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Proliferation of preferential trade agreements: A quantification of its impact

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Abstract

Literature has frequently evaluated the proliferation of preferential trade agreement (PTAs) by counting the number of PTAs or the share of international trade covered by these agreements. But these indicators have been recently criticized. In this paper, using a CGE model, we attempt to quantify the economic impact (measured by its welfare effect) of the proliferation of PTAs. Results show that the welfare impact of PTAs is limited and often vanishes quickly because preferences are eroded by the proliferation of PTAs. This contrasts with the gains from non-discriminatory liberalization. Therefore we argue that the proliferation of PTAs is unlikely to continue. This paper also has methodological implications for CGE modeling: ignoring the proliferation of PTAs bias significantly the results; and the bias is not only potentially large but also its direction is a priori uncertain.

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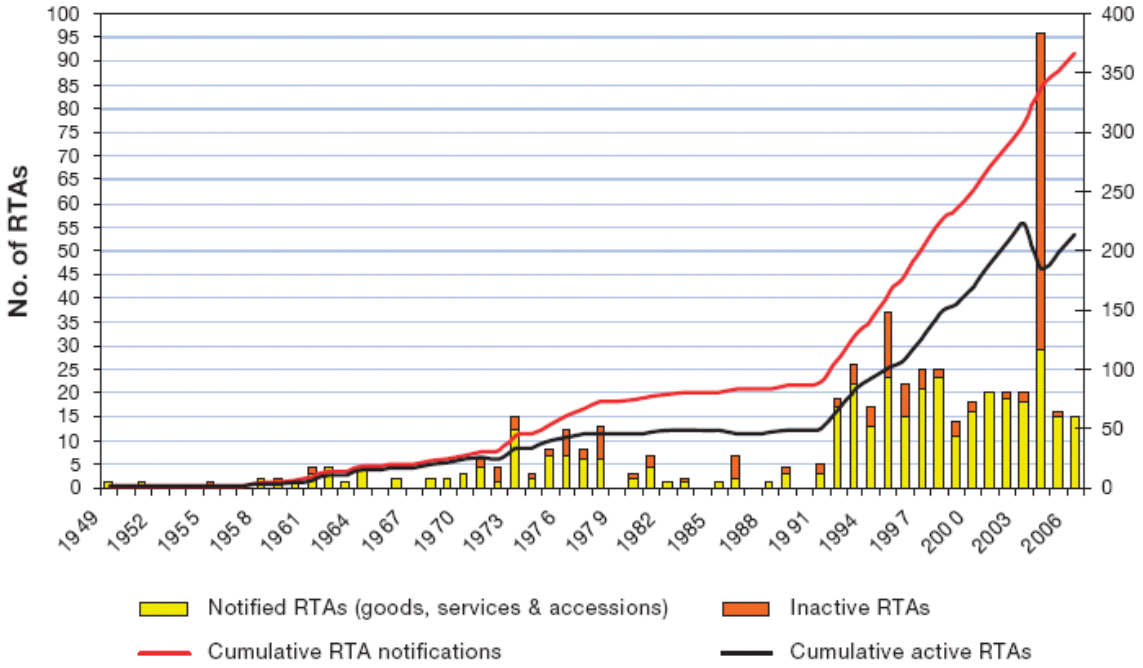
Contents

I. INTRODUCTION

Preferential trade agreements (PTAs) have been proliferating. As indicated in Figure 1, the number of active PTAs is increasing at an exponential speed despite the enlargement of the EU from 15 to 25 members in 2004, which has considerably reduced the number of active agreements. At end-2006, the WTO counted more than 214 active PTAs notified to the organization. To this number, one should add about 70 agreements that have not been notified and about 30 that have been signed but not yet implemented (Fiorentino et al., 2007).

Figure 1. PTAs notified to the GATT/WTO by year of entry into force (1949-2006)



Source: Fiorentino, Verjeda, and Toqueboeuf (2007).

However, Pomfret (2006) argued that this increase in the number of PTAs as well as in the proportion of world trade which takes place between signatories of PTA are "meaningless measures of the extent of regionalism." Messerlin (2007) pointed that the number of PTAs "strongly exaggerates and distorts the true importance of the rise of regionalism." Moreover these indicators, although frequently used, do not provide any insight on the economic impact of the proliferation of PTAs. In this paper, we try to move the debate forward by providing a sense of the economic impact of the proliferation of PTAs by estimating its welfare impact, using a CGE model.

CGE simulations depend crucially on their database. Constructing a global database is a daunting task and delays between the reference year of the database and the time of its release are unavoidable. This time lag would not be a problem for estimating the impact of a regional trade liberalization if PTAs were rare. But this is not the case and this paper argues that overlooking the proliferation of PTAs biases simulation results because it ignores the impact of preference erosion.

The Korea-U.S. Free Trade Agreement (FTA) will be a benchmark in this paper for several reasons. First, it was signed recently but six years after the reference year of the most commonly used CGE database. In the meantime, both the Republic of Korea (hereafter Korea) and the U.S. have multiplied bilateral trade agreements.

Second, the Korea-U.S. FTA may prompt another wage of regional integration. Shortly after the agreement was announced in April 2007, Japan expressed its interest in reviving the suspended PTA talks with Korea, China indicated its intention to speed up the feasibility study of a PTA with Korea. Canada and the EU, which had not negotiated new PTAs for several years, have changed their policy. In May, the European Commission announced it has launched negotiations with Korea and two months later had already concluded two rounds of discussions. In June, after reaching an agreement with EFTA, the Canadian trade minister claimed that his country was "back in the game."

Third, the Korea-U.S. FTA is systematically important. It involves two large trading nations. According to the WTO (2006b), in 2005, the U.S. and Korea were respectively the largest and the eleventh largest trading countries. The U.S. is Korea's second largest trading partner while Korea is the U.S. seventh largest partner for trade in goods.[1]

Finally, the Korea-U.S. FTA share the characteristics that Fiorentino et al. (2007) have identified as the most distinctive features of the current wave of PTAs:

- Unlike most PTAs of previous waves, it is not an agreement between neighbors but a cross-regional agreement.
- It is a bilateral FTA, the increasingly the most favored form of PTAs.[2]
- It has been negotiated in only fourteen months[3] providing support to the fact that "the timing from the launching of the negotiations to their conclusion has been shrinking in recent years" (Fiorentino et al., 2007).

Section 2 reviews the literature on CGE simulations of the Korea-U.S. FTA and shows that the proliferation of PTAs is overlooked. Section 3 summarizes the aspects of the theoretical literature on PTAs that are relevant for this paper. Section 4 describes the model and the methodology used. Finally, the core of the paper is Section 5 where results are detailed.

