (**Chart 8**). Mexico's ascent started only in 2013 but has been steady and appears to have accelerated in 2017.

[12] **Appendix 3** describes how product categories mentioned in this note relate to Harmonized System (HS) six-digit codes.

[13] In 2017, the United States imported US$179 billion in passenger vehicles in total, representing 8.4 per cent of total US imports of non-energy goods.

Chart 7: Mexico has nearly doubled its market share of US imports of motor vehicles (excluding parts), while Canada has lost almost one-third

Market share of US imports of motor services, annual data

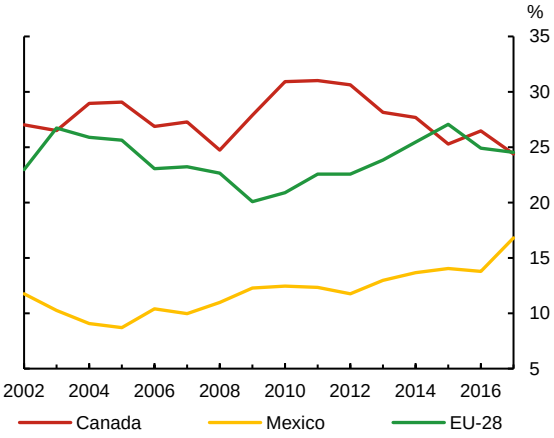


Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

Chart 8: Canada's market share of US imports of passenger vehicles started to decline in 2013, while Mexico has made gains

Share of US imports, annual data



Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

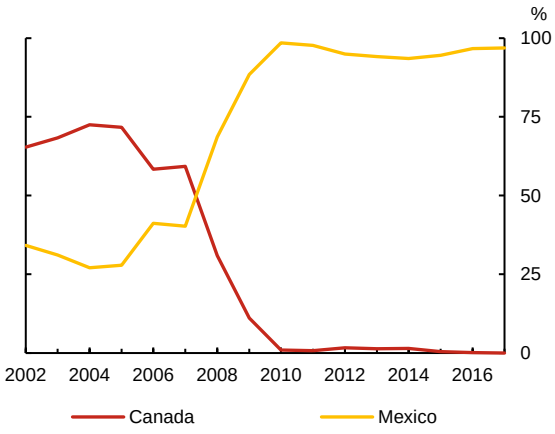
Second, US imports from Canada of small trucks of less than 5 metric tons were completely shut down during the 2008–09 crisis, while those from Mexico increased significantly (**Chart 9**).[14] In this case, US parent companies decided to open new production capacity in Mexico over the post-crisis period once demand returned. Multinational firms might decide where to locate new facilities based on such considerations as proximity to regions with stronger demand (e.g., motor vehicles), greater resources (e.g., lumber) or better trade arrangements and costs (e.g., labour, transport and weather).

Canada's losses in market share of US imports of motor vehicle parts have been more acute than in motor vehicles (excluding parts) and were evident before the crisis (**Chart 10**). Mexico has continued to make gains, while China seems to have stopped making gains since 2014. Canada is the only country that has not fully recovered losses due to shifting preferences in US imports of motor vehicle parts. For example, Japan suffered market share losses due to preferences like Canada's but had recovered those losses by 2011.

[14] In 2007, the United States imported from Canada US$7 billion in small trucks of less than 5 metric tons, or 2 per cent of Canada's total exports of non-energy goods. The United States imported a total of US$13 billion of this product, or 0.8 per cent of total US imports of non-energy goods.

Chart 9: US imports of small trucks (less than 5 metric tons) has shifted from Canada to Mexico

Share of US imports, annual data

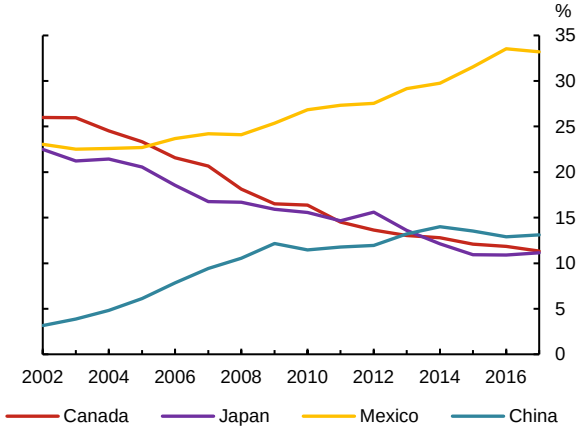


Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

Chart 10: Canada has been steadily losing market share of motor vehicle parts while China and Mexico benefited

