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## CHAPTER VI

# Concluding remarks: major lessons of the Ghanaian experience

Ghana's experience with exchange and import controls has not been happy. In the 1960's the control system produced such dissatisfaction that a serious and prolonged attempt was made to liberalize the system. Yet in the end liberalization collapsed. What are the major lessons of both failures, and how might they be avoided in the future? These concluding remarks are to set out our own broad assessment of the lessons to be drawn from what Ghana has endured.

Failure to recognize the old adage that quantitative controls work best when they are needed least lies at the heart of the matter. During both the period of tight controls and the gradual liberalization, apparently redundant supportive policies received little attention. Aggregate demand for foreign-exchange use was allowed to increase rapidly without continuous compensating adjustments to the nominal effective exchange rates to keep them in line with sustainable real rates. The quantitative controls consequently had to bear an increasingly greater burden as the effects of the supportive policies were eroded. This burden proved to be far greater than they could support.

The case against quantitative controls then was that too much was asked of them: they failed to restrict the level and allocate the composition of foreign-exchange use in a satisfactory way. At the same time, a proliferation of restrictive instruments designed to shore up the control regime compounded the policy-makers' difficulties in maintaining control over the economy. The direction and magnitude of the effects of both old and new policies became so complex that it was frequently impossible for policy-makers to evaluate the effects of changes which were introduced.

Within this ambience several serious consequences of the system emerged. First, the restrictive regime contributed to the economic atrophy of the 1960's. The combination of inflation and massive discrimination between activities was too much for the economy to withstand without suffering. It is difficult to distinguish clearly the individual influences at work, but there is a strong presumption that a significant share of the blame for reduced domestic savings rates, low productivity of investment, and poor export performance must fall on the control regime.

Second, the broad objective of industrialization was almost completely obscured in the indiscriminate distribution of protection. Both the tariff-indirect tax system and the quantitative restrictions created a protective structure with substantial variation among industrial activities. Variation *per se* is not necessarily undesirable if it is based on evidence of divergences between private and social values or the existence of major externalities. Yet no such evidence existed. Variation of protection between activities was at best random and unpredictable.

Third, the administrative system proved incapable of consistently careful management of foreign exchange. Both the heavy borrowing by Nkrumah and the cocoa windfall of Busia were predictably short-lived. When the plethora of foreign exchange had been spent, crises ensued. To solve the crises, the policy-makers typically resorted to a drastic change in one major policy — either reimposition of strict import licencing (1961, 1966, 1972) or a substantial devaluation (1971). The shock of the readjustments required by these drastic changes had a serious unsettling effect on the economic and social fabric of Ghana. In a state of shock, the socioeconomic system required considerably more time to recover than would have been required from a consistent series of gradual policy shifts. Further, the state of shock seemed to preclude attention to follow-up policies necessary to ensure the success of the initial policy adjustment.

Finally, economic planning became bogged down in a frantic attempt to cope with an incredibly complex and detailed system. Policy-makers found themselves caught up in running the control system. Planning in the large was abandoned to the press of planning in the small. Serious errors in policy formulation and implementation inevitably followed. The brave new sense of direction and purpose of the early days of Ghanaian independence was lost. It was lost, but not forever. "Each thing that goes away returns and nothing in the end is lost."<sup>1</sup>

1. Ayi Kwei Armah, modern Ghanaian novelist, the opening sentence of his *Fragments*. Houghton Mifflin, Boston, 1969, p. 1.

**APPENDIX A**  
**GENERAL STATISTICAL TABLES**

Table A-1  
Ghana: GNP and population,\* 1956-1969

	1956	1957	1958	1959	1960					
GNP at current prices (in millions of new cedis)	702	734	776	884	946					
GNP at constant (1960) prices (in millions of new cedis)	748	770	760	879	946					
GNP per capita at current prices	150	154	160	180	141					
GNP per capita at constant prices	159	162	157	179	141					
Population (in thousands)	4,691	4,763	4,836	4,911	6,777					
Annual rates of growth for					1957/56	1958/57	1959/58	1960/59		
GNP at current prices					0.0456	0.0572	0.1392	0.0701		
GNP at constant prices					0.0294	-0.0130	0.1566	0.0762		
GNP per capita in current prices					0.0267	0.0390	0.1250	-0.2167		
GNP per capita in constant prices					0.0189	-0.0309	0.1401	-0.2123		
Population					0.0153	0.0153	0.0155	0.3800		
<hr/>										
1961	1962	1963	1964	1965	1966	1967	1968	1969		
1,008	1,084	1,190	1,345	1,589	1,779	1,757	2,028	2,285		
976	1,028	1,056	1,085	1,093	1,099	1,116	1,120	1,158		
146	153	164	180	207	224	216	242	266		
142	145	145	145	142	138	137	134	135		
6,960	7,148	7,340	7,537	7,740	7,945	8,139	8,376	8,600		
<hr/>										
1961/60	1962/61	1963/62	1964/63	1965/64	1966/65	1967/66	1968/67	1969/68		
0.0655	0.0754	0.0978	0.1303	0.1814	0.1196	-0.0124	0.1542	0.1267		
0.0317	0.0533	0.0272	0.0275	0.0074	0.0055	0.0155	0.0036	0.0339		
0.0355	0.0479	0.0719	0.0976	0.1500	0.0821	-0.0357	0.1204	0.0992		
0.0071	0.0211	0	0	-0.0207	-0.0282	-0.0072	-0.0219	0.0075		
0.0270	0.0270	0.0269	0.0268	0.0269	0.0265	0.0244	0.0291	0.0267		
<hr/>										
Sources:	GNP at current prices, GNP at constant (1960) prices, GNP annual rates of growth, GNP per capita: 1960 through 1969, from <i>Economic Survey, 1969</i> , p. 15.									
	GNP at current prices, 1956 through 1959, from <i>Economic Survey, 1967</i> , p. 13.									
	GNP at constant (1960) prices, 1959, <i>Economic Survey, 1967</i> , p. 107; 1956 through 1958, D. Walters, <i>Report on the National Accounts of Ghana, 1955-1961</i> , Tables I, III, pp. 2-4.									
Population:	United Nations <i>Demographic Yearbook, 1969</i> , p. 136, for years 1960 through 1969.									
	United Nations <i>Demographic Yearbook, 1964</i> , p. 120, for years 1956 through 1959.									

\* Population estimates prior to 1960 census regarded as an underestimate.

Table A-2  
Ghana: price indices, 1956-1971

	1956	1957	1958	1959	1960	1961	1962	1963
GNP deflator index (1960=100.00)	93.85	95.32	102.11	100.57	100.00	103.28	105.45	112.69
Wholesale price index (1963=100.00)	-	-	-	-	-	94.8	103.0	100.0
Consumer price index (1963=100.00)	78.7	79.4	79.4	81.6	82.4	87.5	95.6	100.0

	1964	1965	1966	1967	1968	1969	1970	1971
GNP deflator index (1960=100.00)	123.96	145.38	161.87	157.44	181.07	197.32	N.A.	N.A.
Wholesale price index (1963=100.00)	107.1	124.3	124.2	130.0	153.5	166.3	174.9	N.A.
Consumer price index (1963=100.00)	112.2	140.8	148.2	139.3	153.2	160.7	166.5	174.7

## Sources: GNP deflator index:

Computed from GNP at current and constant prices, *Economic Survey*, 1967 and 1969, for 1959 through 1969; and Birmingham *et al.*, *Economy of Ghana*, p. 50, for 1956 through 1958.

## Consumer price index:

International Monetary Fund, *International Financial Statistics*, 1971 Supplement, pp. 90, 91, for 1956 through 1969; and *ibid.*, December 1972, pp. 152, 153, for 1970 through 1971.

## Wholesale price index:

International Monetary Fund, *International Financial Statistics*, 1971 Supplement, pp. 90, 91, for 1961 through 1969; and *ibid.*, December 1972, pp. 152, 153, for 1970 through 1971.

Table A-3a  
Ghana: balance of payments, 1956-1971 (in millions of U.S. dollars)

	1956		1957		1958		1959		1960	
	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
A. Goods and services	264.60	295.4	287.84	320.60	328.72	287.56	349.72	369.04	364.0	458.92
Merchandise, f.o.b.	239.12	230.44	261.24	249.48	299.88	218.68	316.40	299.04	333.76	348.04
Transportation and mdse. ins.	3.92	31.36	4.48	34.72	5.04	32.76	8.4	33.04	7.56	45.08
Investment income	14.0	15.68	14.56	16.80	14.56	18.20	14.0	18.48	12.32	27.72
Other	7.56	17.92	7.56	19.60	9.24	17.92	10.92	18.48	10.36	38.08
Net goods and services	-	30.80	-	32.76	41.16	-	-	19.32	-	94.92
B. Transfers	2.80	5.60	1.96	5.88	2.52	9.52	1.68	7.84	1.96	15.40
Transfers: private	0.28	2.52	0.28	2.52	0.28	6.44	0.28	5.32	0.56	12.32
Transfers: central gov't.	2.52	3.08	1.68	3.36	2.24	3.08	1.40	2.52	1.40	3.08
Net transfers	-	2.80	-	3.92	-	7.00	-	6.16	-	13.44
Net current account	-	33.60	-	36.68	34.16	-	-	25.48	-	108.36
C. Capital flows (net)	49.0	-	19.04	-	-	39.20	54.04	-	159.60	-
Capital NIE: private	-	2.8	-	11.48	-	11.48	22.40	9.8	10.36	-
Capital NIE: central gov't.	45.92	-	31.08	3.36	-	17.08	42.56	11.2	138.6	1.68
Commercial banks: assets	5.60	-	-	0.56	-	9.80	4.48	-	-	13.16
Deposit money banks: liab.	0.28	-	3.36	-	-	0.84	5.60	-	25.48	-
D. Net monetary authorities	-	7.84	9.52	-	-	2.52	-	24.92	-	27.72
Monetary gold	-	-	-	-	-	-	-	-	-	5.6
IMF accounts	-	-	-	0.56	14.56	14.56	15.12	19.88	-	-
Other assets	-	7.84	7.28	-	-	2.52	-	20.16	15.68	39.20
Other liabilities	-	-	2.80	-	-	-	-	-	1.40	-
Net errors and omissions	-	7.56	8.12	-	7.56	-	-	3.64	-	23.52

Table A-3a (continued)