[1] Merchandise only.

[2] Other forms are customs unions and partial scope agreement. Messerlin (2007) points that moving from regional to bilateral agreements whose impact is more limited is one of the reason why counting the number of PTAs overstate the impact of regionalism.

[3] The expiration of the TPA implied a rapid negotiation but this was also true for other FTAs negotiated by the U.S. which did not meet the deadline. Moreover, Korea appears familiar with quick negotiations: its FTA with EFTA countries was negotiated in one year.

II. CGE LITERATURE ON THE KOREA-U.S. FTA IGNORES THE PROLIFERATION OF PTAS

On June 30, 2007, the United States and Korea signed a free trade agreement. This agreement is the most significant PTA signed by the United States since NAFTA and the most significant ever for Korea. How large will be its impact? This question has stimulated a substantial CGE literature trying to quantify the impact of the agreement before it was signed or even before negotiations were officially launched.

Table 1. Database used in CGE simulations of the Korea-U.S. FTA

	Database	Reference year
Cheong & Wang (1999)	GTAP	1995
Choi and Schott (2001)	GTAP	1995
USITC (2001)	GTAP	1995
Choi and Schott (2004)	GTAP	1997
Schott, Bradford, and Moll (2006)	GTAP	2001
Lee and Lee (2005)	GTAP	2001
Kiyota and Stern (2007)	GTAP	2001

All CGE simulations of the Korea-U.S. FTA rely on various versions of the GTAP database (Table 1). The latest version is benchmarked to the global economy in 2001.[4] At that time, the United States had only three active PTAs: with Mexico and Canada (NAFTA), with Israel, and with Jordan[5] (WTO, 2006a). Korea had no active PTA although its government hade decided as early as 1998 to negotiate them (WTO, 2004).

The landscape has changed dramatically since 2001. Both the United States and Korea have multiplied PTAs. In less than three years (2004 to September 2007), the U.S. Congress approved 11 PTAs of which nine have been implemented and is considering four more agreements (including the one with Korea). Korea does not rely any more exclusively on multilateral liberalization and has implemented three FTAs since 2004 (Table 2). Both countries are also negotiating or contemplating many other PTAs.[6]

Despite this activity, all the CGE studies listed in Table 1 have estimated the impact of the Korea-U.S. FTA as if no PTA had been signed since reference year of their database. This is likely to bias the simulation results. Before trying to measure the extent of this bias, the next

[4] A description of the various versions of the GTAP is available at: https://www.gtap.agecon.purdue.edu/databases/default.asp.

[5] The U.S.-Jordan FTA entered into force in December 2001.

[6] The status of U.S. FTAs can be found at: http://www.ustr.gov/Trade_Agreements/Bilateral/Section_Index.html.

section will show that ignoring the proliferation of PTAs is akin to overlooking some potentially important economic mechanisms.

Table 2. PTAs concluded by the U.S. and Korea since end-2001

United States		Republic of Korea	
Trading partner	Implementation date	Trading partner	Implementation date
Chile	January 2004	Chile	April 2004
Singapore	January 2004	Singapore	March 2006
Australia	January 2005	EFTA	September 2006
Morocco	January 2006		
El Salvador [1/]	March 2006		
Honduras [1/]	April 2006		
Nicaragua [1/]	April 2006		
Guatemala [1/]	July 2006		
Bahrain [2/]	August 2006		
Costa Rica [1/]	March 2007		
Dominican Rep. [1/]	Pending		

Source: WTO, USTR (2006).
1/ Hereafter CAFTA.
2/ Bahrain is not singled out in the GTAP database. This agreement is thus ignored in the simulations presented here.

III. THEORETICAL CONSIDERATIONS ON THE PROLIFERATION OF PTAS

Following the work of Jacob Viner (1950) and James Meade (1955), the static global welfare impact of PTAs is measured by the gains from trade creation (the improvement in allocative efficiency due to the replacement of production and consumption of domestic goods with imports from more efficient partner countries) net of the costs of trade diversion (the welfare cost from switching from an efficient supplier non-member of a PTA to a less efficient supplier but partner in the PTA). In this framework, the maximum net welfare gain of a PTA equals to the lowest net welfare gain of a non-preferential liberalization (Cooper and Massell, 1965) because trade diversion, which is the economic cost of discrimination, affects the welfare impact of a preferential liberalization but not the welfare impact of a non-discriminatory liberalization. This conclusion depends on the assumption that the PTA does not change the terms of trade. But, if the signatories are not small countries, then a preferential agreement will affect world prices and thus the terms of trade of members and non-members countries.

This theoretical framework, which underpins the GTAP model, assumes perfect competition and constant return to scale. When, instead, imperfect competition and increasing return to scale are assumed, the procompetitive impact of a trade liberalization becomes substantial leading to larger trade creation and, thus, to a larger the net welfare gain or a lower net

welfare loss.[7] The Michigan model of World Production and Trade is based on these assumptions (Kiyota and Stern, 2007).

Against this background, what is the impact of the proliferation of PTAs? Three main mechanisms are at play: preference erosion, the reversal of trade diversion, and the creation of a hub-and-spoke system.

First, proliferation of PTAs means erosion of preferences. Let's assume that two countries (A and B), which had initially no preferential agreement, conclude a bilateral PTA. Both enjoy a preferential access to their partner's market. But if A starts multiplying its PTA (with countries C, and D) then more and more countries have a preferential access to A's market. As a result, the value of the preferential access of B to A's market declines. The magnitude of this preference erosion is uncertain a priori. It will depend if countries C and D export or not to A the same products than country B.

Second, Wonnacott (1996) argued that an *expanding* PTA will generate not only new trade diversion but would also eliminate diversion of prior PTAs. He took as an example the extension in 1994 of the Canada-U.S. FTA to Mexico arguing that the Canada-U.S. FTA may have diverted U.S. imports from Mexico to Canada but when this agreement was extended to become NAFTA, U.S. imports may have shifted back to Mexico reversing previous trade diversion. This argument is also valid in the case of the proliferation of PTAs. In an argument supporting the U.S. policy, the Congressional Budget Office (2003) argued that "as more and more FTAs are negotiated, the later agreements become less and less likely to divert trade and more and more likely to reverse the trade diversion that resulted from earlier agreements. […] if NAFTA caused a rise in imports from Mexico at the expense of imports from Chile, the subsequent free-trade agreement with Chile would reverse that diversion of trade and eliminate the resulting harm." Nonetheless, the net global effect of new diversion and reversal of previous diversion remains ambiguous.

