An Anatomy of Inflation in Bangladesh*

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I. Introduction

The general movement of a country's overall price level is of primary concern to all and more so if the movement is upward. The problem of inflation has virtually become a major concern for all economies — developed and developing. In the seventies, inflation has been accelerating at an alarming rate in most developing countries. The problem of inflation is, in a way, more complex in a developing country because of financial and economic dualism and widespread government control of wages, prices, exchange rates, imports, and exports, and plethora of subsidies and incentives, which are often misplaced.

The question has been raised as to whether the theoretical framework developed to explain the problem of inflation in developed countries is useful in explaining the same problem in developing countries. Some economists, generally known as 'structuralists,' argue that inflation in developing countries should be explained by reference to basic weaknesses of these economies, which arise out of their primitive institutions and the structural rigidities that impede their growth. On the other hand, other economists, 'monetarists,' argue that the problem of inflation in developing countries can be mainly explained by reference to an excess of aggregate monetary demand over supply of real output.

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Both positions have been explored in empirical studies. Monetarists have analyzed the rate of inflation as a function of the rate of growth of money supply and output (Harberger, 1963; Behrman, 1973; Vogel, 1974). Structuralists have also tried to explain fluctuations in the rate of inflation as function of some indices of structural bottlenecks (Argy, 1970; Atapattu, 1976).

Prices provide the basic link between all the sectors of an economy. During an inflationary period, the sectoral prices do not necessarily rise at the same rate. Most studies on inflation ignore the inter-sectoral linkages in an economy and examine the fluctuations in the general price level (Harberger, 1963; Behrman, 1973; Vogel, 1974).

In this paper a general econometric model has been developed to study the problem of price behavior in a developing country — Bangladesh. Bangladesh has been chosen because contemporary Bangladesh provides a good case study of inflation in a developing country. The econometric model developed and used for this purpose is a small annual model which embodies the basic structure of the economy. The sectoral disaggregation of the model is dictated by the structural features of the economy. The advantage of our small annual model is that it permits the study of the problem of price behavior in terms of demand for and supply of sectoral outputs. Inclusion of the supply side is important because underdeveloped countries suffer from supply rigidities.

The estimated model has been used to perform some simulation experiments. Simulation experiments are helpful in identifying major sources of pressure on sectoral prices and as well as the general price level.

The paper is organized as following. The second section presents a discussion on the theoretical specification and estimation results of the model. The third section presents a discussion on simulation experiments. The concluding section presents a summary of the findings.

II. Structural Features of the Model

This section summarizes the features of the model essential to understand the simulation results that follow. The model has

forty-six behavioral equations and identities. Functional relationships were formulated on the basis of the optimizing behavior of the relevant economic agent.

The sectoral disaggregation reflects the basic structure of the economy. For example, a distinction between the agricultural and the non-agricultural sectors is essential for the Bangladesh economy. Within the agricultural sector, further distinction is made between production of food and jute. The country suffers from chronic food shortage and has to import food every year. Raw jute and jute goods are the major exports. In the manufacturing sector, jute manufacturing plays an important role as both foreign exchange earner and employer of labour. Thus in the manufacturing sector, jute manufactures are treated separately from other manufactures.

The labour market is divided into two different markets, the labour market in the agricultural sector and the labour market in the manufacturing sector. There is a financial market in the model which describes behaviours of the financial variables and their influence on the real variables. Foreign aid and foreign trade are also incorporated into the model. The model is a short run annual model, thus the stock of fixed capital and also its allocation to various sectors is assumed to be exogenous.

The model is estimated using data on the Bangladesh economy. The data period runs from 1953 to 1977. The nature and the sources of data are discussed in Kabir (1981). The model has been estimated block by block. The blocks of equations describing the markets for jute, non-jute manufactures, and the labour markets (both agricultural and manufacturing) each contains a set of simultaneous equations. The structural equations of these blocks have been estimated using ordinary least squares (OLS) and also two-stage least squares (2SLS). The residuals in some equations, when estimated by OLS and 2SLS, were seriously autocorrelated. The Cochrane-Orcutt iterative technique (CORC) or the two stage Cochrane-Orcutt iterative technique (2SCORC) as appropriate was used to re-estimate those equations. Another technique which was used to estimate these submodels was nonlinear least squares (NLS) method. According to this method, the reduced form equations of the system are estimated imposing the constraints implied by the structure of the model, and then

the structural parameters are determined from the estimated reduced form parameters.

