Almost 90 percent of outstanding government securities are held by banking institutions, including the Central Bank. Since a large portion (about 75% in 1970) of required reserves can be held in the form of government securities, open market operations may not necessarily result in changes in reserves. There may only be a change in reserve composition. Any increase, therefore, in outstanding government securities implies printing money, not public debts.

Given the above peculiarities of the Philippine monetary set-up and the way the instruments are used, the following money supply functions are posited:

$$DD = f\left(\frac{R}{q}, \frac{RD}{q}, \frac{G}{q}, \frac{dr}{lr}\right) \qquad (1)$$

$$M_1 = f\left(\frac{R}{q}, \frac{RD}{q}, \frac{G}{q}, \frac{dr}{lr}\right) \qquad (2)$$

where DD is demand deposit, M_1 is money supply, RA is available reserve, RD is rediscounted loans or borrowing from the Central Bank, G is credit to the government by the banking system, and q is the reserve requirement. dr is discount rate; lr is loan rate

The reserve portfolio function and the money supply function tested for the United States by Hendershott and de Leeuw are also tried on Philippine data.

Quarterly data were used to test the money supply function given in equations (1) and (2). The regression results support the expected behaviour of the system. In both periods the regression coefficient of the relative cost of reserves indicated by the ratio of lending rate to discount rate, RR, was not significant. In the first period, 1955-1961, changes in available reserves, RA was the only significant explanatory variable. The coefficients of both RR and changes in credit to the

government were not significant though they had the correct sign. The regression coefficient of changes in available reserves is significant at less than 5 per cent level. As seen in regression equations 1-3, the value of the regression coefficient of changes in available reserves is stable. The inclusion of other variables into the regression equation left the value of the regression coefficient constant. In the second set of regressions, changes in credit to the government proves to be the only significant explanatory variable in the money supply function. The coefficients of changes in variable reserves RA, and of loan rate to discount rate ratio, RR, are not significant. Though RA has the correct sign RR has the incorrect sign.

These results are to be expected. While in the first period control of money supply was exercised along traditional lines through changes in reserves of commercial banks, in the later period changes in money supply were determined, mainly, by changes in the level of deficit financing through money creation and selective financing of development through the Development Bank and semi-government banks. This brings to focus not merely the selective impact of development and deficit financing but also their use as quantitative instrument.

In both sets of regression equations, the coefficients of the interest rate ratio, RR, are insignificant. This result is to be expected because of the existing set of interest regulations. In the first set using 1951-60 quarterly data, banks kept using large excess reserves. Banks need not borrow from the Central Bank to increase credit and money supply. This could be increased within the limit permitted by the prevailing reserve requirement. Thus we find the unresponsiveness of money supply changes to the relative cost of borrowing from the Central Bank. The reason why banks did not lend more is probably due to the small

volume of demand at the then relevant ranges of interest rate. It is to be noted that the restrictions of the Anti-usury law were not operative then, for the average loan rates during this period were way below the ceiling.

In the later period, specifically after 1964, banks kept zero or very little excess reserves. Normally this condition would imply bank responsiveness to the discount rate. But a countervailing force was in operation. The prevailing nominal rate of interest reached and later on exceeded the Usury Law ceiling. There was probably rationing of credit (or excess demand) at the prevailing loan rates. Since a substantial profit margin between loan rate and discount rate exists, it was profitable for banks to borrow as much as was permitted by the Central Bank. Bank borrowing from the Central Bank would have been determined not so much by the relative cost of borrowing (which was always lower than the loan rate), but by what the Central Bank would lend them. We find therefore a lack of relationship between changes in money supply and discount loan rate ratio.

1953-1960 data

		R^2
1.	M =17.197 + .201 RA (3.492) T. Value	.30
2.	M =16.098 + .199 RA + .015 GD (3.361) (.155)	.29
3.	M =14.366 + .199 RA + .011 GD + .704 RR (3.302) (.109) (.173)	.30

1961-1971 data

		R^2
1.	M =58.947 + .082 RA 1.568	.056
2.	M = 7.598 + .015 RA + .206 GD (.299) (3.247)	.253
3.	M =26.270 + .015 RA + .206 GD -12.270 RR (.285) (3.211) (-.159)	.254

M = money supply, cc + dd
D is demand deposit
RA available reserves/reserve requirement
RR ave. loan rate / basic. disc. rate
GD = credit to government
RAGD = RA + GD

Figures in parentheses are t-values.