Third, Wonnacott (1996) also pointed that the proliferation of PTAs, may creates a hub-and-spoke system whose welfare effect is unclear when compared to a corresponding full PTA. The reasons are that more trade barriers remain in a hub-and-spokes system and that the hub (the U.S. or the EU for example) benefits more from the agreement than the spokes (the various U.S. or the E.U. bilateral partners in a PTA). Indeed, trade between spokes is not liberalized, spokes are competing for the market of the hub (the value of their preferences is thus eroded), and investment may be diverted to the hub.

In short, proliferation of PTAs has welfare implications and therefore must be taken into account in the assessment of a particular agreement such as the Korea-U.S. FTA. Since the welfare impact of each of the three mechanisms associated with the proliferation of PTAs is ambiguous and uncertain a priori, a CGE model is needed to get a sense of their aggregated net welfare effect.

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[7] See, among many others, Pomfret (1988) on these developments in the context of PTAs; Grossman (1992), Helpman and Krugman (1985), and Krugman (1995) on theoretical aspects; and Richardson (1989) and Schmitt (1990) for empirical analyses.

IV. MODEL AND METHODOLOGY

This paper aims at assessing the welfare impact of the proliferation of PTAs using the GTAP model described in Appendix I. The sheer size of the proliferation of PTAs makes impossible to incorporate in the simulations *all* the PTAs that entered into force since 2001. Therefore, we simulate the impact of the Korea-U.S. FTA taking into account the impact of all prior PTAs that both the U.S. and Korea have implemented [8] as well as other important PTAs implemented by countries that have also an agreement with Korea and the U.S. This means that the impact of the eleven PTAs (counting CAFTA as one) listed in Table 3 are considered before estimating the impact of the Korea-U.S. FTA.

Table 3. PTAs considered in the simulations

Bilateral Agreement	Implementation date
Japan-Singapore	2002 (November)
EU-Chile	2003 (February)
U.S.-Chile	2004 (January)
U.S.-Singapore	2004 (January)
Korea-Chile	2004 (April)
U.S.-Australia	2005 (January)
Japan-Mexico	2005 (April)
U.S.-Morocco	2006 (January)
Korea-Singapore	2006 (March)
U.S.-CAFTA	2006 (from March) 1/
Korea-EFTA	2006 (September)
U.S.-Korea	Not yet entered into force
Contemplated FTAs	
EU-Korea	
Japan-Korea	
Canada-Korea	
China-Korea	
Multilateral liberalization	
10 percent cut in 2001 (prior FTAs)	
10 percent cut (after the Korea-U.S. FTA)	

Source: WTO, USTR.
1/ See Table 2 for details.

[8] An exception is the U.S.-Bahrain FTA that entered into force in August 2006. It is not taken into account because Bahrain is not singled out in the GTAP database

Some observers argue that because of the lack of progress in the Doha round, the proliferation of PTAs is likely to continue. In order to assess the likelihood of this views and its implications, some potential systematically important PTAs are also considered. Our focus being on the Korea-U.S. FTA, we limit this exercise to four PTAs currently negotiated or contemplated by Korea: with Japan, Canada, China, and the European Union.[9] PTAs currently negotiated by the United States are ignored for three reasons. First, their systemic impact is arguably more limited. Second, in reaction to the announcement of an agreement between Korea and the U.S., third countries have been more explicit on their intention to consider more actively a PTA with Korea than with the United States. Third, the Bush administration has largely lost its capacity to negotiate new agreements until the Trade Promotion Authority (TPA) that expired in July 2007 is renewed.

These considerations dictate the aggregation. Fourteen countries and regions are considered: the United States and Korea of course, but also (i) countries with which Korea and the United States have an PTA (Australia, Canada, CAFTA, EFTA, Chile, Mexico, Morocco, Singapore), (ii) other main trading blocs with which Korea may conclude a PTA (European Union and Japan), and (iii) the rest of the world.[10]

Each PTA is supposed to result in an immediate and total elimination of import tariffs on goods between the partners while tariffs levied on goods from non-member countries remain unchanged. No PTA goes that far but this is a standard assumption in most simulations of the Korea-U.S. FTA. Therefore our simulations can be compared with the results with those of previous studies. It is noteworthy that assuming a full elimination of customs tariffs is likely to lead to a larger welfare impact than partial liberalizations.[11] As a result, the welfare impact presented in this paper aim at illustrating the welfare impact of the proliferation of PTAs and not at providing precise estimate of the impact of a particular PTA.

Given the speed of the proliferation of PTAs, an agreement is often implemented before the effect of the previous one fully materialize. Thus, it is important to simulate the medium term impact of the PTAs, which is based on the neoclassical assumption that prices change in response to the trade liberalization ensuring that the full employment of productive factors is maintained. The sectoral distribution of these factors will change but not their aggregated level. The incentives to invest in response to the opportunities offered by the PTA are not taken into account (this would affect the level of the stock of capital) because they are assumed to take time and thus will take place in the long term.[12]

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[9] India could be added to this list. It has however not be the case in order to limit the size of the simulations.

[10] Two simplifications should be noted. First, the European Union has expanded twice since 2001 growing from 15 countries to 25 in 2004 and to 27 in 2007. In this paper, the EU refers to the current 27 Member States. Second, due to lack of details in the database, CAFTA covers all Central American countries.

[11] For example, Schott and al. (2004) estimates that excluding rice in the Korea-U.S. FTA reduces the global welfare impact of the agreement by 5 percent.

[12] The terms “medium term” and “long term” are standard in the literature but they may be confusing since the GTAP model has no temporal dimension. The difference relates to the response of the capital stock. It is

(continued…)

Consistent with the theory, the focus of this paper is on the overall impact of the liberalization measured by the welfare effect. In GTAP, changes in welfare are measured as an equivalent variation in income at the base period prices.[13] The equivalent variation measures the amount that individuals would have to pay to go back to the pre-liberalization situation after it occurred. [14]

PTAs listed in Table 3 is simulated in two ways: "in isolation" or "sequentially." The "isolation" approach is the customary approach i.e. the impact of each PTA is simulated ignoring the impact of prior PTAs. In the sequential approach, the impact of the each PTA is simulated after taking into account the impact of previous PTAs. The simulation of a PTA provides an updated database which serves as the basis for the simulation of the next PTA. For example, the effect of the US-Australia FTA that entered into force in 2005 is simulated after updating the database in order to take into account the impact of the Japan-Singapore FTA (2002) then the EU-Chile FTA (2003) then the US-Chile and US- Singapore FTAs (2004), and then the Korea-Chile FTA (2004).