	1961		1962		1963		1964		1965	
	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
A. Goods and services	362.4	494.4	347.9	410.6	340.1	448.0	354.2	429.1	358.7	570.8
Merchandise f.o.b.	332.5	384.7	319.9	310.1	307.0	336.6	321.4	321.5	321.2	439.4
Transportation and mdse. ins.	8.6	52.2	10.6	49.4	12.8	48.0	21.2	53.2	23.7	64.1
Investment income	10.0	25.4	8.4	22.6	8.1	33.3	6.0	23.8	4.4	31.4
Other	11.3	32.1	9.0	28.5	12.2	30.1	5.6	30.6	9.4	35.9
Net goods and services	-	132.0	-	62.7	-	107.9	-	74.9	-	212.1
B. Transfers	2.8	17.9	3.6	17.0	4.4	20.6	2.1	24.0	8.3	19.2
Transfers private	0.6	13.1	0.2	14.0	0.6	17.0	1.6	21.7	4.7	19.2
Transfers: central gov't.	2.2	4.8	3.4	3.0	3.8	3.6	0.5	2.3	3.6	-
Net transfers	-	15.1	-	13.4	-	16.2	-	21.9	-	10.9
Net current account	-	147.1	-	76.1	-	124.1	-	96.8	-	223.0
C. Capital flows (net)	128.2	-	81.9	-	96.0	-	75.1	-	149.5	-
Capital NIE: private	2.6	15.4	22.1	-	30.9	-	35.9	4.8	87.9	2.0
Capital NIE: central gov't.	198.0	67.7	52.3	6.1	97.5	42.8	81.6	31.5	102.1	52.8
Commercial banks: assets	40.5	-	10.0	-	3.6	-	0.2	-	1.2	-
Deposit money banks: liab.	-	29.8	3.6	-	6.8	-	-	6.3	13.1	-
D. Net monetary authorities	23.3	-	2.3	-	40.1	-	18.8	-	63.7	-
Monetary gold	-	-	-	-	-	-	-	-	-	-
IMF accounts	-	-	14.3	-	-	-	-	-	-	10.6
Other assets	39.1	17.3	-	18.4	40.8	-	26.0	21.8	49.4	54.0
Other liabilities	1.5	-	6.4	-	0.4	1.1	14.6	-	78.9	-
Net errors and omissions	-	4.4	-	8.1	-	12.0	2.9	-	9.8	-



Table A-3a (continued)

	1966		1967		1968		1969		1970		1971	
	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit	Provisional Credit	Debit
A. Goods and services	315.2	432.7	314.6	383.9	356.0	396.0	389.4	426.1	466.7	481.8	364.8	485.1
Merchandise f.o.b.	280.3	320.7	284.1	265.3	318.4	270.8	348.3	290.1	424.3	336.6	324.4	338.3
Transportation and mdse. ins.	18.2	56.4	18.0	51.9	21.6	51.4	20.0	65.1	25.6	71.0	23.5	70.2
Investment income	4.2	24.3	3.2	27.4	2.9	35.0	5.3	42.0	2.8	43.1	3.0	44.7
Other	12.5	31.3	9.3	39.3	13.1	38.8	15.8	28.9	14.0	31.1	13.9	31.9
Net goods and services	-	117.5	-	69.3	-	40.0	-	36.7	-	15.1	-	120.3
B. Transfers	10.1	17.7	4.7	19.9	5.1	21.0	4.8	17.1	5.6	16.9	6.9	14.6
Transfers: private	4.1	16.5	1.7	17.2	1.5	17.4	0.8	14.0	2.0	13.8	3.5	11.7
Transfers: central gov't.	6.0	1.2	3.0	2.7	3.6	3.6	4.0	3.1	3.6	3.1	3.4	2.9
Net transfers	-	7.6	-	15.2	-	15.9	-	12.3	-	11.3	-	7.7
Net current account	-	125.1	-	84.5	-	55.9	-	49.0	-	26.4	-	128.0
C. Capital flows (net)	105.0	-	34.3	-	38.0	-	60.8	-	53.2	-	84.9	-
Capital NIE: private	56.1	6.9	34.7	3.4	22.9	3.1	10.2	1.2	20.5	1.7	77.0	-
Capital NIE: central gov't.	57.1	7.9	26.5	7.1	45.5	24.7	57.6	21.7	62.5	17.1	39.6	10.3
Commercial banks: assets	-	1.7	1.7	-	0.7	-	-	0.1	-	3.8	-	21.4
Deposit money banks: liab.	8.3	-	-	18.1	-	3.3	16.0	-	-	7.2	-	-
D. Net monetary authorities	18.2	-	42.0	-	8.0	-	2.7	-	-	34.3	30.0	-
Monetary gold	-	-	-	-	-	-	-	-	-	-	-	-
IMF accounts	46.9	-	18.8	-	10.9	-	-	5.4	11.6	23.2	9.3	31.7
Other assets	27.0	25.8	18.4	3.4	6.7	16.3	37.0	-	22.0	33.2	52.4	-
Other liabilities	-	29.9	27.1	18.9	6.7	-	-	28.9	-	11.5	-	-
Net errors and omissions	1.9	-	8.2	-	9.9	-	-	14.5	7.5	-	13.1	-

Sources: IMF, *Balance of Payments Yearbook*, various issues.

Table A-3b  
 Ghana: foreign-exchange reserves: absolute; percent of exports; percent of imports, 1956-1970

	1956	1957	1958	1959	1960	1961	1962	1963
Foreign-exchange reserves (end of year in thousands of new cedis)	379,622	342,918	362,454	339,242	297,270	147,392	144,836	85,580
Value of exports (in thousands of new cedis)	173,198	183,204	209,116	226,718	231,979	228,981	230,097	217,619
Value of imports (in thousands of new cedis)	177,840	193,370	169,186	226,049	259,235	286,826	235,084	260,775
Foreign-exchange reserves as percent of exports	219.18	187.18	173.33	149.63	128.15	64.37	62.95	39.33
Foreign-exchange reserves as percent of imports	213.46	177.34	214.23	150.07	114.67	51.39	61.61	32.82
Foreign-exchange reserves (end of year in thousands of new cedis)	66,581	26,249	41,165	17,400	22,200	19,100	27,800	
Value of exports (in thousands of new cedis)	229,279	226,883	191,394	246,800	342,040	397,658	467,379	
Value of imports (in thousands of new cedis)	243,184	320,051	250,647	261,523	314,032	354,391	419,046	
Foreign-exchange reserves as percent of exports	29.04	11.57	21.51	7.05	6.49	4.80	5.95	
Foreign-exchange reserves as percent of imports	27.38	8.20	16.42	6.65	7.07	5.39	6.63	

Sources and note: See next page.

Sources and note for Table A.3a

Sources: Value of exports

- CBS, *Economic Survey*, 1969, Table 14, p. 35, for years 1959 through 1969.  
 CBS, *Statistical Yearbook*, 1965-66, Table 109, p. 145, for years 1956 through 1958.  
 Ghana Commercial Bank, *Annual Report for the Year Ended 30th June*, 1971, Table 1, p. 44, for year 1970.

Value of imports

- CBS, *Economic Survey*, 1969, Table 14, p. 35, for years 1959 through 1969.  
 CBS, *Statistical Yearbook*, 1965-66, Table 109, p. 145, for years 1956 through 1958.  
 Ghana Commercial Bank, *Annual Report for the Year Ended 30th June*, 1971, Table 1, p. 44, for year 1970.
- Foreign exchange reserves
- 1956: Bank of Ghana, *Report of the Board for the Financial Year Ended 30th June*, 1960, Appendix 5.  
 1957 through 1962: Bank of Ghana, *Report of the Board for the Financial Year Ended 30th June*, 1965, Table 9.  
 1963 through 1966: Bank of Ghana, *Quarterly Economic Bulletin*, July-December, 1966, Table XIII.  
 1967 through 1970: Bank of Ghana, *Report of the Board for the Financial Year Ended 30th June*, 1971, Statement 20, p. 60.

Note: Reserves include Central Bank, Commercial banks and Treasury and other official institutions for 1963-1969.

Reserves include Treasury, Bank of Ghana, Cocoa Marketing Board, banking institutions, local authorities, higher educational institutions and other official and private institutions for 1956 through 1964.

Reserves are as of end of period, valued at the exchange rate existing at the time.

Table A-4a  
Ghana: commodity composition of trade, 1956-1970 (in thousands of new cedis and in percentages)

## Imports by SITC Sections

0	1		2		3		4		5		6			
	Value	Percent of total	Value	Percent of total	Value	Percent of total	Value	Percent of total	Value	Percent of total	Value	Percent of total		
1956	28,238	15.88	8,498	4.78	638	0.36	10,180	5.72	238	0.13	12,406	6.98	65,348	36.75
1957	34,876	18.04	7,848	4.06	734	0.38	13,690	7.08	332	0.17	14,388	7.44	68,942	35.65
1958	29,348	17.35	7,462	4.41	922	0.54	12,560	7.42	384	0.23	13,216	7.81	58,038	34.30
1959	38,230	16.91	8,540	3.78	744	0.33	12,620	5.58	280	0.12	17,974	7.95	72,966	32.28
1960	42,008	16.21	7,576	2.92	684	0.26	13,578	5.24	444	0.17	19,032	7.34	79,590	30.70
1961	52,472	18.64	7,022	2.49	1,750	0.62	13,066	4.64	908	0.32	20,242	7.19	88,924	31.58
1962	46,278	19.43	2,652	1.11	1,576	0.66	14,641	6.15	646	0.27	19,353	8.13	81,081	34.05
1963	36,903	14.16	2,388	0.92	1,860	0.71	15,268	5.86	1,678	0.64	19,153	7.35	84,271	32.34
1964	40,083	16.50	1,414	0.58	1,994	0.82	14,149	5.82	2,898	1.19	14,974	6.16	79,325	32.65
1965	35,329	11.11	2,299	0.72	3,077	0.97	13,169	4.14	2,999	0.94	20,147	6.33	108,444	34.09
1966	39,287	15.64	2,402	0.96	2,327	0.93	10,579	4.21	2,615	1.04	16,621	6.62	77,109	30.70
1967	43,210	16.52	3,403	1.30	3,672	1.40	15,474	5.92	3,427	1.31	32,756	12.53	72,258	27.63
1968	51,013	16.25	5,035	1.60	6,277	2.00	21,488	6.84	3,952	1.26	48,349	15.40	76,265	24.29
1969	55,178	15.57	1,611	0.45	5,393	1.52	22,871	6.45	5,862	1.65	55,093	15.55	97,438	27.49
1970	79,474	18.97	3,924	0.94	9,420	2.25	24,358	5.81	3,835	0.92	66,874	15.96	100,847	24.07

Table A-4a (continued)

## Exports by SITC sections

	0	1	2	3	4	5	6
	Value	Percent of total	Value	Percent of total	Value	Percent of total	Value
1956	104,392	66.54	36,412	23.21			15,964
1957	102,206	62.97	59,384	36.59			598
1958	125,532	67.34	59,898	32.13			712
1959	140,876	69.36	61,354	30.21			708
1960	136,312	65.97	69,396	33.58			728
1961	142,986	68.49	61,120	29.28	28	0.01	1,908
1962	143,148	68.97	55,654	26.81	20	0.01	1,908
1963	144,693	74.15	44,084	22.59	152	0.08	3,098
1964	147,792	70.83	53,570	25.67	172	0.09	2,538
1965	150,110	72.23	50,259	24.18	10	0.004	2,314
1966	119,584	68.60	46,890	26.90	2,118	1.02	1,644
1967	159,005	70.93	47,538	21.21	7	0.003	837
1968	219,261	70.05	59,265	18.94	39	0.02	9,347
1969	189,292	61.54	63,507	20.65	325	0.14	27,443
1970	337,478	73.33	61,745	13.42	12	0.003	44,878
					79	0.03	33,206
					267	0.06	
					402	0.09	
					402	0.09	

Table A-4a (continued)

