

Evaluating Bolivia's Choices for Trade Integration

Sarath Rajapatirana

Bolivia—which has liberalized its trade regime unilaterally on a most-favored-nation basis—now faces a number of choices for maintaining its position within the Andean Group and for receiving preferential access to Mercosur. Given the size of the market and its potential for export growth, a preferential arrangement with Mercosur is probably the best choice.



Summary findings

Regional integration initiatives have surged in Latin America at the same time that many countries on the continent have undertaken unilateral trade liberalization, and prospects for access to external markets have improved with the successful conclusion of the Uruguay Round. Rajapatirana examines the choices faced by one such country: Bolivia.

To the extent that different regional trade agreements follow World Trade Organization (WTO) rules, they could increase access to markets and allow the countries to realize gains that unilateral liberalization might not have given them. In this sense, regional trade arrangements are not inconsistent with multilateral free trade based on the most-favored-nation (MFN) principle.

Estimating export demand functions using ordinary least squares for different markets as well as an error correction model, constructing a trade compatibility index, and recognizing the presence of contraband trade, Rajapatirana examines Bolivia's four main options for regional integration and ranks them as follows (with 1 being Bolivia's best choice):

1. MFN-based trade combined with a regional agreement that gives it preferential access to Mercosur (GATT-plus trade).
2. Joining Mercosur and maintaining duty-free access to the Andean Group.
3. Remaining within the Andean Group and receiving additional market-access concessions from Mercosur.
4. Remaining within the Andean Group and maintaining existing bilateral trading arrangements.

These rankings merely reflect relative trade access to different markets, assuming stability of demand functions and trade and production patterns. In the final analysis, regional integration is not merely a matter of economics but is related to domestic and regional politics — and those who gain from different choices will support those choices. MFN trade would elicit neither strong opposition nor strong support, as its benefits and costs are more symmetrically distributed than trade associated with increased regional integration.

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Evaluating Integration Choices: The Case of Bolivia

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I. Introduction

In the mid 1980s to the 1990s, there have been a spate of regional integration initiatives in many parts of the world. These initiatives have arisen at the same time the Uruguay Round negotiations had been proceeding and when many countries had undertaken unilateral trade liberalization. The integration choices that countries face have to be evaluated in relation to the other two contemporary movements of multilateral trade liberalization under the Uruguay Round and unilateral trade liberalization.

The integration choices are the widest in Latin America. A large number of countries now belong to one trading group or another. Moreover, countries in one group are offered opportunities and choices to join other groups. This paper examines one such case—that of Bolivia. The aim of the paper is to consider a framework to decide on the different integration choices using Bolivia as an example. Of course, these choices cannot be considered in isolation to the remaining trade reform agenda of a country or unrelated to the multilateral trade liberalization. To the extent that the different regional trade agreements follow the World Trade Organization (WTO) rules regarding the regional integration arrangements, these choices are not mutually exclusive. In fact, membership in a regional trading arrangement could facilitate greater access to different markets that could not have been possible by solely depending on multilateral free trade in the context of the most favored nation principle.

The integration choices facing Bolivia must be considered within the specific objectives of raising national welfare. The proper choice must allow the country to raise its per capita output growth rate by maximizing efficiency gains through trade reforms and raising levels of investment, while diversifying the economy away from coca production, and the related illegal trade. The

choices it makes with different integration options imply different outcomes for these objectives. Moreover, these choices must be tempered by the opportunities arising from completion of the Uruguay Round, and the resulting improvement in market access for Bolivia and its partners. The present paper attempts to evaluate the different integration choices faced by Bolivia.

Economic integration fundamentally entails reducing barriers to trade within a group of countries compared to those that exist with the rest of the world. A free trade area is characterized by reduction of barriers as well as an adoption of rules of origin to prevent the deflection of trade. A customs union on the other hand has in addition to the reduction of barriers a common external tariff (CET). However, in the process of adopting a CET, a customs union may adopt rules of origin to prevent the deflection of trade in the interregnum.

Integration issues are not entirely in the domain of economics. They are very much dependent on regional politics, the relationship with neighbors, and domestic political economy considerations. Whatever particular framework is used to rank the choices, the act of integration is ultimately a political act. Only Bolivian policy makers can make that judgment, as they are the legitimate arbitrators of their freedom to choose. However, some exploratory work in delineating the choices could be worthwhile. It is in that spirit the present paper approaches the issue of integration choices.

MFN free trade as theoretical first best is not usurped in the different analytical techniques used in the paper to rank the different trade options. Reducing barriers that exist against the rest of the world with preferential access to existing regional agreements can be called GATT-plus trade. The second ranking is for the option which would give Bolivia membership or associate membership in MERCOSUR, while maintaining preferential access to the Andean Group. The

third is a variant of the second, in which Bolivia continues its membership in the Andean Group but receives greater access to the MERCOSUR market and converges to free trade faster. The fourth is the maintenance of the status quo, which is membership in the Andean Group with limited access to MERCOSUR, and slow convergence to freer trade with MERCOSUR.

The paper is divided into five sections. Following this Introduction, section II describes Bolivia's trade composition and trends from 1980 to 1993. Section III examines the integration issues, while section IV analyses the integration choices using different analytical techniques and ranks the choices using both the received economic theory and empirical estimates. Section Five summarizes the findings.

II. *Trade Composition and Trends*

Bolivia's trade is small in relation to Western hemispheric and world trade. The share of Bolivia's exports in Western Hemisphere was 0.53 percent and in world trade 0.02 percent in 1993.¹ It has no monopoly position in trade and as such has to take the terms of trade as given. Tin, its main mineral export until the late-1980's, accounts for about 4 percent of the world market for that metal. After the collapse of the Tin Agreement there was no possibility for using that share in concert with other exporters to improve the country's terms of trade. Throughout the eighties Bolivia experienced a strong deterioration in the terms of trade. By 1992, its terms of trade had fallen to a quarter of the 1980 level (see appendix table 1). Combined with the tremendous macroeconomic imbalance that led to hyperinflation and drastic appreciation of the currency, the adverse terms of trade reduced the size of Bolivia's tradable sector prior to the 1985 reforms.

¹ See International Financial Statistics, IMF.

Bolivia's exports grew on average by 0.6 percent during 1980-1993 with sharp drops in exports in 1980 and 1993 (see appendix table 2). Wide variations in the terms of trade were to be expected from a primary product exporter. Its large mineral component is more sensitive to the trade cycle in the importing industrial countries. Its natural gas exports followed the price changes associated with petroleum products after the second oil price shock. Minerals and fuels constitute 68 percent of the country's exports (see appendix table 4). Non-traditional exports have accounted for 20 percent of the exports and have been growing recently. The point to note about the sharp terms of trade improvement is the nature of the export structure as well as the fact that poor policies until the mid 1980s had made trade diversification an impossible task given the prevailing bias against new exports.

The direction of exports is germane for the discussion later on integration choices (see appendix table 3). During the 1980-93 period, 40 percent of Bolivian exports went to MERCOSUR—its main export market. By far, Argentina has been Bolivia's most important trading partner though its importance has declined in recent years. Of the trade with Mercosur, nearly 85 percent consisted of minerals and fuels (SITC group 3, see appendix table 4). In contrast, Bolivia's exports to the Andean Group have been only 6 percent of total exports. Products included mainly food, live animals, basic manufactures and crude materials excluding fuels (SITC groups 0, 6 and 2). These three items comprised 88 percent of Bolivian exports to the Andean Group. Roughly 20 percent of Bolivia's exports were to USA and the EU individually, while exports to the rest of the world have average less than 10 percent. The direction and composition of exports have four important characteristics. First, exports are concentrated in primary products, particularly fuels and minerals. Second, they are concentrated by markets;

MERCOSUR, USA, and EU account for more than 80 percent of total exports. Third, export revenues are subject to wide fluctuations in prices that are linked to the changes in the trade cycle. Finally, while there has not been a very significant shift in the composition of exports despite the recovery in trade after 1985, there has been some changes in destination. In particular, the share of Bolivia's exports to the Andean group has increased while the share to MERCOSUR has declined. This has been primarily due to the decline in natural gas exports to Argentina and the increase in soy exports to Colombia in recent years.

