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What is The Cause of Growth in Regional Trade: Trade Liberalization or RTA's? The Case of Agriculture

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WHAT IS THE CAUSE OF GROWTH IN REGIONAL TRADE: TRADE LIBERALIZATION OR RTAS? The Case of Agriculture

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Abstract

This paper delves into the debate on the proliferation of regional trade arrangements by focusing on bilateral agricultural trade data over the 1962-1995 period for countries that currently are members of NAFTA, Mercosur, the EU and APEC. Agricultural is chosen because it has historically been protected by developed and dis-protected by developing nations, while in the case of the EU, its Common Agricultural Policy was the major policy jointly managed and funded by member countries. We suggest that the literature has tended to focus on factors explaining the level of trade, and neglected factors affecting growth in trade. While neighborhood characteristics affect neighborhood trade, they also appear to affect the policy regimes of neighboring countries. The shift to more outward oriented regimes is thus likely to induce a dynamic in trade among neighboring countries requiring several years to stabilize. As neighborhood trade grows, it is natural to form trade arrangements so as to harmonize policies and to remove other barriers. If this is the case, then we should expect the growth in intra regional trade to exceed growth in extra-regional trade, and these patterns should occur before the formation of regional trade arrangements. Our results support this explanation.

Key Words: International trade; Regional trade arrangements; Agricultural trade

JEL Classification: F1, F15, Q17

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The Case of Agriculture

1. Introduction

Accompanying the reemergence of the global capitalist system in about 1950, and especially so since mid 1980 (Sachs and Warner, 1995), barriers to international trade have fallen dramatically while the growth in world trade has exceed the growth in world GDP (Feenstra, 1998). The number of regional trade arrangements has also increased dramatically in recent years. Between 1990 and 1994, the GATT was informed of 33 regional trading arrangements, nearly a third of all deals since 1948. This recent growth in regionalism has been linked to a number of factors, and much of the debate on implications of regional trading arrangements (RTA) has centered on the observation that the growth of intra regional trade tends to exceed the growth of total regional trade.

Recognizing that trading arrangements account for part of the bias in the direction of trade, Krugman (1991) suggests that the tendency toward neighborhood trade is so strong as to make it overwhelmingly clear that distance still matters and still creates natural trading blocs. In the presence of increasing returns to scale in the production of differentiated final goods (i.e., monopolistically competitive markets) and intercontinental transport costs, Krugman shows that, in principle, FTAs (Free Trade Areas) are unambiguously welfare-enhancing[1]. Rejecting the importance placed on geographic proximity, Bhagwati (1992), among others, e.g., Panagariya

[1] Extending this basic argument to trade in services which is costlier than trade in goods, Baier and Bergstrand (1997) show that regional FTAs on goods and services are welfare improving relative to multilateral liberalization on goods alone.

(1995), argues that the observed concentration in neighborhood trade must be the result of existing discriminatory trading arrangements. Bhagwati (1993) also expresses the concern that once a regional arrangement is in place, executives and bureaucrats might find the effort to pursue multilateral negotiations too difficult.

Since the Krugman - Bhagwati debate, a growing literature has attempted to determine whether neighborhood trade is explained by natural factors, such as geographic proximity, or instead by preferential arrangements. Using various versions of the gravity model, several studies, e.g., Deardorff and Stern (1994), Engel and Rogers (1997), Frankel and Stein (1994), Frankel, et al (1995, 1996, 1997), Wei and Parsley (1995), find strong linkages between bilateral trade and the proximity of its trading partners, where proximity is represented by distance, adjacency and common language to reflect cultural similarities.

Another emphasis has been whether disproportionate trade among member countries in a specific RTA has negative effects on third country's welfare. Based on the decomposition of expenditure shares for the European Community (EC) over the 1980-91 period, Sapir (1992) finds internal and external trade creation in manufacturing but external trade diversion in agriculture. Using an index of the revealed comparative advantage, Yeats (1997) finds evidence of adverse trade-diversion impacts on third countries for the case of Mercosur, i.e., trade within the customs union has grown more rapidly for those products in which members do not have a comparative advantage. The empirical findings from multi-country and multi-sector general equilibrium models find that trade creation is much larger than trade diversion and welfare, measured in terms of real GDP or equivalent variation, increases for member countries (Robinson and Thierfelder, 1998).

Most of this literature, however, have tended to neglect factors affecting growth in trade. Geographic proximity and cultural similarity may explain why neighborhood countries trade disproportionately, but they provide little insight into the *growth* in trade since most of these "variables" are not time varying. Geographical and cultural variables that are used to explain the level of trade, in principle, disappear since they fail to capture changes in the level of trade over time. The same is true for the welfare effects of RTAs in the sense that they tend to be based on static measures. This leaves Krugman's (1995) query on the causes of world trade growth and its consequences largely unanswered, as is the query on the phenomenon of the growth in *intra* regional trade that has outpaced the growth in *inter* regional trade.

While it is now clear that neighborhood characteristics of countries affects neighborhood trade, little attention has been given to the observation that these characteristics also may affect the policy regimes of neighboring countries. Policy regimes pursued by neighboring countries for similar stages of development also tend toward similarity[2]. The U.S. and Canada tend toward similar degrees of openness, and the Uruguay Round led to further liberalization of policies that restricted agricultural trade. Prior to the 1980's, many of the countries in Latin America followed inward oriented policies, as did many of the Asian countries that are now members of APEC, e.g., Indonesia, and Thailand (Sachs and Warner, 1995). To the extent that neighborhood characteristics encourage trade, then liberalization should encourage growth in the share of total trade that is accounted for by neighborhood trade, depending upon whether liberalization occurs at about the same time and to a similar degree among neighboring countries. Since liberalization typically occurs in stages, and resources do not instantaneously adjust to changed incentives, trade

[2] This can be seen most clearly for the case of developing countries from the tables in Sachs and Warner (1995).

patterns are likely to display a dynamic where the growth in intra-regional trade exceeds the growth in extra-regional trade. If this pattern occurs, then neighboring countries become more specialized. Regional trade arrangements may then be entered into to further remove obstacles to trade and to avert policy reversals. Lack of a theoretical framework to capture the dynamics of the "twin neighborhood – policy reform processes" makes explaining growth in regional trade and the cause - effect on the formation of trading blocs difficult.

This study seeks to assess whether movement toward similar trade policies among neighboring countries contributed to changes in patterns of trade growth, and whether the formation of regional trading arrangements are associated, ex-ante or ex-post, with the evolution of such a trade pattern. Given the relatively recent emergence of changes in the growth of trade, and an insufficient analytical framework to depict even the key features of the "twin processes" phenomena, we focus our attention on the bilateral trade data for the period 1962-1995. We implement the Trend and Cycles Decomposition (TCD) analysis, and leave to a future paper a more analytical treatment. This approach, by capturing the dynamics of growth in trade and policy regimes, allow us to obtain insights that a more structured and possibly miss-specified model-based method is not likely to provide. We address these questions by looking at the historical growth path of agricultural trade among countries that currently belong to the largest RTAs in the world: the European Union, NAFTA, Mercosur and APEC. Agricultural trade is chosen because it has historically tended to be protected by developed nations and dis-protected by developing nations. In the case of Europe, the Common Agricultural Policy (CAP) was the first, and for a long time, the major result of European integration. It was also a major hurdle to the conclusions of the Uruguay Round negotiations under the GATT, which some have argued

served largely to place a cap on the CAP (Guyomard et al 1994). Many developing countries, and particularly the countries in Latin America, have liberalized their trade regime in recent years to the benefit of agriculture (Diao, et. al., 1998). As a result, the growth in the value of agricultural exports from Mercosur countries has outpaced export growth in other blocs.

The rest of the paper is organized as follows. In the next section, we summarize recent growth trends in world vs. regional trade using traditional methods. Then, in Section 3, we use the TCD approach to estimate the underlying long-term trends in rates of growth in intra and extra regional trade flows. The results of the analysis for each of the four blocs, NAFTA, Mercosur, the EU and APEC are summarized in Section 4. Section 5 concludes and summarizes the study. Our main finding is that the pursuit of more outward oriented policies has been the major stimulus for increasing intra-regional agricultural trade, which in turn encouraged the formation of regional trading arrangements several years hence.

2. Regional trade grew faster than global trade

On average, agricultural trade of the four blocs studied here grew more rapidly than world total agricultural trade (table 1, part A). Between 1970-95, world agricultural trade grew by 3.4 percent annually, while the annual growth in agricultural exports from countries belonging to NAFTA, Mercosur, EU-15 and APEC averaged, respectively, 3.9, 4.5, 4.8, and 4.4 percent. As a result, the share of these blocs' agricultural exports in total world agricultural trade rose from 70 percent in 1970 to about 85 percent in 1995.

Table 1. Trade Indicators of the Major Trading Blocs

Part A.	**Average growth rates of GDP and agricultural trade by regions, 1970-95**				
	NAFTA	**MERCOSUR**	**APEC**	**EU-15**	**WORLD**
GDP	2.6	3.2	3.3	2.5	3.0
Total agricultural exports	3.9	4.5	4.4	4.8	3.4
Total agricultural imports	3.5	6.5	3.0	2.6	
Intra-reg. ag. Trade	5.0	6.8	4.9	4.9	
Part B.	**Intra-regional agricultural trade concentration ratios, 1962-95**				
1962-69[a]	1.05	2.21	1.18	1.45	
1970-79	1.07	2.13	1.41	1.63	
1989-89	1.27	2.16	1.50	1.77	
1990-95	2.21	5.08	1.52	2.02	
1962-95	1.29	2.60	1.41	1.68	

Part C.	**Intra-regional agricultural export and import concentration ratio, 1962-95**								
	Exports[a]	Imports[b]	Exports	Imports	Exports	Imports	Exports	Imports	
1962-69	0.77	1.52	0.71	39.76	2.66	0.67	1.14	1.90	
1970-79	0.69	1.88	0.69	37.93	2.20	0.98	1.29	2.14	
1989-89	0.81	1.88	0.70	38.46	1.76	1.30	1.45	2.21	
1990-95	1.48	3.64	2 .32	19.10	1.60	1.44	1.87	2.20	

a. Calculated as the intra-regional agricultural exports share in total agricultural exports of the region divided by the region's share of world agricultural exports.
b. Calculated as the intra-regional agricultural imports share in total agricultural imports of the region divided by the region's share of world agricultural imports.

Agricultural imports also grew more rapidly than world trade and the share of agricultural imports in total world agricultural trade remained constant at about 80 percent, due largely to the decline in the growth of agricultural imports of the EU. Looking more closely, we also see that growth in intra-regional agricultural trade exceed growth in total (intra plus trade with the rest of the world) agricultural trade. As intra-regional trade accounts for a large share of each block's total agricultural imports or exports, rapid growth in intra-regional trade has contributed to the growth in world agricultural trade.

The four blocs exhibit considerable diversity as measured by their respective shares in world GDP and world agricultural trade. Not surprisingly, their shares of intra-regional trade in each individual region's total agricultural trade are also quite different. For purposes of assessing the relative importance of each region's intra regional trade, it is useful to normalize each region's trade by its share in world trade. Frankel (1997), for example, calculates intra-regional trade concentration ratios by normalizing each region's intra-regional trade share in the regions total trade (exports plus imports) by the region's share in world trade. Using a similar method, we calculate intra-regional agricultural trade concentration ratios for these four blocs (see table 1, part B). According to this calculation, if trade is concentrated among member countries of a trade bloc, that group should show a ratio in excess of one.

Focusing on the first and last rows of table 1, part B, for the periods 1962-1969 and the entire 1962-95 period, respectively, we see that with the exception of Mercosur, the agricultural concentration ratios are not substantially greater than one. With a few exceptions, these ratios are far lower than the intra-bloc concentration ratios for total merchandise trade calculated by Frankel (1997, p26, table 2-2). Thus, with the exception of Mercosur, on average over the entire period,

the typical member of a trade bloc does not appear to have traded substantially more with another member than did a typical country located anywhere in the world. However, if we break the entire time period into four sub-periods, it can be seen that the concentration ratios steadily rise and reach their highest levels in the1990s when the ratios reach values in excess of two for all the regions except the EU (table1, part C). This result implies that the neighborhood relationship within a bloc (in terms of distance and cultural similarities) is unlikely to be the only explanation for the relatively recent appearance of high concentration ratios in agricultural trade; there must be other factors explaining the evolution of trade shares.

Summing intra-regional exports and imports together in calculating a region's trade concentration ratio is appropriate if regional trade is balanced, i.e., regional exports are approximately equal to regional imports. Of course, balanced agricultural trade is not shown by the data. For this reason, we calculate separate export and import concentration ratios for these four regions (table 1, part C).

Table 1, part C, shows that the export and import concentration ratios are quite different for each region. Notice that for virtually all regions, one concentration ratio (either for exports or imports) is less than one (except for APEC) while the other ratios are much greater than one. Prior to 1990 and with the exception of the EU, the typical member of a trade bloc appears to have the tendency to import a larger share of total agricultural imports from member countries than would a typical country elsewhere in the world. At the same time, the share of total agricultural exports tends not to be disproportionately directed to member countries.

A plausible explanation for the differences in agricultural import–export concentration ratios is the comparative advantage a region may have relative to other regions. Among the four

regions for the entire time period of 1962-95, the EU-15 was the only agricultural trade deficit region. The other three regions have all experienced agricultural trade surpluses. Net agricultural exports accounted for about 40 percent of total NAFTA agricultural exports over the last three decades, while for Mercosur net exports ranged from about 10 to 15 percent of the region's total agricultural exports. APEC is more diverse in the sense that it includes countries that are among the world's major agricultural exporters and importers. Thus, its export concentration ratios are in excess of one throughout the period. As a region, APEC is also an agricultural surplus region. The EU has been a relatively large agricultural deficit region with about 30-70 percent of agricultural imports originating from non-EU countries. Only in recent years has the EU's agricultural trade become almost balanced with a small deficit. If countries of a trade bloc are net exporters of agricultural goods, the bloc's export concentration ratio should be smaller than its import concentration ratio (as can be seen in table 1, part C), as its export market is typically beyond neighborhood trade while its member countries may still import disproportionately from neighboring countries. The opposite situation should prevail for an agricultural trade deficit region such as the EU-15.

The apparent increase in the trend toward neighborhood trade in the 1990s is unlikely to be explained by neighborhood relationships alone (i.e., distance, similarity in culture) nor is it likely that changes in comparative advantage have occurred, since these factors are relatively constant overtime. To better understand this change, it is not sufficient to focus on concentration ratios alone. More in-depth insights can be obtained by also considering the growth path and growth patterns of agricultural trade for these four regional blocks over the period. For this reason, we focus on the *underlying* longer-term trends that summarize the dynamics in the growth

of trade in the following section.

3. Methodology

The following analysis is based on the Trend and Cycles Decomposition approach. A more formal analytical framework, which is beyond this study, is the aim of our future work.

Forming a RTA should logically increase trade among member countries. Due to the relatively short history of most RTA's, (except for EU), conventional statistical methods are not robust in identifying the effects of the recent RTAs on trade. However, if a RTA is formed in order to secure and enhance the mutual benefits from a history (albeit short) of intra-regional growth in trade, then the series should reveal discernable changes in the underlying long-term trends in intra versus inter regional trade prior to the formation of the RTA. Our approach captures these features from the data for NAFTA and MERCOSUR. Since countries of APEC are not, in general, adjacent we find a much less regular growth pattern. The pattern for the EU departs from the other three blocs with evidence suggesting trade diversion.

We utilize a time series of agricultural trade flows from the UN bilateral trade database. To capture more clearly the dynamic features of regional trade, we calculate the annual growth rate of the four blocs' agricultural trade, distinguishing in each case their respective intra from extra regional and total agricultural trade. Of course, the resulting series of growth rates exhibit relatively large annual variability due to any number of factors including weather shocks (see figure 1 as an example). Almost surely, many of the causes for these fluctuations in the data are not factors that are critical for discerning linkages between the RTAs and agricultural trade. Instead, these deviations tend to obscure the underlying longer-term trend in trade growth rates. The longer-term trends in trade growth should better reveal the relationship, either ex-post or ex-

ante, to the formation of a RTA. Thus, we employ the TCD methodology to remove or "filter" these fluctuations from the primary data.

Various methods exist for dealing with such a problem. For our purpose, we choose the approach developed by Hodrick and Prescott (1997) in the study of business cycles. This method has a long history of use, particularly in the actuarial sciences. Following Hodrick and Prescott (1997), the observed time series, y_t, are viewed as the sum of cyclical components, c_t, and growth components, g_t, i.e.,

$y_t = g_t + c_t$, for $t = 1, ..., T$.

Our prior knowledge, based upon growth theory, is that growth components vary "smoothly" over time following their secular evolution. The measure of the smoothness of the $\{g_t\}$ path is the sum of the squares of its second difference. By taking differences, the somewhat ill behaved random walk nature of the data series become ultimately well behaved series of zero mean white noise and makes the series stationary. The variable c_t is the deviation from g_t. The notion is that, over long time periods, the cycles, c_t, where $c_t = y_t - g_t$, average near zero. This presumption leads to the following programming problem for determining the underlying growth components in the observed time series y_t:

$$\underset{<g_t>_{t=-1}^{T}}{\text{Min}} \left\{ \sum_{t=1}^{T} (y_t - g_t)^2 + \lambda \sum_{t=1}^{T} [(g_t - g_{t-1}) - (g_{t-1} - g_{t-2})]^2 \right\}$$

The parameter λ is a positive number that penalizes variability in the growth component of the series. The larger the value of λ, the "smoother" is the underlying growth trend g_t. For a sufficiently large λ, at the optimum all the $g_{t+1} - g_t$ must be arbitrarily near some constant β and

therefore the g_t arbitrarily near $g_0 + \beta_t$. This implies that in the limit of solution to the above equation as λ approaches infinitely is the least squares fit of a linear time trend model, and for $\lambda = 0$, the smoothed data are exactly the same as the sample data.

The selection of the smoothing parameter λ is based on a probability model. If the cyclical components and the second differences of the growth components are identically and independently distributed normal variables with mean zero and variances σ_1^2 and σ_2^2 (which they are not), then the conditional expectation of the g_t, given the observations, would be the solution of the above equation when $\sqrt{\lambda} = \sigma_1/\sigma_2$.

Different values of λ provide different information, e.g., a large value of λ approximates the annual average rate of growth given by an ordinary least squares fit to the log of the data. The problem is to choose the value of λ that best depicts the underlying growth components in the data, and then to employ that value ($\lambda = 20$, in this case) for all countries over the period 1992-95. A sensitivity analysis was performed with the values of λ^x ranging from $4 \geq x \geq ½$. The result of this sensitivity analysis appears in Appendix B, where table B1 reports the standard deviation and serial correlation of the cyclical NAFTA agricultural exports (see also figure B1). Figure B2 shows that larger values of λ result in larger deviations from trend, but the frequency of the cycles remains almost unchanged. The serial correlation of the cyclical components for different values of λ indicates that the selected smoothing parameter ($\lambda = 20$) seems to capture the underlying growth components of the data without undue smoothing which appears to result when x reaches its upper bound[5] (figure B3). The plots of the auto-correlation values in figure B1 also support this conclusion.

We apply this method to the UN bilateral trade database. The original database was readjusted by USDA/ERS[3], so that bilateral trade is balanced, i.e., the value of a commodity's total exports equals the value of its total imports, in fob terms. The adjusted data are aggregated into bilaterally agricultural export and import data. The definition of agricultural commodities is based on that of the FAO. These data, in nominal value terms, are further deflated by FAO's import and export unit value indices. We then use equation (1), with the value of λ set equal to 20, to smooth the real value (expressed on logarithms) of the bilateral and total agricultural trade of 37 countries. These are the countries that now belong to one of the four regional blocs. This is implemented using the GAMS (Brooke, et. al., 1988) software and by deriving the first- and second-order difference equations required to solve the above equation. In the following sections, both the smoothed data and the primary data are presented. When we discuss the trade *shares* or growth rates, including average shares and growth rates, we use the primary – un-smoothed data. When we discuss the *growth paths* and *patterns*, we use smoothed data after removing the cycles.[4]

When the import/export unit value indices are used as deflators, we have to consider whether such deflators alter, in a misleading way, the growth path. This concern arises because the import/export unit value indices not only capture a country's change in its agricultural terms of trade, but also its composition of agricultural trade. To check this problem, we also calculate the nominal growth rates for U.S. total agricultural exports and imports by the same smoothing method using the nominal value data without deflating. It turns out that we only observe

[3] Mark Gehlhar, USDA/ERS did the data adjustment work.

[4] While the smoothed rates depart from the unsmoothed rates in a particular year, the period average growth rate of the two series is the same.

relatively large deviations between the nominal and real growth paths for the periods of early 1970s and mid 1980s, when the value of U.S. dollar exhibited rather large fluctuations. Such deviations should be treated as price effects. This result suggests that using trade unit value indices as deflators and calculating growth rates from the smoothed data results in little if any bias against growth in agricultural trade and hence the result should be reliable for our purposes.

4. Regional Trade Analysis

4.1. NAFTA

Table 2 shows that bilateral agricultural trade between the U.S. and Canada and between the U.S. and Mexico was disproportionately high long before the formation of NAFTA. But this is not the case for agricultural trade between Canada and Mexico.

Table 2. Average shares of bilateral trade in a country's total agricultural trade, 1962-95

	U.S.A.	Canada	Mexico	World[a]
U.S.A.				
Exports		8.0	3.8	16.0
Imports		9.9	7.6	9.9
Canada				
Exports	28.0		0.9	3.4
Imports	55.6		1.3	2.3
Mexico				
Exports	65.1	2.5		1.2
Imports	67.1	3.2		0.9

a. Country's total agricultural trade divided by world agricultural trade.

