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STOCKS, BILLS AND INFLATION IN SRI LANKA

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I. Introduction

One of the central issues in finance is the estimation of expected returns on assets. Asset pricing theories such as the Capital Asset Pricing Model (CAPM) of Sharpe (1964), Lintner (1965) and Black (1972), and the Arbitrage Pricing Theory (APT) of Ross (1976) are concerned with the determination of equilibrium expected returns on assets. The implementation of these asset pricing theories requires estimation of a number of inputs. Main such inputs include the risk-free rate of interest, the market risk premium or the price of risk, and beta coefficients or the amounts of systematic risk. In practice, estimates of these parameters are carried out on the basis of historical data with are then used, either with or without adjustments, as surrogates for the inputs required by asset pricing models.

Estimates of historical returns and risk of alternative financial instruments are available for most markets. Typically, they are supplied by professional consulting firms. Historical risk and return data on the U.S. market are available for over 70 years. Ibbotson Associates, for instance, estimates risk and returns for various U.S financial instruments using data in the post-1926 period.[1] While there have been some work in the area of estimating market model beta coefficients, there is no published work that examines the historical record of the share market, Treasury bills and inflation in Sri Lanka in order to provide average estimates of returns and risk. Samarakoon (1997) uses an estimate of the market risk premium contained in a previous version of this paper along with estimates of the market model beta coefficients to compute cost of equity. Alles (1997) examines the sensitivity of betas to alternative estimation procedures using prices for five stocks listed on the Colombo Stock Exchange (CSE). The present study fills a gap in the literature on the Sri Lankan stock market by providing historical estimates of risks and returns.

The objective of the present study is to examine the entire 13-year history of organised share trading on the Colombo Stock Exchange, from 1985 to 1997 along with Treasury bill yields and inflation, with a view to providing average estimates of nominal and real returns on stocks, equity risk premium, Treasury bill rate, inflation rate, real risk-free rate, and volatility of stocks, Treasury bills and inflation. This study also examines major market trends, and estimates risk and returns of industry portfolios.

This paper is organised as follows. Section II describes stock price, Treasury bill and inflation data used in the study. Section III examines the historical record of stocks, bills and inflation, as well as major market trends and growth of investments over time. Estimates of average returns and risk are provided in Section IV. Section V summarises the main lessons from the brief history of the capital market of Sri Lanka.

II. The Data

This study uses the year-end values of the All Share Price Index (ASPI) and the Sensitive Price Index (SPI) to represent the market portfolio of stocks, and indices on 14 sectors to measure returns on industry portfolios.[2] The source of stock index data is the Colombo Stock Exchange. The ASPI represents the broadest measure of price movements of the Colombo Stock Exchange, and is based on share prices of all listed stocks which numbered 239 at the and of 1997. The SPI, constructed using only 25 blue chip stocks, measures price movements of stocks which are more sensitive to market changes. All market and sector indices are value-weighted indices without dividends, and available from the beginning of 1985. Common stock returns are measured as the annual changes in each index. Dividend yields data on the overall market are available only from 1991. The average total return on common stocks is estimated by adding the average dividend yield observed during the 1991-97 period to the average capital gains on the ASPI during the 1985-97 period. Throughout this paper, the terms 'stock returns' are used to mean stock returns without dividends, and the terms ' total stock returns or dividend-adjusted stock returns' are used to indicate stock returns with dividends.

Treasury bill rates represent primary market yields of Treasury bills of one-year maturity, and are obtained from the Annual Reports of the Central Bank of Sri Lanka.[3] For the 1985-89 period, the Treasury bill rates are calculated using the preceding year-end 3-month Treasury bill rate, which is assumed to compound over the four three-month periods during each year at the same rate. The 3-month rate is chosen as the risk-free benchmark for this period because the 12-month rates are available only after 1989. Since it is necessary to measure returns during comparable time horizons for both stocks and bills, this study treats the yied determined at the last auction of a given year as the Treasury bill return for the following year. The inflation rate is measured as the annual change in the Colombo Consumer Price Index (CCPI), which has the base year 1952. The CCPI data are obtained from the Annual Reports of the Central Bank of Sri Lanka.

III. Historical Behaviour of Stocks, Bills and Inflation

A. Common Stock Returns

Table 1 shows common stock returns in Sri Lanka for the 1985-1997 period. Annual returns on the broader market index, the ASPI, have fluctuated between -33 percent in 1995 and 118 percent in 1991. Returns on the SPI have ranged from a low of about -31 percent in 1995 to a high of about 99 percent in 1990. For the ASPI, nine of the 13 years have produced positive returns while the remaining four years yielded negative returns (see Figure 1). These data clearly demonstrate the high volatility of stock prices on the CSE over the last 13 years.

B. Treasury Bill, Inflation, and Real Risk-Free Rates

Annual Treasury bill rates, inflation rates, and real risk-free rates are also shown in Table 1. The volatility of the Treasury bill rates has been low, particularly during the 1989-96 period when they fluctuated in a narrow range between 17.38 percent in 1997 and 20.24 percent rise in 1989. As Figure 2 clearly shows, the level of Treasury bill rates rose by 9 percent in 1989. Annual inflation has been more volatile than the Treasury bill yields, particularly since 1989. This has caused the difference between the Treasury bill yield and the inflation rate, defined as the real risk-free rate, to be more variable. Except for 1988 and 1990, the real risk-free rate has been positive. It has varied between a low of-3.82 percent in 1988 and a high of 15.17 percent in 1994. Inflation continued to rise till 1990 when it reached a historical high of 19.62 percent. Disregarding the extremely low values observed in 1985, and 1994, the general level of price increases has fluctuated in the 9 to 20 percent range.

C. Equity Risk Premium

The equity risk premium is the difference between common stock returns and Treasury bill rates. As the data in Table 1 show, the risk premium earned on the all-share portfolio has varied between a low of -52.17 percent in 1995 and a high of 99.59 percent in 1991. These values coincide with the lowest and the highest stock returns. Since the Treasury bill rates have fluctuated in a very narrow range since 1989, the volatility of the risk premium is almost solely due to the volatility of stock returns. The risk premium earned on the portfolio of sensitive stocks has ranged from -50.59 percent in 1995 to 79.97 percent in 1990.

