

EFFICIENCY AND THE PROGRAMS TO DEVELOP CAPITAL MARKETS

The Brazilian Experience

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Recent studies suggest that the main avenue to obtain benefits of international portfolio diversification would be direct portfolio investments in the domestic securities of the various countries. There are many barriers to such investments, the most important being the nature of foreign capital markets. Given the potential for attracting foreign portfolio investments and more efficient mobilization of indigenous resources, many less developed countries (LDCs) have embarked upon programs to develop their local capital markets. Among LDCs, the Brazilian effort stands out as the most innovative and systematic. The efforts to develop the Brazilian market have been quite successful with positive effect on the mobilization and allocation of resources. It also exhibits the institutional and other characteristics associated with developed markets. Further, the Sao Paulo exchange seems to be at least as efficient as most of the European markets. Unfortunately, the apparent shift since 1975 in government policy toward public sector dominance in the domestic savings transfer process may reverse the market development process.

1. Introduction

Many recent studies have shown that the international portfolio diversification into developed country (DC) capital markets is desirable.¹ Further, potential gains can be substantially increased by including less developed country (LDC) securities in the opportunity set.²

Two main avenues are generally available to investors who wish to diversify their portfolios internationally:

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¹The most important studies include Grubel (1968), Grubel and Fadner (1971), Solnik (1974a, b), Lessard (1974) and Agmon (1972).

²See Levy and Sarnat (1970) and Errunza (1977, 1978).

- (1) Investments in multinational corporations (MNCs). The MNC activity spans both developed and developing countries. Also, a large number of MNCs derive substantial part of their cash flows from foreign operations. Hence, investments in MNCs should provide the benefits of international diversification. Even though intuitively appealing and easy to implement, empirical tests of the hypothesis cast substantial doubt on the usefulness of MNCs as a vehicle for such diversification. With the exception of the Agmon and Lessard (1977) study, the investigations of Jacquillat and Solnik (1978), Errunza and Yalovsky (1978) and Kohers (1975) indicate that investments in MNCs may not be regarded as a substitute for international diversification.
- (2) Investments in various national markets either on an individual basis or through the intermediation of internationally diversified mutual funds. However, there are many barriers to investments in the individual country markets. The most important barriers include the nature of foreign capital markets, problems of information, foreign exchange regulations and capital controls. These obstacles are likely to be perceived by investors as particularly prohibitive in LDCs which offer the greatest potential for risk reduction due to their very low correlations with developed economies.³

Given the potential for attracting substantial amounts of indirect foreign investments as well as the important role of capital markets in economic development, many LDCs have embarked upon programs designed to develop their local capital markets.⁴ The Brazilian capital market program stands out as the most innovative. It consisted of various legislative reforms, regulatory measures, disclosure rules and liberalization of rules governing foreign portfolio investments. Evidence developed by the author suggests that the Brazilian market developed as expected. Saving rates and resource allocation improved and primary issues market and a reasonably liquid secondary market developed. Thus, systematic evaluation of the Brazilian program offers lessons for other LDC's.

To facilitate understanding of the LDC programs, we first review the role of capital markets in economic development and provide primary reasons for the underdeveloped state of LDC markets. We then discuss the Brazilian program, with special emphasis on efforts to liberalize and attract foreign portfolio investments into Brazilian securities. Success of the Brazilian

³For a detailed discussion of the barriers to international portfolio diversification, see Errunza (1974). The most important studies on DC stock markets outside the U.S. include those by Solnik (1972), Guy (1975, 1977) Altman, Jacquillat and Levasseur (1974). Kendal (1953), Alexander (1961), Jennergren and Korsvold (1976), and Palacios (1976).

⁴For discussion of the role of capital markets and foreign portfolio investments in economic development, see Errunza (1975).

program is then demonstrated through in-depth evaluation of the macro and micro efficiency concepts. Conclusions follow.

2. Capital markets in economic development⁵

Many have demonstrated that improved resource allocation and reduced preference for consumption result from an expanding set of financial assets. Accordingly, Goldsmith (1969), McKinnon (1973) and Shaw (1973) have documented the relationship between financial superstructure and economic development and have advanced hypotheses postulating causal relationships between such complex phenomena as economic development and finance. Unfortunately, these have not been rigorously tested due to data problems. Nevertheless, these ideas have received much attention and application in the recent development strategy of many of the less developed countries. Today, a surprisingly large portion of the LDC effort is directed towards developing domestic capital markets and its attendant institutions.⁶

Given the problems of establishing a direct link between financial development (which includes capital markets) and economic growth, we will not reiterate many of the conclusions reached by previous researchers but simply present major arguments for the facilitating function of capital markets in economic development.⁷

Under self-finance, there is no opportunity for equalization of investment returns at the margin. The development of capital markets would reduce the proportion of investments that are self financed by separation of savings/investment functions and promotion of a range of financial instruments.

Fragmented LDC markets mean local investors face different sets of opportunities. An efficient capital market could accelerate development by re-allocating resources to finance higher return projects until all investors receive similar net returns for a given risk. Capital markets may also improve savings allocation through accumulation of vital information and facilitating comparison of all the available opportunities. In the later stages of capital market development, a number of specialized institutions (brokers, investment advisers, information services) play an active part in investment appraisal and portfolio management decisions.

⁵Throughout this paper, capital markets are defined in a narrow sense, confining it to institutions which deal with longer term instruments, e.g., stocks, bonds.

⁶In the course of economic development, a country's financial superstructure grows more rapidly than the infrastructure of national product and national wealth with indirect finance increasing in importance at the expense of direct finance. Historically, the share of financial institutions in the issuance and the ownership of financial assets has increased considerably during the economic development process. For further elaboration, see Goldsmith (1969, pp. 44–46, 392–402). Direct finance implies a direct transfer between ultimate borrowers and lenders, whereas indirect finance involves financial intermediation.

⁷For detailed discussion of the problems and conclusions, see Goldsmith (1969).

In an efficient securities market, increased liquidity for financial assets, opportunity for portfolio diversification and interim returns on lumpy investments may raise saving rates and capital accumulation of the economy. An increased capital stock, *ceteris paribus*, would enhance the production possibilities of the economy directly as well as by providing access to more capital intensive technology. Thus, an efficient capital market may tend to increase the total amount of savings of the economy by making investment relatively more attractive than consumption at the margin.

2.1. *State of LDC capital markets*

The prevailing conditions in most LDC's constitute a strong barrier to the use of securities markets as a viable alternative to self, bank, or group finance.⁸ As a set these conditions constitute the concept of 'portfolio suppression'. We first-discuss the general environmental factors and then the specific exchange market factors.

