

CANADA-KOREA FREE TRADE AGREEMENT

PRELIMINARY ASSESSMENT OF THE ECONOMIC IM- PACTS OF A CANADA-KOREA FTA

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EXECUTIVE SUMMARY

The Canada-Korea Free Trade Agreement (CKFTA) negotiations were launched on July 15, 2005. A free trade agreement (FTA) between Canada and Korea has the potential to enhance not only Canada's important bilateral economic relationship with Korea, but also to strengthen Canada's presence in the dynamic Northeast Asia region. An FTA with Korea is expected to generate economic benefits across the Canadian economy.

This document analyzes the possible economic impacts of the proposed CKFTA. The economic impacts of tariff elimination are assessed based on simulations using a computable general equilibrium (CGE) model known as the Global Trade Analysis Project (GTAP) and version 6 of its database. Five alternative scenarios are simulated based on a range of assumptions concerning the supply-side response of the economy to expanded trade with Korea, including a central scenario incorporating the assumptions best suited for Canada and Korea respectively. The impact of non-tariff elements of a CKFTA, including impacts on bilateral investment flows and services trade, are taken into account only qualitatively. The main findings are as follows:

- Assuming full elimination of tariffs for industrial and agricultural products, Canada's total merchandise exports to Korea in the central scenario would increase by 56%. Based on the level of Canadian exports to Korea in 2005 of \$2.8 billion¹, this would represent an export gain of about \$1.6 billion.
- Canada's merchandise imports from Korea would increase by 19%. Based on the 2005 figure of \$5.4 billion, this would represent an import increase of about \$1 billion.
- The value of Canada's gross domestic product (GDP) would increase, although the estimated extent varies considerably based on alternative assumptions about the economy's response to expanded trade with Korea. In percentage terms, the alternative simulations place the gain at between 0.064% and 0.268%; in the central scenario, the gain is 0.114%. Compared to the size of Canada's GDP in 2005 (\$1,369 billion), the corresponding GDP gain ranges between \$0.88 billion and \$3.6 billion across the five scenarios, with the central scenario estimate at \$1.6 billion. The corresponding estimates for Korean GDP gains, compared to the size of Korea's economy in 2005, range between \$0.23 billion (0.024%) and \$6.6 billion (0.691%) across the five scenarios, with the central scenario estimate at \$0.66 billion (0.07%).
- The simulations suggest that Canadian households would derive an economic welfare benefit, scaled to the size of Canada's economy in 2005, between \$266 million under the most restrictive supply-side-response assumptions and \$3.5 billion under the least restrictive assumptions; the central scenario estimate is \$1.1 billion. The simulations suggest that Korean households would experience a small decrease in economic welfare under the most restrictive assumptions, but would gain benefits that would exceed Canada's in the least restrictive scenario.

The CGE simulations likely understate the *potential* economic gains since they reflect only the impact of tariff elimination on merchandise trade; the CKFTA negotiations, however, are ad-

¹ All monetary figures are in Canadian dollars unless otherwise noted.



addressing a wide range of issues, including trade in goods, rules of origin, customs procedures, trade facilitation, non-tariff measures, cross-border trade in services, financial services, temporary entry, investment, government procurement, competition, intellectual property, e-commerce, dispute settlement and institutional provisions. In addition, Canada is pursuing environmental and labour cooperation agreements in parallel with the free trade negotiations. At the same time, Canada's trade gains in areas of Korean sensitivity and Korean trade gains in areas of Canadian sensitivity may be constrained in timing or ultimate extent by special provisions that are not known prior to the conclusion of the agreement.

Provisions dealing with non-tariff measures may also affect the estimated impacts in individual sectors. Given these considerations, together with the fact that the impacts are small relative to the size of the Canadian economy and quite sensitive to the specific assumptions made concerning the economy's response to increased trade, the current simulations represent too blunt a tool to provide reliable estimates of the sectoral impacts of the CKFTA. To assess sectoral impacts, specific studies are required, such as the detailed assessment of the Canadian automotive market commissioned by Foreign Affairs and International Trade Canada².

² Johannes Van Biesebroeck, "The Canadian Automotive Market," May 20, 2006



PRELIMINARY ASSESSMENT OF THE ECONOMIC IMPACTS OF A CANADA-KOREA FTA

Introduction

This document analyses the potential economic impacts of a free trade agreement between Canada and Korea. The analysis mainly considers the impact of tariff elimination on merchandise trade. The study briefly considers the impacts of liberalization and facilitation of trade in services and investment, in qualitative terms. However, for reasons discussed below, quantification of these impacts was not possible for the purposes of this preliminary report.

Analytic approach

The main tool used for the analysis is the Global Trade Analysis Project (GTAP) computable general equilibrium (CGE) model, version 6.0.³ This model, which is publicly available, runs on a data set that integrates data on bilateral trade flows, trade protection and domestic support together with national input-output tables that describe the sale and purchase relationships between producers and consumers within each economy. This allows the model to generate estimates of the impact of trade policy changes, such as preferential tariff elimination under free trade agreements (FTAs), on trade flows, the level of national economic output (gross domestic product), employment and economic welfare.

CGE simulations alone cannot, however, adequately take into account the breadth of changes resulting from modern FTAs. For example, negotiations between Canada and Korea are being pursued on a wide range of issues, including trade in goods, rules of origin, customs procedures, trade facilitation, non-tariff measures, cross-border trade in services, financial services, temporary entry, investment, government procurement, competition, intellectual property, e-commerce, dispute settlement and institutional provisions. In addition, Canada is pursuing environmental and labour cooperation agreements in parallel with the free trade negotiations.⁴

In addition to direct economic impacts in the areas of services trade and bilateral investment flows, these additional features of FTAs should have an impact on trade in goods, over and above that resulting from tariff elimination. For example, trade facilitation reduces non-tariff costs of market access. Similarly, given complementarities between investment and services trade on the one hand and goods trade on the other, measures to liberalize investment and services trade should induce a stronger response of goods trade to an FTA than tariff considerations alone would indicate. As well, FTAs have been suggested to have galvanizing effects on business behaviour; that is, in the context of sunk costs of market entry, the political commitment and the non-tariff facilitative aspects of an FTA can provide extra inducement to business to commit the resources to take advantage of the new market opportunities. On this basis, the estimated increase in bilateral merchandise trade is likely to underestimate the increase.

³ For a full description of the model, see Hertel, T. W. (1997). *Global Trade Analysis: Modeling and Applications*, Cambridge: Cambridge University Press.

⁴ See DFAIT, Canada-Korea – Free Trade Agreement Negotiations, <http://www.international.gc.ca/tna-nac/rb/korea-en.asp>.



Several further cautionary notes are required concerning the interpretation of the reported economic impacts. These are set out below.

Caveat: Interpretation of the results

The results of the simulations are best understood as estimates of the *potential* economic impacts of a CKFTA, not as *forecasts* of the actual results. This reflects the following considerations.

First, FTAs typically include provisions to address impacts in sensitive sectors. Thus, with respect to the CKFTA, Canada's trade gains in areas of Korean sensitivity and Korean trade gains in areas of Canadian sensitivity may be constrained in timing or ultimate extent by special provisions that are not known prior to the conclusion of the agreement.

Second, CGE model simulations compare the structure of a given economy at a given point in time, as it was and as it would have been if the simulated policy change were in place with all economic adjustments in response to that policy change already completed. Typically, FTA provisions are phased in to facilitate adjustment; the adjustment path of the economy is not, however, explicitly addressed in this study.

Third, while there is no explicit time dimension in these simulations, the price elasticities that drive the response to tariff changes are based on long-run changes. In other words, the assumed changes would take some time to be reflected in the economy. At the same time, the myriad developments that might influence actual outcomes during the implementation and adjustment period cannot be taken into account; these include importantly technological changes and reorganization of global production patterns that alter the industrial landscape, and trade policy changes such as preferential agreements with third parties involving either Canada or Korea.⁵

⁵ For example, since July 2005, Korea has concluded agreements with Singapore, the European Free Trade Association (EFTA) and the Association of Southeast Asian Nations (ASEAN); has concluded negotiations with the United States; and has trade negotiations under way with, among others, the European Union. Canada, meanwhile, is also negotiating free trade with the Central American Four (CA4), EFTA, and Singapore and exploring free trade with the Andean Community, CARICOM, and the Dominican Republic (see "Regional and Bilateral Initiatives" at <http://www.international.gc.ca/tna-nac/reg-en.asp>.)



Caveat: Sensitivity of the results to model specifications and assumptions

Economic models, to be tractable, necessarily compress an enormous amount of information on the economy into a relatively small number of equations and estimated parameters that represent the stylized behaviour of consumers and producers. By the same token, the results of model simulations can be heavily influenced by the model structure, parameter estimates, the level of aggregation of the data and assumptions made by the modeller as to how to run the simulations (most important, as discussed below, are the assumptions concerning “closure” of the model).

Choice of Model

The GTAP 6.0 model used for the CKFTA simulations was chosen because it permits the greatest possible sectoral and regional disaggregations. This level of disaggregation is important to reduce aggregation bias in estimating trade impacts but comes at the expense of a number of limiting features: the model is static and assumes perfect competition as well as constant returns to scale in all sectors. The GTAP family of models also includes a dynamic model; unfortunately this model does not include Canada as a separate entity, and hence cannot be used for this study. The GTAP family of models also includes a version with imperfect competition, which is a more appropriate modelling framework for the non-agricultural sectors; however, this model only permits simulations based on three sectors, agriculture, industrial goods, and services. Simulations using the static, perfectly competitive model likely understate the gains in output and economic welfare for a given amount of trade expansion compared to simulations using the dynamic and/or imperfectly competitive versions, all else being equal.

Level of Disaggregation

The simulations were conducted on a fully disaggregated sectoral basis (57 sectors, of which 43 are merchandise). Due to computer capacity constraints, the full level of regional disaggregation (92 countries and/or composite regions) could not be used. For convenience, the simulations were conducted with the global economy disaggregated into 15 regions:

- Canada and Korea;
- the major industrialized economies: the United States, the European Union and Japan;
- within the Western Hemisphere: Mexico, Mercosur, the Caribbean Community and Common Market (Caricom), and the Andean Community;
- within Asia-Pacific: China, India, Singapore and Australia;
- in Africa: the South African Customs Union (SACU); and
- the rest of the world (ROW).

Model Structure

The main technical features of the GTAP 6.0 model are as follows:

- On the production side, the model features nested constant elasticity of substitution (CES) production functions. Land, labour (skilled and unskilled), and capital substitute for one another in a value-added aggregate in the first nest, and composite intermediate inputs substitute for value-added at the next nest. Labour and capital are assumed to be fully employed, mobile across all uses within a country and immobile internationally. On the demand side, there is a regional representative household whose expenditure is governed by an aggregate utility function. This aggregate utility function is of a Cobb-Douglas form allocating expenditures across private consumption, government spending, and savings. Private household demand is represented by a Constant Difference of Elasticities (CDE) functional form, which has the virtue of capturing the non-homothetic nature of private household demands (i.e., demand structure changes with increased income, reflecting the fact that consumption of particular types of goods such as luxury goods increases more with higher income than does consumption of other goods such as staple food products).
- Bilateral international trade flows are modelled based on the Armington hypothesis that goods and services are differentiated by region of origin and are imperfect substitutes. The standard GTAP 6.0 parameter set was used; the key Armington parameters (the elasticities of substitution between products according to country of origin) have recently been updated based on new econometric research. These elasticities are on average lower than those used in some other models such as the World Bank's Linkage model; the estimated trade and welfare impacts reported here are thus relatively conservative.⁶

Closure

In performing simulations, the modeller must make some choices with regard to which variables in the model are to be exogenous (i.e., fixed at predetermined values specified by the modeller) and which are to be endogenous (i.e., the values for which are solved by the model). Alternative choices represent alternative “closures” of the model. The choice of closure influences the results significantly.

