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Impact of Economic Reform on Food Demand, Dominican Republic

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ABSTRACT

This report examines the impact on food consumption of increased food prices resulting from economic reform measures adopted by the Dominican Republic in 1984. The response of urban and rural consumers of various income levels to these price increases was determined by estimating the structure of food demand. Prices rose for certain basic commodities including soya oil, wheat flour, sugar, bread, and milk. This led to the substitution of cheaper commodities and a decline in total caloric intake across all groups. Although higher income groups had a greater reduction in caloric intake, lower income urban consumers were most severely affected. An additional 34 percent, for an overall 77 percent of Dominican households, were placed at some degree of nutritional risk as a result of this policy. Alternative monetary policies should be explored to minimize potential negative nutrition effects. When consumers substitute locally produced food for imported food, U.S. food exporters face decreasing demand.

Keywords: Consumer prices, exports, Dominican Republic, food demand, economic reform, nutrition, elasticity.

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INTRODUCTION

The Dominican Republic Government recently announced several economic measures which caused an increase in consumer prices for a variety of foods. These price increases, resulting from economic reforms invoked at the behest of the International Monetary Fund, have provoked popular discontent and demonstrations against the government as the impact on food consumption and expenditure became evident. The impact on consumption due to higher food prices associated with the economic reform measures is the focus of this report.

The price increases announced on April 19, 1984, affected such basic foods as soya oil, wheat flour, sugar, bread, and milk. For example, the price of 1 pound of soya oil increased from RD$0.74 to RD$1.40, an 89-percent increase; wheat flour "primarama" went from RD$0.21 to RD$0.38 per pound, an 81-percent increase; refined sugar was raised by 19 percent from RD$0.26 to RD$0.31; while a 1-ounce roll of bread doubled from RD$0.025 to RD$0.05. The price of powdered milk in 454-gram containers was raised from RD$2.84 to RD$3.39, a 19-percent increase. 1/

CLASSIFICATION OF CONSUMERS

The impact of these price increases on Dominican consumers differs from one group to another, depending upon their demand structure. Faced with higher prices, consumers can generally be expected to lower consumption of those items and to substitute other products to get the most from their food budget. To determine consumers' response to price changes, a complete matrix of demand elasticities was used, so that the interdependent nature of consumers' food selection is taken into account. 2/ The classification of consumer groups is based on monthly household expenditures for foods and nonfoods in urban and rural areas as follows: 3/

1/ 1984 RD$1.00 = U.S.$1.00.

2/ These matrices of demand elasticities for Dominican Republic are available at the Agricultural Development Branch, Economic Research Service, U.S. Department of Agriculture, for 10 consumer groups.

3/ Data used for the income classification were derived from the Dominican Republic Central Bank National Household Budget Survey, 1976-77.

Rural and urban income group I:	Below RD$100 per household per month
Rural and urban income group II:	RD$100 - RD$199 per household per month
Rural and urban income group III:	RD$200 - RD$299 per household per month
Rural and urban income group IV:	RD$300 - RD$399 per household per month
Rural and urban income group V:	RD$400 and above per household per month

Estimates of elasticities were made for 13 foods or food groups: rice, maize, other cereals, roots and tubers, sugar and other sweets, legumes, vegetables, fruits, meat and fish, eggs and milk, oil, spices and other foods, beverages, and tobacco. Foods for which prices were increased are within the following groups: soya oil (in oil group), wheat flour and bread (in other cereals group), refined sugar (in sugar and other sweets group), and powdered milk (in eggs and milk group).

The price increases as announced by the Dominican Government are adjusted to reflect the impact of each food on the overall price of the appropriate food group. The adjusted price increases are as follows: other cereals, 75 percent; sugar and other sweets, 10 percent; eggs and milk, 10 percent; oil, 75 percent. Combined effects of all price changes are discussed in this report.

EFFECTS ON FOOD DEMAND

Economically rational consumers limit their purchases when faced with higher prices. When an individual food price is considered, the expected result is observed. However, the combined direct and substitution effects may cause consumption of a food to increase or decrease in a manner which varies from consumer group to consumer group, according to their unique demand structure. Table 1 shows the combined direct and substitution effects on the percentage change in quantity purchased by consumers.

