ECONOMIC ASPECTS OF THE TRINIDAD AND TOBAGO STOCK MARKET

- COMPTON BOURNE -

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Stock markets are potentially important influences on the rate of economic development. In less developed countries, commercial banks typically dominate the financial sector. Their conservative credit policies, especially the strong preference for short-term lending, militate against long-term, risky investment projects. The large contractual repayment flows imbedded in bank finance constrains prospective investors to low risk projects with short pay-back periods. Equity finance, because it has no fixed repayment obligations, is more compatible with risk-taking. Furthermore, "equity finance acts as the fulcrum against which debt finance is leveraged..." (Long and Veneroso, 1979). In the absence of stock markets, the flow of equity capital tends to be narrowly circumscribed. The main barrier is the illiquidity of corporate securities relative to the pronounced liquidity preference of financial asset holders. Long and Veneroso observe that "in countries where there is no stock market equities more closely resemble real assets than financial assets". By increasing the liquidity of corporate equity, stock markets reduce the influence of risk-aversion on the supply of equity finance.

The stock market is a relatively new phenomenon in Trinidad and Tobago. Although capital market transactions were conducted through a Call Exchange by 1967, these activities were essentially unregulated and were quantitatively minor. A Stock Exchange was established in October, 1981 to create an institutional framework within which capital transactions could be effected. The legislation provided for the registration and regulation of stockbrokers, and the regulatory guidance

of securities issues and listings on the Stock Exchange.

The establishment of an institutional frame work does not of itself ensure the healthy development of stock markets nor the steady growth of equity finance. The breadth, depth, and efficiency of the market are critical. Narrow and shallow stock markets are likely to exhibit several behavioural characteristics damaging to the developmental role of capital markets. The more important include excessive stock price volatility, stock price manipulation, and market inefficiency in the sense used by Fama (1970).

This paper analyses the Trinidad and Tobago Stock Market with a view to assessing its performance and potential. Attention is limited to corporate securities. The next section of the paper discusses the size and structural characteristics of the market for corporate equity. Remaining sections analyses price volatility, risk-return profiles, and market efficiency.

SIZE AND STRUCTURE OF THE STOCK MARKET

The establishment of the Stock Exchange in 1981 may be properly regarded as a turning point in stock market development in Trinidad and Tobago. Previously, the market was quite small. There were only 199 transactions involving 1,211 shares each in 1970. Although there was significant growth during the next decade as shown by the indices of transaction volume in Table 1, stock market activity was still quite

limited. In 1981, there were 5,276 transactions involving 6,069 shares per transaction on average. In 1982, the number of transactions almost quintupled. This large increase in the volume of transactions was accompanied by a 50 per cent decrease in the average number of shares per transaction, which suggests that the Stock Exchange induced a larger number of small trades.

It cannot be assumed that the stock market will grow substantially nor steadily in the future. The experience of Jamaica between 1969 and the present time reveals that the size of stock markets in the Caribbean (if not elsewhere) is acutely sensitive to cyclical movements in the overall economy. During the final stages of economic upswing in Jamaica, i.e. 1969 to 1974, the number of transactions in ordinary corporate equity rose from 7.4 million to 19.4 million. The market pretty much collapsed subsequently. In 1975, there were 6.7 million transactions. Activity remained at low levels until 1985. In view of the Jamaican experience there may be some market significance in the fact that activity levels in the Trinidad and Tobago Stock Market have also decreased synchronously with decreases in real gross domestic product.

There is not widespread ownership of marketable corporate securities. The Stock Exchange was intended to widen shareownership (Williams 1977, DeSouza 1983). To accomplish this distributional objective, restrictions are placed on the size of allotments for new issues. This policy has not been effective. Multiple applications are made through third parties and share ownership transferred subsequently in

TABLE 1 : INDICES OF STOCK MARKET SIZE AND GROWTH (1981 = 100)

YEAR	NO. OF TRANSACTIONS	AVERAGE NO. OF SHARES PER TRANSACTION	UNIT VALUE OF SHARES TRADED
1970	3	20	93
1971	6	68	64
1972	8	90	45
1973	11	86	75
1974	11	99	64
1975	11	117	73
1976	14	113	90
1977	15	125	91
1978	22	138	106
1979	28	112	114
1980	40	126	124
1981	100	100	100
1982	545	52	141
1983	490	46	113
1984	352	48	78

SOURCE: Based on data in Central Bank of Trinidad and Tobago Statistical Digest, various issues.

secondary transactions. As a result, the tendency noted by Williams (1977) whereby the number of shareholders shrinks drastically after a primary issue[1] still exists. Divestment soon after primary acquisition occurs mainly among small assetholders. Data from Williams (1977) and O'Brien (1982) show that the percentage contraction of shareholders tends to be greater among recipients of small allotments.

