
PRICE VOLATILITY IN THE MANILA STOCK EXCHANGE 1986-1993

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Share price volatility is an indicator of a stock market's risk. High volatility means high risk. This, in turn, means that investors will demand high risk premiums, and, therefore, a higher cost of capital for firms. This paper studies share price volatility in the Manila Stock Exchange (MSE) over the period January 1986 to December 1993. It analyzes the MSE Composite Index using two measures of volatility. The study's findings are: One, there is no tendency for price volatility to increase. In fact, volatility appears to have declined in recent years. Two, sharp increases in volatility are transitory and can be easily traced to specific events, mostly political in nature. Three, high volatility occurs not only during market crashes but have also coincided with bullish periods. In other words, high volatility is not necessarily associated with a falling market. Overall, the results appear to be good for capital market development.

INTRODUCTION

This paper analyzes share price volatility in the Manila Stock Exchange (MSE) over the period January 1986 to December 1993, a period of 96 months. This period is marked by occasions of domestic and international instability, political transition, severe natural calamities, economic growth and stagnation. Volatility is measured using two indicators which are analyzed to determine any trend, pattern or other notable feature. These, in turn, are explained by events or developments that affect the stock market.

Interest in share price volatility has increased as a result of the price crash in Wall Street on Black Monday, October 19, 1987 [Jones, et. al., 1989]. The Dow Jones Industrial Average dropped by 508 points or 22.6 percent. Stock markets all over the world, including the Manila and Makati stock exchanges, have experienced similar declines. Fears have been expressed that stock price volatility has been increasing, implying increasing riskiness of stock investments [Jones, et. al., 1989]. In the Philippines, this

would certainly be bad news, particularly in light of efforts by the private sector, government and international lending institutions to develop the capital market. If the stock market is perceived to be more risky than it actually is, investors will demand higher risk premiums and the cost of capital will be higher than it should be. It is therefore important to measure volatility and analyze its behavior over time.

In the United States, blame for the increasing volatility has been initially pinned on derivative securities such as stock index futures and options and trading practices such as index arbitrage, program trading and portfolio insurance [Edwards, 1988]. Explanations were on why the normal price relationships between, say, index futures and the underlying stocks broke down and resulted in increased volatility on Black Monday [Edwards, 1988; Kolb, 1988]. This may not be an immediate concern in the Philippines but it may not be too far off when stock index futures contracts are introduced in the country.

Studies have shown that there is no long term trend of increasing volatility [Jones, et. al., 1989]. Any increase in volatility is transitory. There is no evidence to show that stock index futures trading has resulted in a persistent rise in volatility. While volatility may rise on futures contract

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expiration days, this is also shortlived [Edwards, 1988]. The findings of this study are consistent with these results. Volatility may rise sharply as the market reacts to events but it also quickly falls. Volatility in recent years has been declining and is lower than in earlier years, notwithstanding a pick-up in volatility in the second half of 1993, particularly in December 1993.

DATA AND MEASURES OF VOLATILITY

The Manila Stock Exchange Composite Index has been used to measure price changes. Stocks included in the composite index account for a large share of total market capitalization and should be a good indicator of broad market trends. The MSE Composite Index is highly correlated with a similar index in the Makati Stock Exchange and the findings should apply to both exchanges.

The measures of volatility are adapted from the study of Jones and Wilson [1989]. The first measure, V_1 , is the standard deviation of daily rates of return within a period (monthly or quarterly). The daily rate of return, R_t , is equal to $\ln[I_t/I_{t-1}]$ where I_t is the index value at time t . By defining R_t as the continuously compounded rate of return, the sum of R_t over a period is the rate of return for that period. It is converted into a percentage by multiplying it by 100. Jones and Wilson justify the use of log percentage change because of its symmetric treatment of ups and downs.²

The second measure, V_2 , is the logarithmic percentage spread between the highest and lowest index values in each month or $100 \ln(I_H/I_L)$. Unlike V_1 , which considers all the daily index values in a month, V_2 considers only two index values within each month. V_2 will be more affected by extreme values and will have larger values than V_1 . V_1 and V_2 will be referred to as the standard deviation and spread measures of volatility, respectively.

It should be noted that volatility is dependent on the index used. Kolb [1988] states that the more stocks represented in an index the less volatile the index should be due to the portfolio effect of more complete diversification. Data constraints prevent the computation of separate volatility measures for commercial-industrial (CI), mining and oil indices. It may be surmised, however, that the volatility of the commercial-industrial index should track closely the volatility of the composite index in view of the heavy weight of CI issues in the composite index.

