

THE CANADIAN DOLLAR AND THE DUTCH AND CANADIAN DISEASES*

Serge Coulombe[†]

Department of Economics, University of Ottawa

SUMMARY

With the spectacular rise of the dollar, along with rising natural-resource prices during the first decade of the 21st century, Canadians heard a great deal about Dutch disease. Many politicians and pundits blamed the phenomenon — in which a country's currency, inflated by rising commodity prices, renders manufacturing exports increasingly uncompetitive — for rising unemployment in the Canadian manufacturing industry. But a close look at what happened during that period reveals that the Dutch disease mechanism was only part of the story. The other part, and quantitatively the most important, is an affliction of an altogether different providence: Canadian disease.

Canadian disease is the economic trouble that can be caused by Canada's extraordinarily heavy reliance on the United States as a trading partner. As a consequence, a sudden depreciation of the U.S. dollar will deteriorate the competitiveness of Canadian manufacturing exporters. Such a phenomenon was at work during the "Great Appreciation" of the Canadian dollar between 2002 and 2008 — the largest such appreciation on record in this country. The depreciation of the U.S. dollar is a phenomenon that is independent of the resource boom and the resulting consequences on the Canadian economy cannot be endorsed to a Dutch disease. Almost 2/3 of the employment losses that are exchange rate related in the trade-exposed manufacturers in Canada during the 2002–2008 period could be attributed to the Canadian disease.

The Canadian dollar is partly driven by commodity prices, and the appreciation of the Canadian dollar exerts a negative impact on manufacturing industries that are exposed to international competition. This phenomenon can be coined as a Dutch Affair. The Dutch Affair becomes a disease in the long run when the non-renewable resource is depleted and the manufacturing base is gone. New manufacturing activities might not reappear due to a variety of obstacles. In Canada, we may only have a Dutch Affair, not Dutch disease. Only the future, however, will reveal if the Affair is likely to become a disease.

In the short- and medium-run, the net effect of the commodity boom is clearly positive. However, a commodity boom is a phenomenon analogue to a change in terms of trade and it creates winners and losers that are not necessarily located in the same geographic area. The high level of decentralization of the Canadian federation and the growth of natural resources as a share of Canadian exports heighten our vulnerability. Enhancing the working of the fiscal federalism might well be the most efficient policy strategy in the short- and the medium-run in order to adequately share the benefits of the boom.

The economy does remain particularly vulnerable to Canadian disease, despite a slight recent increase in the diversification of Canadian export markets. The reality is that Canada remains closely tied to the U.S. market by virtue of geography, and therefore, is drawn by the pull of trade "gravity". It will be difficult for Canada to diversify its export markets sufficiently to immunize itself against Canadian disease.

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LE DOLLAR CANADIEN ET LE SYNDROME HOLLANDAIS AU CANADA*

Serge Coulombe[†]
Département d'économie, Université d'Ottawa

RÉSUMÉ

Étant donné la hausse spectaculaire du dollar et des prix des ressources naturelles au cours de la première décennie du 21^e siècle, les Canadiens ont beaucoup entendu parler du syndrome hollandais. Bon nombre de politiciens et d'experts ont imputé la hausse du chômage dans l'industrie manufacturière au Canada à ce phénomène – qui se produit quand la devise d'un pays, gonflée par le prix des produits de base, nuit sensiblement au caractère concurrentiel des exportations dans le secteur de la fabrication. Mais en examinant de plus près la situation durant cette période, on s'aperçoit que le mécanisme du syndrome hollandais ne constitue qu'un aspect du problème. L'autre aspect, quantitativement le plus important, porte sur une atteinte d'une tout autre nature : le mal canadien.

Ce mal se définit comme la tourmente économique que peut entraîner l'extraordinaire dépendance du Canada envers les États-Unis en tant que partenaire commercial. Par conséquent, une dépréciation soudaine du dollar US aura pour effet de nuire à la compétitivité des exportateurs canadiens de biens manufacturés. Nous avons assisté à un phénomène de ce type durant la « grande appréciation » du dollar canadien entre 2002 et 2008 – la plus substantielle du genre dans toute l'histoire du Canada. La dépréciation du dollar US est tout à fait indépendante du boom dans le secteur des ressources, et les conséquences qui en découlent sur l'économie canadienne ne peuvent pas être assimilées à un syndrome hollandais. Au Canada, dans l'industrie manufacturière exposée à la concurrence durant la période 2002-2008, près des deux tiers des pertes d'emplois ayant un lien avec les taux de change seraient attribuables au mal canadien.

La valeur du dollar canadien est en partie déterminée par le prix des produits de base, et son appréciation a des répercussions négatives sur les secteurs de la fabrication vulnérables sur le plan des échanges internationaux. On peut alors parler d'une « affaire hollandaise ». Celle-ci devient un « syndrome » tôt ou tard quand les ressources non renouvelables sont épuisées et que le secteur manufacturier n'a plus de base sur laquelle s'appuyer. De nouvelles activités de fabrication pourraient ne jamais surmonter un certain nombre d'obstacles. Au Canada, nous serions aux prises avec une « affaire hollandaise » et non le « syndrome hollandais ». Seul l'avenir nous dira si l'affaire deviendra syndrome.

À court et à moyen termes, il ne fait aucun doute que le résultat net du boom dans le secteur des produits de base est positif. Toutefois, ce type de boom constitue un phénomène analogue à une mutation dans les conditions des échanges commerciaux et il engendre des gagnants et des perdants qui ne partagent pas nécessairement le même territoire géographique. La grande décentralisation de la fédération canadienne et la croissance des ressources naturelles en tant que part des exportations du pays augmentent notre vulnérabilité. L'amélioration du fonctionnement du fédéralisme fiscal pourrait bien être la stratégie la plus efficace, politiquement parlant, à court et à moyen termes, pour assurer le partage adéquat des gains de ce boom.