Other evidence indicates that stock ownership is highly concentrated. Flow of Funds data reveal that the household sector is a major holder of corporate shares accounting for 57 per cent of the amount existing in 1978. This feature combined with the tendency of small asset holders to divest implies a highly skewed distribution of corporate equity among households. Financial institutions with 34 per cent were the second largest holders of shares in 1978. Hospedales (1984) notes that institutional holders are currently predominant. Since there are few financial institutions, the major share of financial institutions in corporate stock further reinforces asset concentration. More direct evidence is provided in Table 2, which details the number of shareholders for 30 of the 32 firms listed on the Stock Exchange on June 30, 1984. It is evident that most firms have fewer than 3,000 shareholders. Indeed, only commercial bank equity is owned by a relatively large number of assetholders.

The fundamental reasons for the limited size of the stock market and the skewed distribution of stocks across asset holders require careful study before

any definite statements can be made. Nonetheless, there is cause for thinking that powerful constraints exist on both the demand side and the supply side. Low personal incomes and relative financial unsophistication result in a strong aversion to corporate equity and an equally strong preference for bank deposits and other quasi-monetary assets. Risk aversion prevails over expected rates of return. To illustrate, local corporate equity comprised only 5 per cent of the total financial asset holdings of the household and unincorporated enterprise sector in 1978. On the supply side, corporate financing preferences also retard the development of the stock market. There is a distinct preference for commercial bank credit. In 1978, commercial bank credit comprised 28 per cent of total corporate financial liabilities and corporate shares only 19 per cent.

As a consequence of the pattern of corporate financing, new stock issues are made infrequently. There were only seven new issues between 1970 and 1980, and only four since 1981. In addition to risk aversion, reluctance to dilute ownership control, and traditional preferences, transactions costs are probably an important constraint on stock market development. No information is readily available on issue costs, but these are likely to be substantial. For secondary transactions, which must be conducted through brokers, the cost is 3 per cent of the value of transactions. This can turn out to be quite considerable in absolute terms and may well discourage share acquisition in times of low rates of return.

TABLE 2: SHAREHOLDERS FOR LISTED STOCKS

(JUNE 30, 1984)

STOCKS (COMPANY NAME)	NUMBER OF SHAREHOLDERS	STOCKS	NUMBER OF SHARE-HOLDERS
Bank of Commerce	14,463	West Indian Tobacco Co.	5,105
Bank of Nova Scotia	10,409	Ready Mix	1,127
National Commercial Bank	23,595	F.W. Woolworth	1,224
Republic Bank	16,422	Stephens & Ross	3,230
Royal Bank of Trinidad & Tobago	14,874	Agostini	1,475
Workers Bank	14,370	Bata	246
Cooperative Bank	2,241	Cannings	219
United Bank	1,200	Carib Development	759
Geddes Grant	1,098	National Brewing Co.	960
McEnearney Alston	3,342	Trinidad Publishing Co.	409
Neal and Massy	6,477	Valpark	355
Angostura	2,133	L.J. Williams	681
Berger Paints	1,069		
Metal Box	2,058		
Lever Bros.	2,978		

SOURCE: J. Hospedales (1984).

STOCK PRICE VOLATILITY

It has been argued, for example, by Porter ( ) that stock markets which lack breadth and depth will also exhibit considerable price volatility. Small movements in demand and supply in any one segment of the market will tend to generate substantial price movements in the market as a whole. Exaggerated price changes can be damaging to investor confidence and thereby to market growth. An attempt was made to measure stock price variability, utilising weekly and monthly data for individual stocks. Mid-market quotations are the price variable. The sixteen stocks examined affect 88 per cent of shareholders. Table 3 presents frequency distributions of the number of stocks for the coefficient of variation of stock prices. With weekly data for the 1981 to 1984 period, only two out of 16 stocks have coefficients of variation less than 10%. Ten have coefficients of variation between 30 and 49 per cent, and two are slightly above 50 per cent. Stock price variability, while somewhat less pronounced for monthly data, is nonetheless considerable. Six out of thirteen stocks have coefficients of variation between 30 and 50 per cent, and one has a coefficient of variation equal to 100. It is further illuminating to consider the percentage changes in stock prices. For the weekly data, while mean percentage changes are less than unity (frequently negative), the standard deviations are small.