Bolivia's imports are dominated by machinery, transport equipment, basic manufactures, food and live animals (see appendix table 5). Imports grew on average 0.7 percent during 1980-93. As in the case of exports, the average growth rate masks the large annual variations. The variations on import growth have been even larger than for exports, reflecting the vulnerability of imports to macroeconomic developments. Thus, for example, there were huge drops in imports in 1982 following the macroeconomic and debt crisis (see appendix table 2). Although starting from a very low base, following the stabilization program there was a strong recovery in imports. Imports have also been more diversified than exports. This is the usual pattern of trade for a country that has concentrated commodity exports. Some 29 percent of imports in Bolivia originate in MERCOSUR countries during 1985-93. These imports are machinery, transport equipment, manufactures, and basic equipment - similar to the pattern of Bolivia's imports from other countries. While 24 percent of Bolivia's imports originated from the U.S., 28 percent of imports were from the rest of the world. The Andean Group accounted for less than 4 percent of Bolivian imports and these consisted of basic manufactures, machinery and chemicals. As in the case of exports, the composition of imports has remained fairly stable over 1980-93. Also, the

share of the Andean Group in total imports has increased somewhat while the share of MERCOSUR has declined.

With respect to imports, the following characteristics are noteworthy. First, imports have been subject to wide fluctuations due to the changes in domestic income levels, investment and the composition of domestic demand. Second, as to be expected from a small economy, the composition of imports is more varied than exports reflecting Bolivia's narrow resource endowment. Third, import prices have been on a rising trend despite the increasing diversity of imports.

Trade trends indicate an improvement following the 1985 reforms of the New Economic Policy. The hyperinflation of that year led to a tremendous appreciation of the exchange rate created huge disincentives for exports and the contraband trade rose rapidly. Export growth recovered with the radical fiscal reforms that were part of the adjustment program that in turn led to an impressive stabilization of the economy. Emanating from the macroeconomic stabilization as well as from the trade reforms, there is a significant difference in trade trends before and after the reforms.² During 1985-93, export growth recovered and reached 4.0 percent per annum compared to a decline of 5.7 percent per annum during 1980-84 (see appendix table 2). Similarly, import growth recovered to 6.2 percent per annum during 1985-93 compared to the sharp decline of 9.2 percent per annum during 1980-84. The recovery in imports resulted from the recovery in income, and trade liberalization, in particular the elimination of quantitative restrictions. Of course it is difficult to disentangle the efforts of the macroeconomic stabilization from the trade liberalization as far as the trade recovery is concerned. Clearly, both helped.

² Although not explicitly discussed in the paper, the trade reforms launched by Bolivia starting in 1985 were substantial and have resulted in what is today one of the most open regimes in the region.

III. Integration Choices

The pursuit of different choices for integration will have profound implications for Bolivia's trade and welfare. However, Bolivia faces two choices which may not be mutually exclusive. The first is to pursue MFN trade taking advantage of the new, global market access. This may be done by entering into agreements within the framework of what can be called "GATT-Plus" trade, i.e., regional agreements that are GATT consistent and allow the country to achieve greater market access. These regional agreements would raise welfare through net trade creation compared to those agreements that would lead to net trade diversion. In the meantime, as a member of the GATT and now the WTO, Bolivia has to meet obligations as to the probity of its trade policy.

MFN trade is not inconsistent with regional agreements under a GATT-plus approach. Bolivia has four basic integration choices between integration with the rest of the world and within the region itself. These choices emerge when they are narrowed down to the most practical choices. Other more exotic choices would exist such as joining NAFTA or other emerging agreements, but these seem somewhat removed from reality at this time. Bolivia's basic choices are: (a) pursuing of MFN trade in addition to regional agreements to increase access in a "GATT plus" sense; (b) joining MERCOSUR and maintaining duty free status in the Andean Group; (c) remaining within the Andean Group and receiving additional market access concessions from MERCOSUR; and (d) remaining within the Andean Group and implementing the current trade agreements.

1. **Pursuing MFN trade with regional agreements to increase access in GATT-plus sense.**

One of the important arguments for pursuing regional trading agreements had been the doubts regarding the success of the Uruguay Round, but these have now been removed with the successful signing of the Uruguay Round agreement. Industrial country tariffs have been lowered, non-tariff barriers are being phased out and dispute settlement procedures have been strengthened. Meanwhile, the ability to free-ride through breaches of reciprocity has also been reduced. Article XXIV provisions have been better defined, so that future agreements will be scrutinized more closely and the sanctioned departures from the MFN will be enforced more strictly with the WTO having the power to enforce rules better than under the GATT.

In addition to the changed international trading environment, Bolivia has been a model member since joining the GATT in 1990 in following the rules, processes and the conventions carefully. Furthermore, its trade regime is indeed one of the most open in the region. In any event, adherence to international discipline and codes of conduct will be an important factor in achieving higher levels of welfare through free trade. International trade theory supports MFN trade vigorously in relation to preferential trade, as does the success of the East Asian exporters that has been based on MFN-based trade and outward-oriented trade policies.

The other advantage of MFN trade is that it is an antidote against domestic protectionist interests that would use the departures from the MFN principle in exchange for concessions to influence trade policies. Such sector related influences would detract rather than enhance national welfare. This is the reason why Article XXIV of the GATT postulates that regional trade agreements must be based on broad negotiations, so as to reduce the possibility of domestic sector-related interests capturing the negotiations process and influencing the exchange of concessions to increase private profits at the expense of national welfare.

While MFN trade is optimal, there are opportunities to enhance trade beyond what could be achieved under MFN trade. With the low level as well as variance in border protection, it could be said that Bolivia has reached as close to a minimum level of protection that is possible, given the domestic interests. However, providing duty free access beyond what could be achieved under MFN trade at this time could be considered as GATT-plus trade. Thus the low protection and the zero tariff access granted to Andean Group members increases domestic competition beyond what seem possible thorough MFN trade at this time. This is not to say there is a lower bound for protection and that such a threshold has been reached by Bolivia. In the same way that there is no lower bound for protection, there is also no upper bound for access to other markets.

2. Joining MERCOSUR and maintaining duty free status accorded to the Andean Group

Bolivia has made individual agreements with the four MERCOSUR countries that specify a phased reduction of trade barriers faced by Bolivia, and an agreed list of goods that can have zero or low tariffs. However, since each country in the MERCOSUR group has its own lists of preferences, there are four different lists as well as four different rates of convergence to the finally agreed list of preferences. For example, one type of good permitted at zero tariff from one country may not be eligible for such status from another. Also, the goods excluded from preferences currently could be eligible for concessions in the future. Complications arising from the different preferences and the changes in preferences could amount to more than sixty thousand individual tariff lines overtime.³ This also indicates the discretion accorded to customs

³ With about ten thousand tariff lines per country at the four digit level, the tariff schedules of the six countries combined implies approximately sixty thousand country/commodity-specific tariff lines.

administration. Items could be excluded or included from lists at any given point in time. This leads to wide margins of discretion in classification and opportunities for corruption.

Since Bolivia has six agreements outside of the Andean group, an import from abroad has to be classified by origin for customs purposes. An item must then be checked to determine whether or not it is on a list for preferences and finally the list has to be updated each time a new item is added to the preference lists.

Since membership in one group or another is largely a political decision, joining MERCOSUR may imply loss of some preferential access to the other Andean Group countries. The CET rate of MERCOSUR is 20% compared to the Andean Group that has four CET rates all of which are identical or lower (5 percent, 10 percent, 15 percent and 20 percent). The actual conditions of access would depend on the agreements to be made in terms of the CET, the existing arrangements regarding the implementation of the preferences with MERCOSUR countries and arrangements that are permissible for Andean Group countries to join other groups.