L'économie demeure particulièrement vulnérable au mal canadien malgré une légère hausse récente dans la diversification des marchés canadiens de l'exportation. En fait, le Canada demeure étroitement lié au marché des États-Unis en raison de la géographie et par conséquent, il subit les effets de la « gravitation » commerciale. Le Canada aura du mal à diversifier suffisamment ses marchés d'exportation pour s'immuniser contre le mal canadien.

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[†] Je suis redevable aux coauteurs Michel Beine de l'Université du Luxembourg et à Charles Bos de l'Université libre d'Amsterdam (VU). Bon nombre des commentaires et analyses présentés dans ce document ont été élaborés conjointement au cours de la période de recherche en vue de la préparation de l'article de M. Beine, C. Bos et S. Coulombe, intitulé « Does the Canadian Economy Suffer from Dutch Disease? » *Resource and Energy Economics*, vol. 34, no 4 (2012). Je souhaite aussi remercier l'éditeur, Michal Moore, et deux lecteurs anonymes dont les commentaires ont permis d'améliorer cet article.

INTRODUCTION

In January 2002, the bilateral exchange rate of the Canadian dollar reached a historic low of US\$0.625. The “flying” loonie¹ took off thereafter and reached a historic high of \$US1.10 on November 7, 2007. The Canadian dollar returned to parity shortly thereafter. With the outbreak of the global financial crisis, it experienced periodic volatility, recovering from a precipitous dive below US\$0.80 following the bankruptcy of Lehman Brothers. It closed back near parity at the end of 2010. During the 2002 to 2008 “Great Appreciation” period, the Canadian dollar experienced its largest appreciation on record.

Large exchange-rate swings have real economic consequences for a small, open economy such as Canada’s. As for any changes in terms of trade, the potential exists to create significant winners and losers. From an exchange-rate point of view, the case of Canada is particularly interesting. It is a well-developed economy with an industrial core adjacent to the northeast industrial core in the United States. Canada is also a major exporter of a diverse basket of energy and non-energy commodities.

The purpose of this paper is to analyze the relationship between exchange-rate variations and economic activities in the resource and manufacturing sectors in Canada. The key ingredients of my analysis are based on models and empirical analyses derived primarily from the core-periphery model of Krugman,² the Dutch-disease model of Corden and Neary,³ and the empirical analysis of Beine, Bos, and Coulombe⁴ (referred to hereafter as BBC).

The analysis provided in this paper adds one critical dimension to the current debate in Canada regarding Dutch disease. In the spirit of BBC,⁵ I show that part of the appreciation of the Canadian bilateral exchange rate (hereafter referred to as CAD) during the Great Appreciation can potentially lead to a condition of Dutch disease induced by upward pressures in commodity prices (energy and non-energy). Another substantial portion of the Great Appreciation was caused by the depreciation of the U.S. dollar in international markets between 2002 and 2005. This depreciation is not directly related to Dutch disease but results from the fact that the market destination of Canadian exports is not diversified (i.e., Canadian exports are primarily destined for U.S. markets). Canada’s exports are still highly dependent on the United States and idiosyncratic shocks to the U.S. dollar exert an influence on the Canadian economy. In the following analysis, I refer to this phenomenon as the “Canadian disease.”

¹ The Canadian dollar is frequently called the loonie. It takes its name from the Northern Loon (a common duck in Canada) that appears on the reverse side of Queen Elizabeth II on the one-dollar coin. According to Wikipedia, the species is also known as the Great Northern Diver.

² Paul Krugman, *Geography and Trade* (Cambridge, Mass.: MIT Press, 1991).

³ W. M. Corden and J.P. Neary, “Booming sector and de-industrialisation in a small open economy,” *Economic Journal* 92, 368 (1982) 825–848.

⁴ M. Beine, C. Bos and S. Coulombe, “Does the Canadian Economy Suffer from Dutch Disease?” *Resource and Energy Economics* 34, 4 (2012): 468–92.

⁵ *ibid.*

In the next section, I apply the core-periphery model to Canada and briefly highlight the Dutch-disease model. In the section following, I show that, generally speaking, the appreciation of the CAD tends to stabilize the economy of the Canadian periphery and destabilize the economy of the core. I add a dimension to the debate with the use of the Canadian component and the U.S. components of the CAD following BBC⁶ in a subsequent section of this paper. Here, I also present an update of the two components from 2008 to the present. The new data illustrate that the sharp reaction of the Canadian dollar following the bankruptcy of Lehman Brothers was essentially due to a temporary appreciation of the U.S. component. In the final section of this paper, I show that most of the losses of the Canadian trade-exposed manufacturers between 2002 and 2008 — a period that I refer to as the Great Appreciation of the CAD — can be attributed to both Dutch disease and Canadian disease.

TWO MODELS: CORE-PERIPHERY AND DUTCH DISEASE

In his celebrated *Geography and Trade*, published in 1991 (the leading contribution recognized by the Royal Swedish Academy of Sciences for the 2008 Nobel Prize), Paul Krugman used Canada as an illustration of the core-periphery model. The economic-geography model is built from the interaction between economies of scale and transportation costs. Economies of scale imply that the production of manufacturing goods (and some services), that are able to travel through space by trade, tends to concentrate in an industrial and urbanized core. The industrial core should be well-located in such a way that transportation costs are minimized. Goods with very high transportation costs tend to be produced and consumed locally. Extraction of natural resources, agriculture, farming and fishing will also be produced in the periphery, close to the resources used. A decrease in transportation costs due to technological progress tends to increase agglomeration forces.

History is also a dominant force in determining the location of the core because of economies of scale. Krugman⁷ mentions that Sir John A. Macdonald's national policy, enforced after 1879, was the key industrial policy that geographically shaped the economy of Canada. High tariffs on imported manufacturing goods were imposed and the federal government supported the construction of a national railway. The first result was to divert trade between the natural axis between Eastern Canada and the industrial core of northeastern United States, to an artificial east-west axis. The second result was the creation of a country with an industrial core located at the centre between Quebec City and Windsor, Ontario. After the Second World War, reflecting strong economies of scale, the Canadian core was large enough and sufficiently well-located to prosper in the context of the successive tariff reductions from GATT, WTO, and North American free-trade integration.