The adjacency factor may explain the level of disproportionately in bilateral trade between two neighboring countries, but it is unlikely to explain its evolution. The evolution of trade has more important policy implications than the level of trade. To obtain a general picture of intra-regional trade in total agricultural trade over the last three decades, we calculate a three-year moving average of the shares of intra-regional trade in total agricultural exports and imports for

the North American region (figure 2).

4.1.1. Macro economic policies appear to have affected agricultural trade growth

The share of intra-regional trade in NAFTA agricultural trade generally fell during the 1970s and rose in the 1980s (figure 2). The growth paths calculated from the smoothed data capture a similar pattern (figure 3). The smoothed growth path for world total agricultural trade is included in each of the figures as a reference or benchmark. Figures showing the agricultural trade growth patterns for each North American country appear in the Appendix.

The growth path of intra-regional trade departs from the path of extra-regional exports over the entire time period, while the path of extra-regional exports follows closely the path of total NAFTA exports. For the case of agricultural imports, the three growth paths, i.e., intra, extra and total trade, follow a similar pattern through mid 1980s, after which the intra path appears to "pull-up" the growth in total NAFTA trade. The pattern of extra exports and imports tends to follow more closely the pattern of total NAFTA trade because the region is a net agricultural exporter, at least prior to the 1980s, when intra-regional trade was not a dominant factor in determining this region's growth pattern of agricultural exports. However, since the mid 1980s, the higher rates of growth of intra-trade relative to extra-trade suggest that intra-regional trade had a stronger influence on the growth in total trade. Again, however, this influence is stronger for total agricultural imports than for exports.

U.S. agricultural trade accounts for 70 to 80 percent of total NAFTA exports and imports, and the bilateral trade between U.S. and the other two countries accounts for about 98 percent of intra NAFTA agricultural trade. Hence, the growth patterns of NAFTA trade shown if figure 3 are strongly influenced by U.S. agricultural trade and policies. There are two time periods, the

early 1970s and mid 1980s, during which the path of U.S. agricultural exports or imports show a significant departure from their historical path (figure A1). It is well know that in the early 1970s, the U.S. dollar suffered a large depreciation, while in the early 1980s, with high domestic interest rates, the U.S. dollar appreciated relative to its major trading partners. The growth rate of U.S. agricultural exports rose and imports fell with the depreciation of the U.S. dollar in the early 1970s, (figure A1). When the dollar appreciated in early 1980s, the growth rate of its total agricultural exports fell and imports rose. These phenomena are consistent with the prediction of most trade models, and reinforce the importance of macro policy for U.S. agricultural trade. The important effects of macro economic policy are also noted by Whalley (1992) in studying the effects of CAFTA. He concludes that the Canadian economy, and trade in particular, had been more strongly affected by macroeconomic fluctuations than by the bilateral removal of tariffs. With its dominant share of regional trade, the U.S. growth patterns of trade strongly influence the observed pattern of NAFTA's total agricultural exports and imports.

Notice that when the growth rate of U.S. total agricultural exports rose in 1970s, U.S. exports to its North American neighbors did not grow at the same rate (figure A1.a). When the growth rate of U.S. total agricultural imports fell in that time period, its imports from neighbor countries fell more. These two factors working together caused intra NAFTA agricultural trade to grow much more slowly than total NAFTA agricultural exports.

This also suggests that when bilateral trade between neighboring countries accounts for a large share of each country's total exports or imports, factors affecting a country's economy, such changes in policy, tend to generate relatively larger effects on its neighbors than on the rest of the world. Thus, for a given level of effort and conflict in negotiating arrangements, harmonizing

economic policies among neighboring countries is likely to receive higher priority in the policy process than seeking multilateral harmonization.

4.1.2. Policy reforms appear to have stimulated intra-regional agricultural trade growth

We observe in figure 3 that rate of growth in intra NAFTA agricultural trade became significantly higher than that of its total agricultural trade after mid 1980s. This growth in intra trade proceeded the signing of the Canada – U.S. Free Trade Agreement (1989) as well as NAFTA (1993). Thus, as shown in figure 2, the share of intra-regional trade in total NAFTA agricultural trade began to increase long before the formation of RTAs, as though the growth in intra-regional trade induced the formation of the RTA. This implies that there are other factors, besides the formulation of a RTA, which stimulate intra-regional growth in trade. These factors likely include the adoption of a more open trade policy by Mexico following the financial crisis of mid 1980s, and efforts by U.S. and Canada to pursue more market based incentives for agriculture.

It appears that once countries in a region chose to pursue a more open agricultural trade policy, growth in trade among neighbors developed more rapidly than that with the rest of the world. Furthermore, as growth in intra-regional trade has a close relationship with the movement to a more open trade policy by neighboring countries, a logical or natural outcome is for these countries to form a region-wide agreement to lower restrictions to trade. These include the harmonizing of trade policy, reducing intra-regional trade barriers due to different product standards and other non-tariff barriers, and the adoption of a common external trade policy with the rest of world. This opinion is also shared by Ethier (1998). He argues that it is necessary to investigate the causes of the new regionalism and not merely use the traditional tools to try to

deduce its consequences. He suggests that the new regionalism is largely motivated by a desire of many countries engaged in policy reform to facilitate entrance into a now much more developed multilateral trading system.

4.1.3. Trade creation vs. trade diversion

The traditional Venarian trade creation-trade diversion concept has been widely used to judge the welfare effects of a RTA, although this approach has serious limitations, (Fernandez and Portes, 1998). As NAFTA is "recent" in our data (1994 and 1995), little information can be brought to bear as to its effects on welfare. Nevertheless, the pre-NAFTA trends provide insight into the potential welfare effect of NAFTA.

Looking at the shares of NAFTA imports, in terms of total, intra and extra trade in world total agricultural trade, relatively strong downward trends are observed (figure 4 about NAFTA share in the world) in the earlier years. For example, the share of NAFTA total imports in world agricultural trade fell about 6 percentage points in last three decades. Only after the mid 1980s did NAFTA's imports account for a relatively stable share of world total trade. However, comparing the shares of intra- and extra-NAFTA imports in world total trade, we observe that after mid 1980s, the share of its imports from the rest of world fell continuously, while the share of intra-NAFTA trade rose. This rise is coincident with countries' pursuit of more outward oriented policies. Is this trade diversion? As the strong upward trend in the growth of intra-NAFTA trade preceded by many years the arrangement itself, the arrangement cannot be characterized as causing trade diversion.

In terms of long-term trade "creation", NAFTA's world market share (in terms of its exports in world agricultural trade) has also declined in the last three decades, and especially so

during the mid 1980s, when its market share fell about 7 percentage points from its 1960s level. During the 1990s, NAFTA's share in world agricultural trade was relatively stable, which is largely explained by the growth in NAFTA's intra-regional trade during that period. However, there is a noticeable rise in the last year (1995's) share of NAFTA total and external exports, while the internal trade share actually fell. Whether the formation of NAFTA will increase its member countries' competitiveness in the world market and generate more agricultural trade for the world remains to be seen.

In summary, the NAFTA case suggests the neighborhood relationship entails not only more than proximity and cultural similarities, but also policy effects. Differences in trade policy among neighboring countries appear to have greater effects on neighborhood trade than trade with countries outside the region. Thus, the harmonization of trade policies among members seems more likely to benefit them relative to more distant countries, all else constant. Once policies become less restrictive to neighborhood trade, and growth in trade results, a RTA may be a mechanism for "institutionalizing" the removal of other trade barriers. In this case, the adoption of more open trade policy by the neighboring countries can be seen as an engine of intra-regional trade growth, as well as the formation of a RTA.

4.2. MERCOSUR

In contrast to NAFTA, intra-Mercosur agricultural trade accounts for a relatively small share in each country's total agricultural exports (table 3). Only for the two small countries, Paraguay and Uruguay, was the average intra-regional export share in their total agricultural exports relatively high (around 20 percent). Still, relative to Mexico's contribution to NAFTA, these shares are small. As all Mercosur countries are net agricultural exporters, we see, as in the

case of NAFTA, that intra-regional imports accounted for a large share in each country's total agricultural imports (40 – 60 percent).

Table 3. Shares of intra-regional agricultural trade and country's trade in Mercosur total agricultural trade, 1962-95

	Share of intra-regional ag. Trade In country total Ag. Trade		Share of country Ag. Trade in Mercosur total Ag. Trade	
	Exports	Imports	Exports	Imports
Argentina	9.0	42.8	55.5	20.0
Brazil	2.5	38.8	22.5	65.8
Paraguay	23.5	47.2	10.7	5.2
Uruguay	17.2	59.3	11.3	9.0
Mercosur	6.3	24.2	100.0	100.0

4.2.1. The shares of intra-regional trade was unstable before the mid 1980s

The shares of intra-regional trade in the four Mercosur countries' total agricultural imports varied substantially prior to mid 1980s (figure 5b) while intra-regional shares in total Mercosur agricultural exports were quite stable prior to about 1990 (figure 5a). Taking into account the high intra import shares in total imports relative to intra export shares in total exports, the variability in import shares implies that the cause was most likely related to events specific to the Mercosur countries themselves. Notice also that, similar to NAFTA, the share of intra-regional trade in total Mercosur agricultural exports and imports was lower in many of the years prior to about 1990 than in the mid 1960s; the lowest level occurred in the mid 1980s. Keeping these patterns in mind, we turn to the patterns of growth in Mercosur agricultural trade.

4.2.2. Inward-oriental policies negatively affected intra-regional trade

While total Mercosur agricultural exports fell throughout the 1970s and early 1980s, its intra-regional exports fell more during late 1970s and early 1980s (see figure 6a). These growth

patterns likely reflect the import substitution policies these countries pursued during this period. Many Latin American countries levied heavy taxes on agricultural exports to subsidize industrial development and imposed high import barriers on agricultural inputs (Krueger et. al., 1991). Such tax burdens were further exacerbated by inflationary fiscal policies that implicitly taxed the primary sectors of production, especially agriculture. Fiscal policies subsequently led to monetization and over valuation of currencies, which resulted in further taxing producers of traded goods (Little et. al., 1993 and Alam et. al., 1993).

Coincident with these policies, the world share of the four Mercosur country's total agricultural exports in the world agricultural trade fell by nearly 50 percent in 1970s and 1980s, from 7.5 percent in 1960s to less than 5 percent in late 1980s (figure 7). The more interesting result is the apparent negative effects that these policies had on intra-regional trade. That is, neighborhood trade appears, once again, more sensitive or fragile to the adoption of inward oriented policies by Mercosur member countries (i.e., adjacent countries). Conversely, as we note below, neighborhood trade is likely to respond more strongly than trade with distant countries to the pursuit of more common outward oriented policies.

4.2.3. Economic reform generated more intra-regional trade

The Latin American countries' shift toward more outward-oriented trade regimes started in mid 1980s. Agricultural export taxes were largely abolished and average tariff rates were reduced dramatically. The degree of openness, measured by the ratio of the sum of exports and imports to Gross Domestic Product (GDP), increased from a pre-reform level of 49 percent to a post-reform (1991) of 58 percent for Latin American countries on average (Alam, et. al., 1993). Recovering from the crisis, growth in Mercosur countries' agricultural exports and imports began

to exceed the world average level again in early the1990s (figure 6). While growth in agricultural imports increased relatively rapidly, growth in agricultural exports also increased, albeit more slowly. In the meantime, intra Mercosur trade grew much more rapidly than total agricultural trade. All these trends are depicted in figure 6 for the growth paths of agricultural exports and imports and for the trade share in figure 5. Similar to the case of NAFTA, it is evident that the strong growth trend in intra- regional agricultural trade started before the establishment of the RTA; the establishment of Mercosur however appears to have further reinforced this trend.

Thus, the trend and cycle decomposition analysis suggests a close relationship between growth in intra-regional agricultural trade, trade liberalization conducted by member countries, and the establishment of a RTA. The growth in intra-regional agricultural trade seems coincident with trade liberalization in neighboring countries, which then appears to generate a common interest in a RTA.

4.2.4. Trade creation or trade diversion

The positive effects of trade liberalization, together with the RTA can be seen in figures 6-7. With rapid growth of intra-regional trade, Mercosur also increased its agricultural imports from the rest of world. Thus, we observe that growth patterns of intra-, extra-regional and total Mercosur' imports are relatively consistent post late 1980s (figure 6b), and shares of Mercosur's internal imports as well as imports from the rest of world in world agricultural trade both rose in the same period (figure 7). The region's rising demand for imports from the rest of world create trade opportunities for agricultural exporters outside the bloc, i.e., external trade creation.

The positive dynamic effects of trade liberalization are also observed in the shares of Mercosur's total exports and exports to the rest of world in the late 1980s (figure 7). Recent

growth in Mercosur's agricultural exports likely reflects continuing adjustments to its more outward oriented trade policies. The further implementation of Mercosur agreements, including the elimination internal tariffs and the reduction in common external tariff rates, should result continuing growth in its agricultural exports.[5]

4.3 European Union

The European Union is the only region for which a fully implemented trade agreement has been in effect for the entire time period 1962-1995. Hence, we expect the data to show a relatively strong tendency toward intra-EU agricultural trade. While others have also studied EU trade patterns, the main purpose for including the EU is assess whether our methodology leads to similar conclusions, and whether similarities can be seen between the EU and other regions.

4.3.1. Trade diversion in the EU

The finding that the EU's Common Agricultural Policy (CAP) has caused severe trade diversion in its agricultural imports is a widely shared result of many studies (see Winters, 1993; Sapir, 1992; Krugman, 1991; Jacquemin and Sapir, 1988; and Balassa, 1975). We also find evidence in support of this result, although, the extent of trade diversion in agriculture is not as pronounced as we had initially expected it to be. Figure 8b shows that the growth paths of the EU's total agricultural imports, and imports from the rest of the world, were invariably below the growth path of world total agricultural trade, while the path of agricultural imports from member countries were always above the world growth path. A similar trend is also observed in figure 9, where the region's world share of total imports, especially imports from the rest of world in world

[5] In the another study by Diao et. al. (1997), additional gains for Mercosur member countries are seen to arise from technological spillovers associated with the growth in total trade.

total agricultural trade, declined dramatically in the last three decades.

The decline in the share of the EU's total imports in world agricultural trade suggests the well-known fact that the EU is moving from a historically deficit to a more agriculturally self-sufficient region. The mentioned dramatic decline (more than 20 percent) in the share of EU's imports from the rest of world in world total agricultural trade implies a loss of export opportunities for other non-member countries. Had the EU's rate of growth in agricultural imports from the rest of the world grown at the same rate as world agricultural trade, it would have created a agricultural trade opportunity for non-member countries in the range of about 7 to 10 percent of world agricultural trade.[6]

4.3.2. Trade creation in the EU?

Accompanying the EU's dramatic decline in the share of its imports in total world trade emanating from non-member countries is the rise (from about 24 percent to 45 percent) in its share of exports in total world trade. While a modest cause of the rise in this share is exports to non-member countries, the dominant cause is the rise in the share of its exports to member countries; a rise from about 15 percent in 1962 to over 30 percent in 1994. Also, we observe that the growth path of EU's total agricultural exports lies above the path for world agricultural trade, figure 8a.

The growth in the EU's total agricultural trade was clearly driven by the rapid growth of its intra trade. However, in the EU's total exports, intra regional trade remained at a relatively stable share (around 70 percent, see figure 10). EU's exports to the rest of world grew slightly

[6] If imports had grown at the world rate, the region's import shares would have been constant over the period. Thus, the magnitude of the departure of the observed import share from a constant share (which ranges from about 7 to 10 percent) is an approximation of lost trade opportunities of non-member countries.

faster than the world average (figure 8a). Thus, in figure 9, the share of EU's exports to the rest of world trends modestly upward, from less than 10 percent of world total agricultural trade in 1960s to 13 percent in the recent years.

The increased 20 percentage points in the EU's share of world agricultural exports not only shows a significant internal trade creation, but also attests to a rise in its competitiveness in the world market. However, the contribution of growth in the EU's agricultural exports to world agricultural trade does not necessarily imply a welfare improvement. The reason can be seen from the comparison of the growth in EU's exports with its growth in agricultural production and consumption. EU's agricultural production and consumption grew much more slowly than its exports. Using FAO's agricultural production index data, the average annual growth rate of its agricultural production was about 1.34 percent per annum over the last 35 years (1961-96). From the same database, subtracting the value of EU's agricultural exports from the value of production, and adding the value of imports (exports and imports are in the same base year prices as the production data), we calculate the growth rate for EU's total agricultural consumption. The annual growth rate of EU's total agricultural consumption is quite low, a per annum average of about 0.61 percent for the same time period. Thus, rapid growth in EU exports with a modest growth in agricultural production implies that member countries became somewhat more specialized in their production structure. This may benefit agricultural producers of the member countries. However, the rather slow growth in the EU's total consumption of agricultural products implies that consumers in member countries did not benefit from the rise in the EU's market share of trade.

It is well known that the Common Agricultural Policy protects European farmers while

passing some of the costs of protection on to consumers in terms of higher food prices. While the EU experienced relatively high rates of growth in agriculture's total factor productivity over the 1980-1995 period (Gopinath, et al 1997), its competitiveness in world markets has been enhanced artificially by export subsidies. The consequence is sluggish growth in agricultural imports. This implies welfare costs for both consumers in the EU and producers of other agricultural exporting countries.

In recent years however, the extent of trade diversion appears to have lessened. The region's intra-regional export concentration ratio has trended downward (table 2), while its intra-import concentration ratio has risen to levels that are still below the ratio of any other region. As the region approaches self-sufficiency in aggregate agricultural production and consumption, its intra-regional export and import concentration ratios approach values observed for NAFTA, while intra and extra trade growth rates are approaching common values.

4.4. Asian and Pacific Economic Cooperation (APEC) Forum

APEC was formed in 1989. As announced at its 1994 Bogor meeting, the stated long-term goal of APEC is to achieve free and open trade and investment in the Pacific Rim region. With 21 members spatially dispersed along the Pacific Rim, APEC contains countries that rank among the world's major agricultural exporters and importers. In this case, both the adjacency - neighborhood relationship and RTAs are unlikely to explain the disproportionality in trade among members of the bloc.

4.4.1. Steadily raising intra-regional trade

Relatively strong growth is observed in APEC's share of its total agricultural trade that is accounted for by its intra-regional agricultural trade (figure 11). Shares of intra-regional trade in

APEC's total agricultural exports and imports rose from, respectively, 40 and 55 percent in 1960s to above 65 and 70 percent in 1990s, quite close to the level of EU's intra-regional trade. However, if we compare APEC trade in world total agricultural trade, we see that the share of intra-APEC trade in world total agricultural trade was very stable until 1986, and rose by only 5 percentage points thereafter (figure 12).

Table 4. Average shares of intra APEC trade in country's total agricultural trade

	1962-69		1970-79		1980-89		1990-95	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
Australia	64.80	60.52	63.13	66.50	53.36	62.49	63.01	52.23
Canada	43.62	69.59	46.95	70.06	53.90	65.84	73.10	75.23
Chile	24.32	31.02	24.67	37.56	40.32	36.77	48.08	28.39
China	62.75	64.80	65.80	66.68	66.96	79.11	66.93	70.98
Hong Kong	71.31	72.80	61.02	77.18	75.99	80.47	77.69	75.38
Indonesia	58.00	69.34	59.40	72.32	57.65	77.85	55.49	69.00
Japan	46.03	74.21	63.33	73.66	73.85	78.30	82.18	79.82
Korea	86.76	96.12	74.71	95.13	74.60	89.04	83.41	81.21
Malaysia	51.27	78.25	54.13	78.62	49.55	80.10	53.26	73.16
Mexico	73.78	80.48	80.90	77.32	82.04	81.40	87.10	78.28
New Zealand	27.95	51.07	38.56	53.35	47.73	65.70	55.12	74.69
Philippine	68.98	75.52	72.04	81.37	68.34	78.21	69.30	72.20
Singapore	45.73	85.41	42.05	85.28	44.34	83.25	61.16	76.79
Taiwan	74.92	88.97	73.71	81.66	84.47	85.71	93.74	80.86
Thailand	64.80	60.52	63.13	66.50	53.36	62.49	63.01	52.23
USA	33.15	35.70	37.73	37.11	46.11	39.20	59.28	49.65
APEC	44.15	57.82	48.02	61.51	52.74	65.98	64.15	69.54

Relatively stable intra-regional trade relationships post late 1980s can also be seen in table 4, which shows that intra-regional trade tends to modestly dominate APEC's total agricultural exports and imports, while for half of these countries, the share of intra-regional trade change very little.

4.4.2. Declining shares of total trade

The primary reason explaining the rise in APEC's share of intra-regional trade in its total agricultural exports is the relatively slow growth in APEC total agricultural exports, while growth in APEC agricultural imports approximate the world average level, at least before the 1990s. As we observed in figure 12, shares of APEC total exports in world agricultural trade trended downward from above 40 percent at the beginning of the period to below 35 percent in the recent years, which implies that APEC's agricultural exports grew more slowly than the world average level. On the import side, its share in world agricultural trade was around 30 percent until 1990 and rose by only about 3 percent in the recent three years.

4.4.3. A steady decline in the growth path of total trade

The smoothed growth paths in figure 13 also capture these patterns. The growth path of APEC's total agricultural exports tended to lie below the world average path for many years, while growth paths for its intra-regional trade and total imports tended to be quite close to the world level.