3. Remaining within the Andean Group and receiving additional market access concessions from MERCOSUR.

Remaining within the Andean Group would imply the need to adopt the CET of the group in the future—a decision similar to adopting the MERCOSUR CET. Adopting the CET of groups would imply the harmful result of raising Bolivian protection levels. Meanwhile, with this option Bolivia would continue to receive duty free access to the Andean Group countries.

The main issue to be considered under this option, is what additional concessional access could Bolivia get over and above what it has already negotiated in its individual agreements with the MERCOSUR countries. Concerning trade, two additional concessions can be considered. The

first option is to increase the coverage of goods that enter MERCOSUR duty free and in return provide additional access for MERCOSUR countries to the Bolivian market. The second option would be to accelerate the rate at which Bolivia will open its market to MERCOSUR under the current agreements.

To assure investors within the group, one of the challenges of partnership in this agreement is the need to coordinate regulatory, legal and investment policies. Remaining within the Andean Group may not provide sufficient confidence to MERCOSUR investors. In addition, the extent of Bolivian trade with the Andean Group continues to be relatively small—over the last three years it has averaged less than 6 percent of total trade. Finally, the negotiation of additional concessions would give further opportunities to those with domestic sector-related interests in both Bolivia and MERCOSUR to influence the trade regime adversely. If the lobbying power of those with export interests were to be less than that of those producing import substitutes, the new negotiations could raise import protection. Already the soya bean producers—whose main export market is Colombia—are lobbying against joining MERCOSUR since they are concerned about cheap Brazilian imports.

4. Remaining within the Andean Group and implementing the current trade arrangements.

This option implies maintaining the status quo. Even though it has received a temporary respite from adopting the CET, it means that Bolivia will have to adopt the Andean Group's CET. Consequently, in the future Bolivia would have to raise its import tariffs, unless the Andean Group were to reduce the CET. The prospects for a future lowering of the CET may not be good

given that Colombia, Ecuador and Venezuela may not be well disposed toward reducing protection.

Under this option, the problems of the present trade regime—disparate preferences extended to six countries in different commodity groups and varying concessional terms—will persist. In addition, the administrative costs associated with implementing the rules of origin will remain high and unabated. Finally, maintaining the status quo implies that Bolivia will not be taking advantage of the new opening of markets outside the region offered by the Uruguay Round. Also, remaining with the status quo implies foregoing the other options discussed above. It would also mean foregoing the opportunities to attract more private investment into the country that are associated with greater trading opportunities with the rest of the world and adopting regulatory and investment rules that are attractive to the rest of the world. In addition, failing to take advantage of these greater trading opportunities would mean that the present problems—including the lack of diversification, presence of illegal trade and administrative costs of implementing the divergent preference regimes—would continue and could detract from welfare.

IV. *Quantitative Analysis of the Integration Choices*

A quantitative analysis of integration choices for Bolivia must recognize the existence of contrabrand trade as an initial condition. The changes in trade flows following an integration agreement will depend on the level and composition of existing trade, both legal and contrabrand trade. To the extent that trade barriers are reduced among the trading partners, contrabrand trade should be discouraged.

Based on the trade reporting system of partner countries, this section attempts to estimate the extent of contraband. Smuggling indexes for exports and imports were constructed between Bolivia and MERCOSUR and the Andean Group by comparing the recorded exports (imports) of Bolivia to the reported imports (exports) from Bolivia in MERCOSUR and the Andean group. For illustrative purposes, a smuggling index (S_x) for Bolivia's exports to MERCOSUR trade is calculated as.

$$S_x = 1 - (M_{mb}/X_{bm}) \quad (1)$$

where X_{bm} are exports to MERCOSUR(m) recorded by Bolivia(b) in its trade accounts and M_{mb} are imports reported as originating from Bolivia by MERCOSUR countries. If smuggling were equal to zero, *ceteris paribus*, $X_{bm} = M_{mb}$, and $S_x = 0$, whereas, the higher the value of the index, the greater the level of smuggling.

A similar index (S_m) can be constructed for Bolivia's imports:

$$S_m = 1 - (M_{bm}/X_{mb}) \quad (2)$$

where M_{bm} are imports from MERCOSUR recorded by Bolivia in its trade accounts and X_{mb} are exports to Bolivia as reported in the accounts of MERCOSUR countries. These indexes were also calculated for the Andean Group with the results shown in appendix table 6.

For Bolivia's exports to MERCOSUR, the estimated smuggling index is only 0.02. This result is reinforced by the estimated correlation coefficient (0.99) between exports reported by Bolivia and the imports reported by MERCOSUR. This indicates that nearly all of the trade is reported, or that there is significant smuggling associated with Bolivia's exports to MERCOSUR. In contrast, the smuggling index for Bolivia's exports to the Andean Group is significantly higher—0.48—and the correlation coefficient between the trade flows lower—0.40. However,

the smuggling index associated with Bolivian imports from MERCOSUR—is 0.31 and a correlation coefficient of 0.70—suggests an entirely different story. The smuggling index for Bolivia’s imports from Andean group is somewhat lower (0.24) with correlation coefficient of 0.32.

To summarize these results: (i) it is clear that smuggling is more prevalent on the import side than on the export side; and (ii) there is greater smuggling from MERCOSUR countries. In part, the latter reflects the fact that Bolivia’s border with MERCOSUR covers a larger distance than its border with Andean Group countries. With regard to the former, the lower correlation coefficient between the import sources for the Andean Group and MERCOSUR could also be due to reporting errors. It must be noted, however, that these indexes underestimate total smuggling, since they are constructed using only recorded trade. As illegal trade—especially narcotics—is not recorded, the indexes underestimate total contraband trade.

Based on these indexes, some 31 percent of Bolivia’s trade with MERCOSUR is under-reported while about 24 percent of the trade with the Andean Group is under-reported. By using the shares of MERCOSUR and Andean Group trade as weights, it is possible to estimate a more aggregate under-reporting of trade. For these two markets alone, some 10.2 percent of legal trade is under-reported on the import side.⁴

Integration Choices

In order to delineate the integration choices for Bolivia, the following three estimation methods were used: (i) export demand functions using ordinary least squares (OLS); (ii) trade

⁴ $W_m * S_m + W_a * S_a = (29.9) * (0.31) + (3.7) * (0.24) = 10.2$, where W_m and W_a are the shares of imports from MERCOSUR and the Andean Group, respectively, and S_m and S_a are the smuggling indexes for Bolivia-MERCOSUR and the Bolivia-Andean Group, respectively.

compatibility indexes, and (iii) export demand functions using an error correction model (ECM) for the 1980-1993 period. These methodologies are discussed in more detail in the appendix and the results are summarized here.

1. **Export Demand Functions using OLS:** In order to examine the integration choices, six export demand functions were estimated with OLS regressions. These were the demand for Bolivian general and non-traditional exports from MERCOSUR, the Andean Group, and the world (for simplicity, the world was defined as the US, EU, MERCOSUR and the Andean Group).⁵ Notwithstanding the criticisms (see appendix), the results of these regressions do provide some interesting insights regarding integration choices (see appendix table 7).

The export demand function estimated was of the form,

$$\text{Log } X = a_0 + b_1 \log (\text{RER}) + b_2 \log (M) \quad (3)$$

where X is Bolivian exports, RER is the real exchange rate (e.g., a proxy for the relative price variable) and M is total import demand of the target market (e.g., a proxy for demand in that market).

Based on general exports, the results of this methodology (estimating elasticity of exports with respect to market size) would rank Bolivia's integration choices as follows: (i) MERCOSUR; (ii) the world and (iii) the Andean Group.⁶ Based on the results of running the

⁵ The export demand functions were estimated separately for non-traditional exports on the assumption that these exports would be more significant in the future. Several explanations support this assertion: (i) fuel resource exports are exhaustible; (ii) Argentinean development of its natural gas resources will reduce the demand for Bolivian natural gas; and (iii) it is likely that the Bolivian government will implement policies to increase non-traditional exports.

