AN EVALUATION OF THE COMPETITIVENESS OF SELECTED MANUFACTURING PRODUCTS IN BARBADOS DURING THE PAST DECADE

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Abstract

In an environment of ongoing liberalisation of trade, the key to the survival of manufacturing in Barbados is to vigorously adopt modes of production that are international competitive. Using a policy analysis matrix (PAM), *`a la* Monke and Pearson (1989), this paper attempts to shed some light on the burning issue of competitiveness of manufacturing in Barbados over the period 1995-2004. Three indicators (domestic resource cost, the nominal protection coefficient, and the effective protection coefficient), which are derived from the PAM, are used as the basis for the assessment of the competitiveness of forty-three products traded both regionally and extra-regionally. In addition, two profitability measures (private and social profits) per unit of output traded are estimated.

Introduction

There can be no dispute of the significant contribution of manufacturing to economic diversification, domestic output growth and the development of Barbadian society. During the 1970s and 1980s, the sector emerged as the second largest employer after the Government, providing jobs for about 25,000 persons on average, and generated significant foreign exchange earnings. This period was considered the heyday of manufacturing, with the production of food, beverages and tobacco, electronic components and wearing apparel recording the highest rates of growth. The implementation of trade liberalisation measures during the 1990s, however, seriously exposed the previously protected sector to intense competitive pressures for domestic market share, resulting in falling output, employment and sluggish merchandise exports. With production costs comparatively higher in Barbados, manufacturing firms have had to grapple with increasing imports of goods, primarily from Trinidad and Tobago. Most noticeably, some companies in the food processing and non-alcoholic beverage sub-industries have either shifted certain aspects of their operations or have relocated entirely to remain viable. Indeed, an environment of ongoing liberalisation of trade within CARICOM and the world underscores the steadfast commitment to achieving and preserving international competitiveness both at home and abroad for the survival of manufacturing in Barbados.

Using the concept of a Policy Analysis Matrix (PAM), which was originally designed by Monke and Pearson in the late 1980s, this paper attempts to shed some light on the critical issue of competitiveness of manufacturing in Barbados over the past decade. From the PAM, three competitiveness indicators: domestic resource cost, the nominal protective coefficient, and the effective protective coefficient are derived for forty-three manufacturing products. The sample period (1995-2004) was divided into two sub-samples: 1995-99 and 2000-04 to ascertain whether production improved or deteriorated after the intensification of competition. The domestic resource cost (DRC) provides an indication of comparative advantage in production. In effect, a DRC of less than one suggests that production costs of less than one dollar (in domestic currency) earn at least one dollar of foreign currency; a value greater than one indicates the opposite and the manufacturing activity should be reduced. When the DRC is less than zero, production should not occur, since the costs of tradable inputs are greater than total revenue. The nominal protection coefficient (NPC) and the effective protection coefficient (EPC) essentially measure the impact of government policy on output and value-added, respectively. A NPC of greater than one means that the domestic price is higher than the efficiency price (border price), and that government policy favours producers over consumers. When the NPC is less than one, government policy is more beneficial to consumers, since domestic prices are lower. Manufacturers are benefiting from policy intervention when the EPC is greater than one and not if the EPC is less than one. In addition, profitability measures (both private and social profits) per unit of output traded are estimated.

The next section outlines the methodology of the PAM and the three competitiveness indicators. This is followed by the discussion of the results in section three. Section four concludes and highlights critical policy implications of the empirical findings.

2. Methodology

In an imperfect competitive market, the market price for a particular good often diverges from its economic price or the price that optimises output. The PAM, which uses a partial equilibrium approach, provides a convenient way of estimating this divergence, thus allowing for an understanding of the level of distortion in the product market and the extent to which resources are being misallocated. The calculations of the PAM are done using the simple accounting identity: profit = revenue – costs, where the costs of both tradable and non-tradable inputs, also known as domestic resources or factors, are used. These costs are calculated using both market prices and efficiency prices, with the difference being transfers.