²For example, a move in the index from 1000 to 1020 and vice-versa will have the same log percentage change for the up and down moves (1.98%), but will not have the same arithmetic percentage changes.

FINDINGS AND OBSERVATIONS

Figure 1 presents the standard deviation measure of volatility on a monthly basis. For the entire period, the mean value of V_1 is 1.79 percent, with a median of 1.47 percent. According to this measure, July 1987 has the highest volatility at 5.97 percent. Figure 2 presents the standard deviation measure on a quarterly basis. The volatility pattern is generally similar. However, since volatility appears to be transitory it is better to look at shorter periods, i.e., months, since a longer period may smoothen out the effects. The standard deviation on a quarterly basis is useful in looking at patterns across the years rather than particular episodes of volatility. In subsequent discussion, all references to V_1 refer to the monthly measure.

Figure 3 presents the spread measure of volatility. For the entire period, the mean value of V_2 is 13.24 percent, with a median of 10.74 percent. According to V_2 , the most volatile month is June 1987 with a spread volatility of 43.75 percent. Note that this is only one month earlier than the most volatile month under V_1 and the same underlying forces may be at work in both months.

Table 1 ANNUAL MEAN AND MEDIAN OF V_1 (MONTHLY BASIS) AND V_2 , 1986-1993 (log percent)

	V_1		V_2	
	Mean	Median	Mean	Median
1986	1.91	1.50	13.26	13.59
1987	3.23	2.83	22.44	21.38
1988	1.27	1.27	8.64	8.22
1989	1.62	1.30	10.00	7.96
1990	1.98	1.94	17.08	14.61
1991	1.81	1.68	14.17	12.16
1992	1.30	1.37	9.78	9.46
1993	1.20	1.20	10.58	8.01
1986-1993	1.79	1.47	13.24	10.74

In general, the two measures show similar patterns. The years 1986, 1987, 1990 and 1991 have been volatile years while 1988, 1989, 1992 and 1993 have been periods of low volatility. Table 1 lists the mean and median of V_1 and V_2 on an annual basis.

The peaks and troughs of volatility under the two measures also generally coincide. Fourteen out of the top twenty most volatile months according to each measure are the same. This implies that the standard deviation and spread measures corroborate each other even if their bases are quite different.

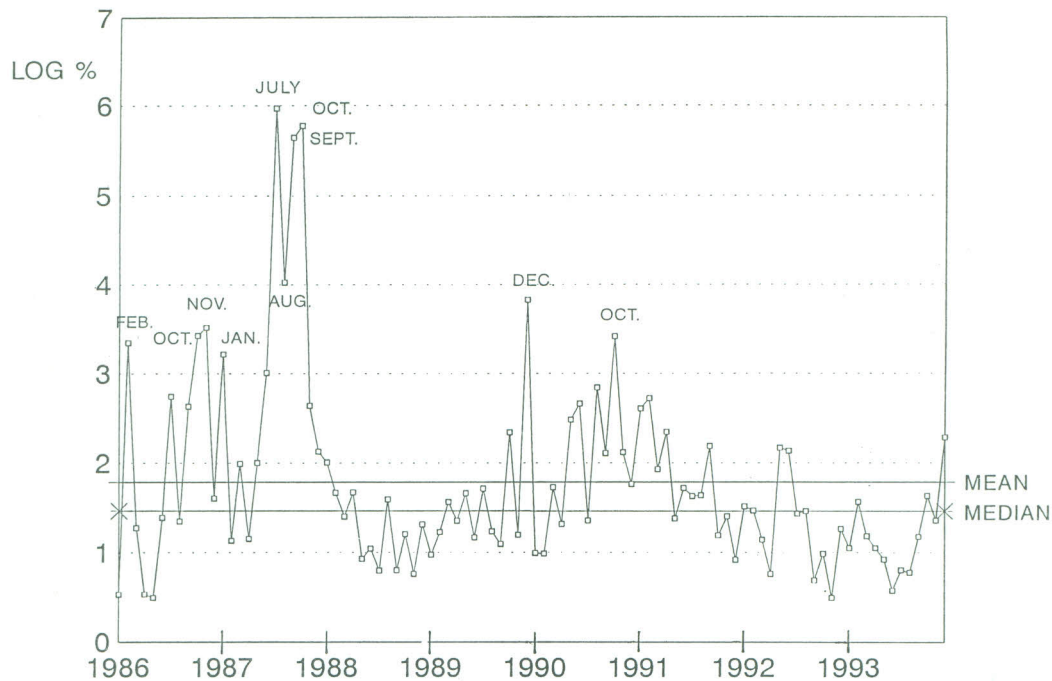


Figure 1: V1 - Standard Deviation Measure of Volatility - Monthly Basis, 1986 - 1993