⁶ These results should be interpreted noting that: (i) for MERCOSUR, the high r^2 suggested a good fit, but the exchange rate coefficient was of the wrong (positive) sign; (ii) for the world, the r^2 was lower, although both coefficients had the expected signs; and (iii) for the Andean Group, the r^2 was lower than in the case of MERCOSUR but both coefficients had the expected signs.

regressions for non-traditional exports Bolivia's integration would be ranked as follows: (i) MERCOSUR (ii) Andean Group; and (iii) the world.⁷

These results have to be interpreted with caution for a number of reasons. More specifically, the export data mix the pre-reform and post-reform periods and partitioning of the data to estimate separate models for each of the two periods is not feasible given the limited number of observations for the post-reform. Moreover, there are huge observation errors given the known existence of contraband trade that is not captured. In addition, these estimations involve an inherent single equation bias, since these export regressions in fact belong to a more fully determined system of simultaneous equations.

2. **Trade Compatibility Indexes:** The second method used to analyze the compatibility of Bolivia's integration with MERCOSUR and the Andean Group was the estimation of compatibility indexes.⁸ These indexes indicate the compatibility of a given country's imports (exports) with the partner country exports (imports). In the present context, an attempt is made to assess the compatibility of Bolivia's imports (exports) with MERCOSUR and Andean Group exports (imports). The index of compatibility of country j's imports with the exports of country k can be defined as (see the appendix for an illustration of a 3 country, two commodity case):

$$S_{mxx} = 1 - ((\sum |m_{ij} - x_{ik}|) / 2) \quad (4)$$

⁷ For the case of MERCOSUR, both coefficients had the expected signs and the r^2 was the highest. In the case of the regression Bolivia non-traditional exports to the world, the market variable had the wrong sign and the fit is quite poor. In the case of the Andean group, the r^2 is lower than for MERCOSUR, but the signs of the price and market coefficient are as expected.

⁸ Michaely developed the compatibility indexes as a prior test for the feasibility of economic integration in Latin America. They could well be called "Michaely Indexes" since they have been used first by Michaely, adopting the indexes used to measure intra-industry trade. See Michaely (1994).

where $S_{m_{ij}k}$ is the index of compatibility of imports of country j with exports of country k , m_{ij} is the share of commodity i in total imports of country j , and x_{ik} is the share of commodity i in total exports of country k . This index ranges between zero and one. Zero means that trade flows are not compatible (implying highly dissimilar trade flows), while an index of one means that trade flows match fully (implying perfect compatibility or identical flows). It should be noted that the matches are examined for separate commodity groups, and therefore, examination of the compatibility issue by commodity groups is necessary.

Similarly, to assess the compatibility of country j 's exports with the imports of country k , a compatibility can be defined as:

$$S_{x_{jmk}} = 1 - ((\sum |x_{ij} - m_{ik}|) / 2) \quad (5)$$

where $S_{x_{jmk}}$ is the index of compatibility of exports of country j with imports of country k , x_{ij} is the share of commodity i in total exports of country j and m_{ik} is the share of commodity i in total imports of country k .

To the extent that the trade flows are correctly reported and that trade patterns are not subject to sudden changes, the indexes indicate the ex-ante increase in the opportunities for trade and essence, the demand patterns between Bolivia and the two regional groups. Based on the indexes (see appendix table 8), Bolivian's choices could be ranked as follows: (i) MERCOSUR; and (ii) the Andean group.⁹

⁹ Trade diversion takes place when there is a substitution of production within a group for a cheaper source of imports from outside the group, due to the cost differential created by the preference margin. As Michaely (1994) has shown, the first index relating Bolivia's imports (exports) to the exports (imports) of MERCOSUR and the Andean Group also shows the potential for trade diversion. Michaely (1994) has also undertaken a further test of compatibility on the supply side by examining the production patterns that prevail in the two regional groupings. As this is a highly data intensive task, it is not attempted here. There are also other methods to evaluate supply responses to economic integration using computable general equilibrium models. However, though they might serve well as a consistency check such models can be subjected to strong criticisms as to their predictive power. (see Whalley and Srinivasan (1986)).

3. **Estimating Demand Functions using an error correction model.** More as a check on the previously mentioned estimated export demand functions, a third method was used to rank Bolivia's integration choices. The error correction model estimated was of the form:

$$x_{ijt} = \alpha_0 + \alpha_1 \Delta y_{jt} + \alpha_2 (x_{ij} - y_j)_{t-n} + \alpha_3 y_{j,t-n} + \alpha_4 \Delta e_{ijt}^r + \alpha_5 e_{ij,t-n}^r \quad (6)$$

where lower-case letters denote the logarithms of the corresponding capitals, X_{ij} is exports of country i to market j , Y_j is the real GDP of market j , and e_{ij}^r is the real exchange rate between country i and market j .¹⁰ The results, presented in the appendix, support the view that an agreement with MERCOSUR would generate more exports compared to that with the Andean Group.

The main conclusion from the analysis of different integration choices is that integration with the world—the theoretically best option—is not contradicted. In other words, MFN trade based on low tariffs would secure both the growth and diversification benefits that Bolivia is seeking from its trade opportunities. Besides, MFN trade is not exclusionary. With low protection based MFN trade, Bolivia would be able to exploit the trade opportunities provided by preferences exchanged between MERCOSUR and the Andean Group. While the analysis is not always clear on this choice, it seems the most sensible both in term of international trade theory and the empirical results, though the latter is not overwhelming. In any case, the evidence does not contradict the superior nature of MFN trade based on low protection.

The empirical results indicate that, at least for economic reasons, the choice of MERCOSUR has to be ranked above the Andean Group. There is also a great plausibility to this choice, as MERCOSUR is larger and closer and has a pattern of trade more compatible with

¹⁰ The expected signs of the coefficients are $\alpha_1 > 1$, $-1 < \alpha_2 < 0$, $\alpha_2 < \alpha_3$, $\alpha_4 > 0$, $\alpha_5 > 0$.

Bolivia. Furthermore, it is expected to grow steadily, especially if the macroeconomic stability persists in Argentina and Brazil.

The consequences of remaining within the Andean Group and receiving concessions from MERCOSUR were not specifically empirically tested. However, the results from the above analysis would seem to support a ranking of this choice above the status quo—e.g. remaining within the Andean Group and not pursuing additional access to MERCOSUR.

V. *Conclusions*

Bolivia faces a fundamental trade policy issue in deciding on the integration choices it faces. Though the trade reforms of 1985 have made significant contributions to the growth of trade, there are considerable opportunities available to increase the international competitiveness of the economy. Trade integration may constitute one such means to increase competitiveness.

In terms of Bolivia's integration choices, theoretical arguments as well as the empirical analysis of this paper, broadly confirm that MFN-based trade combined with preferential access to MERCOSUR and the Andean Group is superior to other choices. Of the three other specific integration choices, joining MERCOSUR in some form (and maintaining the Andean Group concessions) is ranked above that of remaining in the Andean Group and receiving concessions from MERCOSUR.¹¹ The essential difference between these two choices is that MERCOSUR is a larger market, and the tie-in with it (in respect of trade as well as other regulatory and legal environments) will provide some credibility to the efforts of the Bolivian government to attract investment from MERCOSUR. The "status quo" option of remaining within the Andean Group and maintaining the existing preferences is ranked least preferable.

¹¹ However, it should be said that the maintenance of preferential regimes is not without costs. The administration of the rules of origin associated with preferences granted to other countries would operate as a non-tariff barrier when Bolivia has strongly forsaken similar barriers in its trade policy.

In the final analysis, integration choices are not merely a matter of economics, but are very much related to domestic and regional politics. In the case of Bolivia, domestic political interests are aligned on both sides. For example, soya producers prefer the Andean Group over MERCOSUR, while non traditional expanding export activities prefer MERCOSUR. While MFN trade would have neither strong opposition nor support, it would avoid the political economy argument that the future of trade policy could be captured by different sectoral related interests. This is yet one more reason why MFN trade with concessions from both MERCOSUR and the Andean Group is the best of the integration choices that Bolivia faces.