Share of US imports, annual data



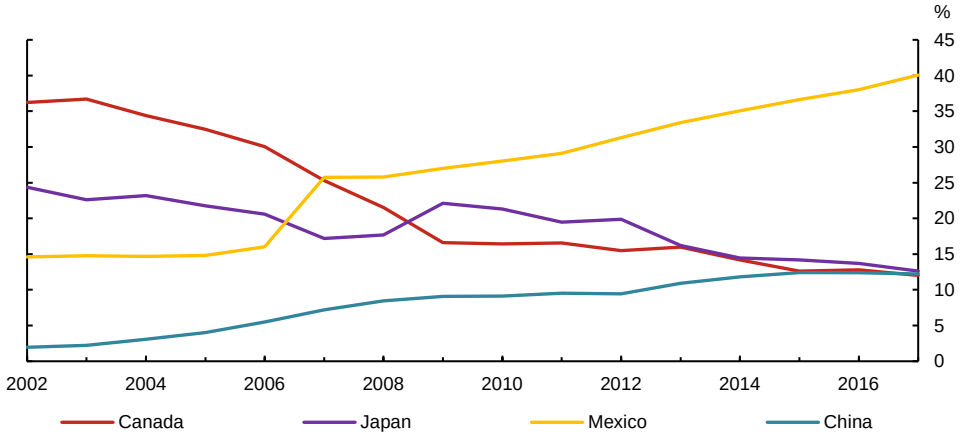
Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

At the product level, we observe a reallocation pattern for motor vehicle parts similar to that of motor vehicles, except that the reallocation began before the crisis. For US imports of parts and accessories for motor vehicles, **Chart 11** shows that Canada's losses to China started in 2004 and have recently slowed.[15] Mexico's gains, however, have been steady since 2009.

Chart 11: Canada has continued to lose market share for US imports of parts and accessories for motor vehicles to Mexico and, to a lesser extent, China

Share of US imports, annual data



Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

[15] In 2017, the United States imported a total of US$17 billion in parts and accessories for motor vehicles, or 0.8 per cent of total US imports of non-energy goods.

Forestry products and building and packaging materials

Losses in forestry products are primarily due to shifts in preferences specific to Canada. Losses are concentrated in two product categories for which US imports collapsed, namely newsprint and uncoated paper and paperboard. Market share losses in forestry accelerated over 2014–17 to 1.4 percentage points per year on average. Within building and packaging materials, Canada's losses are due to a drastic drop in US imports for sawn lumber and particle board, in line with the collapse of the US housing market during the 2008–09 crisis and the US–Canada softwood lumber disputes.[16] From 2002 to 2011, Canada's market share in building and packaging materials has dropped from 46 to 26 per cent and has remained stable since. China benefited from these losses in such products as wooden furniture for kitchen, and structures and parts of iron or steel.

Consumer goods

Losses in consumer goods are widespread across a range of products. For example, China and Vietnam have gained market shares in US imports of wooden furniture (other than kitchen) while Mexico has done the same in bovine meat. In 2017, market share losses in packaged medicine for retail (**Chart 12**) and articles of precious metals explained a 0.1 percentage point drop in Canada's market share in US imports of non-energy goods.[17]

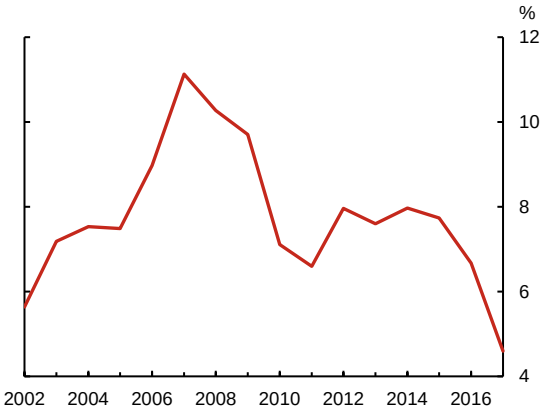
Electronic and electrical equipment and parts

China made strong gains in this sector, increasing its market share from 16 to 45 per cent between 2002 and 2017, while Canada's share declined from 5 to 2 per cent. One product that contributed to Canada's losses was electrical apparatus for line telephony, which was almost extinct in 2017, pointing to losses of export capacity (or reallocation, **Chart 13**).

[16] Barnett and Charbonneau (2015, p. 17) note that Canada's "losses due to unfavourable shifts in demand for building and packaging materials appear to be related to the collapse of the U.S. housing market."
[17] In 2017, the United States imported US$51 billion in packaged medicine for retail in total, representing 2.4 per cent of total US imports of non-energy goods.

Chart 12: Canada has lost market share of US imports of packaged medicine for retail since 2007

Share of US imports, annual data

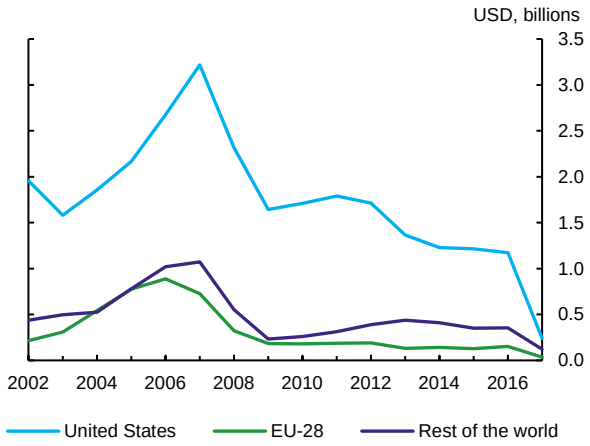


Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

Chart 13: Canada's exports of electrical apparatus for telephony started collapsing in 2008 and are now almost extinct