I have used the core-periphery model in my earlier publications to describe Canadian regional economies.⁸ This provides an essential base for examining and understanding the economy of Canada. It is often said that geography matters. The location of Canada's industrial core is closer to the United States than it is to the Canadian periphery and reflects those dominant regional characteristics.

⁶ *ibid.*

⁷ Krugman, *Geography and Trade*, 90–92.

⁸ See for example: S. Coulombe, "Economic Growth and Provincial Disparity — A New View of an Old Canadian Problem," C.D. Howe Institute Commentary 122, 1999.

The other theoretical ingredient of this analysis is the Dutch-disease model of Corden and Neary.⁹ The model is an open-economy, static model with three sectors: the resource, the manufacturing and the non-trade (service) sectors. Resources and manufactured goods are exported in international markets and the producers are price-takers.

In the model, a resource windfall will drive the real exchange rate of the economy up and will crowd-out manufacturing exports. The windfall will also increase the relative size of the non-trade sector.

The Dutch-disease model that I employ for the Canadian case is more complete than Corden and Neary's model. It includes, for example, the effect of foreign direct investment in the natural resource sector on the exchange rate.¹⁰ The volatility argument used in the next section of this paper can be viewed as a version of Dutch disease.

The crowding-out effect of trade-exposed manufacturing from a resource boom is well documented on theoretical and empirical grounds (see the final section of this paper). I refer to this phenomenon as the Dutch Affair. As Krugman¹¹ put it, the Dutch Affair becomes a disease when the non-renewable resource is depleted and the manufacturing base is gone. The economy might be left with nothing, effectively becoming a "ghost town." New manufacturing activities might not reappear due to obstacles involving economies of scale and learning-by-doing.

In the last section of this paper, I show that the necessary conditions for Dutch disease do exist in Canada, but that we may only have a Dutch Affair, not Dutch disease. Only the future, however, will reveal if the Affair is likely to become a disease.

THE FLUCTUATIONS OF THE CAD ARE STABILIZING THE PERIPHERY AND DESTABILIZING THE CORE

In the next section, I show, following the analysis of BBC,¹² that the CAD can be decomposed into a Canadian and a U.S. component. In the current section, I abstract from this complication and present, in its simplest form, the relationship between the CAD and the core-periphery structure.

Since the empirical work of Amano and van Norden,¹³ the Bank of Canada has used an exchange-rate equation where the CAD was determined by the price of commodities and the

⁹ Corden and Neary, "Booming sector and de-industrialisation in a small open economy."

¹⁰ See, for example, the section on Dutch disease 101 and 401 in: R. Boadway, S. Coulombe, and J.F. Tremblay, "The Dutch Disease and the Canadian Economy: Challenges for Policy-Makers," Prepared for the Conference in Celebration of Thomas J. Courchene: Thinking Outside the Box, Queen's University, forthcoming School of Policy Studies, Queen's University, 2013.

¹¹ Paul Krugman, "The Narrow Moving Band, the Dutch Disease, and the Competitive Consequences of Mrs. Thatcher: Notes on Trade in the Presence of Dynamic Scale Economies," *Journal of Development Economics* 27, 1-2 (1987) 41-55.

¹² Beine, Bos and Coulombe, "Does the Canadian Economy Suffer from Dutch Disease?"

¹³ R. Amano and S. van Norden, "Terms of Trade and Real Exchange Rates: The Canadian Evidence," Bank of Canada Working Paper No. 93-3, 1993.

interest-rate differential between Canada and the United States.¹⁴ Over the years, researchers from the bank produced numerous dynamic simulations of their primary equation illustrating that variations of the CAD was mainly determined by changes in commodity prices. I use this relationship to examine the consequences from a stabilization point of view on the economies of the core and the periphery. As a primary supposition, I assume that an increase (or, conversely, a decrease) in the price of oil generates an appreciation (or, a depreciation in the case of an oil-price decrease) of the CAD.

To begin, it is easier to rely on a single, good model per sector. For illustration, I assume that the periphery produces oil and the core produces automobiles. Both are partly sold in international markets and Canadian producers are price-takers in U.S. dollars in both markets. I also assume that producers in the periphery and the core do not import intermediate inputs. We can now analyze what happens to the “stylized” Canadian core and periphery if an exogenous force, such as an increase in political instability in the Middle East, initiates a substantial increase in the price of oil that is then observed in international markets.

In the Canadian periphery, revenues in U.S.-dollar-per-barrel-of-oil sold on international markets go up. However, with the appreciation of the CAD, the increase in Canadian-dollar-revenues-per-barrel is less pronounced than in the case of the U.S. dollar — i.e., producers in the periphery receive more U.S. dollars for their product but the U.S. dollar is now worth less in Canadian dollars. Of course, we can observe the reverse phenomenon when the price of oil decreases in international markets. Canadian producers receive fewer U.S. dollars per barrel, but the U.S. dollar is now worth more than before in Canada thanks to the depreciation of the CAD. The decrease in revenues-per-barrel in Canadian dollars becomes less important than the decrease in revenues measured in U.S. dollars. For Canadian producers, the stability of the income stream in Canadian dollars matters, since their production costs are paid in Canadian dollars.

This analogy could be extended to all energy and non-energy commodities that are produced in the Canadian periphery, including agricultural products, potash and minerals. As long as the CAD is positively correlated with the prices of these commodities, the economic activity in the periphery is effectively stabilized by the fluctuations of the CAD.