2.1.1. *General environmental factors*

One of the prime obstacles to capital market development is political and economic instability. Such gives rise to capital flight, reduces investor planning horizons, and makes investments in non-productive assets like precious stones, paintings etc. more desirable in relation to financial instruments. The list of LDCs with these problems is too long to reproduce here.

Religious and social practices, exorbitant expenditures on funerals and marriage ceremonies, and religious rules against the payment of interest on loans and deposits work to the detriment of savings investment process.⁹ General level of education and financial training are also extremely important to the success of capital market formation.¹⁰

Taxation discriminates against income from financial assets.¹¹ Such income is also easily assessed. In contrast, real property and self-finance are taxed lightly. Also, re-appraisals of land and other immovable property for

⁸One could postulate that the LDC markets are underdeveloped because they develop as a result of overall economic growth rather than the other way around. Despite the lack of convincing evidence to the contrary, one can make a reasonable argument against this view on the basis of the rather well developed capital markets that exist in some of the major developing countries, e.g., India, Argentina, Chile. Even though two of these are in a state of chaos at present, primarily due to portfolio suppression, they compared favorably with the smaller European exchanges in the recent past.

⁹See Panikar (1961, pp. 64–85) and Oshima (1963, pp. 311–314).

¹⁰See Emery (1970, p. 709).

¹¹See Shaw (1973). At times stocks have been issued in the bearer (portador) form, thereby eliminating all tax liabilities.

tax purposes is favorable to the investor due to the lack of continuous market pricing for these assets and involves substantial time lags. Thus, net returns from holding financial assets do not compare favorably with those from real assets.

High and unstable inflation makes financial assets less desirable. Contrary to the popular belief, securities may not have been a good hedge against such inflation. Also, inflation-induced needs of higher working capital often result in reduction or elimination of cash dividends, which may lead to widespread lack of confidence given short investor horizons.¹²

The impact of artificially fixed low interest rate ceilings on mobilization of savings has been amply discussed by Shaw and McKinnon. Major concerns which have led to continuation of such policies are the adverse effect of higher market clearing rates on investment and government debt burden. Implementation of interest rate ceilings make it very difficult to develop securities exchanges.

2.1.2. Factors specific to the stock exchange

The supply of new stock issues on the primary markets of LDCs is inhibited by the behaviour of controlling shareholders, scarcity of outside financing sources coupled with investor desire for current dividend income, high issue costs, institutional gaps, and cumbersome listing procedures. Further, in many LDCs the securities markets are accessible only to government, their agencies, and large firms. As a result, newly issued primary securities are a much smaller proportion of the GNP and aggregate savings in LDCs.¹³

At times, government-run mutual funds and development banks have preferential access to new issues. The low supply of gilt-edged securities and the red tape of the government securities control board result in delays, high multiples of oversubscription, and substantially higher costs. Hence, besides the preconditions necessary to attract investors to the developing securities markets, the participation in new issues requires added incentives to cover the additional risks and costs associated with such issues.

Market regulation can be either private or by the government. The distinction between the two approaches is very subtle. Both require the disclosure of similar data to the investor either directly or through governmental agencies. In LDCs with no systematic approach to the development of capital markets, creditors know little about debtors due to lack of adequate disclosure,¹⁴ and price manipulations thrive in a loosely monitored

¹²See Eiteman (1966, pp. 81–83).

¹³See Goldsmith (1969).

¹⁴For further details, see McKinnon (1973).

emerging stock exchange. Investors, being particularly risk averse, have neither the profit incentive nor the assurance of maintaining the value of their portfolio. Financial instruments other than money cannot be easily marketed under such conditions.

LDC markets are very small in relation to DC markets, in terms of both the volume of shares traded and the number of securities listed.¹⁵ The volume of transaction in relation to gross national income is very low on LDC markets and may have resulted in somewhat higher unit transaction costs. The number of issues listed on an exchange is sometimes misleading as an indicator of market breadth and liquidity. To attract investors, a market should offer a range of securities to satisfy investor preferences.

3. The Brazilian capital market development program

The new Castello-Branco government that came to power in 1964, set as its primary goal the stabilization, development and reform of the Brazilian economy. Pursuant to this goal, the new economic policy decreased its reliance on inflationary finance and emphasized the role of the financial system in mobilization and allocation of domestic surplus. Wide ranging innovations were needed initially to obtain the shift towards voluntary savings and later to increase aggregate saving rate.¹⁶ To augment domestic savings and increase external (foreign exchange) resources, efforts were made in 1975 to attract foreign portfolio investments.

To accomplish above objectives, the national financial system was reformed through law no. 4595 in December 1964 and the Capital Markets Law (CML) no. 4728 in July 1965. In order to improve the appeal of financial instruments to both investors and firms, the CML provided fiscal incentives to investors and corporations, made an attempt to eliminate specific distortions in the economy, established controls, rules and guidelines for the proper functioning of the stock exchanges and imposed registration and disclosure requirements for publicly traded firms. In addition, it offered incentives for the creation of institutional infrastructure necessary for the development of the securities market.¹⁷

3.1. Elimination of specific distortions

To provide attractive (positive real) yields, the government issued indexed (principal and interest) bonds in 1964. The prohibition against monetary

¹⁵For further discussion, see Basch and Kybal (1970, pp. 66–72).

¹⁶Ness (1974) suggests that the Brazilian financial market innovations can be considered to have been directed to the determinants of growth under the basic Harrod–Domar model.

¹⁷For a complete discussion of the CML see, Trubeck (1971). For the Brazilian experience up to early 70's, see Ness (1974). For details on stock exchange operations, see Bolsa de Valores de Rio de Janeiro (1975).

correction for loans of maturity greater than one year was eliminated by the CML, and the principle of *ex post* monetary correction was subsequently applied to housing bonds, savings deposits and other financial instruments. Generally, the monetary correction components of principal adjustment and interest payments were non-taxable, thereby, providing real return to investments in financial assets. Concurrently, measures were adopted to reduce the attraction of traditional investment alternatives like real estate and foreign exchange. Tax disincentives were provided for real estate transactions beyond a certain number (of transactions) a year and exchange policy of minidevaluations was instituted to discourage currency speculation.

3.2. *Fiscal incentives*

By far, the most important impetus for revitalizing the Brazilian equity markets was the use of strong fiscal measures to channel funds into the market. The Capital Markets Law provided for (a) a substantial reduction in withholding tax on dividends, (b) a personal income tax exemption of approximately \$400 in dividends, (c) a deduction from gross taxable income of 30% of amounts invested in newly issued shares of 'open capital' companies, government bonds, and housing bonds and 15% for investments in mutual funds and savings deposits.