RISK-RETURN RELATIONSHIP

It is useful to examine the empirical relationship between risks and returns. Knowledge of the risk-return trade off provides some insight into the quality investor decisions and into their attitudes towards risk. Strong investor demand for low return -

TABLE 3: FREQUENCY DISTRIBUTIONS OF COEFFICIENTS OF VARIATION OF STOCK PRICES 1981-84

COEFFICIENTS OF VARIATION (%)	NUMBER OF FIRMS	
	MONTHLY DATA	WEEKLY DATA
0 - 9.9	0	0
10 - 19.9	1	2
20 - 29.9	5	2
30 - 39.9	3	7
40 - 49.9	3	3
50 - 100	0	2
100+	1	0
ALL	13	16

SOURCE: Computed From Basic Price Data in West Indies Stockbrokers Reports

high risk stocks would imply either poor decision-making on their part or risk-loving attributes.

The risk-return configuration for corporate equity in Trinidad and Tobago is quite heterogeneous. Table 4 details mean values and standard deviations for thirteen stock based on monthly data for 1976-1984. The first two columns pertain to stock price levels. The degree of heterogeneity is striking. The next two sets of columns deal with returns rather than price levels. The rate of return on a stock is the sum of the dividend rate and the percentage capital gain or loss. Some monthly information on dividend rates are supplied by a stockbroking firm, but these data should be treated cautiously since they seem to be interpolations of reported quarterly dividend payments. When only the percentage change in stock prices are considered, six of the stocks have negative mean returns and small positive mean returns with slightly higher standard deviations. Expectations of capital gains do not appear to be a major motivation for stock transactions in Trinidad and Tobago.

Dividend payments stabilize rates of return in addition to raising expected values. Mean returns are seen to be much higher and the standard deviations relatively smaller than for capital gains (losses) alone.

Granted the weight of dividends in total returns, it is worthwhile to explicitly examine the influence of the dividend rate on bid prices (BID). Annual data for 1971 to 1982 were pooled for seven manufacturing firms and for three banks for two separate sets of regressions. For manufacturing firms, the explanatory variables

TABLE 4 : MEANS AND STANDARD DEVIATIONS OF STOCK PRICES PERCENTAGE CHANGE IN STOCK PRICES, AND RETURNS : MONTHLY DATA (1978-1984)

STOCK (FIRM)	STOCK PRICES		PERCENTAGE CHANGE IN PRICE		RETURNS	
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
1	3.14	3.32	0.05	0.36	7.31	2.11
2	3.15	1.06	-0.01	0.13	4.15	1.87
3	5.80	2.61	.006	0.10	4.98	1.10
4	2.71	0.80	-0.012	0.09	5.09	2.62
5	8.62	3.00	-0.004	0.11	4.87	1.62
6	6.79	1.93	0.003	0.08	3.95	1.07
7	9.20	2.26	-0.001	0.06	4.53	1.34
8	10.65	4.27	0.009	0.07	5.47	1.36
9	3.06	1.38	0.001	0.09	3.60	1.24
10	5.39	2.71	0.01	0.09	6.41	1.26
11	4.20	1.18	-0.01	0.06	4.65	2.10
12	3.94	1.10	-0.01	0.07	4.80	2.32
13	4.75	0.90	0.003	0.08	5.69	0.90

are Dividends Per Share (YIELD) and Price-Earnings Ratio (PER). The former measures the dividend payout rate and the latter reflects the influence of company profitability. The explanatory variables for commercial bank stock prices are Dividends divided by paid-up share capital (DIVR) and the post tax profits divided by paid-up share capital (PROF). The results are set out in equation form below.

MANUFACTURING FIRMS

$$BID = \underset{(2.05)}{0.220}\ YIELD + \underset{(5.08)}{0.261}\ PER + \underset{(5.62)}{5.745}\ DS + \underset{(2.37)}{2.438}\ D7$$

$\bar{R}^2 = 0.5097$ $F = 16.86$ $DW = 1.97$ $RHO = 0.344$

BANKS

$$BID = \underset{(4.81)}{0.170}\ DIUR + \underset{(0.90)}{0.044}\ PROF$$

$R^2 = 0.5052$ $F = 14.78$ $DW = 1.84$ $RHO = 0.437$

The results for both explanatory variables are statistically significant at the 5 per cent level for manufacturing firms. The cross-section dummies for two firms were also statistically significant. For commercial banks only the dividend rate is statistically significant. These results show that investors in corporate securities are influenced by dividend considerations and in the case of manufacturing equity by profit performance.