The stabilizing role of CAD fluctuations in the periphery was at the centre of the analysis of Beine and Coulombe.¹⁵ Based on the share of primary products in provincial total exports and the correlation of economic activity between the Canadian provinces and the United States, Beine and Coulombe argued that Alberta and Saskatchewan were the two provinces that benefitted the most from CAD fluctuations. Current assumptions based on these results should add Newfoundland and Labrador to the list, given the importance of its oil exports in the last 15 years.

In the Canadian core, however, the fluctuations of the CAD tend to destabilize economic activities. When the price of oil in the stylized Canadian economy increases in international markets, the appreciation of the CAD decreases the competitiveness of firms such as automobile exporters in the core. If all their costs of production are in Canadian dollars (as I

¹⁴ To be more precise it is the real exchange rate that entered the Amano and van Norden exchange-rate equation as well as for the BBC analysis. The real exchange rate includes the inflation differential between Canada and the United States. I abstract from this complication since this differential has not been a determinant factor in the last decades.

¹⁵ M. Beine and S. Coulombe, “Regional Perspectives on Dollarization in Canada,” *Journal of Regional Science* 43, 3 (2003): 541–70.

assumed in the stylized model), they will receive fewer Canadian dollars per car exported because their price is fixed in U.S. dollars. This mechanism is at the centre of the Corden and Neary¹⁶ analysis of Dutch disease. A resource boom in an economy is effectively crowding out the activities of trade-exposed manufacturing industries.

Conversely, when the price of oil goes down in the international market, the depreciation of the CAD provides an arbitrary stimulation of economic activities in the Canadian core. The competitiveness of automobile exporters is inevitably increased by this favourable development.

This analysis applies to all manufactured goods produced in the Canadian core that are sold in international markets. CAD fluctuations that are induced by commodity-price movements are destabilizing the economy of the Canadian core.¹⁷ Beine and Coulombe¹⁸ argued that the two Canadian provinces that were the most penalized by the destabilizing effect of CAD fluctuations were Ontario and Quebec. The economic activity in these two provinces was highly correlated with the U.S. business cycle (contrary to Alberta and Saskatchewan) and exports of primary products accounted for a very small share of their exports. They concluded that the economy of these two provinces would be better served, from a macroeconomic stabilization point of view, if they would use the U.S. dollar as a reference, since it is not correlated with commodity prices. I return to this point in the conclusion.

It is worthwhile to point out that the stabilizing and the destabilizing mechanisms would be reduced, but never eliminated, if exporters use imported intermediary inputs. The effect of the fluctuations of the CAD on the cost of inputs will partly offset the effect on export revenues. Finally, it is important to add that, due to the inelasticity of supply in the short run, prices of commodities are more volatile than the prices of manufactured goods or services in general. Consequently, the potential for stabilization (periphery) and destabilization (core) is high.

DIGGING DEEPER: THE CANADIAN AND THE U.S. COMPONENT

The Bank of Canada's real-exchange-rate model was taken for granted in the earlier section.¹⁹ The shortcoming of this approach is that both the CAD and the prices of energy and non-energy commodities are measured in U.S. dollars in international markets, as well as in the Bank of Canada's equation. Consequently, idiosyncratic shocks to the U.S. dollar, which BBC²⁰ defined as the "U.S. component," affect both the CAD (which is on the left-hand side of the exchange-rate equation) and the prices of energy and non-energy commodities (which stand on the right-hand side).

¹⁶ Corden and Neary, "Booming sector and de-industrialisation in a small open economy."

¹⁷ I had the occasion to explain the analysis of Beine and Coulombe ("Regional Perspectives on Dollarization in Canada") to Robert Mundell shortly after its publication. He told me that the destabilizing action of the CAD on the manufacturing core in Canada might be viewed as some sort of Dutch disease.

¹⁸ Beine and Coulombe, "Regional Perspectives on Dollarization in Canada."

¹⁹ For recent updates and analyses using the Bank of Canada exchange-rate equation, refer to: J. Bailliu and M.R. King, "What Drives Movements in Exchange Rates?" *Bank of Canada Review* (Autumn, 2005) 27-39; and P. Maier and B. DePratto, "The Canadian Dollar and Commodity Prices: Has the Relationship Changed Over Time?" Bank of Canada Discussion Paper 2008-5, 2008.

²⁰ Beine, Bos and Coulombe, "Does the Canadian Economy Suffer from Dutch Disease?"

The key contribution of BBC is the recognition that the CAD provides a relative price: the price of the Canadian dollar compared to the price of the U.S. dollar.²¹ According to their terminology, the price of the Canadian dollar is the “Canadian component” and the price of the U.S. dollar is the “U.S. component.” The CAD is the ratio between both components. BBC also produced components for the prices of energy and non-energy commodities.

The Canadian component captures exchange-rate fluctuations that are related to changes in Canadian exports and imports. Capital inflows and outflows in or from Canada, and Canadian monetary policy also potentially affect the Canadian component. From the perspective of the CAD, the U.S. component reflects changes in the exchange rate that originate specifically in the U.S. economy. It is determined by idiosyncratic shocks to the U.S. dollar, such as changes in monetary policy. BBC show that movements of the Canadian component are unambiguously determined by energy and non-energy commodity prices, whereas movement of the U.S. component are not.