D. Market Dividend Yields

The above calculations of market returns do not include dividends that an investor would have earned during each year. Table 2 provides data on year-end market dividend yields for the 1991-97 period. Accordingly, dividend yields have fluctuated between 1.4 percent in 1991 and 4.3 percent

in 1995 with the average being 2.6 percent. The total stock returns in each year during the 1991-97 period can be approximated by adding dividend yield to the returns in the respective year. Since market dividend yield data are not available prior to 1991, the average year-end dividend yield during the 1991-97 period of 2.6 percent is used as the best estimate of historical average market dividend yield.[5]

E. Major Trends in the Stock Market

Since the main objective of this paper is to obtain average estimates of returns and risk, it is important to understand various capital market conditions that prevailed during the 1985-97 period. While it is generally regarded that a bull market is a long-term uptrend in prices and a bear market is a long-term downtrend in prices, there is no clear norm as to the length and the magnitude of such price movements. For the purposes of this study, a major market trend is defined as a rising (bull) or declining (bear) market lasting, at least, 12 months (See also Figure 3). Table 3 shows the major market trends identified by this study using daily All Share Price Index data. On this basis, seven major trends - four bull markets, and three bear markets - have been identified.[6]

Table 1

Stock Returns, Treasury Bill Rates, Inflation, Equity Risk Premium and Real Risk-Free Rates in Sri Lanka (1985-97)

Stock returns are annual percentage changes in the All Share Index (ASPI), and the Sensitive Price Index (SPI), both without dividends. Treasury bill rates are previous year-end primary market yields of Treasury bills of one-year maturity. Inflation rate is the annual change in the Colombo Consumer Price Index. Equity risk premium is the difference between stock returns and Treasury bill rates. Real risk-free rate is the difference between the Treasury bill and inflation rates. Negative numbers are shown in parentheses.

Year	Stock Returns %		Treasury Bill Rate %	Inflation Rate %	Equity Risk Premium %		Real Risk Free Rate %
	ASPI	SPI			ASPI	SPI	
1985	26.93	94.50	14.75	1.48	12.18	79.95	13.27
1986	15.80	37.30	12.01	9.07	3.79	25.29	2.94
1987	55.14	75.24	11.80	10.17	43.34	63.44	1.63
1988	(23.02)	(19.21)	11.21	15.03	(34.23)	(30.42)	(3.82)
1989	6.41	10.63	20.24	15.10	(13.83)	(9.61)	5.14
1990	114.16	99.07	19.10	19.62	95.06	79.97	(0.52)
1991	117.95	76.19	18.36	9.01	99.59	57.83	9.35
1992	(27.75)	(31.04)	17.43	13.82	(45.18)	(48.47)	3.61
1993	61.73	74.51	18.99	10.32	42.74	55.52	8.67
1994	0.79	(0.25)	19.38	4.21	(18.59)	(19.63)	15.17
1995	(32.74)	(31.16)	19.43	11.51	(52.17)	(50.59)	7.92
1996	(9.15)	(9.37)	18.97	16.80	(28.12)	(28.34)	2.17
1997	16.46	18.97	17.38	10.74	(0.92)	1.59	6.64

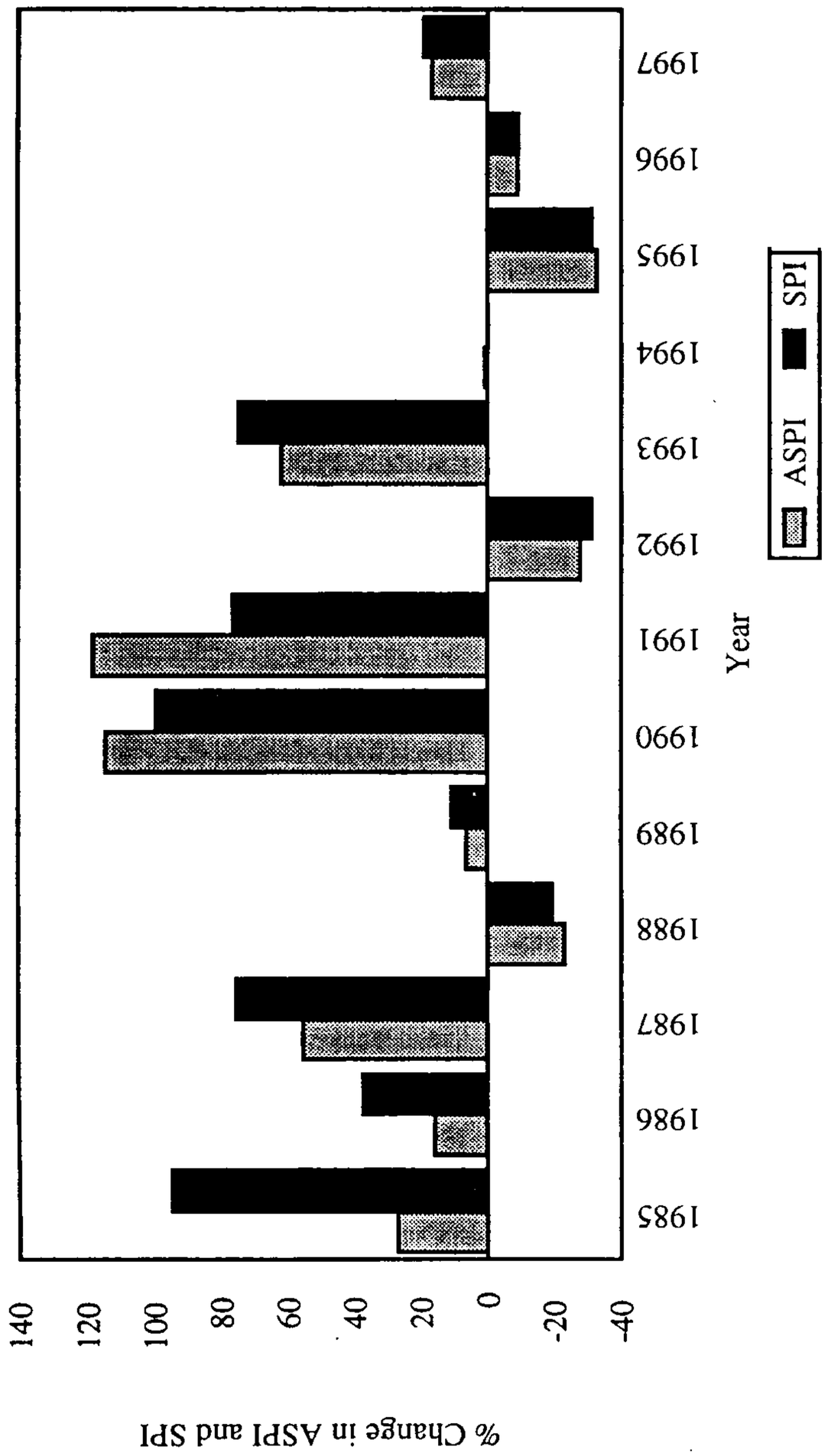


Figure 1

Annual Stock Returns in Sri Lanka (1985-97)

Figure 2

Annual Treasury Bill and Inflation Rates in Sri Lanka (1985-97)