Under the GTAP model's default microeconomic closure, the factor endowments (i.e. the total supply of labour, both skilled and unskilled, as well as of capital and land) are fixed; factor prices (i.e. wages and return to capital and land) adjust to restore full employment of the factors of production in the post-shock equilibrium.⁷ Under alternative microeconomic

⁶ The comparative static version of the Linkage model produced income gains for industrialized countries under multilateral trade liberalization that were one third larger using the trade elasticities in the Linkage model compared to those in the GTAP 6.0 dataset. See Dominique van der Mensbrugghe, “Estimating the Benefits of Trade Reform: Why Numbers Change,” Chapter 4 in Trade, Doha, and Development: A Window into the Issues (World Bank; <http://siteresources.worldbank.org/INTRANETTRADE/Resources/239054-1126812419270/4.EstimatingThe.pdf>); at p. 71.

⁷ This is sometimes described as reflecting a medium-term time horizon in which labour supply is relatively “sticky.”



closures that are sometimes used, the return to capital or to labour can be fixed and the supply of capital and/or labour then adjusts to restore equilibrium.⁸

Each of the above closure rules makes an extreme assumption about the supply of labour and/or capital: it is either perfectly elastic or perfectly inelastic. The reality is likely to be somewhere in between.

The GTAP model can be simulated to approximate intermediate values of the elasticity of supply of capital and/or labour. The modeller's assumptions for these parameters, based on empirical evidence drawn from outside the model, then determine how the gains from an FTA are obtained. For example, for labour, the more inelastic is labour supply, the greater the extent to which gains are achieved in the form of wage increases; conversely, the more elastic is labour supply, the greater the extent to which gains are achieved in the form of additional jobs. Similarly, for the economy as a whole, the gains reflect either improved prices or increased output—or some combination of the two—depending on the assumptions about supply-side elasticities established in the chosen closure. Given the sensitivity of the results to the specific assumption made, we report the results of simulations for five alternative closure rules:

- (i) labour and capital supply fixed (the standard or default closure);
- (ii) labour supply flexible, capital supply fixed;
- (iii) labour supply fixed, capital supply flexible;
- (iv) both labour and capital supply flexible; and
- (v) the central scenario, which as described immediately below reflects judgments as to the most appropriate assumptions for Canada and Korea respectively, coupled with the default closure for all other countries or regions:
 - With regard to the long-run supply of labour, the economic literature supports a positive but not infinite supply elasticity—i.e., somewhere between the two extreme assumptions for labour market closures. On the basis of recent empirical evidence, we adopt a labour market closure for Canada and Korea based on fixing the elasticity of labour supply at approximately one.⁹
 - With regard to the long-run supply of capital, for Canada, a small open economy that has relatively untrammelled access to capital, the most plausible assumption for

⁸ The closure rule in which the rate of return to capital is fixed is sometimes described as reflecting longer-run “steady-state” growth conditions. For an example of the implications of fixing the return to capital and allowing investment to adjust, see John P. Gilbert, “GTAP Model Analysis: Simulating the Effect of a Korea-U.S. FTA Using Computable General Equilibrium Techniques”; http://www.iie.com/publications/chapters_preview/326/appbiie311x.pdf. Gilbert reports net economic welfare gains for Korea that are 2.7 times larger, and for the U.S. that are 2.4 times larger, with this closure compared to standard closure. For an example of the use of the labour market closure rule under which the wage rate is fixed, see Joseph F. Francois and Laura M. Baughman, “U.S.-Canadian Trade and U.S. State-Level Production and Employment,” in John M. Curtis and Dan Ciuriak (eds.) *Trade Policy Research 2004* (Ottawa: DFAIT, 2004).

⁹ For a discussion of the elasticity of supply of labour see John C. Ham and Kevin Reilly, “Using Micro Data to Estimate the Intertemporal Substitution Elasticity for Labor Supply in an Implicit Contract Model,” July 2006; available online at <http://client.norc.org/jole/SOLEweb/hamreilly.pdf>. This study finds statistically significant inter-temporal labour supply elasticities of 0.9 with the Panel Study of Income Dynamics (PSID) data set and 1.0 with the Consumer Expenditure Survey (CES) data set.

capital supply is that it is relatively elastic; this corresponds closely to the steady state closure rule for capital. For Korea, which has in recent memory experienced a major international liquidity crisis and which does not yet have the same degree of institutional development as Canada, we expect the capital supply schedule to be upward sloping; we arbitrarily set the capital supply elasticity at approximately one. From the perspective of the results, this is a conservative assumption since the economic gains for Korea rise steeply with higher capital supply responses.¹⁰

The second aspect of closure is macroeconomic closure. Two approaches are available here: the standard approach with the GTAP model, which is used in the present simulations, is to allow the current account to adjust to the trade shock, with passive accommodation by international investment flows. The change in the current account implies a change in domestic investment. In the GTAP model, the change in investment is reflected in the profile of final demand, which in turn affects the profile of production and trade but does not feed through into the productive capacity of industries/regions. The alternative macroeconomic closure is to fix the current account, implicitly assuming no international capital mobility; this is a much less realistic assumption for Canada and this option is accordingly eschewed.¹¹

Caveat: Data issues

There are several issues concerning the underlying database for the GTAP simulations.

The base year for the GTAP 6.0 data is 2001; in other words, the model depicts the global economy as it was in 2001, including the size of trade flows, the level of protection and support for trade in the various economies, as well as the size and composition of GDP and other economic variables for each country/region.

The base year for the input-output tables in the GTAP 6.0 data base, however, varies from country to country; for Korea the reference year is 2000 but for Canada it is 1990—in other words, the internal linkages in the Canadian economy as mapped out in the GTAP 6.0 data base reflect the Canadian economy's internal linkages as of 1990, prior to its adjustment to the Canada-U.S. FTA and the NAFTA, the Uruguay Round, China's accession to the World Trade Organization (WTO), and other changes in the domestic and global economic environment since 1990.

Given the rapidity of economic change in recent years, several steps are taken in the present analysis to make it as up-to-date as possible:

¹⁰ This is a well-established result with the GTAP model. See Joseph F. Francois, Bradley J. McDonald and Håkan Norström, "Liberalization and Capital Accumulation in the GTAP Model," GTAP Technical Paper No. 7, July 1996.

¹¹ See Gilbert (op. cit.) for a comparison of the impact of using alternative macroeconomic closures in the context of modelling the U.S.-Korea FTA. The fixed current account simulations substantially reduce the economic welfare gains for Korea (to 3/5 the level of the simulation with flexible current account) and marginally (by 5%) for the United States.

- The measures of trade protection in the GTAP 6.0 database are updated to include the completion of implementation of the Uruguay Round tariff cuts, China's accession commitments to the WTO and the expiry of the WTO Agreement on Textiles and Clothing (ATC).¹²
- The model simulations are otherwise performed with the 2001 base year data in the GTAP 6.0 database (in which values are expressed in 2001 U.S. dollar terms), we also present key data (Canada's imports from and exports to Korea, as well as Canadian GDP and consumer welfare estimates) adjusted for scale and composition to reflect the Canadian economy as it was in 2005, and expressed in 2005 Canadian dollars. This is done simply by applying percentage changes generated in the GTAP model to the corresponding 2005 data. This serves to at least partly take into account the implications of the growth of, and structural shifts within, the economy between 2001 and 2005. In the case of Canada's imports from and exports to Korea, this additional step takes into account some particularly important changes in the product composition of bilateral trade between 2001 and 2005. However, this falls short of a consistent updating of the data to reflect the economy in 2005; the 2005-based estimates are thus indicative only.
- Foreign Affairs and International Trade Canada (DFAIT) is arranging for the updating of the Canadian input-output data in the GTAP database. The present preliminary analysis is, however, based on the 1990 input-output structure; an update to this report will reflect more up-to-date input-output data, when those become available. The out-dated input-output data reduce the level of confidence in the estimated sectoral output changes in the present simulations, since these changes combine the direct impact on sectors of own-tariff changes (e.g., the impact on the steel sector of changes in the tariff on steel) with the indirect impact of changes in production in other sectors induced by the FTA (e.g. steel sector output changes in response to a change in auto production induced by tariff changes on autos), based on the input-output structure as represented in the model. Moreover, the sectoral output numbers reflect the structure of trade in 2001. For these reasons, we do not report detailed sectoral output results since these could be quite misleading, given the significant changes in Canada's economic structure since 1990 and trade since 2001.

¹² The methodology for updating the protection data is that developed for the World Bank. For a description see Dominique van der Mensbrugge, "Estimating the Benefits of Trade Reform: Why Numbers Change," in World Bank, *Trade, Doha, and Development: A Window into the Issues*; <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/TRADE/0,,contentMDK:20732399~pagePK:148956~piPK:216618~theSitePK:239071,00.html>; at p. 61.



BACKGROUND ON THE CANADIAN AND KOREAN ECONOMIES

Table 1 sets out summary information on the Canadian and Korean economies.

Table 1: Canada and Korea: Summary Statistics, 2005

	Korea	Canada
Income		
▪ GDP at market prices (C\$ billions)	\$955	\$1,369
▪ Gross National Income at purchasing power parity (US\$ billions)	\$1,055	\$1,040
▪ Population (2005, millions)	47.82	32.27
▪ Per-capita GDP at market prices (C\$)	\$19,972	\$42,423
▪ Per-capita GNI at purchasing power parity (US\$41,950)	\$21,850	\$32,220
Trade and Investment		
▪ Exports of goods and services as share of GDP	42.5%	37.8%
▪ Imports of goods and services as share of GDP	40.0%	34.1%
▪ Two-way trade in goods and services as share of GDP	82.5%	71.9%
▪ Outward direct investment as share of GDP (2004)	4.7%	35.0%
▪ Inward direct investment as share of GDP (2004)	12.9%	29.5%
Economic Structure: shares of total output*		
▪ Primary (agriculture, forestry, fishery & mining)	3.7%	7.2%
▪ Secondary (manufacturing, construction & utilities)	40.0%	25.1%
▪ Tertiary (services)	56.3%	67.7%

Source: GDP and population figures are from the International Monetary Fund (IMF), *International Financial Statistics*; purchasing power parity data are from the World Bank, *World Development Report 2007*, Table 1; the Canada-Korea exchange rate used to convert Korean won data into Canadian dollars is from the Bank of Canada website; trade and industrial structure data and inward and outward investment are from Korea National Statistical Office and Statistics Canada respectively.

*Shares of GDP at factor cost. For Korea, industrial structure is as of 2005; for Canada as of 2002 based on current dollar GDP shares.

Korea ranked 11th globally in terms of gross domestic product (GDP) in 2005 with an economy measured at market exchange rates about 70% the size of 9th-ranked Canada's. Measured in terms of gross national income (GNI) at purchasing power parity exchange rates, Korea's economy was slightly larger than Canada's in 2005. Korea's population in 2005 was almost 50% larger than Canada's, resulting in substantially lower levels of per-capita income when compared at purchasing power parity exchange rates, and even more so when compared at market exchange rates.