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METHODOLOGICAL APPENDIX

A. The computation of the trade compatibility indexes¹²

Two-country, n goods case:

Consider two countries (j, k) and n goods. The index of compatibility of country j's imports with the exports of country k can be defined as:

$$S_{m_{jxk}} = 1 - \left(\left(\sum_{i=1}^n |m_{ij} - x_{ik}| \right) / 2 \right)$$

Furthermore, such estimations involve an inherent single equation bias, since these export regressions in fact belong to a more fully determined system of simultaneous equations.

where $S_{m_{jxk}}$ is the index of compatibility of imports of country j with exports of country k, m_{ij} is the share of good i in total imports of country j and x_{ik} is the share of good i in total exports of country k.

The range of values for the index is between zero and one.¹³ It will be zero when trade flows are not compatible, implying that trade flows are highly dissimilar and the index would be one when trade flows match fully implying perfect compatibility or identical flows.

Another index of compatibility assesses the compatibility of country j's exports with the imports of country k. This index is computed in a similar fashion to the one earlier and is defined as:

$$S_{x_{jmk}} = 1 - \left(\left(\sum |x_{ij} - m_{ik}| \right) / 2 \right)$$

¹² Based on the work of Michaely (1994).

¹³ If the term in brackets in (4) and (5) is not divided by two, the index would range from zero to two.

where $S_{x_{jmk}}$ is the index of compatibility of exports of country j with imports of country k , x_{ij} is the share of good i in total exports of country j and m_{ik} is the share of good i in total imports of country k .

Three-country, two-goods case

Consider three countries (A, B, C) and two goods (1, and 2). The compatibility index of country A's imports with the exports of country B can be defined as

$$S_{m_{AxB}} = 1 - [((|m_{1A} - x_{1B}|) + (|m_{2A} - x_{2B}|))/2]$$

where x_{1B} is the share of good 1 in total exports of country B, m_{1A} is the share of good 1 in total imports of country A, x_{2B} is the share of good 2 in total exports of country B, and m_{2A} is the share of good 2 in total imports of country A. These are in turn defined as follows.

$$x_{1B} = X_{B1}/(X_{B1} + X_{B2}), \quad x_{2B} = X_{B2}/(X_{B1} + X_{B2})$$

$$m_{1A} = M_{A1}/(M_{A1} + M_2), \quad m_{2A} = M_2/(M_{A1} + M_2)$$

where X_{B1} is country B's exports of good 1, X_{B2} is country B's exports of good 2, M_{A1} is country A's imports of good 1, and M_2 is country A's imports of good 2.

A similar compatibility index of country A's exports with the imports of country B can be defined as

$$S_{x_{AmB}} = 1 - [((|x_{1A} - m_{1B}|) + (|x_{2A} - m_{2B}|))/2]$$

where m_{1B} is the share of good 1 in total imports of country B, x_{1A} is the share of good 1 in total exports of country A, m_{2B} is the share of good 2 in total imports of country B, and x_{2A} is the share of good 2 in total exports of country A. These are in turn defined as follows.

$$m_{1B} = M_{B1}/(M_{B1} + M_{B2}), \quad m_{2B} = M_{B2}/(M_{B1} + M_{B2})$$

$$x_{1A} = X_{A1}/(X_{A1} + X_2), \quad x_{2A} = X_2/(X_{A1} + X_2)$$

where M_{B1} is country B's imports of good 1, M_{B2} is country B's imports of good 2, X_{A1} is country A's exports of good 1, and X_2 is country A's exports of good 2.

Based on similar considerations, the compatibility index of country A's imports with the exports of country C can be defined as

$$S_{mAxC} = 1 - [((|m_{1A} - x_{1C}|) + (|m_{2A} - x_{2C}|))/2]$$

where x_{1C} is the share of good 1 in total exports of country C, m_{1A} is the share of good 1 in total imports of country A, x_{2C} is the share of good 2 in total exports of country C, and m_{2A} is the share of good 2 in total imports of country A. These are in turn defined as follows.

$$\begin{aligned} x_{1C} &= X_{C1}/(X_{C1}+X_{C2}), & x_{2C} &= X_{C2}/(X_{C1}+X_{C2}) \\ m_{1A} &= M_{A1}/(M_{A1}+M_2), & m_{2A} &= M_2/(M_{A1}+M_2) \end{aligned}$$

where X_{C1} is country C's exports of good 1, X_{C2} is country C's exports of good 2, M_{A1} is country A's imports of good 1, and M_2 is country A's imports of good 2.

A similar compatibility index of country A's exports with the imports of country C can be defined as

$$S_{xA_mC} = 1 - [((|x_{1A} - m_{1C}|) + (|x_{2A} - m_{2C}|))/2]$$

where m_{1C} is the share of good 1 in total imports of country C, x_{1A} is the share of good 1 in total exports of country A, m_{2C} is the share of good 2 in total imports of country C, and x_{2A} is the share of good 2 in total exports of country A. These are in turn defined as follows.

$$\begin{aligned} m_{1C} &= M_{C1}/(M_{C1}+M_{C2}), & m_{2C} &= M_{C2}/(M_{C1}+M_{C2}) \\ x_{1A} &= X_{A1}/(X_{A1}+X_2), & x_{2A} &= X_2/(X_{A1}+X_2) \end{aligned}$$

where M_{C1} is country C's imports of good 1, M_{C2} is country C's imports of good 2, X_{A1} is country A's exports of good 1, and X_2 is country A's exports of good 2.

These indexes can be used to assess whether the compatibility between country A and B is greater (lesser) than between country A and C. If $S_{mAxB} > S_{mAxC}$, then we can conclude that country A's imports from B are more compatible than its imports from C. Likewise, if $S_{xAmb} > S_{xAmc}$, then we can conclude that A's exports are more compatible with the imports of country B than its exports to C. These indexes in turn can rank for example, country A's integration choices with countries B and C.

B. Estimation of export demand functions

Using OLS:

Using OLS regression techniques, the export demand function estimated was of the form:

$$\text{Log } X = a_0 + b_1 \log (\text{RER}) + b_2 \log (M_t)$$

where X is exports from Bolivia, RER is the real exchange rate— proxy for the relative price variable—and M is total import demand of the target market—a proxy for demand in that market.

Such regression models based on time series estimates are subject to the Lucas (1976) critique that the estimated coefficients are not reliable for prediction because of changes in the underlying structures.

Using an error correction model :

An error correction model was estimated of the form:

$$x_{ijt} = \alpha_0 + \alpha_1 \Delta y_{jt} + \alpha_2 (x_{ij} - y_j)_{t-n} + \alpha_3 y_{j,t-n} + \alpha_4 \Delta e^f_{ijt} + \alpha_5 e^f_{ij,t-n} \quad (6)$$

where lower-case letters denote the logarithms of the corresponding capitals, The expected signs are $\alpha_1 > 1$, $-1 < \alpha_2 < 0$, $\alpha_2 < \alpha_3$, $\alpha_4 > 0$, $\alpha_5 > 0$. X_{ij} is to exports of country i to market j, Y_j is to the real GDP of market j, and e^f_{ij} is to the real exchange rate between country i and market j.

The income and the exchange rate variables in this specification have been so transformed as to nest the 'differences' formulation of the variables in the level form of the equation. This transformation reduces the possibility of the occurrence of the spurious correlation typically associated with time-series data when the relationship between export demand and both foreign market income and the real exchange rate is estimated.