The CAD is depicted in Figure 1 using monthly data for the post-Bretton-Woods era (1972 to March of 2013). The Canadian and the U.S. components are depicted in Figure 2 for the same period. Between 1972 and 2007, inclusive, the data are the same as those used in BBC.²²

FIGURE 1: CANADIAN BILATERAL (US) EXCHANGE RATE (1972:1 TO 2013:4)

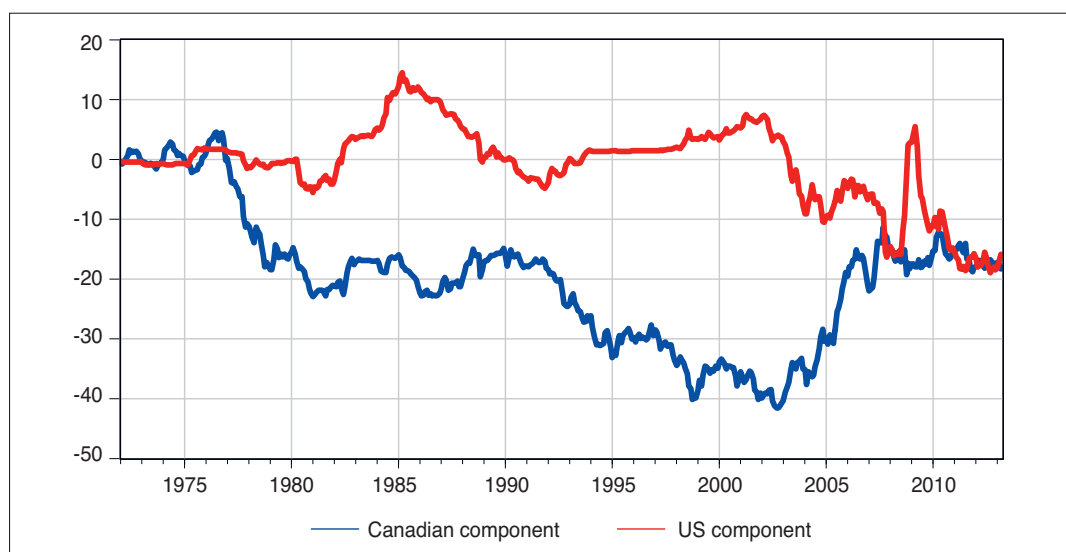


Note: Monthly data CANSIM series number v37426

²¹ To my knowledge, the point on relative price was first made by Don Drummond in his comments on BBC (“Does the Canadian Economy Suffer from Dutch Disease?”) at the State of the Federation 2012 Conference organized by the Institute of Intergovernmental Relations at the School of Policy Studies, Queen’s University, held in Kingston, Ont., November 30, 2012.

²² The components since 2008 are new estimates kindly provided by my co-author, Charles Bos, from VU University Amsterdam.

FIGURE 2: THE CANADIAN AND THE US COMPONENTS (1972.1 TO 2013.4)



Note: Monthly data estimated and provided to the author by Charles Bos, VU University, Amsterdam on April 19, 2013. On the left scale, both components were normalized to zero in 1972:1. Left axis refers to difference in cents. For example, in 2002:10, the Canadian component was 42 cents lower than in 1972:1. For more details refer to Beine, Bos, and Coulombe (2012).

From a peak of US\$0.88 in October of 1991, the CAD followed a depreciating trend in the following years and reached an all-time low of US\$0.625 in February 2002. Since then, the CAD had gone through the most important appreciating phase in its history — the Great Appreciation — to reach US\$1.03 in November 2007.²³ The most recent period is characterized by the sudden and a sharp depreciation of the CAD following the outbreak of the financial crisis at the end of the summer of 2008. After March 2009, the CAD came back quickly to the pre-Lehman-crisis peak level and has remained close to this level ever since.

The use of these components adds one important dimension to this analysis. The depreciating phase of the 1990s was mainly driven — particularly in the first half of the decade — by the depreciation of the Canadian component, reflecting a decrease in energy prices in the aftermath of the Iraqi invasion of Kuwait and the first Gulf War of 1990-1991. However, in the latter part of the 1990s — amidst the massive capital inflow that accompanied the dot-com bubble, among other things — the depreciation of the CAD was *also* driven in part by the appreciation of the U.S. component.

The first phase of the 2002-2008 Great Appreciation is clearly characterized by a substantial depreciation of the U.S. component, which lost 17 cents between February 2002 and January 2005. This period is characterized by significant capital outflows from the U.S. following the burst of the dot-com bubble. Between the end of 2002 and the end of 2007, the Canadian component appreciated by 27 cents. In a nutshell, the Great Appreciation of the CAD was initiated in the United States, but it was fuelled thereafter by pressures on commodity prices by the acceleration of growth in China and other emerging countries.

²³ All the numbers reported in the text reflect monthly data, which are simply averages of daily data (at noon). As shown in the introduction, the Great Appreciation is even more spectacular when it is based on the peak and trough taken from daily data.

The new data on the two components suggests that the temporary, spectacular fall of the loonie in 2008 was mainly driven by the sharp reaction of the U.S. component following Lehman Brothers' bankruptcy and subsequent banking failures. The sharp decrease in commodity prices that also occurred at the time was also partly driven by the U.S.-component appreciation, since those prices are measured in U.S. dollars. The Canadian component did not experience large adjustments during the crisis and by 2011, the U.S. component was back slightly below its pre-Lehman-bankruptcy level.

The stabilization analysis provided in the previous section can now be examined in light of BBC's two primary components. The analysis essentially remains the same, but the impact is doubled. For a constant U.S. component, an increase in the price of oil in U.S. dollars generates an appreciation of the CAD because of the Canadian component. The appreciation of the CAD stabilizes the revenues in Canadian dollars in the periphery using the same mechanism as identified in the previous section. Here, the Canadian periphery is partly immune from the booms and busts that characterize the volatility of commodity prices in international markets due to the stabilizing reaction of the Canadian component of the CAD.

By the same token, any shocks to the Canadian component that originate from adjustments in commodity prices, for a given U.S. component, would destabilize the Canadian core. The mechanism operates exactly as in the previous section.

Shocks to the U.S. component can also prompt CAD responses that stabilize the economy of the Canadian periphery and destabilize the economy of the core, but the mechanism is more subtle. The appreciation of the CAD also stabilizes the economy of the periphery because shocks to the U.S. component affect both the CAD and the prices of commodities in U.S. dollars. For example, the burst of the dot-com bubble in 2000 was followed by large capital outflows from the U.S. The U.S. component depreciated and the price of energy and non-energy commodities went up in U.S. dollars. Revenues of commodity producers measured in U.S. dollars went up. However, the depreciation of the U.S. components translated into an appreciation of the CAD and stabilization in revenues in Canadian dollars in the periphery. At the same time, in the economy of the core, the appreciation of the CAD was crowding-out trade-exposed manufacturing industries. This phenomenon is not Dutch-disease related. In the next section, I argue that it is a Canadian disease.