Since the U.S. is the major agricultural exporter among APEC members, the fall in U.S. agricultural market share is the major reason for the decline in the APEC's world share in world agricultural trade. The U.S. share of world agricultural exports fell from an average annual share of 17 to 14 percent during 1990-95. However, U.S. trade with APEC countries did not decline at the same rate; or stated another way, the decline in U.S. trade with Europe was nearly compensated for by increased trade with APEC countries. As APEC's major agricultural importing countries, such as Japan, Korean, Taiwan and China moved in the direction of liberalize domestic farm policies, intra-APEC trade has, as would be expected, grown. In the meantime, as

APEC members pledged to pursue regional free trade on a most favored nation basis and to promote the notion of open regionalism, APEC may be also expected to promote world agricultural trade. Hence, not only intra-APEC, but also total APEC agricultural exports and imports are expected to grow.

5. Conclusions

This paper delves into the debate on the proliferation of regional trade arrangements by focusing on bilateral agricultural trade data over the 1962-1995 period for countries that currently are members of NAFTA, Mercosur, the EU and APEC. Agricultural trade is chosen because agriculture has historically been protected by developed and dis-protected by developing nations, while in the case of the EU, its Common Agricultural Policy was the major policy managed and funded by member countries. The debate has centered on whether neighborhood trade is "natural," or caused by discriminatory arrangements, whether the formation of RTA's are preferred to multilateral reform, and whether they are an impetus or impediment to multilateral reform. We note that the literature has tended to focus on factors explaining the level of trade, such as adjacency and cultural similarity, and neglected factors affecting growth in trade. Since growth in intra-regional trade is a relatively recent phenomenon, we suggest that other factors, such as transportation costs or changes in technology are unlikely to be major explanatory variables.

While it is clear from several studies that neighborhood characteristics of countries affect neighborhood trade, these characteristics also appear to affect the policy regimes of neighboring countries. In this case, the pursuit of similar policy regimes among relatively adjacent countries tends to have a relatively greater effect on neighboring country trade than trade with more distant

countries. The shift to more outward oriented regimes is thus likely to induce a dynamic in trade among neighboring countries requiring several years to reach a steady state. As neighborhood trade grows, it is natural to form trade arrangements to harmonize policies and to remove other barriers such as those posed by differences in grades and standards. If this is the case, then we should expect the growth in intra regional trade to exceed growth in extra-regional trade, and these patterns should occur before the formation of a RTA among neighboring countries. Our results, based on the computation of trade concentration ratios and a trend and cycles decomposition approach, tend to support this explanation. The formation of RTA's, with the obvious exception of the EU, followed by several years' growth in intra-regional trade. Intra-regional trade in agriculture is clearly the driving force behind the growth in world agricultural trade. For the period and commodity focus of this study, RTAs appear to have contributed positively to the specialization and division of labor in agriculture among the nations. Thus, from the perspective of agricultural trade, the impetus for a RTA came from the pursuit of more common and open trade policies of member countries.

Our analysis sheds little light on whether regional trading arrangements are likely to be a future stumbling block to multilateral trade reform. For the most part, the ex-post RTA data series are too short. The analytical predictions from the various theories of political economy are also of little help in this regard. Predictions from theory depend, largely, on whether constituent interests are modeled to behave so as to induce a bloc to pursue optimal tariff like policies, whether constituent interests are more narrow country level and commodity based in which case they may not behave in the bloc's interest, or whether they respond to longer-run concerns and seek multilateral reform.

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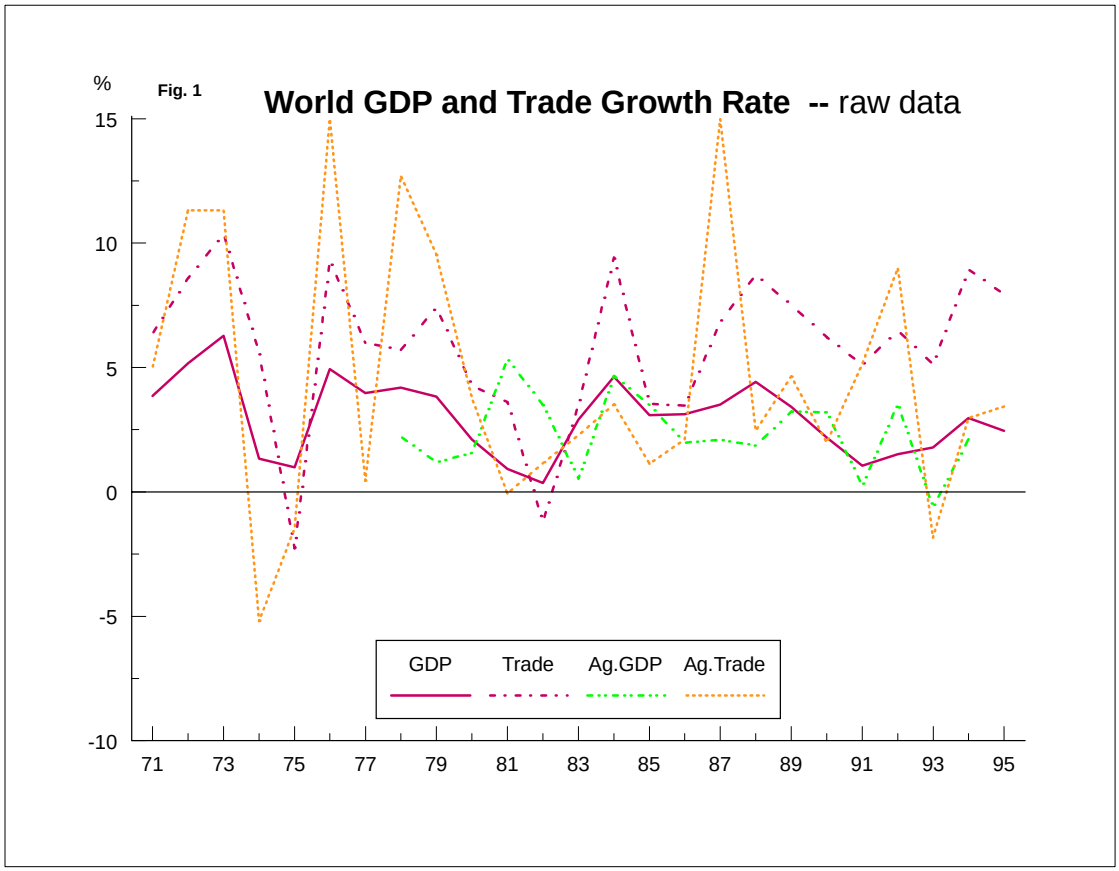
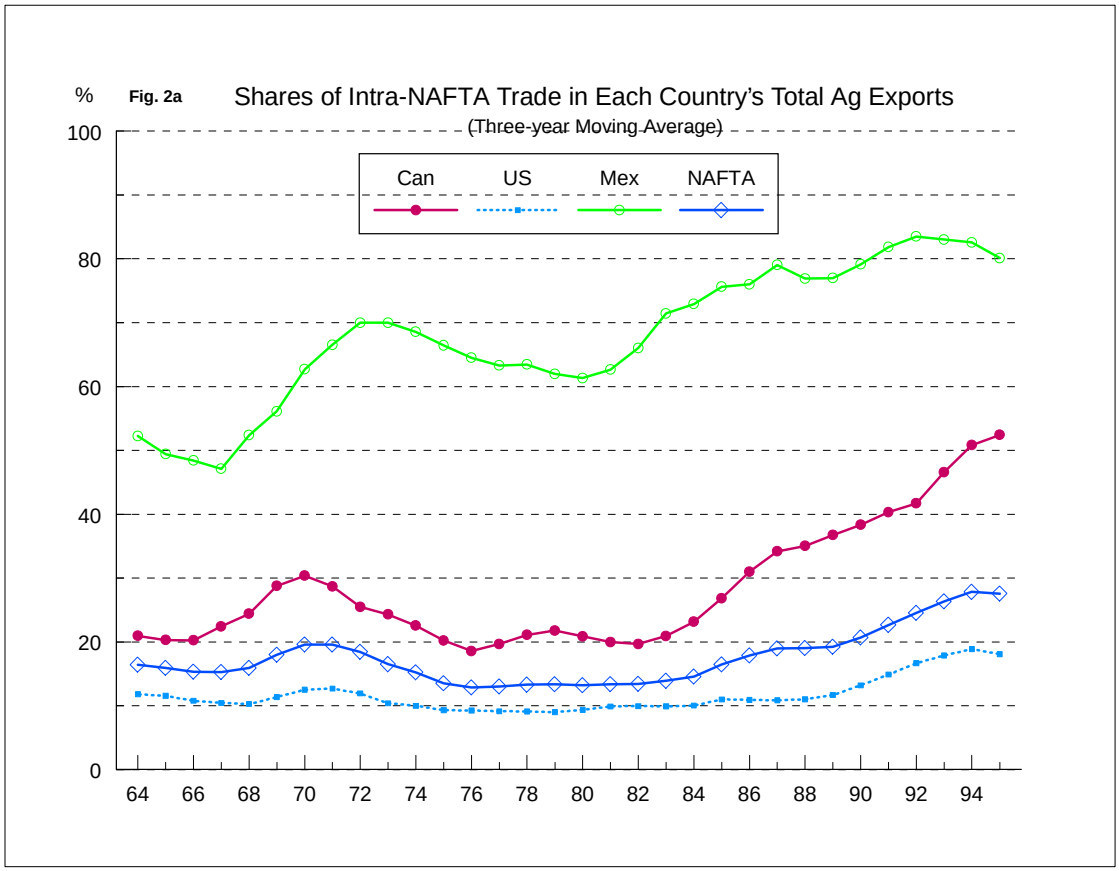
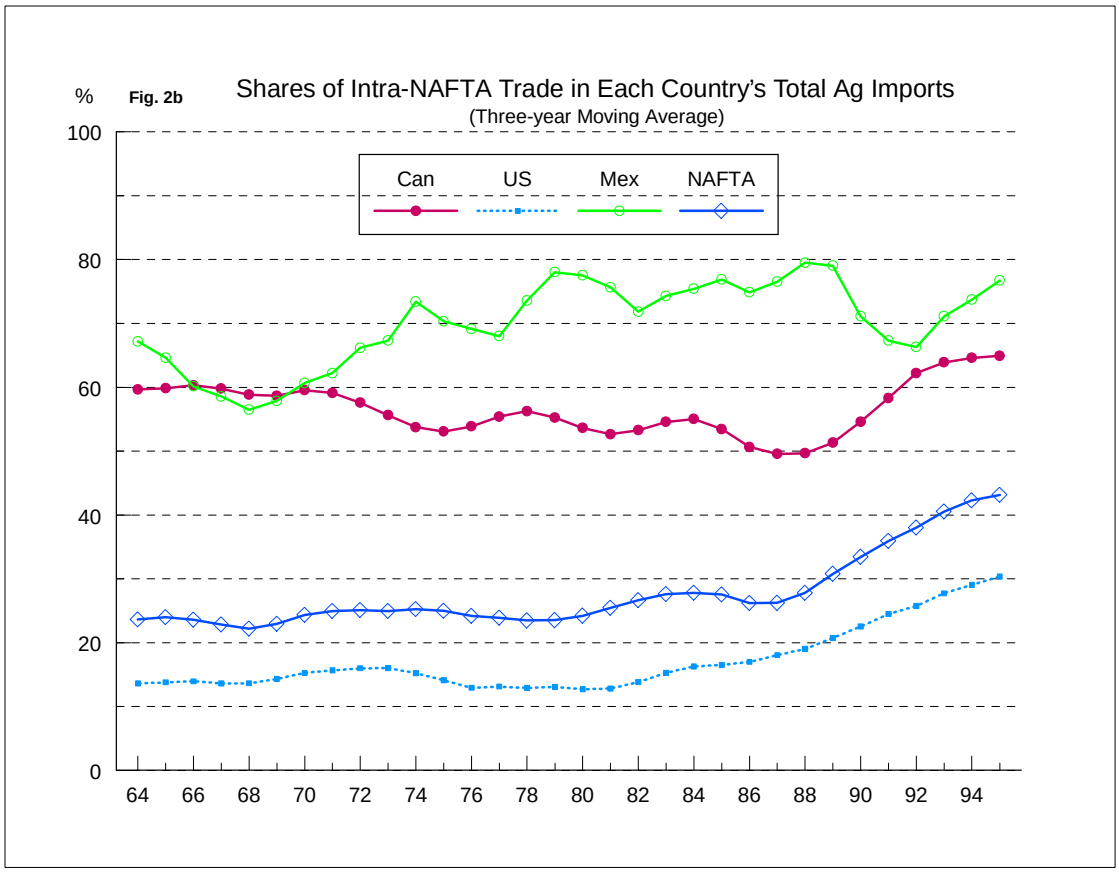
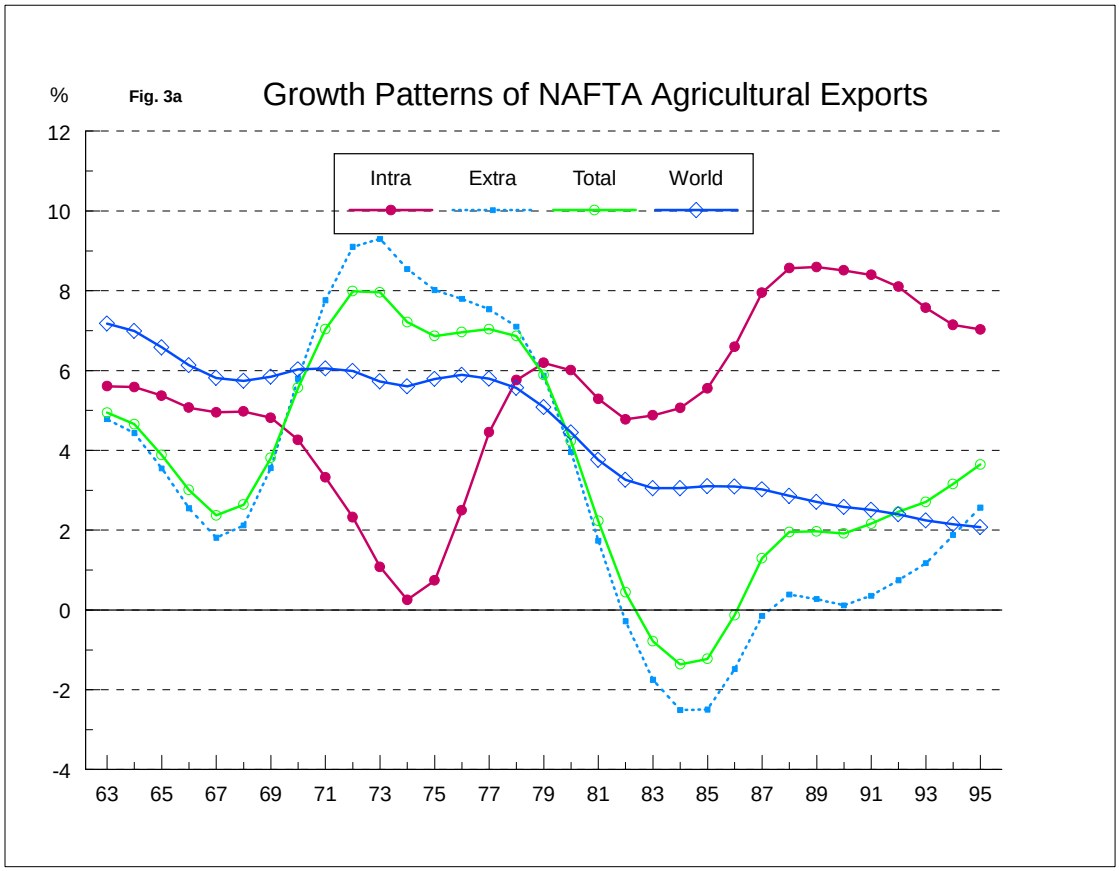
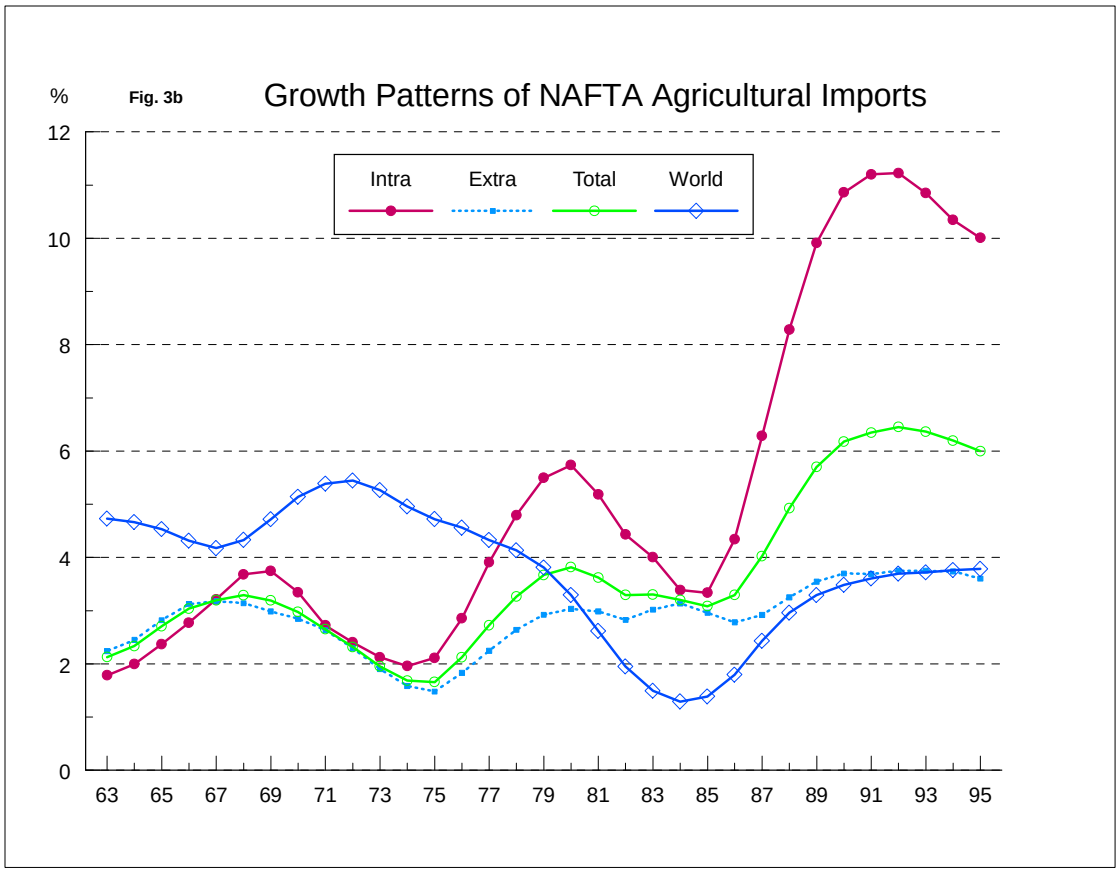


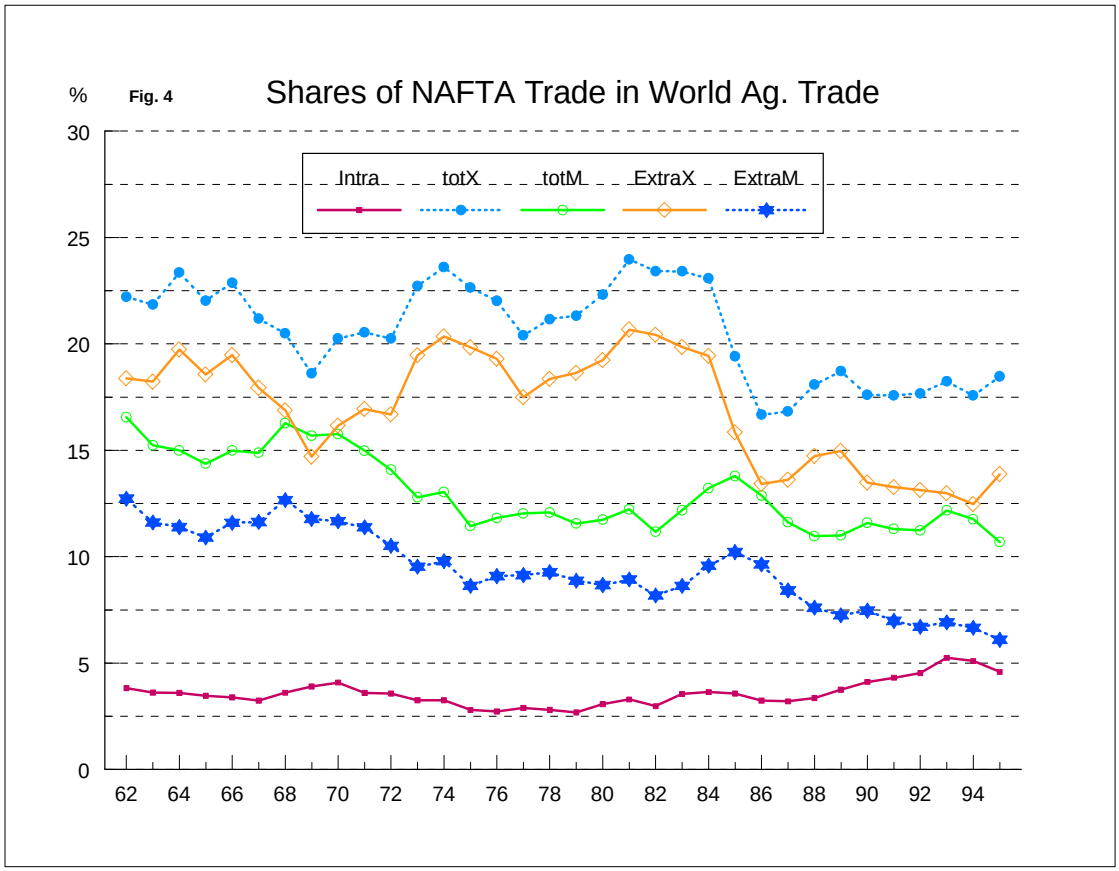
Fig. 1
World GDP and Trade Growth Rate -- raw data
%
15
10
5
0
-5
-10
71
73
75
77
79
81
83
85
87
89
91
93
95
GDP
Trade
Ag.GDP
Ag.Trade