The estimated equation for Bolivia's export demand by MERCOSUR, using Brazil's real exchange rate for MERCOSUR countries, is:

$$x_{ijt} = 14.6 + 0.78\Delta y_{j,t-3} - 0.456^*(x_{ij} - y_j)_{t-3} - 0.145y_{j,t-3} + 0.329^*\Delta e^r_{ijt} + 0.090^*e^r_{ij,t-1} \quad (7)$$

$$(1.4) \qquad (6.0) \qquad (0.9) \qquad (7.7) \qquad (2.7)$$

$$R^2 = 0.97 \qquad \text{Durbin-Watson} = 1.82$$

The estimated equation for Bolivia's export demand by Andean, using Colombia's real exchange rate for Andean countries, is:¹⁴

$$x_{ijt} = -32.97 + 6.8\Delta y_{jt} - 0.974^*(x_{ij} - y_j)_{t-3} + 3.733^*y_{j,t-1} + 0.346\Delta e^r_{ijt} + 0.179e^r_{ij,t-1} \quad (8)$$

$$(1.0) \qquad (3.9) \qquad (2.0) \qquad (0.5) \qquad (0.7)$$

$$R^2 = 0.93 \qquad \text{Durbin-Watson} = 1.68$$

The results support the view that an agreement with MERCOSUR would generate more exports compared to that with the Andean Group. The best fit for the export demand equations involved different lag structures for the variables. While the MERCOSUR equation fitted better, it had to be based on a specification that lagged the right hand side variables in inconsistent ways between the two markets. For example, a three period lag for GDP fitted better for Bolivia's exports to MERCOSUR compared to a one period lag for exports to the Andean Group. One

¹⁴ In (7) and (8), t statistics are shown in parenthesis. An asterisk indicates that the coefficients are statistically significant.

interpretation of this result is that the income effect for MERCOSUR does not begin to degenerate until the third year. While the MERCOSUR option appears better, the different lag structures needed to improve the fit of the demand functions is somewhat reduce the strength of this conclusion.

STATISTICAL APPENDIX

**Table 1: Bolivian Terms of Trade Index, 1980-92
(1987=100)**

Year	Export price index	Import price index	Terms of trade index
1980	181.0	91.3	198
1981	171.0	91.4	187
1982	157.0	88.2	178
1983	153.0	87.2	176
1984	151.0	86.2	175
1985	144.0	86.3	167
1986	116.0	95.5	121
1987	100.0	100.0	100
1988	93.1	111.0	84
1989	103.0	108.0	95
1990	94.1	114.0	83
1991	91.1	125.0	73
1992	67.9	128.0	53

Source: World Bank

**Table 2: Bolivian Imports, Exports, and Growth Rates
1980-93**

Category	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
Imports	518	713	445	465	388	549	537	581	520	579	635	656	698	614	564
Import growth	-34.2	37.7	-37.6	4.6	-16.7	41.7	-2.3	8.3	-10.6	11.5	9.6	3.3	6.4	-12.0	0.7
Exports	640	614	627	626	603	570	661	645	684	853	985	992	950	814	733
Export growth	-23.0	-4.1	2.2	-0.2	-3.3	-5.9	16.1	-2.5	6.1	24.7	15.5	0.7	-4.2	-14.2	0.6
Average growth															
	1980-84	1985-93	1980-93												
Import Growth	-9.2	6.2	0.7												
Export Growth	-5.7	4.0	0.6												

Note: Figures relate to goods and non-factor services. Imports and exports figures are in millions of 1980 US dollars. Growth rates are in percentages.
Source: World Bank (Andrex).

**Table 3: Bolivia: Direction of Imports and Exports
1980-93**

Category	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
Imports															
USA	25.5	22.9	29.1	28.1	19.9	20.4	22.4	21.0	21.8	24.4	22.2	25.9	24.4	22.5	23.6
EEC 10	21.9	19.3	16.7	16.3	14.8	17.3	18.7	14.2	11.8	13.7	13.3	6.3	9.7	10.5	14.6
MERCOSUR	22.5	24.6	26.2	28.5	38.2	36.8	29.9	34.6	34.6	32.2	28.2	26.2	24.1	22.9	29.2
ANDEAN	4.6	3.7	3.3	3.0	4.9	4.0	2.6	2.0	3.0	3.5	4.2	3.4	3.8	6.6	3.7
Others	25.5	29.4	24.7	24.1	22.2	21.5	26.4	28.3	28.8	26.2	32.0	38.3	38.0	37.5	28.8
World	6,546	8,988	4,858	5,312	4,166	6,909	6,740	7,663	5,905	6,199	7,027	9,924	11,286	11,769	7378
Exports															
USA	29.1	27.6	28.8	23.5	18.6	14.1	15.2	16.9	20.7	19.2	20.0	21.9	20.1	26.6	21.6
EEC 10	23.3	20.6	13.9	16.8	22.9	20.5	17.0	21.1	26.9	30.6	28.4	23.2	32.7	28.8	23.3
MERCOSUR	27.2	36.1	46.7	49.2	50.0	56.6	57.4	49.2	40.1	33.8	34.5	34.3	22.4	19.1	39.7
ANDEAN	4.1	4.5	3.8	2.9	2.0	2.5	3.8	5.4	4.6	6.1	6.5	10.0	13.0	15.4	6.0
Others	16.4	11.2	6.8	7.7	6.5	6.3	6.7	7.5	7.7	10.4	10.5	10.6	11.9	10.2	9.3
World	10,362	9,834	8,955	8,176	7,814	6,728	6,402	5,698	5,975	8,192	9,229	8,998	7,653	8,089	8,007

Note: World figures are in tens of millions of US dollars; other figures are percentages of total. MERCOSUR consists of Argentina, Brazil, Paraguay, and Uruguay. ANDEAN consists of Colombia, Ecuador, Peru, and Venezuela.

Source: United Nations (Comtrade).