Finally, it is important to note that shocks to the U.S. component do not always have the effect of destabilizing the Canadian core. For example, after the bankruptcy of Lehman Brothers in September 2008, financial capital flowed to the U.S. economy, translating into an appreciation of the U.S. component as illustrated in Figure 2. The spectacular dive of the loonie at the time acted to stabilize the Canadian manufacturing sector during the outbreak of the storm.

DUTCH DISEASE AND CANADIAN DISEASE

Two necessary conditions must be met if we want to assess whether the Great Appreciation of 2002 to 2008 might have engendered Dutch disease in Canada. First, the Great Appreciation had to be partly driven by the rise of commodity prices. Second, the resource boom should have been detrimental to manufacturing industries in Canada.

In terms of recent commodity prices, recent evidence from the extensive study of Harding and Venables,²⁴ covering the 1975 to 2007 period from 135 countries, suggests that the typical response to a \$1.00 increase in natural-resource production is to decrease non-resource exports by around 50 cents. The results of empirical analyses and calibrated general equilibrium (CGE) analyses of the Canadian economy also suggest clearly that a resource windfall will be detrimental to trade-exposed manufacturing industries.

The Canadian empirical analyses are based on industry employment data,²⁵ industry production data²⁶ and provincial data.²⁷ Using 1,000 regressions with various industry and provincial data since 2006,²⁸ I show that, in a time-series and cross-section framework where the analysis benefits from the stability of the cross-sectional dimension and the introduction of fixed effects, the results are robust.

The inclusion of the corresponding U.S. industry data in the list of controls allow the empirical model to capture the structural change that resulted in the steady decline of the relative size of the manufacturing sector. On average, appreciations of the CAD are shown to be detrimental to trade-exposed manufacturing industries during this period. (A synthesis of BBC results is presented at the end of this section). The results of CGE analyses coming from Dissou²⁹ and Iscan³⁰ also suggest that the crowding-out of trade-exposed manufacturing industries in Canada is the natural outcome, from a theoretical perspective, of a resource boom.

I now focus on the first condition — i.e., the CAD has to be driven by commodity prices. This relationship is at the centre of the model the Bank of Canada has used for years. The analysis of BBC³¹ suggests that the Canadian component of the CAD is clearly driven by commodity prices, but the U.S. component is not; as well, we know that part of the Great Appreciation was due to the depreciation of the U.S. component (see Figure 2). BBC argues that Dutch disease could be associated only with the appreciation of the CAD that originates from the Canadian component. In this case, the causality runs from the resource boom to the manufacturing sector. The appreciation generated from depreciation of the U.S. component, thus, is not Dutch-disease related.

The competitiveness of the Canadian trade-exposed manufacturing sector also decreases with a depreciation of the U.S. dollar. However, the causality does not run from the resource sector to the manufacturing base. Both sectors are affected by the same external factor: the depreciation of the U.S. component which is independent of the resource boom. This, then, is what can be called “Canadian disease.”

²⁴ T. Harding and A.J. Venables, “Exports, Imports and Foreign Exchange Windfalls,” Unpublished, Oxford University, 2010.

²⁵ Beine, Bos and Coulombe, “Does the Canadian Economy Suffer from Dutch Disease?”.

²⁶ M. Shakeri, R. Gray and J. Leonard, “Dutch Disease or Failure to Compete?” IRPP Study 30, 2012.

²⁷ M. Beine, S. Coulombe and W.N. Vermeulen, “Dutch Disease and the Mitigation Effect of Migration: Evidence from Canadian Provinces,” CESifo Working Paper 3813, 2012.

²⁸ The reported number of regressions is a rough approximation. The regressions were performed when I was a research advisor for Industry Canada between 2006 and 2008 and for the preparation of BBC (“Does the Canadian Economy Suffer from Dutch Disease?”) and Beine, Coulombe, and Vermeulen (“Dutch Disease and the Mitigation Effect of Migration: Evidence from Canadian Provinces”).

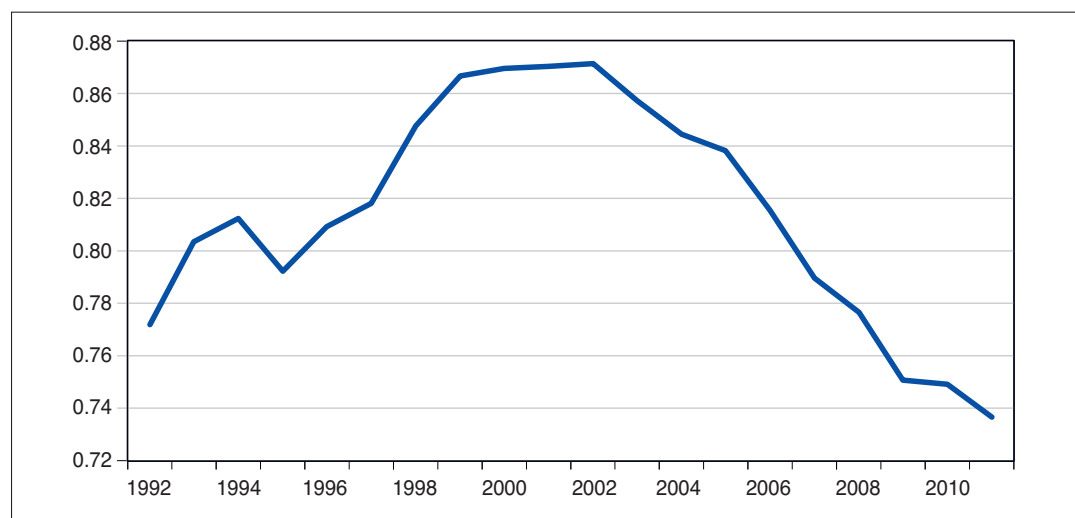
²⁹ Y. Dissou, “Oil price shocks: sectoral and dynamic adjustments in a small-open developed and oil-exporting economy,” *Energy Policy* 38, 1 (2010) 562–572.