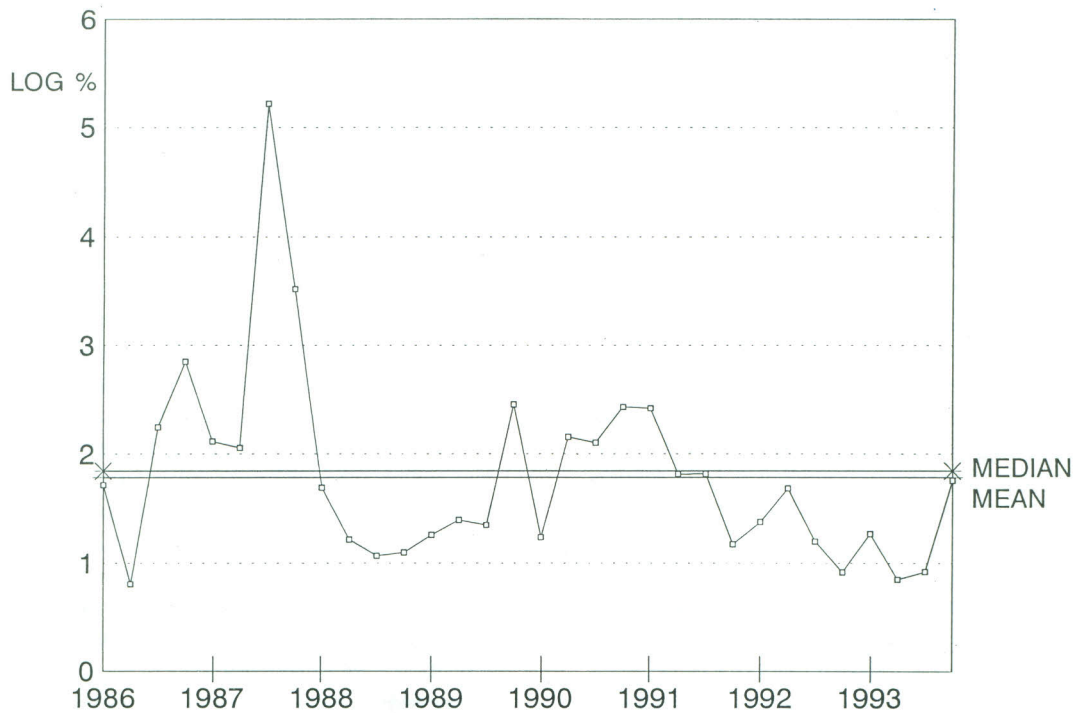


Figure 2: V1 - Standard Deviation Measure of Volatility - Quarterly Basis, 1986 - 1993