**Table 4: Exports by Region and Category
1980-93**

USA															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	12.9	4.7	5.0	5.6	5.7	7.3	7.0	8.8	10.1	7.3	11.9	8.5	6.6	3.7	7.5
1	N.A.	N.A.	0.0	N.A.	0.0	N.A.	0.0	0.0	0.1	0.0	0.2	0.0	0.1	0.0	N.A.
2	39.8	32.5	23.7	24.6	20.2	17.7	45.2	54.2	29.3	27.2	24.8	21.1	11.4	13.2	27.5
3	N.A.	N.A.	N.A.	15.3	5.0	0.0	3.5	5.5	N.A.	N.A.	N.A.	3.2	N.A.	1.6	N.A.
4	N.A.	N.A.													
5	N.A.	0.0	0.0	N.A.	0.0	0.0	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.4	N.A.
6	47.1	62.6	71.2	54.5	69.0	74.9	39.6	29.7	57.9	61.7	58.0	46.9	49.1	40.7	54.5
7	0.0	0.0	0.0	N.A.	N.A.	N.A.	N.A.	N.A.	0.0	0.1	0.1	0.0	5.5	1.9	N.A.
8	0.2	0.2	0.1	0.0	0.0	0.1	0.4	0.8	2.2	3.4	4.8	4.2	26.4	38.2	5.8
9	0.0	0.0	0.1	0.1	0.0	0.0	3.7	0.7	0.3	0.3	0.2	16.1	0.9	0.3	1.6
All	3,012	2,719	2,579	1,920	1,456	948	970	960	1,234	1,571	1,847	1,972	1,537	21,482	17,770
EEC 10															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	1.2	1.5	3.1	3.4	1.4	4.4	13.5	6.0	6.0	2.8	5.4	1.8	1.8	3.6	4.0
1	0.0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0.0	0.0	0.0	0.0	0.0	0.0	N.A.	N.A.
2	72.4	54.9	57.5	56.9	56.1	63.7	74.8	84.1	84.3	88.1	84.1	92.9	92.2	65.7	73.4
3	3.8	N.A.	N.A.												
4	N.A.	N.A.													
5	0.2	0.1	0.1	0.0	0.0	0.0	0.0	N.A.	0.1	0.0	0.2	0.1	0.0	0.0	N.A.
6	21.7	42.8	39.1	39.6	42.5	31.9	11.4	9.8	9.2	8.9	9.8	4.8	5.5	8.2	20.4
7	N.A.	0.0	0.2	N.A.	N.A.	N.A.	N.A.	N.A.	0.0	0.0	0.0	0.0	0.1	0.0	N.A.
8	0.7	0.7	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.4	0.2	0.4	0.6	0.3
9	N.A.	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.3	0.0	22.0	N.A.
All	2,410	2,022	1,248	1,371	1,788	1,381	1086	1,202	1,610	2,505	2,625	2,083	2,501	2,328	1,8685
MERCOSUR															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	0.8	0.4	0.5	0.6	0.6	0.4	4.3	3.7	2.4	8.7	17.2	9.9	1.5	3.3	3.9
1	0.0	0.0	0.0	N.A.	N.A.	N.A.	0.0	0.0	0.1	0.1	0.3	0.6	0.3	0.2	N.A.
2	17.2	3.1	3.2	1.9	1.1	1.0	4.6	6.2	6.1	9.7	7.8	8.4	19.7	24.2	8.2
3	79.0	94.2	94.2	96.0	97.5	98.4	89.6	88.7	89.9	77.3	70.7	75.3	72.5	61.0	84.6
4	N.A.	0.0	N.A.	0.0	0.3	0.4	N.A.	0.0	N.A.						
5	N.A.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.9	0.5	0.5	0.5	N.A.
6	2.9	2.3	2.0	1.5	0.7	0.1	1.5	1.3	1.5	4.0	2.6	2.0	1.6	3.8	2.0
7	0.0	0.0	0.0	N.A.	0.0	3.1	4.2	N.A.							
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.7	2.7	0.3
9	N.A.	N.A.	N.A.	N.A.	N.A.	0.0	0.0	0.1	0.0	0.0	0.0	2.7	0.1	0.1	N.A.
All	2,817	3,546	4,181	4,018	3,904	3,805	3,675	2,802	2,395	2,765	3,188	3,087	1,714	1,543	3,102
ANDEAN															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	14.9	8.6	26.7	34.4	22.3	37.7	37.5	42.8	36.0	57.4	62.5	50.1	49.0	50.9	37.9
1	2.2	1.4	3.9	1.4	0.0	0.5	1.1	0.8	N.A.	0.4	0.4	0.2	0.1	0.3	N.A.
2	1.5	3.0	4.0	2.6	12.9	6.3	34.8	24.1	24.3	15.7	15.7	24.6	22.7	26.4	15.6
3	10.3	N.A.	N.A.	20.6	N.A.	N.A.	N.A.	7.3	13.4	N.A.	N.A.	0.0	0.0	0.5	N.A.
4	N.A.	3.0	1.5	0.2	N.A.	0.2	0.8	0.5	N.A.	4.8	9.6	7.3	5.2	4.4	N.A.
5	0.0	18.5	3.8	0.1	0.7	0.4	4.2	4.9	0.7	9.6	1.3	1.6	2.0	2.3	3.6
6	45.7	44.9	45.1	40.6	63.9	54.7	21.4	19.4	25.2	12.1	10.4	7.7	12.8	10.2	29.6
7	24.6	19.3	13.3	0.0	N.A.	N.A.	N.A.	0.1	0.1	N.A.	0.0	0.1	6.8	3.2	N.A.
8	0.9	1.3	1.8	0.1	0.2	0.0	0.0	0.0	0.1	0.0	0.1	0.2	1.2	1.7	0.5
9	N.A.	0.0	0.0	N.A.	N.A.	0.2	0.1	0.2	0.3	0.1	0.0	8.3	0.2	0.1	N.A.
All	425	444	341	237	156	168	242	307	275	499	599	897	936	1,248	488

World

Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	7.9	3.1	4.2	4.2	2.6	3.7	8.4	8.5	7.7	10.3	16.4	13.1	11.0	11.8	8.1
1	0.1	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.2	0.3	0.1	0.2	0.1
2	40.0	29.7	21.1	20.9	21.1	19.1	26.1	35.5	36.9	43.5	38.1	37.0	45.7	34.2	32.1
3	23.7	34.2	44.5	51.4	49.8	55.7	51.9	44.9	36.6	26.2	24.6	26.8	16.5	12.7	35.7
4	0.0	0.1	0.1	0.0	N.A.	0.0	0.0	0.0	0.0	0.3	0.8	0.9	0.7	0.7	N.A.
5	0.1	0.9	0.2	0.0	0.0	0.0	0.3	0.3	0.1	0.7	0.6	0.4	0.5	0.7	0.3
6	26.9	30.7	29.0	23.4	26.5	21.5	11.4	10.3	17.8	18.0	18.1	14.7	15.5	16.9	20.1
7	1.0	0.9	0.6	0.0	N.A.	N.A.	0.9	0.0	0.0	0.0	0.0	0.0	3.3	2.0	N.A.
8	0.3	0.4	0.1	0.0	0.0	0.0	0.1	0.2	0.6	0.7	1.2	1.2	6.3	11.7	1.6
9	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.2	0.1	0.2	0.1	5.6	0.4	9.0	1.2
All	10,362	9,834	8,955	8,176	7,814	6,728	6,402	5,698	5,975	8,192	9,229	8,998	7,653	8,090	8,007

0 food and live animals; 1 beverages and tobacco; 2 crude materials, excluding fuels; 3 mineral fuels etc.; 4 animal, vegetable oil, fat; 5 chemicals, related products; 6 basic manufactures; 7 machines, transport equipment; 8 misc. manufactured goods; 9 goods not classified by kind.

Note: Figures for all commodities are in tens of millions of US dollars. The rest are percentages.

Source: United Nations (Comtrade).

**Table 5: Commodity Composition of Bolivian Imports,
1980-93**

USA															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	21.2	10.6	17.4	30.7	20.2	9.2	27.3	32.7	21.8	31.4	26.9	17.9	18.5	16.2	21.6
1	1.2	1.3	0.9	0.7	0.7	0.2	0.3	1.2	0.8	1.0	0.9	0.4	0.2	0.4	0.7
2	1.6	1.7	2.2	2.0	4.8	3.0	2.0	1.6	1.3	1.1	1.4	1.7	1.4	1.4	1.9
3	0.4	4.2	1.7	1.8	0.8	0.9	1.3	0.4	3.5	0.7	0.8	1.0	3.2	4.1	1.8
4	1.2	0.7	0.9	1.3	0.2	1.1	2.5	1.4	0.8	2.4	1.9	0.6	0.8	0.1	1.1
5	8.0	9.3	6.6	13.7	12.8	10.6	7.3	8.4	8.0	5.9	7.0	8.0	7.0	9.8	8.8
6	13.8	17.7	16.3	7.6	11.6	12.4	9.5	8.1	11.1	9.7	7.7	8.9	8.1	9.3	10.8
7	47.6	46.6	49.6	38.6	41.9	54.4	42.4	37.6	42.3	40.0	41.4	41.0	43.2	44.3	43.6
8	4.9	7.8	4.4	3.6	7.0	7.9	6.7	7.8	9.8	7.5	10.2	10.4	7.7	7.3	7.4
9	0.0	0.1	0.1	N.A.	0.0	0.5	0.7	0.9	0.6	0.5	1.7	10.1	9.8	7.1	N.A.
All	1,671	2,062	1,416	1,491	828	1,409	1,511	1,609	1,258	1,514	1,561	2,574	2,755	2,652	1,738

EEC 10															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	14.1	15.2	15.3	11.5	10.8	8.6	7.6	12.7	9.3	17.8	8.1	11.3	7.2	6.5	11.1
1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.4	0.5	0.2	0.2	0.2
2	1.8	2.2	1.6	1.1	0.9	1.9	1.6	4.1	2.9	4.1	4.2	1.6	0.8	0.7	2.1
3	0.7	0.4	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.4	0.3	0.0	1.2	0.0	0.4
4	0.3	0.3	0.4	0.2	0.1	0.5	0.5	8.6	0.7	2.9	0.3	1.2	1.7	0.6	1.3
5	20.6	19.3	22.9	19.5	28.3	19.1	17.8	16.4	22.8	19.7	19.4	16.3	8.0	6.1	18.3
6	11.1	12.6	12.5	9.5	9.0	9.0	10.9	7.9	14.1	8.6	12.0	24.4	11.4	4.4	11.2
7	45.2	45.0	30.7	47.1	37.5	33.8	40.9	40.4	40.4	36.1	39.5	35.8	56.9	77.8	43.3
8	6.0	4.5	16.3	10.8	12.8	25.9	20.0	7.2	8.8	9.6	8.7	8.9	12.6	3.1	11.1
9	0.0	0.4	N.A.	N.A.	0.1	0.8	0.5	2.2	0.6	0.6	7.0	0.0	0.0	0.6	N.A.
All	1,434	1,738	809	868	618	1196	1,261	1,087	698	851	938	621	1,097	1,230	1,031

