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Editor

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Rethinking the role of the agriculture sector in the economic development of Barbados

"Some emerging challenges"

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Abstract

The role of the agriculture sector in the economic development of Barbados has been substantially reduced as the country has continued on a path of economic diversification. Policy initiatives aimed towards this notable structural change in the economy, however, have subsequently resulted in a significant decline in output from the agriculture industry. However, recent global and national challenges have brought the need to rethink the relevance of the agriculture to the fore. This paper reviews some of the prevailing literature pertaining to the role of the agriculture on economic growth and development. In doing so, the potential scope of the industry for the overall economic growth and development of Barbados should be revealed. The paper also highlights two key agricultural issues that could potentially threaten economic development in Barbados. These are: the rising level of imports and rising food prices. Strategies that may be deemed beneficial to the local agricultural industry, if it is to remain a viable tool for national economic growth and development, will also be presented.

Key words: Barbados, agriculture, economic development, challenges, rising prices, high imports, and agriculture policies.

INTRODUCTION

Over the past five decades, successive Government administrations of Barbados have sought to achieve economic growth and development for the country. Macroeconomic policy actions have therefore been geared mainly towards the achievement of structural change in the local economy, resulting in a shift away from agricultural production, to a high reliance on tourism and financial services (see Howard, 2006).

As a strong advocate for the maintenance of a vibrant local agricultural industry, the Ministry of Agriculture of Barbados has made a firm commitment to ensuring that the country not only becomes food secure,

but also attains sovereignty over its food needs. This has required the development and implementation of policies geared towards increasing national agricultural production, as well as policies that address issues of quality and consistency of the national food supply. In essence, the Ministry's policies will have to mitigate the negative impact that structural change has had on the agriculture industry. Further, the Ministry of Agriculture will also have to convince policy makers in Barbados to rethink the role and relevance of the local agricultural industry, particularly if the country is to continue on a sustainable path of economic growth and development.

The objective of this paper is to present some of the prevailing literature relating to

the role of the agriculture industry on economic growth and development. In doing so, the potential scope of the agriculture sector for the overall economic growth and development of Barbados should be revealed. The paper will also assess, although not in great detail, the process of structural change in Barbados and its impact on agricultural output over the past fifty years. Also highlighted are two current macroeconomic issues that, if left unchecked, could have a serious impact on the country's overall developmental objectives.

The remainder of the paper is therefore organised as follows: Section 2 provides a review of the literature on agriculture and its role in economic development; Section 3 presents a brief review of the performance of the agriculture industry over the past 50 years and its policy framework; Section 4 highlights the two agricultural issues with macroeconomic consequences for Barbados; Section 5 presents some recommendations based on an examination of the country's agricultural policy framework; and Section 6 concludes.

LITERATURE REVIEW ON AGRICULTURE AND ITS ROLE IN ECONOMIC DEVELOPMENT

Structural change can be referred to as the long-term change in the fundamental structure of an economy throughout its developmental experience. Classical economists such as Fisher (1939), Clark (1940), and Chenery and Syrquin (1975), highlighted the positive relationship between structural change and economic growth. For these economists, structural change referred to production shifting from the primary (agriculture, fishing, forestry, and mining) to the secondary (manufacturing and construction) and finally the tertiary industry (services).

Kuznets (1961, 1971) in his empirical analysis of the theory of economic growth, disaggregated the economy into the classifications of agriculture, industry and services. He found an association between growth of per capita income and a shift in production structure (structural change). According to him, the relationship was established due to the combined effect of changes in the (i) structure of consumer demand, (ii) comparative advantage and (iii) technology (Nayak and Mishra, 2009).

Developmental economics was also highly influenced by Lewis (1954). Lewis (1954) sought to explain the dynamics of how structural transformation from an agricultural-based economy to a more industrial system would result in economic growth and development. Essentially, Lewis (1954) argued that the economy was dualistic, that is, divided into the traditional and capitalist sectors. His theory highlighted the fact that the traditional sector exhibited low productivity, low technology, and those who resided in rural areas produced most of what they consumed. However, the capitalist sector was profit-oriented, more capital intensive, exhibited high productivity, was technologically driven and paid higher wages than the traditional sector.