Estimation results obtained using different estimation methods are reported in Kabir (1981); only one estimated equation for every functional specification is reported in this paper. The estimated equations were chosen on the basis of the technique of estimation used as well as the fit of the equation. In fact, once a theoretical equation was specified, no attempt was made to change its functional form to improve its fit.

Some interesting results emerge from the estimated model which deserves comments. In the food sector, population stands out as an important determinant of demand for food and exerts significant pressure on food price. Imported raw materials have emerged as a crucial determinant of the supply of non-jute manufactures. Capital is an important variable in the supply equation of the jute-manufacturing sector. In a developing country like Bangladesh, where capital is almost entirely imported and imports are subject to government controls, low price elasticity of supply is quite expected. Liquidity holding has been defined as money supply and used as proxy for wealth in the demand equations. This variable often has a positive sign, which is in line with the monetarists belief. However, we hasten to add that in the structuralist model of inflation, an accommodating rise in money supply is essential for sustained inflation.

III. Some Simulation Results

Simulation experiments were used to test the validity of various hypotheses regarding the sources of pressure on price level. In these experiments, the effects of a sustained change in some important exogenous variables initiated in the beginning of the sample period have been examined.

A. The Effects of a Higher Rate of Growth of Population

According to the structural school's thought, the high rate of growth of population is a major cause of inflation in developing countries. We ran simulation experiments to test the validity of this claim. Simulated values of endogenous variables for two di-

fferent rates of growth of population (2.6% and 2.7%) were calculated. The cumulative effect of this difference in growth rates implies a 2.4% difference in population at the end of the simulation period. The differences between simulated values of the endogenous variables for the two different rates of growth of population are reported in Table 1.

Table 1

EFFECTS OF AN INCREASE IN THE GROWTH RATE OF POPULATION

Year Variable*	1955	1960	1965	1970	1975	1977
CPI	.001	.002	.007	.018	.060	.083
PFA	.001	.007	.015	.037	.177	.146
PNJM	-.001	-.009	-.014	-.011	-.093	-.083
PP	.001	.005	.011	.023	.062	.060
PJM	.000	.003	.006	.010	.018	.029
WAA	.001	.004	.010	.019	.072	.055
WMM	-.001	-.005	-.008	-.009	-.069	-.046
CRED	-.031	-.126	-.996	-3.149	10.984	3.024
LIQ	-.030	-.135	-.983	-3.119	10.996	3.040
QFS	.009	.889	2.696	4.057	7.958	6.799
QJSB	-.020	-.744	-2.161	-3.510	-3.234	-4.298
QNJM	.096	1.593	3.984	3.488	7.859	9.746
YD	7.667	70.959	188.607	492.974	2403.369	2355.712
LDNJM	.000	-.002	-.004	-.007	-.018	-.019
PRYD	.001	.638	.713	.298	2.809	1.702
FE	.012	1.544	5.308	12.380	14.264	9.891

* PRYD is per capita real disposable income. Definitions of all other variables appear in the appendix.

The consumer price index and other prices and wages have increased in response to a higher rate of growth of population. The only exceptions to this are the price of non-jute manufactures and the manufacturing wage rate. In fact, a higher rate of growth of population increases demand for food, which leads to a higher

price of food. Price of food is the most important component in the CPI and thus an increase in the price of food increases the CPI. In the demand for non-jute manufactures, the price of food appears with a negative sign. Thus, a rising price of food reduces demand for non-jute manufactures.

An important point to note about this simulation experiment is that a higher rate of growth of population increases real disposable income. This happens mainly because of two reasons: (i) a higher rate of growth of population leads to a higher food price, which in turn increases the volume of food production; (ii) a higher growth rate of population depresses manufacturing wage rate, which boosts up production in that sector. As a result, real disposable income increases. This result is consistent with the findings of others (Kelly and Williamson, 1974).

The results of this set of experiments support the view of the structural school that a higher rate of growth of population increases the food price and consequently the cost of living index.

B. The Effects of Deficit Financing

An important structuralist argument is that the developing countries, because of their inelastic tax base, have to resort to deficit financing, which is inflationary. In this simulation experiment, government expenditures were increased by one million taka without a corresponding increase in government revenue.