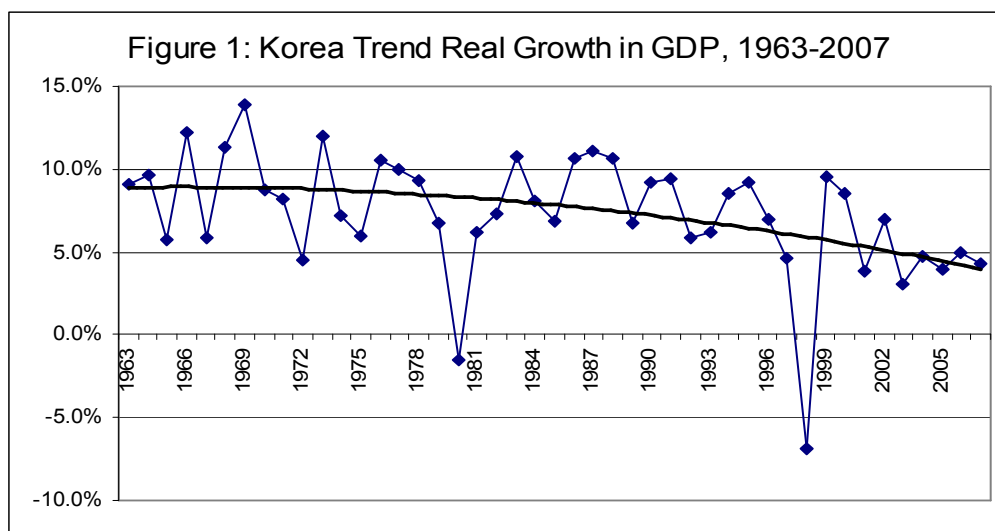
Like Canada, Korea is a highly open economy, with two-way trade in goods and services equivalent to 82.5% of GDP in 2005 (versus 71.9% for Canada). In 2005, Korea ranked 12th in the world in two-way merchandise trade of \$660.3 billion. However, Korea is much less open in terms of two-way investment than it is in trade: the stock of inward foreign direct investment (FDI) in Korea in 2004 amounted to \$114 billion or 12.9% of Korea's GDP; the stock of outward investment totalled only \$42 billion or 4.7% of Korea's GDP.

Over time, Korea's industrial structure has come to increasingly resemble the structure of the advanced economies. Compared to Canada, Korea's primary and services sector are smaller, while manufacturing and other industry accounts for a greater share of output than in Canada.



Korea's macroeconomic performance and prospects

Korea's economic growth has slowed from the torrid pace of 8.3% maintained from 1963 through 1996, which served to elevate Korea from an impoverished agrarian economy to OECD membership status in 1996. Since then, a period that includes the steep recession at the time of the Asian Economic and Financial Crisis, Korea has averaged 4.2% real growth; however, in the context of the global upswing from the global recession of 2001, Korea has maintained an average growth rate of 4.7%. Current IMF projections suggest that Korea will maintain a 4.7% pace in 2006-2007 on average.¹³



Source: Historical data from the IMF, *International Financial Statistics*; 2006-2007 projections from the IMF, *World Economic Outlook*, September 2006. Trend line is a polynomial trend fitted with Excel.

The short- and medium-term prospects for the Korean economy are broadly positive. Inflation has been moderate (3.3% average CPI growth over 2001-2005 with “core inflation” at 2.2% in mid-2006) and unemployment has been low (average of 3.7% over 2001-2005 and 3.5% in mid-2006). The external accounts have been in steady surplus since the Asian crisis (including a trade surplus equivalent to 2.5% of GDP in 2005). External debt is moderate (about 25% of GDP in 2005) and fully covered by foreign exchange reserves, which reached US\$228.2 billion in September 2006.

Korea's economic policy posture is essentially neutral. Korea was expected to achieve a modest budget surplus of about 1% of GDP in 2006.¹⁴ Korean short-term interest rates rose to the 4% to 5% range in 2006, reflecting some tightening of policy since 2005; however, the yield curve has remained moderately upward sloping.

Bilateral Canada-Korea Economic Relations

In 2005, Korea was Canada's seventh-largest merchandise trading partner. From Korea's perspective, Canada was its 21st-largest trading partner. Two-way merchandise trade is sub-

¹³ International Monetary Fund, *World Economic Outlook*, September 2006.

¹⁴ Global Insight, *Quarterly Review and Outlook: Asia-Pacific*, First Quarter 2006.

stantial, with Korea in the surplus position by about \$2.2 billion, going by import statistics to measure the bilateral flows.¹⁵

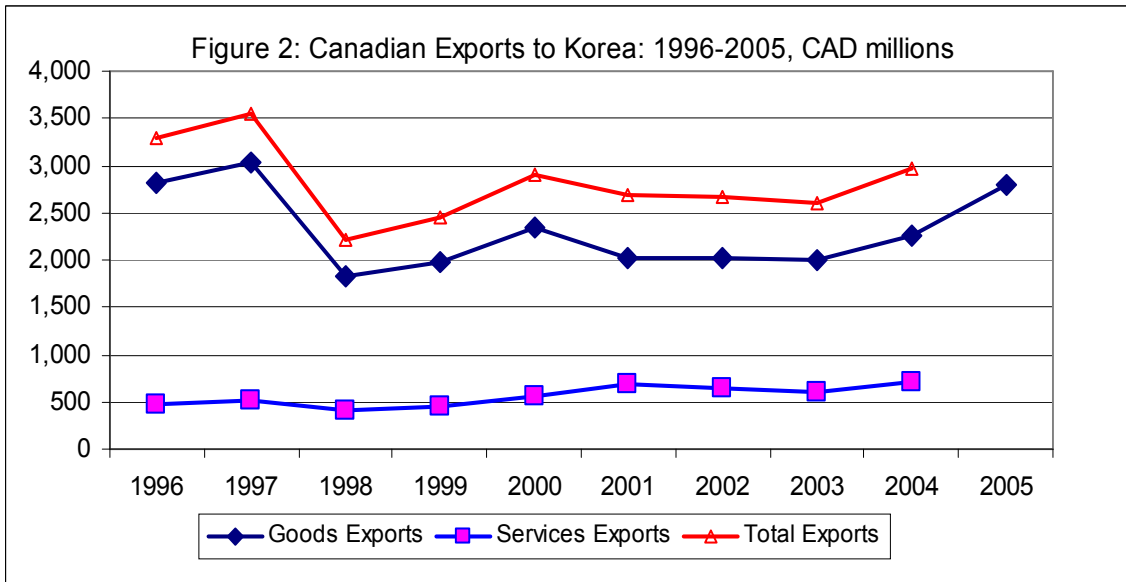
Table 2: Canada-Korea Merchandise Trade, 2005, C\$ Millions

Korean Statistics	
▪ Exports to Canada	4,171
▪ Imports from Canada	3,147
▪ Two-way trade	7,318
▪ Balance (Korean perspective)	1,024
Canadian Statistics	
▪ Exports to Korea	2,806
▪ Imports from Korea	5,374
▪ Two-way trade	8,181
▪ Balance (Canadian perspective)	-2,568
Import-Import Comparison	
▪ Korean Imports from Canada	3,147
▪ Canadian Imports from Korea	5,374
▪ Two-way trade	8,522
▪ Balance (Canadian perspective)	-2,227

Source: World Trade Atlas

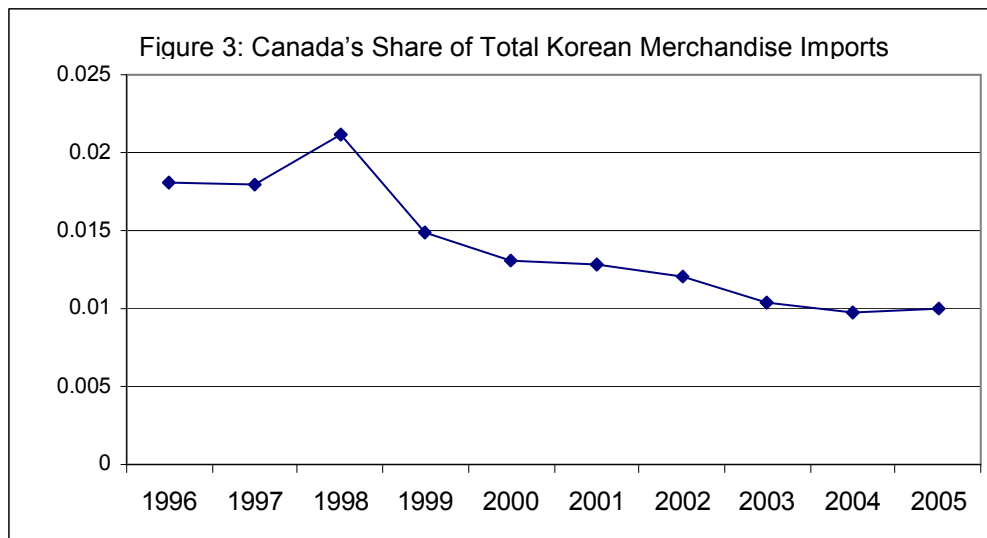
Following the Asian Economic and Financial Crisis, which resulted in a steep depreciation of the won against the Canadian dollar, Canada's merchandise exports to Korea fell off sharply and remained low for several years. Since 2003, however, they have rebounded strongly. In 2005, Canadian exports were 54% higher than the low point in 1998, although they still have to regain the peak of 1997 (Figure 2).

¹⁵ Trade statistics collected by one country frequently differ from statistics measuring the same trade flow collected by its trading partners. In the case of Canada-Korea trade, a trade data reconciliation exercise conducted on the 2001 and 2002 bilateral trade data indicated that Canada's bilateral deficit and Korea's bilateral surplus were both overstated. The main source of errors in the data was underreporting of exports due to non-filing of export documents and indirect trade (e.g. Canadian shipments to the U.S., which then are sent onwards to Korea might be reported as exports to the U.S. in Canadian statistics, overstating Canada-U.S. trade and understating Canada-Korea trade). As Statistics Canada notes in its comment on the reconciliation exercise "Customs offices are generally more attentive to goods entering the country rather than leaving because of the requirement for tariff assessment and the application of trade agreements. Consequently, import data are usually more reliable than export data." Accordingly, for unreconciled data such as the 2005 figures, the most accurate measure of the balance is on the basis of import-import data. For a fuller discussion see Sandra Bohatyretz, "Tiger by the Tail? Canada's Trade with South Korea," in *Canadian Trade Review*, Statistics Canada Catalogue No. 65-507-MIE, (2004).



Source: Statistics Canada

In terms of market share, Canada has witnessed a decline in its share of Korean imports from the 2% range in the mid-1990s to the 1% range (Figure 3).



Source: World Trade Atlas

Canada-Korea cross-border services trade has grown in recent years but remains small and flows have been rather volatile from year to year (see Table 3). Of particular note, it is difficult to discern a sustained dynamic expansion in the area of commercial services, the main area for potential gain from a services component in the CKFTA and an area in which trade has been growing very rapidly worldwide in the age of outsourcing, notwithstanding the lack of progress in the multilateral negotiations on trade in services.