According to Eicher and Staats (1998), the relative neglect of the agricultural industry during the 1950s was further exacerbated by the two independent theses of Raul Prebisch and Hans Singer in 1949, and Hirschman in 1958. Prebisch and Singer both argued that over time, the terms of trade would be against those countries that exported primary products and imported manufactured ones. Hirschman (1958) on the other hand introduced the concept of linkages as a tool for investing. He suggested that investing in one type of activity induces investment in other income-generating activities. According to Hirschman (1958), investment

in industry would generally lead to a more rapid and broad-based economic growth than investment in agriculture would.

These aforementioned classical theories that placed agriculture in a secondary role essentially overshadowed the works of other economists who attempted to illustrate the industry in a positive light. Kuznets (1961) was one of these economists that acknowledged the positive contributions of the agricultural industry to economic growth, in such areas as product, market and factor development in the economy.

Johnston and Mellor (1961) also supported Kuznets (1961) by arguing that agriculture could play a far from passive role by making five important contributions in the growth and development of developing economies. These contributions include: increasing national food supplies; providing labour for other industries; capital formation; the earning of foreign exchange; and the stimulation of industrialisation through increased rural net cash income.

Johnson (1997) suggested that throughout the course of history not only did farmers contribute to the economic wealth of nations, but also those persons who engaged in other aspects of agriculture such as: the invention and production of farm machinery; the discovery of the nutritional requirements of plants; and those who increasingly integrated farming into the rest of the economy. Johnson (1997) also indicated that the Industrial Revolution was made possible by two significant agricultural improvements: rapid increases in labour productivity and simultaneous increases in food production to provide for growing populations. With regards to the former argument, Johnson (1997) concurred with Ester Boserup (1965) that throughout most of recorded history, labour was the scarcest factor of production in agriculture and therefore agricultural progress resulted from developing ways to

save labour.

According to Johnson (1997), increases in labour productivity and output subsequently contributed to low food prices. This argument is particularly important since according to the FAO (2006), the number of undernourished persons in the developing world actually increased from 823 million in 1990 to 830 million in 2004. Ahmed et al (2007) also suggested that those persons in the world living below US \$1 per day were estimated at about 160 million, some of whom live on less than US \$0.50 cents per day. The agriculture industry is therefore thought to be able to improve the livelihoods of people at the bottom of the income scale.

Timmer (1998) contended that the importance of the agriculture industry in the economies of the developing countries is reflected in the association between the growth of agriculture and of the economy as a whole. By examining countries where the agricultural share of GDP was greater than 20 percent in 1970, Timmer (1998) highlighted that agricultural growth in the 1970s exceeded 3 percent a year in 17 of the 23 countries whose GDP growth was above 5 percent a year. He also pointed out that during the same period, 11 of the 17 countries with GDP growth below 3 percent a year managed agricultural growth of only 1 percent or less.

Timmer (1998) also suggested that the parallels between agricultural and GDP growth, implied that the factors that affected agricultural performance may therefore be linked to economy-wide social and economic policies. The author suggested that the expansion of agricultural production through technological change and trade creates important demands for the outputs of other industries, notably fertilizers, transportation, commercial services and construction.

More recently, Pingali and Stringer (2004) argued that improving agricultural

performance generates income in both rural and urban areas. As incomes increase, households save more and spend more, stimulating growth and investment in other industries (Pingali and Stringer, 2004). Additionally, agriculture provides tax revenues and supplies a wide range of raw materials to agriculturally-based local manufacturers.

From the above literature, it can be seen that the traditional economists such as Lewis (1954) had an impression of economic growth being synonymous with economic development (see Girvan, 2005). In fact, the arguments that rendered the role of agriculture as being secondary in the development process, do not consider such elements of economic development as quality of life, or the nutrition of the population. These issues are considered within the more contemporary literature.

AGRICULTURE INDUSTRY IN BARBADOS

Agriculture Industry Performance and the Barbados Economy

Downes (2001) highlighted that Barbados' medium-term plans for the periods 1952-1957 and 1955-1960, incorporated the initial signs of the Government of the country's intent on creating a more diversified economy, through the promotion of the manufacturing and tourism industries and a lesser reliance on the sugar industry. Downes (2001) also indicated that these national strategies were consistent with the approaches articulated by Lewis (1954) that mapped out the necessary strategic direction for regional economic development.