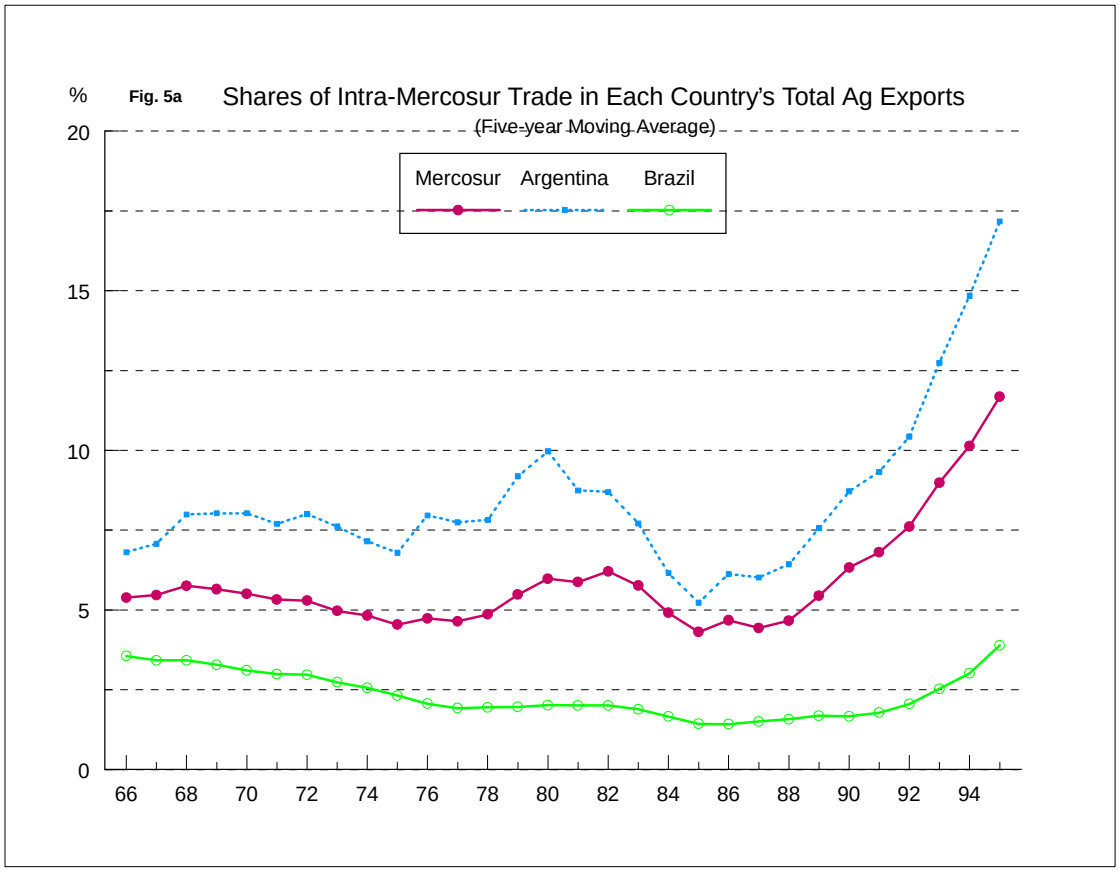

%
Fig. 2a
Shares of Intra-NAFTA Trade in Each Country's Total Ag Exports
(Three-year Moving Average)
Can
US
Mex
NAFTA
100
80
60
40
20
0
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94

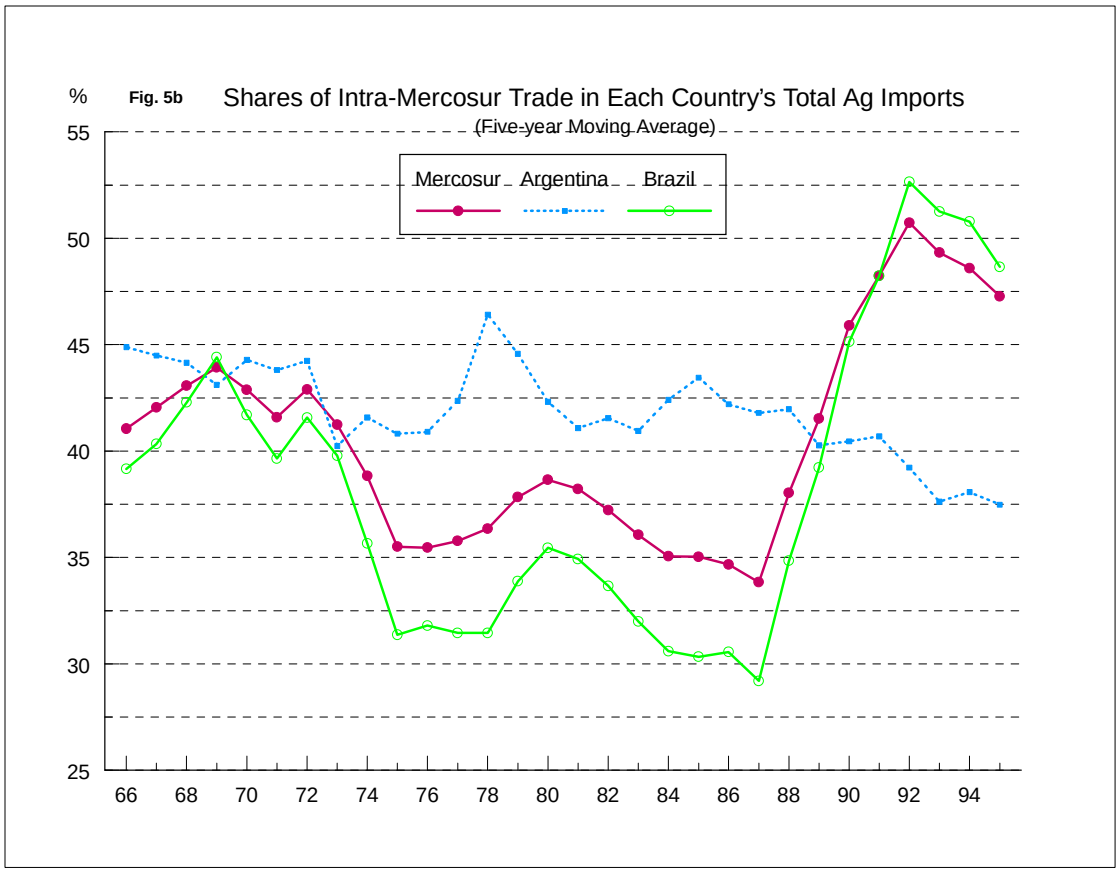

%
Fig. 2b
Shares of Intra-NAFTA Trade in Each Country's Total Ag Imports
(Three-year Moving Average)
Can
US
Mex
NAFTA
100
80
60
40
20
0
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94

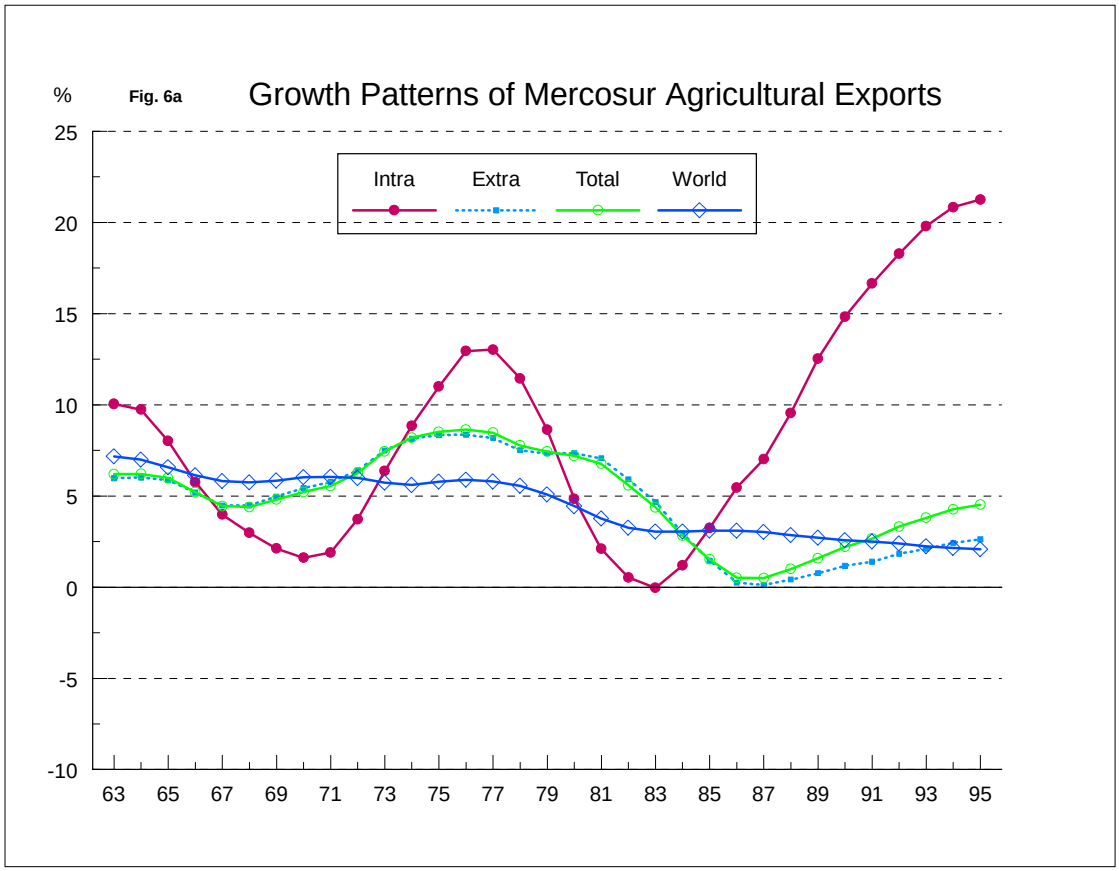

%
Fig. 3a
Growth Patterns of NAFTA Agricultural Exports
Intra
Extra
Total
World
12
10
8
6
4
2
0
-2
-4
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

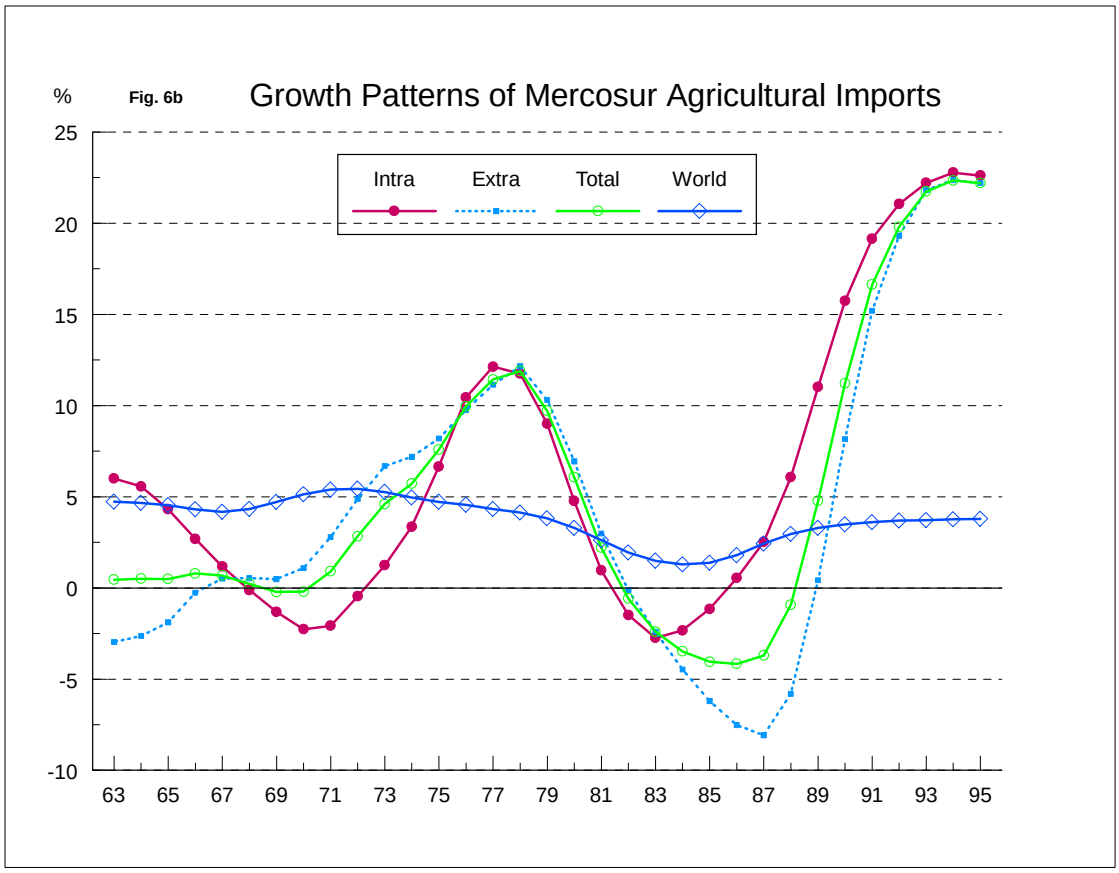

%
Fig. 3b
Growth Patterns of NAFTA Agricultural Imports
Intra
Extra
Total
World
12
10
8
6
4
2
0
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

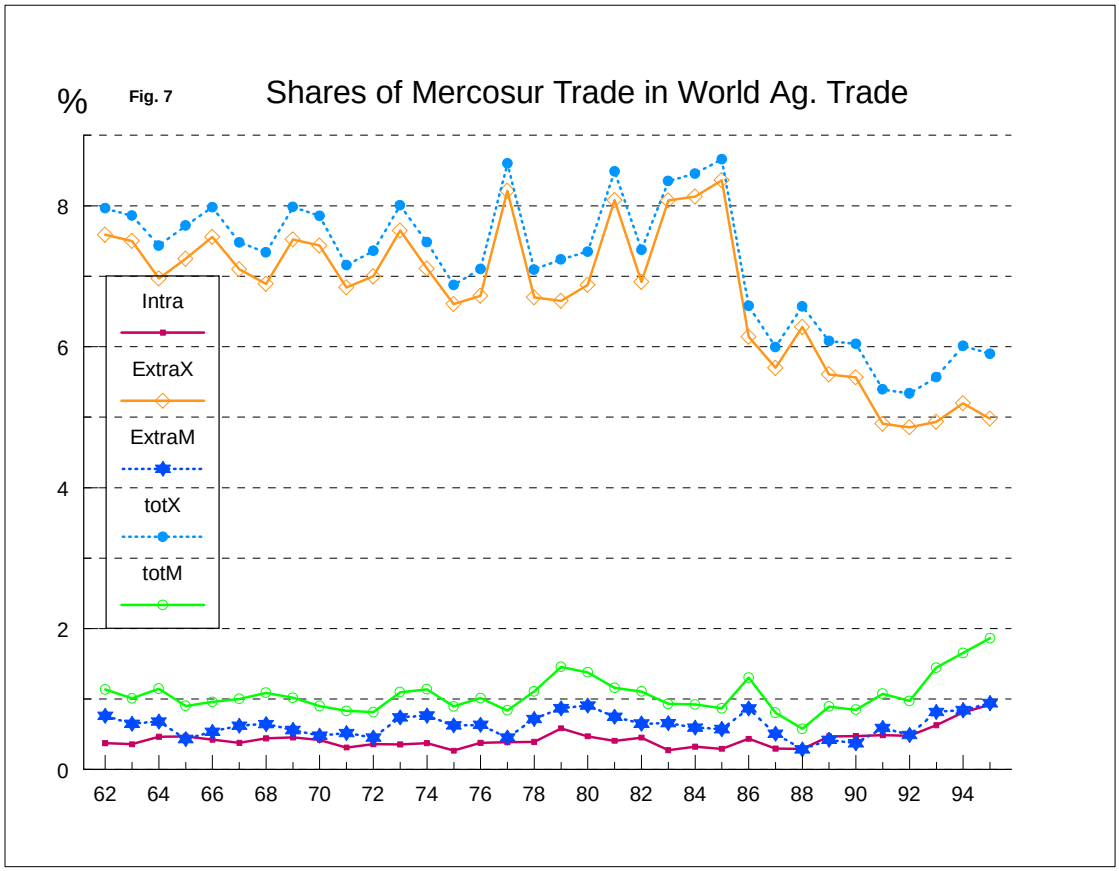

%
Fig. 4
Shares of NAFTA Trade in World Ag. Trade
Intra
totX
totM
ExtraX
ExtraM
30
25
20
15
10
5
0
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94

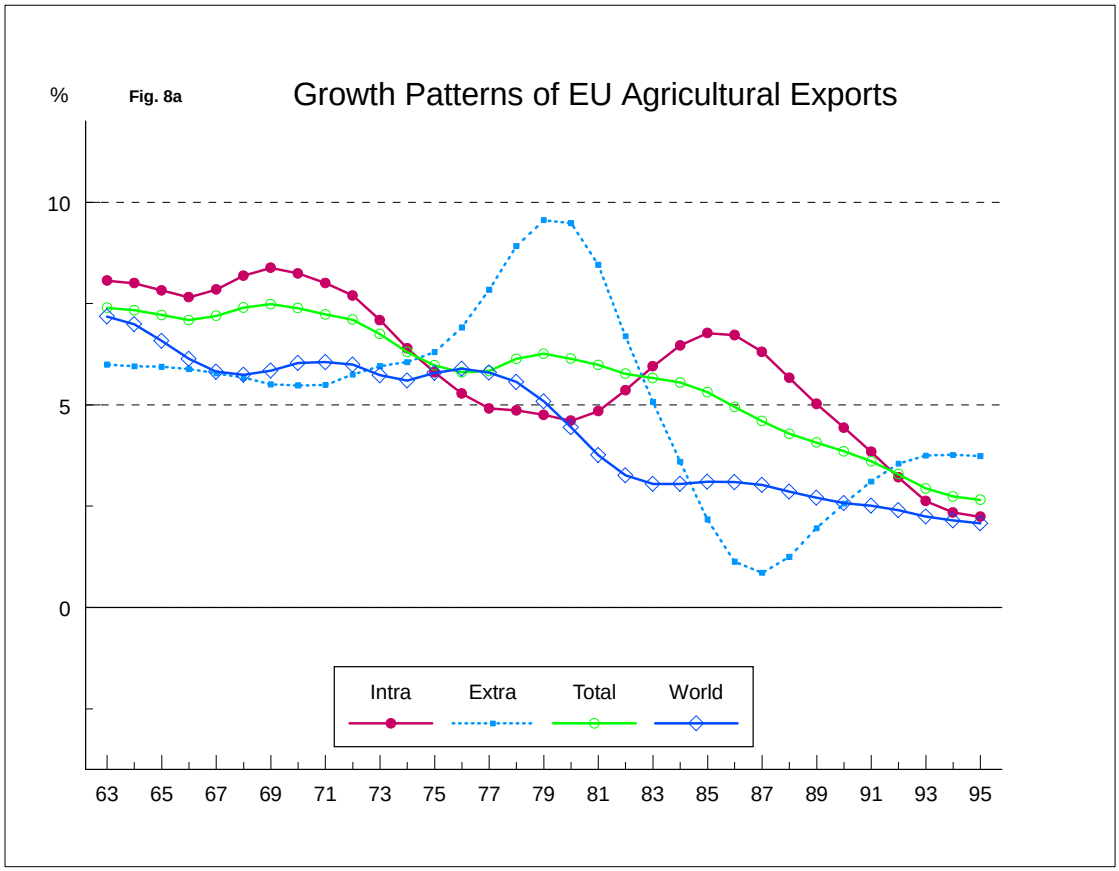

%
Fig. 5a
Shares of Intra-Mercosur Trade in Each Country's Total Ag Exports
(Five-year Moving Average)
Mercosur
Argentina
Brazil
20
15
10
5
0
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94