Table 3. Canada-Korea Cross-border Trade in Services, 1996-2004, C\$ millions

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total Services Receipts (Canadian exports)	479	506	400	456	568	681	643	607	706
Travel	195	204	109	146	238	284	269	251	273
Commercial services	180	190	190	182	149	198	192	183	171
Transportation (incl. gov't services)	105	113	100	127	181	199	182	173	262
Total Services Payments (Canadian imports)	257	249	166	176	303	229	216	296	350
Travel	60	60	15	27	28	27	31	66	60
Commercial services	71	74	66	47	140	77	60	125	106
Transportation (incl. gov't services)	126	115	85	101	135	125	125	105	184

Source: Statistics Canada

Overall, Canada has thus experienced an erosion of its share of the Korean market since the mid-1990s. Given Korea's program of free trade negotiations (see footnote 3), Canada's presence in this dynamic East Asian economy is at risk of further marginalization.

While the bilateral investment relationship has been expanding, it remains modest. The stock of Canadian direct investment in Korea was \$779 million in 2005, while the stock of Korean direct investment in Canada was \$364 million.

SIMULATION RESULTS: IMPACT OF CANADA-KOREA MERCHANDISE TRADE LIBERALIZATION

This section describes the impact of tariff elimination on Canada-Korea bilateral merchandise trade and the implications for GDP and economic welfare. The simulation involves full elimination of trade protection as captured in the GTAP database, updated as described above, for all industrial and agricultural sectors. Two interventions are made to take account of developments affecting the auto and dairy sectors:

- (a) Explicit account is taken of the impact on automotive shipments from Korea to Canada of the establishment of Korean brand auto production in the United States. These “transplants” are assumed to reduce automotive shipments from Korea to Canada by 57.2% compared to the level that otherwise would have been the case.
- (b) The dairy sector impacts are constrained to nil to reflect a WTO dispute settlement ruling that constrains Canadian exports of dairy products and the lack of Korean export capacity.

A detailed discussion of the rationales and methods for these interventions, with supporting evidence, is provided in Appendix 1.

Sectoral Aggregation, Armington Elasticities and Protection Levels

The simulations were run with a full sectoral disaggregation. The definitions of the GTAP merchandise trade sectors are given in Table 4a below, along with the values of the corresponding Armington elasticities of substitution.



Table 4a: GTAP sectors and Armington elasticities of substitution

	Full GTAP description	Armington Elasticities	
		Domestic vs. Imports	Between alternative sources of imports
Rice	Paddy rice	5.1	10.1
Wheat	Wheat	4.4	8.9
Cereal grains	Cereal grains	1.3	2.6
Vegetables & fruit	Vegetables, fruit, nuts	1.9	3.7
Oil seeds	Oil seeds	2.5	4.9
Sugar	Sugar cane & sugar beet	2.7	5.4
Plant-based fibres	Plant-based fibres	2.5	5.0
Crops	Crops	3.3	6.5
Live animals	Cattle, sheep, goats, horses	2.0	4.0
Animal products	Animal products	1.3	2.6
Wool	Wool, silk-worm cocoons	6.4	12.9
Forestry	Forestry	2.5	5.0
Fishing	Fishing	1.3	2.5
Coal	Coal	3.0	6.1
Oil	Oil	5.2	10.4
Gas	Gas	17.2	34.4
Minerals	Minerals	0.9	1.8
Bovine meat	Meat: cattle, sheep, goats, horses	3.8	7.7
Meat products	Meat products	4.4	8.8
Vegetable oils	Vegetable oils & fats	3.3	6.6
Dairy products	Dairy products	3.7	7.3
Processed rice	Processed rice	2.6	5.2
Processed sugar	Sugar	2.7	5.4
Food products	Food products	2.0	4.0
Beverages & tobacco	Beverages & tobacco products	1.1	2.3
Textiles	Textiles	3.8	7.5
Apparel	Wearing apparel	3.7	7.4
Leather products	Leather products	4.1	8.1
Wood products	Wood products	3.4	6.8
Paper & publishing	Paper products & publishing	3.0	5.9
Petroleum & coal	Petroleum & coal products	2.1	4.2
Chemical products	Chemical, rubber, plastic products	3.3	6.6
Mineral products	Mineral products	2.9	5.8
Ferrous metals	Ferrous metals	3.0	5.9
Metals	Metals	4.2	8.4
Metal products	Metal products	3.8	7.5
Motor vehicles & parts	Motor vehicles & parts	2.8	5.6
Transport equipment	Transport equipment	4.3	8.6
Electronic equipment	Electronic equipment	4.4	8.8
Machinery & equipment	Machinery & equipment	4.1	8.1
Other mfg products	Other manufacturing products	3.8	7.5

Source: GTAP

The protection data in the GTAP 6.0 database are obtained from Market Access Map (MAcMap), which was produced and is maintained collaboratively by the Paris-based Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) and the International Trade



Centre (ITC) in Geneva. The tariff data are compiled at the Harmonized Tariff System 6-digit level and include the *ad valorem* equivalent of specific tariffs and the tariff equivalent of tariff rate quotas (TRQs). The GTAP 6.0 protection data are, however, current only as of 2001; accordingly, as previously noted, these data were updated to take into account the full implementation of the Uruguay Round tariff cuts, China's accession commitments to the WTO, and the expiry of the WTO Agreement on Textiles and Clothing (ATC).

Table 4b presents the updated Canadian and Korean bilateral protection data for the GTAP merchandise trade classification,¹⁶ along with the 2001 trade levels in the GTAP database on the basis of which the simulations were run. Generally speaking, the size of the trade impact is determined largely by the size of the elasticities and the size of the "wedge" between domestic prices and imports created by protection. As can be seen, Canada has high tariffs (9.9-113.9%) in few product categories, namely dairy, transport equipment, vegetable oils, and textiles and apparel. These products accounted for 13.3% of total Canadian imports from Korea, with textile products accounting for more than half of this total (7.2%). The bulk of Canadian imports from Korea faced duty rates that ranged between 0.1% and 8.6%. Electronic equipment was clearly the most significant sector in this group, representing 28.9% of total Canadian imports, followed by motor vehicles and parts with a trade-weighted tariff rate of 5.9%. Other major Canadian imports from Korea were machinery and equipment as well as chemical products. The duty rates for these products were low.

Korea has much higher levels of protection than Canada. About 0.3% of Canadian exports to Korea faced tariffs ranging between 206.8% and 1,000%. The main Canadian exports in this category were cereal grains (tariff rate of 321.7%) and beverages and tobacco (206.8%). About 7.8% of Canadian exports to Korea faced tariffs of 10.4% to 47.4%. Most products in this category were agricultural and food products, in which Canada has a clear comparative advantage. The majority (71.6%) of total Canadian exports to Korea faced duty rates of 0.1% to 8.1%. Sectors in this category included coal, chemical products, metals, electronic equipment, machinery and equipment, and mineral products. About 20.3% of Canadian exports (pulp and paper products) to Korea were duty-free.

Given the generally higher tariffs faced by Canadian exporters to Korea than Korean exporters to Canada, the CKFTA would be expected to result in a larger percentage increase in Canadian exports than in Canadian imports. Given Korea's high levels of protection, particularly in the agricultural sector, Canadian exports to Korea would also be expected to be boosted by market share captured from third-country exporters. Such a trade diversion would reduce Korea's economic welfare gains derived from expanded trade with Canada.

¹⁶ In the simulation, tariffs for sectors with zero trade (e.g. Canadian exports of rice) are set to zero in order to avoid a spurious surge in exports/imports upon tariff elimination. This is consistent with standard practice in GTAP-model simulations.

Table 4b: Canadian and Korean bilateral tariffs & trade weights, GTAP classification,

	Trade-weighted Canadian tariffs, updated (%)	Canadian imports from Korea in 2001 (US\$ millions)	% of Canadian imports	Trade-weighted Korean tariffs, updated (%)	Korean imports in 2001 (US\$ millions)	% of Korea imports
Rice	0.0	0.0	0.0	1,000.0	0	0.0
Wheat	2.1	0.0	0.0	2.2	49.5	3.2
Cereal grains	0.0	0.0	0.0	321.7	2.6	0.2
Vegetables & fruit	1.1	5.8	0.2	31.4	1.6	0.1
Oil seeds	0.0	0.1	0.0	33.7	0.8	0.1
Sugar	0.0	0.0	0.0	2.9	0	0.0
Plant-based fibres	0.0	0.0	0.0	1.8	0	0.0
Crops	0.5	2.1	0.1	47.7	20.9	1.3
Live animals	0.0	0.0	0.0	0.1	0.2	0.0
Animal products	0.0	0.7	0.0	3.3	38.4	2.4
Wool	0.0	0.0	0.0	3.0	0	0.0
Forestry	0.0	0.1	0.0	2.0	3.8	0.2
Fishing	0.0	0.5	0.0	19.7	0.1	0.0
Coal	0.0	0.0	0.0	1.0	225.5	14.4
Oil	0.0	0.0	0.0	5.0	16.4	1.0
Gas	0.0	0.0	0.0	1.0	16.1	1.0
Minerals	0.0	0.2	0.0	1.4	104.5	6.7
Bovine meat	6.5	0.1	0.0	32.9	20.9	1.3
Meat products	9.9	0.4	0.0	24.5	29.6	1.9
Vegetable oils	17.5	0.1	0.0	14.4	6.1	0.4
Dairy products	113.9	0.5	0.0	47.7	7.2	0.5
Processed rice	0.0	0.7	0.0	1,000.0	0	0.0
Processed sugar	6.0	0.0	0.0	11.9	0.4	0.0
Food products	4.3	26.0	0.9	15.1	31.9	2.0
Beverages & tobacco	8.6	6.8	0.2	206.8	2.6	0.2
Textiles	9.9	214.5	7.2	8.1	17.9	1.1
Apparel	16.8	161.5	5.4	10.4	2.4	0.2
Leather products	6.1	28.7	1.0	5.1	3	0.2
Wood products	3.6	4.8	0.2	5.7	19.3	1.2
Paper & publishing	0.0	15.1	0.5	0.0	318.2	20.3
Petroleum & coal	0.0	34.0	1.1	6.0	4.8	0.3
Chemical products	3.0	187.9	6.3	3.3	182.2	11.6
Mineral products	0.9	16.9	0.6	7.9	6.4	0.4
Ferrous metals	0.2	113.6	3.8	3.0	1.2	0.1
Metals	0.1	14.6	0.5	3.0	128.3	8.2
Metal products	2.7	85.2	2.9	7.2	6.8	0.4
Motor vehicles & parts	5.8	730.8	24.6	8.0	43.9	2.8
Transport equipment	21.0	17.5	0.6	2.4	49.7	3.2
Electronic equipment	0.1	859.4	28.9	0.6	91.8	5.8
Machinery & equipment	0.9	400.2	13.5	5.6	109.2	7.0
Other mfg products	2.3	41.5	1.4	7.2	6.4	0.4
Total		2970.3	100.0		1570.6	100

Source: Authors' calculation based on the GTAP data.



Merchandise Trade Impacts

Table 5 sets out the changes in Canada's exports to Korea as a result of tariff elimination on bilateral trade in industrial and agricultural products based on the central scenario for closure.

Table 5: Changes in Canada's merchandise exports (f.o.b) to Korea under a CKFTA

	Pre-FTA 2001 US\$ millions (1)	Change in 2001 US\$ millions (2)	% Change (3)	2005 Base in C\$ millions (4)	Change in C\$ in millions (5)	% Change (6)
Primary sectors & food products (GTAP 1-25)	516	606	117%	1,296	1,177	91%
Other manufactured products (GTAP 26-41)	939	211	22%	1,386	333	24%
Total merchandise exports	1,456	817	56%	2,806	1,581	56%

Source: Authors' calculations based on GTAP simulations; central scenario closure. Note: differences in the percentages in column (3) vs. (6) reflect differences in weights and a minor difference in the definition of total merchandise trade in the GTAP database and the total as given by Statistics Canada based on the harmonized system (HS) classification of merchandise trade.