On the demand side, a firm classified as 'open capital company' received fiscal benefits like lower tax rate on distributed profits. To qualify as an 'open capital' company (*sociedade anonima de capital aberto* – SCA) a corporation had to meet four requirements: (1) its stock must be negotiable, (2) its stock must be distributed among a certain minimum number of public shareholders, (3) the public shareholders must hold 30% of 'voting capital', (4) the number of public shareholders and the percentages of capital they hold must increase over time until they reach certain limits.¹⁸

¹⁸Subsequently, new legislations to increase the profitability of corporations and the return on securities in relation to other forms of investment were passed. In 1969, decree law no. 62, together with decree law no. 401, allowed companies to reevaluate their working capital in keeping with monetary correction, hence effectively increasing their profits. In 1970, decree law no. 1109 put into law the government's policy of granting corporations exemption from taxation when incorporating reserves. In 1971, the government created fiscal incentives for company mergers. In 1973 decree law no. 1283 provided fiscal incentives for corporations to increase dividend payouts by allowing dividends to be classified as corporate pre-tax expenses. In 1974, decree law no. 1338 provided fiscal incentives for Brazilians and foreign residents who subscribed to new issues or purchased shares on the stock exchange. The main thrust of law 1338 was to change the fiscal incentives (offered to the would-be investor) from deductions from gross income to reductions in income tax due. A taxpayer was allowed to deduct 6% to 12% of his stock market investment from his income tax due.

3.3. *Registration and disclosure requirements*

To provide adequate information and investor protection, and to increase the credibility of the market and of business in general, the CML required all companies whose shares were publicly traded on the exchange, as well as all new issues, to register appropriate financial information with the Central Bank.¹⁹ The Sao Paulo exchange does not have special requirements for registration, whereas, for registration on the Rio exchange, the firm must comply with the resolution no. 90 of the Rio de Janeiro stock exchange. Compulsory listing is required only for 'open capital' companies.

3.4. *The stock exchange*

From 1939 until 1964, practically no new legislation was introduced into the Brazilian stock market. During early 60's, the market was in an incipient state with main dealings in foreign exchange. The 1964 law no. 4595 was designed to restructure the financial market and create an organized regulated market as well as define the rights of investors and institutions. Under the new legislation, stock markets became private bodies run by the stockbroking firms (which are members of the exchange) with Central Bank supervising operations of the exchanges and activities of its brokers. At present there are fifteen exchanges most of which are located in the capital cities of the various states. The transactions on the exchange floor are restricted to the stockbrokers and are closely watched through operating rules and inspection by the Central Bank. Trading off the exchange floor is generally not allowed. Trading is by public auction. The exchange maintains a guarantee fund to assure investors against disagreements with or fraudulent actions by the member brokers. The Rio exchange also provides clearing facilities, a modern information system and billing facilities.

3.5. *Institutional infrastructure*

A major feature of the Brazilian effort relates to the development of financial institutions. Resolution no. 18 created investment banks (by converting existing finance companies engaged in the short-term end of the market)

¹⁹Law no. 5589 of 1970 required companies with traded stock to submit bi-annual reports to the exchanges and stipulated that the dividends had to be paid within 60 days from the date of publication of the minutes of stockholders' meetings on the subject. In 1972, resolutions no. 220 and 214 of the Central Bank sought to improve control of accounting practices and disclosure of financial information. The resolution no. 220 required open-capital companies to have professional auditors verify their balance sheets since at that time only 25% of the listed companies and 2% of the financial intermediaries published independently audited financial statements. The resolution no. 214 required all corporations floating new stock issues to register a formal prospectus with the Central Bank detailing the operations, earnings and future expectations of the firm.

whose direct financial activities include lending, purchase of shares, underwriting of stocks and bonds, brokerage and operation of mutual funds. It was expected that the development of project evaluation and underwriting capacity by the investment banks together with the fiscal incentives for firms going public in a well regulated securities market would lead to higher proportion of investment funding from private investors via the securities market. Also, Fundo de Desenvolvimento do Mercado de Capitais, a government fund formed with the help of the World Bank and U.S. AID, was developed to underwrite new issues.

In 1967, law no. 157 established a new type of mutual fund to increase investment in the stock market. The resources of '157 funds' (i.e., 'fiscal funds') came from tax deductions of individuals and companies.²⁰ At the end of 1974, there were 65 such funds with combined assets of about U.S. \$300 million. The fiscal funds also helped the expansion of the mutual fund industry. By the end of 1971, there were more than 150 mutual funds with total assets of nearly U.S. \$1 billion.²¹

3.6. *Foreign portfolio investments*

The decree law 1401 and the accompanying resolution no. 323 issued by Central Bank in May 1975 legalizes and provides incentives for foreign portfolio investments in Brazilian securities.²² Conceptually, the efforts to develop capital markets can benefit substantially from parallel liberalization of restrictions on foreign portfolio investments into LDC securities. The participation of sophisticated foreign investors in the market place would instill confidence among local investors, necessitate development of new institutions and may reduce market imperfections that afflict most LDC markets. The transfer of knowledge and training of local executives and technicians resulting from close contact and satisfaction of foreign investor demand would accelerate further development. The development of domestic markets, the listing of family controlled enterprises and improved reporting

²⁰Initially, the law allowed 10% of individual and 5% of corporate tax liabilities to be placed in these funds and the amounts so placed could not be withdrawn for two years. Similarly, resolution 185 required 'fiscal funds' to place 70% of their funds in new issues. The conditions of investment in and withdrawals from these funds, and their regulation has undergone many changes over the years to reflect the development needs of the market.

²¹These funds operate under strict regulations of the Central Bank regarding portfolio composition, reporting and financial statements, auditing etc. to protect investor interest. A specific authorization from the Central Bank is required to organize a fund, which must have a minimum initial value of U.S. \$125,000. The fund must invest 80% of its assets in equities, with a minimum of 20 different stocks, none representing over 10% of the total assets of the fund. The manager is obliged to publish twice a year a complete report, including financial statements and details of the composition of the portfolio, both audited by an independent firm.

²²For further details on the law, see Bolsa de Valores do Rio de Janeiro (1975). For a discussion of the law, its development impact and its operationalization, see Errunza (1975).

practices would increase access of LDC corporations to the worldwide stock exchanges. Foreign listing would improve the image and increase confidence of domestic investors, leading to their active participation in that company's securities. Increased confidence on the part of domestic investors and the availability of a wider selection of securities may substantially reduce the loss of domestic savings through capital flight.²³ This, in conjunction with the capital inflows in the form of portfolio investments, would augment the funds available for domestic investment.