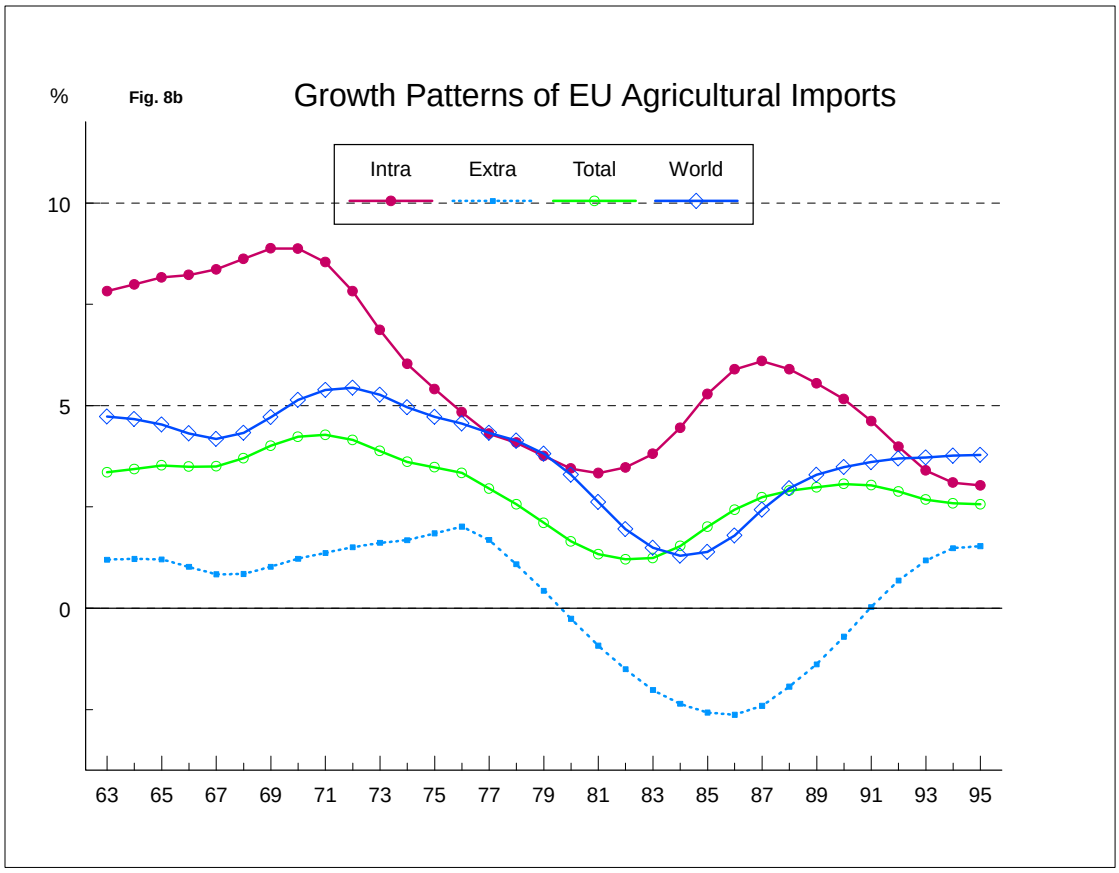

%
Fig. 5b
Shares of Intra-Mercosur Trade in Each Country's Total Ag Imports
(Five-year Moving Average)
Mercosur
Argentina
Brazil
55
50
45
40
35
30
25
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94

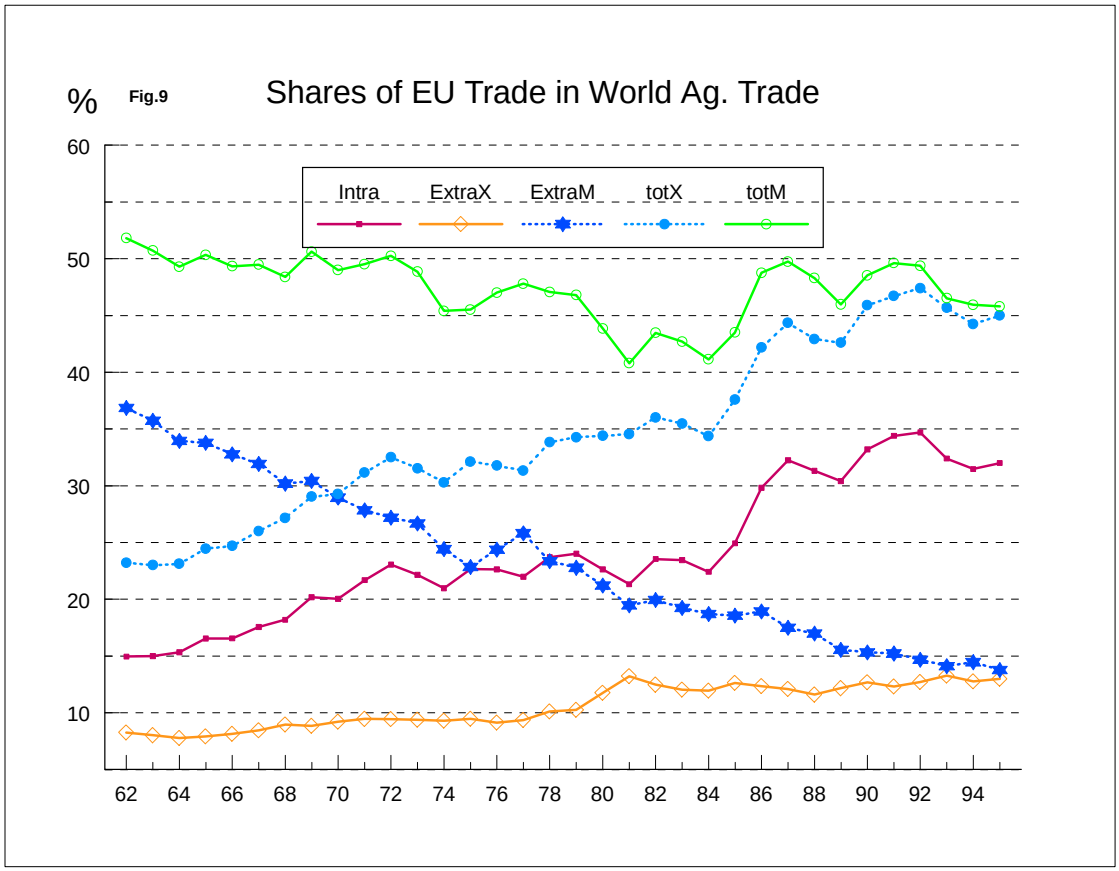

%
Fig. 6a
Growth Patterns of Mercosur Agricultural Exports
Intra
Extra
Total
World
25
20
15
10
5
0
-5
-10
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

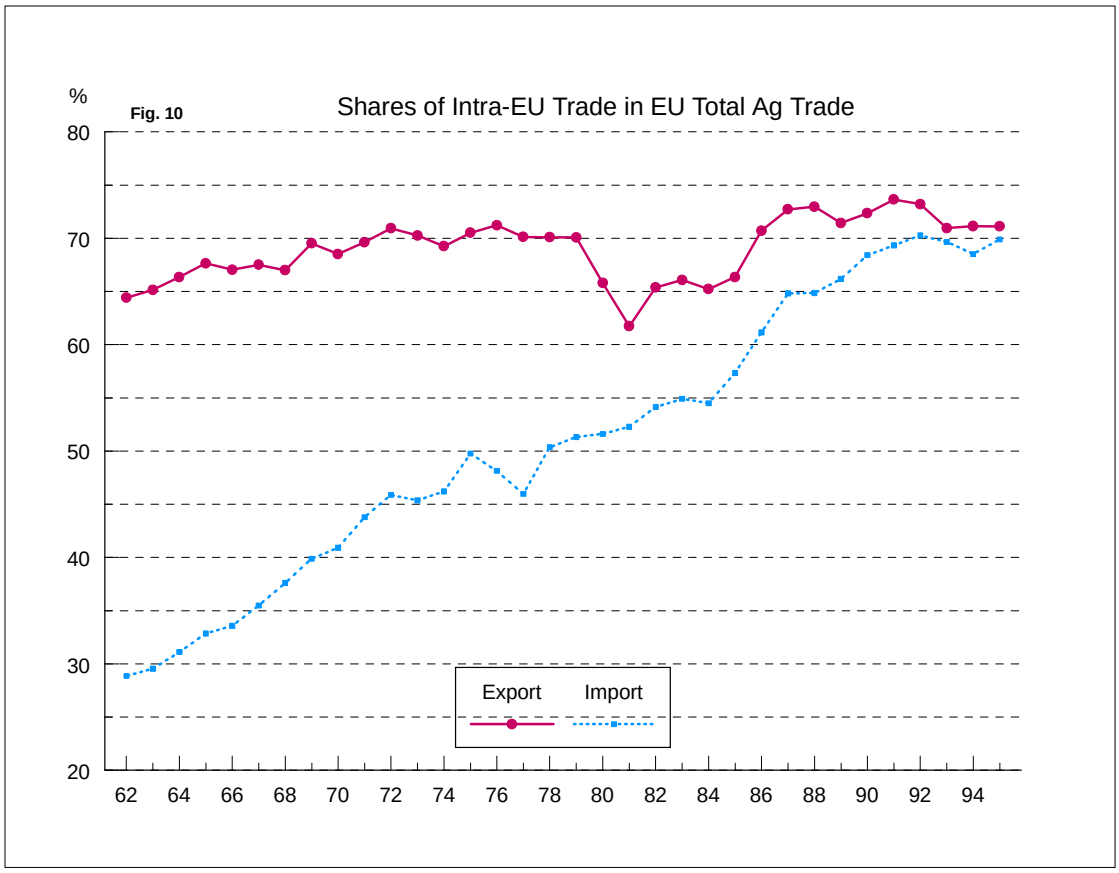

%
Fig. 6b
Growth Patterns of Mercosur Agricultural Imports
Intra
Extra
Total
World
25
20
15
10
5
0
-5
-10
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

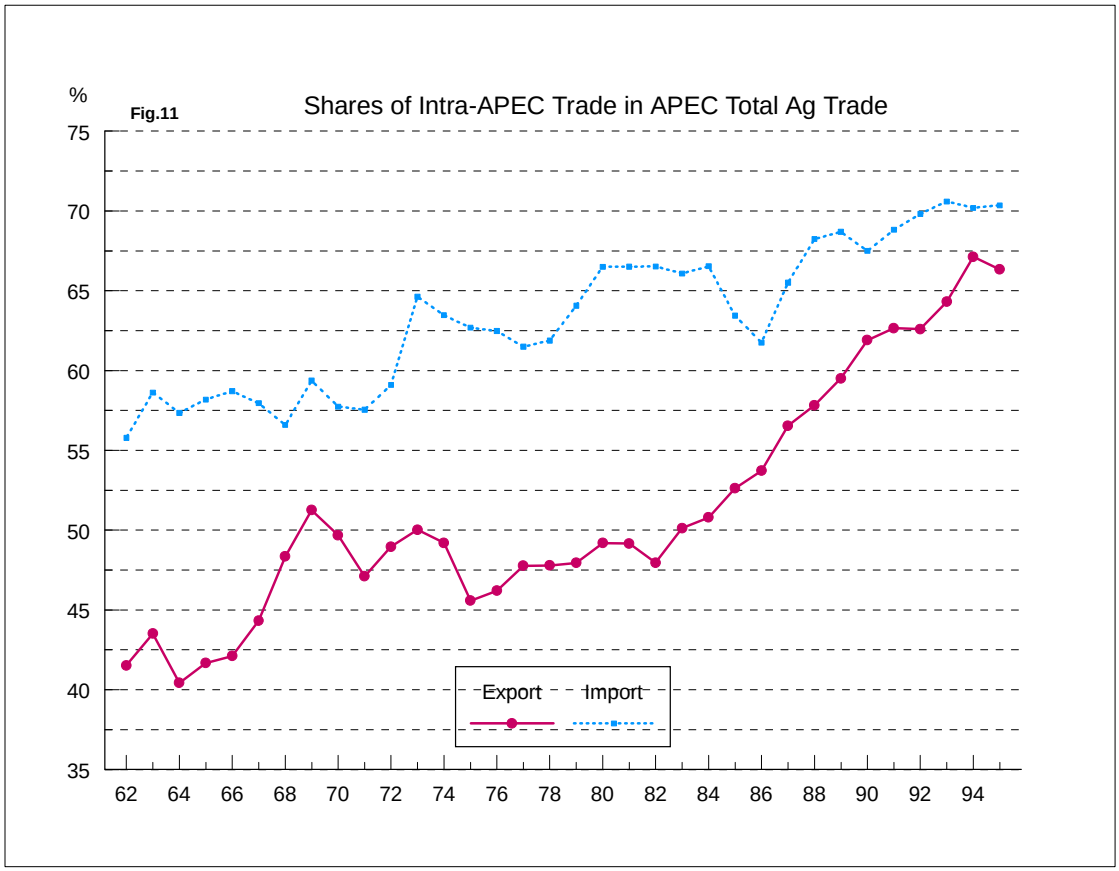

%
Fig. 7
Shares of Mercosur Trade in World Ag. Trade
8
6
4
2
0
Intra
ExtraX
ExtraM
totX
totM
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94

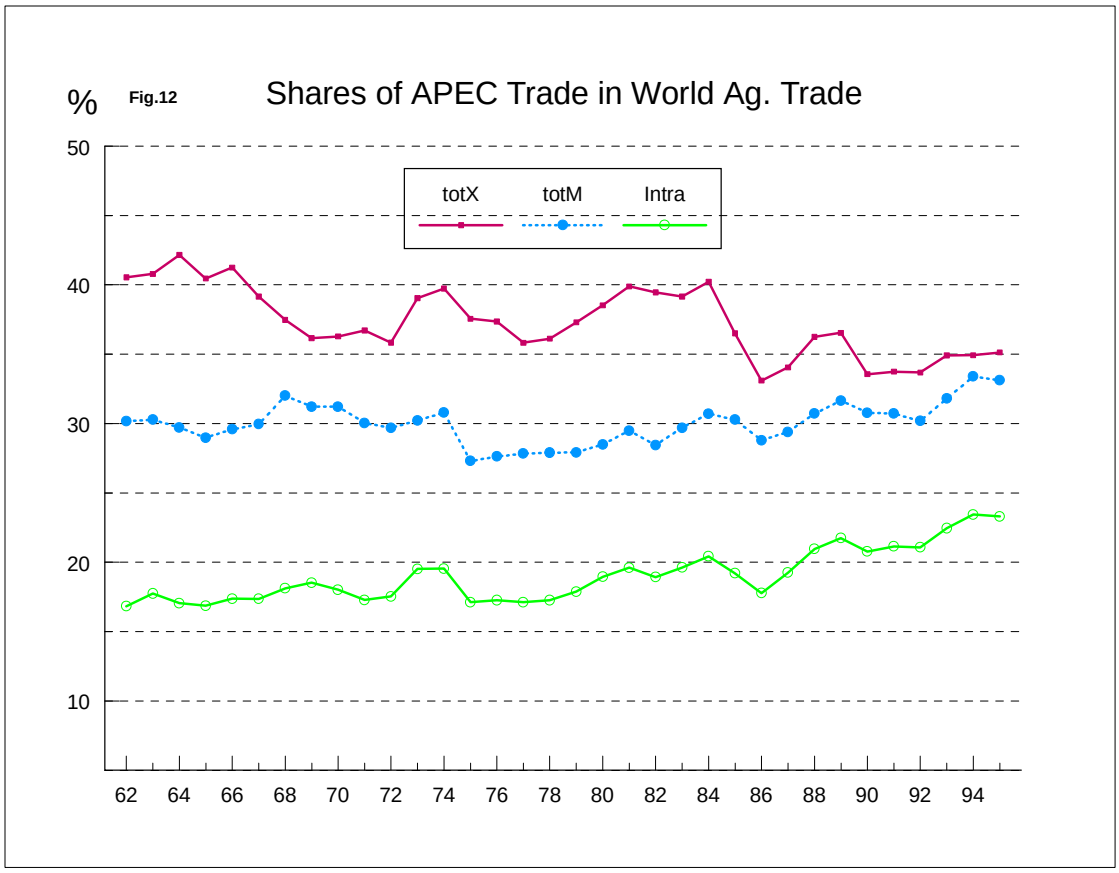

%
Fig. 8a
Growth Patterns of EU Agricultural Exports
10
5
0
Intra
Extra
Total
World
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

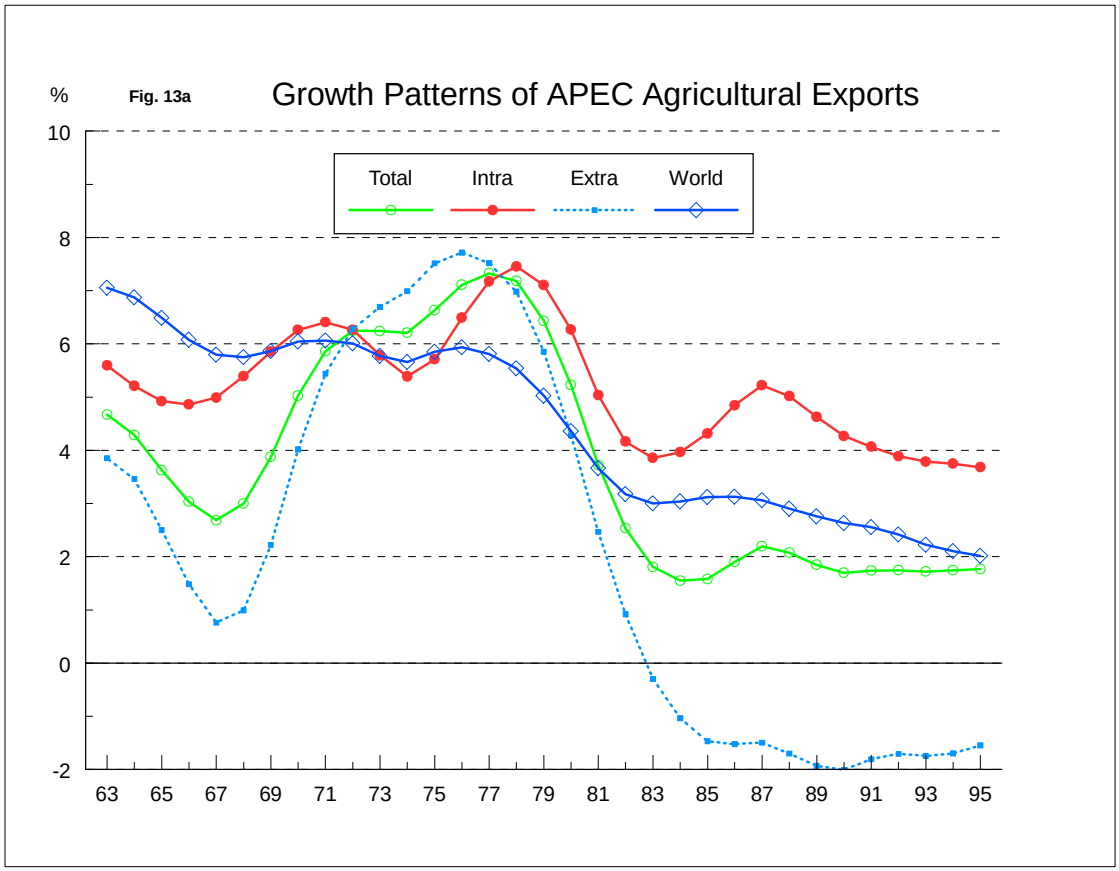

%
Fig. 8b
Growth Patterns of EU Agricultural Imports
Intra
Extra
Total
World
10
5
0
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

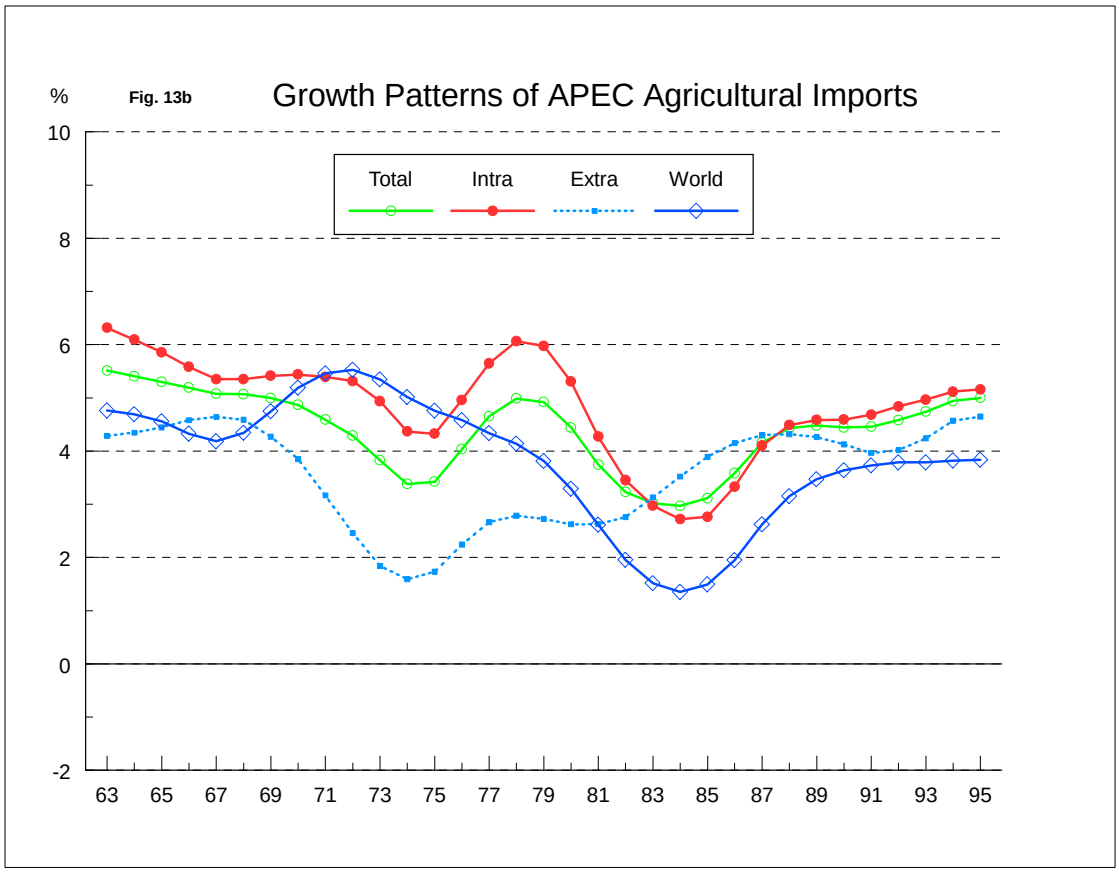

%
Fig.9
Shares of EU Trade in World Ag. Trade
Intra
ExtraX
ExtraM
totX
totM
60
50
40
30
20
10
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94