Based on the 2001 level and sectoral composition of Canada's merchandise exports to Korea, the CKFTA induces an increase of 56% (these results are reported in columns 1 through 3). Applying the percentage changes by GTAP sector to the 2005 level and sectoral trade composition (set out in columns 4 through 6) shows the implications for these results of the changes in Canada-Korea trade levels and composition between 2001, the base year for the GTAP model, and the most recent year for which we have complete sectoral merchandise trade data. Overall, the increase in Canadian exports is at the same at 56%. Based on the 2005 data, the value of Canadian exports to Korea would increase by \$1,581 million.¹⁷

The major export gains are in the primary and processed food sectors, areas where Canada has been making inroads into the Korean market in recent years. Exports of other manufactured goods are boosted to a lesser degree, although the gains are still substantial.

Table 6 sets out the changes in Canada's imports from Korea as a result of tariff elimination on bilateral trade in industrial and agricultural products. Based on the 2001 level and sectoral composition of Canada's merchandise imports from Korea, the simulation results indicate a 29% increase. Based on the 2005 level and sectoral composition, the increase is smaller at 19%; this largely reflects the steep decline in Korean exports of textiles and clothing since 2001. This difference demonstrates the potential sensitivity of the results to the initial conditions reflected in the model database; by the same token, it shows the importance of taking into account significant structural changes that have occurred in the post-base-year period, such as in this case, the major reorganization of global trade in textiles and clothing due to China's emergence and the expiry of the WTO's Agreement on Textiles and Clothing, which resulted in the dismantling of the quota-based system of trade in this sector. Based on the 2005 data, the value of Canadian imports from Korea would increase by \$1,006 million.

¹⁷ Note: the bilateral trade figures are not significantly influenced by the choice of closure. Accordingly, we report only the results for the central scenario for closure. As shown below, the main impact of alternative closures is on the extent of trade diversion experienced by third countries.

Table 6: Changes in Canada's imports (c.i.f) from Korea as a result of a CKFTA

	Pre-FTA 2001 US\$ millions (1)	Change in 2001 US\$ millions (2)	% Change (3)	2005 Base in C\$ millions (4)	Change in 2005 C\$ mil- lions (5)	% Change (6)
Primary sectors & food products (GTAP 1-25)	44	8	18%	46	8	17%
Other manufactured products (GTAP 26-41)	2,926	848	29%	4,891	916	19%
Total merchandise imports	2,970	856	29%	5,374	1,006	19%

In contrast to Canada's export gains, which are concentrated in the primary and food products sectors, Canada's import increases are primarily in the other manufactured goods sectors.

Trade Creation and Trade Diversion

The relative sizes of the trade creation/diversion effects of a CKFTA in respect of imports and exports are shown in Tables 7 and 8 below. All data in these tables are on the original GTAP 6.0 basis, based on 2001 trade levels and expressed in 2001 U.S. dollars.

Preferential access to a market created by a free trade agreement can lead to both trade creation and trade diversion. A concrete example serves to illustrate these effects. Consider, for example, the substantial increase in Canadian exports to Korea of primary and food products predicted by the model (as shown in Table 5). One such food product is boneless beef, which currently faces a 40% tariff in the Korean market. With the model's assumption of price-sensitive consumer preferences, the elimination of this tariff on Canadian boneless beef imports would necessarily expand demand in Korea for beef, as lower-priced imports from Canada lead to a decline in boneless beef prices in Korea. However, much of the increase in Canadian exports would not reflect the expansion of final demand, but rather the capture of additional market share in Korea. In part, this additional market share would be captured from higher-priced domestic Korean producers; this is trade creation, which drives efficiency-enhancing structural adjustment in the Canadian and Korean economies. However, in part, the additional market share would be captured from third-party suppliers of beef (e.g. Australia), which would still face the 40% tariff. So while Korean imports of beef from Canada would increase, imports of beef from third parties would fall; this is trade diversion. As discussed below, whereas trade created by the CKFTA leverages economic welfare gains, diverted trade partly offsets these gains.

As can be seen in Table 7, the choice of closure impacts significantly on the extent of trade diversion in import markets. The extent of trade diversion is greatest under the most restrictive closure, in which both capital and labour supply are fixed and the gains from trade in the factor markets take the form of increases in wages and returns to capital. The amount of trade diversion is least in the closure scenario, in which both labour and capital supply are fully flexible and gains from trade in factor markets are reflected in increases in jobs and capital. The expanded economic activity due to the increased supply of labour and capital generates additional demand for imports from all parties, offsetting the diversion effect of the CKFTA

with the third parties. In the case of Korea, the demand for imports—when both supplies of labour and capital are allowed to change—more than offsets the trade diversion effect, resulting in a net increase in imports from third parties.

Table 7: CKFTA Impact on Source of Canadian and Korean Merchandise Imports Under Alternative Closures, in 2001 US\$ millions

	Labour & capital fixed (i)	Labour flexible, capital fixed (ii)	Labour fixed, capital flexible (iii)	Labour & capital flexible (iv)	Central Scenario (v)
Change in Canadian imports					
Korea	852	858	859	891	856
ROW	-538	-455	-510	-161	-433
Total	315	403	349	730	423
Change in Korean imports					
Canada	884	887	887	907	887
ROW	-442	-284	-321	445	-384
Total	442	604	566	1,352	502

Table 8 below provides a similar comparison of the trade creation and trade diversion effects on the export side.

Table 8: CKFTA Impact on Destination of Canadian and Korean Merchandise Exports Under Alternative Closures, in 2001 US\$ millions

	Labour & capital fixed (i)	Labour flexible, capital fixed (ii)	Labour fixed, capital flexible (iii)	Labour & capital flexible (iv)	Central Scenario (v)
Change in Canadian exports to:					
Korea	814	818	818	835	817
ROW	-466	-419	-374	37	-286
Total	348	399	443	872	531
Change in Korean exports to:					
Canada	816	821	822	853	820
ROW	-404	-287	-149	841	-333
Total	412	534	673	1,694	487

As can be seen, the impact of alternative closures on export trade diversion is even greater than on the import side. For both Canada and Korea, the expansion of productive capacity under the least restrictive closure (iv) is sufficient to support not only the expansion of bilateral trade under the CKFTA but also additional exports to third parties. Conversely, under the most restrictive closure rule with fixed supply of labour and capital, a larger part of the bilateral trade stimulated by the CKFTA in fact requires a reduction in Canadian and Korean exports to third parties. This largely reflects the resource constraints that are assumed in this simulation. Productive resources are assumed to be fixed in supply and fully used in the both the pre-FTA context and the post-FTA context. Accordingly, the additional production to support increased exports to the FTA partner must come from increased efficiency of production; insofar as the efficiency gains induced by the FTA are insufficient, the implication is diversion of shipments from domestic or third-country markets to the FTA partner.

The empirical literature does not offer a consensus opinion on the extent of trade diversion caused by FTAs. The “conventional wisdom” has been that the trade-creation effect has dominated the trade-diversion effects. Direct attempts to measure whether FTAs reduce the amount of trade with third parties using gravity models have generally failed to show significant negative affects, although different studies have reached opposite conclusions on this point.¹⁸ Our central scenario, which has only comparatively modest amounts of trade diversion, is thus not out of line with the empirical literature.

Impact on GDP

Table 9 compares the changes in GDP as a result of the CKFTA for Canada, Korea and other trading partners, under the alternative closure assumptions; all data in this table are on the original GTAP 6.0 basis, based on 2001 data and expressed in 2001 U.S. dollars.

Table 9: Changes in GDP as a result of the CKFTA under Alternative Closures, Selected Regions, in 2001 US\$ millions

	Labour & capital fixed (i)		Labour flexible, capital fixed (ii)		Labour fixed, capital flexible (iii)		Labour and capital flexible (iv)		Central Scenario (v)	
	US\$	% ch	US\$	% ch	US\$	% ch	US\$	% ch	US\$	% ch
Canada	460	0.064%	797	0.111%	557	0.078%	1,921	0.268%	815	0.114%
Korea	104	0.024%	653	0.152%	462	0.108%	2,963	0.691%	296	0.069%
USA	-564	-0.006%	-481	-0.005%	-448	-0.004%	130	0.001%	-412	-0.004%
EU	-124	-0.002%	-132	-0.002%	-85	-0.001%	-5	0.000%	-89	-0.001%
Japan	-72	-0.002%	-84	-0.002%	-33	-0.001%	28	0.001%	-45	-0.001%
Mexico	0	0.000%	-1	0.000%	1	0.000%	-2	0.000%	-2	0.000%
Mercosur	-32	-0.004%	-30	-0.004%	-19	-0.002%	20	0.002%	-27	-0.003%
Caricom	-9	-0.009%	-8	-0.007%	-7	-0.007%	2	0.002%	-8	-0.008%
Andean	-4	-0.002%	4	0.001%	5	0.002%	52	0.018%	1	0.000%
China	-92	-0.008%	-86	-0.008%	-81	-0.007%	-36	-0.003%	-86	-0.008%
India	-39	-0.008%	-40	-0.009%	-36	-0.008%	-35	-0.007%	-37	-0.008%
Singapore	0	0.000%	1	0.001%	1	0.001%	4	0.005%	0	0.000%
Australia	-32	-0.009%	-23	-0.006%	-21	-0.006%	32	0.009%	-26	-0.007%
SACU	-3	-0.002%	-2	-0.002%	-2	-0.001%	4	0.004%	-3	-0.002%
ROW	-154	-0.004%	-91	-0.002%	-93	-0.002%	257	0.007%	-112	-0.003%
Total	-560	-0.002%	478	0.002%	202	0.001%	5,336	0.017%	266	0.001%

For Canada, the simulations suggest the CKFTA would result in an increase in the value of GDP of between 0.064% in the standard closure scenario (labour and capital supply both fixed) to 0.268% in scenario (vi) where both capital and labour supply are flexible. In the

¹⁸ A 2003 study for the Australian Productivity Commission contradicted this conventional wisdom, finding that most FTAs reported to the WTO were trade diverting. See Adams, R., P. Dee, J. Gali, and G. McGuire. 2003. “The Trade and Investment Effects of Preferential Trading Arrangements—Old and New Evidence.” Staff Working Paper. Australia Productivity Commission. Canberra. However, a more recent review of this same evidence using updated trade data reached the opposite conclusion, namely that most FTAs were net trade creating. See Dean A. DeRosa. 2007. “The Trade Effects of Preferential Arrangements: New Evidence from the Australia Productivity Commission.” Working Paper 07-1, Peter G. Peterson Institute for International Economics, Washington, D.C., January 2003.

central scenario (labour supply elasticity = 1, capital supply flexible), the GDP gain for Canada is 0.114%.

Applying these percentage changes to the size of Canada's GDP as it was in 2005 (\$1,369 billion), the corresponding range is from \$876 million to \$3.7 billion, with the central scenario estimate at \$1.6 billion.¹⁹

The value of Korean GDP would increase by between 0.024% and 0.691% across the five scenarios, with the central scenario estimate at 0.059%. Scaled to the size of Korea's economy in 2005 (\$955 billion), this amounts to a range of between \$229 million and \$6.6 billion, with a central scenario estimate of \$659 million.