4. Evaluation of the Brazilian program – macro-efficiency

There is no explicit definition of what constitutes a developed market, however, one can ask whether available funds are allocated comparatively efficiently. Thus, we might accept the notion that capital markets are efficient if they generally channel funds to the most productive uses. This is macro-efficiency. On the other hand, we may ask whether security prices behave as we expect them to behave, i.e., do returns follow a random walk or are all securities traded in an integrated market or one which is highly segmented. This is micro-efficiency. Of course, these two efficiency concepts are not mutually exclusive. In this section, we investigate macro-efficiency issues. Since the impact of capital market development policies cannot be isolated from other financial reforms and economic measures, one must be careful in interpretation of the following sections.²⁴

4.1. Savings mobilization

As discussed in the previous section, the development of securities markets may lead to higher saving rates and capital accumulation in the economy. Since the beginning of the Brazilian reforms in 1964, the financial markets have expanded considerably. The reduction in the inflation rate and higher interest on savings deposits also contributed to the expansion. The ratio of all financial assets (other than shares) to GNP rose from a low of 13% in 1964 to a high of 62% in 1975. The volume of total share financing (including registered public offerings, and other subscriptions such as rights

²³At times, financial shallowness is blamed for the large capital outflows in the form of capital flight. This is an oversimplification. It is possible that a small part of the total is in response to the political uncertainties, over-valued exchange rates, and lack of profitable opportunities. However, a large portion is for the purpose of achieving portfolio balance through holding short-term, liquid assets. The development of financial intermediaries and the monetary sector will not suffice to halt this drain of productive capital from the LDCs. Development of securities markets and check on inflationary pressures may help reduce these outflows by creating confidence, as well as proper short-term instruments.

²⁴A much detailed discussion of macro-efficiency issues can be obtained from an unpublished manuscript by Frank Veneroso (1979), 'Brazilian securities market development'.

offerings, new incorporations, public and foreign direct investment) rose from 1% of GNP in 1964 to a high of over 6% of GNP during peak market activity in 1971 and then stabilized around 4% of GNP until 1975. Domestic saving rates increased from 16% of GNP in 1960 to over 20% of GNP in 1974. Thus, share financing played an important role until the early 1970's in the channeling of domestic savings through the financial markets.

The year 1974 marked a significant change in government policy and consequently the financial markets. During 1974, share issues declined significantly from the peak of 1971, real GNP growth rate peaked, and expansion of financial markets came to a halt. Furthermore, the investments were financed internally (earnings retention), by foreign credits and through the development banking system. The government development bank (BNDE) emerged as a major long-term source of finance providing funds equal to about 1% of GNP in 1974. The net flow of funds intermediated through BNDE is expected to increase many times by 1980. Further, the share of indexed instruments and contractual savings continued to increase at the expense of all other savings flows. This shift from private non-indexed assets to public mobilization of domestic savings can be attributed to a change in government policy away from private financial market development and the resurgence of inflationary pressures that led to indexation of savings deposits and government bonds.

Thus, the initial positive response of domestic savings and the private financial market flows to capital market innovations has been dampened since 1974 by the rising rates of inflation, declining stock markets and the apparent shift in government policy towards greater reliance on indexation and public sector participation in the financial markets.

4.2. Resource allocation

Development of capital markets, in general, would be expected to improve allocation of resources and economic growth rate. Even though, a direct evaluation of the impact of the Brazilian policies would be very difficult to obtain, the high uninterrupted growth (from 1968 to 1974, the annual Brazilian real growth rate was about 10%) was unusual in the sense that such high growth rates were generated by incremental capital to output ratio of less than 2. When compared to a capital to output ratio of over 5 in mid 60's, some evidence in favor of the hypothesis of improved resource allocation resulting from the expanded and more efficient financial markets is suggested. The observed low incremental capital to output ratios, in spite of high industrial productive capacity utilization, also indicate a high degree of financial market efficiency. Lastly, there is some evidence of reduction in the reliance of Brazilian firms on internal finance. Thus, the available evidence suggests that the increased domestic savings and their distribution through a

competitive market characterized by improved information about investment opportunities seems to have resulted in a better allocation of resources, improvement in capital to output ratio and a sustained high economic growth rate.

4.3. Role of foreign savings

As a result of recent changes in world financial flows and effort on the part of the Brazilian government, the Brazilian market has become more integrated with its foreign counterparts. On the debt side, the increasing size of the Eurocurrency market along with the high country credit rating for Brazil has meant large inflows of medium- and long-term credits. Such credits have been easily available and relatively inexpensive. During the first half of 1970's, these credits accounted for a significant percentage of total long-term financing in both the private and public sectors. Annual foreign debt flows increased from 1% of GNP to 5% of GNP during 1970–1974. In more recent years, the credit flows have primarily been to the public enterprises due to the tightening of credit terms and supply conditions. Thus, on the debt side, it is uncertain whether the foreign bank credits are substitutable for domestic securities market in the long run.

On the equity side, the decree law 1401 and the resolution no. 323 legalized and provided incentives for foreign portfolio investments.²⁵ Initial foreign investor response indicates that the liberalization of foreign portfolio investments has not resulted in as large capital inflows as expected. The potential reasons can be briefly summarized as: A noticeable drop in the Brazilian economic growth rate, energy dependence and higher rates of inflation since 1974, legal requirements that the foreign investors invest through the formation of a local investment company and that only Brazilian investment banks or brokerage houses manage the portfolio of such investment companies, and the concern over illiquidity of foreign funds as discussed in Errunza (1977).

4.4. The primary market

The securities in the Brazilian market consist of debt instruments of the government, corporate stock and debentures of public and private sector enterprises. The public sector debt instruments amounted to over 10% of GNP in 1975. They are held primarily by public sector and financial

²⁵The main development impact of foreign investments as expected by some of the highest ranking Brazilian government officials and private sector executives included: improved balance of payments, increased market stability and liquidity, rekindled interest among Brazilian investors in domestic asset opportunities, institutional development and new legislation for further securities market development.

institutions. Private holders have largely participated in this market through the brokers who 'bank' indexed government securities by issuing their own short-term paper. Given the profits from 'banking' long-term government debt securities, a system of distribution for these securities has not developed.

Most debentures have been issued by public sector enterprises. Unwillingness of private sector corporations to issue indexed debt (that can compete with public debt) and the availability of foreign credits, development loans and equity finance have resulted in very few debenture issues and an inactive secondary market.

The level of new share subscriptions in relation to GNP was very low (approximately 1%) prior to 1964. It expanded through the late 1960's, reaching a peak of over 6% in 1971 before stabilizing around 4%. A large percentage of total share subscriptions can be attributed to new incorporations, direct foreign investments, rights offerings etc. That is, the registered public offerings constituted a small fraction of total subscriptions. Since approximately half of the primary offerings have been registered to benefit from tax incentives, they have not affected security market development. However, tax incentives, government policy and stock market activity have resulted in a large increase in the number of companies that are listed and traded.