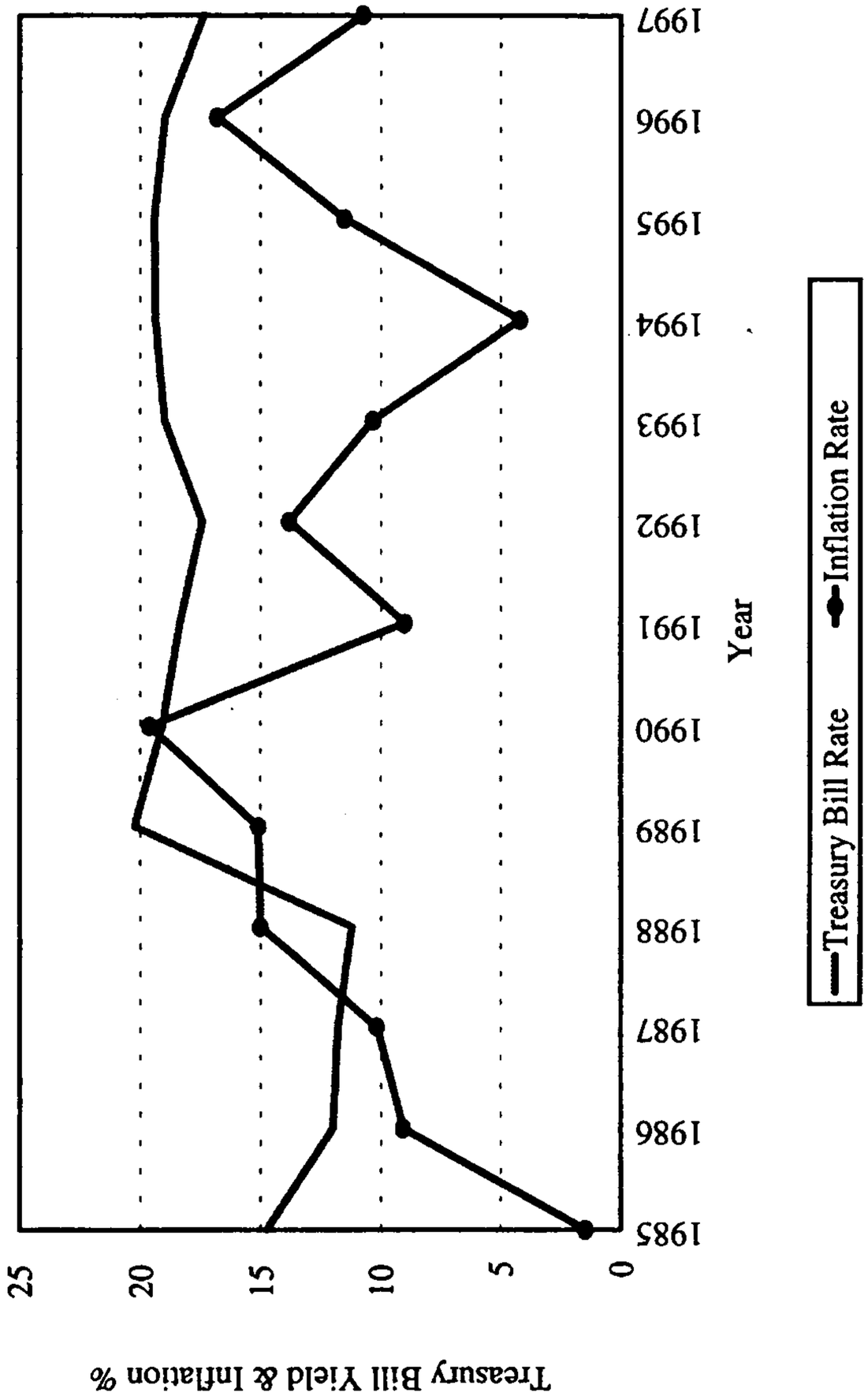


Table 2

Annual Dividend Yields in the Sri Lankan Stock Market (1991-97)

Market dividend yields are the total dividends on common stocks divided by the total market capitalisation of dividend paying companies, calculated at the end of each year (D_t/P_t).

Year	Dividend Yield %
1991	1.4
1992	2.2
1993	1.4
1994	1.7
1995	4.3
1996	4.1
1997	3.2
Average	2.6
Standard Deviation	1.2

Source: Annual Reports of the Colombo Stock Exchange

The longest bull market lasted 37 months from December 1988 to January 1992, and produced a return of 559 percent. The shortest bull run lasted for 12 months starting in February 1993 and ending with the all time high ASPI of 1378.8 on March 01, 1994. Although it was shorter in duration, it was the second most lucrative bull market with a return of 160 percent. This was followed by the longest and the worst bear market of 29-month duration in which the ASPI plummeted nearly 60 percent. The brief capital market history also suggests that the length of bull markets has become shorter while the duration of bear markets has become longer recently.

Table 3

Major Trends in the Sri Lankan Stock Market (1985-97)

Returns are percentage changes in the All Share Price Index from the beginning to the end of each market trend. Bull refers to a rising market while bear refers to a falling market.

Time Period (ASPI Low - ASPI High)	Trend	Returns %	Duration in Months
85-01-02 - 87-11-24 (96.09 - 224.96)	Bull	+134	35
87-11-24 - 88-12-07 (224.96 - 135.96)	Bear	-40	12
88-12-07 - 92-01-10 (135.96 - 896.01)	Bull	+559	37
92-01-10 - 93-02-16 (896.01 - 529.54)	Bear	-41	14
93-02-16 - 94-03-01 (529.54 - 1378.80)	Bull	+160	12
94-03-01 - 96-07-22 (1378.80 - 551.94)	Bear	-60	29
96-07-22 - 97-12-31 (551.94 - 702.20)	Bull	+27	17

Figure 3

Major Trends in the Sri Lankan Stock Market (1985-97)