Annual data



Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

2. Canadian gold shipments offset competitiveness losses in Europe's imports of non-energy goods

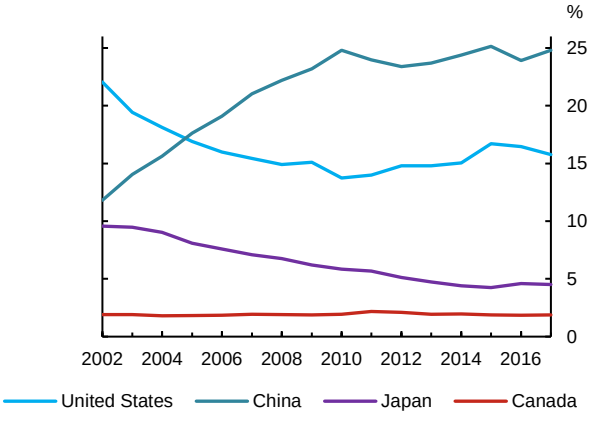
Europe (EU-28) accounted for 9 per cent of Canada's exports of non-energy goods in 2017, up from 5 per cent in 2002. Canada's market share in this category has hovered around 2 per cent (**Chart 14**). Similar to the US market, China's market share in EU-28 imports of non-energy goods has plateaued since 2010.

However, one key sector (metal and non-metallic mineral products) offsets losses made by a broad range of other sectors (**Chart 15**).[18] Losses due to shifting preferences are mostly concentrated in forestry products and building and packaging materials, while losses due to competitiveness are broad-based across sectors.

[18] Most of the growth in this sector is due to gold shipments from Canada to the United Kingdom, most likely to the London Metals Exchange (Ballingall 2012). Canada's exports of gold shipments to the United Kingdom skyrocketed from US$74 million in 2002 to peak at US$12 billion in 2012 and settle at US$9.6 billion in 2017. In 2017, this represented 3 per cent of Canadian exports of non-energy goods (and one-third of non-energy goods exports to Europe).

Chart 14: Canada's market share in Europe's imports of non-energy goods has been stable at around 2 per cent.

Share of Europe's imports, annual data

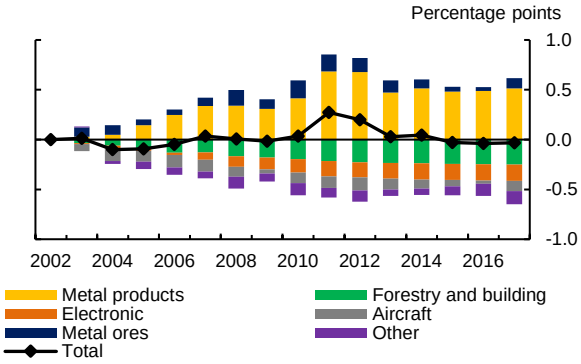


Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

Chart 15: Metal and non-metallic mineral products was the only sector significantly supporting Canada's market share for Europe's imports of non-energy goods

Decomposition of Canada's market share in Europe, annual data



Note: For example, metal and non-metallic mineral products were supporting the level of Canada's market share in Europe's imports of non-energy goods by 0.5 percentage points in 2017 relative to its level in 2002. This can be entirely attributed to gold shipments.

Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2017

At the product level, gold shipments are helping offset Canada's market share losses in other product categories, such as chemical wood pulp and electric apparatus for telephony, which are unlikely to come back. Contrary to Canada, the United States was able to more or less maintain the level of its exports of chemical wood pulp to Europe relative to 2002.[19]

3. Farming has helped Canada maintain its market share in China's imports of non-energy goods

China accounted for 5 per cent of Canada's exports of non-energy goods in 2017, up from 1 per cent in 2002. Canada's market share in China's imports of non-energy goods has hovered around 1 per cent (**Chart 16**). It should be noted that thanks to the stronger growth of China's imports of non-energy goods, the nominal value of Canada's exports to China grew from US$3 billion to US$17 billion between 2002 and 2016, or above 10 per cent per year on average.[20] In contrast to Canada, Australia has been able to almost triple its market share from 2002 to 2013 after slightly declining over 2014–16.

Chart 17 shows a decomposition of Canada's market share in Chinese imports of non-energy goods by sector. Positive competitive and preference effects in farm, fishing and intermediate food products offset competitiveness losses in a broad range of sectors, including basic and industrial chemical, plastic and rubber products, and electronic and electrical equipment and parts.[21]

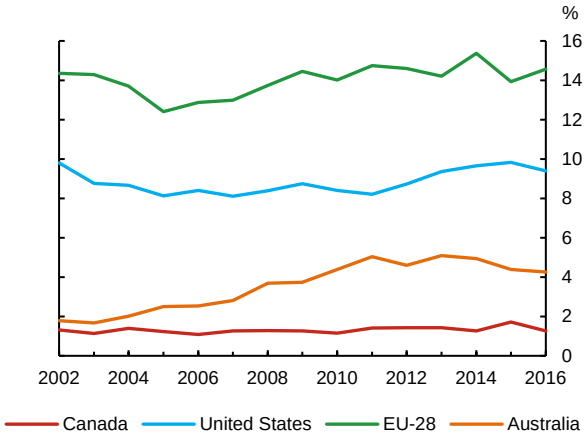
[19] This is probably due to the limited supply of harvestable lumber, which might have led large Canadian forestry products to increase their production capacity in the United States.

[20] Data on China's imports of non-energy goods for 2017 have not been released yet.