STOCK MARKET EFFICIENCY

"Efficiency" has a special meaning in the context of capital markets. "A market in which prices always "fully reflect", available information is called "efficient" " (Forna, 1970). This notion of "efficiency" is linked to the concept of "fair game". With a fair game, expected gains and losses are zero. If markets are efficient no single investor has an intrinsic advantage to profit persistantly. Securities prices at any point in time will fully reflect all available information.

The efficient market hypothesis has been tested by random walk models. The random walk hypothesis posits independence of successive changes in stock prices or returns, and the identical distribution of these changes. Granger (1975) has argued that the random walk hypothesis is better tested in log random walk (LRW):

$$\ln P_t = \ln P_{t-1} + e_t + z\ (i)$$

or in capital return random form (CRW):

$$C_{t,i} = \frac{Pt - Pt-1}{P_t} = r\ (i) + n_{t,i}$$

where P is stock prices, t is time, z(i) is a constant mean of P over i time units, r is the normal expected value of C over i time units, and e and n are error terms. The models imply that lagged values are not a basis for estimating mean values of log price changes or capital returns.

Granger prefers the Capital Return Random Walk model because of its "intuitive appeal", its property of a systematic link between the variability of errors and price levels, and because the presence of the "normal expected return" is easier to explain from the general market philosophy than is the constant, Z.

The models were tested on weekly data for the period November 1981 to December 1984. The regression models employed are:

$$\ln P_t = a + bP_{t-1} + \epsilon_t$$

and

$$C_t = cC_{t-1} + n_t$$

The results are presented in Tables 5 and 6. In the LRW model all the coefficients of the lagged stock price are statistically significant at the 5% level. As can be seen, the values of b are close to unity for each stock. The LRW tests thus indicate that stock prices are serially dependent. The CRW results contained in Table 6 are not conclusive. Six of the sixteen stocks exhibit serial dependence. For the others, the coefficients of the lagged percentage price change are not significantly different from zero at the 5 per cent level. On the whole, the LRW and the CRW tests lead to the conclusion that the Trinidad and Tobago market for corporate equity is not efficient.

Random walk tests are "weak form" tests in that the information set is comprised of historical prices only. "Semi-strong form" tests would require analysis

of stock price response to announcements on corporate financial performance and policies. "Strong form" tests involve the study of differential access to stock market information. The 'semi-strong' and 'strong' form tests could not be employed with the data available. In any case, if the efficiency hypothesis is rejected by weak form tests it is unlikely to pass the semi-strong or strong form tests.

An alternative weak form test is the runs test. A run is defined as a sequence of stock price changes of like signs, i.e. positive, negative or zero. The test compares the actual number of runs with the number expected from a randomly distributed series of price changes. Formally, denoting the total number of stock price changes by N, the number of price changes of each sign by N_i (where i = 1 for positive changes, = 2 for negative changes, and = 3 for no change), one can define the expected number of runs by:

$$Re = [N\ (N + 1) - \sum_{i=1}^{3} ni^2]/N$$

with standard deviation:

$$Re = \left(\frac{\sum_{i=1}^{3} ni^2 \left[\sum_{i=1}^{3} ni^2 + N(N+1)\right] - 2N \sum_{i=1}^{3} n_i^3 - N^3}{N^2 (N-1)} \right)^{\frac{1}{2}}$$

The expected number of runs is calculated on assumption that successive price changes are independent and that sample proportions are good estimates of population proportions.

TABLE 5: REGRESSION RESULTS : LOG RANDOM WALK

STOCK	CONSTANT	ONE PERIOD LAGGED DEPENDENT	$\bar{R}^2$	DW
1	0.018	0.974	.953	2.06
2	-0.014	1.0064	.990	1.93
3	-0.008	1.006	.987	1.64
4	0.083	0.951	.934	1.99
5	-0.020	1.012	.989	1.79
6	0.084	0.959	.926	2.26
7	0.026	0.981	.967	1.89
8	0.040	0.974	.950	2.10
9	-0.014	1.004	.987	1.18
10	0.018	0.985	.979	2.20
11	-0.019	1.007	.991	1.55
12	-0.014	1.005	.993	1.56
13	-0.000	0.998	.987	1.74
14	0.003	0.995	.982	2.04
15	0.001	0.997	.984	1.47
16	0.045	0.967	.978	2.23

TABLE 6 : REGRESSION RESULTS : CAPITAL RETURN RANDOM WALK

FIRM	ONE PERIOD LAGGED DEPENDENT	$\bar{R}^2$	D.W.
1	-0.045	0.002	1.99
2	0.078	-0.023	1.99
3	0.191*	0.030	2.01
4	-0.008	-0.002	1.99
5	0.154*	-0.008	2.02
6	-0.153*	0.023	2.01
7	0.053	-0.003	2.00
8	-0.059	0.001	2.00
9	0.424*	0.158	2.01
10	-0.102	0.009	1.98
11	0.251*	0.042	1.95
12	0.245*	0.038	2.05
13	0.136	0.010	1.99
14	-0.016	-0.008	2.00
15	0.266*	0.068	1.90
16	-0.086	-0.003	1.94

NOTE: * denotes statistical significance at the 5% level.