It was assumed that half a million taka would be invested by the government and the rest half would be spent on consumption of services. Higher government expenditures are, in fact, financed by borrowing, which increases money supply. Prices and wages in all the sectors increase in response to deficit financing. Because of the low price elasticity of supply, output does not respond quite as favorably. Thus, the per capita real disposable income falls. The results support structuralist's view, though the monetarist's position is also not contradicted. The results are reported in Table 2.

C. The Effects of an Increase in the Direct Tax Rate

The weakness of administrative structures to collect tax-revenue and inelasticity of tax base are common features of

Table 2

EFFECTS OF A SUSTAINED INCREASE IN GOVERNMENT EXPENDITURES

Year / Variable	1955	1960	1965	1970	1975	1977
CPI	.585	.284	.232	.178	.050	.042
PFA	.672	.331	.268	.204	.058	.049
PNJM	.752	.354	.293	.233	.062	.053
PP	.420	.205	.167	.126	.036	.030
PJM	.349	.089	.080	.052	.014	.011
WAA	.401	.227	.207	.145	.064	.034
WMM	.581	.274	.227	.179	.047	.040
CRED	.229	.165	.044	.021	.007	.005
LIQ	.056	.046	.032	.013	.009	.007
QFS	.009	.007	.007	.005	.003	.001
QJSB	-.131	-.039	-.039	-.022	-.012	-.008
QNJM	-.235	-.110	-.092	-.072	-.020	-.017
YD	.441	.272	.210	.130	.053	.040
LDNJM	.180	.085	.070	.057	.015	.013
PRYD	-.141	-.012	-.022	-.047	.003	-.002
FE	.260	.723	1.467	1.995	.302	.131

developing countries. Structuralists argue that the inability to raise adequate revenue, because of the structural rigidities, is a cause of inflation in developing countries. The effects of a 10% increase in the direct tax rate were simulated to study the response of prices. The results are summarized in Table 3.

A higher direct tax reduces pressure on prices in two ways. First, the higher direct tax reduces the disposable income and thereby reduces demand for final goods. Prices in general go down in response to the lower demand. Secondly, a higher direct tax increases the tax revenue, and for a constant level of government spending, reduces the magnitude of budget deficit. Thus, the money supply is reduced and that has an additional downward pressure on prices. This latter result would, however, be reversed if the additional tax revenue were used to increase government expenditure instead of decreasing government deficit.

Table 3

EFFECTS OF AN INCREASE IN THE DIRECT TAX RATE

Year Variable	1955	1960	1965	1970	1975	1977
CPI	-3.989	-3.155	-4.364	-4.216	-3.714	-3.860
PFA	-4.581	-3.672	-5.058	-4.812	-4.380	-4.497
PNJM	-5.085	-3.918	-5.455	-5.443	-4.472	-4.770
PP	-2.898	-2.297	-3.170	-3.007	-2.724	-2.804
PJM	-2.270	-1.103	-1.495	-1.138	- .665	- .912
WAA	-2.638	-2.846	-3.560	-3.103	-2.367	-3.019
WMM	-3.959	-3.047	-4.250	-4.230	-3.487	-3.717
CRED	-1.707	-1.893	- .909	- .577	- .688	- .489
LIQ	- .414	- .530	- .657	- .354	- .824	- .666
QFS	- .050	- .097	- .107	- .092	- .047	- .084
QJSB	.868	.497	.748	.486	.565	.679
QNJM	1.657	1.268	1.782	1.772	1.457	1.554
YD	-3.085	-3.121	-4.036	-3.136	-3.990	-3.761
LDNJM	-1.247	- .956	-1.339	-1.339	-1.091	-1.166
PRYD	.941	.035	.343	1.127	- .286	.103
FE	-1.566	-6.154	-14.778	-24.465	-3.789	-1.500

The results of this experiment are quite interesting. The nominal disposable income has declined but the per capita real disposable income has increased in most of the periods. The results of this experiment support the structuralist position that low tax rates in developing countries contribute to inflationary pressure.

D. The Effects of an Increase in Imported Raw Materials

Developing countries in general suffer from a chronic shortage of foreign exchange. In Bangladesh, a shortage of foreign exchange exists because her export earnings are not sufficient to finance the desired imports of food, raw materials and capital goods. As a result, the government controls the allocation of foreign exchange to different types of imports. The allocation priorities are reviewed from time to time in response to short-run

changes in the economy. Because of the shortage of foreign exchange, the import of raw materials is often not sufficient to operate the manufacturing sector at full capacity.