Even though the size (new issues in relative and absolute terms) of a primary market depends on many factors such as the size of the country, nature of the economy (development stage), how the nation finances its investments, development history of the nation, its financial traditions, internationalization of the economy etc., past researchers have used this measure to explain financial development within and across countries.²⁶ The data is generally not consistent over time or across countries. The figures available include not only new issues to public at large, but also incorporate stock dividends, private placements and rights subscriptions, thereby distorting the role of primary market and their level of development. As a result, no formal hypothesis can be formulated to indicate the universal causality. Thus, even though the ratios for Brazil are quite similar to the U.S. and the U.K. markets, one can not conclude that the three markets are equally well developed.

4.5. *Underwriting*

The underwriting business reached the peak volume of over U.S. \$500

²⁶For example, the group phenomena in Central America and the development of the Financiera in Mexico have largely pre-empted the development of the organized stock exchanges. On the other hand, the development of securities markets in former colonies, e.g. India, has been very different from the experience of railroads in the U.S. or the evolution of stock markets via the commodities future markets in Japan. Data on stock issues on various markets is regularly reported in OECD Financial Statistics.

million in 1971 and then stabilized around U.S. \$100 million. It is conducted by brokerage houses, investment banks and the development bank (BNDE). The role of investment banks as underwriters and bankers has impeded their underwriting activity. This is because loan extension to corporate clients has been far more profitable than underwriting fees. Brokerage houses have underwritten close to half of the offerings. However, they are constrained by the lack of adequate financial resources needed for this activity. In recent years, BNDE has acted as a leading underwriter and as a stand-by underwriter to subscribe unsold balances of issues underwritten by brokerage firms and investment banks. The participation of BNDE was necessitated by the risks and costs of underwriting faced by the brokerage firms and investment banks.

Since existing shareholders are entitled to pre-emptive rights in case of a public offering, underwriting generally amounts to a stand-by guarantee. Time delays resulting from exercise of pre-emptive rights and registration at the central bank result in time lag between the pricing of an issue and its distribution to the public at large. This procedure entails significant additional risk and cost to underwriters. As a result, underwriting costs are fairly high. Cost of an issue obviously depends on issuer, market conditions etc., however, by some estimates, a 5 year debt issue may cost close to 10%.

4.6. The secondary market

The size of this market has important implications for its liquidity and efficiency. The Rio and Sao Paulo exchanges account for most of the transaction volume in Brazilian securities. During the 1970's, the number of shares transacted on both of these exchanges was greater than many of the European markets and compared favorably with the London and New York stock exchanges. For the period 1971–1974, the number of shares transacted on Rio and Sao Paulo exchanges amounted to more than 5 billion shares each year. However, for international comparisons, the ratio of transaction volume to GNP (or other similar indicator) is more appropriate. In terms of this ratio, the Brazilian market compares quite favorably during the recent period as evident from table 1. However, this and similar other ratios should be interpreted with care because it does not take into account the number of actively traded stocks which may vary greatly across nations. One could use the market value of listed stocks in relation to transaction volume, but such a ratio would also be biased by a great number of stocks which are listed but not traded on LDC markets.

Alternatively, one may use turnover ratio as an indicator of individual stock liquidity. Even this measure is not very meaningful given the LDC markets that consist largely of companies with block (private or institutional) holdings. Since the number of shares available for trading is unknown, a

Table 1
Volume of stock transactions on selected stock exchanges (in millions of U.S. \$).^a

	1966	1967	1968	1969	1970	1971	1972	1973	1974
Rio de Janeiro ^b	58 (0.24)	69 (0.26)	69 (0.27)	379 (1.25)	566 (1.37)	2520 (5.22)	1240 (2.17)	993 (1.30)	870 (0.91)
Sao Paulo ^b	—	—	43 (0.17)	189 (0.62)	323 (0.78)	1990 (4.12)	1570 (2.74)	1620 (2.12)	965 (1.01)
Bogota ^c	21 (0.39)	30 (0.58)	36 (0.65)	47 (0.78)	42 (0.64)	45 (0.65)	56 (0.71)	—	—
Caracas ^d	4 (0.05)	4 (0.05)	4 (0.04)	5 (0.05)	7 (0.06)	9 (0.07)	12 (0.09)	—	—
NYSE ^e (in billions of \$)	98.6 (13.1)	125.3 (15.7)	145 (16.7)	129.6 (13.8)	103.1 (10.5)	147.1 (13.8)	159.7 (13.6)	146.5 (11.2)	99.2 (7.02)

^aNumbers in parentheses are stock transactions volume as a percentage of the gross national product.

^bSource: Yearbooks of Rio and Sao Paulo Stock Exchanges.

^cSource: 'Revista del Banco de la Republica', by the Colombian government, various issues.

^dSource: 'Bolsa de Comercio de Caracas', by Venezuelan authorities, various issues.

^eSource: The NYSE 1976 Fact Book, edited by T. Murphy (p. 17).

turnover ratio based on total outstanding stock would result in a significant downward bias to the liquidity estimate. Further, low turnover may not mean lack of adequate liquidity. In Brazil, several stocks have recorded low transaction volume due to lack of sellers at market prices. On the other hand, a high turnover ratio for a stock with limited available supply may not allow large transactions without significantly affecting market price.

In recent years, the trading volume in Brazil has increasingly concentrated in a few securities with adverse effect on the liquidity of the rest of the stocks. The liquidity of secondary market has also suffered from increasing institutionalization of the market accompanied by high asset concentration within the investment fund industry.

To conclude, the Brazilian capital market development program seems to have raised domestic savings rates, increased the proportion of savings channelled through the financial market and improved resource allocation. In terms of market size, the primary market has grown considerably and adequate secondary market liquidity conditions prevailed for most major companies until 1975. The foreign portfolio liberalization effort undertaken after the shift in government policy has fallen short of expectations. Thus, the Brazilian market reforms seem to have improved macro-efficiency even though, the initial success has been somewhat blurred by the apparent shift in government policy in recent years toward centralized (public sector) mobilization and allocation of savings which is diametrically opposite to a free market system symbolized by the capital market development program. We now investigate the micro-efficiency types of issues.

5. Micro-efficiency tests

It has been suggested by Sharma and Kennedy (1977) that the efficient capital market hypothesis may be, *a priori*, suspect for less developed markets and that such behavior might stem from the institutional or structural characteristics of the capital market being investigated. Solnik (1973) provides empirical evidence on the adequacy of random walk hypothesis for European stock prices and suggests that departures from random walk can probably be explained by technical and institutional characteristics of European markets.²⁷ Most important of these characteristics were covered in the earlier sections along with Brazilian efforts to develop their markets. The preconditions of liquidity, appropriate allocation of savings and institutional characteristics necessary for systematic investigation of the micro-efficiency seem to be satisfied in Brazil. Further, since no LDC market study based on individual security data is available in

²⁷See Fama (1965, 1970) for seminal work on tests of random walk hypothesis for NYSE stocks.

published form, the tests which follow should help the general understanding about security price behavior on markets outside the developed world.