Constructing the PAM

As mentioned earlier, the PAM measures the extent of divergence between actual market prices and efficiency prices. Since it is not possible to directly observe efficiency prices in the market, suitable proxies must be calculated, usually from the border prices of actual and potential imports and exports. The concept of allocative efficiency is important in this regard for an understanding of how border prices can be used to estimate efficiency prices.

To achieve allocative efficiency, the opportunity costs of resources used in production must be equated at the margin to the goods scarcity value to consumers. The critical issue here is that efficiency prices reflect opportunity costs and scarcity values. In an open economy facing given prices in international markets, border prices of actual and potential imports and exports are important reflections of the opportunity costs of production and scarcity values in consumption. For example, if the export free-on-board (FOB) price is the highest price a producer could receive for an extra, or marginal, unit of output, then this price measures the opportunity cost of resources that could be used to produce another good. Similarly, if the import cost-insurance-freight (CIF) price is the lowest consumer price for another unit of a good, then this price measures the scarcity value of the good to the economy.

The use of border prices as a proxy of efficiency prices means that efficiency and social profitability are being judged according to the principle of international comparative advantage. An important caveat is needed here. Although the efficiency prices used in the PAM are based on this principle, this does not mean that its conclusions dictate a particular free trade policy aimed at maximising foreign exchange earnings. The PAM cannot inform whether a country should import or export a certain good, or that all domestic prices should be determined exclusively by the import and export border parity pricing principle. It does, however, help to quantify and examine the costs of deviating from such principles in order to achieve other non-efficiency goals.

Important Components of the PAM

The PAM takes all the commodities, services, and factors, which are inputs, and classifies them as tradable inputs, domestic factors, non-tradable inputs and transfers. Table 1 below presents the basic structure of the PAM used for the purposes of this paper.

Table 1: Structure of the Policy Analysis Matrix

		Costs		
	Revenues	**Tradable Inputs**	**Domestic Factors**	**Profits**
Valuation in Private Prices	A	B	C	D
Valuation in Social Prices	E	F	G	H
Transfers (Divergences)	I	J	K	L
Policy Transfers	I_P	J_P	K_P	L_P
Market Transfers	I_M	J_M	K_M	L_M
Domestic Resource Cost		G/(A-B)		
Nominal Protection Coefficient		B/F - Inputs		
Effective Protection Coefficient		A/E - Outputs		
		(A-B)/(E-F)		
Private Profits		D = A-B-C		
Social Profits		H = E-F-G		

Source: Adapted from Monke and Pearson (1989)

Tradable Inputs

Inputs that are or can be traded, and for which there are world market prices. The border CIF or FOB prices are used to derive efficiency prices.

Domestic Factors

These are primary factors of production, such as land, labour and capital for which no world price exists. The efficiency prices of such factors are determined by their domestic opportunity costs.

Non-tradable Intermediate Inputs

The inputs that fall under this category include domestic transport, electricity and other utilities, insurance services which can contain both traded and domestic factors in their own costs of production but which are not themselves tradable goods.

Transfers

These include taxes and subsidies and are reflected in market prices; since transfers are not a cost of production, which has an opportunity cost, they are not included in social prices.

Domestic Resource Cost (DRC)

The DRC is the value of domestic inputs at economic prices to the value-added at economic prices. Therefore, the interpretation of DRC is indicated by the cost required to earn a unit of foreign exchange. The DRC is a summary measure of efficiency of domestic production or comparative advantage.

Nominal Protection Coefficient (NPC)

The Nominal Protection Coefficient measures the effects of policy intervention on output. The NPC of a product is the ratio of its domestic price to its import border price.

Effective Protection Coefficient (EPC)

The EPC is a measure of the impact of policy on value-added. Value-added in this case is determined as the value of tradable inputs (i.e. raw materials, energy inputs, supplies) used to produce a unit of output.

Private Profits

Private profits are the result of taking total revenue at market or private prices and deducting the costs of tradable inputs cost and domestic resource at private prices.

Economic Profits

Economic profit is total revenue at economic prices less tradable inputs and domestic resource costs at their opportunity costs.