In this experiment, the effects of a sustained increase in imports of raw materials of one million 1959 taka initiated in 1954 are simulated. This increase represents a 0.34% increase in 1954 and 0.07% increase in 1977. The results of this experiment are reported in Table 4. An increase in the availability of raw materials increases the supply of manufactured (non-jute) output.

Table 4

EFFECTS OF AN INCREASE IN IMPORTED RAW MATERIALS

Year Variable	1955	1960	1965	1970	1975	1977
CPI	-1.500	-.535	-.219	-.309	-.102	-.087
PFA	-1.792	-.658	-.238	-.379	-.142	-.118
PNJM	-1.765	-.590	-.211	-.341	-.073	-.069
PP	-1.131	-.409	-.175	-.235	-.087	-.073
PJM	-1.020	-.203	-.082	-.119	-.030	-.024
WAA	-1.149	-.587	-.220	-.235	-.122	-.082
WMM	-1.439	-.492	-.191	-.288	-.078	-.070
CRED	.830	.309	.143	.149	.064	.045
LIQ	.202	.086	.104	.091	.077	.061
QFS	-.026	-.022	-.007	-.006	-.004	-.002
QJSB	.387	.091	.041	.048	.025	.018
QNJM	.746	.278	.138	.172	.078	.064
YD	-1.134	-.528	-.202	-.231	-.121	-.088
LDNJM	-.447	-.141	-.058	-.099	-.023	-.021
PRYD	.371	.007	.017	.078	-.019	-.001
FE	-1.167	-3.953	-8.132	-12.578	-2.610	-1.426

This lowers the price of non-jute manufactured goods. A lower price of non-jute manufactures reduces the consumer price index and works through the sectoral models. All prices decrease and real disposable income increases for most of the sample period.

The results support the structuralist view that scarcity of foreign exchange is one of the causes of inflation in developing countries.

E. The Effects of an Increase in Foreign Aid

In this experiment, the effects of an increase in foreign aid by one million current taka are simulated. This increase coresponds to a 40% increase in 1954 and a 0.0001% increase in 1977. The way the additional amount of foreign aid is spent is an important factor in determining the effects. There are many alternative ways of spending the additional amount of foreign exchange, among which three deserve comments.

First, this additional amount of foreign aid may be used to reduce the extent of deficit financing by an equal amount while government expenditure remains constant. The effects of such a policy have been simulated and the results are summarized in Table 5. All prices go down while the per capita real disposable income increases.

Table 5
EFFECTS OF AN INCREASE IN FOREIGN AID

Year Variable	1955	1960	1965	1970	1975	1977
CPI	-.394	-.190	-.154	-.119	-.032	-.029
PFA	-.453	-.223	-.179	-.136	-.039	-.032
PNJM	-.508	-.239	-.196	-.156	-.040	-.034
PP	-.285	-.138	-.111	-.084	-.024	-.020
PJM	-.235	-.059	-.053	-.035	-.010	-.006
WAA	-.270	-.154	-.138	-.096	-.043	-.023
WMM	-.394	-.185	-.152	-.120	-.032	-.028
CRED	-.148	-.106	-.028	-.013	-.005	-.003
LIQ	-.035	-.030	-.020	-.009	-.005	-.004
QFS	-.005	-.005	-.004	-.003	-.002	-.000
QJSB	.089	.027	.026	.014	.008	.005
QNJM	.160	.076	.062	.049	.013	.011
YD	-.295	-.182	-.139	-.085	.035	-.026
LDNJM	-.122	-.057	-.047	-.036	-.010	-.008
PRYD	.099	.008	.015	.034	.003	.003
FE	.517	1.596	3.745	6.166	1.206	.596

Second, the additional amount can be used to import raw materials. The effects of this policy would be the same as the simulation experiment which deals with the impact of an increase in raw materials (Table 3). A comparison of Table 3 with Table 5 shows that the use of foreign aid to import more raw materials has a stronger downward pressure on prices.