Using national accounts data, Howard (2006) investigated the changes in the compositional structure of the Barbados economy throughout the years of 1955 to 2000. Patterns of structural change were

identified by categorising the country's economic industries into primary (agriculture and mining), secondary (manufacturing) and tertiary (services) industries, and analysing their respective contributions to nominal Gross Domestic Product (GDP) over the review period. From his examination of the movement of the broadly defined industries, Howard (2006) concluded that over the past five decades the Barbados economy observed a persistent shift away from primary production and has become more services-oriented.

While Howard's (2006) analysis may be criticised for his use of nominal GDP and proportional statistics to observe the transition of the Barbados economy over the past five decades, the dearth of real GDP statistics for Barbados from as far back as the 1950s necessitates this approach. Howard's (2006) examination also allows us the opportunity to take a wider glance at the economic structure of the Barbados economy.

Table 1 presents an adaptation of the industrial distribution of GDP for Barbados from Howard's (2006) analysis, with the inclusion of 2007 data that was garnered from the Barbados Economic and Social Report 2007. An examination of the data shows that over the past fifty years, the contribution of the agriculture industry to GDP has continued on a downward trajectory. During 2007, the agriculture industry was estimated to have contributed approximately 2.9 percent of the country's nominal GDP. This represents a significant decline from the 35.2 percent the industry had contributed to GDP during 1955. On the other hand, the contribution of the services industry to GDP over the comparative period had doubled from 45 percent in 1955 to 90.2 percent in 2007.

In addition, over the review period, the manufacturing or secondary industry also displayed a steady decline from the 19.8

percent which it contributed to GDP during 1955, to a contribution of 6.2 percent during 2007. This decline in the performance of the manufacturing industry may support Timmer's (1998) argument that the manufacturing industry is usually dependent on improvements in the agriculture industry. Therefore, countries that have a stagnant agriculture industry often show no industrial development.

Craigwell et al (2008) also investigated the inter-relationships among the agriculture, industry and services industries in Barbados over two distinct time periods over the past five decades (1946-1969 and 1970 to 2003). The aim of the study was to shed some light on whether changes in the output in one industry impacted on the others. The authors suggested that the results of the analysis could be used by policy makers to better understand the sectors that principally drive economic growth in Barbados. Using time series cointegration, it was discovered that industrial linkages with agriculture had faded over time. Where in the first period (1946-1969) the output of the agriculture industry was determined by the output of the industry and service sectors, during the second period (1970-2003) agriculture was not found to be part of the cointegrating system. The results from the latter period suggested that in the past three decades agriculture had little or no linkages with the industrial and services sectors. The findings of Craigwell et al (2008) therefore suggest that the industrial linkages that facilitated growth in the agriculture industry must be re-established and the constraints that hindered its growth must be addressed in order to see it flourish.

Irrespective of its total decline in output over the past five decades, it must be noted that the agriculture industry still remains a valuable source of economic output, employment and foreign exchange for Barbados. During 1998 to 2008, the

country's receipts from the exports of primary and secondary agriculture products averaged BDS \$152.9 million per year. For the corresponding ten-year period, on average 5,100 persons were directly employed by the agriculture industry each year. Additionally, the poultry and pig industries have both been exhibiting steady growth over the past five years, with the former industry boasting near self-sufficiency.

Impact of Policies on Non-Sugar Agriculture Output

Barbados' agriculture policy framework has evolved over the past forty years. The transitional shift away from the dominance of the sugar industry to a more diversified industry was the driving force behind the conceptualisation and implementation of agricultural policies during the 1960s. This led to the development of the Agricultural Incentive Scheme in 1964, a package of rebates and concessions that was created to provide some impetus for the growth of the non-sugar agricultural industry. The fiscal incentives which comprised this package during its earlier stages were generally geared towards: 1) pasture development and the construction of sub-division fencing; and 2) livestock development through the provision of stud and artificial insemination services at a greatly reduced fee. However, these incentives were not sufficient to stem the general movement of the economy away from agriculture.