MERCOSUR															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	23.9	19.6	28.9	22.1	20.5	30.9	9.2	13.1	7.5	9.0	5.6	8.7	11.3	7.8	15.6
1	0.7	0.5	0.2	1.0	0.2	0.3	0.3	0.7	1.2	1.0	0.8	1.3	0.6	1.2	0.7
2	1.7	2.2	1.5	2.1	2.0	2.0	1.2	1.2	0.7	0.7	0.8	1.3	0.7	1.7	1.4
3	0.7	1.0	5.0	1.1	0.8	0.6	0.4	0.4	0.3	1.4	0.3	0.8	4.9	10.6	2.0
4	4.3	4.2	3.5	3.6	1.2	3.3	0.5	0.4	0.7	0.6	0.1	0.2	0.9	0.6	1.7
5	5.1	4.3	6.6	10.6	7.8	7.7	8.4	8.8	11.6	9.9	10.4	12.6	9.2	13.2	9.0
6	20.4	25.0	27.8	36.0	25.6	16.9	30.5	29.9	29.1	35.6	35.2	36.0	36.0	32.0	29.7
7	38.5	39.1	24.9	21.6	40.7	36.4	45.0	39.8	43.1	36.3	41.6	34.6	32.1	28.2	35.8
8	4.8	4.1	1.7	2.0	1.2	1.7	4.4	5.6	5.7	5.4	5.2	4.5	4.4	4.6	4.0
9	0.0	0.0	0.0	N.A.	N.A.	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	N.A.
All	1,474	2,211	1,271	1,517	1,593	2,545	2,012	2,648	2,044	1,994	1,982	2,599	2,716	2,699	2,093

ANDEAN															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	21.0	13.9	9.9	7.4	13.7	8.0	8.3	8.6	5.8	4.3	5.6	5.0	4.2	5.6	8.7
1	1.0	0.6	1.1	1.2	0.2	0.0	0.2	0.4	0.0	0.1	0.2	0.0	0.4	0.1	0.4
2	0.9	0.8	0.9	17.4	20.3	10.7	20.0	10.7	13.7	12.5	12.2	7.7	24.2	29.2	12.9
3	0.3	0.6	1.1	0.5	0.1	0.8	0.3	1.4	0.1	0.3	0.4	0.7	9.8	7.4	1.7
4	1.7	0.0	0.1	N.A.	0.0	0.0	0.5	0.4	N.A.	0.2	0.1	0.0	0.0	0.0	N.A.
5	29.4	33.1	37.7	28.1	20.1	15.6	17.8	26.4	24.3	32.7	26.6	28.8	22.0	22.8	26.1
6	25.8	29.1	27.7	27.9	20.2	18.2	20.1	30.1	25.4	28.6	23.9	31.0	20.7	19.2	24.8
7	14.2	17.2	18.7	12.1	21.1	42.8	25.0	11.7	21.8	11.2	19.0	17.5	13.2	7.6	18.1
8	5.7	4.7	2.9	5.3	4.2	3.4	7.4	9.8	8.2	9.2	12.0	9.4	5.3	8.1	6.8
9	0.0	0.0	N.A.	0.1	0.0	0.5	0.4	0.6	0.7	0.8	0.0	0.0	0.0	0.0	N.A.

All	298	333	159	158	203	275	174	154	177	216	299	333	425	775	2842
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World															
Commodity	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Avg.
0	16.8	12.7	17.1	18.2	15.7	16.3	12.1	15.5	10.0	14.9	10.3	9.8	10.0	8.4	13.4
1	0.6	0.5	0.4	0.6	0.3	0.2	0.3	0.7	0.7	0.6	0.5	0.3	0.5	0.5	0.5
2	1.4	1.7	1.8	2.0	3.2	2.4	1.9	2.0	1.6	2.0	2.3	2.1	2.0	3.4	2.1
3	0.5	1.7	1.9	1.0	0.5	0.5	0.5	0.4	0.9	0.8	0.6	0.8	3.3	4.9	1.3
4	1.5	1.3	1.2	1.5	0.5	1.6	0.9	1.8	0.5	1.2	0.5	0.4	0.7	0.3	1.0
5	11.2	10.0	10.7	12.3	12.7	11.3	10.1	9.9	11.5	10.6	11.0	11.8	8.8	10.8	10.9
6	20.7	23.0	23.0	22.1	21.3	14.7	18.6	19.5	20.4	20.3	19.3	19.5	18.5	15.9	19.8
7	41.2	43.1	37.4	38.1	41.0	45.0	46.4	41.2	44.7	41.5	45.9	44.1	46.1	47.0	43.1
8	6.1	5.9	6.4	4.2	4.7	7.6	9.0	8.4	9.3	7.7	8.3	8.3	7.9	7.2	7.2
9	0.0	0.1	0.0	0.0	0.0	0.4	0.3	0.6	0.3	0.4	1.3	2.7	2.5	1.7	0.7
All	6,546	8,988	4,858	5,312	4,166	6,909	6,740	7,663	5,905	6,199	7,027	9,924	11,286	11,769	7,378

0 food and live animals; 1 beverages and tobacco; 2 crude materials, excluding fuels; 3 mineral fuels etc.; 4 animal, vegetable oil, fat;

5 chemicals, related products; 6 basic manufactures; 7 machines, transport equipment; 8 misc. manufactured goods; 9 goods not classified by kind.

Note: Figures for all commodities are in tens of millions of US dollars. The rest are percentages.

Source: United Nations (Comtrade)

Table 6: Smuggling Indexes: 1980-93

	Imports	Imports	Exports	Exports
	Smuggling Index(S_m)	Correlation Coefficient	Smuggling Index(S_e)	Correlation Coefficient
Bolivia-Andean Group	0.24	0.32	0.48	0.40
Bolivia-MERCOSUR	0.31	0.70	0.02	0.97

Source: Author's calculations

Table 7: Regression Results for Bolivia's exports to MERCOSUR, Andean, and World:**1980-1993**

	Intercept	Log(RER)	Log(M _t)	Adjusted R ²
I(a)	-0.235* (-2.54)	0.023* (3.54)	1.032* (60.53)	0.997
I(b)	4.596 (1.39)	-1.988* (-8.61)	0.609 (1.00)	0.860
II(a)	4.766* (2.14)	-1.305* (-6.16)	0.583 (1.21)	0.789
II(b)	-5.835* (-2.40)	-0.051 (-0.22)	2.346* (4.46)	0.626
III(a)	-1.342 (-0.61)	-0.232 (-1.55)	0.755* (2.36)	0.707
III(b)	8.356 (0.87)	-1.933* (-2.94)	-0.516 (-0.37)	0.546

Note: I(a)-Bolivia's total exports to MERCOSUR; I(b)-Bolivia's non-traditional exports to MERCOSUR

II(a)-Bolivia's total exports to Andean; II(b)-Bolivia's non-traditional exports to Andean

III(a)- Bolivia's total exports to the World; III(b)-Bolivia's non-traditional exports to the world

t-values are shown in parentheses * indicates that these are statistically significant

Source: Author's calculations

Table 8: Indexes of Trade Compatibility: 1980-1993

Bolivian Exports	<i>Andean Imports</i> 0.339	<i>MERCOSUR Imports</i> 0.464
Bolivian Imports	<i>Andean Exports</i> 0.353	<i>MERCOSUR Exports</i> 0.608

Notes: computed on the basis of 1-digit SITC data.

Source: Comtrade database, UN

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