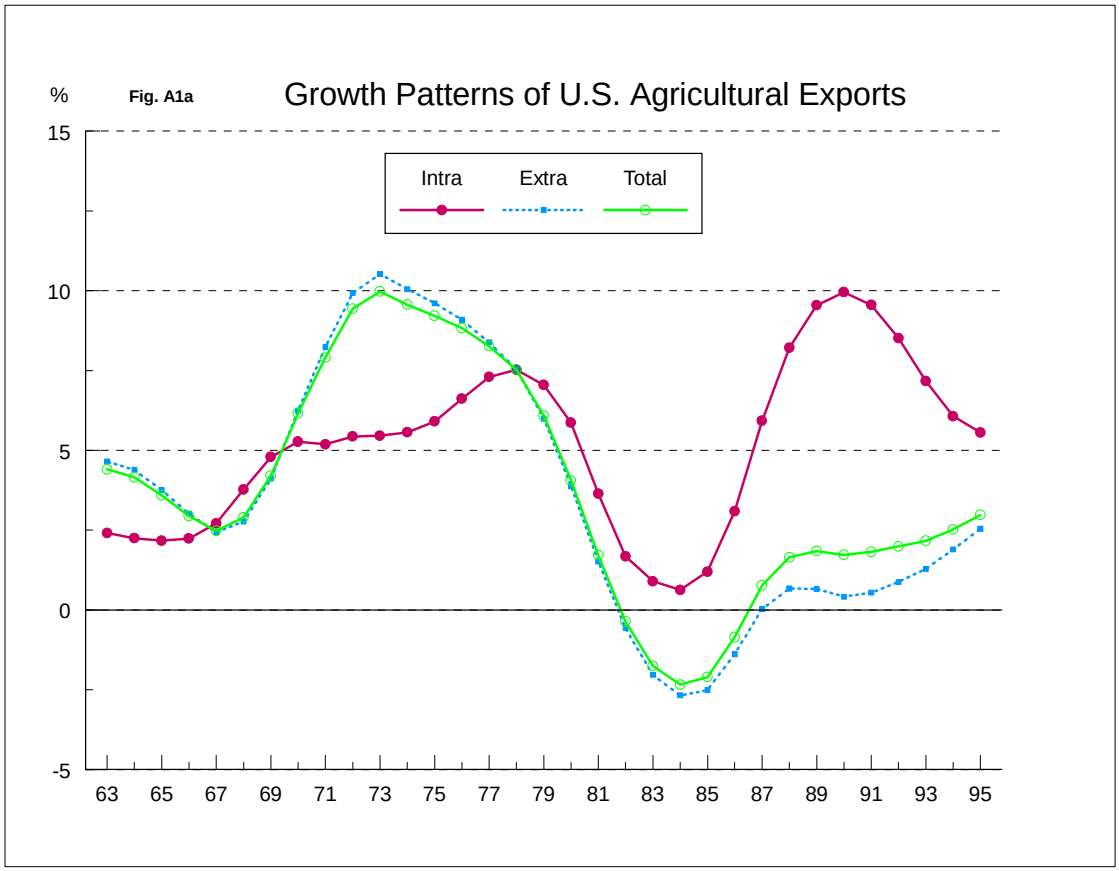

%
Fig. 10
Shares of Intra-EU Trade in EU Total Ag Trade
80
70
60
50
40
30
20
Export
Import
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94

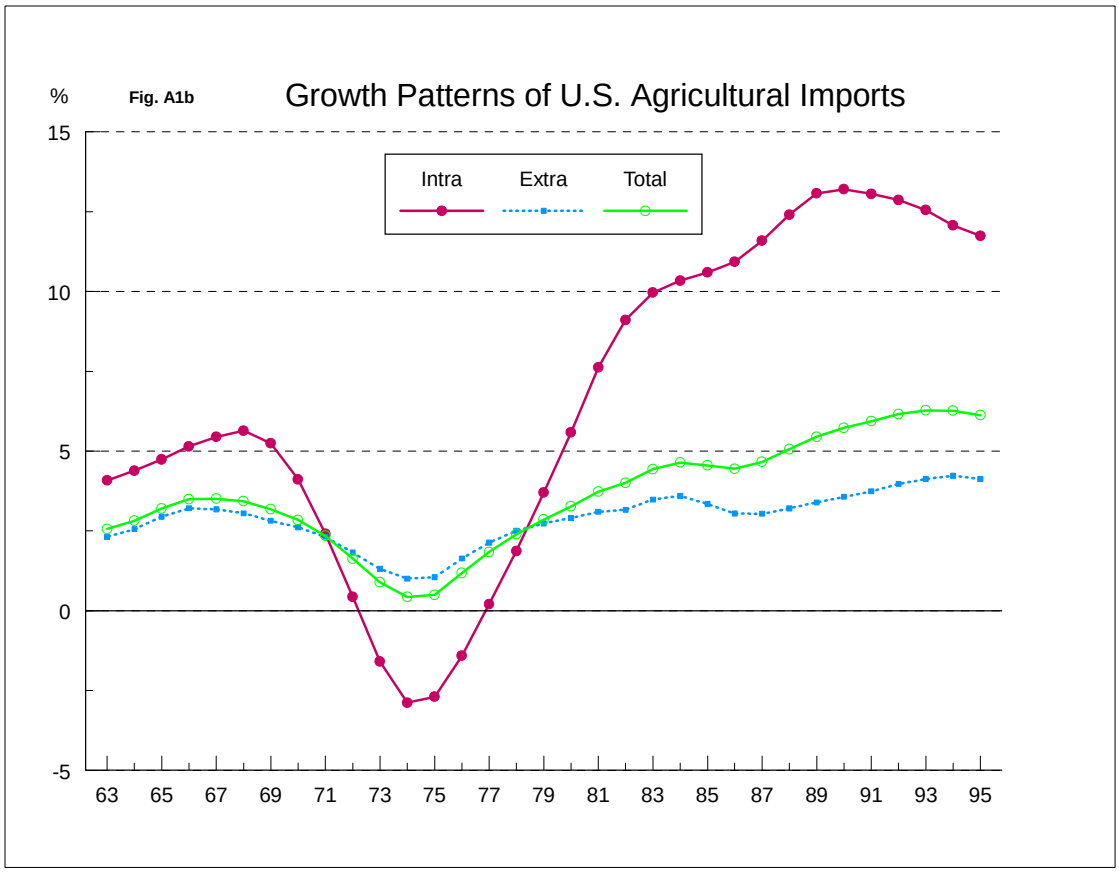

%
Fig.11
Shares of Intra-APEC Trade in APEC Total Ag Trade
75
70
65
60
55
50
45
40
35
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94
Export
Import

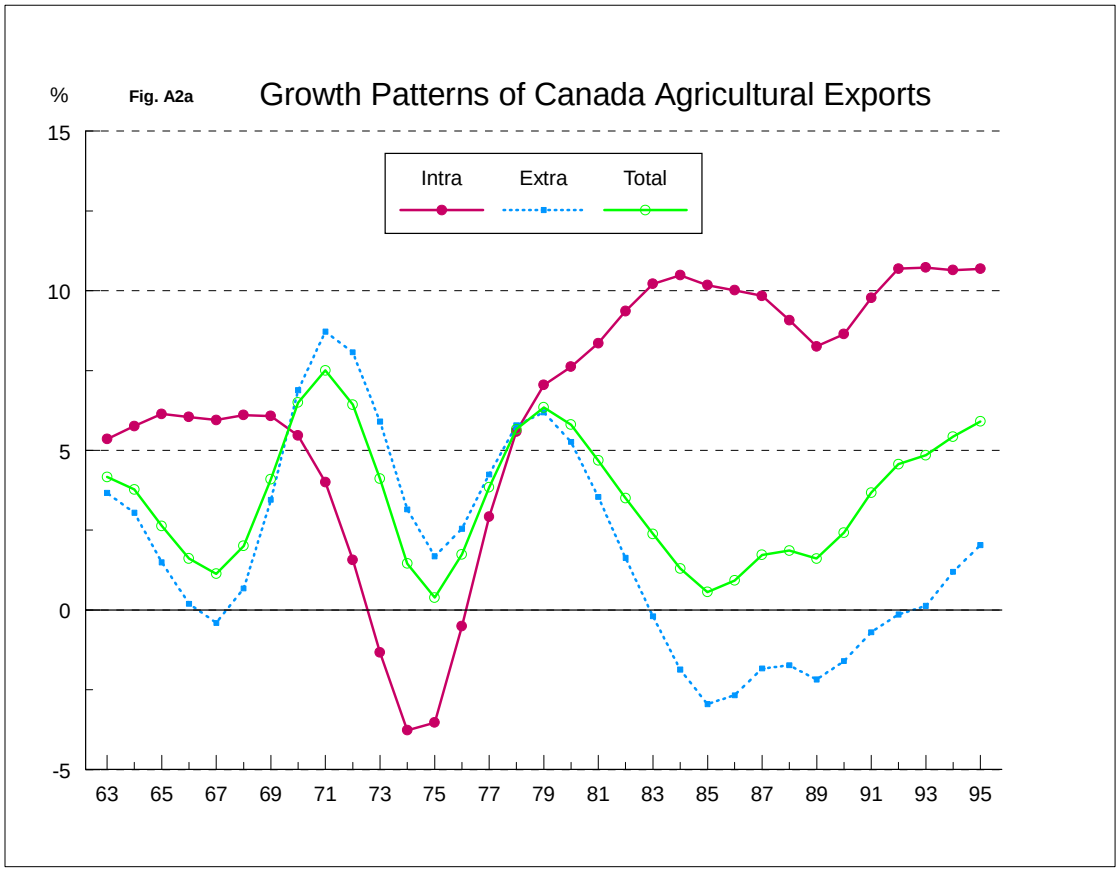

%
Fig.12
Shares of APEC Trade in World Ag. Trade
50
40
30
20
10
62
64
66
68
70
72
74
76
78
80
82
84
86
88
90
92
94
totX
totM
Intra

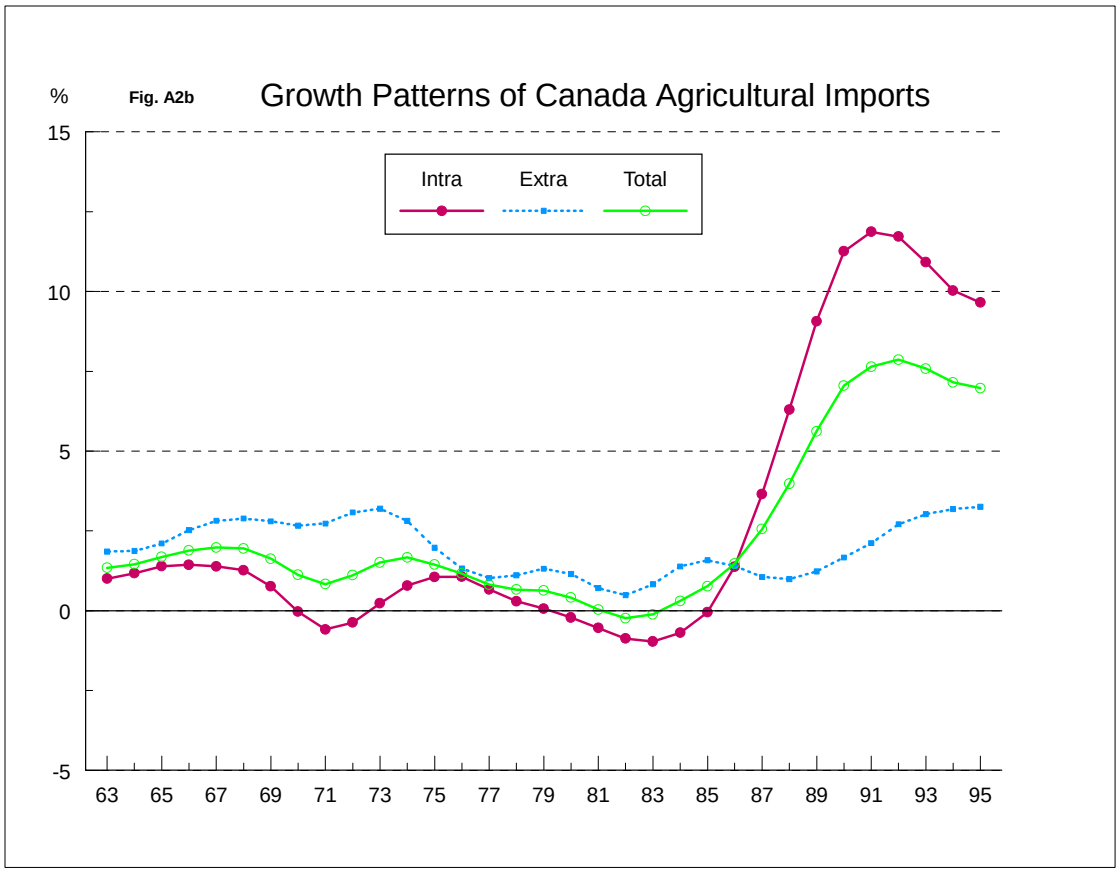

%
Fig. 13a
Growth Patterns of APEC Agricultural Exports
Total
Intra
Extra
World
10
8
6
4
2
0
-2
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

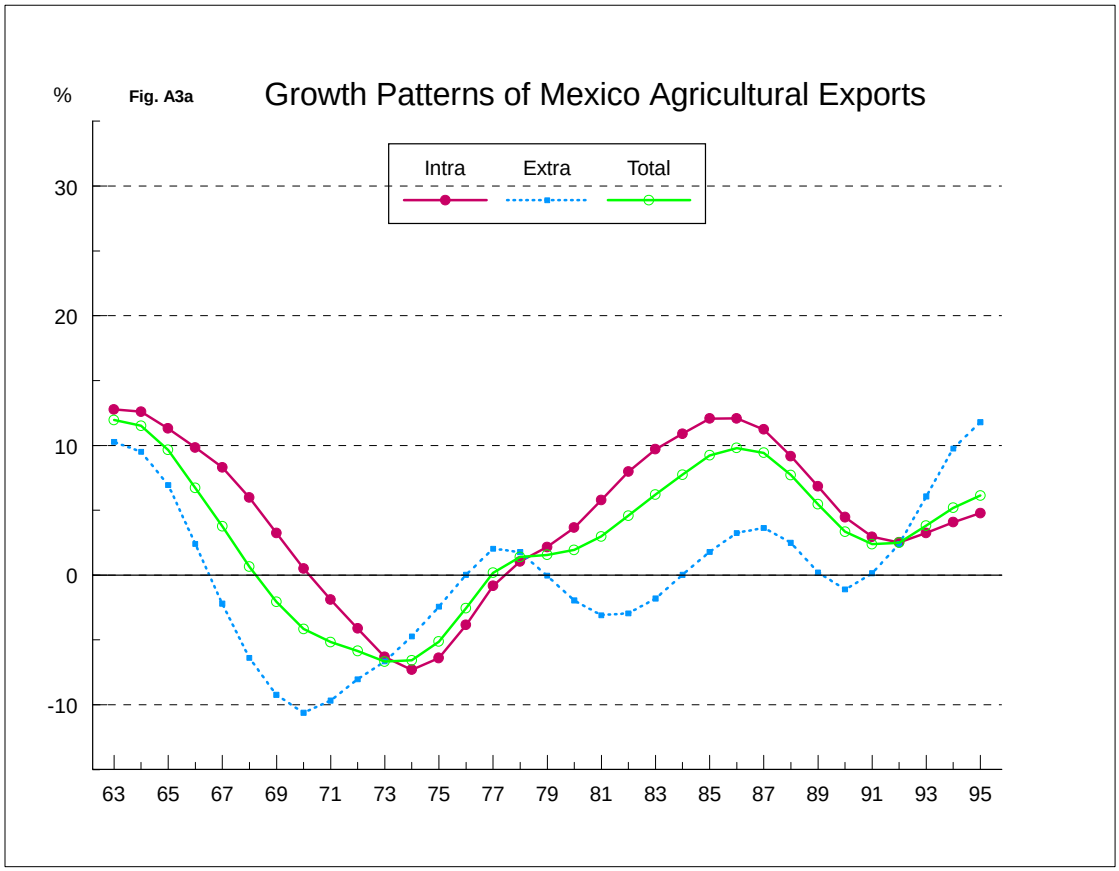

%
Fig. 13b
Growth Patterns of APEC Agricultural Imports
Total
Intra
Extra
World
10
8
6
4
2
0
-2
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A1a
Growth Patterns of U.S. Agricultural Exports
Intra
Extra
Total
15
10
5
0
-5
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A1b
Growth Patterns of U.S. Agricultural Imports
Intra
Extra
Total
15
10
5
0
-5
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A2a
Growth Patterns of Canada Agricultural Exports
Intra
Extra
Total
15
10
5
0
-5
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A2b
Growth Patterns of Canada Agricultural Imports
Intra
Extra
Total
15
10
5
0
-5
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A3a
Growth Patterns of Mexico Agricultural Exports
Intra
Extra
Total
30
20
10
0
-10
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