³⁰ T.B. Iscan, “Dutch Disease or Structural Change? Quantitative Evidence from Canada,” Mimeo, Department of Economics, Dalhousie University, February 2013.

³¹ Beine, Bos and Coulombe, “Does the Canadian Economy Suffer from Dutch Disease?”.

We can suppose that an idiosyncratic shock to the U.S. dollar will translate into a depreciation of the U.S. component. This shock will generate an increase in the price of all currencies against the U.S. dollar. Consider the case of Canada and Australia. Both the Canadian dollar (and the Australian dollar) will appreciate with respect with the U.S. dollar, although the effect of the appreciation is benign for the competitiveness of Australian manufacturing exporters. Only five per cent of Australia's exports go to the United States. Australian exports are not dependent on the events of one particular country. Its most important trading partners are China (24.6 per cent of Australian exports) and Japan (16.6 per cent).³² This is not the case in Canada. We have seen in the theoretical model of the first section that Canada's manufacturing core is closer to the United States than it is to the rest of Canada. International trade is governed by a gravity equation. Canadian manufacturing exports should mainly go to the United States. The share of Canadian exports going to the U.S. is depicted in Figure 3. It averaged 81.5 per cent during the 1991 to 2011 period. It increased from 79 per cent to 87 per cent following the 1994 North American Free Trade Agreement. It decreased after 2002 and reached a period low of 74 per cent by the end of the period.

FIGURE 3: SHARE OF CANADA EXPORTS SHIPPED TO THE USA



Note: Nominal data retrieved from Trade Data Online, Industry Canada

Even if Canada is not as dependent today on U.S. exports as it was in 2002, the United States still accounts for around three-quarters of Canada's exported goods. This dependency is the source of Canadian disease. Canadian exports are so naturally oriented to the U.S. market that any shocks to the U.S. dollar materialize as a change in our terms of trade.

³² The numbers for Australia exports are for 2012 and are taken from <http://www.dfat.gov.au/tradematters/>.

BBC³³ provides an econometric analysis for the case where the adjustment in employment at the industry level in Canada is determined by the employment in the same industry in the United States, the Canadian component (Dutch-disease related) and the U.S. components (Canadian-disease related). The estimation is performed using annual data from the 1987-2007 sample; a decomposition is provided specifically for the period of the Great Appreciation that accounted for 328,000 employment losses in Canadian manufacturing industries. Here, they estimated that 31 per cent (101,000) are Dutch-disease related, 55 per cent (180,000) could be imputed to the depreciation of the U.S. component, and 14 per cent (46,000) were due to the long-run structural decline that is captured by the U.S. employment decline in the equation.

Most (86 per cent) of the employment losses occurring in the trade-exposed manufacturing industries during the 2002 to 2008 period appear to be exchange-rate driven. This should not be surprising since, as illustrated before, this period is characterized by the largest appreciation of CAD in history. However, only a portion of the exchange-rate driven employment losses are Dutch-disease related. The other portion, and arguably the most important portion, can be imputed to Canadian disease. This disease results from the lack of diversification (from a country-base point of view) of Canadian exports. Large swings in the U.S. dollar that result from rearrangements in international capital flows affect the competitiveness of Canadian manufacturers.

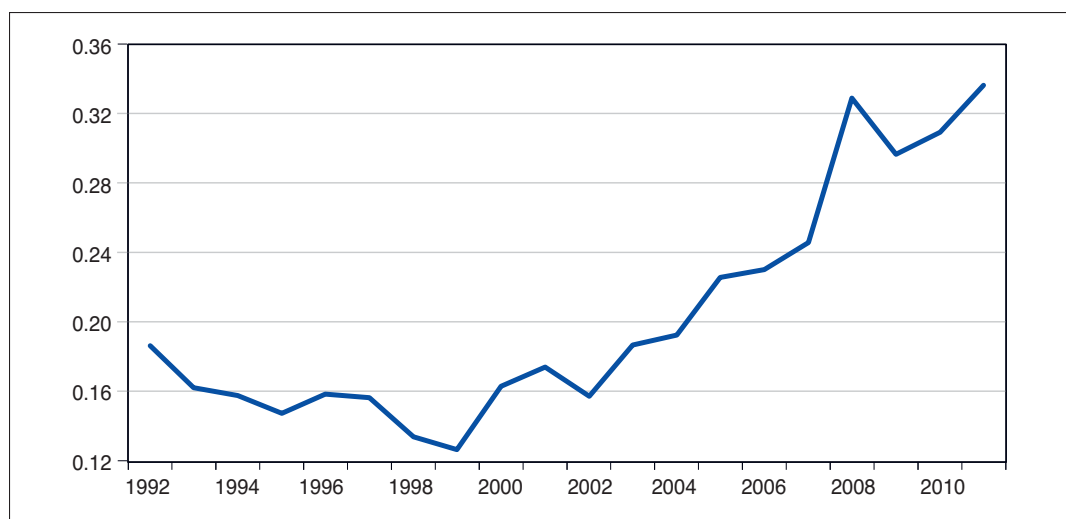
I conclude this section prospectively. The decreasing trend observed after 2002 of the share of Canada exports going to the United States, as illustrated in Figure 3, suggests that, were the trend to continue, the potential of a Canadian disease occurring gradually might be diminishing. In this context, the appreciation since 2002 should be interpreted as evidence of diversification rather than decline. If Canada becomes less and less dependent on the United States as a destination for its exports, the effect of autonomous shocks to the U.S. components on the Canadian economy will eventually decline. However, it would be imprudent to argue that this is the beginning of a long-lasting trend. In order to persist in the future, the trend would have to fight against the “law of gravity.” In theory, trade is determined by a gravity model. This gravity theory of trade derives its name from Newton’s law of universal gravity. According to Newton, the attraction between two masses in the universe is proportional to the product of each mass divided by the square of the distance. In trade, trade flows between two countries should be proportional to the product of each one’s GDP divided by the square of the distance between the two countries.³⁴ The closer a country is to big economies, the more it will trade with them. The further a country is from small economies, the less it will trade with them. This model, which has strong empirical foundations, suggests that Canada’s trade, thanks to the proximity of its industrial core to the northeastern U.S. economy, should continue to be directed southward to the U.S.