There are substantial decreases in quantity demanded in response to higher prices across all income groups for the category other cereals. Both rural income group 2 and urban income group 1 virtually eliminate this food from the diet. Cooking oil consumption also decreases across all income groups. This decrease is highest in urban income group 1 at 66 percent, followed by rural income group 2 with 62 percent. The food category eggs and milk, which includes powdered milk, shows a decrease in consumption in all income groups, except urban income group 2, which shows a small increase of 1.5 percent. 4/ The combined effect of all price increases on the category sugar and other sweets is mixed, showing no discernable pattern across the consumer groups.

Substitution among foods occurs as a consequence of the price increases. As a result, every income group in both rural and urban areas increases purchases of roots and tubers. For example, urban income group 4 increases purchases by 64 percent and rural income group 4 by nearly 42 percent. Except for rural income group 5, all income classes in rural areas increase maize consumption. Income groups 1 and 3 have increases of 48.5 and 47.5 percent, respectively. 5/

4/ The reason behind this slight increase in the latter income group is the cross-elasticity substitution effect of this category in response to the price increase of other cereals (table not shown in the text).

5/ The changes in quantities demanded are somewhat overestimated. The reason lies in the constant elasticity values which underlie the analysis. The magnitude of the price changes experienced pushes to the limit the validity of the constant elasticity analysis procedure. See references 1, 2, and 3 for details of the analysis procedure.

Table 1--Change in food quantities demanded caused by price changes deriving from economic reform, by income group

Food item	Rural					Urban				
	1	2	3	4	5	1	2	3	4	5
	Percent									
Rice	-7.84	-4.63	-1.47	-27.32	-5.76	2.83	6.93	-17.92	2.13	28.63
Maize	48.52	8.08	47.52	38.04	-44.62	-65.29	.49	-13.58	-23.25	-6.84
Other cereals	-74.01	**	-73.03	-74.65	-93.60	**	-89.61	-56.81	-65.42	-58.36
Roots & tubers	27.20	22.89	.22	41.73	6.83	24.42	48.51	16.06	64.05	9.22
Sugar & other sweets	-6.27	-1.86	4.93	25.95	16.10	-4.19	19.43	4.11	-10.21	-22.60
Legumes	-16.62	.28	-12.03	-11.02	15.02	-43.29	-12.87	15.76	7.12	.14
Vegetables	7.79	23.93	2.79	-47.95	-11.36	14.23	-7.32	10.64	14.70	-18.67
Fruits	-5.53	-1.70	-.10	1.54	-6.25	16.76	-21.07	-9.55	-8.15	-4.75
Meat & fish	-21.81	.33	.48	-8.31	1.59	7.83	-26.18	-7.88	5.05	-1.15
Eggs & milk	-12.01	-12.44	-10.17	-8.99	-9.42	-9.80	1.53	-8.99	-16.78	-5.88
Cooking oil	45.72	-62.26	-57.06	32.81	-51.10	-66.02	-39.74	-39.23	-60.98	-72.04
Spices & other foods	26.25	5.01	-1.25	14.25	10.16	10.33	21.85	11.25	-19.80	-3.71
Beverages & tobacco	-5.67	-1.96	-7.37	-9.06	-2.42	-6.42	.80	-12.79	-2.05	-3.71

**Consumption is virtually eliminated.

Consumers reduce their purchases of beverages and tobacco in response to decreased purchasing power. While this is not surprising, some income groups, especially those in rural areas, also decrease their purchases of rice. For the remaining foods/food groups, the combined direct and substitution effects are mixed throughout the income groups in urban and rural areas.

Overall price increases for wheat flour, bread, sugar, and milk cause consumers to turn to foods which provide a cheaper source of calories, such as maize and roots and tubers, as substitutes for preferred and more expensive foods, such as rice and meat and fish, and to avoid purchase of nonessential items such as beverages and tobacco. As a result, there are sharp changes in expenditures on some food categories, such as maize, cooking oil, and other cereals (table 2). Purchases of other cereals are essentially eliminated in rural income group 2 and urban income group 1. For cooking oil, the largest expenditure decrease occurs in urban income group 5 (-55.26 percent) and in urban income group 1 (-45.64 percent). For two food groups (sugar and other sweets, eggs and milk), the impact on expenditure is mixed. 6/

The estimated impacts on nutrient intake of the price increases are shown in tables 3 and 4. Table 3 indicates that all income groups in both urban and rural areas experience a drop in caloric intake, with a decrease of at least 100 calories per capita per day. The largest drop is found in rural income group 5 where the level of intake falls by 442 calories per capita per day. Urban income group 5 also indicates a large decline of 395 calories per capita per day.