Methodological Issues

Representative Budgets
The establishment of an inventory budget for the product system is fundamental to the construction of the PAM. This consists of an inventory of the physical inputs and outputs at each stage of the production system along with private and efficiency prices of each input and output. In markets with a large number of producers, a particular type of product can be manufactured at different plants, each of which uses different types and ages of equipment. However, in a small market such as Barbados, there are not a large number of manufacturers producing the same type of product.

Social Prices for Tradables
Social prices for tradables are based on border prices for importables. These prices must be converted to domestic currency and adjusted for all the costs of moving the import to the consumption center. The exchange rate must be also adjusted for over or under valuation to remove any distortion that may seriously bias the results.

When applying this concept to the Barbadian context, the CIF value is converted to US currency at the official exchange rate and then to Barbadian currency using the real exchange rate. Using this approach removes any distortions resulting from changes in interest rates, fiscal, and monetary policies. The real effective exchange rate is used to adjust the official exchange rate for exogenous distortions impacting on the exchange rate.

Social Prices for Domestic Resources
On the other hand, social prices for domestic resources are based on the principles of shadow pricing. In order to determine whether or not actual market prices for domestic resources differ form efficiency prices, such that shadow prices must be calculated, policy officials must ask questions to identify the distortions. These questions may include, but not limited to, the following:

1. Is there legislation for minimum wages, which keeps wage rates above efficiency?
2. Are there strong trade union movements, which have the same result?
3. Is there a strong family involvement in the production process? If so, what is the opportunity cost such as labour?
4. Are there subsidies for interest rates?
5. Is the sector strongly subsidised otherwise?
6. Is the market for capital and land undeveloped? If so, what is the opportunity cost of such factors of productions?

Interpreting the Results of the PAM
In the case where private profits are zero, this means zero "excess" profit. At this optimum level, capital, land and labour will still be receiving "normal" returns. Put differently, domestic factors will be receiving their prevailing market rates of return. Zero private profit suggests that there is no strong incentive to expand or contract the activity in question.

Alternatively, zero-economic profit indicates that the activity is only efficient in terms of its foreign exchange earning capacity. In the case of a positive result, that is greater than zero, the activity is generally efficient and should be expanded. In the case of a negative economic profit, the activity should be reduced and resources redirected to another activity with a positive economic profit.

Transfers indicate whether a producer receives more or less, given the distortion, at market prices than at social or economic prices. Negative transfers on tradable inputs and domestic cost indicate that producers pay less at private prices than they would if they were paying at social prices.

When the DRC is less than one, it costs less than $1 of domestic currency to earn $1 of foreign exchange, suggesting that the activity has some degree of comparative advantage and should be expanded. When the DRC is greater than one, this indicates that it costs more than $1 worth of domestic resources to earn $1 of foreign exchange. Therefore, the manufacture of that product does not have a comparative advantage and should be reduced. When the DRC is less than zero, the tradable inputs cost more than total revenue and production should not occur.

A NPC greater than one indicates that the domestic price is greater than the efficiency price (border price of the product). In other words, positive protection is occurring and policy is favouring domestic producers over consumers. If the NPC is less than one, the domestic price is lower than the border price as a result of the policy intervention. In this case, the policy intervention favours consumers over producers because domestic prices are lower than what they should be under competitive market conditions. When the NPC value equals one, the domestic price equals the border price. In this situation, government's policy intervention is either not affecting the domestic price of the product or there is an absence of government intervention in the particular product market. In this case, government policy is neutral.

An EPC of greater than one indicates that manufacturing firms are benefiting from policy intervention and are enjoying positive protection. Hence, producers are receiving a greater return on their resources. On the other hand, an EPC of less than one but greater than zero implies that producers are not benefiting from policy intervention; instead, they are receiving negative protection, i.e. if domestic producers were allowed to purchase inputs at the border price, they would enjoy higher returns on their resources. In a situation where EPC equals one, the structure of protection is equal – i.e. neither producer nor consumer are favoured or disfavoured. The case of a negative EPC means that either the value-added of domestic prices or the value-added of border prices is negative. A negative value for the value-added in domestic prices suggests that the costs of the inputs used are greater than the value of the output produced. It would be expected that manufacture of the product would decline under such conditions. Therefore, a negative value for the value-added at border prices implies that the economy is losing foreign exchange by producing the product because the cost of the input used exceeds the value of the output.