Third, the additional amount of foreign aid can be spent by the government without a concomitant increase in government borrowing or taxes. In this way, one could observe the effects of increased government spending alone without the effects of the associated increase in deficit spending which is included in the results presented in Table 2. An estimate of the effects of an increase in government spending without any associated change in government borrowing can be derived by comparing the results in Tables 2 and 5. For example, the percentage change in the CPI in 1955 due to a one million current taka increase in government spending financed by foreign aid is approximately 0.191% (the difference between 0.585% from Table 2 and 0.394% from Table 5). This estimate of the effect is only an approximate estimate due to the nonlinearity of the model.

The results discussed above support the structuralist position that a shortage of foreign exchange contributes to inflation in less developed countries.

F. The Impact of Technical Change in Production of Food

Productivity in the agricultural sector in developing countries is generally low and therefore their supply of agricultural output is often low relative to demand. High population growth exerts substantial pressures on the price of food which, in the view of many economists, constitutes a major cause of inflation in these countries. As a result, increasing agricultural productivity is believed to be a prerequisite for not only a means of moderating inflation but also a means of saving foreign exchange and raising the income of the rural area in order to increase their demand for urban manufactured goods. Increased agricultural productivity is considered to be a key element of development policy.

In this simulation experiment, a technical change in the production of food is considered. We represent technical change by

an increase in output by ten percent with no concomitant change in inputs. This corresponds to a technical change of the Hicks-neutral type. The results of the experiments are presented in Table 6. The results indicate that technical change in the production of

Table 6

EFFECTS OF TECHNICAL CHANGE IN PRODUCTION OF FOOD

Year Variable	1955	1960	1965	1970	1975	1977
CPI	6.38	4.29	1.29	2.75	.11	.25
PFA	6.71	4.40	.88	2.54	-.46	-.30
PNJM	9.85	6.88	3.07	5.06	1.54	1.72
PP	4.17	2.71	.55	1.57	-.28	-.18
PJM	3.57	1.16	.33	.75	-.01	-.07
WAA	4.09	3.20	.94	1.33	-.20	-.26
WMM	7.47	5.22	2.31	3.82	1.12	1.27
CRED	-4.44	-3.30	-1.99	-2.27	-1.29	-1.14
LIQ	-1.07	-.92	-1.44	-1.39	-1.55	-1.55
QFS	1.70	1.71	1.65	1.64	1.63	1.60
QJSB	-1.32	-.51	-.16	-.30	-.01	.05
QNJM	-2.87	-2.03	-.90	-1.49	-.43	-.49
YD	5.17	4.67	1.66	2.42	.75	.72
LDNJM	2.31	1.63	.75	1.22	.39	.43
PRYD	-1.44	.35	.36	-.32	.64	.47
FE	2.46	8.07	15.39	19.43	2.99	1.35

food increases both prices and wages across all sectors. However, there is a corresponding increase in disposable income which leads to a rise in the demands for food and non-jute manufactures. The labor supply in manufacturing falls, driving up manufacturing wages, and thus reducing the supply of non-jute manufactured goods. This reduction in the supply of non-jute manufactured goods, together with the increase in the demand due to higher disposable income, results in higher prices which also contribute to the increase in the consumer price index. There are, however,

linkages working in the opposite direction. Increased income leads to more government tax revenues, less government borrowing and, given fixed government expenditure, a lower money supply. Also, the increased price of food tends to reduce the demand for non-jute manufactures. These counter-linkages tend to dampen the increases in prices.

The results of this experiment are not in line with our *a priori* expectations. It is expected that a technical change in production of food will lower price of food and other prices, and increase real disposable income. But our results show that prices will in fact increase as a result of a technical change, thus mostly wiping out the effect of increased production on real income. The results presented above indicate that general equilibrium interactions are crucial in determining the macroeconomic effects of technical change in the agricultural sector.

IV. Concluding Remarks

The simulation results presented in this paper highlight the nature of inflation in Bangladesh. Higher government expenditure financed by deficit financing results in higher prices. Increases in tax revenues through direct taxation, with government expenditure fixed, result in a lower price level but do not reduce real disposable income. This latter result occurs due to interactions between sectors, which are an important feature of the model.

A higher rate of growth of population results in a higher price of food which in turn raises wages in agriculture. On the other hand, wages in the manufacturing sector and the price of non-jute manufactures fall.