The rationale for this is double. First, there is a methodological consideration. CGE simulations of a PTA are likely to be biased if the impact of prior PTAs are not taken into account. A sequential approach quantify how large this bias is. Second, the sequential approach measures the preference erosion triggered by the proliferation of PTAs. Simulating simultaneously all the PTAs would be less time-consuming than a sequential approach but results provide much less details. Notably it does not give any indication on the extent of preference erosion. The results of simulation are discussed in Appendix II.

V. RESULTS

A. The proliferation of PTAs affects significantly welfare estimates

The proliferation of PTAs has substantial consequences for CGE modeling. Estimates of the welfare impact of each PTA is significantly different if the proliferation of PTAs is ignored (Appendix III) or is considered (Appendix IV). Four main points emerge:

First, the difference is frequent and large. In almost ¾ of the cases[15] (71 percent), the difference in the estimated welfare impact of a PTA between the two simulations is larger than 0.5 percent. The 0.5 percent threshold may appear too low to be meaningful, but the bias

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assumed that investment in response to the trade liberalization simulated takes more time than other adjustments and therefore ignoring this dimension is called as medium term while taking it into account is called long term.

[13] This is also the case for the Michigan Model used by Kiyota and Stern (2007).

[14] For more details on the welfare calculation in GTAP, see Huff and Hertel (2001) and McDougall (2003).

[15] A case is defined as the impact of a simulation on the regions/countries considered (including the world as a whole). However, there are not 240 cases (15 regions x 16 PTAs) because (i) there is no difference in the two approaches for the first FTA considered chronologically and (ii) the U.S.-Chile FTA and the U.S.-Singapore FTA are considered simultaneously (they entered into force the same day). Thus, there are 210 cases (15 x 14).

remains significant if other thresholds are considered: almost ½ of the cases (48 percent) show a difference in the predicted welfare effect of more than 5 percent and more than 1/3 of the cases (36 percent) exhibit a difference larger than 10 percent.

Second, the magnitude of the bias is a priori uncertainty. Only in 29 percent of cases the two approaches gives a similar estimated welfare impact (difference below 1 percent). In 44 percent of cases, the welfare impact is larger in isolation than in the sequential approach, in 22 percent it is lower.

Third, the sign of the estimated welfare impact is unstable. In 5 percent of cases, taking into account previous PTAs changes the predicted welfare impact of an agreement from a gain to a loss or from a loss to a gain. For example, simulating the U.S.-Chile and U.S.-Singapore FTAs without updating the database, leads to conclude that Chile will suffer from a welfare loss of US$16 million (Appendix III), while if the database is updated to take into account the Japan-Singapore and E.U.-Chile FTAs which were implemented before, Chile is predicted to enjoy a welfare gain of US$14 million (Appendix IV).

Fourth, the bigger the number of ignored prior PTAs, the larger the difference in the magnitude of the estimated losses and gains between the isolation and the sequential approaches. And sign reversals become more frequent. The reason is that each PTA modifies world trade structure and countries protection. Proliferation of PTAs multiplies these changes. The larger the size of (ignored) changes in world trade and in protection, the larger is the bias in the estimated welfare effect of the simulation "in isolation."

In sum, taking into account previous PTAs is crucial because of the frequency of the bias, its magnitude, and the impossibility to identify a priori its direction.

B. Preferences are eroding fast when PTAs are proliferating

As usual in the literature, simulations point to a small static gain from PTAs. The welfare impact of the PTAs considered in this paper is lower than 0.5 percent of GDP for each region. The only exceptions are Central American countries with CAFTA and a 2 percent of GDP gain for Korea if a PTA with China is ever signed.

Moreover, this limited economic gain tends to be eroded by the proliferation of PTAs leaving only marginal gains, if any (Table 4 and Appendix IV). For example, the U.S. welfare gain from the six FTAs it has implemented since 2001 is estimated US$4 billion (0.04 percent of U.S. GDP). But, many other countries have also sign PTAs. The U.S. net gain from its PTAs is cut by about 25 percent (US$3.2 billion) when the impact of the six non-U.S. PTAs considered in this paper are taken into account. The decline would be even dramatic if more non-U.S. PTAs were considered.

Sequential simulations summarized in Appendix IV provide details on the mechanism of preference erosion. For example, the U.S.-Chile and U.S.-Singapore FTAs brought the United States a welfare gain of US$151 million. This offset the US$81 million welfare loss it experienced from the Japan-Singapore and EU-Chile FTAs signed about a year before. But the U.S. gain from the agreements with Chile and Singapore has then been eroded by the

Korea-Chile (US$16 million welfare loss) and then the Korea-Singapore (US$13 million welfare loss). Moreover, the three FTAs that Korea has implemented so far reduced U.S. welfare by US$43 million. This U.S. welfare loss would be, of course, more than offset by the gains of the Korea-U.S. FTA of about US$3 billion. But if the race to PTAs continues, PTAs contemplated by Korea would reduce preferences U.S. has negotiated with Korea and reduce its welfare by US$3 billion leaving it with no net gain but a more distorted trade regime. Besides Korea, many other major trading nations intend to sign PTAs with non-U.S. partners. This would leave the U.S. with a negative net welfare impact of the proliferation of PTAs.

Table 4. The proliferation of PTAs has a limited economic impact
(welfare changes in percent of initial GDP, sequential approach)

	12 PTAs	16 PTAs	Multilateral liberalization [1/]
United States	0.03	0.00	0.00
Korea	0.19	2.74	0.17
Mexico	-0.03	-0.03	0.02
Canada	-0.08	-0.06	-0.02
Chile	0.06	0.01	0.00
Singapore	0.46	0.26	0.07
Australia	-0.05	-0.10	0.02
Morocco	-0.28	-0.31	0.23
CAFTA	1.59	1.43	0.03
EFTA	-0.01	-0.02	0.07
EU	-0.02	-0.02	0.01
China	-0.04	-0.11	0.12
Japan	0.00	0.01	0.03
Rest of the World	-0.03	-0.08	0.04
WORLD	0.00	0.02	0.02

[1/] 10 percent cut after the Korea-US FTA.

That the proliferation of PTAs erodes preferences is not a new phenomena. At the end of the 19th century, trade officials realized that the multiplication of bilateral agreements led to preference erosion and thus "nearly all European countries began using 'most favored nation' (MFN) clauses in their bilateral agreements." The U.S. reached the same conclusion in the 1920s (Krueger, 1999), and despite the move to regional blocks in the 1930s, MFN treatment became the cornerstone of the GATT/WTO system. This historical lesson may have been forgotten but is likely to be rediscovered soon.