3. Results

In general, economists have not agreed on a single definition of competitiveness. In the context of this study, competitiveness is based simply on the ability of manufacturing firms to compete on a combination of price and quality. Hence with equal quality and an established reputation manufacturers are competitive only if their prices are as low as their rivals. A new manufacturer without an established reputation may need a lower price than its rivals to compete. With products of lower quality than its competitors, a manufacturer may not be competitive even with a lower price; with a reputation for superior quality, a manufacturer may be competitive even with a higher price.

The business model, which is under review, relates to production and cross border trading. Simply put, production and cross border trading occurs when the good is produced in the home market and shipped to destination market. This business model is substantially different from the production-integrative model, which is based on utilising the strength in a given country or territory to overcome a production or process weaknesses of a given product. In addition, there is the franchising model, which occurs when a firm transfers technology and 'know how' on a given product to another firm in exchange for royalties on the intellectual property it sells. This paper does not seek to analyse these various models, but instead to evaluate the impact on production under the model that currently exists.

As shown in Table 2, during the period 1995-99, the DRC averaged - 0.73, which indicates that the tradable inputs cost more than the total revenue for the product and production should not occur.

An analysis of the individual products indicates considerable dispersion around the average. For example, orange juice registered a substantially low DRC of $0.08 to earn equivalent $1 of foreign currency. In addition, products such as malt beverage, beer, shandy, margarine, wooden furniture, household insecticide, plastic bags, steel structures and clay-tiles appear to have some comparative advantage *vis a vis* overage among competing products. Alternatively, products such as aerated beverages, flavoured waters, stouts, crude soya bean oil, shortening, pasta, guava jams and jellies, salami sausages, other canned sausages, prepared poultry meat, sweet biscuits and unsweetened biscuits, rum registered a DRC ratio above 1, suggesting that resources in those particular activities should not be expanded. A negative DRC was registered for a range of products. In such a case, resources should have been removed from those activities and placed in product areas that demonstrated a DRC below one and above zero. The products with a negative DRC include flour, other soya bean oil, grapefruit juice, pineapple juice, apple juice, other jams and jellies, canned chicken sausages, other chicken sausages, ham and cuts of swine, luncheon meat, bacon, other prepared swine meat, confectionary products, potato chips, ice cream, portland cement, mauby syrup, steel doors, aluminum windows and doors and mattresses.

The average DRC for the period 2000-04, the post liberalisation phase, was 0.93, demonstrating some improvement in comparative advantage. Although the level of dispersion in DRC values was reduced, it was still quite high. Beer, steel structures, plastic bags and clay-tiles continued to register a DRC below one and positive, while the DRCs of unsweetened biscuits and stout moved from a value greater than one to substantially below one. The DRCs for bacon, other chicken sausages, flour, pineapple juice, apple juice, ice cream, Portland cement and steel doors rose from negative to positive and less than one. Interestingly, some products, which registered high and positive DRCs during the period 2000-04 were negative during the 1995-99 period, suggesting that a transition was made and may be still in progress. Those products falling into this group were other soya bean oil, aluminium windows and doors and mattresses.

Pasta, guava jam and jellies and prepared poultry meat continued to record higher DRCs, an indication of increasing social costs. Other products that continued to record a DRC above one during the period 2000-04 include rum, sweet biscuits, aerated beverage, flavoured waters, and crude soya bean oil. Although these products record a DRC above one, it is important to note that they are not substantially above one. In fact, they seem to maintain a stable DRC.