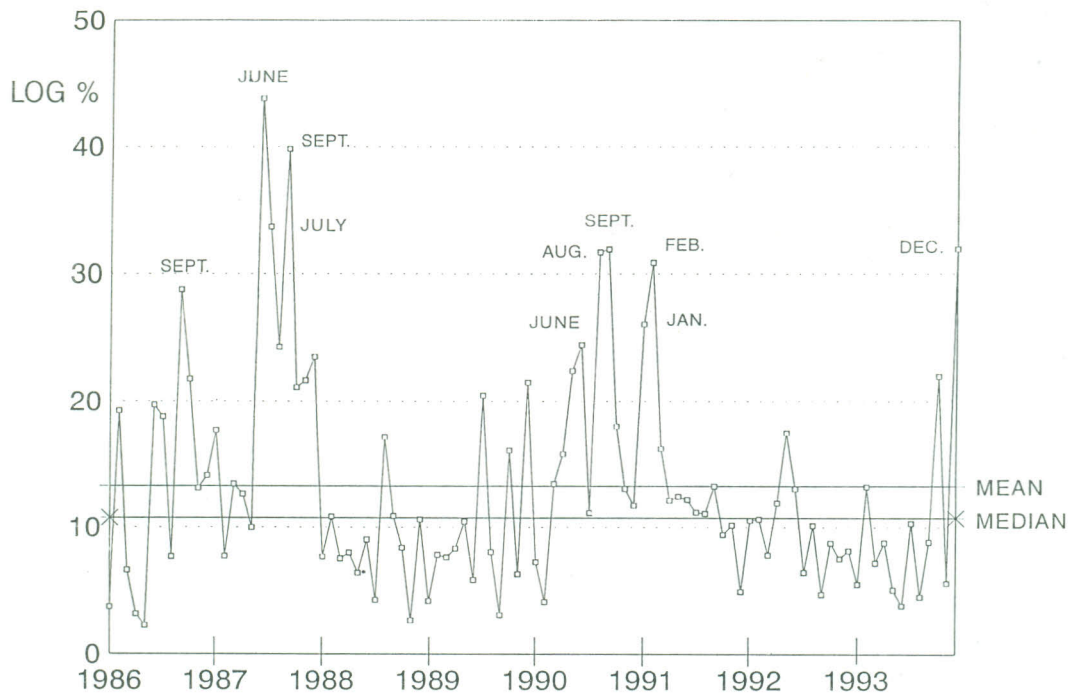


Figure 3: V_2 - Spread Measure of Volatility - Monthly Basis, 1986 - 1993

1987 has been an extremely volatile period. For V_1 , seven of the top twenty volatile months, including the top four, belong to 1987. For V_2 , seven of the top twenty, including the top three, are from 1987. This is not surprising since the first half of 1987 saw a very bullish market that eventually tumbled in the August 1987 coup attempt and Black Monday in October 1987. Since the coup attempt occurred in late August, the volatility did not show up until September.

What is a little surprising is that the highest levels of V_1 and V_2 have been attained in July and June 1987, respectively. These have been months when the market registered spectacular gains, although prices have begun to soften in mid-July. In June 1987 the index has risen from 613.59 to a high of 950.37 or a gain of nearly 55 percent. In July it has continued to rise, and peaked at 1337.59 or a gain of 44 percent from its June close. Thereafter, it has fallen and closed July at 1150. High volatility in a bullish market is also evident in the high spread volatility (V_2) of December 1993, a month which has also registered sharp gains. By this measure December 1993 is the fourth most volatile month. Even with V_1 , December 1993 is the 22nd most volatile month.

It is surprising to have as the most volatile months these months when large gains have been recorded, since

volatility might be more closely associated with sharp price drops and falling markets. For example, in the study of Jones and Wilson the two most volatile months under both measures were October 1929 and October 1987, months when the market experienced crashes. The implication is that high volatility is not necessarily associated with crashes or a declining market nor does it always imply higher risk.³ However, months of high volatility generally coincide with falling markets.

1986 and 1990 have also been volatile years. Volatility in 1986 is explained by the overthrow of the Marcos government in February 1986. This was followed by a recovery of the market but towards the end of the year, the market went down because of political tension that eventually led to the relief of J.P. Enrile as defense minister in November 1986. The volatility in 1990 appears to be the result of the earthquake in July and Iraq's invasion of Kuwait in August. Higher oil prices and international tension have weakened the market. In August the index dropped from a high of 937 to a low of 732, or 22 percent. In September it has dropped further from a high of 748 to a low of 544, or 27 percent.

³This is the problem when risk is measured by standard deviation or some other measure of spread. Upside possibilities will increase standard deviation or spread but in fact may be viewed as good opportunities rather than risks. It is only the downside possibilities that may be considered risky.

Table 2
TEN MOST VOLATILE MONTHS
ACCORDING TO V_1 AND PROBABLE REASONS FOR VOLATILITY

Rank	Month	V_1 (log %)	Probable Reason
1	July 1987	5.97	Continuation of a bull run that began in June followed by a sharp reversal in the third week of July
2	Oct. 1987	5.78	Black Monday, Wall Street crashes, Manila tumbles
3	Sept. 1987	5.65	Aftermath of August 1987 coup attempt
4	Aug. 1987	4.02	Bearish market, coup attempt on August 28, 1987
5	Dec. 1989	3.83	Coup attempt in early December 1989
6	Nov. 1986	3.52	Cabinet rifts, political tension, J. Ponce-Enrile relieved as defense minister
7	Oct. 1986	3.43	Cabinet rifts; J. Ponce-Enrile and President Aquino part ways
8	Oct. 1990	3.42	Uncertain, jittery market, peso devalued to P28 / \$1
9	Feb. 1986	3.35	People power revolution, Marcos overthrown
10	Jan. 1987	3.22	Mendiola massacre, loyalist military rebellion, Channel 7 takeover

Tables 2 and 3 show the ten most volatile months for standard deviation and spread measures, respectively. The probable reason for the volatility is indicated.