5.1. *The sample*

The total sample consists of 64 securities (38 common and 26 preferred) traded regularly on the Sao Paulo exchange.²⁸ These were selected from the original sample of the 100 most traded (in cash) stocks on the exchange. Several had to be dropped due to problems of data or inconsistencies between different data bases. The initial time period of January 1971–April 1975 had to be reduced to September 1971–April 1975 due to lack of data for some stocks in the sample. The final data base consists of month end prices, cash and stock dividends and capital adjustment factors. Monthly stock price index (BOVESPA) was also obtained.²⁹

5.2. *Tests of the random walk*

In a statistical sense, the random walk concept consists of two distinct hypotheses. First, the price changes conform to some distribution whose form need not be specified. Second, the price changes are independent random variables.³⁰

²⁸There are three types of certificates: Bearer (Portador), Nominative (Nominativa) and Endorsable Nominative. Bearer certificates provide anonymity and tax shelter to the holder and they are transferred by physical hand-over. The Nominatives are transferred through the company books, and endorsable nominatives may be transferred by owner's endorsement with company book changes at a later date. Since there are no transfer agents in Brazil, the considerable time needed for affecting transfers further discourages trading in nominative shares. There are two main types of transactions on the market. In cash or at term. The cash transactions are settled within 5 days whereas the term transactions are for settlement within 30, 60, 90 or 120 days. More than 90% of the transactions are in cash. Our sample of 64 securities accounted for about 90% of total transaction volume during 1974.

²⁹During the period studied, mean returns for different portfolios using different weighting schemes are negative in most cases. The market was very volatile as indicated by the range of 9.0%–16.0% for standard deviations of monthly returns. On the London Stock Exchange, Guy (1975) found standard deviations of monthly returns in the range 3.5%–4.5%. Even though the market capitalization weights changes substantially during the period, a small number of securities dominated the various portfolios. The performance of various portfolios is mixed and the return on index does not correspond to any of our portfolios. Hence, for tests of efficiency that involve use of market index, we will use portfolios of securities in our sample. Since our portfolio would comprise of only regularly traded securities, the problems of thin trading on tests of market model will be circumvented. For a discussion of this problem, see Fowler, Rorke and Riding (1977).

³⁰Even though the independence hypothesis is the more important one, the form of the distribution provides important information regarding the price generating process, riskiness of the security and for empirical studies on the capital markets. The independence hypothesis requires the probability distribution for the price change to be independent of the sequence of past price changes. For a detailed discussion, see Fama (1965).

5.2.1. *Empirical distributions*

We first examine the distributions of monthly stock price changes for individual securities. The purpose of the tests is to provide preliminary evidence regarding the form of the distributions on an LDC (Brazilian) market. The small sample size does not allow a more rigorous test of either Mandelbrot's (1963) hypothesis or the Gaussian hypothesis [Osborne (1959)] on the Brazilian market. However, the results have important implications for further empirical work reported in this paper.

Frequency distributions of the first differences of natural logarithms of individual month end stock prices were constructed. The proportions of price changes within certain ranges of standard deviations from the mean change were tabulated and compared with Fama's (1965) results on the NYSE stocks as well as the unit normal distribution. The empirical distributions for Brazilian securities are similar to NYSE stocks in that they are also more concentrated in the center (within one standard deviation of the mean change). However, none of the 64 stocks exhibit fatter tails than what would be expected if the distributions were normal. In fact, there are no observations beyond five standard deviations and only two stocks have one observation each beyond four standard deviations.³¹ Thus, the Brazilian stock price changes seem to be more normal than the NYSE stocks.

To increase our confidence about the normality assumption used in some of the subsequent work, the Lilliefors test was conducted for each security. This test determines if a random sample fits well to the normal distribution when the population mean and standard deviation are not known. It uses the modified Kolmogorov–Smirnov critical tables with the test statistic based on sample mean and standard deviation.³² For only 15 of the 64 securities in our sample, the test statistic is significant at the 0.01 level. Thus, a large majority of the stocks in our sample give no indication of non-normality; however, a general conclusion would have to await more rigorous tests with larger samples.

5.2.2. *The independence hypothesis*

Two approaches are used for testing this hypothesis. We first examine returns for serial independence by studying the distribution of serial correlation coefficients and then compare our results with those obtained by other researchers.

³¹For 64 stocks with 43 observations each, one would expect $(64 \times 43 \times 0.000062 = 0.17)$ observations beyond four standard deviations in case of normality. For a distribution similar to the one obtained by Fama (1965), one would expect $(64 \times 43 \times 0.003041 = 8.37)$ observations beyond four standard deviations.

³²For detailed explanation of the test, see Pfaffenberger and Patterson (1977, pp. 683–688).

For large samples, the least squares estimate of β_j in the following regression equation is identical to the estimate of the first order serial correlation coefficient:

$$R_{j,t} = \alpha_j + \beta_j R_{j,t-1} + \mu_{j,t},$$

where

$$R_{j,t} = \ln [(P_{j,t} + D_{j,t})/P_{j,t-1}],$$

where $p_{j,t}$ is the adjusted price of the j th security at the end of period t , $D_{j,t}$ is the adjusted cash dividend during the t th period, $\mu_{j,t}$ is the error term, and

$$\beta_j = \text{cov}(R_{j,t}, R_{j,t-1}) / \sigma^2(R_{j,t-1}) = \rho(R_{j,t}, R_{j,t-1}),$$

if

$$\sigma(R_{j,t}) = \sigma(R_{j,t-1}).$$

The estimate of β_j , i.e. $\rho(R_{j,t}, R_{j,t-1})$, is consistent and unbiased as long as the characteristic exponent α of the underlying stable paretian process is greater than one.³³ Since the return distributions for our sample are very close to being normal, the serial correlations constitute an important test of the independence analysis.

For the entire period, five serial correlation coefficients were significant at the 5% level. During the first and second subperiod, three and two serial correlations were significant at the 5% level, respectively. Due to the small number of observations in each subperiod the results are not very meaningful except the result that the dependence is not stable. No security indicated significant dependence in both subperiods and only two securities with significant dependence during the total period exhibited significant dependence in one of the two subperiods.³⁴

Table 2 compares the Brazilian summary statistics with other studies that also utilize monthly data. The standard errors (σ) of serial correlation coefficients were obtained by the formula $\sigma = 1/\sqrt{n-1}$, where n is the number of observations.³⁵ The standard deviations of the serial correlations as well as the number of terms greater than two standard errors are

³³See Wise (1963) and Fama (1965) for details.

³⁴The preponderance of negative signs observed is consistent with the results of Cootner (1964), Moore (1964) and Cheng and Deets (1971) for weekly returns and King (1966) for monthly observations. Fama's (1965) results were mixed in that he obtained negative serial correlations for four and nine day differencing interval and positive serial correlations for daily and sixteen day differencing intervals. King (1966) explains this on the basis of a market component of return common to all securities.