If individual food/food groups are considered, the categories other cereals and cooking oil are the leading contributors to the overall decrease in caloric intake. The foods which appear to be substituted, maize in rural areas and roots and tubers in all areas, do not fully compensate for the calories lost.

Even though low-income consumers do not experience the large decreases in nutrient intakes found for high-income consumers in both urban and rural areas, the consequences are greater. As calculated from the 1976-77 household consumption survey, the nutrient consumption for each income group is listed in table 5. Given that the recommended level of calories is approximately 2,200 per capita per day, the following income groups are below this threshold: rural income groups 1 and 2, and urban income groups 1, 2, and 3. Urban income group 4 just reaches the recommended level. Urban areas are the most

6/ The total expenditure on food after the price increase does not exactly equal the preprice increase expenditure because the budget constraint restriction used in the estimation procedure holds strictly only at the means of the commodity budget shares. At all other values, the budget constraint restriction is an approximation. Nevertheless, real disposable income probably decreases. This is because there were substantial price increases for many nonfood consumer goods. However, since data in this analysis is limited to food purchases, no direct estimates for the nonfood sector, or the cross-sector substitution, can be made. It is assumed that total nominal income is constant and will not increase in the short run.

Table 2--Change in monthly per capita food expenditures caused by price changes deriving from economic reform, by income group

Food item	Rural					Urban				
	1	2	3	4	5	1	2	3	4	5
	Percent									
Rice	-7.84	-4.63	-1.47	-27.32	-5.76	2.83	6.93	-17.92	2.13	28.63
Maize	48.52	8.08	47.52	38.04	-44.62	-65.29	.49	-13.58	-23.25	-6.84
Other cereals	-54.52	**	-52.81	-55.64	-88.79	**	-81.82	-24.42	-39.49	-27.13
Roots & tubers	27.20	22.89	.22	41.73	6.83	24.42	48.51	16.06	64.05	9.22
Sugar & other sweets	3.11	7.96	15.43	38.55	27.71	5.39	31.37	14.52	-1.23	-14.86
Legumes	-16.62	.28	-12.03	-11.02	15.02	-43.29	-12.87	15.76	7.12	.14
Vegetables	7.79	23.93	2.79	-47.95	-11.36	14.23	-7.32	10.64	14.70	-18.67
Fruits	-5.53	-1.70	-.10	1.54	-6.25	16.76	-21.07	-9.55	-8.15	-4.75
Meat & fish	-21.81	.33	.48	-8.31	1.59	7.83	-26.18	-7.88	5.05	-1.15
Eggs & milk	-3.21	-3.68	-1.19	.11	-.36	-.78	11.68	.11	-8.45	3.53
Cooking oil	-13.16	-39.61	-31.29	7.50	-21.77	-45.64	-3.58	-2.77	-37.57	-55.26
Spices & other foods	26.25	5.01	-1.25	14.25	10.16	10.33	21.85	11.25	-19.80	-3.71
Beverages & tobacco	-5.67	-1.96	-7.37	-9.06	-2.42	-6.42	.80	-12.79	-2.05	-3.71
Total	-5.42	-7.04	-5.27	-3.85	-5.20	-7.93	-5.89	-4.52	-6.04	-5.72

**Consumption is virtually eliminated.

Table 3--Change in daily per capita caloric intake caused by price changes deriving from economic reform, by income group

Food item	Rural					Urban				
	1	2	3	4	5	1	2	3	4	5
	Calories									
Rice	-40	-29	-10	-195	-46	13	39	-107	12	165
Maize	33	8	69	76	-134	-12	0	-3	-3	-2
Other cereals	-52	-106	-89	-98	-119	-111	-153	-109	-139	-153
Roots & tubers	52	56	1	105	19	19	47	16	70	12
Sugar & other sweets	-9	-4	11	64	45	-6	36	9	-24	-60
Legumes	-27	1	-23	-20	29	-50	-17	23	10	0
Vegetables	1	7	1	-17	-5	2	-2	3	6	-14
Fruits	-6	-3	0	5	-25	14	-23	-16	-15	-11
Meat & fish	-13	0	1	-18	5	7	-41	-16	12	-4
Eggs & milk	-11	-21	-28	-28	-37	-12	4	-30	-65	-35
Cooking oil	-64	-125	-151	-89	-181	-86	-92	-116	-192	-288
Spices & other foods	13	3	-1	11	8	6	15	10	-16	-4
Beverages & tobacco	-1	0	-3	-5	-2	-1	0	-5	-1	-3
Total	-123	-215	-223	-209	-442	-216	-187	-341	-345	-395