Postwar Price Movement

The Philippines experienced a fairly mild inflation in the early post-war years. In the 1960's however, two serious cases of inflation occurred, one in 1961 to 1963, another in 1969 to 1971. There is no single explanation for either case of inflation. Increases in money supply were deemed to provide but a partial answer. Both autonomous increases in the prices of traded goods and crop failure contributed to the inflationary pressure.

In this section, we will trace the movement of price level and see to what extent each of these three variables -- (1) increases in money supply, (2) increases in prices of traded goods, and (3) a drop in agricultural production -- explain Philippine inflation.

A sizeable portion of the Philippine household budget is alloted to food. This budget is naturally affected whenever there is crop failure due to typhoon or drought, resulting, in turn, in a substantial rise in food prices. Also since a large part of imports consists of producer goods, autonomous increases in the prices of imports are reflected in general price increases. Moreover, imports still constitute a large share of the GNP. Treadgold and Hooley discovered that shifts in crops from domestic market to foreign market contributed to the inflationary pressure of 1961 to 1964, leading one to include rise in export prices as an explanation

of inflation.[1]

As we observed in the preceding sections, the government followed a conservative monetary policy in the 1950's. From 1950 to 1952, money supply slowly declined. From 1952 to 1955, it increased at about two per cent per year, although prices declined in each of these years. Beginning in 1955, money supply was allowed to increase at much faster rates and we see, in fact, an accelerating rate of growth from 1955 to 1970. Please see Table IV.4.

In the same table, we also observe movement in the indexes of volume of production and of import and export prices. There were abnormal changes in the value of these indexes. In 1958, 1961, 1964 and 1969, the index of volume of agricultural production dropped significantly from previous years' average level. Import and export price indexes moved up significantly in 1957 to 1958, in 1962 to 1963, and again in 1970 to 1971. The rise in the index in the last two periods were mainly due to devaluation of the peso. Treadgold thought that the rise in the index in 1957-1958 was due to the barter trade allowed by the Central Bank in 1958 which raised the exchange rate.

In 1956 to 1959, the rate growth of food production dropped from its early average rate of about 6 per cent per year to 1.9 per cent between 1956 to 1957, and to 1.0 per cent between 1957 to 1958. Import and export prices also

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[1] Treadgold and R. Hooley, "Decontrol and the Re-direction of Income Flows: A Second Look" (July 10, 1967). U.P.-IEDR Discussion Paper.

went up beginning in 1956 to 1959. The exchange rate rose due to the allowed barter of as much as 10 per cent of export. In the 1961 to 1963 inflation, all three factors were again present. However, the increase in money supply and in prices of traded goods due to the devaluation of the peso must have dominated the cause of inflation. Treadgold and Hooley showed some decline in the supply of goods for domestic consumption arising from a shift in agricultural production from crops for domestic production to crops for export helped to further raise food prices. Then, the peso value of export earning increased. It is likely that the marginal propensity to consume from this monetary increase was larger than the marginal propensity to consume from ordinary relaxation of monetary control. Monetary increases due to the increase in the peso value of export go more to households than to business.

We see the play of identical forces in the 1969 to 1971 inflation. From 1965, money supply was allowed to increase at extremely high rates - 14 percentage points in 1965, 18 in 1966, 26 in 1957, 21 in 1968, 30 in 1969 and 44 in 1970. Except for the first period of devaluation, money supply had never been allowed to increase at these rates. In 1967 drought affected extensive areas of the Philippines and in 1969, typhoon Yoling devastated a large part of the country. Volume of agricultural production hardly increased between 1966 to 1967, and it dropped from its 1968 level of 170 to 168 in 1969. Neither did it rise between 1970 to 1971. Moreover the peso was devalued in February 1971, resulting in another fast rise in money

supply. This was regardless of restrictive monetary measures used.