## Imports by SITC sections

	7		8		9		Total
	Value	Percent of total	Value	Percent of total	Value	Percent of total	
1956	34,220	19.24	14,492	8.15	3,574	2.01	177,834
1957	33,004	17.07	16,060	8.31	3,496	1.81	193,370
1958	30,360	17.94	13,894	8.21	3,002	1.77	169,186
1959	51,212	22.66	20,248	8.96	3,234	1.43	226,044
1960	67,432	26.01	25,278	9.75	3,598	1.39	259,222
1961	66,166	23.50	26,876	9.55	4,136	1.47	281,562
1962	51,784	21.74	17,651	7.41	2,492	1.05	238,156
1963	74,141	28.45	21,347	8.19	3,604	1.38	260,611
1964	71,259	29.33	15,045	6.19	1,834	0.75	242,974
1965	104,096	32.72	23,249	7.31	5,309	1.67	318,116
1966	82,190	32.72	15,160	6.04	2,907	1.16	251,199
1967	70,424	26.93	15,350	5.87	1,529	0.58	261,503
1968	85,968	27.38	13,950	4.44	1,637	0.52	313,935
1969	94,518	26.67	14,601	4.12	1,827	0.52	354,391
1970	108,132	25.80	16,376	3.91	5,805	1.39	419,047

Table A-4a (continued)

## Exports by SITC sections

	7		8		9		Others		Total
	Value	Percent of total	Value	Percent of total	Value	Percent of total	Value	Percent of total	
1956							126	0.08	156,894
1957							116	0.07	162,304
1958							264	0.14	186,406
1959							166	0.08	203,104
1960							204	0.10	206,640
1961	912	0.44	710	0.34	754	0.36			208,772
1962	1,946	0.94	682	0.33	2,440	1.18			207,556
1963	1,494	0.77	216	0.11	1,472	0.75			195,134
1964	972	0.47	224	0.11	1,186	0.57			208,656
1965	1,522	0.73	86	0.04	1,772	0.85			207,823
1966	2,909	1.67	407	0.23	2,317	1.33			174,332
1967	536	0.24	114	0.05	4,889	2.18			224,156
1968	388	0.12	69	0.02	4,074	1.30			312,990
1969	257	0.08	107	0.03	6,650	2.16			307,596
1970	240	0.05	95	0.02	26,131	5.68			460,232

Table A-4a (concluded)

## Imports by end-use

	1. Consumer goods		2. Materials		3. Capital equipment		4. Fuels and lubricants		Total
	Value	Percent of total	Value	Percent of total	Value	Percent of total	Value	Percent of total	
1956	96,278	54.14	45,730	25.71	26,920	15.14	8,910	5.01	177,838
1957	109,932	56.85	46,486	24.04	25,024	12.94	11,928	6.17	193,370
1958	92,200	54.50	42,340	25.03	23,488	13.88	11,158	6.60	169,186
1959	113,768	50.33	58,908	26.06	42,412	18.76	10,960	4.85	226,048
1960	129,496	49.95	61,840	23.85	56,106	21.64	11,792	4.55	259,234
1961	141,189	49.43	79,027	27.66	53,470	18.72	11,975	4.19	285,661
1962	111,808	47.88	65,936	28.24	42,696	18.29	13,050	5.59	233,490
1963	102,792	39.42	79,076	30.32	64,483	24.73	14,423	5.53	260,774
1964	81,584	33.54	82,762	34.03	64,900	26.68	13,973	5.75	243,219
1965	109,887	34.33	100,689	31.46	96,618	30.19	12,857	4.02	320,051
1966	77,652	30.98	86,005	34.31	76,637	30.58	10,353	4.13	250,647
1967	85,716	32.84	100,064	38.34	59,887	22.94	15,352	5.88	261,019
1968	90,612	28.85	123,939	39.47	78,261	24.92	21,220	6.76	314,032
1969	107,040	30.20	141,958	40.06	82,729	23.34	22,664	6.40	354,391

Notes: SITC 1-digit sections are: 0, food and live animals; 1, beverages and tobacco; 2, crude materials; 3, mineral fuels, lubricants; 4, animal and vegetable oils; 5, chemicals; 6, manufactured goods; 7, Machinery and transport equipment; 8, Misc. manufactured articles; 9, Others.

## Sources: Exports and imports by SITC classification

1956, United Nations, *Yearbook of International Trade Statistics*, 1959.

1957 through 1960, United Nations, *Yearbook of International Trade Statistics*, 1961.

1961, United Nations, *Yearbook of International Trade Statistics*, 1964.

1962 through 1963, United Nations, *Yearbook of International Trade Statistics*, 1965.

1964, United Nations, *Yearbook of International Trade Statistics*, 1967.

1965, United Nations, *Yearbook of International Trade Statistics*, 1968.

1966 through 1969, United Nations, *Yearbook of International Trade Statistics*, 1969.

1970, CBS, *External Trade Statistics*, December 1970.

## Sources: Imports by end-use classification

1966 through 1969, Central Bureau of Statistics, *Economic Survey*, 1969, p. 37.

1964 through 1965, Central Bureau of Statistics, *Economic Survey*, 1968, pp. 125, 126.

1963, Central Bureau of Statistics, *Economic Survey*, 1966, p. 31.

1961 through 1962, Central Bureau of Statistics, *Economic Survey*, 1963, p. 43.

1956 through 1960, Central Bureau of Statistics, *Statistical Year Book*, 1963, p. 133.

Table A-4b  
Ghana: geographic composition of trade, 1959-1969  
(in thousands of new cedis and in percentages)

Year	Sterling area excluding African countries				European economic community			
	Exports		Imports		Exports		Imports	
	Values to	Percent of total to	Values from	Percent of total from	Values to	Percent of total to	Values from	Percent of total from
1956	68,462	39.53	96,249	54.13	33,000	32.56	33,400	18.79
1957	73,904	40.34	94,540	48.88	54,000	29.48	37,000	19.13
1958	84,648	40.46	84,721	50.07	69,400	33.17	32,200	19.03
1959	76,903	33.91	105,124	46.52	85,800	37.83	50,400	22.30
1960	78,988	34.05	103,824	40.05	81,478	35.12	66,254	25.56
1961	72,557	31.52	114,990	40.26	73,393	31.88	61,966	21.69
1962	78,585	34.16	89,482	38.33	64,342	27.97	52,174	22.35
1963	67,863	31.17	94,106	36.08	62,213	28.58	66,057	25.33
1964	58,814	25.65	77,394	31.82	67,414	29.40	55,924	22.99
1965	51,718	22.80	88,008	27.50	63,091	27.81	68,476	21.40
1966	53,065	27.73	75,244	29.95	42,060	21.98	53,178	21.17
1967	81,312	32.92	90,798	34.69	48,947	19.82	53,139	20.30
1968	108,879	31.83	102,060	32.50	88,266	25.81	63,894	20.35
1969	121,111	30.46	110,116	31.07	101,011	25.40	74,346	20.98

Table A-4b

	Dollar area				Centrally planned economies			
	Exports		Imports		Exports		Imports	
	Values to	Percent of total to	Values from	Percent of total from	Values to	Percent of total to	Values from	Percent of total from
1956	33,600	19.40	10,000	5.62	4,200	2.42	3,600	2.02
1957	30,800	16.81	15,000	7.76	12,400	6.77	5,400	2.79
1958	41,400	19.79	13,400	7.92	800	0.38	5,200	3.07
1959	44,800	19.75	20,200	8.94	4,800	2.12	7,600	3.36
1960	36,874	15.90	21,490	8.29	16,774	7.23	-11,084	4.28
1961	56,782	24.66	31,407	10.99	10,940	4.75	15,614	5.47
1962	45,034	19.57	26,479	11.34	20,418	8.87	17,408	7.46
1963	36,754	16.88	22,853	8.76	29,830	13.70	28,597	10.96
1964	52,436	22.87	28,176	11.58	27,108	11.82	38,598	15.87
1965	42,107	18.56	33,758	10.55	48,264	21.27	84,158	26.30
1966	32,407	16.93	43,868	17.46	40,233	21.02	38,106	15.17
1967	44,444	17.99	47,907	18.31	37,058	15.00	21,834	8.34
1968	70,493	20.61	67,447	21.48	31,651	9.25	24,149	7.69
1969	82,134	20.65	71,803	20.26	28,804	7.24	31,209	8.81



Table A-4b (concluded)

Year	African countries				Japan			
	Exports		Imports		Exports		Imports	
	Values to	Percent of total to	Values from	Percent of total from	Values to	Percent of total to	Values from	Percent of total from
1956	4,778	2.76	11,382	6.40	—	—	18,000	10.12
1957	3,864	2.11	12,774	6.60	—	—	20,600	10.65
1958	5,250	2.51	12,728	7.52	—	—	13,600	8.04
1959	4,712	2.08	16,170	7.15	1,200	0.53	17,200	7.61
1960	8,144	3.51	17,762	6.85	1,790	0.77	21,674	8.36
1961	6,492	2.82	20,989	7.35	3,250	1.41	22,077	7.73
1962	8,110	3.53	15,642	6.70	4,930	2.14	15,481	6.63
1963	3,992	1.83	17,643	6.76	7,400	3.40	16,105	6.17
1964	4,626	2.02	22,760	9.36	8,172	3.56	13,034	5.36
1965	4,360	1.92	13,225	4.13	5,225	2.30	13,855	4.33
1966	4,041	2.11	10,723	4.27	9,388	4.91	13,348	5.31
1967	4,618	1.87	11,100	4.24	17,004	6.88	15,749	6.02
1968	3,744	1.09	11,974	3.81	23,108	6.76	17,332	5.52
1969	3,727	0.94	17,297	4.88	28,204	7.09	20,772	5.86

Table A-4b

Year	Others (including parcel post)				Totals	
	Exports		Imports		Exports	Imports
	Values to	Percent of total to	Values from	Percent of total from	Values	
1956	6,160	3.56	5,169	2.91	173,200	177,800
1957	8,232	4.49	8,086	4.18	183,200	193,400
1958	7,702	3.68	7,351	4.34	209,200	169,200
1959	8,585	3.78	9,306	4.12	226,800	226,000
1960	7,918	3.41	17,146	6.61	231,966	259,234
1961	6,807	2.96	18,607	6.51	230,221	285,649
1962	8,646	3.76	16,815	7.20	230,064	233,481
1963	9,655	4.43	15,457	5.93	217,708	260,819
1964	10,710	4.67	7,334	3.02	229,280	243,220
1965	12,116	5.34	18,571	5.80	226,881	320,051
1966	10,199	5.33	16,742	6.66	191,393	251,209
1967	13,611	5.51	21,180	8.09	246,994	261,707
1968	15,899	4.65	27,176	8.65	342,040	314,032
1969	32,667	8.21	28,848	8.14	397,658	354,391

Sources: 1966 through 1969, Central Bureau of Statistics, *Economic Survey*, 1969, Table 21, p. 46.  
1965, Central Bureau of Statistics, *Economic Survey*, 1968, Table 21, p. 51.  
1964, Central Bureau of Statistics, *Economic Survey*, 1967, Table 18, p. 41.  
1961 through 1963, Central Bureau of Statistics, *Economic Survey*, 1965, Table 16, p. 39.  
1960, Central Bureau of Statistics, *Economic Survey*, 1963, Table 17, p. 48.  
1956 through 1959, Central Bureau of Statistics, *Statistical Year Book*, 1963, Tables 120, 121, and 122, pp. 120, 122, and 123.