[21] Mostly through electrical apparatus for telephony (including cell phones).

Chart 16: Canada's market share in China's imports of non-energy goods has been hovering around 1 per cent

Market share of China's imports, annual data

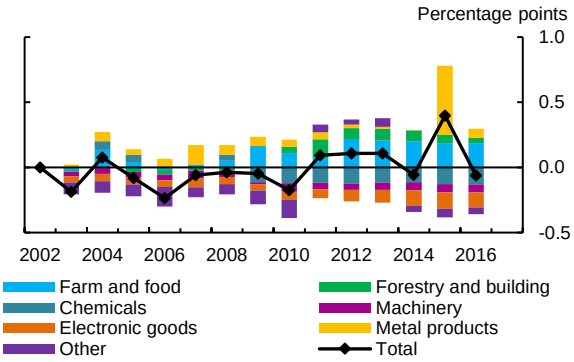


Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2016

Chart 17: Farm, fishing and intermediate food products offset losses in a broad range of sectors in China's imports of non-energy goods

Decomposition of Canada's market share in China, annual data



Note: For example, metal and non-metallic mineral products were supporting the level of Canada's market share in China's imports of non-energy goods by 0.5 percentage points in 2015 relative to its level in 2002. This can be entirely attributed to gold shipments.

Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2016

4. Could services offset Canada's losses in market shares?

Exports of services represented only 20 per cent of non-energy exports in 2017, but they accounted for one-third of the nominal growth and half of the real growth in non-energy exports from 2002 to 2017 (**Chart 18**). Given the rebalancing of the Canadian economy from the production of goods to services, doing the shift-share analysis only on non-energy goods might give an incomplete picture. Unfortunately, it appears that Canada suffers from the same competitiveness issues in services that it does in other sectors.

Despite its high human capital performance,[22] Canada has lost market share in US imports of services, while India has made significant gains (**Chart 19**). Canada's market share in US non-energy imports (including goods and services) dropped from 15 to 10 per cent between 2002 and 2016.[23] Services contributed 0.3 percentage points to this drop, including a loss of 0.4 percentage points from competitiveness and a gain of 0.1 percentage point from shifts in preferences.[24] So, while services represent a growing share of US imports, Canada is losing competitiveness in this area.

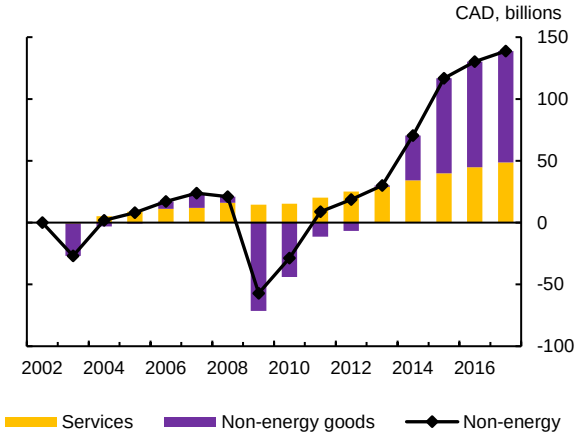
[22] According to the World Economic Forum's Global Human Capital Reporter 2017 (p. 16), Canada ranked third among G20 countries for its human capital performance.

[23] US imports of services for 2017 should be released by the end of April 2019.

[24] We found quality issues with disaggregated data for services based on the classification EBOPS 2002, so we did not conduct a shift-share analysis on the disaggregated vectors for services.

Chart 18: Exports of services represented about one-third of the nominal growth in non-energy exports from 2002 to 2017

Annual data

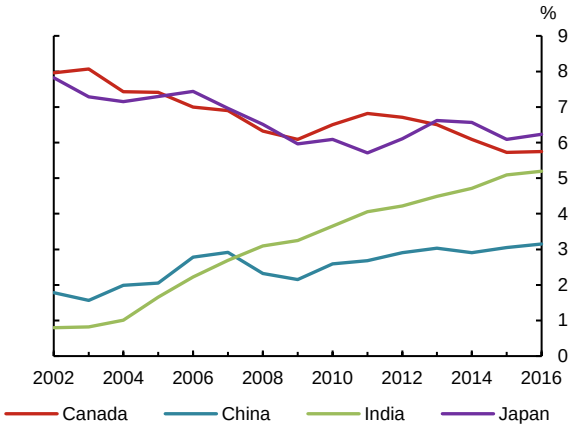


Sources: Statistics Canada and Bank of Canada calculations

Last observation: 2017

Chart 19: Canada's market share in US imports of services has gradually been eroded, while India has made significant gains

Share of US imports of services, annual data



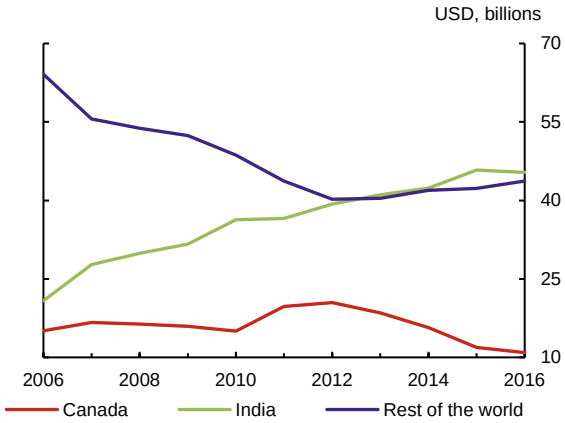
Sources: UN Comtrade and Bank of Canada calculations

Last observation: 2016

Canada is also losing ground in the provision of knowledge-based services such as computer and information services (**Chart 20**) and research and development (**Chart 21**).