In the Encarnacion, et.al. study, the following price equation was obtained.

$$P = 85.37 - .0043\,Y + .0423\,Z \qquad R^2 = .99$$
$$\qquad\qquad (-7.71) \quad (18.22) \qquad\quad DW = 1.83$$

where Y is real income and Z is money supply. The same equation is tested but for annual differences in price and money indexes. This is done to avoid the possible auto-correlation that may be present in the time series of the variables. Furthermore, we used volume of agricultural production as an alternative to Y. Import and export prices were alternatively included as another explanatory variable.

The equation

CPI = f(, Y, WPIM, WPIX) was tested on annual changes in the indexes of consumer prices Manila, CPIM; consumer prices, Philippines CPIP, money supply, M, real income, Y, wholesale prices of import, WPIM and of exports, WPIX, for two sets of data, one for 1950 to 1971, the other for 1958-1971. Annual data on consumer price index for the Philippines only began in 1957. So we tested the price quotation using CPIP for the years 1958-1971.

We ran a series of regressions using all and alternative combinations of the independent variables. We eliminated those that we found to be insignificant and those where multicollinearity existed. Indexes of real income

and money supply seemed to be correlated as the standard errors increased with the inclusion of the income variable. We removed real income in the next regression. In all cases, export prices were found to be insignificant.

We are left with two significant variables, money supply and import prices. Given below are the regression results:

1950-71	R^2	D.W.	
CPIM = -1.186 + .442 M (4.12)	.46	1.77	(1)
CPIM = -3.827 + .291 M + .578 Y (1.36) (.82)	.48	1.75	(2)
CPIM = -2.176 + .201 M + .183 Y + .Y22 WPIM (1.15) (.31) (3.34)	.68	1.72	(3)
CPIM = -1.344 + .245 M + .431 WPIM (2.42) (3.57)	.68	1.68	(4)
CPIM = 1.245 + .589 WPIM (5.21)	.58	.94	(5)
1958-1971			
CPIP = -.808 + .447 M (2.54)	.35	1.45	(6)
CPIP = -2.311 + .303 M + .468 Y (.78) (.42)	.36	1.43	(7)
CPIP = 2.131 + .434 M - .863 Y + .620 WPIM (1.25) (-.73) (2.02)	.54	1.48	(8)
CPIP = -.674 + .225 M + .494 WPIM (1.16) (1.98)	.52	1.64	(9)
CPIP = 2.556 + .661 WPIM (3.21)	.46	1.47	(10)

Equation 4. shows that a one percentage change in both the money supply index ~~in~~ and import price index would result in about .7 per cent change in consumer price index. We may say that both demand-pull and cost-push forces were present in post war Philippine inflation. Their regression coefficients are significant at less than 5 per cent.

Note:

These money supply functions were the same ones presented in an earlier study - Central Banking and Credit Policies in the Philippines, U.P. IEDR Discussion Paper No. 72-20, July 1972. In this study, the money supply functions were tested on only one set of data - quarterly time series, 1961-1970. Secondly, a less precise variable for deficit financing was used, that of total government expenditures. We are able to estimate quarterly credit to the government from outstanding securities and Central Bank and other bank credit to the government. We used this in lieu of government expenditures.