Table A-5  
Ghana: Ventral government accounts, 1957/58-1969  
(in millions of new cedis)

	1957/58	1958/59	1959/60	1960/61
<b>I. Current revenue</b>				
(1) Income from property and entrepreneurship	6.712	8.598	7.670	13.968
(2) Taxes on production and expenditure	81.014	91.360	90.444	92.284
(3) Taxes on income and fines	16.012	16.138	14.866	17.836
(4) Grants	6.068	4.652	2.188	2.702
(5) Sales, fees and other items	10.346	13.074	13.900	17.410
Total current revenue	120.152	133.822	129.068	144.200
Less refund of revenue	0.104	0.126	0.118	0.336
Total net current revenue	120.048	133.696	128.950	143.864
<b>II. Current expenditure</b>				
(1) Consumption expenditure	54.660	63.152	68.638	90.140
(2) Interest on public debt	1.698	1.662	1.724	3.032
(3) Rent	0.168	0.532	0.440	0.644
(4) Subsidies	0.334	0.008	0.432	1.166
(5) Pensions	3.510	3.310	3.038	2.830
(6) Other transfers	18.036	22.612	26.320	36.178
Total current expenditure	78.406	91.276	100.592	143.868
III. Saving (=I-II)	41.640	42.420	28.358	9.878
<b>IV. Capital receipts</b>				
(1) Savings on current account	41.640	42.420	28.358	9.878
(2) Repayment of loans	0.182	0.196	0.190	0.372
(3) Capital taxes				
(4) Other capital receipts	4.652	4.802	2.984	4.286
(5) Capital transfers	0.072	-	11.204	22.254
(6) Borrowings	-	8.060	44.562	26.114
Total capital receipts	46.546	55.478	87.298	62.904
<b>V. Capital disbursements</b>				
(1) Capital expenditures	19.374	24.652	36.472	62.818
(2) Transfer payments	7.562	8.092	19.358	19.088
(3) Loans and advances	12.060	32.194	21.608	19.522
(4) Loan repayments	8.050	1.186	9.252	2.610
(5) Changes in reserves: (increase = +)	-0.502	-10.644	0.610	-41.134
Total capital disbursements	46.544	55.480	87.300	62.904

Notes: 1957/58 through 1960/61 are July-through-June fiscal years. 1960 through 1969 are calendar years.

Table A-5 (concluded)

1961	1962	1963	1964	1965	1966	1967	1968	1969
6.716	3.903	5.011	4.563	4.525	5.625	13.481	10.517	9.677
102.964	103.600	121.854	128.682	192.417	152.256	166.102	198.527	232.427
23.891	24.501	21.835	56.693	57.516	54.066	52.395	61.926	67.830
1.252	0.010	0.010	0.010	2.083	0.238	0.238	0.451	0.600
18.979	20.569	20.627	25.613	26.014	18.029	21.276	26.265	21.373
153.802	152.583	169.337	215.561	282.555	230.214	253.492	297.686	331.907
0.353	0.162	0.143	0.130	0.155	0.541	0.930	0.273	0.300
153.449	152.421	169.194	215.431	282.400	229.673	252.562	297.413	331.607
96.824	93.834	102.588	119.855	132.906	105.586	124.159	154.769	177.268
3.291	4.772	5.352	12.487	14.053	19.102	25.089	26.695	29.244
0.710	0.814	0.620	0.561	0.559	0.717	0.896	0.896	0.859
0.130	0.405	1.034	5.773	0.338	0.001	0.002	0.002	0.001
2.907	3.207	3.482	3.619	3.673	5.159	6.746	21.892	10.990
38.225	44.302	48.496	59.307	68.226	73.051	88.246	95.927	96.498
142.087	147.334	161.572	201.602	219.755	203.616	245.138	300.181	314.860
11.362	5.087	7.622	13.829	26.645	26.057	7.424	-2.768	16.776
11.362	5.087	7.622	13.829	26.645	26.057	7.424	-2.768	27.645
0.294	4.192	0.131	0.104	0.008	0.008	0.220	1.859	5.735
0.089	0.195	0.370	0.530	1.424	0.661	0.542	0.258	0.139
1.721	10.226	1.894	-6.014	6.717	9.807	18.253	24.186	2.346
19.692	0.024	0.010	37.240	-	-	-	-	-
36.019	78.986	132.565	89.008	103.700	137.307	56.529	99.392	77.993
69.177	98.710	142.592	134.697	138.494	173.840	82.968	122.927	113.858
69.862	76.698	69.118	83.020	101.305	46.561	41.582	48.639	44.879
20.923	23.955	35.598	44.924	40.666	18.199	27.017	18.701	11.324
38.479	-0.041	-8.480	-0.247	7.021	34.632	15.020	5.545	8.465
2.537	6.610	3.351	44.248	24.267	54.176	5.571	52.625	34.165
-62.625	-8.512	+43.004	-37.248	+1.235	+20.271	-6.222	-2.584	+4.154
69.176	98.710	142.591	134.697	174.494	173.839	82.968	122.926	102.987

Sources: 1961 through 1969, Central Bureau of Statistics, *Economic Survey*, 1969, Tables IV, V, VI, VII, pp. 110-113.

1957/58 through 1960/61, Central Bureau of Statistics, *Economic Survey*, 1963, Tables III, IV, V, VI, pp. 128-131.

## APPENDIX B

### TARIFF RATES AT SITC 1-DIGIT LEVEL

In Table II-1 of Chapter II we report our aggregate calculations of the effective exchange rates facing imports from 1955 through 1971, taking into account not only tariffs but also indirect taxes, surcharges, and other trade impediments operating on the price of imports. Full details of these effects for all years were not available at a disaggregated level of classification such as the SITC 1-digit sections. However, data on tariff collections were available on this disaggregated basis for the period 1955 through 1969. Because there is such a wide variation between sections, it is worth recording these details. Further, the conversion of the tariff rate into an effective exchange rate facilitates comparison between the pre-1967 and post-1967 situations. The data are contained in Table B-1.

Table B-1  
 Import tariff rates and effective exchange rates due to tariffs only by SITC 1-digit sections, 1955-1969  
 (tariff rates in percentages, effective exchange rates in new cedis per dollar)

Section Year	1		2		3		4			
	Food & L. anim. Tm	Bev. & tob. Tm	Crude mat. Tm	Fuels & lubric. Tm	Oils & fats Tm	Food & L. anim. EERm	Bev. & tob. EERm	Crude mat. EERm	Fuels & lubric. EERm	Oils & fats EERm
1955	2.1	0.73	141.1	1.72	1.1	0.72	42.8	1.02	-	0.71
1956	2.2	0.73	137.5	1.70	3.5	0.74	49.2	1.07	-	0.71
1957	2.1	0.73	122.3	1.59	3.8	0.74	45.3	1.04	-	0.71
1958	2.4	0.73	106.0	1.47	2.6	0.73	55.8	1.11	-	0.71
1959	2.3	0.73	99.3	1.42	3.8	0.74	61.3	1.15	-	0.71
1960	2.4	0.73	132.7	1.66	5.8	0.76	58.1	1.13	-	0.71
1961	8.3	0.77	138.4	1.70	23.0	0.88	91.8	1.37	0.4	0.72
1962	20.2	0.86	189.1	2.07	19.3	0.85	105.4	1.47	3.7	0.74
1963	30.2	0.93	218.7	2.28	29.2	0.92	120.6	1.58	13.9	0.81
1964	28.9	0.92	107.2	1.91	21.5	0.87	148.8	1.78	9.9	0.78
1965	36.2	0.97	66.4	1.19	71.2	1.22	52.2	1.09	11.0	0.79
1966	34.5	0.96	142.4	1.73	10.2	0.79	207.9	2.20	11.0	0.79
1967A	35.6	0.97	158.4	1.85	4.6	0.75	133.8	1.67	9.7	0.78
1967B	17.3	1.20	147.6	2.53	4.3	1.06	123.8	2.28	10.1	1.12
1968	12.3	1.15	80.2	1.84	3.9	1.06	92.0	1.96	10.2	1.12
1969	13.3	1.16	204.6	3.11	5.1	1.07	83.6	1.87	9.3	1.12

Notes: 1967A is January through June at the old official exchange rate (Nq 0.714/dollar).

1967B is July through December at the new official exchange rate (Nq 1.02/dollar).

Sources: CBS, *Quarterly Digest of Statistics*, 1956-1969 Issues (imports and import duties by section).

Table B-1. (concluded)

Section Year	5 Chemicals		6 Manufactures		7 Mach. & transp. E.		8 Misc. mfg.		9 NEC		Total Tm	EERm	EERm
	Tm	EERm	Tm	EERm	Tm	EERm	Tm	EERm	Tm	EERm			
1955	17.0	0.84	9.9	0.79	2.1	0.73	16.0	0.83	15.8	0.83	17.1	0.84	0.84
1956	16.5	0.83	11.1	0.79	2.2	0.73	16.9	0.84	17.6	0.84	17.1	0.84	0.84
1957	15.8	0.83	15.0	0.82	2.5	0.73	19.3	0.85	18.2	0.84	17.5	0.84	0.84
1958	15.9	0.83	14.0	0.81	2.9	0.73	18.2	0.84	18.6	0.85	17.6	0.84	0.84
1959	14.1	0.82	13.3	0.81	2.3	0.73	18.2	0.84	17.5	0.84	15.4	0.84	0.82
1960	14.3	0.82	18.0	0.84	3.6	0.74	19.8	0.86	17.6	0.84	17.0	0.84	0.84
1961	16.1	0.83	22.4	0.87	5.4	0.75	23.8	0.88	19.0	0.85	21.5	0.87	0.87
1962	19.1	0.85	26.0	0.90	3.8	0.74	25.1	0.89	18.5	0.85	25.9	0.90	0.90
1963	19.8	0.86	25.0	0.89	4.1	0.74	26.7	0.90	16.1	0.83	26.8	0.91	0.91
1964	22.0	0.87	25.8	0.90	3.3	0.74	24.6	0.89	116.3	1.55	27.9	0.91	0.91
1965	24.7	0.89	37.1	0.98	3.4	0.74	40.4	1.00	43.4	1.02	26.5	0.90	0.90
1966	20.1	0.86	32.2	0.94	4.9	0.75	35.5	0.97	13.2	0.81	30.8	0.93	0.93
1967A	14.1	0.81	26.9	0.91	6.8	0.76	25.4	0.90	40.6	1.00	29.0	0.92	0.92
1967B	10.9	1.13	31.8	1.34	6.5	1.09	22.9	1.25	29.1	1.32	25.9	1.28	1.28
1968	8.3	1.10	24.0	1.27	6.2	1.08	23.9	1.26	85.3	1.89	20.1	1.23	1.23
1969	6.8	1.09	16.2	1.19	6.9	1.09	22.3	1.25	32.0	1.35	17.1	1.19	1.19

## APPENDIX C

### FORMULAS, DATA, AND METHODS FOR CALCULATING RATES OF PROTECTION

This Appendix is for the reader interested in the details of how we derived the formulas and handled the various data problems encountered in calculating the rates of protection reported in Chapter III.