Table 4--Change in daily per capita protein intake caused by price changes deriving from economic reform, by income group

Food item	Rural					Urban				
	1	2	3	4	5	1	2	3	4	5
	Grams									
Rice	-0.79	-0.58	-0.21	-3.85	-0.92	0.27	0.77	-2.11	0.24	3.26
Maize	1.02	.24	2.12	2.32	-4.10	-.38	0	-.10	-.10	-.05
Other cereals	-1.52	-3.10	-2.61	-2.87	-3.49	-3.24	-4.49	-3.21	-4.09	-4.48
Roots & tubers	.72	.77	0	1.45	.27	.26	.66	.23	.97	.17
Sugar & other sweets	-.01	0	.01	.08	.06	0	.05	.01	-.03	-.08
Legumes	-1.39	.03	-1.18	-1.03	1.49	-2.54	-.87	1.16	.52	.01
Vegetables	.07	.35	.06	-.87	-.24	.11	-.10	.17	.32	-.13
Fruits	-.07	-.04	0	.06	-.30	.17	-.29	-.19	-.18	-.13
Meat & fish	-1.08	.04	.08	-1.54	.39	.58	-3.39	-1.37	.98	-.34
Eggs & milk	-1.06	-2.07	-2.66	-2.61	-3.50	-1.10	.83	-2.85	-6.15	-3.34
Cooking oil	-.05	-.10	-.12	-.07	-.14	-.07	-.07	-.09	-.15	-.23
Spices & other foods	.53	.12	-.04	.44	.33	.22	.61	.39	-.63	-.15
Beverages & tobacco	0	0	0	0	0	0	0	0	0	0
Total	-3.64	-4.34	-4.53	-8.48	-10.15	-5.71	-6.78	7.96	-8.30	-6.06

Table 5--Coverage of per capita daily recommended allowance

Income group	Calories (recommended level = 2,200)				Protein (recommended level = 48 grams)			
	Daily consumption	Change due to price increases	Total	Coverage rate	Daily consumption	Change due to price increases	Total	Coverage rate
	------ Calories ------			Percent	------ Grams ------			Percent
Rural:								
1	1,627	-123	1,504	68	44	-4	40	83
2	2,269	-215	2,054	93	65	-4	61	127
3	2,816	-223	2,593	118	86	-5	81	169
4	3,005	-209	2,796	127	94	-8	86	179
5	3,609	-442	3,167	144	115	-10	105	219
Urban:								
1	1,456	-216	1,240	56	43	-6	37	77
2	2,019	-187	1,832	83	65	-7	58	121
3	2,442	-341	2,101	96	84	-8	76	158
4	2,553	-345	2,208	100	91	-8	83	173
5	3,245	-395	2,850	130	127	-6	121	252

affected by the price increases. This is especially true for urban income group 1 which covers only 56 percent of recommended level after the price increases. 7/

Protein intake per capita per day also decreases in every income group of urban and rural areas (see table 4). All groups drop at least 3 grams of protein per capita per day. Rural income group 5 sustains the largest drop of 10.15 grams of protein per capita per day. In urban areas, the largest drop is 8.3 grams in income group 4. The food categories of other cereals and eggs and milk are the big contributors to the decrease in protein intake in all income groups.

Protein intake is not as severely affected as the caloric intake by the economic reform measures. After the price increases, only rural income group 1 and urban income group 1 are below the recommended level; both were substandard before the price increases.

Tables 6 and 7 provide the basic information needed to determine the overall nutritional impact of the economic reform measures. Table 6 provides the estimates of the percentage of the households falling within each consumer group. Table 7 summarizes the adequacy of caloric intake before and after the economic reform measures were put in place. Two additional consumer groups, urban 3 and rural 2, fall below the recommended level for average daily per capita caloric intake. These two consumer groups represent a net addition of nearly 29 percent of the households to those nutritionally at-risk. An additional 4.9 percent of the households in urban consumer group 4 have very marginal caloric intake. Thus, of the total households, approximately 77 percent have marginal or substandard diets. Only the highest urban income group, and rural groups 3, 4, and 5, may be considered to have adequate caloric intake.