TABLE IV.1
QUARTERLY AVERAGES OF MONEY SUPPLY, DEMAND DEPOSITS, RESERVES AND CREDIT TO THE GOVERNMENT

		(1) Money Supply	(2) Demand Deposits	(3) Total Reserves q*	(4) Borrowed Reserves /q	(5) Credit to the government	(6) RAGD (3) + (5)	Loan Ra Discount Rate
1953	1	1196	568	785	244	803	1588	3.12
	2	1185	570	810	172	902	1712	3.14
	3	1152	549	795	61	1068	1863	3.18
	4	1202	556	864	67	1099	1963	3.18
54	1	1233	569	910	114	1113	2023	4.45
	2	1215	572	951	22	1143	2094	4.49
	3	1209	568	888	47	1149	2037	4.50
	4	1219	557	873	277	1165	2038	4.45
55	1	1216	554	817	211	1341	2158	4.22
	2	1213	565	827	127	1453	2281	4.25
	3	1230	594	923	86	1645	2569	4.27
	4	1297	629	952	140	1717	2669	4.26
56	1	1360	681	1042	208	1839	2882	4.23
	2	1399	707	1031	451	1948	2979	4.23
	3	1434	750	1130	776	2092	3222	4.24
	4	1479	775	1221	572	2138	3359	4.21
57	1	1541	820	1321	475	2222	3544	4.20
	2	1571	834	1206	510	2309	3516	3.15
	3	1548	820	1124	392	2340	3465	1.73
	4	1587	826	1227	252	2420	3647	1.44
58	1	1585	827	1301	441	2496	3797	1.40
	2	1620	853	1503	321	2533	4036	1.46
	3	1643	876	1685	247	2568	4253	1.46
	4	1704	906	1789	456	2669	4458	1.46
59	1	1789	969	1803	478	2795	4599	1.59
	2	1791	979	1534	479	7899	4383	1.57
	3	1811	1005	1527	495	2877	4404	1.23
	4	1840	975	1453	642	3003	4456	1.40
60	1	1797	924	1354	663	3027	4381	1.57
	2	1792	920	1260	631	2998	259	1.54

TABLE IV.1
QUARTERLY AVERAGES OF MONEY SUPPLY, DEMAND DEPOSITS, RESERVES AND CREDIT TO THE GOVERNMENT

		(1) Money Supply	(2) Demand Deposits	(3) Total Reserves q*	(4) Borrowed Reserves/q	(5) Credit to the government	(6) RAGD (3) + (5)	Loan Rate Discount Rate
	3	1783	924	1343	432	3074	4417	1.53
	4	1858	918	1476	439	3115	4591	1.58
61	1	1915	976	1665	536	3229	4894	1.57
	2	1994	1031	1636	988	3503	5139	1.56
	3	2025	1069	1829	1716	3985	5815	1.57
	4	2164	1126	1898	2036	4434	6332	1.56
62	1	2138	1135	1736	1392	4411	6148	1.35
	2	2187	1170	2046	1114	4327	6374	1.36
	3	2212	1173	2099	863	4454	6554	1.38
	4	2383	1246	2293	886	4827	7120	1.38
63	1	2556	1399	2402	1145	5176	7578	1.48
	2	2673	1450	2344	1377	5418	7762	1.31
	3	2741	1515	2524	1273	5662	8187	1.38
	4	2853	1534	2642	1088	6115	8758	1.39
64	1	2813	1535	2419	1287	6462	8881	1.44
	2	2637	1414	2303	1914	6402	8705	1.46
	3	2649	1416	2376	2034	6571	8948	1.46
	4	2761	1479	2435	2173	6874	931	1.47
65	1	2776	1515	1852	2212	6988	8841	1.48
	2	3082	1467	3701	4693	7041	10742	1.46
	3	2758	1453	4145	4641	7216	11361	1.52
	4	2950	1501	4037	5335	7636	11673	1.84
66	1	3011	1571	4017	5061	7688	11705	2.07
	2	3085	1624	4096	5250	7678	11774	2.05
	3	3126	1724	4473	5620	7822	12295	2.08
	4	3242	1760	4747	6079	8474	13221	2.07
67	1	3365	1860	5286	5743	9135	14421	2.08
	2	3407	1887	4545	6027	9501	14097	2.02
	3	3398	1883	4793	6463	9848	14642	1.64
	4	3607	1910	4568	6572	10497	15066	1.60

TABLE IV.1
QUARTERLY AVERAGES OF MONEY SUPPLY, DEMAND DEPOSITS, RESERVES AND CREDIT TO THE GOVERNMENT

		(1) Money Supply	(2) Demand Deposits	(3) Total Reserves q*	(4) Borrowed Reserves/q	(5) Credit to the government	(6) RAGD (3) + (5)	(7) Loan Rate Discount
1968	1	3697	2016	5853	7444	11028	16882	1.47
	2	3768	2067	5644	8091	11118	16762	1.34
	3	3596	1883	5417	8649	11303	16721	1.34
	4	3737	1999	5743	8415	11456	17200	1.34
69	1	3813	2134	6923	8189	12116	18539	1.34
	2	3928	2206	6423	8568	12243	18666	1.32
	3	4014	2262	6748	8766	12591	19340	1.30
	4	4545	2524	7773	8605	13484	21257	1.32
70	1	4592	2669	8998	8716	13913	22911	1.29
	2	4579	2550	6752	6597	13935	20688	1.35
	3	4535	2486	7269	5809	13962	21231	1.42
	4	4764	2972	7732	5615	14730	22463	1.41
71	1	4995	2606	8102	5853	16419	24522	1.42
	2	5196	2779	8171	5670	16618	24789	1.43
	3	5126	2729	8055	5233	16741	24797	1.47
	4	5348	2758	7555	5005	17317	24872	