#### 1. Derivation of formulas

Given the usual relationship between the value of output ( $X_j$ ), the value of material inputs ( $\sum_i X_{ij}$ ), and value-added ( $V_j$ ) at free-trade prices, we want to know the way in which trade distortions affect each of the elements:

$$X_j = V_j + \sum_i X_{ij} \quad (\text{C.1})$$

To simplify the analysis we will assume fixed physical coefficients of production.<sup>1</sup>

If the quota is the binding constraint on imports, the set of distortions results in an inflation of equation (C.1) in the following way:

$$X_j(1 + rb_j)(1 + qr_j) = \{V_j(1 + f_j) + \sum_i X_{ij} [(1 + rb_i)(1 + t_i) + r_i + l_i]\}(1 + sd_j)$$

where (C.2)

$qr$  = the rate of excess of domestic price over world price due to the quota restriction;

$rb$  = the higher c.i.f. price charged importers due to the compulsory credit on imports, as a proportion of the c.i.f. free-trade price;

$f$  = the effective rate of protection of value-added;

$t$  = tariff rate on imports;

$sd$  = indirect tax rate on domestic production;

1. For a specification of the usual set of assumptions, see J. Clark Leith, "Substitution and Supply Elasticities in Calculating the Effective Protective Rate," *op. cit.*

$r$  = interest charge on compulsory credit on imports, as a proportion of the c.i.f. value;

$l$  = import-licensing fee as a proportion of the c.i.f. value.

The inflation of (C.1) to yield (C.2) involves the following elements: The left-hand side is inflated first, due to the effect of the compulsory credit on imports whereby all importers must obtain a 180-day credit from the supplier. As a result, the c.i.f. cost of competing imports is increased by some amount over and above what it would be in the absence of this requirement. Part of this increased cost appears as a higher invoice price and hence is part of the base on which subsequent distortions build. We have labeled this portion the rate  $rb$ . The remaining part enters as an interest charge which is not part of the invoiced cost but is nevertheless a part of the cost of goods to the importers. We have used the rate  $r$  for this part when it appears. The second inflation of the left-hand side is due to the quota premium.

On the right-hand side of (C.2) we consider first the material input costs. Importable inputs are inflated due to the 180-day credit scheme ( $rb_i$  and  $r_i$ ), input tariffs ( $t_i$ ) and an import-licence fee ( $l_i$ ). Manufacturers are exempt, from indirect taxes on inputs purchased for further processing; hence indirect taxes do not enter into the input cost structure. Second, the value-added is inflated by the residual, the effective rate of protection. Finally, the entire right-hand side is inflated by the domestic indirect taxes ( $sd$ ).

Our data reflect the protected situation; hence for estimation purposes we must deflate the protected data relationship:

$$X'_j = V'_j + \sum_i X'_{ij} \tag{C.3}$$

where the primes indicate values at protected prices. The deflation of (C.3) proceeds in exactly the same way as the inflation of (C.1) to yield (C.2), with one exception. Our output data are at ex-factory prices exclusive of domestic indirect taxes. Hence the left-hand side of (C.3) is deflated not by  $qr_j$ , but by the rate of ex-factory mark-up over free-trade prices, for which we use the symbol  $q_j$ .<sup>2</sup> This also means that we do not deflate the entire right-hand side by the domestic indirect tax rate. The deflation of (C.3) then is:

$$\frac{X'_j}{(1 + rb_j)(1 + q_j)} = \frac{V'_j}{1 + f_j} + \sum_i \frac{X'_{ij}}{(1 + rb_i)(1 + t_i) + r_i + l_i} \tag{C.4}$$

Solving for  $f_j$ , we obtain the effective rate of protection in the quota-constrained case, i.e., QR ERP<sub>j</sub>:

2. Algebraically,  $1 + q_j = (1 + qr_j)/(1 + sd_j)$ , or:  $q_j = (qr_j - sd_j)/(1 + sd_j)$ .



$$\text{QR ERP}_j = \frac{V'_j}{\frac{X'_j}{(1+rb_j)(1+q_j)} - \sum_i \frac{X'_{ij}}{(1+rb_i)(1+t_i) + r_i + l_i}} - 1 \quad (\text{C.5})$$

Equation (C.5) applies when the quota is the binding constraint on imports. When it is not, the left-hand side of (C.4) is deflated by the tariffs and indirect taxes, yielding:

$$\frac{X'_j(1+sd_j)}{(1+rb_j)(1+t_j)(1+sm_j) + r_j + l_j} = \frac{V'_j}{1+f_j} + \sum_i \frac{X'_{ij}}{(1+rb_i)(1+t_i) + r_i + l_i} \quad (\text{C.6})$$

where

$sm$  = indirect tax rate on duty paid value of imports,

$sd$  = indirect tax rate on ex-factory value of domestic output.

The domestic indirect tax rate appears because  $\overline{X'_j}$  is valued at ex-factory prices.

The difference between equations (C.4) and (C.6) lies solely on the left-hand side. This simplifies the test for whether or not the quota is binding. The quota is binding when the deflation of  $X'_j$  due to quotas exceeds the deflation due to tariffs and indirect taxes, i.e., when:

$$(1+rb_j)(1+q_j) > \frac{(1+rb_j)(1+t_j)(1+sm_j) + r_j + l_j}{(1+sd_j)} \quad (\text{C.7})$$

When the inequality (C.7) does not hold, we simply substitute the right-hand side of (C.7) for the left-hand side in the deflation of  $X'_j$  in (C.4) and (C.5).

Turning to the net rate of protection of output, in terms of the analysis above:

$$\text{NRP}_j = f_j \frac{V_j}{X_j} \quad (\text{C.8})$$

Equation (C.8) can be converted to values at protected prices, utilizing the following relationships obtained from comparing (C.1) and (C.4).

$$\begin{aligned} X_j &= X'_j / (1+q_j)(1+rb_j) \\ V_j &= V'_j / (1+f_j) \\ X_{ij} &= X'_{ij} / [(1+rb_i)(1+t_i) + r_i + l_i] \end{aligned} \quad (\text{C.9})$$

Substituting from (C.9) into (C.8) for the case of QR's yields:

$$\text{QR NRP}_j = (\text{QR ERP}_j) \cdot \frac{V_j'}{(1 + \text{QR ERP}_j)} \cdot \frac{(1 + q_j)(1 + rb_j)}{X_j'} \quad (\text{C.10})$$

Calculation of the protection due to tariffs and indirect taxes is done by first determining the input and output values at free-trade prices, shown on the left-hand side of the relationships (C.9) and then applying the set of tariffs and indirect taxes to the world price data.<sup>3</sup>

Given  $X_j$ ,  $X_{ij}$ , and  $V_j$ , we inflate the relationship (C.1) to obtain:

$$X_j [(1 + rb_j)(1 + t_j)(1 + sm_j) + r_j + l_j] = \{ V_j(1 + f_j) + \sum_i [X_{ij}((1 + rb_i)(1 + t_i) + r_i + l_i)] \} (1 + sd_j) \quad (\text{C.11})$$

Solving for  $f_j$  yields the effective rate of protection due to tariffs and indirect taxes,  $\text{TAR ERP}_j$ :

$$\text{TAR ERP}_j = \frac{[(1 + rb_j)(1 + t_j)(1 + sm_j) + r_j + l_j] / (1 + sd_j) - \sum_i a_{ij} [(1 + rb_i)(1 + t_i) + r_i + l_i]}{v_j} - 1 \quad (\text{C.12})$$

where  $a_{ij} = X_{ij}/X_j$  and  $v_j = V_j/X_j$ . And utilizing the value of  $\text{TAR ERP}_j$  obtained from (C.12), we can solve for the net rate of protection due to tariffs and indirect taxes,  $\text{TAR NRP}_j$ :

$$\text{TAR NRP}_j = \frac{(\text{TAR ERP}_j) V_j}{X_j} \quad (\text{C.13})$$

Finally, to calculate the surcharge-inclusive rates of protection, we inflate

3. It is important to note that in general, consideration of any change in the protective structure must use world price input and output values. In the case of a reduction in protection such as is implied in the hypothetical comparison of protection due to tariffs with the actual protection due to QR's, use of the original protected data would understate the protection in the new situation. See J. Clark Leith, "Across-the-Board Nominal Tariff Changes and the Effective Rate of Protection," *op. cit.*, p. 983.

(C.1) in the same way as we obtained (C.11) with the addition of  $t^*$ , which is the rate of surcharge on the c.i.f. value:

$$X_j [(1 + rb_j)(1 + t_j + t_j^*)(1 + sm_j) + r_j] \\ = \{ V_j (1 + f_j) + \sum_i [X_{ij} ((1 + rb_i)(1 + t_i + t_i^*) + r_i)] \} (1 + sd_j). \quad (C.14)$$

Solving for  $f_j$ , the effective rate of protection due to tariffs plus surcharges is:

$$\text{TAR} + \text{SCHG ERP}_j \\ = \frac{[(1 + rb_j)(1 + t_j + t_j^*)(1 + sm_j) + r_j] / (1 + sd_j) - \sum_i a_{ij} [(1 + rb_i)(1 + t_i + t_i^*) + r_i]}{v_j} - 1. \quad (C.15)$$

The net rate of protection is simply:

$$\text{TAR} + \text{SCHG NRP}_j = \frac{(\text{TAR} + \text{SCHG ERP}_j) V_j}{X_j} \quad (C.16)$$

## 2. Data sources and methods

### (a) Input-output data

For each establishment identified by an industry and establishment code we had the following information extracted from the CBS Industrial Survey returns:

#### (a) Finished goods:

- (1) for each item, quantity and value produced, sold, stocks at beginning and stocks at end;
- (2) for total only, sales and excise taxes paid.

#### (b) Materials:

- (1) for each item, quantity and value purchased and consumed, stocks at beginning and stocks at end;
- (2) for imported items, quantity and value of each item purchased and total customs duties paid.

#### (c) Fuels: for each item, quantity and value purchased and consumed, stocks at beginning and stocks at end.

#### (d) Electricity: quantity and value purchased, generated, sold and consumed.

The data we received required some editing. We initially checked for completeness of each establishment's entries and were forced to omit a few. We also omitted a number of essentially non-traded domestic sectors, such as bakeries and printing. For the remaining establishments we checked:

- (a) Addition of item values for total.
- (b) Implied versus stated stock changes. This revealed a number of omissions in individual item entries, and emphasized provision (c) below.
- (c) Inclusion of import duties in material values. Almost all establishments, contrary to CBS instructions, excluded import duties and transport charges from the factory-delivered values of materials purchased and consumed, but not from their stock figures. We added them in such cases.
- (d) Inclusion of capital equipment in purchase of materials. Several establishments included major capital equipment purchases in their material purchases, in some cases yielding negative value-added at domestic prices. We deducted them.
- (e) Major inputs omitted. A few establishments failed to include major inputs in their returns (e.g., one cocoa butter factory omitted cocoa beans). We omitted such establishments.

After the editing we were able to compute the output, input, and value-added data implied by the production and use relationships.<sup>4</sup> In addition, the sales and excise taxes paid enabled us to calculate the indirect tax rate on domestic production: we used the ratio of sales and excise taxes paid to sales.<sup>5</sup>

#### (b) Tariff and tax data

We had two possible types of sources for our tariff and tax data: the schedules and the amounts paid. Since our primary concern was with the actual rather than with some hypothetical protection, we opted for the duties and taxes paid as our best indicator of the actual tariff and tax-imposed price rises relevant for each product produced and used by an establishment.

