Agricultural Export Diversification in Latin America and the Caribbean

Timothy G. Taylor and Brian Francis

Agriculture, in general, and agricultural exports in particular, have long been critical to economic growth and development in Latin America and the Caribbean (LAC). Despite the importance of agriculture to the region and the vast amount of resources devoted to the promotion of agricultural export diversification in LAC, there has been virtually no research undertaken to assess the degree to which the agricultural export structures in LAC countries have in fact diversified. Using disaggregate data on agricultural exports over the 1961–2000 period for 19 LAC countries, entropy-based measures of diversification are computed and analyzed. The empirical results show that the post-1985 period has witnessed some degree of agricultural export diversification in LAC. However, the results are mixed particularly for the smaller Organization of Eastern Caribbean Countries.

Key Words: agriculture, Caribbean, diversification, entropy, exports, Latin America

Agriculture in general, and agricultural exports in particular, have long been considered critical to economic growth and development in Latin America and the Caribbean (LAC). Indeed, although agriculture accounts for only about 8% of LAC gross domestic product, a recent report by the Inter-American Development Bank (IADB) states that, "for most countries agricultural growth is essential for economic growth" (IADB, p. 6). Such growth is also essential in terms of reducing rural unemployment and improving the general welfare and environmental conditions of the rural sectors of LAC countries.

Over the past 40 years, the treatment of agriculture in the development process has changed significantly. In the 1960s and 1970s, development policy under the influence of the writings of Raul Prebisch was characterized by import-substitution industrialization (ISI).

Under this policy paradigm, there was an implicit anti-agriculture bias, because economic growth and development were believed to depend critically on the industrialization of LAC economies. Of course, key elements in this paradigm were macroeconomic and trade polices that had an anti-export bias. In spite of this anti-agriculture bias, Spoor notes that the agricultural sector performed reasonably well.[1]

In response to the debt crisis of the early 1980s, a fundamental shift in development policy was undertaken, with ISI being supplanted by polices predicated on export-led growth and openness to international markets (Weeks; Thorpe). Commensurate with this policy shift, agricultural exports and export diversification were given increased priority.

Driven in large part by national security interests, the United States increased its political and economic involvement in LAC during the 1980s. Overseas development assistance to the

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[1] One reason for this is that agricultural sectors in LAC received considerable support via subsidized credit and public investment and other services.

region, the majority of which was supplied by the United States, increased substantially over the 1979–1988 period (Organization of Eastern Caribbean Countries [OECS]). The diversification of export agriculture was advocated because traditional exports subjected LAC economies to disruptive world market fluctuations and the region was believed to possess a comparative advantage in the production of labor-intensive commodities. Nontraditional agricultural exports were given high priority because of the region's tropical climate and the belief that such products would not be likely to compete with U.S. production.

In 1984, the National Bipartisan Commission on Central America (NBCCA) reiterated the importance of nontraditional exports in achieving economic growth and stability in the region. Responding to the NBCCA, the U.S. Department of State issued an implementation plan. Of specific importance to the plan was its emphasis on the long term:

> "A sustained effort over a decade or more will be needed if nontraditional products are to play an important role in generating export earnings. . . . It is now obvious that transformation of these economies—changing the base from traditional exports of coffee, sugar, cotton and meat, to nontraditional agricultural products and manufactures—will require significantly more time than envisioned by the NBCCA." (U.S. Department of State)

The most visible and highly publicized policy actions taken by the United States were the passage of the Caribbean Basin Economic Recovery Act (CBERA) in 1983 and its successors, most recently the Caribbean Basin Trade Partnership Act (CBTPA). The CBTPA expanded duty-free access to the U.S. market provided by the original CBERA and provided near North American Free Trade Agreement (NAFTA) parity to eligible beneficiaries.

Although the CBERA has been the most visible policy action taken by the United States to promote nontraditional exports in LAC, projects funded by the U.S. Agency for International Development (USAID) have made up the region's most significant NTAE promotion efforts. Between 1986 and 1993, 25

USAID projects operated in the region with expenditures totaling $335.9 million.