Table 2: Summary of Competitive and Profitability Indicators: 1995-2004

	Private Profit		Social Profit		DRC		NPC		EPC		Recom	
	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	1995-99	2000-04	Business	Rating
Product	Average	Average	Average	Average	Average	Average	Average	Average	Average	Average	Model	
Aerated Beverages	0.74	0.25	0.63	0.05	1.12	1.72	0.90	0.84	1.63	2.45	I	2
Flavoured Waters	0.49	0.30	0.11	0.13	1.14	1.31	0.98	0.82	1.79	1.93	I	2
Malt Beverages	0.29	0.41	1.30	0.60	0.31	-1.92	0.58	0.74	0.52	-4.06	F	1
Beer	0.29	0.31	1.19	0.72	0.38	0.57	0.63	0.64	0.61	0.87	L	3
Stout	0.37	0.38	-0.38	-1.59	1.75	0.11	1.19	1.38	3.37	0.19	L	3
Shandy	0.07	0.17	0.17	0.31	0.19	0.76	0.28	0.71	0.29	1.07	L	3
Flour	0.19	0.19	0.02	-0.37	-0.40	0.87	0.90	0.90	-0.63	1.27	L	3
Crude Soya Bean Oil	1.49	0.34	0.53	-0.99	2.86	2.56	1.16	1.24	4.39	3.95	I	2
Other Soya Bean Oil	0.42	0.25	-0.76	-0.41	-0.83	1.58	1.16	0.92	-0.98	2.39	I	2
Shortening	0.38	0.39	0.37	-1.02	4.31	-0.34	0.69	1.04	6.68	-0.55	F	1
Margarine	0.50	0.35	-1.18	-0.78	0.63	-1.30	1.33	0.96	1.09	-1.88	F	1
Pasta	1.32	0.51	0.75	-2.12	2.44	18.18	0.99	1.19	3.84	28.09	I	2
Orange Juice	0.38	0.29	-0.10	-0.54	0.08	-2.01	1.01	0.94	0.02	-3.08	F	1
GrapeFruit Juice	0.82	0.30	-1.23	-0.54	-0.36	-0.84	1.40	0.94	-1.76	-1.18	F	1
Other Pineapple Juice	-0.23	0.19	-1.79	-0.01	-1.26	0.70	1.38	0.74	-1.26	0.97	L	3
Apple Juice	0.32	0.28	-0.84	0.00	-0.21	0.04	1.26	0.80	-0.40	0.02	L	3
Guava Jam Jellies	0.31	0.29	1.09	-0.02	1.05	9.15	0.66	0.85	1.56	13.43	I	2
Other Jams and Jellies	0.59	0.71	-1.68	-2.69	-0.63	-0.66	1.32	1.25	-0.99	-1.21	F	1
Canned Chicken Sausages	0.81	0.65	-2.63	-2.70	-15.86	-0.61	1.39	1.23	-24.01	-0.95	F	1
Other Chicken Sausages	0.72	0.66	-2.16	-2.78	-1.08	0.41	1.31	1.19	-1.74	0.56	L	3
Salami Sausages	1.58	1.24	-2.48	-6.47	1.92	-4.31	1.15	1.31	2.85	-6.55	F	1
Other Canned Sausages	0.83	0.63	-3.36	-3.08	3.10	-1.30	1.57	0.41	4.50	-2.22	F	1
Prepared Poultry Meat	-0.81	0.81	-1.76	-4.00	3.68	4.02	1.12	1.25	1.39	5.89	I	2
Hams & Cuts of Swine	1.87	0.96	-12.55	-5.04	-0.49	-0.49	3.79	1.30	-0.76	-0.72	F	1
Luncheon Meat	0.93	0.69	-3.98	-4.33	-2.30	-0.84	2.16	1.54	-3.53	-1.26	F	1
Bacon	-0.72	1.69	-17.81	-19.42	-0.66	0.49	5.00	4.03	-0.61	-0.51	F	1
Other Prepared Swine Meat	2.23	1.14	-0.62	-6.29	-34.42	-1.14	1.23	1.31	-50.04	-1.71	F	1
Confectionery Products	1.23	2.03	-4.25	-7.73	-1.78	-0.35	1.44	1.65	-2.56	0.00	I	2
Sweet Biscuits	0.60	0.49	0.11	0.29	1.04	1.08	0.88	0.77	1.62	1.60	I	2
Unsweetened Biscuits	0.40	0.46	-0.42	0.28	1.05	0.44	0.91	0.81	1.86	0.64	L	3
Wood Furniture	-0.71	-1.21	-9.00	1.10	0.33	4.14	1.64	0.76	0.95	2.76	I	2
Chips	1.33	-1.11	-8.04	-10.79	-0.43	-0.73	2.44	2.14	-0.67	-0.63	F	1
Ice Cream	0.82	0.81	-2.43	-1.40	-0.79	0.16	1.40	0.94	-1.21	0.22	L	3
Portland Grey Cement	11.44	0.22	-36.52	4.36	-0.19	0.09	0.07	0.20	-0.37	0.14	L	3
Mauby Syrup	0.28	0.28	-0.72	-0.33	-0.24	-0.06	1.12	0.96	-0.28	-0.10	F	1
Household Insecticides	1.09	1.06	5.51	-2.85	0.47	-0.34	0.66	1.06	0.60	-0.62	F	1
Plastic Bags	0.15	-0.72	3.01	0.93	0.69	0.91	0.47	0.62	0.81	0.80	L	3
Steel Structure	0.87	0.82	4.50	7.45	0.76	0.21	0.59	0.40	1.34	0.33	L	3
Steel Doors	1.19	1.03	-3.31	5.86	-0.44	0.60	0.98	0.51	-0.76	0.99	L	3
Clay-Tile	0.24	0.26	0.45	1.47	0.53	0.28	0.70	0.54	0.99	0.45	L	3
Rum	0.98	0.89	1.35	-1.44	2.82	3.83	0.96	1.06	4.15	5.32	I	2
Alum. Windows & Doors	1.68	2.78	-2.96	1.98	-0.46	1.59	1.00	0.90	-0.57	2.59	I	2
Mattresses	-0.45	1.23	-1.07	-4.33	-1.04	1.40	1.01	1.14	0.06	2.02	I	2
Average	**0.87**	**0.55**	**-2.34**	**-1.56**	**-0.73**	**0.93**	**1.23**	**1.05**	**-1.08**	**1.25**	**F**	**1**