Whereas the trade impacts generated by the model are relatively stable across the alternative scenarios (with the bilateral trade impacts showing almost no sensitivity), the estimated GDP gains vary greatly across the scenarios and thus depend heavily on the assumptions made by the modeller concerning the supply response of the economy to the incentives created by liberalized trade.

Empirical estimates of the relationship between expanded trade and economic activity suggest a strong impetus to GDP growth but overall smaller gains in GDP than in trade: "Research reported elsewhere ... using a variety of alternative techniques, suggests that annual GDP gains to each partner would amount to 20% of the expanded [bilateral] trade... These gains reflect the adoption of improved production methods in response to competitive pressures, the exit of less efficient firms, scale and network economics, reduced mark-up margins, more intensive use of imported inputs, and greater variety in the menu of available goods and services."²⁰

Applying this rule of thumb to the estimated increase in the trade share of GDP for Canada and Korea generated in the central scenario closure scenario, the implied GDP gain would equal about \$276 million for Canada and \$504 million for Korea. The estimated GDP gain for Korea in the central scenario matches up well with this simple rule of thumb; the gain for Canada is, however, substantially higher.

In considering the plausibility of the size of the estimated GDP gain for Canada, we take note of the following two considerations:

- Given the structural features of the Canadian and Korean economies that would be affected by an FTA, the GTAP simulations show higher gains for GDP for Canada than

¹⁹ These figures are not significantly impacted by the change in the expenditure composition of Canada's GDP between 2001 and 2005. A rough check on this can be made by applying the percentage changes generated in the model simulation for individual components of GDP (i.e. consumer expenditure, investment, government spending, exports and imports) to the levels of these GDP components in 2005 and recalculating the total GDP change. Taking this into account marginally reduces the gain in scenario (i) from \$880.8 million to \$872.9 million.

²⁰ Dean DeRosa and John Gilbert, "Estimates from Gravity and CGE Models," Chapter 8 in Gary Clyde Hufbauer and Richard E. Baldwin, "The Shape of a Swiss-U.S. Free Trade Agreement," op cit.; at p. 238.

for Korea under all the alternative closures, save for that where the constraints on both labour and capital are fully relaxed (iv).²¹

- The estimated GDP gain for Canada is estimated to be substantially larger (\$876 million) in the most restrictive closure scenario in which trade diversion effects are very large. The estimated GDP gain inferred from the rule of thumb would therefore require an implausibly larger trade diversion effect.

On these grounds, we conclude that the estimated GDP impact for Canada, which is larger than Korea's gain, and is consistent with only modest degrees of overall trade diversion, is in the right ballpark.

For most third parties, the proposed CKFTA is estimated to have a negative impact on GDP under the restrictive standard closure (i). However, the size of the negative impacts diminish as the constraints on the production capacity in both Canada and Korea are relaxed under less restrictive closure rules (ii)-(iii) and (v), and turn into positive gains for many regions under the least restrictive scenario (iv). For instance, the United States is shown to have a reduction of GDP by US\$564 million under the standard closure rule; however, in the least restrictive scenario (iv), it has a positive GDP gain of US\$130 million. Under the central scenario, the GDP impacts on third parties are, for the most part, negative but negligible; and global GDP impacts are overall modestly positive, dominated by the gains experienced by Canada and Korea. This latter outcome is consistent with the positive association between trade liberalization and global growth.

Impact on Household Economic Welfare

The most widely reported measure of the economic benefits or costs of a policy change in computable general equilibrium model simulations is known as “equivalent variation”; this is the amount of money that would make the household sector as well off in the pre-policy shock scenario as in the policy shock scenario.²²

Table 10 reports the economic welfare gains generated in the simulation for Canada, Korea and other countries/regions, broken down into three main components:

- (a) Changes in allocative efficiency that arise from the reallocation of production inputs (labour and capital) to their most effective applications induced by the reduction in the level of tariff distortions in the FTA partner economies.
- (b) Changes in the terms of trade (the ratio of export to import prices) induced by the impact of the FTA on prices of goods and services in each country.

²¹ For both Canada and Korea, the GDP gains under the least restrictive closure rules (iv) are much bigger than those under the scenarios (ii)-(iii) and (v). This may be understood intuitively on the following basis. When a constraint is imposed on one of primary production factors (labour or capital), economic growth is subject to diminishing returns. When the constraints on all primary factors are removed under the scenario (iv), however, the economy expands under constant returns to scale, which generates a greater GDP impact.

²² This measure is technically Hicksian equivalent variation calculated using pre-shock prices.

- (c) Changes in the availability of factor endowments such as labour and capital induced by the FTA under alternative scenarios. This applies to Canada and Korea only; in other regions, the supply of labour and capital in other countries remains fixed.

For purposes of this international comparison, the data are presented in terms of the original GTAP data – i.e., in 2001 US\$ scaled to the size of the various economies in 2001.

Table 10: Regional Household Economic Welfare Impacts, in 2001 US\$ millions

	Labour & capital fixed (i)	Labour flexible, capital fixed (ii)	Labour fixed, capital flexible (iii)	Labour & capital flexible (iv)	Central Scenario (v)
Canada (total)	143	514	280	1,868	586
Allocative efficiency	15	192	57	753	192
Terms of trade	139	129	113	8	90
Endowment	0	203	117	1,103	308
Korea	-2	632	321	2,979	201
Allocative efficiency	-74	62	-10	545	-32
Terms of trade	87	54	33	-202	70
Endowment	0	525	308	2,611	176
U.S.	-130	-118	-104	2	-92
Allocative efficiency	-7	-8	-8	-13	-8
Terms of trade	-111	-97	-86	28	-73
ROW	-121	-95	-70	110	-101
Allocative efficiency	-44	-51	-37	-38	-43
Terms of trade	-115	-85	-61	166	-86
Total	-110	922	427	4,960	594
Allocative efficiency	-110	194	3	1,247	110
Terms of trade	0	0	0	0	0
Endowment	0	728	424	3,713	485

Note: Allocative efficiency, terms of trade, and endowment effects do not add exactly to the total. The GTAP welfare calculation also includes a term that reflects the price differentials between saving and investment.

As in the case of the GDP impacts, the estimated economic welfare gains vary considerably across the alternative closure scenarios. The simulations suggest that Canadian households would derive an economic welfare benefit of between US\$143 million and US\$1.9 billion, with our central scenario estimate at US\$586 million. Scaled to the size of Canada's economy in 2005, the corresponding range is between \$266 million under the most restrictive assumptions and \$3.5 billion under the least restrictive assumptions; the central scenario estimate is \$1.1 billion.²³

²³ The scaling up from 2001 US\$ figures to 2005 C\$ figures is done as follows: the GTAP figure for equivalent variation for Canada of \$143.1 million in 2001 US\$ is 0.035% of 2001 consumer expenditure. Applying this percentage to consumer expenditure of \$760,380 million in 2005 yields the above estimate of equivalent variation in 2005, expressed in C\$. The other figures are calculated in like fashion.

For Korea, the results range from a negligible loss under the most restrictive closure scenario to a gain of almost US\$3 billion in the least restrictive scenario²⁴. Most other regions, and the global economy as a whole, would incur losses due to trade diversion under the most restrictive scenario; however, the outcomes for third parties improve sharply under less restrictive scenarios; for the global economy as a whole, economic welfare improves as resource constraints in Canada and Korea are relaxed.

With regard to the sources of gains/losses, this is influenced heavily by the closure assumption. If capital and labour are fixed, as they are in scenario (i), increased demand largely results in increases in wages and in returns to capital; these higher factor costs are passed on in the form of higher prices which are reflected in the model's accounting as terms of trade gains. In scenarios in which higher factor prices induce greater labour and capital supply, the smaller become the net increases in wages and returns to capital; in welfare accounting, the gains attributed to terms of trade decline while the gains attributed to increases in allocative efficiency and endowments increase. Under the least restrictive scenario (iv), the endowment effect overwhelms all other gains, accounting for roughly 60% and 80% of the total welfare gains for Canada and Korea, respectively.

How Canada and Korea derive benefits from the CKFTA (i.e. whether largely in the form of improved terms of trade or in the form of improved allocative efficiency and/or increased endowments) determines whether the impact on the rest of the world is positive or negative. This can be understood intuitively on the following basis: since one region's export prices are another region's import prices, global terms of trade impacts must net out to zero. Accordingly, improved terms of trade for Canada and Korea necessarily translate into terms of trade deterioration in the rest of the world combined.²⁵ Scenarios in which Canada and Korea extract gains in the form of terms of trade improvement thus are necessarily worse for the rest of the world than scenarios in which the gains come in the form of improved allocative efficiency and/or increased supply capacity.

²⁴ The small decline in household economic welfare for Korea in the most restrictive scenario contrasts with the gain in GDP reported earlier for the same scenario. This result reflects the fact that GDP gains are reported taking into account the relative price changes induced by the FTA while equivalent variation, the measure of household economic welfare, does not take these price changes into account. Since Korea experiences terms of trade gains but allocative efficiency losses the choice of post-shock versus pre-shock prices in doing such a calculation can result in one measure being positive and the other negative if both are relatively close to zero.

²⁵ The widespread losses in terms of trade in the most restrictive closure scenario reflect the loss of exports to Canada and Korea due to preference erosion. Since most countries have exports to Canada and Korea, they all tend to be affected in this manner. Mechanically, the loss of exports to Canada and Korea results a price decline of production in other countries to restore equilibrium; this is only partially offset by the extent to which Canadian and Korean imports are reduced (since these imports are also higher priced in the shock scenario) and replaced by domestic production abroad or from third-party imports. The Armington assumption is an essential factor here: the imperfect substitutability of goods according to location of production allows relative increases in prices of Canadian and Korean products—if there were perfect substitutability, competitive forces would negate these terms of trade effects.

The estimated economic welfare gains for Canada in the central scenario (\$1.1 billion) are broadly consistent with the size of the gain in GDP (\$1.5 billion) and the size of the incremental bilateral trade flows (\$2.6 billion). The gains for Canada are greater than for Korea; this is to be expected since the negative welfare impacts of trade diversion for Korea should be greater given the overall higher level of tariffs.

TRADE IN SERVICES

A specific estimate of the impact of services trade liberalization under the CKFTA is not provided in this study. This reflects the following considerations.

First, the General Agreement on Trade in Services (GATS), which provides the framework for the liberalization of international trade in services, classifies trade in services into 155 service types and four modes of supply:

- (a) Cross-border supply: a service is supplied from a supplier's country of residence to a consumer's country of residence.
- (b) Consumption abroad: a service is supplied through the movement of a consumer to a supplier's country of residence.
- (c) Commercial presence: a service is supplied through the movement of a commercial organization to a consumer's country of residence.
- (d) Presence of natural person: a service is supplied through the movement of a natural person to a consumer's country of residence.

Barriers to trade in services can be put in place in each of the four modes of supply. The measurement of barriers to services trade thus involves quantifying the trade restrictive effect of a wide variety of domestic regulatory measures, which indirectly affect trade in all four modes. Unlike the case of merchandise trade, for which there exists a comprehensive and reasonably reliable data set describing the height of border barriers, a comprehensive database on the barriers to Canada-Korea services trade does not exist.²⁶ By the same token, it is not possible to obtain an estimate of the complete elimination of trade barriers, as was done above for goods trade. An estimate of the services component of the CKFTA would require before-the-fact knowledge of the specific measures that would be subject to liberalization, and this is not available.