Despite the importance of agriculture and the amount of resources devoted to the promotion of agricultural export diversification in LAC, there has been virtually no research undertaken to assess the degree to which the agricultural export structures in LAC countries have in fact diversified. It is to this purpose that the present article is directed. Using disaggregate data on agricultural exports over the 1961–2000 period for 19 LAC countries, entropy-based measures of diversification are computed and analyzed.

The plan of the article is as follows. The second section examines the issue of measuring export diversification and presents the entropy-based measures of diversification used in the analysis. These measures of diversification are based on Theil's entropy measure. The third section describes the data used in the analysis and presents and discusses the resulting diversification measures. Conclusions are presented in the final section.

Measuring Export Diversification

The vast majority of applications have focused on measuring corporate diversification and its effect on firm growth (e.g., Baldwin, Beckstead, and Caves; Hoopes; Hoskisson et al.; Ramanujam and Varadarajan; Palepu). Empirical analyses of export diversification are found in Stanley and Bunnagi and in Gutierrez de Pineres and Ferrantino.

Intuitively, any measure of export diversification should capture changes in both the number of products exported as well as their distribution. To this end, there are numerous potential measures that have been used in the literature. As noted by Jacquemin and Berry, most empirical measures of diversification take the general form

$$(1) \quad I = \sum_{i=1}^{n} S_i w_i$$

where I is the diversification index, S_i is the share of the ith product group, w_i is an assigned weight, and n is the number of product groups.

Various diversification indexes can be derived by choosing alternative weighting schemes. For example, if the weights are chosen such that $w_i = 1$ for $i = 1, \ldots, 4$, and 0 otherwise, the index in Equation (1) reduces to the well know "four-firm" concentration ratio (Gilligan). If the w_i is defined as the product group shares, S_i, the diversification index becomes the Herfindahl[2] index:

$$(2) \quad H = \sum_{i=1}^{n} S_i^2.$$

If the weights are chosen to be $\ln(1/S_i)$, the resulting diversification index becomes the entropy index, which owes its origin to Theil

$$(3) \quad E = \sum_{i=1}^{n} S_i \ln\left(\frac{1}{S_i}\right).$$

There are, of course, other measures of diversification that have been used in the literature that are not special cases of Equation (1). Imbs and Wacziarg use, among others, the coefficient of variation and log-variance of product-group shares. Gutierrez de Pineres and Ferrantino measure diversification use a temporal adaptation of Finger and Kreinen's export similarity index. Dalum and Villumsen recently examined export specialization (the inverse of diversification) using a measure based on Balassa's revealed competitiveness in combination with Galtonian regression.

There is no unified theory to guide in the choice of a particular empirical measure for diversification. Furthermore, as noted by Gollop and Monahan, none of the conventional measures satisfy all of the desired properties that might be ascribed to a perfect measure of diversification. As such, the choice of index ultimately rests on the properties of a given measure in relation to the objectives of a particular analysis and the available data.

The present analysis uses the entropy index of diversification. This index has been widely used in analyses of diversification that focus

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[2] Typically $1 - H$ is used in diversification studies so that the index varies directly with the degree of diversification.

on examining related and unrelated corporate diversification within a unified framework (Palepu). The data used for empirical analysis are composed of 555 agricultural products categories defined at the four-digit level. These product categories, however, may be grouped into 23 broad commodity aggregates. Thus, the analysis can not only assess the degree of total export diversification but also examine the degree to which diversification has occurred within broad product aggregates (related diversification) and across these aggregates (unrelated diversification).

To see how this is accomplished using the entropy index, let n define the total number of commodities (in the present case, $n = 555$) and K denote the number of commodity aggregates (in the current analysis $K = 23$). Further define

$$(4) \quad S_k = \sum_{i \in k} S_i$$

to be the share of total exports in aggregate group k. The measure of export diversification within this group is then given by

$$(5) \quad E_{wk} = \sum_{i \in k} \frac{S_i}{S_k} \ln\left(\frac{S_k}{S_i}\right).$$

The measure of exports diversification across the group aggregates is given by

$$(6) \quad E_A = \sum_{k=1}^{K} S_k \ln\left(\frac{1}{S_k}\right).$$

The entropy measure for total export diversification is given by

$$(7) \quad E_T = \sum_{i=1}^{n} S_i \ln\left(\frac{1}{S_i}\right).$$

Jacqueman and Berry show that a significant advantage of the entropy index is that the measure for total export diversification may be decomposed into expressions involving Equations (5) and (6). This can be shown by rewriting the entropy measure for total exports as