³⁵For details, see Kendall (1953). The 95% confidence limits around zero for sample correlation coefficients are approximately equal to twice the standard error.

Table 2
Summary statistics of serial correlation coefficients distribution for Brazil, eight European countries, U.S.A. and Canada.

	Average serial correlation	Standard deviation (s.d.)	s.d./ σ	No. of terms $\geq 2\sigma$	No. of positive terms
Brazil (total period)					
All securities	-0.163	0.127	0.82	5/64	6/64
Common stocks	-0.184	0.132	0.85	4/38	3/38
Preferred stocks	-0.133	0.116	0.75	1/26	3/26
U.S.A. - NYSE ^a	0.009	0.099	0.8	1/30	17/30
France ^a	0.012	0.104	0.9	1/65	38/65
Italy ^a	-0.027	0.110	0.9	1/30	7/30
U.K. ^a	0.020	0.108	0.9	1/40	19/40
Germany ^a	0.058	0.099	0.8	2/35	23/35
Netherlands ^a	-0.011	0.134	1.1	2/24	9/24
Belgium ^a	-0.022	0.133	1.1	1/17	5/17
Switzerland ^a	-0.017	0.150	1.3	1/17	7/17
Sweden ^a	0.140	0.138	1.2	1/6	6/6
U.K. ^b	-0.035	0.101	1.21	9/99	28/99
Canada ^c	-0.0488	—	—	11/133	44/133
U.S.A. - OTC ^d	-0.0762	—	—	31/253	78/253

^aFrom Solnik (1973, p. 1156).

^bFrom Guy (1975, p. 15). The statistics reported here are for 99 companies, period 1-131.

^cRorke, Wills, Hagerman, and Richmond (1976). The statistics reported here are for 133 companies, period 1958-1967.

^dHagerman and Richmond (1973). Figures reported here are for the full period 1963-1967.

comparable to results obtained for most of the markets outside U.S. and the over the counter market in U.S. The average serial correlations for the Brazilian market are substantially larger than all other markets except Sweden. However, the mean is approximately equal to the standard error indicating that the mean is not significantly different from zero.³⁶

Also, since it is almost impossible to empirically obtain (or expect) total independence between successive price changes, the economic investigation of whether there are opportunities to make extra normal profits depends to some degree on the transactions costs. In general, these costs are larger in LDC markets which imply that even with higher dependence among successive price changes, there may not be opportunities for extra profits. In other words, greater dependence in LDC markets need not necessarily imply inefficiency in the asset pricing process.³⁷

5.2.3. The runs test

Distribution free statistics will now be used to test the independence hypothesis for Brazilian securities. This is accomplished by computing the variable Z_j for each security for the entire period and the two subperiods. The variable Z_j is defined as

$$Z_j = (R_j + \frac{1}{2} - \mu_j) / \sigma_j ,$$

where R_j is the total number of observed runs for company j , μ_j is the total expected number of runs of all signs given the sample proportions, σ_j is the variance of μ_j , and the $\frac{1}{2}$ in the numerator is a discontinuity adjustment. For large samples, Z_j will be approximately normal with zero mean and variance of one.³⁸

Summary statistics are reported in table 3. Again, the evidence supports the independence hypothesis. Also, the Brazilian market seems to be at least as efficient as the Canadian and the OTC markets in the U.S. Further, the

³⁶Potential biases resulting from errors in the variables, problems of non-fixed regressor, effect of the market factor and the assumption of normality in significance tests of the serial correlation coefficients are well documented in Hagerman and Richmond (1973). However, one cannot estimate their impact on the empirical results. Most importantly, the measurement error (inaccurate data) as well as overreaction by investors to good and bad news and the subsequent corrections in a pure auction market may have resulted in preponderance of negative serial correlations in this study.

³⁷For example, the transactions costs for fairly large transactions (at least one round lot) (a) for Indonesia (1974), 0.5%–2% on transaction amount by both buyer and seller, (b) for U.S. (April 1, 1974), commission rates were revised upward to 0.5%–1% depending on the amount transacted and the number of round lots, (c) for Brazil (1975), 1.5% up to first 20,000Cr., 1% between 20–110,000Cr. and 0.5% over 110,000Cr. of transaction amount payable by both buyer and seller, with 30Cr. as the minimum commission charge.

³⁸For detailed discussion, see Wallis and Roberts (1956, pp. 569–575).

preferred stocks as a group seem to confirm the random walk hypothesis somewhat better than the common stocks in our sample.³⁹

Thus, based on the tests reported in this section, the Brazilian stock price changes are very close to being normally distributed. The independence hypothesis tests indicate somewhat higher deviations from the random walk than those observed for the companies traded on the New York Stock Exchange. However, the Brazilian market compares favorably with the European, Canadian and the OTC market.

Table 3
Significant Z values with continuity correction.

	5% significance		1% significance	
	No. of values	%	No. of values	%
Brazil (total period)				
All securities	5	7.8	0	0
Common stocks	5	13.2	0	0
Preferred stocks	0	0	0	0
Canada ^a	7	5.26	1	0.7
U.S. - OTC ^b	19	7.5	2	0.8

^aRorke, Wills, Hagerman, and Richmond (1976). Figures reported here are for the full period 1958-1967.

^bHagerman and Richmond (1973). Figures reported here are for the full period 1963-1967.

5.3. Tests of the market model

This section briefly examines the market model for the Sao Paulo Stock Exchange.⁴⁰

³⁹However, as Hagerman and Richmond (1973) suggest, the sample as a whole may exhibit dependence even when individual securities do not. To test this possibility, Lilliefors test was conducted by comparing the distribution of Z_i 's with that of a unit normal. For the full period, the hypothesis that the Z_i 's can be considered to be a random sample from a normal population must be rejected at the 5% level of significance, a result similar to the one obtained by above authors. Hagerman and Richmond suggest the use of Kolmogorov-Smirnov test. Since the population parameters are unknown, the Lilliefors test is more appropriate.

⁴⁰The classic literature includes works by Markowitz (1959), Sharpe (1963, 1964) and Fama (1968, 1971). Many empirical tests on the U.S. market are available in the literature. Some tests on foreign markets have also appeared, most notably those of Pogue and Solnik (1974), Lau, Quay and Ramsey (1974), Guy (1975, 1977), Altman, Jacquillat and Levasseur (1974). Briefly, the model states that the return $\tilde{R}_{i,t}$ on a security i is a linear function of the market factor and can be represented as

$$\tilde{R}_{i,t} = \alpha_i + \beta_i \tilde{R}_{m,t} + \tilde{\epsilon}_{i,t}$$

All linear regression assumptions hold and the parameter β_i is a measure of the systematic risk associated with security i relative to the risk of the market portfolio.