SUMMARY AND IMPLICATIONS

The economic reform measures encouraged by the International Monetary Fund aim to increase the viability of the Dominican Republic within the international economy. But the reforms instituted place over 75 percent of the population at-risk nutritionally. This effect can only slow the rate of formation of human capital, thereby decreasing the country's ability to generate and sustain long-term economic development. The implications of this inconsistency may have far-ranging consequences.

The results of this analysis suggest that the price increases in basic foods in the Dominican Republic will:

1. reduce the consumption of a major share of the population, placing as much as 75 percent of the households at-risk nutritionally,

2. affect urban consumers more severely than rural consumers, and

3. result in the substitution of locally produced foods, particularly roots and tubers, for imported foods such as wheat.

7/ Estimating nutrient intake from household food purchase data is difficult at best and especially so for the low-income groups where food gifts, working for food, and scavenging contribute to the overall diet. For this reason, the percentage coverage in the lower income groups may be somewhat low.

Table 6--Distribution of households by consumer group

Income level	Residence area	
	Rural	Urban
	Percent	
1	19.07	9.4
2	18.8	14.6
3	5.7	10.0
4	2.5	4.9
5	3.4	11.0
Total	50.1	49.9

Source: "Dominican Republic Major Social Concerns and Policy Recommendations," unpublished report of the World Bank, January 31, 1980.

Table 7--Consumer groups nutritionally at-risk

Income group	At-risk prior to economic reform	At-risk after economic reform
Urban:		
1	yes	yes
2	yes	yes
3	no	yes
4	no	very marginal
5	no	no
Rural:		
1	yes	yes
2	no	yes
3	no	no
4	no	no
5	no	no

The implications are threefold. First, planners of economic reforms should be cognizant of the possible consumption impacts of policy changes. Alternatives could be explored to determine if the objective of fiscal reform can be addressed through a set of policies that would, at least, minimize the nutritional impacts upon the poorer segments of the economy. This can be done by estimating the consumption impacts of alternative policies, such as was done in this analysis, to evaluate their effects and determine what segments of the population will bear the burden of the policy changes. Knowing which consumers will be most affected would allow planners to seek alternatives that have less severe consumption and nutritional impacts, or methods to offset these imports on a target group within the population.

Exporters should be concerned with the impact of reduction in consumption on the demand for their exports. This implies looking for ways in which the exporting countries can work with the importer during the period of financial crisis and fiscal austerity in order to seek ways of offsetting the fall in consumption. This could involve concessional trade or food assistance consistent with both the country's food need and the need to maintain domestic food production. It could involve agreements to expand their exports to provide the capability to meet financial obligations while permitting the importation of food required for adequate diets. The surplus food production in exporting countries, in part the result of decline in demand in the Dominican Republic and other developing countries, could serve as short-term transfers of resources to provide both financial and nutritional aid.

Assistance of this nature by the major food exporters is both humanitarian and in their own self interest to maintaining strong and growing markets for their exports.

The impact of economic reforms on consumption is of vital interest to both the nation faced with reforms and the countries which supply them with food imports. Both stand to lose by severe reductions in consumption, and both could gain by exploring measures to minimize the consumption impacts of reforms designed to restore viability within the international economy.

For example, the United States is the major supplier of the Dominican Republic's food imports, providing nearly all the imported wheat, over two-thirds of the corn, and half the cooking oil. During the economic recovery period, U.S. agricultural exports will suffer along with the diets of Dominican consumers.

REFERENCES

1. Chieruzzi, Alice, Larry C. Morgan, and Mervin J. Yetley. "A Comparison of Three Cross-Section Demand Models," Staff Report No. AGES830602, Economic Research Service, U.S. Department of Agriculture, June 1983.

2. Tun, Sovan, and Mervin J. Yetley. A New Method to Assess Effects of Food Supply Shocks on Consumption in Developing Countries. Technical Bulletin No. 1697, Economic Research Service, U.S. Department of Agriculture, January 1985.

3. Yetley, Mervin J., and Sovan Tun. "Comparison of Three Food Consumption Estimation Procedures," Staff Report No. AGES840126, Economic Research Service, U.S. Department of Agriculture, February 1984.