Table 1. Entropy Indexes of Diversification for the MDCs

Country	1961	1965	1970	1975	1980	1985	1990	1995	2000
Barbados									
Across	0.63	0.79	0.81	0.62	0.92	1.10	1.35	1.80	1.62
Within	0.31	0.26	0.33	0.40	0.48	0.72	0.48	0.59	0.43
Total	0.94	1.05	1.14	1.01	1.40	1.82	1.83	2.39	2.05
Belize									
Across	1.07	1.42	1.44	0.68	1.05	1.41	1.33	1.06	0.83
Within	0.56	0.58	0.59	0.46	0.45	0.70	0.60	0.72	1.05
Total	1.63	2.00	2.03	1.14	1.49	2.11	1.93	1.78	1.89
Guyana									
Across	0.82	0.92	0.74	0.61	0.72	0.71	0.71	0.77	0.38
Within	0.16	0.16	0.20	0.07	0.12	0.03	0.00	0.00	0.08
Total	0.98	1.08	0.94	0.68	0.84	0.75	0.71	0.78	0.46
Jamaica									
Across	1.22	1.27	1.39	1.10	1.74	1.93	1.82	1.93	1.93
Within	0.59	0.65	0.71	0.30	0.61	0.79	0.64	0.66	0.54
Total	1.81	1.92	2.10	1.41	2.35	2.72	2.46	2.59	2.47
Trinidad									
Across	1.16	1.18	1.51	1.23	1.73	1.49	1.96	1.99	2.07
Within	0.44	0.49	0.62	0.43	0.91	0.61	0.86	0.95	1.03
Total	1.59	1.67	2.13	1.66	2.64	2.10	2.82	2.94	3.10
World									
Across	2.44	2.48	2.52	2.43	2.49	2.51	2.58	2.58	2.58
Within	1.94	2.01	2.05	1.98	2.03	2.13	2.18	2.22	2.25
Total	4.37	4.49	4.57	4.41	4.53	4.63	4.76	4.80	4.83

$$(8) \quad E_T = \sum_{k=1}^{K} \sum_{i \in k} S_{ik} \ln\left(\frac{1}{S_{ik}}\right)$$

which, after some algebraic manipulation (see Jacqueman and Berry, p. 361–2), can be rewritten as

$$(9) \quad E_T = \sum_{k=1}^{K} S_k E_{wk} + E_A.$$

As is evident in Equation (9), the entropy measure of total diversification can be decomposed into two distinct components: (1) within broad product group (related) diversification, as measured by the weighted average of the within group entropy measures; and (2) the across broad aggregate group (unrelated) measure of diversification E_A.

Empirical Results

The data used in calculating the entropy index in Equation (9) were obtained from the FAO-STAT online database and are composed of observations on 555 agricultural commodities over the 1961–2000 period. Information on the commodity classification and their concordance with other commodity classification schemes is available online at http://www.fao.org/WAICENT/faoinfo/economic/faodef/FAODEFE.HTM#COMG. All data were measured in terms of nominal values expressed in U.S. dollars.

The estimated entropy indexes for total diversification, and the within and across commodity group decompositions (see Appendix Table A.1 for the commodity group definitions) for selected years are presented in Tables 1–4. As a basis of comparison, the entro-