Second, given the various alternative modes for trade in services, companies will tend to choose the path of least resistance—e.g., opting for commercial presence (mode 3) over cross-border provision (mode 1), or vice versa, depending on which approach is less costly in terms of regulatory compliance. It follows that liberalizing one mode (e.g. cross-border trade) in a context in which another mode is relatively unimpeded (e.g. commercial presence

²⁶ For a detailed review of the issues facing the quantification of services trade barriers and estimating the impact of services trade liberalization, with specific reference to the Canadian context, see the trio of articles in Part II of John M. Curtis and Dan Ciuriak (eds.) *Trade Policy Research 2002* (Ottawa: Department of Foreign Affairs and International Trade, 2003): Brian R. Copeland, "Benefits and costs of trade and investment liberalization in services: Implications from trade theory"; Zhiqi Chen and Lawrence Schembri, "Measuring the Barriers to Trade in Services: Literature and Methodologies"; and Shenjie Chen, "Trade and Investment in Canada's Services Sector: Performance and Prospects."

through inward FDI) may yield little in the way of impacts since firms will have already committed resources to the path of least resistance. In other words, there is as much uncertainty about the market response to a change in a restrictive measure as there is about the quantification of the measure's restrictive force.

Third, there are equivalent difficulties to evaluating the liberalizing effect of specific negotiated changes to domestic regulations to the difficulties involved in estimating the overall trade-impeding effect of the regulatory framework.

Several elements of the negotiation agenda address services trade in one mode or another: financial services, cross-border trade in services, investment and temporary movement of persons. Other elements of the negotiations that facilitate international commerce could also be expected to impact to some extent on the ease of conducting services trade between Canada and Korea. Absent specific estimates, it can be inferred that the results for merchandise trade understate the total trade impact, the impact on GDP and the impact on consumer welfare.

INVESTMENT LIBERALIZATION

The GTAP scenarios elaborated above do not take into account measures that might be included in a CKFTA to liberalize or facilitate direct investment. To take into account the impact of investment liberalization, a dynamic CGE model that includes FDI is required. Such a model is being developed for Canada but is not yet available. At present, it should be noted that the potential to expand two-way direct investment between Canada and Korea appears to be reasonably strong, particularly with regard to Canadian direct investment into Korea. This can be inferred from an index measuring the overall level of investment restrictiveness in the two countries in terms of tax equivalents. For Canada, restrictions on inward FDI from the FTAP model database²⁷ are evaluated to be equivalent to a 6.11% tax on foreign affiliates' capital; the equivalent figure for Korea is 22.01%.

Absent specific estimates, it can be inferred that the GDP and consumer welfare impacts reported above deriving from merchandise trade liberalization likely understate the extent of gains in these areas from such investment liberalization as might be forthcoming pursuant to the CKFTA.

²⁷ For background on the FTAP model and data see, Australian Productivity Commission "The Structure of the FTAP Model" at <http://www.pc.gov.au/research/rm/ftap/index.html>.

APPENDIX 1: SECTORAL INTERVENTIONS

This appendix sets out the analytical basis for adjustments to the simulations to take into account structural or institutional developments that have implications for the response of two sectors in the economy—automotive and dairy—to a CKFTA.

Automobiles and Auto Parts

(Trade data for this category of products are under HS8407-8409, HS860900, HS87)

Since 2001, the base year for the GTAP model, Korean auto assemblers have greatly expanded their sales in North America, including in Canada, and as a result two Korean firms have made the strategic decision to begin production in North America to serve the North American market. As noted in a study on the auto sector commissioned by the Department of Foreign Affairs and International Trade, "...[t]he next investor in North American assembly plants will be Hyundai, which recently opened a plant in Alabama. Early 2006 it decided on a site in Georgia for its Kia subsidiary, nearby its Hyundai plant in Montgomery, AL so it can share suppliers for its two plants. Further capacity expansions are highly uncertain; the viability of the Kia plant already relies on a very ambitious sales projection and the Alabama plant will take some time to ramp up its production to its full capacity of 300,000 vehicles per year."²⁸

As background, Canada's imports of automotive products from Korea totalled \$1.7 billion in 2005 up by about 55% from \$1.1 billion five years ago. Imports of assembled vehicles (almost entirely passenger automobiles) rose by about 50% in this period while imports of automobile parts grew even faster, by 174%, albeit from a relatively low base. Table A1 breaks down the growth in vehicle imports from Korea by firm.

Table A1. Sales of Korean Light Vehicle Imports in Canada

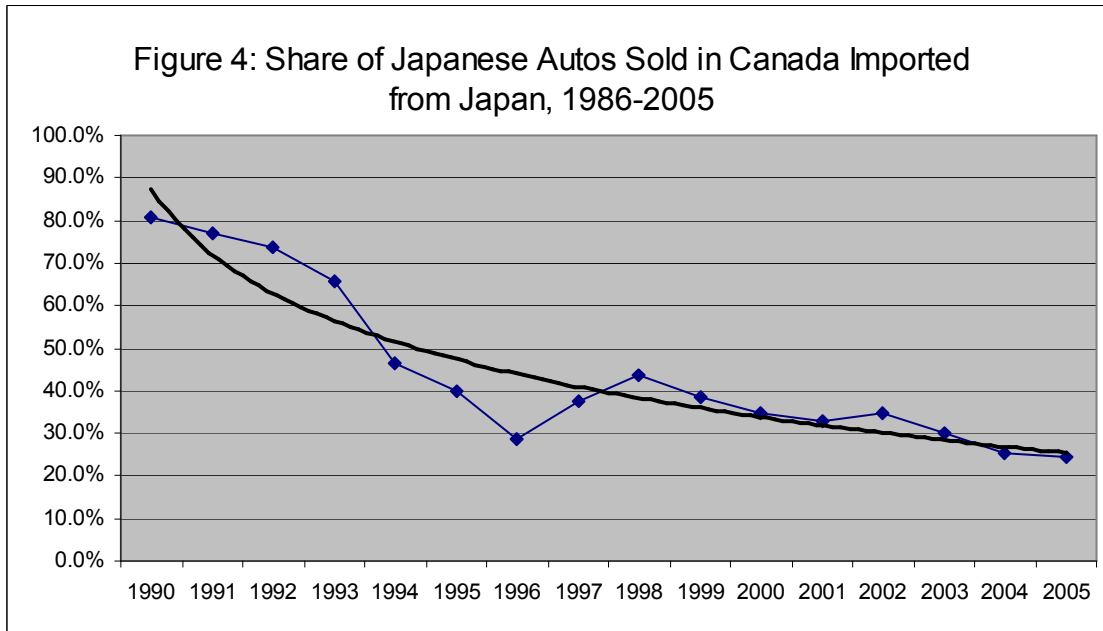
Company	2001	2002	2003	2004	2005	% Share in 2005
Daewoo	1,567	403	0	0	0	0.000
General Motors	0	0	1,777	38,094	36,090	0.283
Hyundai	56,166	66,917	65,378	58,666	63,061	0.494
Kia Motors	26,013	29,014	30,523	26,409	28,286	0.222
Suzuki	0	0	31	626	236	0.002
Grand Total	86,746	96,334	97,709	123,795	127,673	1.000

Source: Industry Canada, "Partial Equilibrium Analysis of the Impact of a Canada–Korea FTA on the Canadian Automotive Industry"; citing information obtained from Ward's AutoInfoBank.

Insofar as Canadian demand for particular models is satisfied from these new U.S. plants, this market segment would not be impacted by the CKFTA. The best information available at the present time to assess the implications of the Korean "transplants" on vehicle sourcing is the prior experience of the most comparable suppliers, namely the Japanese auto firms. The

²⁸ Johannes Van Biesebroeck, "The Canadian Automotive Market," May 20, 2006; p 75. According to updated information, Hyundai production in North America is slated to grow from 91,218 units in 2005 to the 450,000 range by 2012. The Kia plant has since been confirmed, with production slated to start in 2010 building to about 250,000 units by 2012. Source: Ward's AutoInfoBank.

following figure describes the sourcing patterns for Canadian sales of Japanese transplants in North America.



Source: Ward’s AutoInfoBank . Trend line is an exponential trend fitted using Excel spreadsheet.

As shown, Japanese firms that established plants in North America progressively shifted the bulk of their assembly of units for sale in Canada to their North American operations. Note that the “undershoot” from 1994 to 1997 coincided with a period of very high values for the yen and sharply lower volumes of imports from Japan as well as of total sales of Japanese brands in Canada; subsequently, as volumes picked up as the extent of yen over-valuation eased, the share sourced from Japan resumed a more gradual decline. The trend appears to be flattening out in the 30% to 40% range. This result does not appear to depend upon where in North America the plants are located: the pattern of sourcing of Toyota, which has capacity in Canada, is similar to that of Nissan, which does not.²⁹

The early results from the Hyundai plant in Montgomery, Alabama are consistent with the Japanese patterns: within the first year and half of production, the share of Canadian sales accounted for by North American assembled units has risen to over one quarter and is on a steeply rising trend from month to month. A private-sector forecast projects this share to rise to about 65% by 2012.³⁰

The advent of Korean transplants in North America raises a number of issues for the analysis of a CKFTA. Insofar as Korean transplants do not satisfy NAFTA rules of origin, their importation into Canada from the United States attracts the MFN tariff. However, such a state of affairs is likely to be transitional, with the transplants organizing their production to meet NAFTA rules of origin, just as the Japanese firms have done. Importantly, this means that

²⁹ According to Ward’s AutoInfoBank, the share of Nissan automobiles sold in Canada directly imported from Japan declined from 99.9% in 1990 to 33.2% in 2005.

³⁰ Source: Wards Automotive Infobank.

automotive parts production for Hyundai and Kia North American vehicles is likely to shift to their North American production centres.³¹ Once that happens, the impact of tariff elimination on Korean-brand auto sales in Canada would be limited to models shipped from Korea.

Based on the average Japanese transplant experience and forecast data for Hyundai-Kia North American production, we assume that only 35% of the units sold in Canada would be shipped from Korea; the rest would be assembled in North America. Since Hyundai and Kia account for only 71.6% of assembled vehicles imported into Canada and assembled vehicles account for only 92% of the value of Korean imports, this implies that only 57.2% of the Korean export base to Canada benefits from tariff elimination.³² To reflect the impact of tariff elimination in the presence of Korean transplant operations in North America, we therefore reduce the effective protection rate in the GTAP database by 57.2%, from 5.8% to 2.5%.

Dairy Products

(Trade data for this category of products are under HS40, HS170211, HS170219, HS210500 and HS350110)

Both Canada and Korea impose high tariffs on the imports of dairy products. The GTAP 6.0 database reports 113.9% for the weighted Canadian import tariff on dairy products and 47.7% for Korea, after taking into account the conventional *ad valorem* tariffs, *ad valorem* equivalents of specific rates, mixed and compound rates, as well as the effective protection provided by tariff rate quotas (TRQs). A simulation of tariff elimination in this sector would result in very large boosts to bilateral trade, as shown in Table A2.

Table A2. CKFTA Impact on Trade in Dairy Products

	Pre-FTA 2001 US\$ millions	Post-FTA, 2001 US\$ millions	Change in 2001 US\$ millions	% Change	Change scaled to 2005 in C\$ millions
Exports to Korea	7.0	93.1	86.2	1,239.6%	186.3
Imports from Korea	0.5	121.8	121.3	22,888.7%	87.5

Neither estimated effect appears to be credible. While Canada has the export capacity to fill the simulated growth in demand from Korea and some established presence in the Korean market,³³ Canada's exports of dairy products are subject to WTO constraints. In a WTO chal-

³¹ A number of major Korean suppliers have already located near the Alabama plant, following the pattern of the Japanese suppliers.