(1) Protection of output. Each item of an establishment's output was matched with the appropriate SITC 6-digit item. There were a few exceptions to this rule. In some cases, output was not specified in sufficient detail to

- 4. We used production and input use rather than sales and input purchases to avoid problems of inventory changes.
- 5. The use of purchases and sales data for calculating the imported input tariffs and sales and excise tax rates involves a misstatement to the extent that the mix of material purchases differs from material use and the mix of product sales differs from the mix of production when the rates vary between items. However, because only totals were available, we had no alternative but to adopt this procedure.

permit exact matching. Hence we had to group two or more 6-digit items. These were

Product	SITC 6-digit groups
Distillery products	112-410, 112-420, 112-430, 112-440, 112-450
Pharmaceuticals	all 541
Furniture	821-019, 820-099
Shirts	841-101, 841-102, 841-103
Logs (export tax)	all 242
Timber (export tax)	all 243

For each competing item or group of items the tariff and sales tax rate was computed, using collections of tariffs and sales taxes from CBS, *Customs Duties Collections by Trade Classification*, 1968, unpublished; and imports from CBS, *External Trade Statistics*, December 1968. Given the tariff and sales tax on imports competing with each item of an establishment's output, we computed a weighted average combined tariff and sales-tax rate protecting the establishment's output, the weights being free-trade production proportions.

(2) Tariffs on inputs. Directly imported inputs are by far the most significant portion of importable inputs used by Ghanaian industries. This is because all manufacturers are granted major duty concessions on imports of inputs, and some are granted additional exemptions often to the extent of duty-free imports of inputs for the first several years of production. Hence the cost inflation due to input tariffs can vary between firms using identical inputs. For this reason we had to rely on reported duties paid on directly imported inputs to calculate the cost inflation due to input tariffs. The input tariff rate was calculated from the duties paid and import purchases data. In our subsequent calculations this was applied to use data.

(3) Other inputs. Electricity, fuels, and lubricants, in addition to materials, are part of the inputs. We assumed electricity to be valued at free-trade prices. Petroleum fuels and lubricants, however, are higher priced because of protection. The question is, by how much?

Ghana has a petroleum refinery that uses imported crude to produce propane gas, gasoline, kerosene, and various fuel and diesel oils. No lubricants are domestically produced. The refinery receives the imported crude from the Ghana Supply Commission, refines it for a fee, and returns the output to the Supply Commission, which sells to wholesalers. We have been unable to determine the extent to which the refining fee exceeds what it would be under free trade. Hence, as a minimum estimate of the tariff and tax rate on petroleum fuels and lubricants we computed the following ratio:

$$\frac{\text{duties and taxes on imported items} + \text{domestic taxes on domestic items}}{\text{c.i.f. values of imports} + \text{domestic production}}$$

Data for the numerator were from CBS, *Customs Duties Collections by Trade Classification*, 1968, unpublished; the import values from CBS, *External Trade Statistics*, December 1968; and domestic production from CBS, *Industrial Statistics*, 1966-1968, August 1970. The result was an average excess of 87.137 percent over free-trade cost of petroleum fuels and lubricants.

Because petroleum fuels and lubricants constitute a relatively small proportion of the input costs of the establishments covered, we used the average figure as our input tariff on petroleum fuels and lubricants. We assumed non-petroleum fuels (mostly firewood) to be unaffected by the tariff and tax structure.

(4) Other trade impediments. The 1 percent import licence fee is included in the calculations for 1968, but is dropped from the 1970 calculations because it was abolished effective December 31, 1968. For the cost of the 180-day credit scheme we used two alternative assumptions of the average across-the-board costs (see Chapter II, section 2): 8 percent and 15 percent, which pretty well brackets the possible averages. This is made up of 3 percent interest charge and a 5 percent or 12 percent higher price. Only the 8 percent assumption is reported in the text. The 15 percent assumption made little difference in the ranking, so is not reported separately. The results, however, are available on request.

(5) Special cases: exports and input subsidies. An industry that exports all or part of its product does not, of course, receive any protection of its exported output or may even face an export tax. These cases involved gold mining, bauxite mining, fruit squashes, kente weaving, cocoa butter and sawmilling. The nominal tariff-protecting output thus was set equal to zero, or the appropriate negative rate in the case of an export tax, and the import-licence fee and 180-day credit cost were also set equal to zero. Of the commodities covered in our data, the export tax applies only to lumber and logs. The average export tax rate for these was computed from the collections data as noted above.

There is a case of an input subsidy relative to costs under free trade. The two cocoa butter factories (only one is included in our results) purchase cocoa beans at a price lower than the export price received by the Cocoa Marketing Board. The subsidy rate was computed by taking the difference between actual per-ton cost paid by the factory and the average export unit value of cocoa beans for 1968 (the former from our establishment data and the latter from the trade data) as a proportion of the export unit value. The net subsidy rate amounted to 7.854 percent, which was treated as a negative input tariff of that rate.

(c) Supplementary information

There are a few industries whose domestic production nearly meets domestic demand. In these cases our assumption that the international price plus tariffs and taxes is the minimum rise in the domestic price is open to some doubt. We have indicated those industries in which domestic production exceeds 90 percent of domestic demand. This was done at the SITC 6-digit level, using our industry data and the trade statistics plus tariff and sales tax data from the collections.

A further piece of supplementary information concerns those items produced domestically that are under price control. While we are skeptical of the effectiveness of the price control legislation as it concerns the final consumer, the manufacturer is in a relatively conspicuous position and is less able to evade than the small retailer. To the extent then that the control price is a binding constraint on the price the manufacturer receives, our results overstate his protection. We have indicated the industries where this may be the case, drawing on the price control legislation contained in "The Price Control (Maximum Prices) Order, 1967" (L.I. 100).

## APPENDIX D

### DERIVATION OF PRODUCTION AND INPUT USE RESPONSES TO INPUT SUBSIDIES

Given the production function as defined in the text:

$$X = A K^\alpha L^\beta M_F^\delta M_D^\gamma \quad (\text{D.1})$$

we want to know what impact various subsidies might have on output and input use. We retain the assumptions made in the text: (a) the price of output is given to the producers, and (b) the prices of all inputs but one are given to the producers, and the remaining input is available only at increasing costs.<sup>1</sup>

Equation (D.1) can readily yield a unit cost function:

$$p_x = \frac{p_k^\alpha \cdot p_l^\beta \cdot p_{mf}^\delta \cdot p_{md}^\gamma}{c} \quad (\text{D.2})$$

where  $c = C\alpha^\alpha \beta^\beta \delta^\delta \gamma^\gamma$ , which is a constant, and the  $p$ 's represent unit prices of outputs and inputs.

Keeping  $p_x$  constant, we now introduce *ad valorem* subsidies on the prices of capital and imported materials at the rates  $\text{sub}_k$  and  $\text{sub}_{mf}$ :

$$p_x c = [p_k (1 - \text{sub}_k)]^\alpha \cdot [p_l (1 + dp_l/p_l)]^\beta \cdot [p_{mf} (1 - \text{sub}_{mf})]^\delta \cdot p_{md}^\gamma \quad (\text{D.3})$$

Recalling that the constraint on expanding output is the price of the one input available at increasing costs, we want to solve for the proportionate change in its price permitted by the subsidies on the other inputs (but with the output price constant). This is done by setting all other prices equal to unity (because we are only interested in proportionate price changes). Assume for the present that labor is the constraining input.<sup>2</sup> Then:

1. The method used here follows closely the approach we developed elsewhere in dealing with tariffs. See J. Clark Leith, "The Effect of Tariffs on Production, Consumption, and Trade: A Revised Analysis," *op. cit.*
2. The analysis is readily adjusted to handle a different input as the constraining one, which we do below.



$$1 = (1 - \text{sub}_k)^\alpha \cdot (1 + dp_l/p_l)^\beta \cdot (1 - \text{sub}_{mf})^\delta \cdot 1^\gamma. \quad (\text{D.4})$$

And solving for  $dp_l/p_l$ :

$$dp_l/p_l = [(1 - \text{sub}_k)^\alpha \cdot (1 - \text{sub}_{mf})^\delta]^{-1/\beta} - 1. \quad (\text{D.5})$$

The next step is to find the expression for change in the use of labor. This is given by  $dp_l/p_l$ , together with the elasticity of supply of labor to the using industry ( $e_l$ ):

$$\frac{dL}{L} = \frac{dp_l}{p_l} \cdot e_l. \quad (\text{D.6})$$

We also want to know by how much output expands. Defining  $a_l$  as the quantity of labor used per unit of output in the initial situation:

$$X \equiv L/a_l. \quad (\text{D.7})$$

With the introduction of subsidies:

$$X(1 + dX/X) = \frac{L(1 + dL/L)}{a_l(1 + da_l/a_l)}. \quad (\text{D.8})$$

And because (D.7) holds, then:

$$\frac{dX}{X} = \frac{1 + dL/L}{1 + da_l/a_l} - 1. \quad (\text{D.9})$$

To solve (D.9), we already have  $dL/L$  from (D.6), but we need to know  $da_l/a_l$ . Since  $\beta$  is the share of labor payments:

$$a_l \equiv \beta \frac{p_x}{p_l}. \quad (\text{D.10})$$

With the introduction of subsidies we obtain:

$$a_l(1 + da_l/a_l) = \beta \frac{p_x}{p_l(1 + dp_l/p_l)} \quad (\text{D.11})$$

and solve for  $da_l/a_l$  to obtain:

$$\frac{da_l}{a_l} = \frac{1}{1 + dp_l/p_l} - 1. \quad (\text{D.12})$$

Substituting from (D.5):

$$\frac{da_l}{a_l} = \frac{1}{[(1 - \text{sub}_k)^\alpha \cdot (1 - \text{sub}_{mf})^\delta]^{-1/\beta}} - 1. \quad (\text{D.13})$$

We can now substitute the expressions for  $dL/L$  and  $da_l/a_l$  into (D.9) to obtain:

$$\frac{dX}{X} = [1 + (dp_l/p_l)e_l] \cdot (1 + dp_l/p_l) - 1. \quad (D.14)$$

Finally, we want to know the changes in input use. Non-subsidized input use will expand in the same proportion as output, but use of subsidized inputs will expand relatively more. In the same way as we derived (D.14) we can use the relationships:

$$a_k \equiv \alpha \frac{p_x}{p_k}, \quad a_{mf} \equiv \delta \frac{p_x}{p_{mf}} \quad (D.15)$$

where the  $a$ 's are quantities per unit of output, to obtain:

$$\frac{da_k}{a_k} = \frac{1}{1 - \text{sub}_k} - 1 \quad (D.16)$$

and:

$$\frac{da_{mf}}{a_{mf}} = \frac{1}{1 - \text{sub}_{mf}} - 1.$$

Then, from expanding the relationships:

$$X \equiv \frac{K}{a_k}, \quad X \equiv \frac{M_f}{a_{mf}} \quad (D.17)$$

and solving for the proportionate changes in the quantity of capital and imported materials, we obtain:

$$\frac{dK}{K} = \frac{[1 + (dp_l/p_l)e_l] \cdot (1 + dp_l/p_l)}{1 - \text{sub}_k} - 1 \quad (D.18)$$

$$\frac{dM_F}{M_F} = \frac{[1 + (dp_l/p_l)e_l] \cdot (1 + dp_l/p_l)}{1 - \text{sub}_{mf}} - 1.$$