Table 2. Entropy Indexes of Diversification for the OECS Countries

Country	1961	1965	1970	1975	1980	1985	1990	1995	2000
Dominica									
Across	0.38	0.30	0.41	0.64	0.67	0.58	0.47	0.85	1.02
Within	0.59	0.56	0.54	0.75	0.48	0.46	0.40	0.67	0.70
Total	0.97	0.86	0.95	1.40	1.15	1.04	0.87	1.51	1.72
Grenada									
Across	0.64	0.56	0.60	0.66	0.71	0.61	0.92	1.27	0.83
Within	0.56	0.53	0.67	0.53	0.58	0.67	0.64	0.71	0.35
Total	1.20	1.10	1.27	1.18	1.29	1.28	1.56	1.98	1.18
St. Kitts									
Across	0.10	0.13	0.11	0.06	0.11	0.67	0.59	0.46	0.45
Within	0.08	0.09	0.26	0.17	0.15	0.30	0.03	0.04	0.05
Total	0.18	0.22	0.37	0.23	0.26	0.97	0.63	0.50	0.51
St. Lucia									
Across	0.90	0.38	0.71	0.71	1.38	0.56	0.56	0.48	0.53
Within	0.14	0.12	0.26	0.18	0.29	0.11	0.10	0.14	0.17
Total	1.05	0.51	0.96	0.89	1.67	0.67	0.66	0.62	0.70
St. Vincent									
Across	1.22	1.17	0.90	1.24	1.34	1.11	0.77	0.91	1.01
Within	0.12	0.16	0.25	0.61	0.54	0.56	0.30	0.49	0.42
Total	1.35	1.33	1.15	1.86	1.88	1.67	1.08	1.40	1.44
World									
Across	2.44	2.48	2.52	2.43	2.49	2.51	2.58	2.58	2.58
Within	1.94	2.10	2.05	1.98	2.03	2.13	2.18	2.22	2.25
Total	4.37	4.49	4.57	4.41	4.53	4.63	4.76	4.80	4.83

py diversification index for total world exports is included in each table. To facilitate the discussion, the empirical results are presented separately for the so-called moderately developed Caribbean (MDC) countries, the Organization of Eastern Caribbean Countries (OECS), Central American countries and Mexico, and other Caribbean countries.

The results in Table 1 for the MDCs reveal considerable variation in the changes in the diversification index over the 1961–2000 period. Prior to 1980, the calculated indexes for Barbados, Jamaica, and Trinidad exhibited either declining levels of diversification or no clear trend. However, after 1980, all three exhibited noticeable increases in the implied levels of agricultural export diversification. This is especially true for Barbados, where examination of the data suggests that the observed diversification is strongly correlated with the decline of sugar exports. In contrast, observed

diversification in Jamaica appears to be related to increases in exports of coffee and cigars, whereas in Trinidad the increase in measured diversification is apparently due to a combination of a decline in sugar exports and an increase in the export of a range of processed agricultural products.

In Belize and Guyana, the diversification measures exhibit variable but generally declining values, which suggests an increase in export concentration. Over the period of analysis, agricultural exports in Belize have become increasingly concentrated in sugar, bananas, and concentrated orange juice. The volatility of the entropy index for Belize is related to the variability of sugar exports. For Guyana, the decline in diversification is related to the strong increase in the proportion of sugar in total exports over the period of analysis. Indeed, in 2000 sugar accounted for about 90% of Guyana's agricultural exports.

Table 3. Entropy Indexes of Diversification for Central American Countries and Mexico

Country	1961	1965	1970	1975	1980	1985	1990	1995	2000
Costa Rica									
Across	1.45	1.57	1.65	1.64	1.73	1.63	1.71	1.64	1.63
Within	0.31	0.36	0.40	0.51	0.48	0.30	0.51	0.65	0.89
Total	1.76	1.93	2.05	2.15	2.21	1.94	2.22	2.30	2.52
El Salvador									
Across	0.97	1.07	0.91	1.25	0.67	0.68	0.86	1.22	1.60
Within	0.22	0.19	0.20	0.22	0.14	0.06	0.14	0.35	0.66
Total	1.20	1.26	1.10	1.47	0.81	0.73	0.99	1.58	2.27
Guatemala									
Across	1.63	1.81	1.95	2.01	2.00	1.94	1.98	1.93	1.97
Within	0.33	0.34	0.57	0.38	0.48	0.53	0.57	0.61	0.80
Total	1.95	2.14	2.53	2.39	2.48	2.47	2.56	2.54	2.77
Honduras									
Across	1.25	1.47	1.44	1.70	1.62	1.47	1.34	1.32	1.60
Within	0.10	0.24	0.20	0.24	0.30	0.28	0.23	0.30	0.52
Total	1.35	1.71	1.64	1.94	1.92	1.75	1.58	1.62	2.12
Nicaragua									
Across	1.44	1.36	1.82	1.83	1.42	1.29	1.72	1.78	1.81
Within	0.29	0.24	0.48	0.51	0.20	0.29	0.27	0.55	0.65
Total	1.73	1.60	2.30	2.33	1.62	1.58	1.99	2.32	2.45
Panama									
Across	0.36	0.44	0.49	0.86	1.11	0.84	0.90	1.03	1.46
Within	0.01	0.05	0.08	0.15	0.21	0.27	0.38	0.37	0.49
Total	0.37	0.49	0.57	1.00	1.32	1.11	1.28	1.40	1.95
Mexico									
Across	1.73	1.92	2.06	2.02	1.94	1.89	1.92	2.06	2.16
Within	0.64	0.65	0.70	0.86	1.03	1.14	1.58	1.69	1.66
Total	2.37	2.57	2.76	2.88	2.97	3.03	3.50	3.75	3.81
World									
Across	2.44	2.48	2.52	2.43	2.49	2.51	2.58	2.58	2.58
Within	1.94	2.01	2.05	1.98	2.03	2.13	2.18	2.22	2.25
Total	4.37	4.49	4.57	4.41	4.53	4.63	4.76	4.80	4.83