³² The calculation is as follows: Hyundai and Kia accounted for 71.5% of Korean auto imports into Canada in 2005 by number of units. Assuming the non-Hyundai-Kia production destined for Canada (which accounted for 28.5% of Korean auto imports in 2005) remains in Korea, the level of Korean-sourced units sold in Canada in the post-transplant "equilibrium" as a share of the pre-transplant level is then $.716 \times .35 + .284 = .535$. Autos account for 92% of Korean shipments to Canada and parts 8%; accordingly the value of Korean total automotive shipments in the post-transplant "equilibrium" as a share of the pre-transplant automotive shipments = $.535 \times .92$ plus $.08 = .572$. In the GTAP 6.0 database, the trade weighted tariff rate for Canada's imports of Korean automobile products was 5.8%. The FTA impact is then calculated by reducing the level of border protection by 57.2% from 5.8% to 2.5%.

³³ In 2005, Canada exported \$279 million worth of dairy products, of which \$149 million went to the U.S. Exports to Korea amounted to only \$9 million, or about 3.5% of total Canadian exports of dairy products; of this total, \$7.9 million were products consisting of natural milk constituents, and the remaining \$1 million were cheese and ice cream.

lenge to Canada's exports of dairy products under the system of supply management, New Zealand and the United States successfully argued that exports of dairy products from Canada were subsidized and should count against Canada's WTO commitments to reduce subsidized agricultural exports.³⁴ In response to the original Canada-Dairy panel and Appellate Body reports, the Canadian supply-management system was modified to exclude export milk from the domestic management scheme. However, in a subsequent challenge to this regime, the WTO determined that this scheme did not bring Canada into compliance with its obligations under the Agreement on Agriculture; even exports based on milk excluded from the domestic management system were deemed to benefit from subsidies, and thus must count against Canada's allowed amount of subsidized exports.³⁵ This ruling effectively constrains Canada's exports of dairy products outside of the allocated quotas, restricting any response to a CKFTA.

With regard to Canadian imports, imports of fluid milk are restricted under Canada's negotiated Uruguay Round commitments to milk for household use and subject to a tariff rate quota. Since fluid milk is not traded over large distances because of its weight, for practical purposes the tariff rate quota on fluid milk applies only to the United States for cross-border purchases of milk. Otherwise, imports of dairy products are in the form of constituent milk components and processed foods such as cheese, yoghurt, ice cream, etc. Any Korean expansion of exports to Canada would have to be in these categories.

As shown in Table A3 below, Korea is a major net importer of most dairy products and has minimal exports in any dairy category save for a handful of speciality products in the category of "buttermilk, yogurt, kephir etc, flavoured etc or not," in which in fact it is a small net exporter. Shipments to Canada are minimal. The 15-fold expansion of Korea's worldwide dairy exports implied by the GTAP simulation would appear to require unrealistic supply-side responses in Korea.

Without pre-judging what might be negotiated in a CKFTA with regard to trade in dairy products, for the purposes of the present assessment this sector is excluded on the basis that the GTAP estimates indicate an implausibly large effect and there is no information on hand on which otherwise to base an assessment of dairy trade as it might be affected by a CKFTA.

³⁴ For a review of the case history, see Report of the Panel, *Canada – Measures Affecting the Importation of Milk and the Exportation of Dairy Products*, WT/DS103/RW, WT/DS113/RW, 11 July 2001, p. 11, para 3.2.

³⁵ *Ibid.*, p. 66, para 7.2.



Table A3: Korea's Trade in Dairy Products with the World, US\$ millions

HS	Exports	2004	2005	2006
0401	Milk and cream, not concentrated or sweetened	0.05	0.02	0.00
0402	Milk and cream, concentrated or sweetened	0.22	0.57	0.48
0403	Buttermilk, yogurt, kephir etc., flavoured etc. or not	4.17	4.28	4.71
0404	Whey & milk products NESOI ³⁶ , flavoured etc. or not	0.07	0.25	1.75
0405	Butter and other fats and oils derived from milk	0.00	0.00	0.05
0406	Cheese and curd	0.78	1.31	0.80
	Total dairy exports	5.29	6.43	7.79
HS	Imports	2004	2005	2006
0401	Milk and cream, not concentrated or sweetened	5.96	4.75	2.58
0402	Milk and cream, concentrated or sweetened	7.25	13.33	14.03
0403	Buttermilk, yogurt, kephir etc., flavoured etc. or not	1.03	0.30	0.61
0404	Whey & milk products NESOI, flavoured etc. or not	49.42	67.64	64.73
0405	Butter and other fats and oils derived from milk	5.39	9.47	6.52
0406	Cheese and curd	88.51	106.86	111.08
	Total dairy imports	157.56	202.35	199.54

³⁶ Not elsewhere specified or included

APPENDIX 2: GLOSSARY

Aggregate utility function: A measure of satisfaction. Underlying most economic theory is the assumption that people do things because doing so gives them utility. People want as much utility as they can get. Aggregate utility function is an aggregation of each individual's satisfaction.

Allocative efficiency: Allocative efficiency is improved if production is shifted to lower-cost producers and/or if consumers gain access to lower-cost goods.

Armington elasticity: The degree of substitution between domestic and imported products, or between different sources of imports. It is a major behavioural parameter that determines the quantitative results in the policy simulation.

Caribbean Community and Common Market (CARICOM): Originally the Caribbean Community and Common Market, CARICOM was established by the Treaty of Chaguaramas, which came into effect on August 1, 1973. The first four signatories were Barbados, Jamaica, Guyana and Trinidad and Tobago. A Revised Treaty of Chaguaramas establishing the Caribbean Community including the CARICOM Single Market and Economy came into force on July 5, 2001.

Cobb-Douglas production function: A mapping from quantities of inputs to quantities of an output as generated by a production process. The Cobb-Douglas functional form of production function shows that the shares of labour and of capital and of others within the economy are relatively constant over time. This function is widely used in policy simulation.

Computable general equilibrium (CGE): A class of economic model that seeks to explain the economic-wide changes in production, consumption, and price. It uses actual economic data to estimate how an economy might react to changes in policy or other external factors. It is widely used to analyze the aggregate welfare and distributional impacts of policies whose effects may be transmitted through multiple markets, or different policy instruments. A CGE model usually consists of equations describing economic behaviour of economic agents and a database that is consistent with the model equations.

Constant elasticity of substitution (CES) production function: A function describing production often with two inputs that are usually capital and labour. In this function form, the elasticity of substitution between capital and labour is constant.

Elasticity (supply-side): Measures how much the quantity of supply of a good changes if its price changes. If the percentage change in quantity is more than the percentage change in price, the good is price elastic; if it is less, the good is inelastic.

Endogenous variables: The variables that are solved inside the economic model.

Exogenous variables: The variables that are given outside the economic model.



Foreign direct investment: Investing directly in production in another country, either by establishing an enterprise, expanding operation of its existing business, or acquiring ownership or control of an existing enterprise.

General Agreement on Trade in Services (GATS): The creation of the GATS was one of the landmark achievements of the Uruguay Round, whose results entered into force in January 1995. The GATS was inspired by essentially the same objectives as its counterpart in merchandise trade, the General Agreement on Tariffs and Trade (GATT): creating a credible and reliable system of international trade rules; ensuring fair and equitable treatment of all participants (principle of non-discrimination); stimulating economic activity through guaranteed policy bindings; and promoting trade and development through progressive liberalization.

Global Trade Analysis Project (GTAP): A global network of researchers and policy makers conducting quantitative analysis of international policy issues using a CGE model developed by Purdue University.

Gravity model: Predicts bilateral trade flows based on the economic sizes of (often using GDP measurements), distance, and other variables between countries. The model has often been used to test the effectiveness of trade agreements and organizations such as NAFTA and the WTO.

Gross national income (GNI): A term now used instead of GNP (see below).

Gross national product (GNP): A measure of a country's economic performance that is calculated by adding to Gross Domestic Products (GDP) the income earned by residents from investments abroad, less the corresponding income sent home by foreigners who are living in the country.

Input-output table: A matrix representation of a nation's economy. It depicts how the output of one industry goes to another industry where it serves as an input, and thereby makes one industry dependent on other both as customer of output and as supplier of inputs. It could be used to predict the effect of changes in one industry on others and by consumers, government, and foreign suppliers on the economy.

Intermediate inputs: Goods or services used as inputs in the production of other goods, such as partly finished goods or raw materials. A firm may make then use intermediate inputs, or make then sell, or buy then use them.

International Trade Centre (ITC): Originally established by the GATT and now operated jointly by the WTO and the UN, the latter acting through the UN Conference on Trade and Development (UNCTAD). The focal point of ITC is for technical cooperation on trade promotion of developing countries.

South African Customs Union (SACU): Comprises Botswana, Lesotho, Namibia, South Africa and Swaziland.



Tariff rate quota (TRQ): Combines two policy instruments that nations have used to restrict imports: quotas and tariffs. Imports entering under the quota portion of a TRQ are usually subject to a lower, or sometimes a zero, tariff rate. Imports above the quota's quantitative threshold face a much higher tariff.

World Trade Organization (WTO): The only global international organization dealing with the rules of trade between nations. At its heart are the WTO agreements, negotiated and signed by the bulk of the world's trading nations and ratified in their parliaments. The goal is to help producers of goods and services, exporters, and importers conduct their business. The WTO began life on January 1, 1995, but its trading system is half a century older. Since 1948, the General Agreement on Tariffs and Trade (GATT) had provided the rules for the system. Over the years GATT evolved through several rounds of negotiations. The last and largest GATT round was the Uruguay Round, which lasted from 1986 to 1994 and led to the WTO's creation.

WTO Agreement on Textiles and Clothing (ATC): Since January 1, 1995, international textiles and clothing trade has been going through fundamental change under the 10-year transitional program of the WTO's Agreement on Textiles and Clothing (ATC). Before the Agreement took effect, a large portion of textiles and clothing exports from developing countries to the industrial countries was subject to quotas under a special regime outside normal GATT rules. Under the Agreement, WTO members have committed themselves to remove the quotas by January 1, 2005 by integrating the sector fully into GATT rules.



APPENDIX 3: ACRONYMS

ASEAN	Association of Southeast Asian Nations
ATC	WTO Agreement on Textiles and Clothing
CA4	Central American Four
CARICOM	Caribbean Community and Common Market
CDE	Constant difference of elasticities
CEPII	Centre d'Etudes Prospectives et d'Informations Internationales
CES	Constant elasticity of substitution
CGE	Computable general equilibrium
CKFTA	Canada-Korea Free Trade Agreement
DFAIT	Foreign Affairs and International Trade Canada
EFTA	European Free Trade Association
FDI	Foreign direct investment
FTA	Free trade agreement
GATS	General Agreement on Trade in Services
GDP	Gross domestic product
GNI	Gross national income
GTAP	Global trade analysis project
IMF	International Monetary Fund
ITC	International Trade Centre
MERCOSUR	Southern Cone Common Market
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Co-operation and Development
ROW	Rest of world
SACU	South African Customs Union
TRQ	Tariff rate quota
WTO	World Trade Organization