In simulations examining the effects of larger amount of foreign aid, the effects are dependent on the way in which the foreign aid is used. Increases in foreign aid do not increase the price level but rather reduce it, if the foreign aid is used by government to reduce the deficit financing. Prices are also reduced if the foreign aid is used to increase raw material imports. However, if foreign aid is used to finance increased government spending, prices are increased.

As a whole, the results of our simulation experiments help identify important sources of pressure on the price level in Bangladesh. Several interesting results occur because both supply and demand efforts and interactions between sectors are incorporated in the model. Thus, the conclusions reached are different from those of the Keynesian, and Monetarist demand-determined models usually applied to developing countries. In addition, some of the results reaffirm the importance of using a general equilibrium model to examine macroeconomic issues in development economics.

Both the monetarist and structuralist views of inflation in developing countries find support in the simulation results. The two views are clearly complementary rather than conflicting, at least in this multi-sectoral model of Bangladesh.

APPENDIX

A Disaggregated Econometric Model of Bangladesh

Market for Food

(1) OLS

$$\ln QFS = 2.84 + .07\ln PFA_{-1} + 0.09\ln PJ_{-1} + 0.53\ln LND + .08\ln KA - 0.10\ln WAA + 0.01 TIME + .13 DUM - .008\ln FLOD - 0.02\ln DRO$$

(1.13) (1.46) (175) (2.14) (.59) (−1.90) (2.61) (.59) (−.80) (−1.55)

$R^2 = .96$; D.W. = 2.3

(2) OLS

$$\ln TQF = 2.7 - .33\ln PFA + .09\ln PNJM - .01\ln LIQ + .28\ln AYD + .91\ln POP - .37 DUM$$

(3.6) (−1.40) (1.9) (−.09) (1.35) (1.33) (−1.89)

$R^2 = .95$; D.W. = 1.75

(3) $TQF = QFS + IMF$

Market for Jute

(4) OLS

$$\ln QJSB = -5.5 + 0.21\ln PJ - 0.21\ln PFA_{-1} + 1.16\ln LND + .08\ln KA + 0.10\ln WAA + .001 TIME + .02 DUM - .005\ln FLOD - .008\ln DRO$$

(−1.2) (2.6) (2.6) (2.3) (.38) (1.06) (.13) (.06) (−.21) (−.34)

$R^2 = .71$; D.W. = 2.01

(5) CORC

$$\ln QJSRW = 7.66 + .24\ln PJW_{-1}$$

(101) (3.21)

$R^2 = .94$; D.W. = 1.28

(6) CORC

$$\ln QJDB = -.12 + 1.04\ln QJMS$$

(−.08) (3.83)

$R^2 = .68$; D.W. = 1.9

* Estimation methods are reported below the number of each equation; t-values are given in parentheses.

(7) lnQJDRW = 5.99 + .39 lnPJMW − .17 lnPJW + .51 lnYF − .05TIME
2SCORC (7.1) (1.54) (−1.43) (2.3) (−1.87)

R^2 = .91; D.W. = 1.79

(8) QJSW = QJSB + QJSRW

(9) QJDW = QJDRW + QJDB

(10) QJSW = QJDW

(11) EXJ = QJSB − QJDB

(12) lnPJ = −.63 + .89 lnPJW + .22 lnEXRAT + .18 lnFRET
2SLS (−1.33) (4.95) (1.09) (1.48)

R^2 = .91; D.W. = 1.31

Market for Jute Manufactures

(13) lnQJMS = 4.4 + .29 lnKJM + .32 lnPJMW − .24DUM − .17EXRAT
OLS (5.5) (3.1) (1.5) (−.66) (−.95)

R^2 = .95; D.W. = 1.85

(14) lnEXJM = −5.1 − 1.8 lnPJMW + 1.4 lnYF − 2.2DUM + 1.1 lnEXRAT + .72 lnPJMS
OLS (−1.4) (−1.3) (1.8) (−1.7) (2.0) (2.5)

R^2 = .84; D.W. = 1.4

(15) lnPJM = −1.13 + .98 lnPJMW + .44 lnEXRAT + .06 lnFRET
OLS (2.6) (7.0) (2.7) (.65)

R^2 = .95; D.W. = 1.13

(16) QJMD = QJMS − EXJM

Market for Non-Jute Manufactures

(17) lnQNJMS = 8.10 + .251nPNJM − .73 1nWMM − .621nKNJM
2SLS (1.32) (9.71) (−1.65) (−.97)