Many developing countries have invoked preference erosion to justify their reluctance to agree on multilateral tariff cuts in the Doha Round. But as is clear from our results, preference erosion is already taking place (U.S. preferences to Africa under the AGOA are

eroded by the U.S. PTAs as EU preferences to LDCs and ACP countries will be eroded when the EU will conclude new PTAs). Proliferation of PTAs leads to welfare losses to poor countries (that are part of the rest of the world in Table 4) while multilateral liberalization would bring some gains.

C. Preferential versus multilateral liberalization.

If both multilateral and preferential liberalizations erode preferences, there is a key difference between them: the distribution of welfare gains. Tables 4 and 5 show that the gains from PTAs are limited to signatories and tend to come at the expense of the rest of the world. If PTAs benefit members at the expense of non-members, this may trigger reactions. Non-members countries have incentives to try to offset the loss they experience by negotiating their own PTAs and thus eroding preferences granted to their partners in PTAs and accelerating proliferation of PTAs. This explains partly why Japan and Korea, which until the end of the 1990s were only "multilateralists," became "active regionalists" in the 2000s.[16]

Table 5. Distribution of gains
(welfare impact, millions of 2001 U.S. dollars) [1/]

	Members	Non-members
Japan-Singapore	104	-151
EU-Chile	165	-192
U.S.-Chile & U.S. Singapore	313	-346
Korea-Chile	47	-65
U.S.-Australia	382	-440
Japan-Mexico	850	-883
U.S.-Morocco	71	-130
Korea-Singapore	53	-78
U.S.-CAFTA	1,644	-1,541
Korea-EFTA	81	-74
Korea-U.S.	3,888	-2,589
Korea-EU	1,514	-1,250
Korea-Japan	1,356	-1,344
Korea-Canada	165	-155
Korea-China	8,674	-4,233

1/ Results from the sequential approach. Results are not significantly different for the simulation "in isolation."

[16] Korea entered PTAs only in 2004 and Japan in 2002. In 2006, Japan had three active agreements and signed another one. In the eight months of 2007 alone, it signed 4 additional agreements and the Japanese government plans to signed about 12 new agreements by 2009 (IMF, 2007).

In contrast, virtually all countries gain from a multilateral liberalization. Like several other CGE simulations (see for example DeRosa and Gilbert, 2004), results presented in Table 4 and Appendix IV suggest that the United States and Canada are two exceptions. They would loose from a multilateral liberalization of trade in goods. But their loss is negligible and, actually, less than the GDP measurement error. At most the U.S. loss would amount to 0.005 percent of its initial GDP and Canada 0.03 percent. Moreover, this loss may be overestimated since the simulation ignores the services sector where the United States is expected to be a major winner from multilateral liberalization. Finally, the welfare impact of a trade liberalization, which can be decomposed into allocative efficiency and terms of trade, depends on the models assumptions. In GTAP, trade liberalization usually results in large change in terms of trade because it erodes countries monopoly power (Appendix I). In the case of the United States and Canada, changes in the terms of trade resulting from a multilateral liberalization are large and outweigh the gains from allocative efficiency. Other models, such as the Michigan model used by Kiyota and Stern (2007), where predicted changes in terms of trade are more limited, reach a different conclusion: the U.S. welfare is expected to benefit from a multilateral trade liberalization.

In order to illustrate how proliferation of PTAs also affects the expected gains from a multilateral liberalization such as the Doha Round, the impact of a small cut of 10 percent in applied tariff by all countries is simulated. If undertaken in 2001, when the Doha Round was launched, the tariff cut would have boosted world welfare by US$6 billion. This gain dwarfs the US$1 billion total welfare gain from the twelve PTAs considered in this paper (Appendix IV and Table 4).[17] What would be the impact of the same (limited) multilateral tariff cut if implemented after the Korea-U.S. FTA enters into force? At US$5.7 billion, the global welfare gain would remain almost unchanged.

D. What if proliferation continues?

Some observers argue that, because of the lack of progress in the Doha Round, PTAs are likely to continue to proliferate. What is the cost of such a scenario? The answer will vary depending on expectations on how many and which PTAs would be implemented. The simulation undertaken here show that if Korea alone implements the four PTAs it contemplates with major trading countries, the gains from a multilateral liberalization (still defined by a multilateral 10 percent cut of applied tariff) may fall dramatically from US$6 billion to US$2.2 billion. This is still more than the gains of the PTAs implemented so far but much less than the gain from the four Korean PTAs which amounts to US$4.7 billion. However, this result should be interpreted with caution. The welfare gains of the four PTAs are almost entirely due to the bilateral agreement with China (excluding it the gain drop from US$4.7 billion to US$0.3 billion). But this particular agreement is at best uncertain, facing huge political obstacles. These obstacles are such that chances may be larger to liberalize the Korea-China trade under the Doha Round than through bilateral discussions.

[17] This conclusion on the larger benefit of a multilateral liberalization is shared by DeRosa and Gilbert (2004) and Kiyota and Stern (2007).

Moreover, a continued proliferation of PTAs may affect significantly the U.S. providing incentives to drop its "competitive liberalization" strategy for multilateral liberalization. So far (including the U.S.-Korea FTA), the U.S. appears to have benefited from PTAs: simulations estimate this gain at US$3 billion. However, this gain is marginal accounting for only 0.03 percent of U.S. GDP and the "competitive liberalization" strategy has limits. If PTAs continue to proliferate and do not include the U.S., then the U.S. will experience welfare losses as Europe did recently. In 1997, the European Commission decided to stop launching new bilateral negotiations because there were few new potential partners and because of the political strain of numerous bilateral PTAs signed with central European countries in the early 1990s was too onerous. With the hub of new PTAs shifting from Europe to North America, Europe has then experienced welfare losses as indicated in Appendixes III and IV. The U.S. may face the same fate because, the center of new PTAs is shifting again, this time toward Asia, while, with the expiration of the TPA in July 2007, the administration has effectively lost the possibility of negotiating new trade agreements in the short or even medium term.

This scenario appears considered by the Bush administration. In June 2007, Susan Schwab, the U.S. Trade Representative, wrote in a letter to the House Ways and Means Commission Committee Chairman, "More than 100 bilateral trade negotiations are currently underway among our trading partners. […] It is important that the United States not sit on the sidelines as other countries lock in new preferential trading arrangements with our competitors." If, despite major political hurdles, Korea successfully concludes PTAs with the EU, Canada, Japan, and China, the U.S. would see 85 percent of the welfare gains of its recent PTAs disappear. And this is only the impact of Korea's PTAs ignoring those of such major trading partners as the EU, Canada, and Japan. Indeed, the EU has changed its policy and intend to negotiate a PTAs with ASEAN, Korea, India, Russia,[18] and potentially in a longer run with China (European Commission, 2006). Australia, China, Japan, Canada have all expressed interest in new PTAs. In such a scenario, proliferation of PTAs would affect so much the U.S. that a multilateral liberalization, by eroding discrimination and reversing some trade diversion would then bring not anymore losses to the U.S. but gains (Appendixes III and IV).