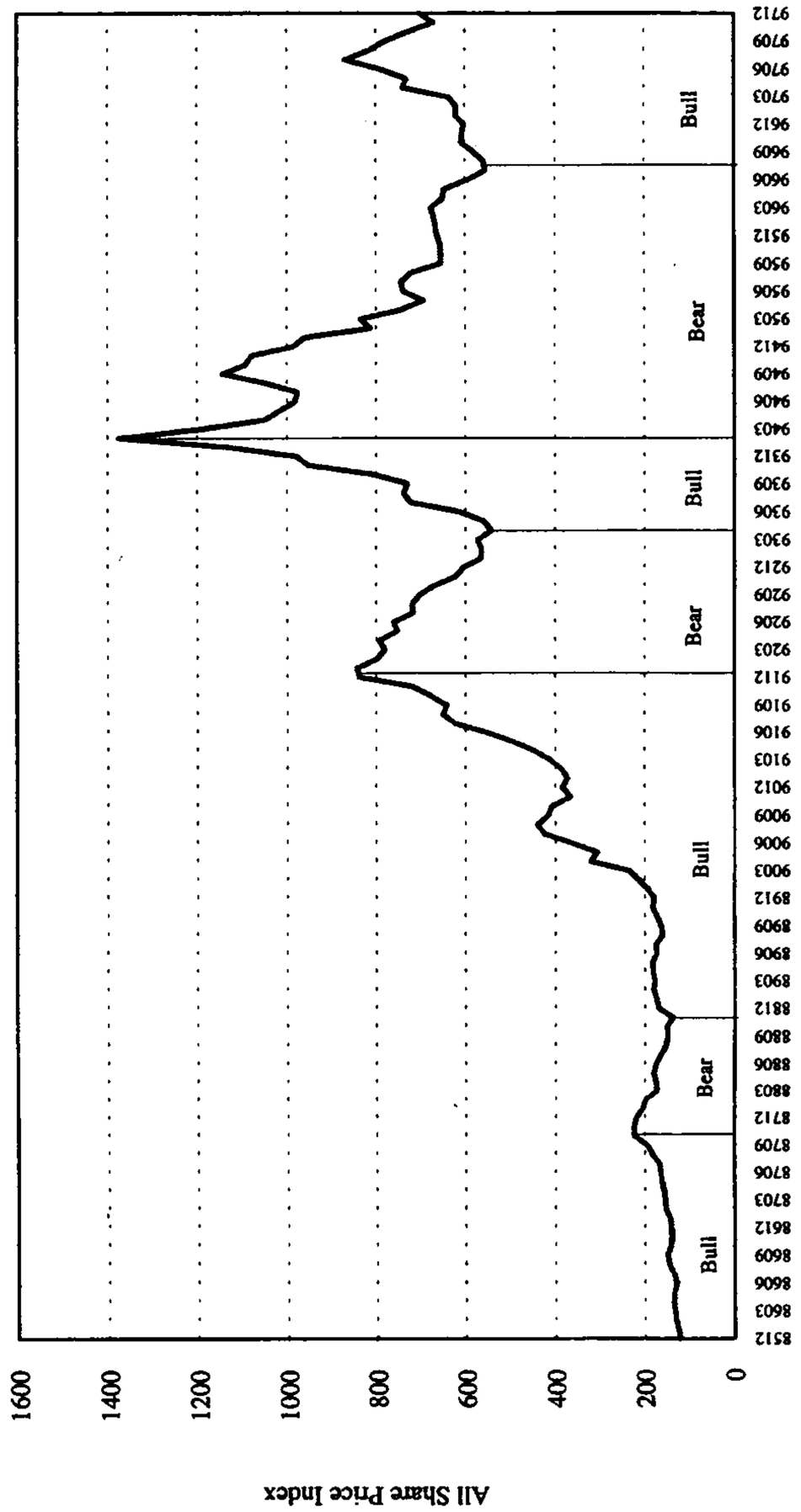
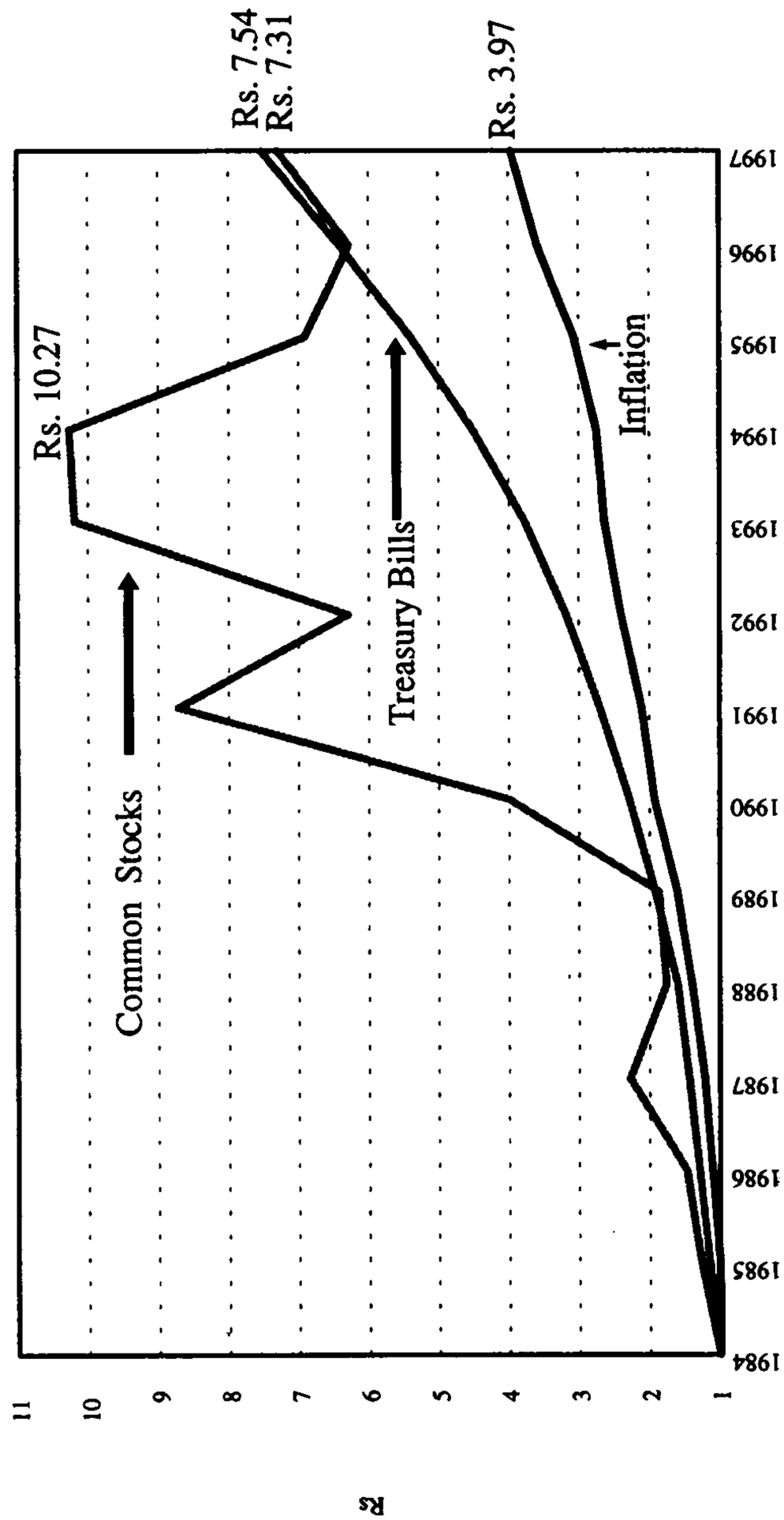


Figure 4

Value Rs. 1 Invested in Different Portfolios (1984-97)

(Year-end 1984 = Rs. 1)



F. Growth of Investments

Figure 4 shows the growth of Rs. 1 invested in different portfolios at the end of 1984. The original Rs. 1 invested in the market portfolio of common stocks, as represented by the ASPI, grew to Rs. 7.31 by the end of 1997. The investment reached a high of Rs. 10.27 by the end of 1994. However, Rs. 1 invested in Treasury bills grew to Rs. 7.54 by the end 1997, more than the growth in the investment in stocks. The value of T-bill portfolio surpassed that of the stock portfolios both in 1996 and 1997. This was due to the fact that the market declined consecutively in 1995 and 1996 which brought the value of stocks to a level below that of the T-bill portfolio in 1996, and that the stock return was less than the T-bill yield in 1997. The steadily rising inflation shows that Rs. 3.97 is needed to replace the original Rs. 1. When adjusted for inflation, the values of stock and T-bill portfolios become mush less. These values indicate the actual wealth accumulated through investments with compounding over 13 years. The corresponding returns are captured by the geometric average returns shown in Table 4.