It is interesting to note that both Jamaica and Trinidad demonstrate higher levels of export diversification than Barbados, Belize, and Guyana. It may be conjectured that this is at least partially related to the larger and more diverse nature of the Jamaican and Trinidad economies. Barbados remains heavily dependent on tourism, whereas Belize and Guyana have large agricultural sectors that dominate the countries' export structures.

The calculated entropy indexes of export diversification for the OECS countries are pre-

sented in Table 2. It is no surprise that the implied levels of export diversification for these countries are generally lower than those found in their Caribbean Community and Common Market (CARICOM) brethren (the MDCs). In general, the entropy indexes for the OECS countries reveal varied export experiences. Dominica demonstrates the strongest level of export diversification among this group. This is especially true for the post-1975 period. During this period, considerable international donor funds were expended to pro-

Table 4. Indexes of Diversification of Other Caribbean Countries

Country	1961	1965	1970	1975	1980	1985	1990	1995	2000
Suriname									
Across	1.24	1.40	1.13	0.61	0.68	0.62	0.74	0.65	0.83
Within	0.19	0.28	0.49	0.14	0.03	0.03	0.20	0.21	0.51
Total	1.43	1.68	1.63	0.75	0.72	0.65	0.94	0.86	1.34
DR									
Across	1.36	1.18	1.21	0.77	1.18	1.62	1.70	1.73	1.54
Within	0.62	0.42	0.55	0.38	0.67	0.83	0.83	0.93	0.70
Total	1.99	1.60	1.76	1.15	1.86	2.45	2.52	2.66	2.24
Haiti									
Across	1.12	1.05	0.85	1.18	0.64	0.72	1.17	0.71	1.08
Within	0.49	0.39	0.68	0.59	0.40	0.52	0.54	0.71	0.78
Total	1.61	1.44	1.53	1.77	1.04	1.24	1.71	1.42	1.85
Cuba									
Across	0.19	0.16	0.16	0.12	0.16	0.22	0.23	0.52	0.67
Within	0.86	0.91	0.90	0.87	0.87	0.76	0.78	0.72	0.68
Total	1.05	1.07	1.06	1.00	1.02	0.98	1.01	1.25	1.35
World									
Across	2.44	2.48	2.52	2.43	2.49	2.51	2.58	2.58	2.58
Within	1.94	2.01	2.05	1.98	2.03	2.13	2.18	2.22	2.25
Total	4.37	4.49	4.57	4.41	4.53	4.63	4.76	4.80	4.83

mote the diversification of agricultural exports into nontraditional commodities. The majority of these funds were administered through the Agricultural Diversification Coordinating Unit headquartered in Dominica. The empirical results for Dominica may be reflective of these efforts. Grenada also exhibited a generally increasing trend in the entropy index, suggesting an increase in the diversity of its agricultural exports. To some extent, this apparent increase is related to the decline in banana exports over the period of analysis. Although agricultural exports remain concentrated in spices (mainly nutmeg and mace) and cocoa beans, examination of the data reveals that Grenada has been successful in developing (re-)exports of wheat flour as well as exports of miscellaneous beverages and food preparations.