The years 1988 and 1989 have been periods of low volatility. No significant event that may roil the market can be identified for these years. Volatility only shot up in December 1989 when there was another serious coup attempt. Volatility appeared to have declined from 1991 onwards. By 1991 destabilization attempts have been discounted in view of the forthcoming 1992 presidential elections. The only spurt of volatility that seemed to break the trend of a declining V_1 is the result of higher share prices after the successful conduct of the May 1992 election and the recent bull run in the second half of 1993, particularly in December 1993. Surprisingly, the eruption

of Mt. Pinatubo in June 1991 does not appear to have affected volatility.

In the absence of data on stock markets of comparative size and development, it is not possible to say whether the Philippine stock exchanges are more volatile than other emerging markets. However, the mean and median values of V_1 and V_2 for the Philippines are about twice the values reported by Jones and Wilson for the US. The maximum volatility for each measure are roughly the same, around 6 percent and 40 percent for V_1 and V_2 , respectively. A study of volatility in the Singapore stock exchange shows the V_1 measure of volatility spiking up to nearly 15 percent in the October 1987 crash and on a few other occasions exceeded the 6 percent maximum in the Philippines [Kuen, et. al., 1992]. Unfortunately, the mean and median values were not given.

Table 3
TEN MOST VOLATILE MONTHS ACCORDING TO V_2 AND PROBABLE REASONS FOR VOLATILITY

Rank	Month	V_1 (log %)	Probable Reason
1	June 1987	43.75	Bull run, record price increases and heavy trading fueled by low interest rates, improving metal prices, oil drilling activity, stable exchange rate
2	Sept. 1987	39.81	Aftermath of August 1987 coup attempt
3	July 1987	33.62	Continuation of bull run followed by a sharp reversal at around the third week of July
4	Dec. 1993	31.87	Bull run marked by very sharp gains. Index rose from 2322.76 on the first trading day and closed the month at 3196.08
5	Sept. 1990	31.86	Continuing uncertainty from Iraq's invasion of Kuwait
6	Aug. 1990	31.64	Invasion of Kuwait by Iraq
7	Feb. 1991	30.83	Allied forces triumph in Gulf war, domestic outlook is positive
8	Sept. 1986	28.78	Optimism on President Aquino's visit to the US, improvement in gold prices
9	Jan. 1991	26.10	Commencement of the Gulf war, outcome is discounted, positive economic indicators, e.g., low T-Bill rates, stable FX rate
10	June 1990	24.47	Rally from 19-month lows, index moves from a low of 740 to a high of 945

CONCLUSION

On the whole, it appears that there is no tendency for price volatility to increase. In fact, with the relatively stable political conditions in recent years, volatility appears to be declining. Since domestic political instability has been the main source of volatility, the on-going peace talks may portend low volatility in the future.

Sharp increases in volatility are transitory and can be easily traced to specific events. This is consistent with the findings of similar studies in the United States. What seems different is that in the Philippines, periods of high volatility have also coincided with very bullish periods. This is unlike in the US and Singapore where the highest volatilities were recorded during crashes. This implies that high volatility does not always imply risk and losses, it could also mean opportunities and gains.

The results appear to be good for capital market development. It shows that the stock market is not getting any

riskier. This should attract more investors to equity securities without asking for very high risk premiums. Firms will have more long term capital available without having to pay very high costs.

REFERENCES

- F. E. Edwards, "Does Futures Trading Increase Stock Market Volatility", *Financial Analysts Journal*, January-February 1988, pp. 63-69.
- C. P. Jones and J. W. Wilson, "Is Stock Price Volatility Increasing?", *Financial Analysts Journal*, November-December, 1989, pp. 20-26.
- R. W. Kolb, *Understanding Futures Markets*, Scott, Foresman, 1988.
- T. Y. Kuen and T. S. Hoong, "Forecasting Volatility in the Singapore Stock Market", *Asian Pacific Journal of Management*, Vol. 9, No. 1, 1992, pp. 1-13.