IV. Average Returns and Risk

Table 4 shows central evidence on average returns and standard deviations of common stocks, Treasury bills, and inflation in Sri Lanka for the entire period of 13 years and for two sub-periods, 1985-90, and 1991-97. Both arithmetic and geometric averages are provided. The discussion will be primarily based on arithmetic averages.

A. Average Common Stock Returns

The overall market, as measured by the ASPI, produced an average return of 24.82 percent with a standard deviation of 49.60 percent. This translates into a relative risk, risk per unit of return, of two.[7] The average return is higher in the first six years relative to those in the more recent seven-year period. Assuming an average market divided yield of 2.6 percent, the average dividend-adjusted return on the ASPI is estimated as 27.42 percent per year. The portfolio of sensitive stocks has given an average return of 30.41 percent with a risk of 48.30 percent. During the 1991-97 period, the average return of the overall market has declined although the risk has increased.

B. Average Treasury Bill and Inflation Rates

Treasury bills have given an average yield of 16.85 percent with a standard deviation of 3.25 percent during the full period. Although the Treasury bill yields have remained at higher levels over the 1991-97 period,

they have exhibited much less volatility with a standard deviation of only 0.87 percent in comparison to a standard deviation of 3.94 percent in the 1985-90 period.

The average rate of annual inflation is 11.30 percent with a standard deviation of 4.95 percent during 1985-97. The statistics substantiate the earlier observation that the volatility of inflation is higher than that of Treasury bill yields. The evidence also shows that while the average rate of inflation has not fluctuated much between the two subperiods, the inflation volatility is much larger in the first sub-period.

Table 4

Average Stock Returns, Treasury Bill Yields, Inflation, and Standard Deviations in Sri Lanka

Nominal returns are average annual percentage changes in the All Share Price Index (ASPI) and the Sensitive Price Index (SPI) which do not include dividends. Theasury bill yields are yields of Treasury bills with one-year maturity. Inflation rate is the annual change in the Colombo Consumer Price Index. Averages are estimated as arithmetic and geometric averages. Standard deviation measures risk.

Asset	Average Returns %		Standard Deviation %
	Arithmetic	Geometric	
Full Period: 1985-97			
All Share Price Index	24.82	16.53	49.60
Sensitive Price Index	30.41	21.86	48.30
Treasury Bills	16.85	16.81	3.25
Inflation	11.30	11.20	4.95
Sub-Period 1: 1985-90			
All Share Price Index	32.57	25.99	47.44
Sensitive Price Index	49.59	42.37	48.01
Treasury Bills	14.85	14.80	3.94
Inflation	10.75	11.59	6.31
Sub-Period 2: 1991-97			
All Share Price Index	18.19	8.99	54.17
Sesitive Price Index	13.98	6.66	45.41
Treasury Bills	18.56	18.56	0.87
Inflation	10.92	10.86	3.92

C. Average Equity Risk Premium

The historical average market risk premium is one of the most useful inputs in estimating expected returns on assets in the CAPM framework. Table 5 shows the average risk premium earned by common stocks. On the basis of the arithmetic average of the changes in the ASPI, stocks have earned 7.97 percent above the Treasury bills over the 13-year period (see also Figure 5). While the risk premium during the first sub-period is 17.72 percent, more than twice the overall average, it is marginally negative with -0.38 percent in the second sub-period. For the portfolio of sensitive stocks, the average risk premium during the full period is 13.56 percent, about 1.7 times that for the broader market. When adjusted for the estimated average dividend yield of 2.6 percent, the arithmetic average risk premium for the overall market becomes 10.57, while that for the portfolio of sensitive stocks is 16.16. The geometric average risk premiums portray a different picture of the performance of stocks relative to Treasury bills. During the full period, the geometric average risk premium is - 1.71 percent for the ASPI and 3.29 percent for the SPI.

Which measure of market risk premium, arithmetic or geometric, should be considered as the better estimate of the expected market risk premium? There is divergence of opinion on this matter.[8] Arguments for the use of the arithmetic average are based on the fact that it is consistent with the standard CAPM which is concerned with returns during the next period, and that the arithmetic average is a better predictor of next period's returns. Those who advocate the geometric mean argue that since it takes into account compounding, it is a better predictor of returns in the long term. To a certain extent, these arguments imply that the choice of the method is influenced by the purpose for which any calculation of cost of equity capital is done using the estimated risk premium as an input.

At an empirical level, however, the estimated geometric risk premiums are too low and may not be considered reasonable. A perspective on the reasonableness of the estimated risk premiums can be obtained by looking at risk premiums in markets elsewhere. Damodaran (1994) reports the following geometric risk premiums, over the Government bond rate, for financial markets with different degrees of risk.

Emerging markets with political risk (South American & East European markets)	8.5%
Emerging markets (Mexico, Asian markets other than Japan)	7.5%
Developed markets with wide listings (US, Japan, Britain)	5.5%

Developed markets with limited listings (Western Europe without Germany and Switzerland)	4.5% - 5.5%
Developed markets with limited listings and stable economies (Germany and Switzerland)	3.5% - 4.0%

Three points must be considered in using these numbers as a frame of reference. First, geometric averages are lower than arithmetic averages. Second, the above averages use the Government bond rate as the risk-free benchmark which is likely to be higher than the Treasury bill rate. Thirdly, Sri Lanka will fall among the first two categories of markets. Therefore, the arithmetic equity risk premium for Sri Lanka must be higher than 7.5 - 8.5 percent range. Ibbotson (1992), using data for 1926-91 period in the U.S market, reports an arithmetic average risk premium of 8.3 percent and a geometric average risk premium of 6.5 percent. This alone would suggest a risk premium higher than 8.3 percent for Sri Lanka.

As Damodaran (1994) points out, the size of the risk premium is influenced by the variance in the underlying economy, political risk and the structure of the market. On first two factors, Sri Lanka may be considered having fairly high economic risk, and political instability. The structure of the Sri Lnakan stock market is one characterised by a fairly high degree of ill-liquidity and a larger number of small companies whose shares are traded very infrequently. These factors also argue for a higher equity risk premium. Thus, the estimated dividend-adjusted arithmetic average risk premium of about 10.6 percent may be considered a reasonable estimate for Sri Lanka.