St. Lucia and Grenada demonstrated no clear trend in the diversification of agricultural exports. This is clearly related to the continued dominance of banana exports in both countries. In the case of St. Lucia, the banana industry is generally acknowledged as providing disincentives to the development of agricul-

tural export diversification. Indeed, the variability of the diversification index is strongly correlated with the variability of banana exports.

It is interesting to note that although St. Vincent has exhibited no clear trend in export diversification over the period of analysis, its export structure is in general the most diverse among the OECS countries, despite its reliance on banana exports. This is related to the fact that St. Vincent at times has been successful in diversifying its export into nontraditional crops such as roots and tubers as well as (re-)exports of wheat flour and rice.

Agricultural exports from St. Kitts have been dominated by sugar over the entire period of analysis. This is reflected in the low values of the entropy index. It should be noted, however, that post-1980 St. Kitts has experienced a moderate increase in agricultural export diversification, primarily through increased exports of some nontraditional agricultural products and nonalcoholic beverages.

Table 3 presents the entropy indexes of export diversification for Central American

countries and Mexico. Examination of the indexes reveals several interesting things. First, it is clear that, with a few exceptions, the level of export diversification in Central America and Mexico over the period of analysis has generally been higher than that observed in the MDC and OECS countries. A notable exception is Panama in Central America and the MDCs of Jamaica and Trinidad. Second, it can be seen that Mexico has generally had a more diverse export structure than its Central American neighbors. Furthermore, the observed gap in diversification increased after 1985. It is interesting that this occurred over the period of time when Mexico undertook significant unilateral trade reforms (the mid-1980s) and then later joined NAFTA (1993).

A third factor that is apparent in Table 3 is that, whereas Central American countries demonstrated mixed performance as regards agricultural export diversification prior to 1985, all exhibited increases in the measured level of agricultural export diversification during the post-1985 period. The latter corresponds to the period when considerable resources were devoted to the promotion of agricultural export diversification in Central America (Hardesty and Taylor). This period also corresponds to the time when most Central American countries began to experience some degree of political stability and undertook significant trade and market liberalization strategies. Although no formal statistical analysis is conducted herein, the entropy indexes in Table 3 suggest that all of these factors have played a role in achieving some degree of agricultural export diversification during the post-1985 period.

The entropy indexes for several other Caribbean countries are presented in Table 4. The entropy index for Suriname reveals a trend toward increased export concentration prior to 1985, with some degree of agricultural export diversification occurring thereafter. This behavior is strongly correlated with the economic difficulties experienced under its long-running military dictatorship and subsequent democratization. In July 1995, Suriname became a full member of CARICOM.

The Dominican Republic (DR) and Haiti share the island formerly known as Hispaniola. As can be seen in Table 4, although the DR has a more diverse agricultural export structure, both countries exhibited generally similar patterns of agricultural export diversification over the 1961–2000 period. Prior to 1980, neither country demonstrated a clear trend in export diversification. However, since then, both have exhibited a significant increase in the diversity of their agricultural exports.

In the DR, the observed increased in export diversification after 1980 is related to a decline in the importance of sugar exports and an increase in exports of nontraditional agricultural products as well as a variety of processed products. In the case of Haiti, the increases in diversification are associated with increased exports of mangoes, coffee, and essential oils.

The final Caribbean country considered in the analysis is Cuba. The political history of the country and it relationship with the United States are well known. As can be seen in Table 4, prior to 1990, Cuba demonstrated very little change in the diversity of its agricultural exports.[3] Exports over this time were dominated by sugar beets and raw sugar. Since 1990, the entropy index for Cuba indicates that some degree of export diversification has occurred. Examination of the data suggests that this is related to increased export of cigars, tobacco, and coffee. It is clear that the increase in cigar exports is related to the significant increase in global demand for Cuban cigars since the early-1990s. The extent to which Cuban reforms since 1990 have influenced the observed degree of agricultural export diversification is unknown.

Summary and Conclusions

The purpose of the present article was to investigate trends in agricultural export diversification for a number of countries in Latin America and the Caribbean over the past 40 years. In doing so, the analysis spans an interesting historical panorama of development

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[3] The quality of data on the value of Cuban agricultural exports is uncertain. Thus, remarks based on these data must be gauged accordingly.

polices undertaken in LAC. Prior to the mid-1980s, the primary development paradigm was predicated on import industrialization substitution and protected domestic markets. These policies were arguably biased against agricultural exports. Beginning in the early to mid-1980s, the development paradigm shifted in favor of export-led growth and openness to international markets. In this context, agricultural exports and export diversification moved to a central role.