+ .43 lnIMR − .30DUM + .09TIME − .32DUMP
(1.40) (−1.26) (2.62) (−1.13)

R^2 = .97; D.W. = 1.46

(18) lnQNJMD = 1.93 + .001 lnYD + .40 lnLIQ + .071PNJM − .69 lnPFA
2SCORC (.66) (.02) (1.57) (.20) (−2.80)

−.22DUM + .031nIMNJM
(.57)

R^2 = .97; D.W. = 2.1

(19) QNJMD = QNJMS + IMNJM

Labor Market in the Agricultural Sector

(20) lnLDA = 5.0 + .16 lnPFA + .11 lnPJ − .36 lnWAA − .45 lnKA
2SLS (.85) (1.82) (1.46) (−1.81) (−1.67)

+ .13 lnLND + .23DUM
(.29) (.66)

R^2 = .83; D.W. = 2.3

(21) lnLSA = −1.06 + .02 lnWAA − .015 lnPFA + .981RURP
2SCORC (−4.6) (.84) (−.64) (17.11)

R^2 = .99; D.W. = 1.97

(22) LDA = LSA

Labor Market in Manufacturing Sector

(23) lnLDJM = −6.18 + .33 lnQJMS
CORC (−4.12) (1.40)

R^2 = .95; D.W. = 2.0

(24) lnLDNJM = .34 − .381nWMM + .40DUM − .121nIMR + 0.06TIME
2SLS (.18) (−2.43) (2.19) (−.39) (2.40)

−0.10DUMP
(−.77)

R^2 = .94; D.W. = 2.14

(25) 2SLS $\ln LSM = -0.65 + .351nWMM - 0.041nCPI + 0.651nURP$
$(-4.12)\ (1.63)\qquad (-.21)\qquad (4.9)$
$R^2 = .91;\ D.W. = 1.25$

(26) $LDJM + LDNJM = LSM$

Financial Market

(27) CORC $\ln CREDP = -1.94 + 0.871nr_c + 0.721nGS + 0.471nRES + 0.40DUMF$
$(-1.35)\ (.87)\qquad (2.41)\qquad (2.87)\qquad (2.09)$
$R^2 = .98;\quad D.W. = 1.78$

(28) $LIQ = CWP + CREDP - TD + RES + RESF$

Foreign Sector

(29) $IM = PIMF \cdot IMF + PIMNJM \cdot IMNJM + PIMR \cdot IMR + PCAP \cdot IMCAP$

(30) $*EX = PJW \cdot EXJ \cdot (PJW59) \cdot EXRAT + PJMW \cdot EXJM \cdot (PJMW59) \cdot EXRAT + EXOT$

(31) $\Delta FE = EX - IM + FA + RESF$

32) $FE = FE_{-1} + \Delta FE$

Government Sector

(33) CORC $\ln IREV = -.814 + .311nPNJM + .311nQNJM + .841nPJM$
$(.87)\quad (1.42)\qquad (1.42)\qquad (3.65)$
$+ .841nQJM + .015DUM$
$(3.65)\qquad (.078)$
$R^2 = .97;\qquad D.W. = 1.25$

* Variable names followed by 59 represent values in the year 1959 and are used to convert constant taka values to current taka values.

(34) $DREV = t(YFC)$

(35) $\Delta GS = GE - DREV - IREV - \Delta FA + RESG$

(36) $GS = GS_{-1} + \Delta GS$

(37) $GE = GC + GI$

(38) 2SLS
$$\ln YSP = \underset{(1.06)}{1.73} + \underset{(1.58)}{.451nYD} - \underset{(-1.5)}{.15DUM} + \underset{(1.76)}{.531nCPI}$$
$R^2 = .97$; D.W. = .96

(39) CORC
$$\ln PP = \underset{(2.6)}{.09} + \underset{(8.2)}{.611nPFA} + \underset{(.44)}{.041nPJ} + \underset{(.03)}{.0031nPNJM} + \underset{(1.7)}{.201nPJM}$$
$R^2 = .99$; D.W. = 1.55