D. Average Real Equity Returns and Real Risk-Free Rate

Table 6 gives estimates of average real returns on stocks and Treasury Bills. Over the 1985-97 period, common stocks earned a return of 13.53 percent in excess of the average inflation rate. When adjusted for the average dividend yield of 2.6 percent, the adjusted real returns on stocks become 16.13 percent. The record of the SPI is very impressive with a 19.12 percent real return without dividends. The real equity returns are positive in both sub-periods. This evidence indicates that stocks in Sri Lanka have provided a very good hedge against inflation.[9]

Table 6 also shows the real return embedded in the Treasury bill yields. The real risk-free rate in the Sri Lankan economy averaged 5.55 percent with a volatility of 5.36 percent. This rate is found to be only 3.11 percent in the first sub-period due to the low levels of nominal Treasury bill rates, while it has averaged 7.65 percent in the second sub-period due to higher Treasury bill rates. This suggests that the variability of the real risk-free rate in Sri Lanka is primarily due to the variability of Treasury bill rates rather than inflation.

Table 5

Equity Risk Premium in the Sri Lankan Stock Market (1985-97)

Equity risk premium is the difference between the returns on the market and the Treasury bill yield. The returns on the market are annual percentage changes in the All Share price Index (ASPI), and the Sensitive Price Index (SPI) both without dividends. The Treasury bill yields are yields of Treasury bills with one-year maturity. Averages are estimated as arithmetic and geometric averages. Standard deviation measures risk.

Asset	Equity Risk Premium % (Without Dividends)		Standard Deviation %
	Arithmetic Average	Geometric Average	
Full Period : 1985-97			
All Share Price Index	7.97	-1.71	49.38
Sensitive Price Index	13.56	3.29	48.80
Sub-Period 1: 1985-90			
All Share Price Index	17.72	10.75	45.94
Sensitive Price Index	34.74	26.85	47.32
Sub-Period 2: 1991-97			
All Share Price Index	-0.38	-11.27	54.23
Sensitive Price Index	-4.58	-13.39	45.42

Figure 5

Equity Risk Premium in the Sri Lankan Stock Market (1985-97)

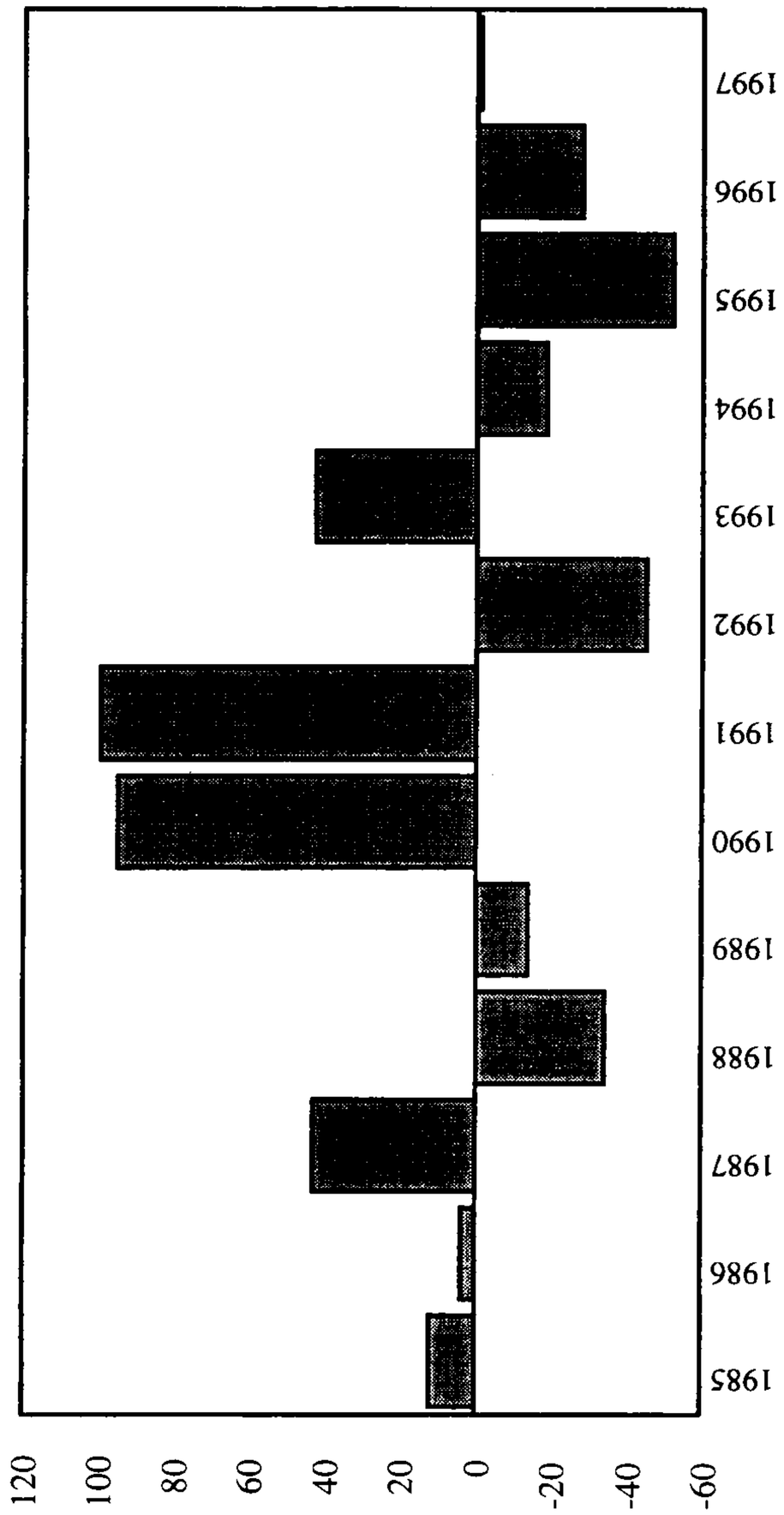


Table 6

Average Real Equity Returns and Real Risk-Free Rate in Sri Lanka (1985-97)

Real equity return is the difference between nominal returns on market indices and inflation rate. Nominal returns are average annual percentage changes in the All Share Price Index (ASPI) and the Sensitive Price Index (SPI) which do not include dividends. Real risk-free rate is the difference between the Treasury bill yield with one-year maturity and inflation. Averages are estimated as arithmetic and geometric averages. Standard deviation measures risk.

Asset	Average Real Returns %		Standard deviation %
	Arithmetic	Geometric	
Full Period: 1985-87			
All Share Price Index	13.53	4.00	49.76
Sensitive Price Index	19.12	8.96	49.73
Treasury Bills	5.55	5.43	5.36
Sub-period 1: 1985-90			
All Share Price Index	20.82	13.48	45.99
Sensitive Price Index	37.84	28.99	50.19
Treasury Bills	3.11	2.97	5.84
Sub-period 2: 1991-97			
All Share Price Index	7.27	-3.50	55.60
Sensitive Price Index	3.06	-5.71	46.86
Treasury Bills	7.65	7.58	4.24

E. Average Returns, Risk Premium and Risk of Industry Portfolios

Table 7 shows arithmetic average returns, arithmetic average risk premium and standard deviation of returns of 14 industry categories listed on the Colombo Stock Exchange. These risk premiums do not include dividends since dividend yield data on sectors are not available. This induces a downward bias into these estimates. The lowest average return of 5.57 percent and the lowest risk premium of -11.28 percent have been recorded by the Land & Property (L&P) sector. Interestingly, this sector has been the least risky sector with an annual standard deviation of 25.43 percent. Bank, Finance and Insurance (BFI) sector has provided the highest average return of 44.01 percent and the highest risk premium of 27.16 percent during the 13-year period. This sector also has the third highest risk with an annual standard deviation of 80.37 percent.