We now have expressions showing the expansion of output: equation (D.14) and the expansion of input uses: equations (D.6) and (D.18) in response to the introduction of subsidies where labor is the constraining input. If however the constraining input is domestic materials, the relevant equations are as follows – the relative change in the price of domestic materials is:

$$\frac{dp_{md}}{p_{md}} = [(1 - \text{sub}_k)^\alpha \cdot (1 - \text{sub}_{mf})^\delta]^{-1/\gamma} - 1. \quad (D.5')$$

The rates of expansion of input uses are:

$$\frac{dM_D}{M_D} = \frac{dp_{md}}{p_{md}} \cdot e_{md} \quad (\text{D.6}')$$

and:

$$\frac{dK}{K} = \frac{[1 + (dp_{md}/p_{md})e_{md}] \cdot (1 + dp_{md}/p_{md})}{1 - \text{sub}_k} - 1 \quad (\text{D.18}')$$

$$\frac{dM_F}{M_F} = \frac{[1 + dp_{md}/p_{md}]e_{md} \cdot (1 + dp_{md}/p_{md})}{1 - \text{sub}_{mf}} - 1.$$

Finally, the proportionate expansion of output is:

$$\frac{dX}{X} = [1 + dp_{md}/p_{md}]e_{md} \cdot (1 + dp_{md}/p_{md}) - 1. \quad (\text{D.14}')$$

## APPENDIX E

### DERIVATION OF FORMULAS – RATE OF CHANGE IN NEW CEDIS PER DOLLAR OF TRADEABLES

For a given commodity there are two important local currency prices. First there is the new-cedi price paid or received by domestic residents who are the ultimate purchasers or producers of tradeable goods,  $P_d$ . Second, there is another new-cedi price,  $P_f$ , which is the price paid or received at the frontier, and is the value that is subsequently translated into foreign exchange: for imports it is the before-duty price, and for exports it is the after-export-tax price. In other words,  $P_f$  is the new-cedi price at the ocean-side door of the customs shed. In addition, the price  $P_f$  may be denominated in dollars as  $P_{\$}$ .

If the devaluation is fully transmitted to the domestic price  $P_d$ , the change in the dollar price must be reflected fully in the price  $P_d$ . Thus the following relationship must hold, where  $r$  is the N¢/\$ exchange rate and the primes indicate the post-devaluation situation:

$$\frac{P'_d}{P_{\$}} = \frac{P'_f/r'}{P_f/r} = \frac{P'_d}{P_d} \quad (\text{E.1})$$

If however the devaluation is not fully transmitted, we can translate (E.1) into a relationship indicating the extent to which devaluation is reflected in domestic prices: the proportionate change in the new-cedis-per-dollar price facing domestic residents. The magnitude of the proportionate domestic price change relative to the base of the change in the dollar price is:<sup>1</sup>

$$\frac{\Delta (P_d/P_{\$})}{P_d/P_{\$}} = \frac{P'_d}{P_d} \cdot \frac{P_f}{P'_f} \cdot \frac{r'}{r} - 1 \quad (\text{E.2})$$

1. This follows from the definition of  $P_d/P_{\$}$  as  $P_d r/P_f$ . Hence the proportionate change is:

$$\frac{\Delta (P_d/P_{\$})}{P_d/P_{\$}} = \left[ \frac{P'_d r'}{P_f} - \frac{P_d r}{P_f} \right] \cdot \frac{P_f}{P_d r} = \frac{P'_d}{P_d} \cdot \frac{P_f}{P'_f} \cdot \frac{r'}{r} - 1.$$

In cases of infinitely elastic supply of imports or infinitely elastic demand for exports we can simplify (E.2). Since under this assumption  $P'_f/P_f = r'/r$ , the expression becomes:

$$\frac{\Delta (P_d/P_\$)}{P_d/P_\$} = \frac{P'_d}{P_d} - 1. \quad (\text{E.2}')$$

Our measures of the impact of the devaluation can be obtained in terms of relationships (E.2) or (E.2') as appropriate.

### 1. Exports

Here we are concerned with the extent of the change in the new-cedi price of exports received by domestic producers of export goods. There are a number of important points to note in the analysis of the Ghanaian case. First, the elasticity of demand facing some Ghanaian exports may be (and clearly is in the case of cocoa) less than infinity. Consequently relationship (E.2) rather than (E.2') holds. Devaluation shifts the demand curve upwards, in terms of local currency, by the proportion of the devaluation. Because of the less than infinitely elastic demand (assuming some positive elasticity of supply), the national export price rises proportionately less than the devaluation. However, as long as the export-tax rate remains constant the proportionate change in the producers' price equals the proportionate change in the national export price. For there to be a difference there must be some mechanism whereby the export tax rate changes.

This leads us to a second complication. Not all export taxes are explicit *ad valorem* rates. Some are implicit taxes and others are specific. In the cases of all the commodities handled by the State Cocoa Marketing Board (CMB), the export tax is a residual: the producer price is fixed by the CMB without direct reference to the export price.<sup>2</sup>

#### (a) Cocoa

The case of cocoa involves both the issue of less than infinitely elastic demand and an implicit export tax. This is illustrated in Figure E.1. The pre-devaluation foreign demand in terms of new cedis is the curve D, and the domestic supply curve is the curve S. The producer price of  $P_d$  must be explicitly increased by the CMB if the devaluation is to have any effect on export volume: if it were kept at  $P_d$  there would be no expansion of the quantity supplied, and the export price in terms of new cedis could rise to  $P'_f$ .\* For the devaluation to be fully transmitted, the proportionate change in the

2. There is also an export tax paid by the CMB, but this simply affects the initial distribution of the total implicit tax between the government treasury and the CMB.

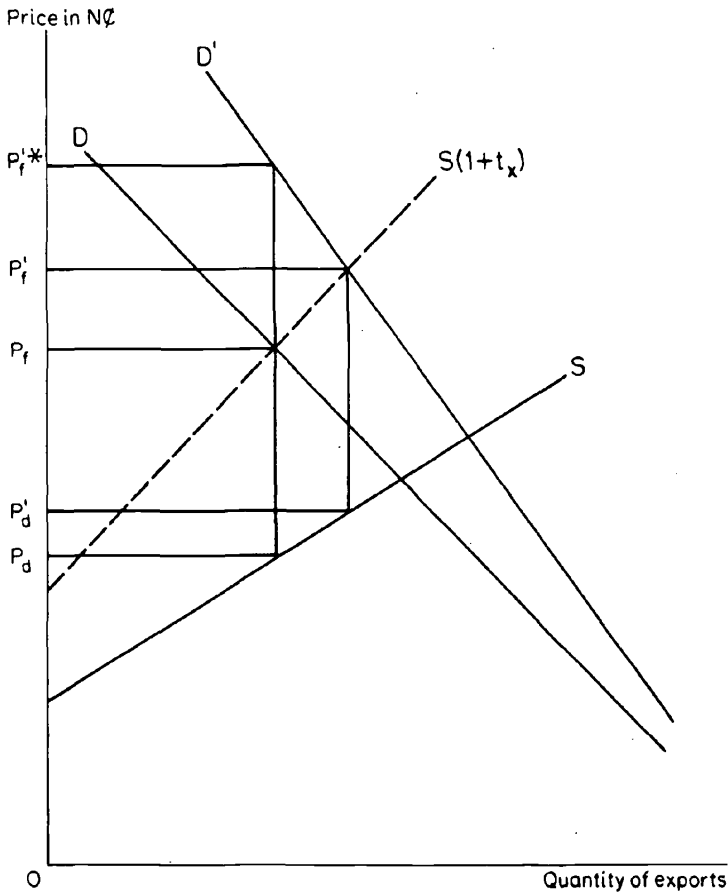


Fig. E.1. Devaluation and domestic market for exportables.

producer price [i.e.  $(P'_d - P_d)/P_d$ ] must be equal to what the proportionate change in the foreign price would be if the export tax rate were to remain constant. To accomplish this graphically we draw an imaginary curve  $S(1+t_x)$  above the supply curve  $S$  by the proportion of the existing tax rate  $t_x (= P'_d \cdot P'_f / OP_d)$ . For the export-tax rate to remain constant, the producer price must rise to  $P'_d$ , yielding a foreign price  $P'_f$ . In other words,  $(P'_d - P_d)/P_d$  must equal  $(P'_f - P_f)/P_f$ .

To determine the rate  $(P'_f - P_f)/P_f$ , given the rate devaluation and the demand and supply elasticities is the familiar incidence problem. We want to

know  $P'_f - P_f$  relative to  $P'_f - P_f$ , and both can be expressed *vis-à-vis*  $P_f$ . The solution for linear demand and supply curves is:

$$\frac{P'_f - P_f}{P_f} = \frac{dr}{r} \cdot \left[ \frac{n}{n-e} \right] \quad (\text{E.3})$$

where  $dr/r$  is the rate of devaluation and  $n$  and  $e$  are the demand and supply elasticities for Ghana.<sup>3</sup>

The actual magnitudes to be inserted in (E.3) are of course a problem. For the short-run (one to three years) some recent estimates of demand and supply elasticities yield  $n = -0.58$  and  $e = 0.17$  over the range relevant at the time of the devaluation.<sup>4</sup> Plugging these into (E.3):

$$\frac{P'_f - P_f}{P_f} = 0.4285 \left[ \frac{-0.58}{-0.58 - 0.184} \right] = 0.325.$$

In sum, to transmit the devaluation fully, the producer price would have to have been increased by about 33 percent, and this would have resulted in a new-cedi export price increase of the same percentage.<sup>5</sup>

#### (b) Timber

Another case of interest is timber, where the export taxes are specific.

3. The proof proceeds by noting:

$$\frac{P'_f - P_f}{P_f} = \frac{dr}{r} + \frac{dq}{q} \cdot \frac{1}{n}, \quad \text{where } dq/q \text{ is the proportionate change in the quantity}$$

demanded along the original demand curve. With some manipulation:

$$\frac{P'_f - P_f}{P_f} \left[ 1 - \frac{e}{n} \right] = \frac{dr}{r}, \quad \text{and hence: } \frac{P'_f - P_f}{P_f} = \frac{dr}{r} \cdot \frac{n}{n-e}.$$

4. M.J. Bateman, "Cocoa Study," *op. cit.*, finds that short-run supply elasticities are: for the Colony area (39 percent of output in 1966/67)  $e = 0.1419$ ; and Ashanti/Brong-Ahafo area (60 percent of output in 1966/67)  $e = 0.2146$ . The average, weighted by 1966/67 output is:  $e = 0.1840$ . On the demand side his estimates of the elasticity facing Ghana depend on world price and market share. At a world price of 25 cents per pound and a market share of 29 percent, which approximates the situation for the 1966/67 crop year, interpolation yields a short run  $n = -0.58$ .
5. Note that we are considering only the question of the appropriate short-run response of the CMB in order to fully transmit the effect of the devaluation, given the short-run demand and supply elasticities for Ghana. The long-run issue of the appropriate producer price obviously requires a full specification of the objective function given the long-run demand and supply elasticities, both of which are considerably larger than in the short run. (See Chapter II, section 6.)