In 2000, emphasis on the implementation of Barbados' commitments to the World Trade Organisation by the Government of Barbados, as well as the increased attention that was paid at the national level to sustainable development, prompted a renewed thrust towards the development of policies for the local agriculture industry. In this regard, the scope of the Agricultural

Incentives Scheme was broadened to address the diverse range of agricultural issues that were felt to be impeding the sustainable growth and development of the industry. The objectives of the Agricultural Incentives Scheme are now as follows:

- To encourage the involvement of farmers in new technology and processes that are likely to enhance farm efficiency and productivity;
- To encourage the engagement of farmers in enterprises that are unfamiliar and in which they are hesitant to become involved;
- To encourage agricultural practices that are environmentally sound and aesthetically pleasing;
- To encourage practices that enhance animal welfare;
- To show farmers that the Government of Barbados is interested in their welfare; and
- To provide a basis for cooperation among local farmers.

Throughout the period 2001 to 2008, the Ministry of Agriculture disbursed an estimated BBD \$7.3 million in fiscal support to registered commercial farmers under the Agricultural Incentives Scheme. Of the total amount, the payment of rebates to farmers amounted to BBD \$6.4 million (87.2%), while grants and concessions were recorded at BBD \$0.9 million (12.8%).

Using Pearson's Correlation to examine the relationship between the disbursement of rebates to farmers and total non-sugar agricultural output over the past 19 years, a coefficient of 0.25 was obtained with a p-value of 0.3. This result allows us to conclude that although for the period under review there is a low positive relationship between the disbursement of rebates to farmers and non-sugar agricultural output, the hypothesis that a definitive relationship exists between the two variables cannot be

accepted.

An investigation of the graphical plot of the percentage changes of non-sugar agricultural output, and the percentage changes in total incentive payments also reveals that for the 19-year period under review, the two variables generally tend to move in the same direction (see Figure 1). It must be noted however, that since 2001 rebate payments and non-sugar agricultural output seem to move inversely. This occurrence could be attributed to the change in the scope of the incentives as indicated in the previous section, which may have had a lagged effect on non-sugar agricultural output.

AGRICULTURAL ISSUES WITH IMPLICATIONS ON ECONOMIC DEVELOPMENT IN BARBADOS

High Food Prices

According to the Overseas Development Institute (April 2008), world food prices have been increasing since the early 2000s and particularly since 2006. Several publications (Timmer, 2008; Capehart and Richardson, 2008; and Overseas Development Institute, June 2008) have attributed this development to five (5) basic cumulative causes which include:

1. The rising living standards in China, India and other rapidly growing developing countries;
2. The rapid depreciation of the dollar against the euro and other important currencies;
3. Mandates for ethanol made from corn in the US, that have caused a ripple-effect beyond the corn industry as less land is being planted in vegetables and root crops;
4. Massive speculation from financial players seeking higher returns on

- the commodity markets; and
5. High prices of petroleum and oil.

According to Timmer (2008), the extent to which changes in world prices are transmitted to domestic prices are important for two reasons: first, domestic prices affect the welfare of poor consumers and farmers; and second, the magnitude of price transmission will influence the extent to which adjustments by producers and consumers help stabilize world price movements.

As a net food importing country, world price movements have a direct impact on domestic food prices in Barbados. During the global food crisis of 2008, there was some outcry from the Barbados public over the soaring prices of food on the domestic market. Based on the retail price index of the country, at the end of 2008 the prices of food items increased by 13.5 percent over the prices of food recorded in 2007. For the comparative period however, domestic prices for all items increased by 8.1 percent, while total non-food items registered a price increase of 2.7 percent. From these statistics it can be inferred that during 2008, the increase in local food prices was the main cause of inflation in Barbados.

The retail price index data also indicated that throughout the period 2000 to 2008, food prices increased at an annual average rate of 6.2 percent as opposed to the average annual rate of 4.5 percent during the period 1980 to 1999. The annual growth rate in food prices during 2000 to 2008 suggests that food prices in Barbados increased at a faster rate than what was experienced prior to that period.