Household insecticides, malt beverages, shortening, margarine, orange juice, salami sausages and other canned sausages have seemingly regressed during the period 2000 to 2004, moving in the opposite direction from their 1995 to 1999 positions. These products should be carefully monitored. Some products have maintained their negative DRC position. These are grapefruit juice, other jam and jellies, canned chicken sausages, hams and cuts of swine, luncheon meat, other prepared swine meat, confectionary products, potato chips and mauby syrup.

From this analysis it is evident that achieving comparative advantage is not a simple task, and winners and losers in the manufacturing sector are not determined only by changes in government policy, but also events and actions within the market.

During the period 1995-99, the average NPC for the selected products was 1.23. The NPC is determined by comparing domestic market prices and efficiency prices at the border, after adjusting the CIF prices using the REER. The average NPC recorded for the years 1995-99 fell below one, indicating that government's policy favoured the domestic consumer. During the same period, 4% of the selected products had a NPC measure of one, meaning that the impact of government policy was neutral. It is interesting to note that an NPC greater than one was calculated for half of the products, suggesting that government policy favoured the manufacturers of these products.

During the period 2000-04, the average NPC moved to a ratio of 1.05. At first glance, it would appear that the government policy in this period still favoured the producer. However, closer inspection indicated that 55% of the selected products in this study registered a NPC less than one, suggesting that government policy favoured the consumers, in contrast to the period 1995 to 1999. Alternatively, some 36% of the products recorded a NPC above one. Therefore, government policy was more beneficial to the producer of these products. During the period 2000 to 2004, policy was not neutral on any specific products.

The lesson here is that government policy tended to favour the consumer. This is consistent with a country that is moving away from policies based on import substitution. It would therefore be reasonable to conclude that during the last five years, government's policy has sought to point the producer in the direction of the export promotion and the external market.