Chart 20: India has benefitted from most of the growth in US imports of computer and information services while Canada's market share is declining since 2013

Annual data

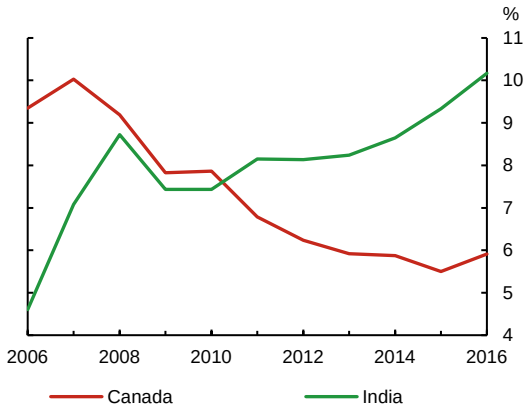


Source: UN comtrade services, computer and information services (EBOPS 2002 262)

Last observation: 2016

Chart 20: India has outpaced Canada in the provision of research and development (R&D) services to the United States since 2011

Share of US imports of R&D services, annual data



Source: UN Comtrade services, research and development (EBOPS 2002 279)

Last observation: 2016

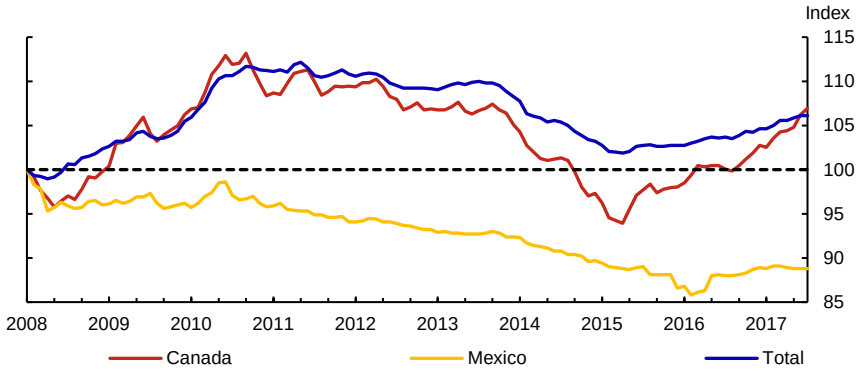
5. Reasons behind Canada's loss in competitiveness

Relative price movements are a likely candidate to explain Canada's lost competitiveness. We examine whether they can explain Canada's continued loss of competitiveness before turning to two major determinants—labour costs and the exchange rate.

The International Price Program of the US Bureau of Labor Statistics produces US import deflators across a wide range of industries and products. **Chart 22** shows deflators in manufacturing industries and highlights the improvement in Mexico's relative prices since 2008. The improvement in Mexico's prices likely explains, in part, the large gains in US imports of motor vehicles.[25] Canada's relative prices declined in 2014 with the depreciation of the Canadian dollar, but have recovered since. Two major drawbacks of this approach are the scope of industries, which may have different dynamics, and the change in the composition of the basket of imports by country throughout the sample, making the deflators less comparable.

Chart 22: The depreciation of the Canadian dollar that started in 2012 was not sufficient to compensate for higher import prices in the United States compared with Mexico relative to 2008

Deflators in the manufacturing sector, 2008M12 = 100, monthly data



Source: Bureau of Labor Statistics, International Price Program

Last observation: June 2018

We attempt to address these drawbacks by using UN Comtrade's quantity data. We take the basket of non-energy goods exchanged between Canada and the United States at the beginning of the sample in 2002 and we price it with Canadian, Mexican and Chinese prices from 2002 to 2017.[26]

Charts 23 and **24** show that this basket would have been cheaper for most of the sample using Mexican or Chinese prices relative to Canadian prices mostly due to two sectors: motor vehicles and parts and consumer goods. Therefore, relative price movements help explain Canada's competitiveness losses in motor vehicles and parts and in consumer goods, especially the important gains in market share that Mexico has made in the United States since 2010. However, the losses in competitiveness are more broad-

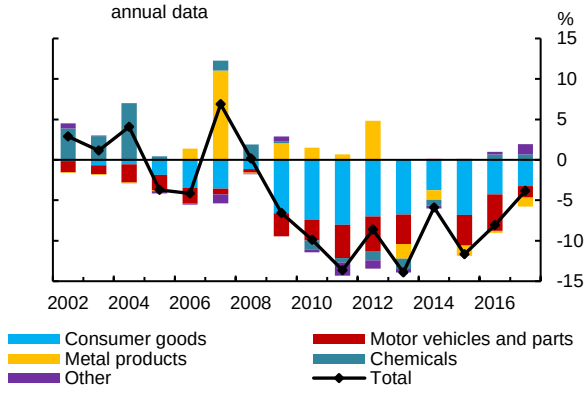
[25] Manufacturing industries include NAICS 31 to 33.