In sum, the gains of a continued proliferation rely on agreements that are very unlikely for political reasons, are prone to rapid erosion, and, in any event, would provide smaller gains than even a small multilateral liberalization. In addition, a continued proliferation of PTAs will provide incentives to the U.S. to put more emphasis on multilateral rather than preferential liberalization. Therefore, the scenario of a continued proliferation appears unlikely for both political and economical reasons.

E. The case of the Korea-US FTA

The Korea-U.S. FTA being our benchmark PTA, it is worth describing our results and checking if they are in line with those of other studies. This is done in Table 6. Column (a)

[18] FTA negotiations started in May 2007 with Korea and in June 2007 with India. For an analysis of this strategy, see Messerlin (2007).

summarizes the result of the "isolation scenario," which is the type of simulation undertaken by six other studies (columns (b) to (g)). It is not unusual for a study to present several CGE scenarios. In that case, Table 6 reports the result of the scenario the closest to the one we have (full liberalization of both agricultural and non-agricultural goods). Nonetheless, differences in both specifications (described in the notes to the Table 6) and results remain large because reference years are different (thus elasticities, trade structure, and trade policies are different), but also because models differ as well as scenarios (notably inclusion or exclusion of agriculture or services, short term or long term effect).

Table 6. Survey of the literature estimates of Korea-U.S. FTA
(net welfare impact in millions of U.S. dollars) [1/]

	Isolation	Cheong and Wang [2/] (1999)	Choi and Schott [4/] (2001)	Choi and Schott [5/] (2004)	Lee and Lee [6/] (2005)	Schott, Bradford and Moll [7/] (2006)	Kiyota and Stern [8/] (2007)
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
World	1,236	…	1,426	…	…	25,871	41,040
U.S.	2,897	3,700	3,783	2,694	…	766	25,120
Korea	950	4,800	4,100	1,638	2,374	27,582	9,280
Canada & Mexico	-490	…	-432	…	…	…	450
Japan	-290	…	-2,232	…	…	1,676	970
Model	GTAP	GTAP [3/]	GTAP	GTAP	GTAP	Other	Michigan model
Reference year	2001	1995	1995	1997	2001	2001	2001

1/ USITC simulations are not presented because they do not provide a welfare impact.
2/ Scenario: full liberalization of all sectors.
3/ The description of the model suggests it is either the GTAP model or a GTAP-like model.
4/ Scenario: full liberalization of goods, services excluded.
5/ Scenario: full liberalization of goods, services excluded. Simulation results are from the technical appendix by DeRosa and Gilbert (2004)
6/ Scenario: 80 percent liberalization of agriculture, full liberalization of other goods, and 20 percent liberalization of services. The results are sensitive to the assumption on service liberalization: if the liberalization of the sector is assumed at 50 percent instead of 20 percent, Korea's welfare gain increases by more than 14 percent to US$2,717 million.
7/ Scenario: full liberalization but it is unclear if trade in services is covered.
8/ Scenario: Services included.

Two studies stand out as predicting a very large impact of the Korea-U.S. FTA. The simulation of Schott, Bradford, and Moll (2006) are a surprising outlier but because the author give very few details on their assumptions, it is difficult to understand why. Kiyota and Stern (2007) also present a large impact. The first reason is that their model assumes imperfect competition. In such a framework, the procompetitive effect of a trade

liberalization and the exploitation of economies of scale tend to yield significantly larger welfare gains. The second reason is that their simulation is not limited to trade in goods but also includes services which are ignored by most other studies.

Despite the differences in base years and scenarios, our results appear in line with other studies (column (b) to (e)), in particular the 2004 version of the Choi and Schott analysis. The larger impact reported by Cheong and Wang (1999) and Choi and Schott (2001) appear due to an database benchmarked on 1995 when trade policies were more restrictive (in particular it does not incorporate the liberalization impact of the Uruguay Round). The best illustration of the importance of the change of the database is the two versions of the Choi and Schott study. The initial study (2001) was based on a GTAP database benchmarked on 1995 which predicted larger effect than their updated study (2004) which was based on a GTAP database benchmarked on 1997 (Table 6).

Table 7. The welfare impact of the Korea-U.S. FTA
(millions of 2001 US dollars)

	Isolation	Sequential	Difference in percent
United States	2,897	2,876	-1
Korea	950	1,012	7
Canada	-331	-328	-1
Mexico	-158	-161	2
Chile	-15	-23	53
Singapore	-20	-41	105
Australia	-169	-163	-4
Morocco	-3	-2	-33
CAFTA	-38	-30	-21
EFTA	-64	-69	8
EU	-694	-685	-1
China	-200	-200	0
Japan	-290	-272	-6
Rest of the World	-626	-615	-2
World	1,236	1,299	5

Table 6 reports the expected impact of the Korea-U.S. FTAS ignoring the proliferation of PTAs. Table 7 summarizes how the predicted impact of the Korea-U.S. FTA changes if they are taken into account. Again, results show that there is a bias and the direction of the bias is unpredictable. Differences between the two scenario is only 1 percent for the U.S. but can reach 7 percent for Korea and, in the most extreme case, the welfare loss of Singapore can be twice as large.

As expected, Table 7 also show that: (i) the larger an economy, the larger are the expected terms of trade changes, and (ii) the larger the distortions in an economy, the larger the potential gains from allocative efficiency. Indeed, the U.S. welfare gains come from the

changes in terms of trade, while the impact of the allocative efficiency is smaller and negative. In contrast, Korea would experience a negative impact of the terms of trade but a larger gain due to improved allocative efficiency. Choi and Schott (2004) reach the same conclusion. Even Kiyota and Stern (2007), with a model which by construction result in much smaller changes in the terms of trade than GTAP, found that changes in the terms of trade would benefit the U.S. but affect negatively Korea.

VI. CONCLUSION

The reality and the implications of the proliferation of PTAs are debated. This paper, using a CGE model, contributes to this debate by trying to quantify its welfare effect. We limit our analysis to twelve PTAs implemented since 2001, the reference year of the latest version of the widely used GTAP database. Twelve PTAs is obviously a very small subset of the actual PTAs that have been formed since 2001. Nonetheless, it provides interesting results that presumably would have been even larger if more PTAs would have been considered:

First, the proliferation of PTAs has substantial implications for CGE modeling of trade liberalization. Ignoring it would bias significantly results and in some cases produce estimates of the wrong sign. Moreover, it is impossible to argue that ignoring the proliferation of PTAs results in an overestimate or an underestimate of the true impact of a trade liberalization because the direction of the bias is uncertain a priori.
Second, as in other studies, the static gains from PTAs is limited. For most countries, the welfare impact of the twelve PTAs considered is below 0.5 percent. This conclusion is particularly important for the United States since all the PTAs it has signed since 2001 are taken into account. These results are however partial for two reasons: (i) only a small number of PTAs are considered and (ii) only the static impact of the PTA is considered ignoring the potential dynamic gains but also more generally the systemic implications of the PTAs.