Here, in the absence of any change in the tax structure or specific charges,<sup>6</sup> the export tax rate would decline and prices paid domestic producers would rise proportionately more than the devaluation.

### (c) Primary commodity exports

Finally, world prices of many of the primary commodity exports are constantly shifting. This can be thought of as movement of the demand curve facing Ghana. Hence as long as the export-tax rate is constant, the price facing domestic producers is a constant proportion of the dollar price, and the devaluation would be fully transmitted. But in making before-after comparisons as we do in the text, when export taxes are not explicit rates or are specific, the time period chosen for the before-after comparisons will, perhaps seriously, affect the results of our calculations. Nevertheless, whatever time period is under consideration, the appropriate comparison is between the change in the domestic price and the change in the export price.

## 2. Imports

The situation of early 1967 (most imports constrained by licences) is illustrated in Figure E.2. The curve  $ED$  is the excess demand for imports and  $P_f$  is the world price in terms of new cedis at the pre-devaluation exchange rate. Assuming an infinitely elastic supply of imports, and given an import licence valued at  $(OQ_1)$  ( $OP_f$ ) new cedis, the quantity of imports is restricted to  $Q_1$ . When this quantity is placed on the domestic market for resale, it eventually fetches a price of  $OP_d$ . The price  $P_f(1+t_m)$ , where  $t_m$  is the *ad valorem* tariff rate on imports, is irrelevant in setting the domestic price level and hence in determining the level of imports. When devaluation occurs, assuming the dollar value of licences is kept constant, the c.i.f. value of the licences in terms of new cedis increases by the proportion of the devaluation to  $(OQ_1)$  ( $OP'_f$ ), and the duty-paid price rises to  $P'_f(1+t_m)$ . Depending on the height of  $P'_f(1+t_m)$  relative to  $P_d$ , the devaluation wipes out part or all of the premium attributable to the licence, and the price to domestic purchasers of imports rises not at all, or by less than the proportion of the devaluation. We have drawn Figure E.2 such that the licensee's premium is not entirely wiped out, and the price paid by ultimate purchasers is unchanged. (In terms of the foreign-exchange market, Figure V.1 in the text, this occurs when the postdevaluation price of foreign exchange is less than  $rm_0^*$ .) Of course, even when the licensee's premium is entirely eaten up by devaluation, the proportionate change in the domestic price will be less than

6. The tax is specific in local currency. And as long as foreign demand elasticity is (algebraically) less than zero, the local currency pre-tax price rises. Hence the tax rate declines.



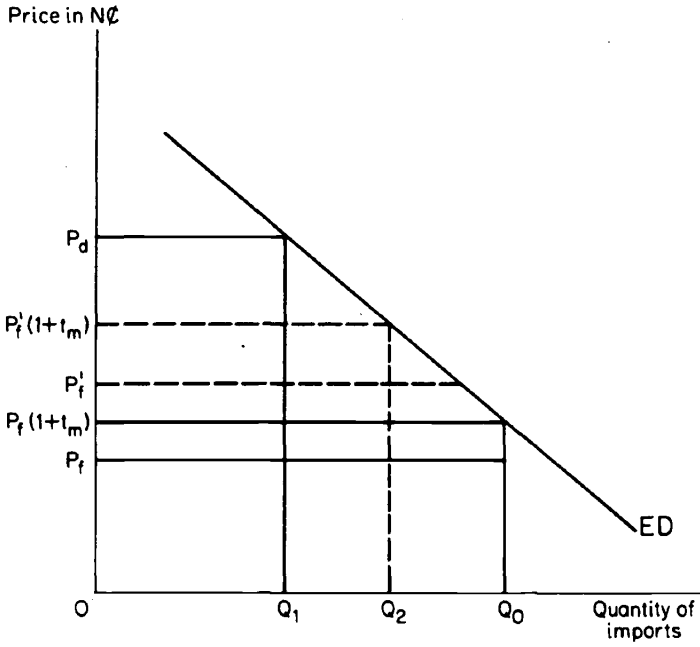


Fig. E.2. Devaluation and domestic market for importables.

the devaluation. In sum, it is the change in domestic price  $P_d$  that we want to measure as an indicator of the impact of devaluation on the licence-constrained situation of 1967.

## APPENDIX F 1

### DEFINITION OF CONCEPTS USED IN THE PROJECT

#### *Exchange rates*

(1) *Nominal exchange rate*: The official parity for a transaction. For countries maintaining a single exchange rate registered with the International Monetary Fund, the nominal exchange rate is the registered rate.

(2) *Effective exchange rate (EER)*: The number of units of local currency actually paid or received for a one-dollar international transaction. Surcharges, tariffs, the implicit interest foregone on guarantee deposits, and any other charges against purchases of goods and services abroad are included, as are rebates, the value of import replenishment rights, and other incentives to earn foreign exchange for sales of goods and services abroad.

(3) *Price-level-deflated nominal exchange rate*: The nominal exchange rate deflated in relation to some base period by the price level index of the country.

(4) *Price-level-deflated EER (PLD-EER)*: The EER deflated by the price level index of the country in question.

(5) *Purchasing-powerparity adjusted exchange rate*: The relevant (nominal or effective) exchange rate multiplied by the ratio of the foreign price level to the domestic price level.

#### *Devaluation*

(1) *Gross devaluation*: The change in the parity registered with the IMF (or, synonymously in most cases, *de jure* devaluation).

(2) *Net devaluation*: The weighted average of changes in EER's by classes of transactions (or, synonymously in most cases, *de facto* devaluation).

(3) *Real gross devaluation*: The gross devaluation adjusted for the increase in the domestic price level over the relevant period.

(4) *Real net devaluation*: The net devaluation similarly adjusted.

#### *Protection concepts*

(1) *Explicit tariff*: The amount of tariff charged against the import of a good

as a percent of the import price (in local currency at the nominal exchange rate) of the good.

(2) *Implicit tariff* (or, synonymously, tariff equivalent): The ratio of the domestic price (net of normal distribution costs) minus the c.i.f. import price, to the c.i.f. import price in local currency.

(3) *Premium*: The windfall profit per dollar of imports accruing to the recipient of an import license. It is the difference between the domestic selling price (net of normal distribution costs) and the landed cost of the item (including tariffs and other charges). The premium is thus the difference between the implicit and the explicit tariff (including other charges) times the nominal exchange rate.

(4) *Nominal tariff*: The tariff — either explicit or implicit, as specified — on a commodity.

(5) *Effective tariff*: The explicit or implicit tariff on value-added as distinct from the nominal tariff on a commodity.

(6) *Domestic resource cost*: The value of domestic resources (evaluated at “shadow” or opportunity cost prices) employed in earning or saving a dollar of foreign exchange (in the value-added sense) when producing a good domestically.

## APPENDIX F 2

### DELINEATION OF PHASES USED IN TRACING THE EVOLUTION OF EXCHANGE CONTROL REGIMES

To achieve comparability of analysis among different countries, each author of a country study was asked to identify the chronological development of his country's payments regime through the following phases. There was no presumption that a country would necessarily pass through all the phases in chronological sequence. Detailed description of the phases will be found in Bhagwati and Krueger, *Exchange Control, Liberalization, and Development: Experience and Analysis* (publication forthcoming).

*Phase I:* During this period, quantitative restrictions on international transactions are imposed and then intensified. They generally are initiated in response to an unsustainable payments deficit and then, for a period, are intensified. During the period when reliance upon quantitative restrictions as a means of controlling the balance of payments is increasing, the country is said to be in Phase I.

*Phase II:* During this phase, quantitative restrictions are still intense, but various price measures are taken to offset some of the undesired results of the system. Heightened tariffs, surcharges on imports, rebates for exports, special tourist exchange rates, and other price interventions are used in this phase, but primary reliance is placed on quantitative restrictions.

*Phase III:* This phase is characterized by an attempt to systematize the changes which take place during Phase II. It generally starts with a formal exchange-rate change and may be accompanied by removal of some of the surcharges, etc., imposed during Phase II and reduced reliance upon quantitative restrictions. Phase III may be little more than a tidying-up operation (in which case the likelihood is that the country will re-enter Phase II), or it may signal the beginning of the removal of reliance upon quantitative restrictions.

*Phase IV:* If the changes in Phase III result in adjustments within the country so that liberalization can continue, the country is said to enter Phase IV. The necessary adjustments generally include increased foreign exchange earnings and gradual relaxation of quantitative restrictions. The latter relaxation may take the form of changes in the nature of quantitative restrictions or of increased foreign exchange allocations, and thus reduced premia, under the same administrative system.

*Phase V:* This is a period during which an exchange regime is fully liberalized. There is full convertibility on current account, and quantitative restrictions are not employed as a means of regulating the *ex-ante* balance of payments.

## APPENDIX F 3

### IMPORTANT GHANAIAN NAMES AND ABBREVIATIONS

- Acheampong, Col. I.K. - Chairman of National Redemption Council, 1972-.
- Afrifa, Brigadier A.A. - Member of National Liberation Council and Commissioner of Finance, later Chairman of National Liberation Council, 1966-1969.
- Busia, K.A. - Prime Minister during entire period of elected Progress Party government, 1969-1972.
- CBS - Central Bureau of Statistics.
- CMB - State Cocoa Marketing Board.
- CPP - Convention Peoples Party, founded and led by Nkrumah.
- Danquah, J.B. - "Doyen" of Ghanaian politics, one of the early leaders of the independence movement.
- Guggisberg, Sir F.G. - British Governor of the Gold Coast, 1919-1927.
- Mensah, J.H. - Commissioner of Finance in the NLC government, and Minister of Finance in the Busia government, 1968-1972.
- N¢ - New cedi, Ghanaian local currency unit. There have been a number of changes in the internal designation and scaling of the local currency unit, but to facilitate comparisons of values, throughout the period of this study we have converted all local currency values to N¢. These changes are entirely independent of changes in the foreign-exchange rate. Until July 1965 the local currency unit was the Ghana pound (£G), which was then replaced by the cedi (¢) at the rate £G 1.00 = ¢ 2.40. In February 1967 the cedi was replaced by the new cedi (N¢ at the rate ¢ 1.20 = N¢ 1.00, hence N¢ 2.00 = £G 1.00. In December 1971 the term "new" was dropped without a change in scaling: i.e., N¢ 1.00 = ¢ 1.00.
- NLC - National Liberation Council, government from time of *coup* which overthrew Nkrumah to the inauguration of the Busia government, 1966-1969.
- NRC - National Redemption Council, government from the time of *coup* which overthrew Busia government, 1972-.
- Nkrumah, K. - Leader of Government Business, Prime Minister, and President of Ghana, 1951-1966.
- PP - Progress Party, under leadership of Busia.
- Valco - Volta Aluminum Company which established an aluminum smelter to use electricity from the Volta Dam project. Owned by Kaiser Aluminum (90 percent) and Reynolds Metals (10 percent).
- VRA - Volta River Authority, the Ghanaian agency established to handle the entire Volta Dam project.

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