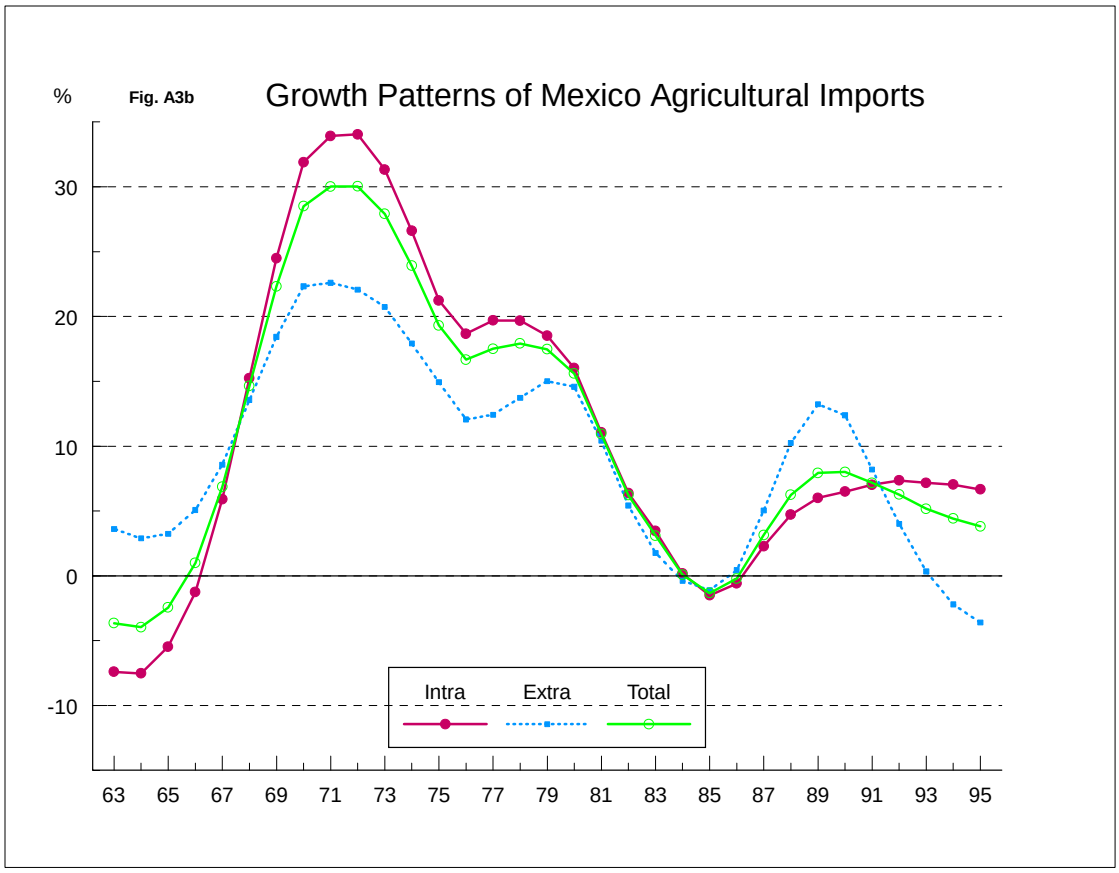

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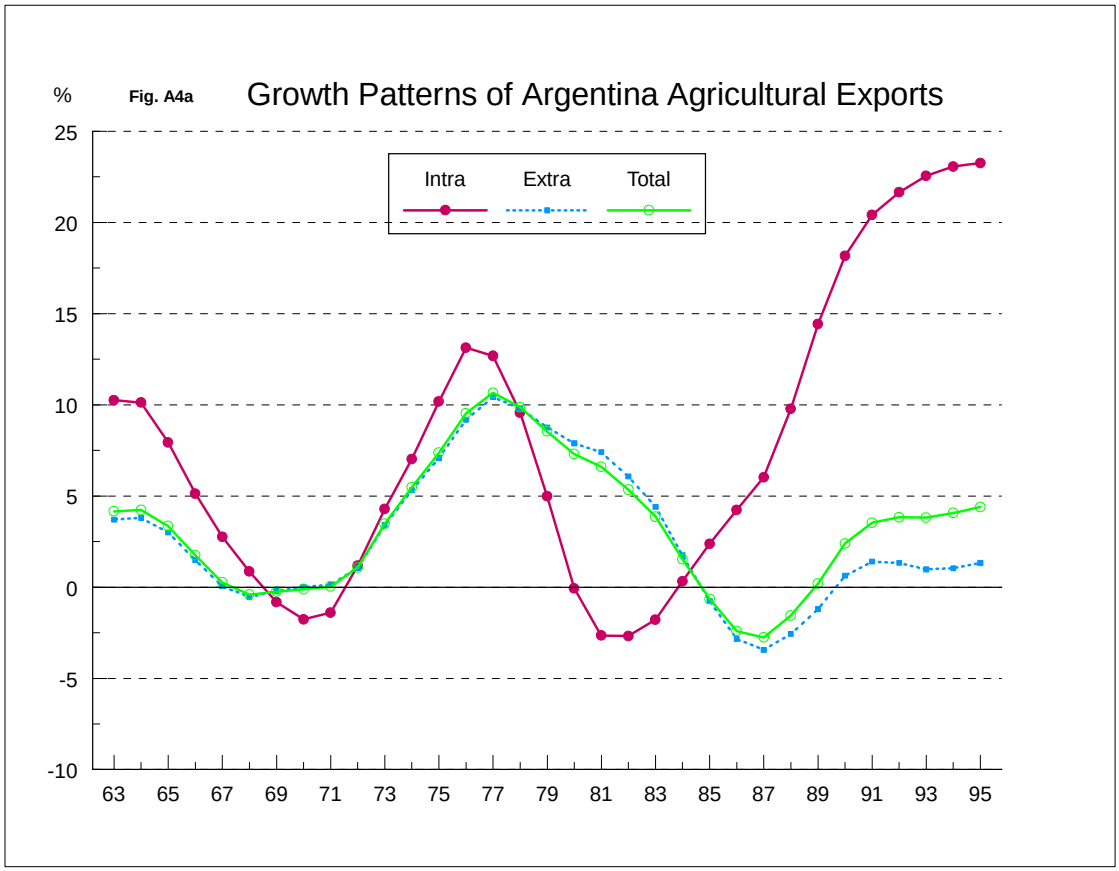
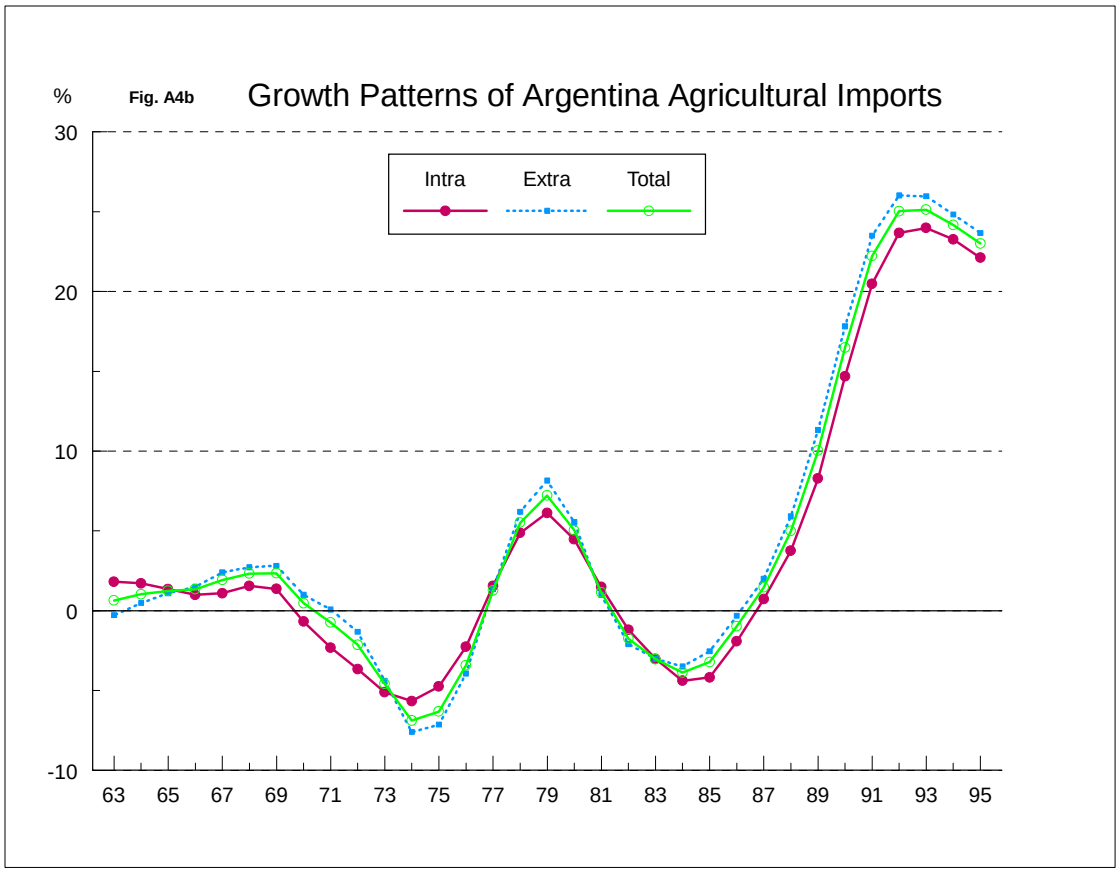
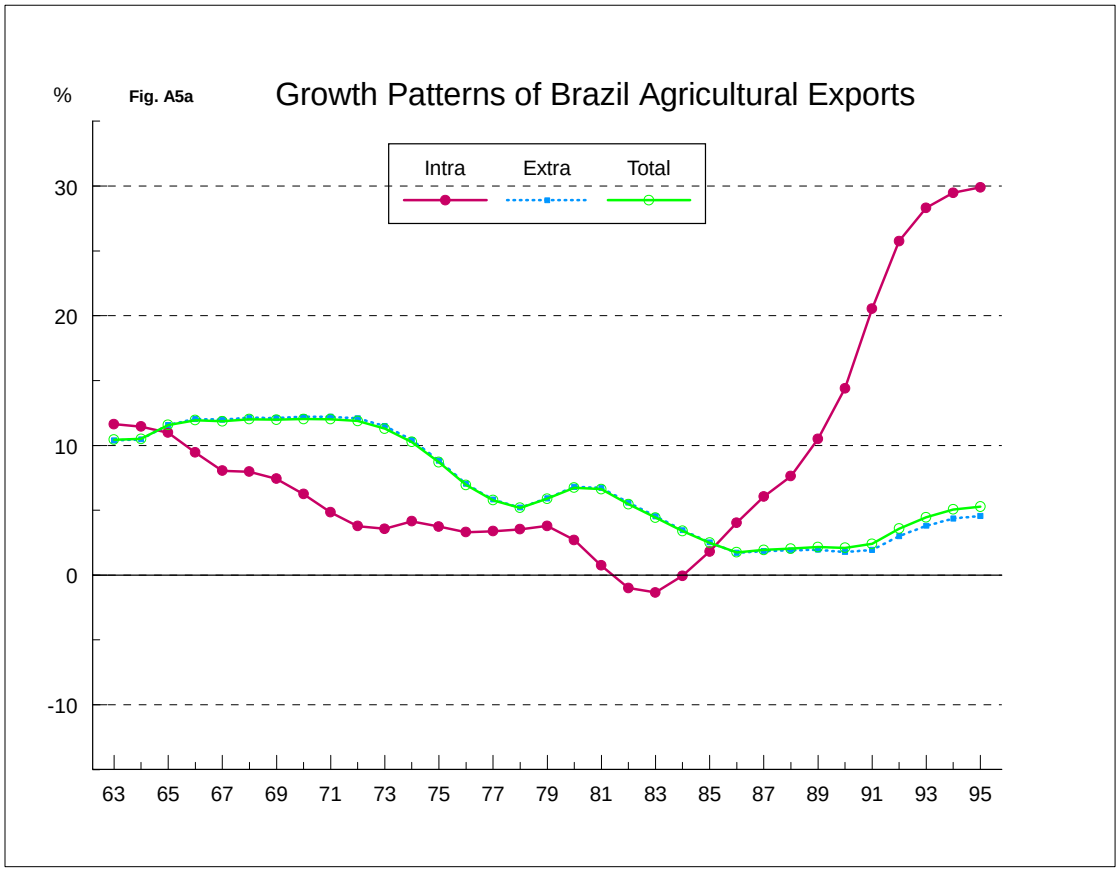
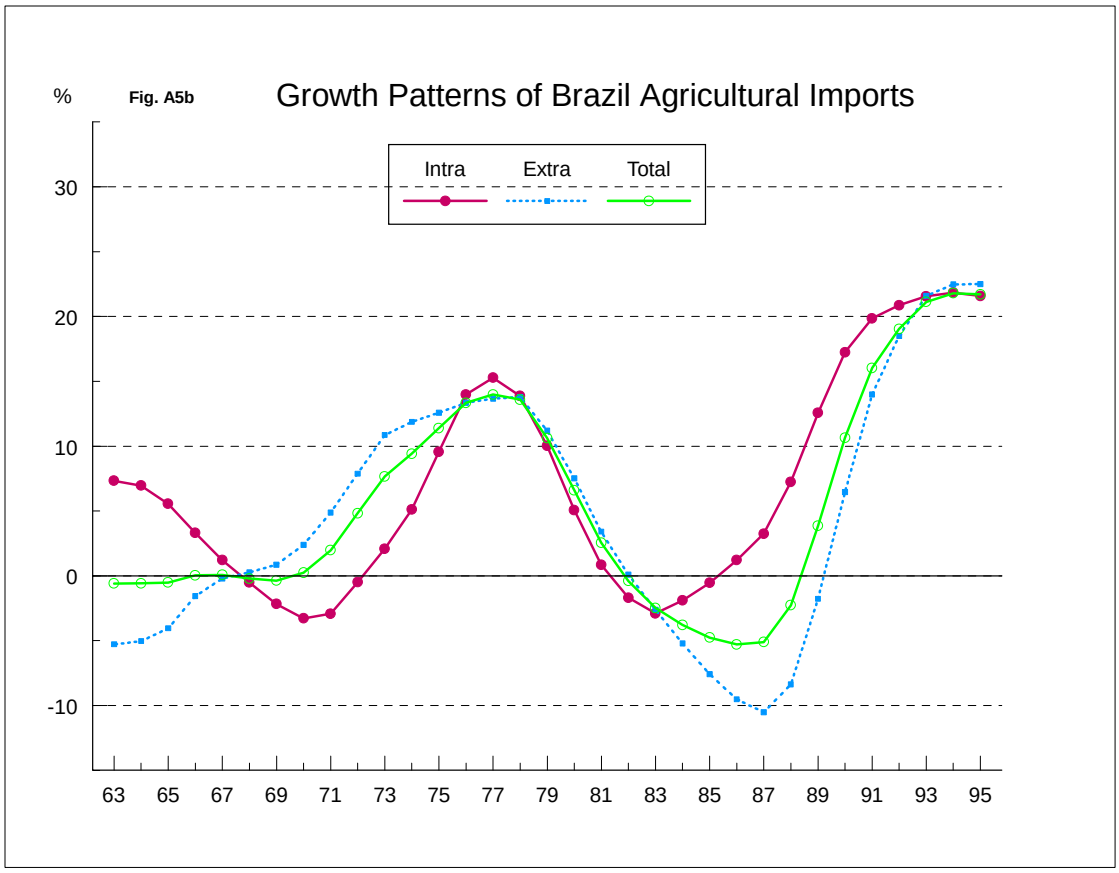
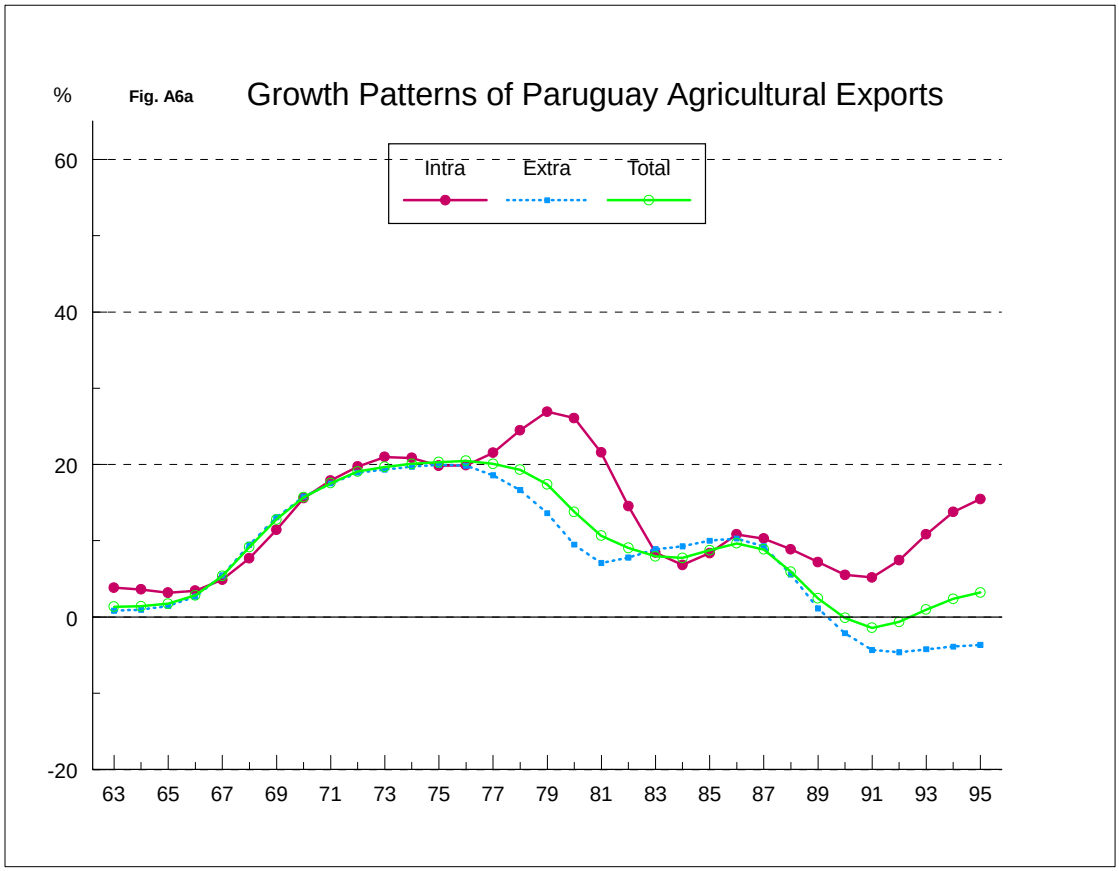
Fig. A3b
Growth Patterns of Mexico Agricultural Imports
Intra
Extra
Total
30
20
10
0
-10
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

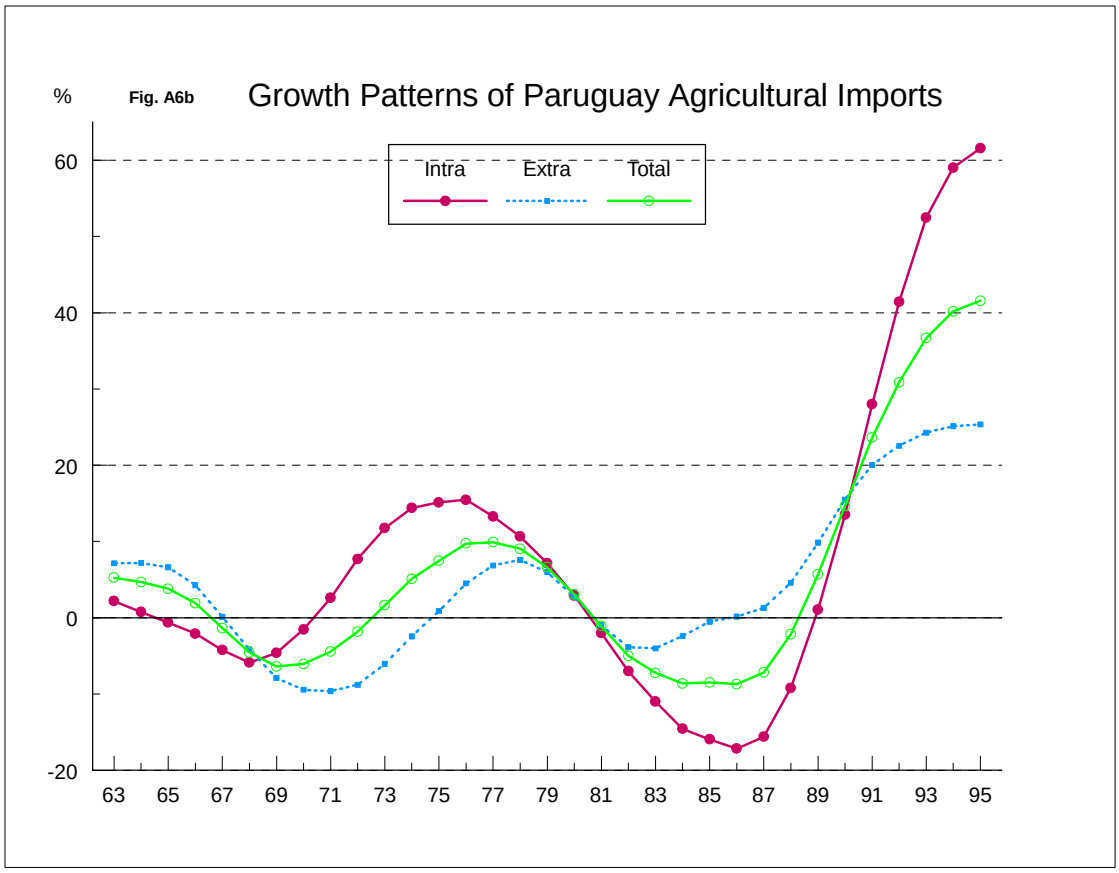

%
Fig. A4a
Growth Patterns of Argentina Agricultural Exports
Intra
Extra
Total
25
20
15
10
5
0
-5
-10
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

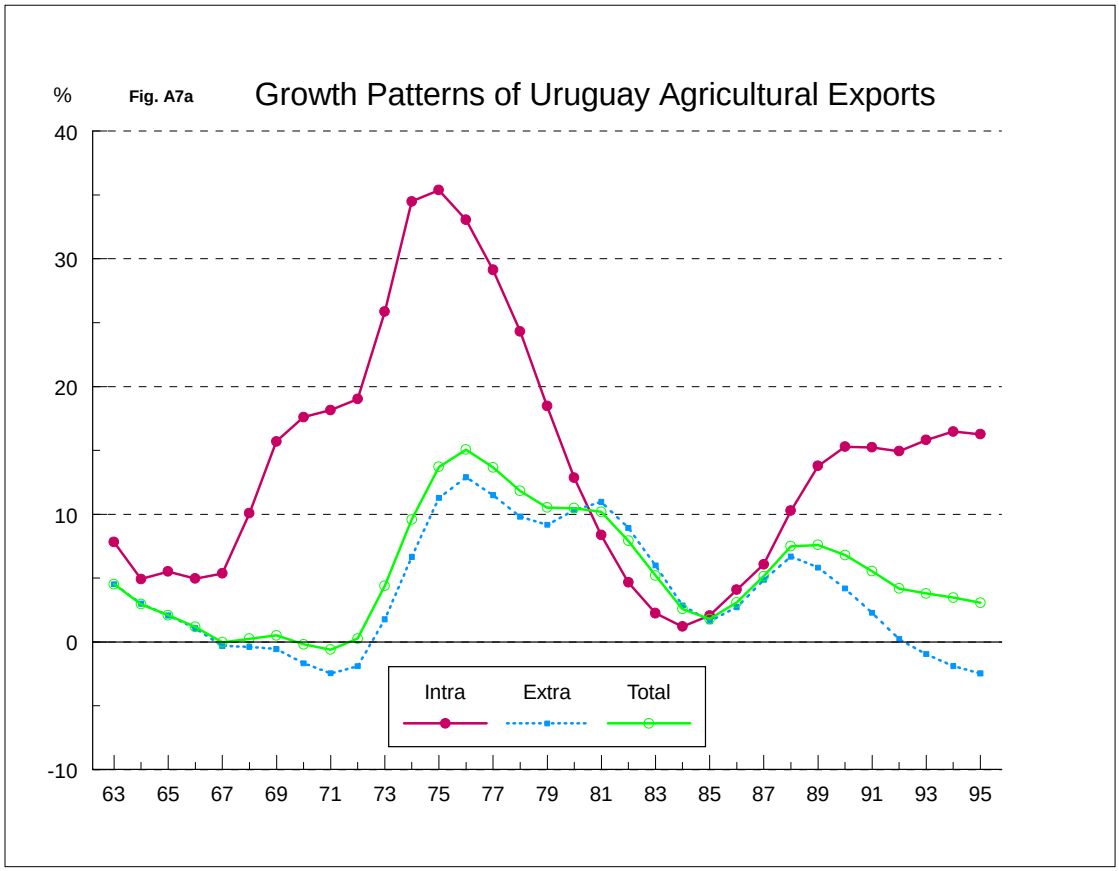

%
Fig. A4b
Growth Patterns of Argentina Agricultural Imports
Intra
Extra
Total
30
20
10
0
-10
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