Another element of this prospective is offered by Figure 4, depicting the growth of the share of natural-resource exports of Canada’s total exports. Since 1999, the natural- resource share has risen from 12.6 per cent to 33.6 per cent. This spectacular development suggests that the CAD should be more dependent now on the price of commodities than it was just 10 years ago. The implication is that the potential for Dutch disease might be more relevant today than it was in the past.

³³ Beine, Bos and Coulombe, “Does the Canadian Economy Suffer from Dutch Disease?”.

³⁴ Of course, other factors also exert effects on trade, such as free-trade agreements and transport infrastructure.

FIGURE 4: SHARE OF NATURAL RESOURCE IN CANADA EXPORTS



Note: Nominal data retrieved from Trade Data Online, Industry Canada

CONCLUSION

In this paper, following the analysis of BBC,³⁵ I add one new dimension to the national debate in Canada regarding Dutch disease — namely that the Canada-U.S. bilateral exchange rate is the relative price between the value of the Canadian dollar and the value of the U.S. dollar. The variation of the Canadian component is determined by commodity prices whereas the U.S. component is not. I show that the Great Appreciation of the Canadian dollar between 2002 and 2008 was initiated by a depreciation of the U.S. component but was fuelled thereafter by commodity prices and the appreciation of the Canadian component. Only manufacturing employment losses resulting from the appreciation of the Canadian component are Dutch-disease related. Consequently, employment losses resulting from the depreciation of the U.S. components are not caused by the resource boom. They result from a Canadian disease. Canada exports are still primarily directed to the U.S. market, and this lack of diversification is the source of the Canadian disease.

I also show in this paper that the variations of the Canadian exchange rate are generally beneficial to the resource sector and detrimental to the manufacturing sector.³⁶ The positive correlation between the Canadian dollar and commodity prices translates into an automatic stabilization device that is operative for the Canadian resource sector in the periphery. This same device, however, exacerbates the reaction of the manufacturing core to commodity-price shocks. The booms and busts of the resource sector are transmitted to the industrial core.

³⁵ Beine, Bos and Coulombe, “Does the Canadian Economy Suffer from Dutch Disease?”.

³⁶ Beine and Coulombe, “Regional Perspectives on Dollarization in Canada.”

As a policy matter, the economy of Quebec and Ontario will be better served by an exchange rate that is not dependent on commodity prices. For these two provinces, the benefits from a resource boom depend mainly on the redistribution effect that comes out of the workings of fiscal federalism.³⁷

Courchene and Harris³⁸ argued that Canada might be better off by adopting the U.S. dollar, or by forming a monetary union with the United States. The recent experience in Europe with the debt crisis clearly indicates that the costs of joining a monetary union, in terms of financial and macroeconomic stabilization, have been highly underestimated. It would appear that countries may lose important levies, time and influence when they allow other third parties to print money in the face of short-term monetary or economic crises. Among other things, it appears that the role of lender-of-last-resort is much more complicated when the central bank cannot print money. Furthermore, by fixing the Canadian dollar to the U.S. dollar, the Canadian periphery will lose the stabilizing power of exchange-rate adjustments. I believe that the optimal solution would be to maintain the actual monetary regime and to help stabilize the economy of the core with fiscal policy. Many policy options are discussed in Boadway, Coulombe and Tremblay.³⁹ They argue for a new design of natural-resource taxation in Canada and for a strengthening of fiscal federalism in order to tackle the excessive fiscal imbalances across provinces. They also suggest that a larger share of the rent collected by governments should be invested for the future welfare of Canadians.

Finally the recent trends in trade data indicate that Canadian exports are more dependent on natural resources and less dependent on the United States, with the first trend being more pronounced. The first trend suggests an increase in the potential for Dutch disease in Canada. The second supports a decrease in the potential for Canadian disease. It is extremely difficult, however, to assume that those trends will simply continue in the future. This is particularly true for the resource sector. Commodity prices are more volatile than the price of other goods; however, it is clear that the United States will continue to be the dominant destination for our manufacturing exports. This is evident from the relationship between geography and trade. The effect of any policies in Canada geared at diversifying the destination of our exports, such as the proposed Canada-EU free trade agreement, would be necessarily limited since, in the end, these would have to fight against the force of gravity.

³⁷ Policy aspects related to this issue are analyzed and discussed in Boadway, Coulombe and Tremblay, "The Dutch Disease and the Canadian Economy: Challenges for Policy-Makers."

³⁸ T. J. Courchene and R.G. Harris, "From Fixing to Monetary Union: Options for North American Currency Integration," C.D. Howe Institute Commentary 127, 1999.

³⁹ Boadway, Coulombe and Tremblay, "The Dutch Disease and the Canadian Economy: Challenges for Policy-Makers."

About the Author

Serge Coulombe is a professor of economics at the University of Ottawa. He holds a B.A. and Ph.D. in economics from Université Laval. His current fields of research include trade and growth, Dutch disease, human capital, migration and growth, economic growth and regional economic development. He is a member of University of Ottawa's senate and fulfilled the role of Senior Research Advisor to the Chief Economist of Industry Canada from 2005 until 2008.

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