It must be noted that at the microeconomic level, expenditure on food is generally high. Therefore, rising food prices reduces consumer spending power or reduces disposable income. This case is especially detrimental the most vulnerable

persons within the economy are considered, that is, those persons who are working in the lower-income bracket and already have limited disposable income, single income households and persons with special dietary needs.

The Ministry of Agriculture sees the local agriculture industry as playing an integral role in reducing local food prices. According to economic principles, it is anticipated that increased prices should signal domestic producers to increase production that will subsequently lead to declines in food prices in the longer-term. In this regard, the Ministry has continued to encourage increased agricultural output through its existing fiscal incentives.

High Levels of Food Imports

In order to approximate the food import bill for Barbados, the Ministry of Agriculture defines food as those products found within chapters two (meat and edible offal) to twenty-two (beverages, spirits and vinegar) of the Harmonised Commodity Description and Coding System (HS)¹ of tariff nomenclature, with the exclusion of chapters 5 (products of animal origin), 6 (live trees and other plants), 13 (Lac, gums and resins and vegetable saps and extracts) and 14 (vegetable plaiting materials). Using this methodology, the Ministry estimated that the country's retained imports of food for 2008 amounted to BBD \$680.9 million (see Figure 3). The 2008 import figure represented an increase by 101.9 percent over the retained imports of BBD \$337.3 million that was recorded for 1997.

The trade data also indicated that in 2008, Barbados ran a food trade deficit of BBD

¹ The Harmonised Commodity Description and Coding System (HS) of tariff nomenclature is an internationally standardized system of names and numbers for classifying traded products developed and maintained by the World Customs Organization.

\$467.1 million as compared with the deficit of BBD \$153.3 recorded in 1997. These statistics suggest that during the period 1997 to 2008, Barbados' trade deficit for food increased by an estimated 204.8 percent.

High net trade deficits could have a severe implication on the foreign reserves of Barbados and also leave the country vulnerable to supply shocks from the international market. With regards to former, Barbados must hold adequate levels of foreign reserves to maintain its fixed currency exchange rate with the US dollar. According to Craigwell et al (2006), if a country experiences persistent deficits on the external current account, then it is most likely that the foreign reserves are being used to support the parity of the exchange rate.

Craigwell et al (2006) estimated Barbados' demand for foreign reserves using a dynamic ordinary least squares (DOLS) model for a sample of annual observations that spanned the period 1975 to 2005. It was revealed that in the short and long-run, the demand for international reserves was positively related to real national income, the propensity to import and a capital account liberalisation measure. Additionally, it was discovered that the impact of the average propensity to import was the strongest, suggesting that a 1 percent change in this variable increases the demand for foreign reserves by 0.8 percent.

The finding of a strong relationship between Barbados' demand for international reserves and the propensity to import is especially important to this author. Food imports accounted for approximately 17.2 percent of the country's annual total retained imports over the past decade and 20 percent in 2008. Therefore, it is expected that an increased demand for imported food would also be positively related to the country's demand for foreign reserves.

Using Pearson's Correlation to examine the relationship between food imports and international reserves, a coefficient of 0.64 with a p-value of 0.034 was found. This suggests a very positive, significant relationship between food imports and international reserves in Barbados. In light of the correlation results coupled with the findings of Craigwell et al (2006), it can easily be seen how the issue of a rising food import bill has the potential to become a significant problem for the economy of Barbados.

POLICY OR STRATEGIC RECOMMENDATIONS

An assessment of the agricultural policies that the Government of Barbados has implemented thus far, suggests that these policies are comprehensive in their extent. However, this section presents some additional policy options that should be considered if the agriculture industry is to realise sustainable growth and development. These include:

1. Youth Participation in Agriculture –

In its attempt to increase youth participation in agriculture over the years, the Ministry of Agriculture has taken the narrow approach of developing programmes that are limited to training individuals in the use of newer technologies such as greenhouses and hydroponics. This author suggests that attempts should also be made to engage young persons who are conducting scientific research at the University of the West Indies and the Barbados Community College to develop new technologies. Additionally, there is scope for the development of higher yielding cultivars of food crops by local scientists that could advance the food security objectives of the island.