The runs test is conducted on the standardized normal variable.

$$K = (Ra - Re \pm \tfrac{1}{2}) \sigma Re$$

where Ra is the actual number of runs and $\frac{1}{2}$ is the discontinuity adjustment factor (0 where Ra Re, and 0 when Ra Re). N, K is approximately normal with zero mean and unit variance.

The results of the runs tests are presented in Table 7. In no case did the expected number of runs exceed the actual number of runs. The K statistic is significantly different from zero in all instances. Moreover, the percentage difference between the actual and expected number of runs is never less than 50 per cent. The runs test, therefore, provides strong evidence that stock price changes are not serially independent in the Trinidad and Tobago stock market.

EFFECTS OF INFLATION ON STOCK PRICES AND RETURNS

Several studies of stock price behaviour in the USA and Europe have investigated the influence of inflation on stock prices. The starting point for such studies is Irving Fisher's hypothesis that in an efficient stock market the expected real rate of return on common stocks and the expected inflation rate vary independently or its corrollary that nominal rates of return vary systematically with the expected inflation rate. The absence of a systematic relationship between stock price changes

and the expected rate of inflation may thus be taken as indirect evidence that the stock market is not efficient.

The model employed in this Trinidad and Tobago study is:

$$R_t = a + b \pi_t + e_t$$

where

R_t is the nominal rate of return (defined either by the one period percentage charge in stock prices or by the dividend rate plus the one period change in stock prices), π is the contemporaneous rate of inflation as a proxy for the expected rate of inflation (and is measured by the one period percentage change in the consumer price index; and e_t is a stochastic disturbance. Monthly data were utilised for 13 firms over the 1978 to 1984 period.

The results conclusively show that the contemporaneous rate of inflation has no effect on monthly changes in stock prices or on the rate of return properly defined. Only for one stock is the coefficient of the inflation variable significantly different from zero at the 5 per cent significance level. Although it is planned to conduct the test with different assumptions about expectations formation it is unlikely that the conclusion will be materially affected.

TABLE 7: ACTUAL AND EXPECTED NUMBER OF RUNS: WEEKLY DATA 1981-1984

STOCK	Ra	Re	K
1	93	155	-18.10
2	78	161	-28.85
3	77	161	-29.77
4	95	155	-17.08
5	86	158	-22.86
6	57	108	-35.27
7	90	152	-18.77
8	102	153	-13.56
9	92	156	-19.03
10	89	157	-21.07
11	98	154	-15.52
12	89	157	-20.83
13	84	159	-24.03
14	77	161	-29.52

CONCLUSIONS

This study of the Trinidad and Tobago stock market with emphasis on its behaviour subsequent to the establishment of a stock exchange in 1981 points to several weaknesses still prevailing in the capital markets of the country. The stock market is narrow and thin if these characteristics are measured by the volume of transactions, the number of market participants and the degree of price volatility. Moreover, the market is not efficient in the sense of offering equal prospect of gain to all market participants. Although this study has not analysed the reasons for the non-random behaviour of stock prices and for the absence of inflation effects on stock prices and rates of return, Parris argues that interlocking directorates, insider trading and collusion generate non-uniform flows of information to market participants. In such situations, the stock market will not be efficient.

In April 1983, the then Governor of the Central Bank of Trinidad and Tobago was reported as saying:

> "Today we have a stock exchange which we feel is well established along very sound lines and one which is expected to strengthen the existing machinery in which trading takes place through the introduction of measures relating to the protection of investors' valuation of shares."

This study yields a less sanguine assessment.

NOTES

(1) Former Prime Minister, Eric Williams, observed that in two new issues by a major commercial bank in 1973 and 1976, 12,555 individuals were allotted less than 100 shares each. By April 1977, the number of shareholders had decreased to 512. A further 18,169 persons were allotted 250 shares each, but their number had contracted to 8,035 by April 1977 (Williams 1977).

(2) Hospedales (1984) claims that experience between 1973 to 1985 shows a shrinking of share registers subsequent to secondary market dealings.

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