With regard to the EPC measure, during the 1995-99 period, the average value was –1.08. A negative EPC normally occurs under two conditions; either the value-added at domestic prices or value-added at border prices are negative. A negative value-added at domestic prices indicates that the cost of the inputs used is greater than the value of the output produced. A negative value for the value-added at border prices implies that the economy is losing foreign exchange because the production costs of inputs exceeds the value of output. Since private profits were generated during this period and in many cases the imported inputs outstripped the value of the competing imported good, it is safe to conclude that the negative EPC indicates that the economy lost foreign exchange from the production of such goods. Indeed, 44% of the selected products recorded a negative EPC during 1995 to 1999, while 56% of products registered a positive EPC. During 2000 to 2004, 37% of the products were estimated to have a negative EPC, while 63% of the products show a positive EPC, which resulted in an average EPC 1.25. The products moving from positive to negative EPC between the two sub-periods were malt beverages, shortening,

margarine, orange juice, other canned sausages, and household insecticides. Alternatively, the products that moved from negative to positive EPCs are flour, other soya bean oil, pineapple juice, apple juice, other chicken sausages, confectionery products, ice cream, portland cement, steel doors and aluminium windows and doors.

Those products with positive protection coefficients are deemed to have benefited from government policies during both periods. The products that with EPC measures greater than one during 2000 to 2004 were: aerated beverages, flavoured water, shandy, flour, crude, sand refined, soya bean oil, pasta, guava jams and jellies, prepared poultry meat, sweet biscuits, wooden furniture, rum, aluminium windows and doors, and mattresses. On the other hand, there are several products with EPC measures greater than zero but less than one. The conclusion that is drawn from this measure is that these products are receiving negative protection. The products with an EPC less than one include: beer, stout, pineapple juice, apple juice, other chicken sausages, unsweetened biscuits, ice cream, portland grey cement, plastic bags, steel structures and clay-tiles.

Profitability

The majority of products have positive private profitability measures despite increasing competitive pressures, largely due to the tariff protection, which replaced the restrictive licensing regime of the past instituted by he Government of Barbados to safeguard market share. Private profits were higher between the periods 1995 to 1999, but declined during 2000 to 2004.

Social profits are generally negative and indicate that without the intervention of government via monetary and fiscal policies many of the products would have made significant losses and would be forced to cease production. Resources would, therefore, have been redeployed to sectors with positive social profitability. Indeed, any move to adjust the current foreign exchange rate regime towards a real foreign exchange rate would result in an increase to further the border cost of raw materials and hence detrimental to the manufacturing sector. If there were a move to revalue the local currency, the sector would have to quickly review the way it carried out its business and change in a substantial manner.

4. Conclusion

The analysis indicates some interesting findings. Firstly, under the current production and cross border trading business model, profitability over the period 1995-2004 followed a cyclical trend. In fact, the products are currently in the upward phase of the trend. Secondly, the average DRC rose from –0.73 to 0.93, indicating an improvement in comparative advantage. It is also interesting to note that some losers in one period became winners in another and vice versa. Thirdly, the NPC measure has reveal that for products under review, government policy is tending to favour the consumer. The estimates of the EPC suggest a transition between the two periods under review where producers are generally benefiting from positive protection. The analysis also revealed that there are some products that should be monitored and the cost of the inputs should be reduced as much as possible.

When we combine the three measures of the analysis, it is clear that government seem to be removing some of the protection available to manufacturing and therefore the import substitution model on which government seem to have based its policies for the industrial sector in the past, is no longer the key principle for guiding policy. This is not to say that government has abandoned the principle entirely. An important lesson learnt is that the process of selecting winners will not necessarily reap rewards as today's winners could easily become tomorrow's losers. Barbados' manufacturing sector should review the models and methods which they base their operation. Indeed, there is scope for utilizing integrative and franchise type business models and government should encourage these types of models to reposition the manufacturing, as it is quite possible to produce a product for export but lose more foreign exchange than we earn.

The products with DRCs less than one but greater then zero, and NPCs and EPCs, which favour the consumers, can be produced in Barbados. The underlining reason would be that the cost to the economy to earn the equivalent foreign exchange would be low and hence competitive. In cases where the DRC is greater than one and the NPC is also greater than one, but the EPC is below one but greater than zero, such products should be considered for an integrative type business model. These products are of a high cost to the Barbadian economy but can increase profitability by reducing cost as it seek to integrate its weaker processes in other locations, which can improve competitiveness. Finally, producers of products with negative DRCs, extremely high NPCs and negative EPCs should re-evaluate their operations to determine whether they should consider a franchise business model.

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