These initiatives could be attained if the Ministry develops partnerships with the local University and College, where a reward system could be implemented in an effort to motivate young local scientists to focus on the development of the agriculture industry.

2. **Promotion of Food Security at the Household level**

– In order for food security to be fully realised households must have adequate access to nutritious food. To date, the Ministry of Agriculture has been developing policies directed at boosting agricultural production within the agricultural community only. The Ministry of Agriculture needs to develop policies directly aimed at the urban communities as well. It is therefore suggested that the Ministry should develop programmes to educate the urban communities about household food security, food nutrition and even possibly the importance of back-yard farming. Regarding the latter point, research could be undertaken by the Ministry to show the positive impact of back-yard farming on household budgets and nutrition, and the outputs of these studies disseminated to the public and especially the urban communities.

3. **Greater Collaboration between the Ministries of Agriculture, Industry and Services**

– As stated earlier, Craigwell et al (2008) recommended that agriculture needed to form greater linkages with the other economic industries in order to promote its own growth as well as national output. In this regard, this author suggests that a national committee could be established consisting of stakeholders of the various economic industries, to assess possible backward and forward linkages with the

agriculture industry. The committee would then be responsible for the development of a strategic plan that highlights these formal linkages to be considered by the various Ministries of Agriculture, Industry and those that are services-oriented. The committee may also be responsible for the development of policy papers highlighting areas for farmer-manufacturer alliances, new product development and farmer-hotel partnerships, to mention a few examples.

CONCLUSION

Over the past five decades, successive Government administrations of Barbados have developed and implemented policies to induce structural change in the country's economy. These policy actions resulted in the role of the local agriculture industry in the economic growth and development of the country being diminished over the 50-year period.

This author contends that agriculture could play an integral role in the current economic and developmental objectives of Barbados. Kuznets (1961) acknowledged the positive contributions of the agriculture industry to economic growth over the years in such areas as product, market and factor development in the economy. Additionally, it has been argued that agriculture could make important contributions in the growth and development of developing economies by: providing labour for other industries; capital formation; earning of foreign exchange; stimulating industrialisation; providing tax revenues; and improving the livelihoods of the impoverished.

The aforementioned positive roles of agriculture are especially significant as Barbados is currently challenged with two issues that could have serious macroeconomic implications for the country. These issues are rising global and

domestic food prices, and increasing levels of food imports. While rising food prices may have an adverse effect on the most vulnerable persons in Barbados' society, increased food imports leaves the country exposed to international shocks and places a burden on the country's international foreign reserves. Johnson (2007) indicated that increased agricultural productivity can result in lower food prices, while Johnston and Mellor (1961) suggested that increased production can reduce the dependency on foreign imports by increasing national food supplies.

It is noted however that although the policies that have been developed to increase production thus far by the Ministry of Agriculture are comprehensive in their extent, additional policy actions could be considered in order to enhance the relevance of the agriculture industry in Barbados. These policy actions include: the broadening of the approach to youth participation in agriculture in the country in order to exploit the tacit knowledge of the local scientific community; the establishment of formal linkages between agriculture and other economic industries in Barbados to address the issue of rising imports; and the promotion of food security within urban communities through research and educational programmes.

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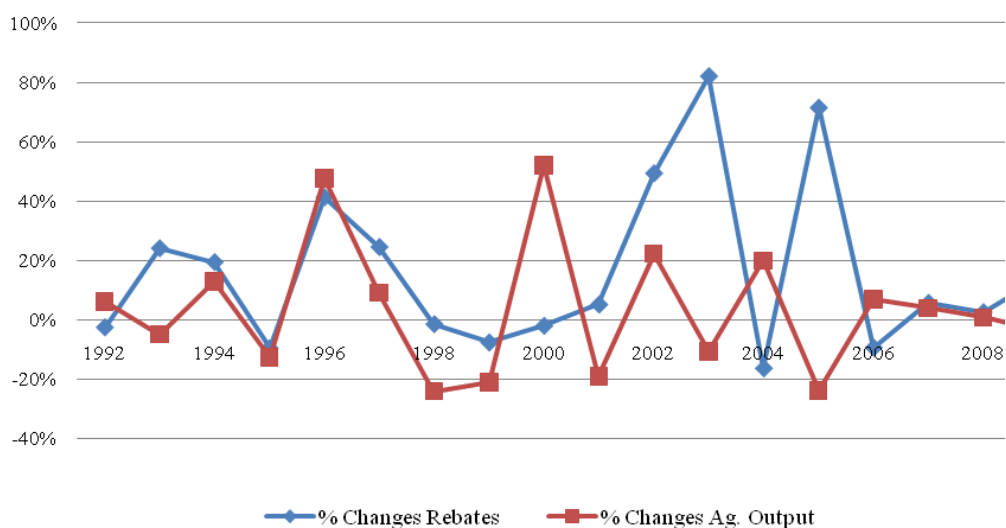
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Table 1: Industrial Distribution of Nominal GDP (Selected Years; Percent)