(40) CORC
$$\ln CPI = \underset{(1.70)}{1.18} + \underset{(6.0)}{.471nPFA} + \underset{(2.3)}{.1881nPNJM} + \underset{(1.55)}{.121nPIMC}$$
$R^2 = .99$; D.W. = .73

(41) $YS = YSP + GC$

(42) $YY = (PFA59)PFA \cdot QFS + (PJ59)PJ \cdot QJSB + (PJM59)PJM \cdot QJM + PNJM \cdot QNJM - (PJ59)PJ \cdot QJDB - PIMR \cdot IMR$

(430 $YMP = YY - YS + YOT$

(44) $YFC = YY - IREV + SUB$

(45) $YD = YFC - DREV$

(46) $AYD = YD + (PFA - PFG) \cdot IMF$

List of Variables

AYD = Disposable income adjusted for food subsidy
CPI = Consumer price index
CRED = Bank credit in current taka
CWP = Cash with the public in current taka
DREV = Direct tax revenue in current taka
DUM = Dummy variable for the liberation war
DUMF = Dummy variable in the financial sector
DUMP = Slope dummy in the non-jute manufacturing sector
EX = Value of exports in current taka
EXOT = Value of exports other than jute and non-jute manufactures
EXJ = Export of jute in volume
EXJM = Export of jute manufactures in volume
EXRAT = Exchange rate
FA = Foreign aid in current taka
FE = Foreign exchange reserve in current taka
FRET = Index of freight charges
GC = Government consumption in current taka
GE = Government expenditure in current taka
GI = Government investment in current taka
GS = Government security in current taka
IM = Value of imports in current taka
IMF = Import of food
IMCAP = Imports of capital goods in millions of constant taka
IMNJM = Imports of non-jute manufactures in millions of constant taka
IMR = Import of raw materials in constant taka
IREV = Indirect tax revenue in current taka
KA = Capital stock in the agricultural sector
KF = Capital in food production
KJ = Capital in jute production
KJM = Capital in jute manufactures production
KNJM = Capital in non-jute manufactures production
LDF = Labour demand in food production
LDJ = Labour demand in jute production
LDJM = Labour demand in jute manufactures
LDNJM = Labour demand in non-jute manufactures

LIQ = Liquidity in current taka
LND = Area of agricultural land
LNDF = Area of agricultural land used in production of food
LNDJ = Area of agricultural land used in production of jute
LAS = Labour supply in the agricultural sector
LSM = Labour supply in the manufacturing sector
PP = General price level
PCAP = Price of imported capital goods
PFA = Price of food
PFG = Price of food in government controlled shops
PIMC = Import price index of consumer goods
PIMNJM = Price index of imported non-jute manufactures
PIMR = Import price index of raw material
PJ = Price index of jute
PJM = Price index of jute manufactures
PJMS = Price of jute manufactures substitute in the world market
PJMW = Price index of jute manufactures in the world market
PJW = Price index of jute in the world market
PNJM = Price index of non-jute manufactures
POP = Population
QFD = Quantity of food demand
QFS = Quantity of food supply
QJDB = Quantity of jute demand by Bangladesh
QJSB = Quantity of jute supply by Bangladesh
QJDRW = Quantity of jute demand by the rest of the world
QJDW = World demand for jute
QJSRW = Rest of the world's demand for jute
QJSW = World supply of jute
QJMS = Supply of jute manufactures
QJMD = Domestic use of jute manufactures
QNJMS = Supply of non-jute manufactures
QNJMD = Demand for non-jute manufactures in constant taka
RES = Cash reserves of commerical banks
RESF = Residual from the balance sheet of the commercial banks
RESG = Residual from the government budget constraint

RURP = Rural population
r_c = Interest rate charged by commercial banks on credit
r_g = Interest rate on government securities
SUB = Government Subsidy
t = Direct tax rate
TIME = Time trend
TQF = Total quantity of food (imported plus domestically produced)
URP = Urban population
WAA = Index of nominal agricultural wage rate
WMM = Index of nominal wage rate in the manufacturing sector
YD = Disposable income in current taka
YFC = GNP at factor cost in current taka
YOT = National income from sources other than agriculture, manufacturing and services
YS = GDP originating from services sector
YSP = Aggregate demand for services by the private sector
YY = GDP at market price in current taka originating from all the sectors other than the services and the residual sectors
YMP = GNP at market price in current taka
YYD = Disposable income net of spending on food supplied by the government.

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