[26] This approach is equivalent to a Laspeyres index, except that the basket of goods is kept fixed not only across periods but also across countries for comparison: $P_{L,t_n}^{country} = \sum_{c=1}^{C}(p_{c,t_n} \cdot q_{c,t_0}^{Canada}) / \sum_{c=1}^{C}(p_{c,t_0} \cdot q_{c,t_0}^{Canada})$.

based across sectors (compare **Chart 5** with **Chart 23** and **Chart 24**), suggesting that relative price movements are not the only factor. Essentially, relative price movements are helpful to understand some broad movements in market shares but are not sufficient to explain Canada's continued losses extending up to 2017.[27]

Chart 23: The basket imported by the United States from Canada in 2002 would have been cheaper using Mexican prices compared with Canadian prices, mostly due to motor vehicles and parts and consumer goods

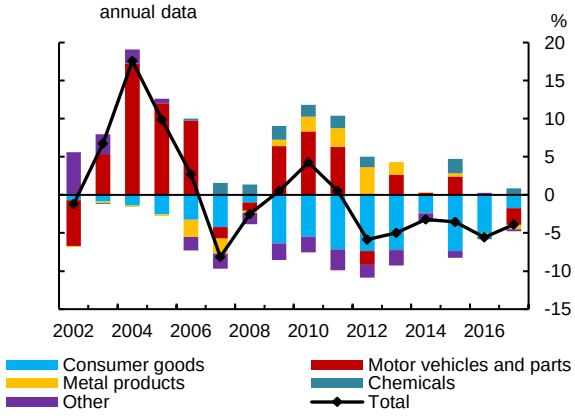
Basket imported from Canada by the United States in 2002 priced with Mexican relative to Canadian prices, annual data



Sources: UN Comtrade and Bank of Canada calculations Last observation: 2017

Chart 24: The basket imported by the United States from Canada in 2002 would have been cheaper using Chinese prices compared with Canadian prices, mostly due to consumer goods

Basket imported from Canada by the United States in 2002 priced with Chinese relative to Canadian prices, annual data



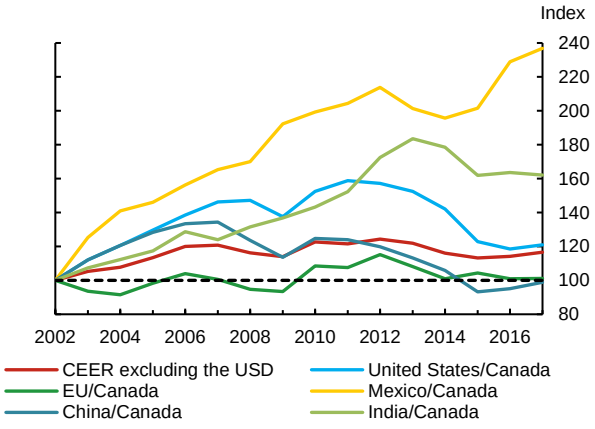
Sources: UN Comtrade and Bank of Canada calculations Last observation: 2017

Canada might have higher relative prices for its exports to the United States in part due to the exchange rate (unless products are priced in US dollars) and relative unit labour costs. The Canadian dollar has been strong relative to Canada's competitors, especially Mexico (**Chart 25**). This has not helped Canada's unit labour costs, which have increased relative to 2002. Unit labour costs have decreased in the United States and Mexico over the same period (**Chart 26**). Over 2014–17, Canada's unit labour costs have decreased, in part due to the exchange rate, but not sufficiently to halt competitiveness losses accumulated since 2002.

[27] This analysis is subject to several caveats: (1) The sample must reject about 75 per cent of the nominal value of US imports of non-energy goods from Canada due to data limitations for quantities. (2) Quantity data from UN Comtrade do not take into account quality improvements. (3) UN Comtrade includes products at the HS six-digit level, whereas eight or ten digits might be necessary to obtain prices with sufficient precision. (4) Transfer pricing might distort prices observed at customs, which is our proxy for production costs by region. For example, PricewaterhouseCoopers (2006, p. 4) discusses a case study in the automotive industry in which Mexican suppliers had to adjust their pricing to "set the appropriate profits for Mexico and [ensure] that the value for services and marketing intangibles were properly captured in the U.S." (5) Finally, the integrated value chains might make Canada's exports cheaper if they rely on cheap imports, hiding the marginal costs of Canada's added value, which this analysis does not capture.

Chart 25: Canada's currency has appreciated more than most of its competitors relative to 2002

Foreign currency over Canadian dollar, 2002 = 100, annual data



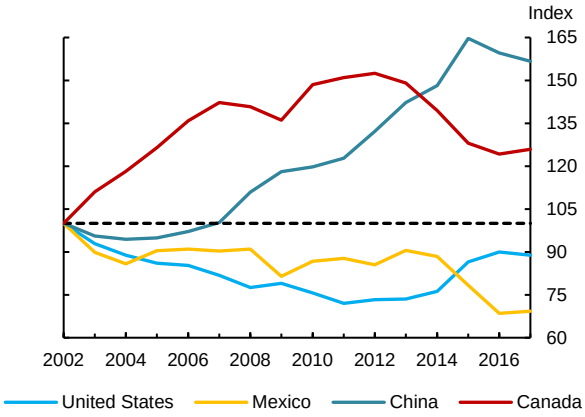
Note: CEER is the Canadian effective exchange rate