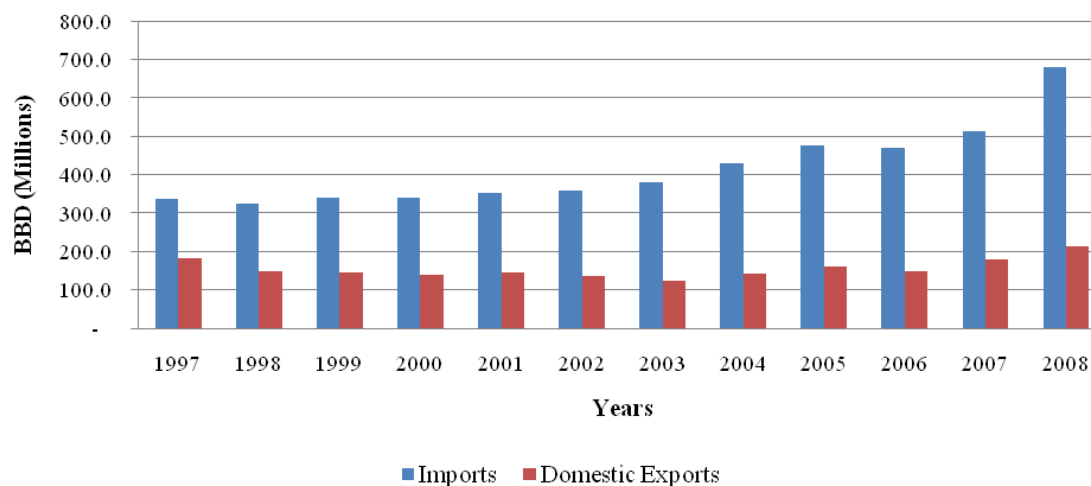
Industry	1955	1960	1970	1980	1986	1990	2000	2007
Sugar	23.4	21.3	9.9	6.4	2.8	2.0	1.5	0.6
Other Agriculture	11.8	6.8	4.8	3.4	3.6	3.4	3.0	2.3
Mining	-	-	-	0.8	1.3	0.7	0.7	0.8
Total Primary	35.2	28.1	14.7	10.6	7.7	6.1	5.2	3.7
Manufacturing/Secondary	19.8	8.3	10.1	10.9	9.8	8.0	6.3	6.2
Transport & Public Services	6.2	5.7	7.6	7.5	12.3	11.3	13.6	17.2
Construction	7.3	9.8	10.1	7.2	5.6	6.5	5.8	6.3
Distribution	10.6	23.0	26.0	21.8	20.9	20.0	17.6	16.3
Tourism	-	-	-	12.0	10.0	11.4	11.3	13.7
Other Services	12.2	15.3	15.9	15.1	17.4	18.2	22.7	19.4
Government Services	8.7	9.8	15.6	14.9	16.3	18.5	17.5	17.2
Total Services/Tertiary	45.0	63.6	75.2	78.5	82.5	85.9	88.5	90.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Howard (2006) and the Barbados Economic and Social Report 2007



Source: Data from the Ministry of Agriculture and the Economic and Social Report 2007

Figure 1: Co-movements of Changes in Agricultural Output and Changes in Rebate Payments



Source: Data from the Barbados Statistical Service

Figure 2: Barbados' Imports and Exports of Food (1997 – 2008)