Monthly returns for our sample of 64 securities were regressed on monthly returns for various equally weighted portfolios.⁴¹ The returns on common stocks were regressed on equally weighted portfolio of all 64 stocks as well as on a similar portfolio constructed with only the 38 common stocks in our sample. Similarly, the returns on preferred stocks were regressed on equally weighted portfolio of all 64 stocks as well as on a portfolio of only the 26 preferred stocks in our sample. The estimates of parameters are very similar regardless of which portfolio is used. This results from very high correlations between these three equally weighted portfolios. Further, the first order serial correlations for all three portfolios are negative and not significantly different from zero at the 5% level.⁴² Also, this timing problem common to all infrequently traded securities is not important in our case as indicated by low negative and insignificant coefficients obtained for regression of the common stock and preferred stock portfolios on the lagged portfolios of all securities.

Only one beta estimate is not significant at the 5% level for the common stock group, their mean is very close to 1.0 and they are divided equally around 1.0. Similarly only three beta estimates for the preferred group are not significant at the 5% level, their mean is very close to 1.0 and they are also divided evenly around 1.0. Further, the marketwide factor explains up to a maximum of about 74% of the variance of returns on the individual stocks. On an average, the common factor accounts for about 40% of the variance for the preferred stock group and about 35% for the common stocks.⁴³ Generally speaking, the coefficients of determination, r^2 , seem to increase with the regression coefficients β in the case of both groups. This is similar to the results obtained by Fama (1976) for NYSE stocks. Thus, it is reasonable to conclude that the Brazilian market, as the U.S. and the European markets, is

⁴¹The normal practice for tests of the market model is to use return on a broad market index as a proxy for the return on the market. Since a large number of securities listed on the Sao Paulo exchange are not regularly (infrequently) traded, use of an overall market index would bias our results. Since a few securities in our sample dominate an index weighted by market capitalization, we have used equally weighted portfolios of stocks in our sample as a proxy for the market return. Further, given the restrictions on portfolio capital outflows and minimum foreign capital inflows, the Brazilian market is more likely to be segmented than integrated with the international capital market. As a result, the Brazilian index was preferred over a world index.

⁴²If these portfolios included infrequently traded securities, one would expect positive serial correlations. See Fowler, Rorke and Riding (1977).

⁴³These proportions are very similar to the results obtained by Solnik (1974a) for European markets, but substantially larger than those for the U.S. market. A comparison of the preferred and common stock betas (of a given company) did not confirm the results of Bildersee (1973) who found preferred stock beta to be consistently lower than the beta for the same company's common stock in the U.S. However, we had only six such pairs and hence these results should be considered preliminary pending further evaluation. Also, on the average the estimates for the sub sample of six nominative stocks within the common stock group are not significantly different from the total group means.

characterized by a strong market factor consistent with a single factor return generating process.

5.3.1. Beta stationarity

The primary usefulness of estimating beta coefficients is to enable the investor to forecast future riskiness of the security (portfolio). Individual security betas appear to be non-stationary. The correlation coefficients between two subperiod betas are:⁴⁴

Type of security	Correlation coefficient
Common stocks	0.135
Preferred stocks	0.478
Total sample	0.235

This non-stationarity may be attributed to the measurement error in the estimated betas which calls for a grouping procedure.⁴⁵ Also, since investors are assumed to be concerned about portfolio risk rather than individual security risk, we estimated correlation coefficients of betas for portfolios containing 2, 3, 4, 5, 6, 8 and 10 securities. First, the betas for all 64 securities were computed for the first half (October 1971 – June 1973) and companies were arranged in the ascending order. Arbitrary portfolios of N (where $N = 2, 3, 4, 5, 6, 8$ and 10) securities were formed so that the first portfolio included the N lowest beta securities, the second portfolio included the next N lowest beta securities and so on. To calculate portfolio betas, equal weighting was assumed. Finally, the correlation coefficients were obtained by comparing the average portfolio (of a given size N) betas during first half with the average betas for portfolios consisting of exactly the same securities during the second half. The correlation coefficients reach a high of 0.903 for the 10 security portfolios.⁴⁶ This is similar to the correlations of 0.901 for French market calculated by Altman, Jacquillat and Levasseur (1974) and 0.867 for the U.S. market obtained by Levy (1971). Our results, however, should be interpreted with caution due to small sample size.

⁴⁴These are similar to the correlation coefficient of 0.254 for London Stock Exchange reported by Guy (1975) and 0.297 by Pogue and Solnik (1974).

⁴⁵Three stage grouping procedure recommended by Guy (1975) was not used due to the small number of observations. For the same reason, extensive tests performed by Altman, Jacquillat and Levasseur (1974) could not be duplicated.

⁴⁶Correlation coefficients of 0.249, 0.403, 0.426, 0.566, 0.635, 0.646 and 0.903 were obtained for 2, 3, 4, 5, 6, 8 and 10 security portfolios respectively.

6. Conclusion

Direct tests of the Brazilian effort to develop their capital markets and their degree of success are extremely difficult due to the problems of identification of causality, quantification of most of the components of the capital markets development program and the impact of the other environmental factors on financial development as discussed earlier in this paper. Nevertheless, the evidence presented in this paper together with germane results from others' research indicates improved mobilization and allocation of domestic savings, a developing primary issues market and a reasonably liquid secondary market. Further, the Sao Paulo stock market appears to be weak form efficient and is characterized by a strong market factor consistent with a single factor return generating process. Thus, the Brazilian program that consisted of fiscal incentives, policies for the elimination of specific economic distortions, development of institutions and mutual funds,⁴⁷ regulatory and operational measures on the stock exchanges and dissemination of relevant information,⁴⁸ seems to have developed an efficient capital market.

The effort to attract foreign portfolio investments seems to have fallen short of expectations. This shortcoming along with the setbacks suffered by the capital market since 1975 can be traced to the state of the Brazilian economy, other institutional problems associated with the foreign portfolio investment legislation as discussed in section 4 and more importantly the apparent shift in government policy toward public sector dominance in the domestic savings transfer process through the intermediation of BNDE. Hence, the Brazilian experience since 1975 cannot be construed as a pure case of market oriented capital market development program. In fact, continuation of the policy of public sector dominance in the national mobilization and allocation of resources may undo the success of late 60's and early 70's and reverse the market development process.

⁴⁷See Fama (1965) for an excellent discussion of the importance of sophisticated investors and chartists for market efficiency. For a discussion of the Colombian experience with mutual funds, see Errunza and Montiel (1975).

⁴⁸Many studies have appeared in the literature on the usefulness of accounting information for investment decision making, for example, see Benston (1973), Beaver (1968), and Ball and Brown (1968).

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