In terms of average returns and risk premiums alone, the sectors that have shown consistently better performance during the overall period as well as the two sub-periods are Bank, Finance and Insurance (BFI), Footwear and Textiles (F&T), Motors (MTR), and Stores and Supplies (S&S). Most other sectors show relatively better performance in the 1985-90 period. Figure 6 depicts the relationship between average returns and standard deviation of returns of industry portfolios as well as the two market portfolios. There is a discernible positive relationship between risk and returns, and the correlation coefficient is 0.55.

Figure 6 has been broken into four quadrants on the basis of the risk-return profile of each portfolio in relation to the risk-return profile of the market portfolio, marked M, which is measured by the ASPI. This shows the relative performance of each portfolio from a total risk perspective. The number next to each portfolio, shown within parentheses, indicates the relative risk, as measured by the coefficient of variation. It measures the risk per unit of return. The relative risk of the market is equal to two. Portfolios in Quadrant I, Sensitive Price Index (SPI), Chemicals and Pharmaceuticals (C&P), and Beverages, Food and Tobacco (BFT), have clearly outperformed the market. Their coefficients of variation are less than two.

Portfolios in Quadrant IV have clearly under-performed the market. The evaluation of the relative performance of portfolios in Quadrants II and III has to be based on the relative risk. Three portfolios in Quadrant III, Bank, Finance, and Insurance (BFI), Services (SRV), and Oil Palms (OIL), have relative risk less than that of the market indicating that they have performed better than the market. Overall, five sectors have outperformed the market from a relative risk standpoint.

Table 7

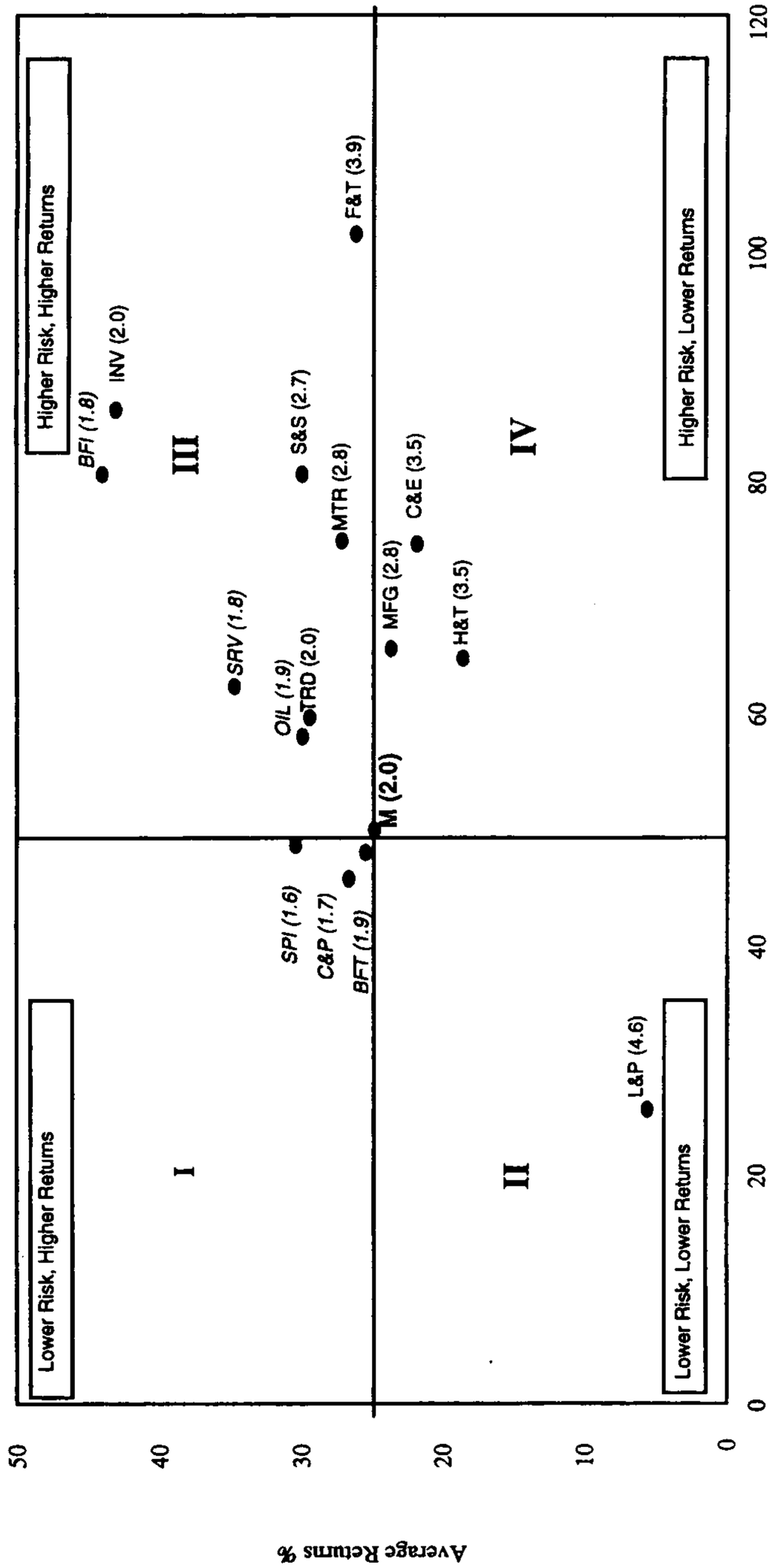
Average Returns, Risk Premium and Standard Deviation of Industry Portfolios in Sri Lanka (1985-97)

The average return is the arithmetic average return of the annual percentage changes in each sector index without dividends. Average risk premium is the difference between the annual average return to each sector index and the Treasury bill yield with one-year maturity. Standard deviation measures the variability of annual changes in each index. BFI=Banks, Finance & Insurancee, BFT=Beverage, Food & Tobacco, C&P=Chemicals & Phamaceuticals, C&E=Construction and Engineering, F&T=Footwear and Textiles, H&T=Hotels & Travels, INV=Investment Trusts, L&P=Land & Property, MFG=Manufacturing, MTR=Motors, OIL=Palm Oil, SRV=Services, S&S=Stores & Supplies, and TRD=Trading.