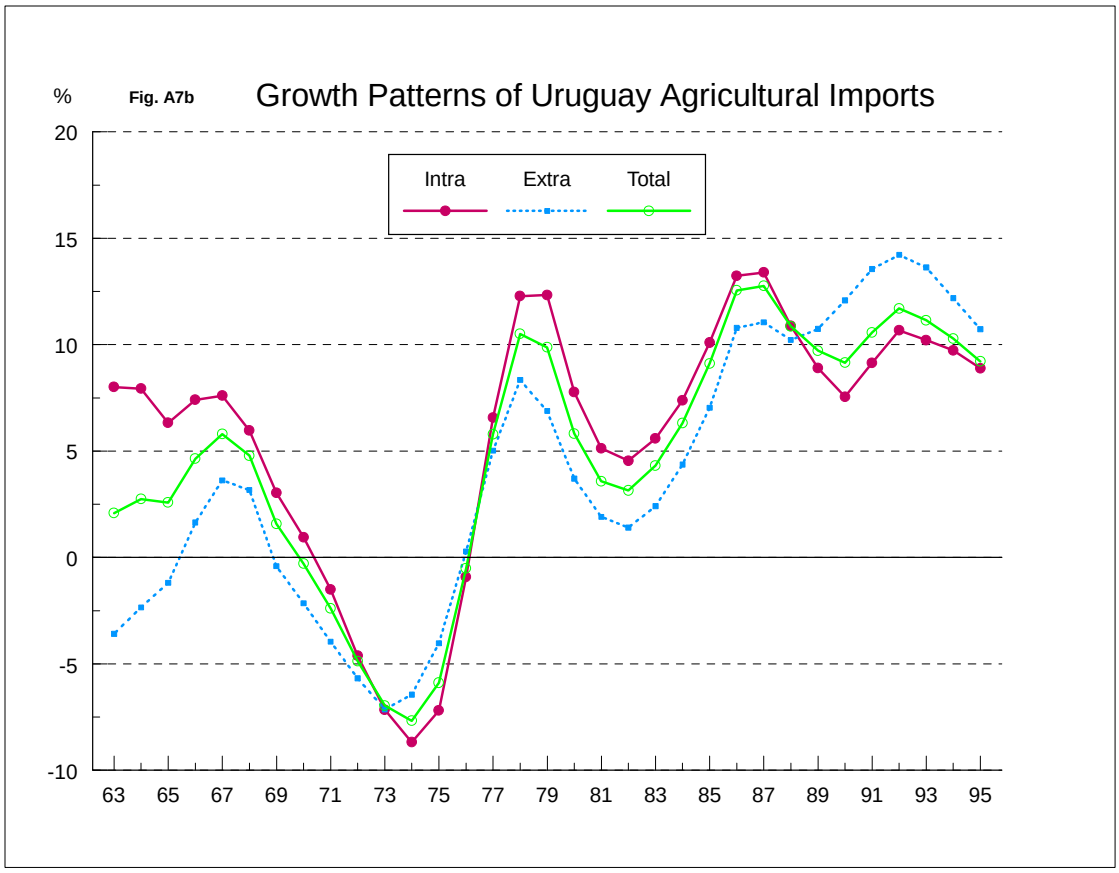

%
Fig. A5a
Growth Patterns of Brazil Agricultural Exports
Intra
Extra
Total
30
20
10
0
-10
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A5b
Growth Patterns of Brazil Agricultural Imports
Intra
Extra
Total
30
20
10
0
-10
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A6a
Growth Patterns of Paruguay Agricultural Exports
Intra
Extra
Total
60
40
20
0
-20
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A6b
Growth Patterns of Paruguay Agricultural Imports
Intra
Extra
Total
60
40
20
0
-20
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A7a
Growth Patterns of Uruguay Agricultural Exports
40
30
20
10
0
-10
Intra
Extra
Total
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95


%
Fig. A7b
Growth Patterns of Uruguay Agricultural Imports
20
15
10
5
0
-5
-10
Intra
Extra
Total
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95

Appendix B: Choosing the Value of Lamda

Table B1. Standard Deviation and Serial Correlation of Cyclical NAFTA Agricultural Exports for Different Lamda: 1962-95

	La=20**1/2	La=20	La=20**2	La=20**3	La=20**4
Standard dev.	0.073	0.09	0.113	0.141	0.154
Autocorrelations					
order 1	0.137	0.303	0.498	0.681	0.736
order 2	-0.366	-0.258	0.038	0.327	0.419
order 3	-0.262	-0.365	-0.158	0.157	0.257
order 4	-0.181	-0.376	-0.277	0.044	0.146
order 5	-0.174	-0.292	-0.290	-0.005	0.086
order 6	-0.023	-0.011	-0.132	0.018	0.076
order 7	0.208	0.307	0.059	0.073	0.094
order 8	0.475	0.552	0.187	0.067	0.053
order 9	0.082	0.172	-0.105	-0.194	-0.197
order 10	-0.188	-0.188	-0.373	-0.496	-0.499

Fig. B1.a

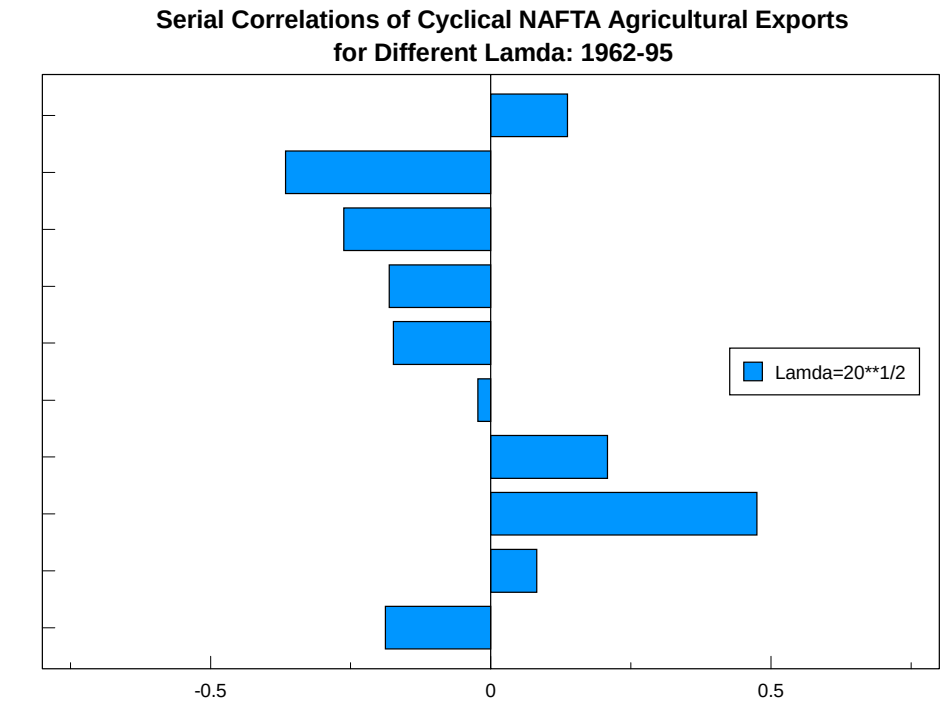


Fig. B1.b

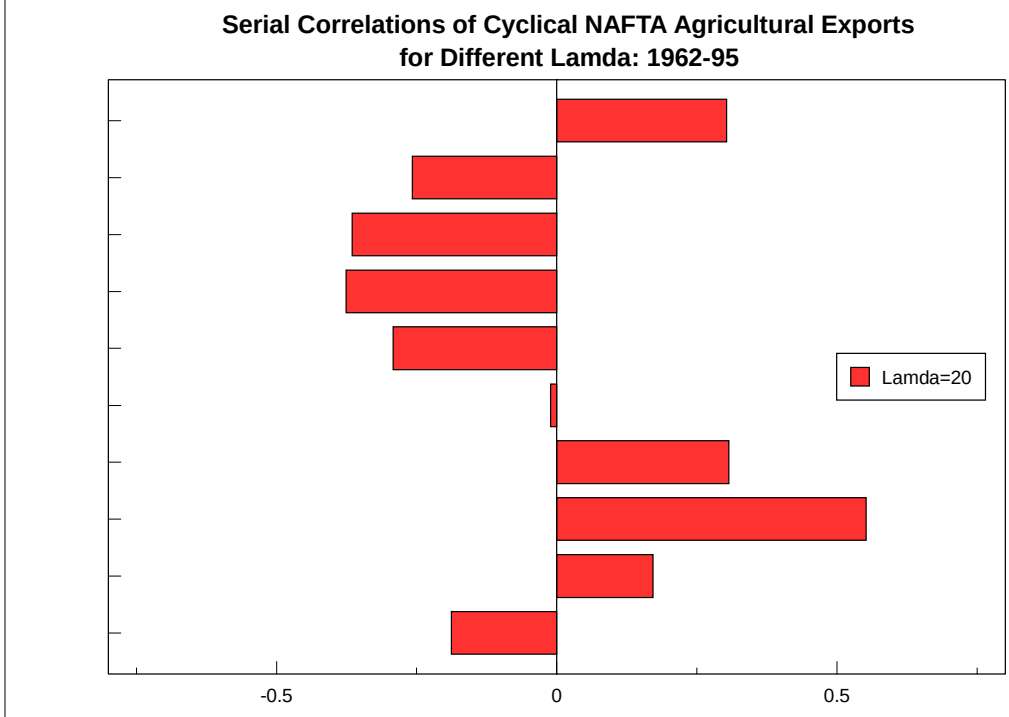


Fig. B1.c

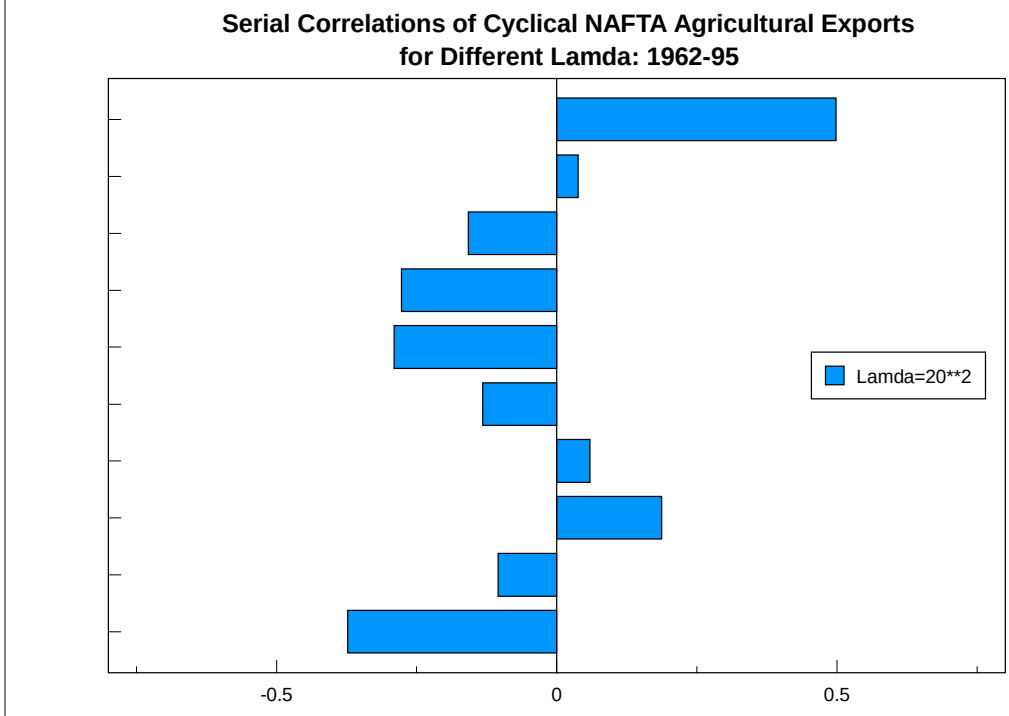


Fig. B1.d

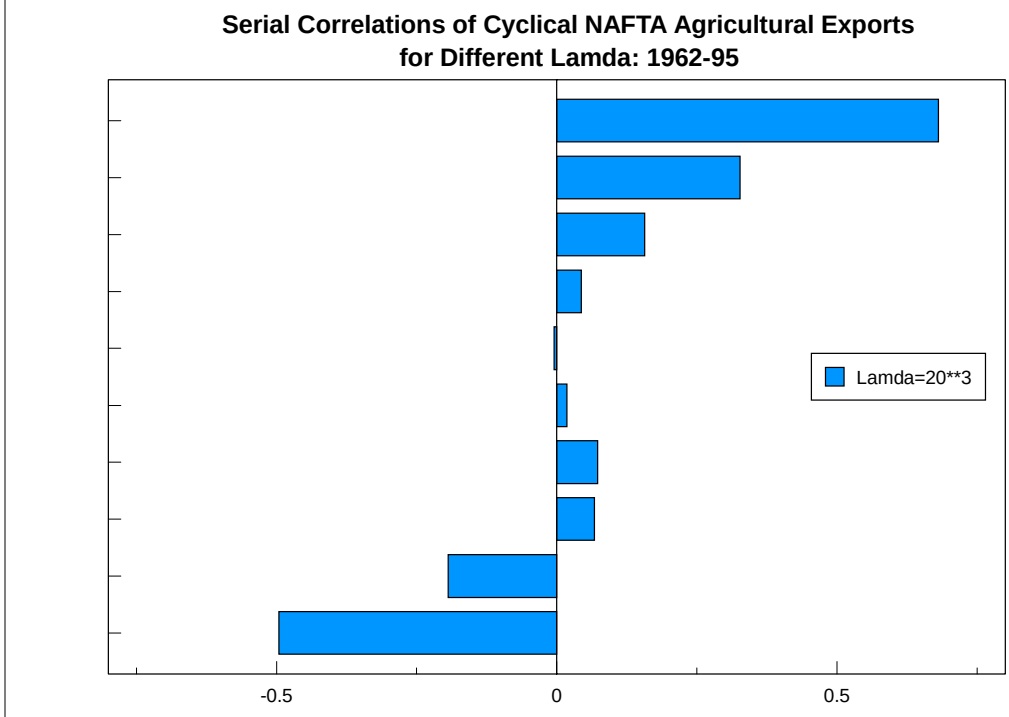


Fig. B1.e

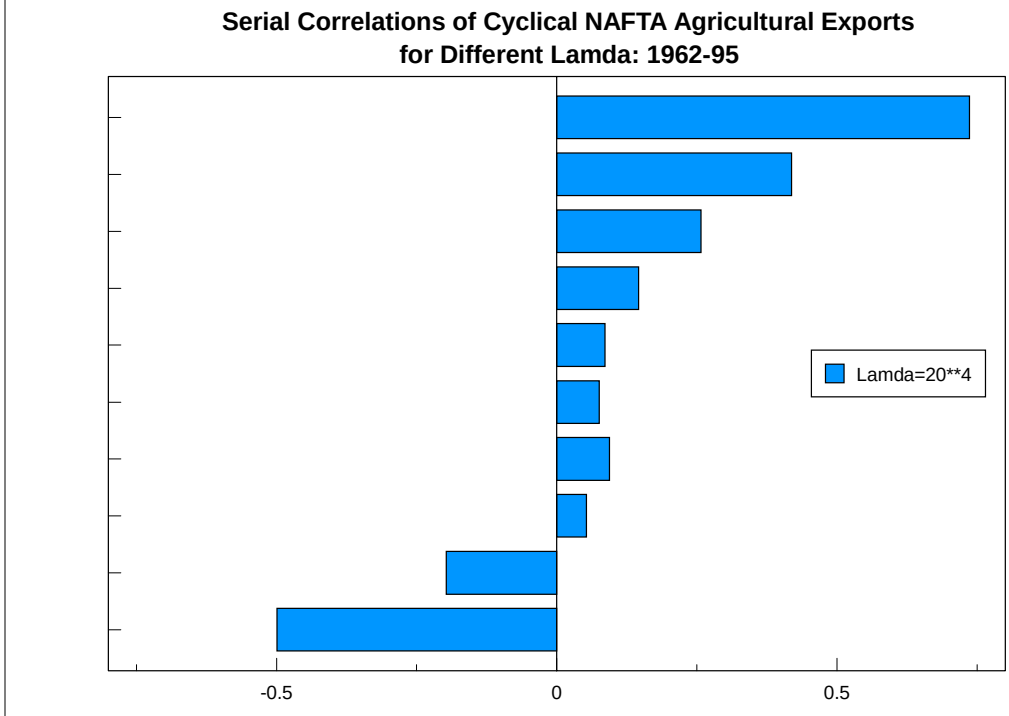


Fig. B2.

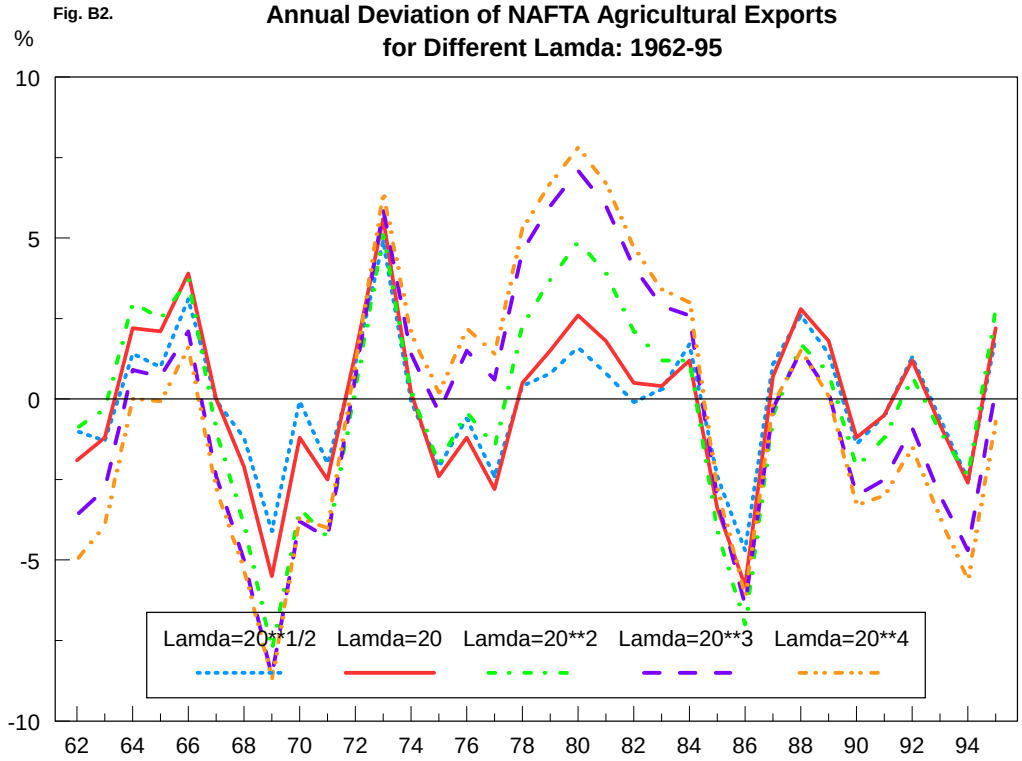
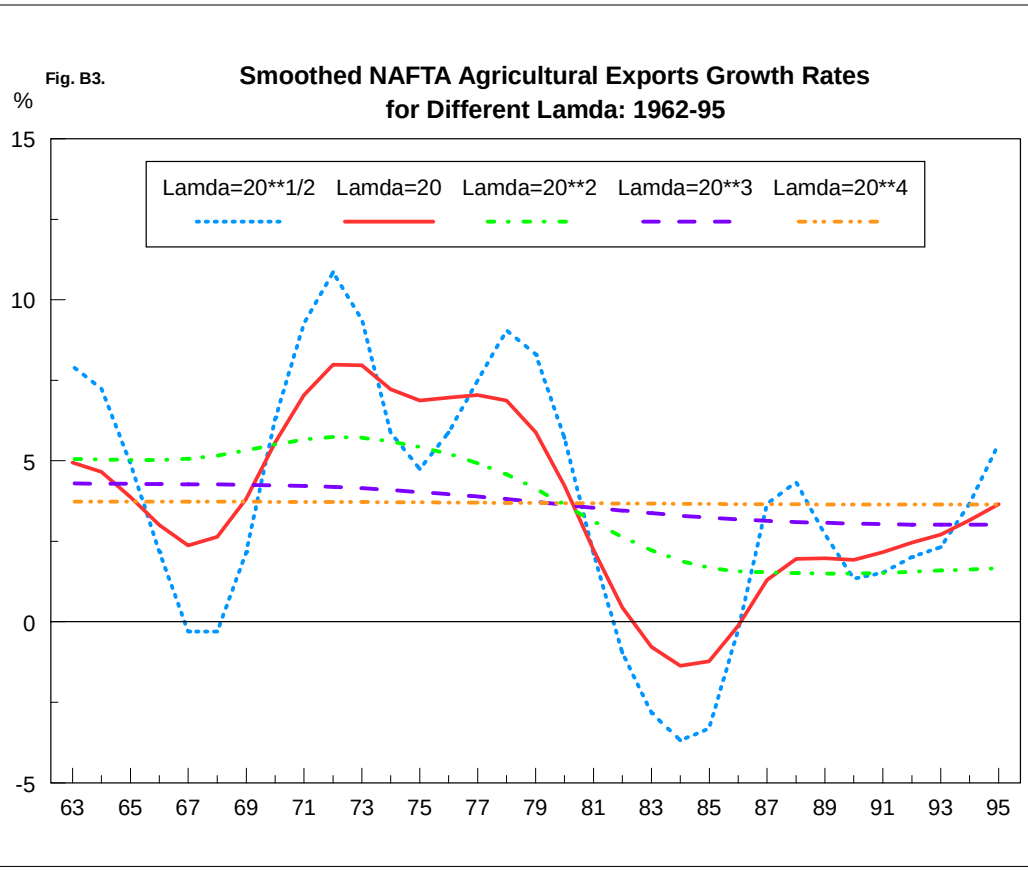

Annual Deviation of NAFTA Agricultural Exports
for Different Lamda: 1962-95
%
10
5
0
-5
-10
62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94
Lamda=20**1/2
Lamda=20
Lamda=20**2
Lamda=20**3
Lamda=20**4

Fig. B3.


Smoothed NAFTA Agricultural Exports Growth Rates
for Different Lamda: 1962-95
%
15
10
5
0
-5
63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95
Lamda=20**1/2
Lamda=20
Lamda=20**2
Lamda=20**3
Lamda=20**4