*q is reserve requirement:

Source: CB Statistical Bulletin
Various Issues

TABLE IV.2

EXCESS AND AVAILABLE RESERVES OF COMMERCIAL BANKS

YEAR	EXCESS RESERVES	TOTAL AVAILABLE RESERVE	RATIO OF EXCESS TO TOTAL RESERVES
1950	128.6	244.3	0.52
51	19.3	116.0	0.16
52	39.7	147.5	0.26
53	34.3	147.8	0.23
54	48.1	165.8	0.29
55	51.7	188.5	0.27
56	72.7	234.3	0.31
57	41.5	201.9	0.20
58	155.0	324.7	0.47
59	43.3	296.5	0.14
60	53.9	251.1	0.21
61	80.9	310.2	0.26
62	91.0	404.6	0.22
63	62.9	459.9	0.13
64	65.4	449.6	0.14
65	63.9	465.4	0.13
66	129.4	506.6	0.25
67	90.9	855.8	0.10
68	78.6	1040.5	0.07
69	185.6	1295.4	0.14
70	263.7	1373.4	0.19

Source: Central Bank Statistical Bulletin, 1971.

TABLE IV-3

INDEXES OF PRICES, MONEY SUPPLY, VOLUME OF PRODUCTION AND REAL INCOME
1950-1971

	CPIP	CPIM	WPIA	WPIL	WPIM	WPIX	M	VA	Y
1949		101.6	110.5	115.1	84.4	112.1	88.6	59.8	62.3
50		104.7	106.6	105.4	102.5	122.9	92.1	64.4	67.7
51		113.4	118.7	115.9	128.9	126.7	97.7	73.8	73.5
52		106.1	108.9	108.9	114.4	100.8	92.8	79.4	79.5
53		102.5	108.6	106.8	108.5	123.5	95.5	85.2	86.2
54		101.0	102.6	101.4	105.2	108.5	98.4	94.0	93.4
55		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
56		102.7	103.1	102.0	108 0	104 3	114.4	106.1	107.2
57	100	104.5	107.6	106.1	114.6	109.2	126.0	110.2	113.4
58	102.5	108.0	111.2	108.5	119.2	120.8	132.2	110.9	117.7
59	100.6	107.0	112.7	106.7	129.9	136.5	145.9	117.5	125.8
1960	105.6	111.5	117.4	111.8	137.4	133.0	145.9	120.8	127.5
61	110.3	113.2	123.2	117.4	144.5	138.1	163.3	120.6	135.9
62	113.6	119.8	129.4	119.6	158.2	167.1	180.0	129.8	144.2
63	122.6	126.5	142.0	130.1	167.8	200.0	218.3	134.8	154.8
64	133.5	136.9	148.6	139.2	169.4	194.2	219.1	136.5	158.7
65	137.6	140.4	151.9	142.8	170.2	199.6	233.3	140.4	167.4
66	144.5	149.1	158.5	151.2	172.3	197.7	251.5	152.1	177.4
67	153.0	157.6	165.9	158.4	173.5	216.2	277.9	155.4	188.2
68	154.1	158.1	170.7	161.2	174.6	243.0	298.5	169.8	199.9
69	156.7	160.4	171.9	163.3	178.2	233.3	328.8	168.4	212.4
1970	180.7	188.2	205.4	190.5	220.9	304.8	372.6	178.7	235.4
71	222.4	224.0	237.7	226.1	245.6	321.3	416.9	178.7	250.6

Source: Central Bank Statistical Bulletin, 1971 except for real income which are from Phil. Statistical Reporter - 1949-66 1968 1967 1969-71 1969 Series 1971 Series

The Money supply series are annual averages