The entropy index of diversification based on Theil's entropy measure was used to measure the extent to which agricultural export diversification occurred across a time period spanning these two development policy paradigms. Although a formal statistical analysis of these measures is left to another paper, qualitative analysis on the data permit several tentative conclusions regarding agricultural diversification that can form the basis of further statistical analysis.

Examination of the entropy indexes suggests, with the exception of the OECS countries Belize and Guyana, that most countries demonstrated some increase in agricultural export diversification during the post-1985 period. Thus, the empirical results are not inconsistent with the conclusion that the promotion of agricultural export diversification in LAC countries was to some degree successful. The extent to which this diversification resulted from export promotion programs funded by international donors as opposed to trade and domestic market liberalization undertaken by LAC country governments is unknown.

The performance of the OECS countries vis-à-vis other LAC countries admits to two possible conclusions. The first is that size matters. The countries that make up the OECS are very small, even in relation to other LAC countries. Thus there may exist significant resource constraints to the diversification of agricultural exports beyond that observed over the past decade or so. However, the absence of agricultural export diversification may also be related to the disincentives to diversification implicit in the significant commodity preferences for sugar and bananas received by OECS countries. Although most CARICOM

countries receive similar preferential treatment, few are as dependent on these preferences as the OECS countries.[4]

This latter argument is given some credence by the observed export diversification behavior of Belize and Guyana. Neither of these countries may be considered small in relation to other LAC countries. However, agricultural exports from these two countries demonstrated increased specialization as opposed to diversification. Both also have become increasingly concentrated in commodity exports, which receive preferential access to European Union and, to a lesser extent, North American markets.

It is also interesting to note that there is no clear evidence to suggest that the ISI paradigm pursued prior to the early 1980s negatively affected agricultural exports diversification. Although there was an absence of clear upward trends in the entropy index that characterized the post-1985 period, there were no consistent declines in the index to suggest that agricultural exports were becoming more specialized in relation to historical trends. These results are consistent with Spoor's argument that the bias against agricultural exports associated with ISI policies was neutralized by various indirect support measures provided to agriculture.

A final interesting result relates to the composition of the entropy index in terms of the importance of within-group (related) to across-group (unrelated) export diversification. The empirical results show that, in the vast majority of cases, the contribution of the across-group component (E_a) to the total entropy diversification index exceeded 65%. Thus, the majority of observed export diversification occurred across commodity groups.

The meaning of this must, of course, be tempered by the manner in which commodity groups are defined. However, examination of the Food and Agriculture Organization (FAO) commodity groupings as well as the data suggest that the predominance of the across group diversification measure captures the fact that

[4] An exception is Grenada, which does not export banana or sugar.

much export diversification in the LAC countries occurred across primary commodities as opposed to further processing or adding value to existing exports. If additional processing had occurred on existing exports, the particular commodity grouping used by FAO would have resulted in much larger contributions to total diversification by the within group component. It may be noted that Mexico, which has increased its exports of processed agricultural products significantly, has the second lowest across groups composition measure at 57%.

In closing, the present article perhaps raises as many questions as it answers. The estimated entropy indexes suggest that, since the mid-1980s, when emphasis was placed on agricultural export diversification, some degree of diversification has indeed occurred in LAC countries. It is also true that many of the smaller Caribbean countries, while becoming marginally more diverse in their agriculture export structures, remain rather specialized. Determining the causes of the observed level of agricultural exports diversification and their affects on economic growth in LAC are the logical next steps in answering many of the questions raised.

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Table A.1. Commodity Group Aggregates

Cereals & derived products
Roots & tubers
Sugar, sweetners & derived products
Pulses & derived products
Nuts & derived products
Oil-bearing crops & derived products
Vegetables & derived products
Fruits & derived products
Water, ice & beverages
Beverage crops & spices
Vegetable fibres
Feedstuffs
Cattle & products
Buffaloes & products
Sheep & products
Goats & products
Pigs & products
Poultry & products
Horses etc. & products
Camels & products
Rabbits & products
Other animals & products
Other animal products