Sources: Haver analytics and Bank of Canada calculations

Last observation: 2017

Chart 26: Canada's unit labour costs have increased more than Mexico's and the United States' relative to 2002

Unit labour costs, 2002 = 100, annual data



Note: the relative unit labour costs were calculated using real US dollars

Source: Organization for Economic Cooperation and Development via Haver Analytics

Last observation: 2017

Beyond relative prices, Del Gatto et al. (2011) and Mandel (2012) employ gravity-type regression models to bilateral trade flow. They find that country characteristics, such as size relative to the world, membership in trade agreements and fixed effects (to account for gravity measures such as distance or other unobservable trade cost factors), can explain a significant part of the dynamics of a country's global share of exports. The unexplained part from such an exercise contains information about the relative measure of competitiveness. Mandel (2012) points to one caveat: cross-border production sharing might contribute to more extreme gains and losses of relative productivity, since a country using more foreign inputs will obtain a higher share of world exports for the same unit of output. The shift-share analysis presented above did not control for these factors, which we leave to future work.

6. Conclusion

In this paper, we updated and expanded the shift-share analysis of Barnett and Charbonneau (2015) to decompose the movements in Canada's market share in US, European and Chinese imports of non-energy goods and in US imports of services. We make three observations that raise concerns for Canada's competitiveness:

1. Over 2014–17, Canada continued to lose market share in US imports of non-energy goods despite the depreciation of the Canadian dollar. Although motor vehicles and parts is a key contributor to the total losses in market share and competitiveness, especially in 2017, competitiveness losses are widespread across sectors.
2. Canada's market shares in European and Chinese imports of non-energy goods have been roughly stable from 2002 onward. However, in each case, one key sector offsets competitiveness losses in a broad range of sectors, which may pose a risk in the future.

3. For US imports of services, Canada faces stiff competition from emerging markets such as India, even in advanced sectors such as computer and information services.

We turned to relative prices to try to explain Canada's continued losses in US imports of non-energy goods extending up to 2017 and found that relative price movements are helpful but not sufficient to understand some broad movements in market shares. Future work should consider a broader set of variables to understand the drivers behind Canada's competitiveness losses, such as its size relative to the world and the ease of doing business. Controlling for cross-border production sharing might also help to get a better assessment of Canada's competitiveness relative to other countries.

References

Ballingall, A. 2012. "The British Are Coming—for Our Gold." *Maclean's,* April 26.

Barnett, R. and K. B. Charbonneau. 2015. "Decomposing Movements in U.S. Non-Energy Import Market Shares." Bank of Canada Staff Discussion Paper No. 2015-5.

Barnett, R., K. B. Charbonneau and G. Poulin-Bellisle. 2016. "A New Measure of the Canadian Effective Exchange Rate." Bank of Canada Staff Discussion Paper No. 2016-1.

Brouillette, D., J. Dorich, C. D'Souza, A. Gagnon and C. Godbout. 2018. "What Is Restraining Non-Energy Export Growth?" Staff Analytical Note No. 2018-25.

Del Gatto, M., F. di Mauro, J. W. Gruber and B. R. Mandel. 2011. "The Revealed Competitiveness of U.S. Exports." International Finance Discussion Papers 1026, Board of Governors of the Federal Reserve System (U.S.).

Mandel, B. R. 2012. "Why Is the U.S. Share of World Merchandise Exports Shrinking?" Federal Reserve Bank of New York *Current Issues in Economics and Finance* 18 (1): 1–9.

PricewaterhouseCoopers. 2006. "Transfer Pricing in the Automotive Industry."

World Economic Forum (WEC). 2017. "The Global Human Capital Report 2017—Production Capacity Management and Transfer Pricing Economics."

Appendix 1: Methodological background on the shift-share analysis

Following Barnett and Charbonneau (2015), we use the UN Comtrade data set, which covers more than 5,200 individual products at the HS six-digit level based on the HS 2002 classification.

The standard shift-share analysis decomposes the movement of country *c*'s market share in the imports of a given country (e.g., the United States) between two years (i.e., *t* and *t-1*) into three effects: competitiveness, preference and interaction.[28]

$$\Delta MS_t^c = \underbrace{\sum_{k=1}^{K} sh_{t-1}^k * \Delta MS_t^{c,k}}_{competitiveness} + \underbrace{\sum_{k=1}^{K} \Delta sh_t^k * MS_{t-1}^{c,k}}_{preference} + \underbrace{\sum_{k=1}^{K} \Delta sh_t^k * \Delta MS_t^{c,k}}_{interaction} \quad \text{(A1.1)}$$

where sh_t^k = the share of good *k* in total imports

$MS_t^{c,k}$ = the market share of country *c* in the total imports of good *k*

By adding the first differences over time (equations A1.2 and A1.3), we can decompose the difference in market shares between any two points in time.