Third, the small gains from PTAs are to be rapidly eroded showing that preference erosion is not limited to the multilateral tariff reduction in the Doha Round. Resisting a multilateral agreement on the basis of preference erosion is thus an illusion especially if delays in the Doha Round stimulate new PTAs. EU preferences to LDCs with the Everything but Arms or to the ACP countries under the Lomé Convention as well as U.S. preferences to Africa under the AGOA or preferences granted under the Generalized System of Preferences will be eroded no matter what. They will be eroded by a successful Doha Round or by PTAs. But multilateralism will bring gains to these developing countries. PTAs among large trading partners will bring the economic cost of trade diversion and the political cost of isolation.

Fourth, proliferation of PTA, because of the preference erosion, makes the benefit of each PTA uncertain and temporary. In such, it contrasts with a multilateral liberalization, which even if limited, provides much larger gains and importantly do not lead to the distributional issues associated with PTAs: PTAs usually give advantages to members at the expense of non-members. In particular, if, as it appears likely, the center of PTAs moves from North America to Asia, U.S. welfare gains will turn into losses, as Europe experienced it when the center of PTAs moved from Europe to North America in the 1990s.

Therefore, because proliferation of PTAs brings only a few gains, which are extracted at the expense of other countries, are eroded quickly, and lead to a complex trade system due differences in the level of preferences and different and cumbersome rules of origin, it faces increasingly skepticism. Faced with regional discrimination that fractures its globalized production structure, the business community is increasingly calling for an harmonization and a simplification of the trading system. Proliferation also carries political cost that are not offset by the limited economic gains. The political strain of large number of PTAs concluded by the EU in the 1990s led it to suspend the launch of new negotiations for ten years. Thus, eventually, trade negotiators will reach the same conclusion than their predecessors who, a century ago, realized the political and economical costs of multiplying bilateral PTAs and decided to focus more on the MFN liberalization that is the cornerstone of the WTO system.

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Appendix I - The GTAP Model [19]

The GTAP model is a comparative static, global general equilibrium model based on neoclassical theory. Firms maximize their profits while consumers maximize their utility. All markets are assumed to be perfectly competitive, and constant returns to scale prevail in all production and trading activities. It is assumed that products can be distinguished by national origin (the Armington assumption). This assumption means that countries have some monopoly power that is eroded by a tariff cut, leading to large changes in the terms-of-trade, which are a component of welfare changes; the focus of this paper.

Firms use both a composite of primary factors and a composite of intermediates to produce their output according to Leontief production technology. The primary factor composite is a constant elasticity of substitution (CES) function of labor, capital, land and natural resources, while the intermediate composite is a Leontief function of material inputs, which are in turn CES blends of domestically produced goods and imports. Imports are sourced from all regions, with their share depending on trading prices (the Armington approach).

On the demand side, each country or region is assumed to have a "super" household disposing of regional income in fixed proportions in the form of private consumption, government expenditure and savings. Household consumption is assumed to be a constant difference in elasticities function of various consumer goods while government expenditure is based on a CES function of various commodities. Both household and government consumption are CES blends of domestically produced goods and imports, which are in turn sourced from all trading regions based on the Armington approach.

In closing the model, regional savings are assumed to be homogenous and contribute to a global pool of savings, which is then allocated among regions for investment in response to changes in regional expected rates of return. These changes are assumed to be equalized across regions, thus giving rise to capital (i.e., savings) mobility across regions. This allows for greater changes in the trade balance as a result of trade liberalization. In contrast to savings, capital stocks are assumed to be immobile across regions, although they are perfectly mobile within a region, as is labor. Land and natural resources are industry-specific, and only limited transformation of their uses among industries is possible.

The GTAP model provides a unified theoretical framework and its simplicity model makes its simulation results relatively easy to interpret, but limits its capacity to deal with more complex economic issues, such as long-term effects of trade policies associated with investment accumulation, technology and productivity change. Also absent in the model are adjustment costs associated with trade liberalization. These limitations and the fact that the model leads to large terms-of-trade effects[20] must be kept in mind when interpreting the results presented in this paper.

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[19] This appendix is partly based on the description of the GTAP model by Mlachila and Yang (2004). See Hertel (1997) for more details on the GTAP model.

[20] Kiyota and Stern (2007) express reservation noting "In our judgment, GTAP models may yield results that are not altogether plausible because of their reliance on the Armington assumption."

Appendix II – Simultaneous versus sequential simulations.

Prior PTAs need to be taken into account in order to avoid potentially severe biases in the estimated impact of a trade liberalization. But a sequential approach is tedious and time-consuming since it implies many simulations. Is there a shortcut? Is it possible to combine in a single simulation the liberalization considered and all the previous PTAs? Simulating simultaneously all PTAs may provide a convenient shortcut if it produces similar results than the sequential approach. However, this shortcut has a cost, many details provided by the sequential approach are lost. Importantly, the simultaneous approach does not allow an assessment of the extent of preference erosion.

DeRosa and Gilbert (2004) have simulated the simultaneous impact of fourteen PTAs that the United States could be willing to conclude. The estimated welfare gain for Korea of a PTA with the U.S. is 35 percent lower if the agreement is simulated along with other PTAs rather than in isolation. For the United States, the welfare gain is 3 percent larger. With a different list of PTAs we reach the same conclusion. Korea's welfare gain would be 12 percent lower in the simultaneous simulation and the U.S. welfare gain 11 percent higher (Text table). Once again it is clear that ignoring prior or other PTAs leads to a bias in the estimated impact of a PTA such as the Korea-U.S. FTA.

	Isolation	Simultaneous	Difference in percent
United States	2,897	3,213	10.9
Korea	950	833	-12.3
World	1,236	1,111	-10.1

Source: Appendix III

Appendix IV shows that, when looking at past PTAs (including the Korea-U.S. FTA), the differences in the results between simultaneous and sequential approaches are negligible overall and for each country and region. This suggests that a shortcut may exist. However, if the set of PTAs is extended from twelve to sixteen by incorporating the four PTAs considered by Korea, differences between the sequential and the simultaneous approach becomes more substantial. Although still limited (at most 6 percent for the countries and region but 9 percent for the global impact), this suggests that the larger the set of PTAs considered and the most significant they are in terms of the size of the trading partners, the more important it becomes to resort to the sequential approach.