Return and Risk	Sector													
	BFI	BFT	C&P	C&E	F&T	H&T	INV	L&P	MFG	MTR	OIL	SRV	S&S	TRD
Full period: 1985-97														
Average Return %	44.01	25.46	26.65	21.82	26.13	18.57	43.05	5.57	23.66	27.15	29.91	34.73	29.96	29.41
Average Risk Premium %	27.16	8.61	9.80	4.97	9.28	1.72	26.20	-11.28	6.81	10.30	13.06	17.88	13.11	12.56
Standard Deviation of Returns %	80.37	47.68	45.43	74.39	101.20	64.52	85.96	25.43	65.36	74.66	57.69	62.03	80.37	59.35
Sub Period 1: 1985-90														
Average Return %	45.13	36.07	56.75	6.23	28.43	35.81	73.28	14.59	28.56	21.05	61.54	56.12	28.94	51.28
Average Risk Premium %	30.28	21.22	41.90	-8.62	13.58	20.96	58.43	-0.26	13.71	6.20	46.69	41.27	41.09	36.43
Standard Deviation of Returns %	57.92	51.29	45.99	53.49	48.70	87.93	109.96	27.40	64.40	50.72	75.10	78.40	53.79	68.34
Sub Period 2: 1991-97														
Average Return %	43.06	16.36	0.85	35.18	24.16	3.79	17.14	-2.15	19.45	32.39	2.80	16.39	30.84	10.66
Average Risk Premium %	24.50	-2.20	-17.71	16.62	5.60	-14.77	-1.42	-20.71	0.89	13.83	-15.76	-2.17	12.28	-7.90
Standard Deviation of Returns %	100.60	46.33	26.13	90.73	136.01	36.46	54.83	23.09	71.01	94.52	9.91	41.50	102.50	47.58

Figure 6

Average Returns and Risk of Market and Industry Portfolios in Sri Lanka (1985-97)



V. Summary

This study examines the risk and return profile of common stocks, Treasury bills and inflation in Sri Lanka over the 13-year period 1985-97, and for two sub-periods, 1985-90 and 1991-97. The average estimates are provided on nominal equity returns, nominal dividend yields, nominal Treasury bill rates, inflation rate, nominal equity risk premium, real equity returns, and real risk-free rate along with the standard deviation of each one of them. Risk and return profile of industry portfolios is also analysed. The results of the study provide the following major lessons from the capital market history of Sri Lanka (see Table 8).

a. Common stocks earned an average return, without dividends, of 24.8 percent with a standard deviation of about 49.6 percent.

b. Common stocks earned an average dividend yield of about 2.6 percent with a standard deviation of 1.2 percent, in the 1991-97 period.

c. The average dividend-adjusted nominal return on common stocks is estimated as 27.4 percent.

d. Treasury bills provided an average yield of 16.9 percent with a standard deviation of 3.3 percent.

e. The average divided-adjusted equity risk premium is estimated as 10.6 percent.

f. The inflation rate averaged 11.3 percent with a standard deviation of 5 percent.

g. The average dividend-adjusted real return on common stocks is estimated as 16.1 percent.

h. The real risk-free rate in the Sri Lankan economy has averaged 5.6 percent with a standard deviation of 5.4 percent.

i. There have been seven major markets trends; four bull markets and three bear markets.

j. Five industries outperformed the market from a relative risk standpoint. They are Chemicals and Pharmaceuticals, Services, Bank Finance and Insurance, Beverages Food and Tobacco, and Oil Palms in the descending order of performance.

These findings are useful in many areas of financial decisions such as capital budgeting, valuation, investments, and portfolio management. They provide the historical inputs which are essential in forecasting future capital market conditions. The estimated market risk premium can be used in determining cost of equity in the CAPM framework. One must, however, be conscious of the fact that these estimates have been made using a relatively shorter time period of 13 years. While historical averages are informative, necessary care must be taken to make appropriate adjustments to these averages to reflect the current expectations accurately.

Table 8
Major Lessons From Capital Market History of Sri Lanka (1985-1997)

Nominal stock returns without dividends are annual percentage changes in the All Share Price Index. Market dividend yield is the total dividend on common stocks divided by the total market capitalisation of dividend paying companies at the end of each year in the 1991-97 period. Treasury bill yields are yields of Treasury bills with one-year maturity. Inflation rates are annual changes in the Colombo Consumer Price Index. All averages are arithmetic averages. Risk is measured by the standard deviation annual observations.

Asset	Average Returns %	Risk %
Nominal Stock Returns without Dividends	24.8	49.6
Market Dividend Yield	2.6	1.2
Dividend-Adjusted Nominal Stock Returns	27.4	
Treasury Bill Rate	16.9	3.3
Dividend-Adjusted Equity Risk Premium	10.6	
Inflation Rate	11.3	5.0
Dividend-Adjusted Real Stock Returns	16.1	
Real Risk-Free Rate	5.6	5.4

Notes:

1 "Stocks, Bonds, Bills and Inflation Yearbook" published by the Ibbotson Associates, Chicago is considered the most authoritative source of estimates of historical risk and returns for the U.S. market.

2 Stocks on the Colombo Stock Exchange are classified into 16 sectors. Two sectors, Diversified, and Plantations, are excluded from analysis due to lack of long-term data. Index data on these sectors are available only from the beginning of 1996.

3 The 3-month Treasury bill rate is from 1995 (Table 91) and the 12-month rate is from 1996 (Table 111) Annual Report of the Central Bank of Sri Lanka.

4. The returns on the SPI in 1994, -0.25 percent, will become positive once adjusted for the dividend yield of stocks represented in the index.

5 Year-end dividend yield is the actual dividends for the year as a percent of the year-end prices (D_t/P_t) which are obtained from the Annual Reports of the Colombo Stock Exchange. Although the appropriate measure of dividend yield earned by an investor during a year is the dividends as a percent of the year beginning prices (D_t/P_o), it could not be estimated due to lack of data on market capitalisation of dividend paying companies in each year. The year-end dividend yield will overstate the true dividend yield when the year-end prices are lower than the year-beginning prices, and it will understate the true dividend yield when the year-end prices are higher than the year-beginning prices. During the 1991-97 period, there were three years in which the year-end market capitalisation was lower than the year-beginning market capitalisation. Further, the increases in market capitalisation were much stronger than the decreases in them. Therefore, the use of year-end market capitalisation is likely to induce a downward bias into market dividend yields.

6 The most recent bull market shows a peak on July 31, 1997. Since one year has not passed since then, it is not possible to judge whether this was in fact the end this bull market. Hence, returns have been calculated up to December, 1997.

7 This is the Coefficient of Variation which is calculated as the standard deviation divided by average returns.

8 For example Ehrhardt (1994), and Brigham and Gapenski (1994) recommend using arithmetic average, while Damodaran (1994) and Copeland, Koller and Murrin (1995) recommend the geometric average.

9 Samarakoon (1996) provides strong statistical evidence that Sri Lankan stocks are an effective hedge against inflation as predicted by the Generalised Fisher Hypotheses. The evidence shows that both lagged inflation and expected inflation are significantly positively related to stock returns.

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