$$MS_t^c - MS_{t-i}^c = \sum_{j=0}^{i-1} \Delta MS_{t-j}^c \quad \text{(A1.2)}$$

$$MS_t^c - MS_{t-i}^c = \sum_{j=0}^{i-1} \Delta Competitiveness_{t-j}^c + \sum_{j=0}^{i-1} \Delta Preference_{t-j}^c + \sum_{j=0}^{i-1} \Delta Interaction_{t-j}^c \quad \text{(A1.3)}$$

Appendix 2: Sectors by NAPCS 2007

Sector referred to in the charts	NAPCS 2007
Aircraft	C21 Aircraft and other transportation equipment and parts
Chemicals	C15 Basic and industrial chemical, plastic and rubber products
Consumer	C22 Consumer goods
Electronic	C18 Electronic and electrical equipment and parts
Farm and food	C11 Farm, fishing and intermediate food products
Forestry and building	C16 Forestry products and building and packaging materials
Machinery	C17 Industrial machinery, equipment and parts
Metal ores	C13 Metal ores and non-metallic minerals
Metal products	C14 Metal and non-metallic mineral products
Motor vehicles and parts	C19 Motor vehicles and parts

Source: Statistics Canada NAPCS 2007 classification.

[28] The interaction term captures, for example, the offset caused by losing competitiveness in a product that constitutes a lower share of total imports.

Appendix 3: Product categories by HS code

Product category referred to in the text	HS code	Description
Articles of precious metals	HS 711590	Articles of precious metal or of metal clad with precious metal, others
Bovine meat	HS 020110	Carcasses/half-carcasses of bovine animals, fresh/chilled
	HS 020120	Meat of bovine animals, fresh/chilled (excl. of 0201.10), bone-in
	HS 020130	Meat of bovine animals (boneless, fresh or chilled)
	HS 020210	Carcasses/half-carcasses of bovine animals, frozen
	HS 020220	Meat of bovine animals, frozen (excl. of 0202.10), bone-in
	HS 020230	Meat of bovine animals, frozen, boneless
	HS 020610	Edible offal of bovine animals, fresh/chilled
	HS 020621	Tongues of bovine animals, frozen
	HS 020622	Livers of bovine animals, frozen
	HS 020629	Edible offal of bovine animals (excl. tongues and livers), frozen
	HS 021020	Meat of bovine animals, salted/in brine/dried/smoked
	HS 160250	Prepared/preserved preps. of bovine animals (excl. homogenized preps.)
	HS 410120	Whole bovine (incl. buffalo)/equine hides and skins, wt. per skin not >8kg
	HS 410150	Whole bovine (incl. buffalo)/equine hides and skins, wt. >16kg(fresh/salted/d)
Chemical wood pulp	HS 470311	Wood pulp; chemical wood pulp, soda or sulphate, (other than dissolving grades), unbleached, of coniferous wood
	HS 470319	Wood pulp; chemical wood pulp, soda or sulphate, (other than dissolving grades), unbleached, of non-coniferous wood
	HS 470321	Wood pulp; chemical wood pulp, soda or sulphate, (other than dissolving grades), semi-bleached or bleached, of coniferous wood
	HS 470329	Wood pulp; chemical wood pulp, soda or sulphate, (other than dissolving grades), semi-bleached or bleached, of non-coniferous wood
Electrical apparatus for line telephony	HS 8517	Telephone sets, including telephones for cellular networks or for other wireless networks; other apparatus for the transmission or reception of voice, images or other data
Gold shipments	HS 710811	Gold shipments include gold, non-monetary, powder
	HS 710812	Gold, non-monetary, unwrought (but not powder)
	HS 710813	Gold, semi-manufactured
	HS 710820	Gold, monetary
Light petroleum oils and preparations	HS 271011	Light petroleum oils and preparations
Newsprint	HS 480100	Newsprint in rolls or sheets
Packaged medicine	HS 300490	Packaged medicine for retail

Particle board	HS 4410	Particle board and similar board of wood
Parts and accessories for motor vehicles	HS 870899	Parts and accessories for motor vehicles, others
Passenger vehicles	HS 870321	Micro cars
	HS 870322	Small sized cars
	HS 870323	Medium sized cars
	HS 870324	Large sized cars
	HS 870331	Small diesel engine cars
	HS 870332	Medium diesel engine cars
	HS 870333	Large diesel engine cars
	HS 870390	Other vehicles including gas turbine powered
Sawn lumber	HS 4407	Wood sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end jointed, of a thickness exceeding 6 mm
Silver shipments	HS 710610	Silver powder
	HS 710691	Silver (including silver plated with gold/platinum), unwrought
	HS 710692	Silver (including silver plated with gold/platinum), in semi-manufactured forms
Small trucks of less than 5 metric tons	HS 870431	Motor vehicles for goods transport with spark-ignition internal combustion piston engine, gross vehicle weight not over 5 metric tons
Structures and parts of iron or steel	HS 730890	Iron and steel parts other than for bridges, towers, doors, windows and equipment for scaffolding, etc.
Uncoated paper and paperboard	HS 480261	Uncoated paper and paperboard
Wooden furniture	HS 940330	Wooden furniture of a kind used in offices
	HS 940350	Wooden furniture of a kind used in the bedroom
	HS 940360	Wooden furniture (excl. of 94.01 and 9403.30-9403.50)
Wooden furniture for kitchen (classified in building and packaging materials)	HS 940340	Wooden kitchen furniture, except seats