Appendix III - Welfare impact of PTAs: Isolation and simultaneous approaches

(in millions of 2001 US dollars)

	US	Mex	CAN	Chile	Sing	Aust	Morocco	CAFTA	Korea	EFTA	EU27	China	Japan	ROW	WORLD
Japan-Singapore	-31	-1	-3	-1	208	-4	0	0	-5	-3	-29	-12	-104	-61	-4
EU-Chile	-50	-9	-3	33	2	-2	-1	-1	-6	-4	132	-11	-11	-95	-2
US-Chile & Singapore	167	-23	-34	-16	149	-4	0	-3	-12	-7	-102	-30	-32	-115	-6
Korea-Chile	-15	-2	0	20	0	-1	0	-1	24	-1	-13	-8	-4	-26	-2
US-Australia	360	-15	-38	-2	-10	23	0	-4	-16	-10	-124	-30	-82	-109	-5
Japan-Mexico	-692	138	23	-4	-13	-13	-1	-13	-33	8	-26	-47	707	-71	-3
US-Morocco	162	-3	-12	0	0	-2	-91	0	-3	-3	-58	-6	-13	-30	-5
Korea-Singapore	-14	-1	-1	0	103	-2	0	0	-50	-2	-19	-5	-12	-25	-2
US-CAFTA	480	-104	-143	-5	-5	-12	-1	167	-62	-38	-488	-94	-238	-353	10
Korea-EFTA	-12	0	-1	0	-1	-2	0	0	-11	91	-24	0	-12	-20	7
US-Korea	2897	-168	-331	-15	-20	-169	-3	-38	950	-64	-694	-200	-290	-626	12
Total sum isolation	3250	-180	-543	9	414	-189	-97	108	775	-32	-1446	-443	-90	-1532	10
Total simultaneous	3213	-183	-538	42	387	-182	-95	116	833	-37	-1445	-488	-59	-1603	11
Contemplated FTAs															
Korea-EU	-335	-17	-13	-7	-12	-47	-5	-13	441	-52	510	-153	-171	-504	-3
Korea-Japan	-414	3	2	-6	-48	-64	-1	-18	196	-6	-183	-163	1140	-473	-3
Korea-Canada	-134	0	88	0	1	-3	0	-2	-13	0	-8	-14	-4	-22	-1
Korea-China	-1068	-18	-14	-27	-97	-202	-7	-90	738	9	-391	42	-503	-1067	3
All contemplated sum isolation	-1952	-32	63	-41	-157	-317	-13	-123	7942	-49	-72	-288	462	-2067	2
All contemplated simultaneous	-1806	-31	10	-40	-166	-298	-13	-120	8880	-37	-177	-282	275	-2528	3
Discrepancy in percent isolation	-7%	-6%	-85%	-1%	-1%	-6%	-6%	-2%	12%	-24%	146%	-2%	-40%	-3%	3
Multilateral liberalization															
10% before FTAs	-253	147	-188	0	105	53	60	105	1130	365	472	1358	1076	1072	67
10% actual FTAs 1/	2783	-35	-683	42	447	-102	-15	116	1660	283	-986	956	1043	404	63
10% all FTAs 1/	79	-30	-569	12	299	-263	-25	1040	1100	264	-953	395	1331	-1097	18

1/ Simultaneously

Appendix IV - Welfare impact of PTAs: Sequential approach
(in millions of 2001 US dollars)

	US	Mex	CAN	Chile	Sing	Aust	Morocco	CAFTA	Korea	EFTA	EU27	China	Japan	ROW	WORLD
Japan-Singapore	-31	-1	-3	-1	208	-4	0	0	-5	-3	-29	-12	-104	-61	-47
EU-Chile	-50	-9	-3	33	2	-2	-1	-1	-6	-4	132	-11	-11	-95	-27
U.S.-Chile & Singapore	151	-22	-32	14	148	-3	0	-3	-11	-6	-110	-28	-29	-103	-33
Korea-Chile	-16	-2	0	30	0	-1	0	-1	16	0	-13	-6	-4	-21	-18
U.S.-Australia	360	-15	-38	-2	-10	23	0	-4	-16	-10	-124	-30	-82	-109	-58
Japan-Mexico	-691	138	23	-3	-18	-13	-1	-13	-33	8	-27	47	714	-70	-33
U.S.-Morocco	162	-4	-12	0	0	-1	91	0	-3	-3	-58	-6	-12	-30	-59
Korea-Singapore	-14	0	-1	0	101	-2	0	0	-48	-1	-18	-5	-11	-25	-25
U.S.-CAFTA	478	-105	-143	-5	-5	-12	0	1166	-62	-38	-488	-94	-236	-353	103
Korea-EFTA	-13	0	-1	0	-1	-2	0	0	-10	91	-24	0	-11	-20	7
U.S.-Korea	2876	-161	-328	-23	-41	-163	-2	-30	1012	-69	-685	-200	-272	-615	1299
Total isolation	3250	-180	-543	9	414	-189	-97	1108	775	-32	-1446	443	-90	-1532	1004
Total simultaneous	3213	-183	-538	42	387	-182	-95	1116	833	-37	-1445	438	-59	-1503	1111
Total sequential	3213	-183	-538	42	387	-182	-95	1115	833	-37	-1444	438	-59	-1503	1110
Contemplated FTAs															
Korea-EU	-315	-13	-6	-7	-17	-32	-5	-14	1167	-47	347	-159	-162	-473	265
Korea-Japan	-372	-1	-1	-8	-50	-60	-1	-18	443	-9	-218	-161	913	-447	12
Korea-Canada	-104	-2	33	0	0	-1	0	-2	131	0	-4	-16	-3	-22	9
Korea-China	-2089	15	84	-21	-98	-84	-6	-76	9142	27	-117	-467	-456	-1411	4442
All (16) PTAs simultaneous	337	-181	-425	7	222	-359	-106	1010	11160	-64	-1425	-1191	240	-3848	5375
All (16) PTAs sequential	332	-183	-427	7	221	-360	-106	1005	11716	-65	-1437	-1241	233	-3856	5837
Multilateral liberalization															
10% before FTAs	-253	147	-188	0	105	53	60	105	1130	305	472	1358	1076	1702	6072
10% after Korea-US FTA	-480	145	-143	-1	61	76	78	19	720	304	592	1382	1083	1828	5664
10% after all FTAs	288	-1	16	-5	24	76	19	38	5	93	69	346	519	713	2201