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Relationship of Risk Premium with Expected Volatility and Unexpected Volatility in Developing and Developed Economies

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Abstract

After application of ARIMA model to monthly risk premium and Threshold GARCH-In-Mean (TGARCH-M) models to daily risk premium of developed economies i.e. USA, UK, Germany, France and Canada and developing economies i.e. Pakistan, India, Malaysia and China over a period from January 2000 to December 2014, this study reported that in monthly data relationship between risk premium and expected volatility is negative in Pakistan: positive in Indonesia and Canada while insignificant in all other countries. The relationship between risk premium and unexpected volatility is negative in all the countries except Pakistan and China where it is insignificant while positive in USA. By the application of asymmetric volatility model on daily data for the same span, the relationship between risk premium and expected volatility is negative and significant in UK and France while this relationship is insignificant in all other countries. The study also indicates that the arrival of bad news has a greater impact on conditional volatility than the arrival of good news in all the economies whether developing or developed.

Keywords: Risk Premium, Expected Volatility, Unexpected Volatility, ARIMA, TGARCH-M

Introduction

The relationship between return and its own risk is very important. The first model introduced to find that relationship was the Capital Asset Pricing Model (CAPM). CAPM is a model which measures an asset's return and its risk when assessing assets in a portfolio and this model is being used frequently (Fama & French, 2004).

The Intertemporal Capital Asset Pricing Model (ICAPM) is also a well known version of the CAPM. The basic version of the CAPM implies the constant opportunity set for the portfolio maximization as it assumes a single period investment horizon, while the ICAPM, on the other hand, assumes varying opportunity sets of the portfolio rather than constant opportunity set for wealth maximizing investor. As a result, the portfolio selection for intertemporal investors will be different as compare to the investors facing a constant opportunity set (Merton, 1973). The longer time horizon than a single period will be considered by intertemporal investor that means the investor will have to keep in mind the events in terms of returns in forthcoming period and also the current period and how they are to affect each other (Merton, 1973). A single period investor would not have to make any portfolio decisions over the period as he has no intention to change the portfolio during that time. An intertemporal investor, on the other hand will have to, except for the single period, choose another portfolio set for the future period, since there are may be the new events and the returns to consider.

A positive relationship between the stock's excess market return and its conditional variance was postulated by Intertemporal Capital Asset Pricing Model (ICAPM) as reported by Merton's (1973). Empirically, this assumption is supported by many studies. Although, some of the empirical studies have also found that there exist a negative relationship between return and its volatility that was justified by Black (1976) by giving the leverage effect hypothesis. He postulated that the negative shocks to the returns increase financial leverage which makes stocks more risky and therefore enhances the volatility.

Financial markets have been studied for a longer period from different points of view due to their pivot role in the economic positions of the countries. In this regard, the analysis of stock returns and its volatility is one of the major aspects of stock markets which have attracted much attention in the financial literature.

Volatility is being used as a proxy for the investment risk. By volatility persistent means that the return and its risk tradeoff changes in the predictable way over a business cycle (Krainer, 2002). So, in order to explore the relationship between return on an asset and its own variance (being used as a proxy for risk) remained an important topic in the financial research.

The growth in stock market volatility is rapid. It is a general observation that the stock markets are becoming strongly interrelated and more interdependent around the world. So, this interest in the stock market volatility has also been extended from the developed economies to the emerging economies because it is now considered that emerging markets are an alternate investment opportunity in comparison with developed markets, which is being indicated in the increase of the share of the world's capital markets invested in the emerging markets (Hartmann and Khambata, 1993). But the efficiency of the stock markets in developing economies differ from the developed economies due to low per capita income, high population growth rate, poverty, lawlessness, political instability, low level human capital and industrialization and many more similar characteristics of the developing economies.

Due to differential characteristics of the emerging economies from developed economies as mentioned above, the emerging markets exhibit the greater volatility than the developed capital markets. Emerging capital markets also have differentiating characteristics such as higher average returns, lower correlations than developed markets, and the more predictable returns, Bekaert, G. & Harvey, C. (1997). So, the investors investing in emerging markets must keep in mind these characteristics and also the currency risk which means the local currency depreciates over the investor's domestic currency; the expected return are also high as developing markets accelerate to catch the developed markets; the emerging markets are less liquid as compare to developed ones due to the reason that the large public companies are still owned by the sole individual or the families and also the companies own shares in other companies (Dale A. Norton, 2013). Therefore, it is of interest to analyze these issues from the developing and developed stock markets perspective.

Due to the difference in the characteristics of developing and developed economies, it is important to find the relationship between return, expected volatility and unexpected volatility in the stock markets of these economies. In order to find the relationship between return, expected volatility and unexpected volatility many studies have been conducted in the developed economies, but this relationship has not been discussed extensively in the developing economies especially the relationship between risk premium and unexpected volatility as the unexpected volatility is high in the developing economies. This relationship is important for the economy because all the stake holders whether the investors or policy makers will make their decisions on the basis of this relationship. Policy makers of a country will realize whether this relationship positively or negatively affects the returns. If returns negatively affect the economy then what measures they have to take in order to reduce volatility.

Similarly, in this study risk premium has been used instead of return because the investor is more interested in risk premium rather than return. As the risk premium tells the investors that what percentage of the excess return he will drive for the extra risk he bears by not investing in the risk free asset. So, he is more interested to find the direct relationship between risk premium and volatility rather than return and volatility.

This study will help the investors to identify whether they are rewarded for extra risk they bear. It means their return increases as their risk increases. So, from the investor's point of view, this relationship is important because he will take the risk if this is positive otherwise not. Finally, this study is also helpful for long time horizon and short time horizon investors by using daily and monthly data both in the developing and developed economies.

This study analyzes risk premium and their own volatility relationship in order to check whether a time varying risk premium exists in the sense of the increased expected rate of excess return that is required in response to an increase in the predictable volatility of the returns in the developing and developed economies. The expected and unexpected volatility is modeled and forecasts are derived from the ARIMA and asymmetrical TGARCH-M type of models, the outperforming class of the models introduced by the Engle (1982) firstly. The unexpected volatility and risk premium relationship has also been analyzed.

The next section is organized in this way that the second chapter two deals with the literature review. Third chapter explains the data collection and research methodology. Fourth chapter deals with the results and their analysis. Fifth chapter concludes the paper after analyzing the results.

Literature review

Numerous empirical studies have been conducted for determining the relationship between stock market returns and its volatility in the developing and developed economies. The findings of these early studies were mixed.

First of all those studies will be discussed, which found relationship between return and volatility as a proxy for risk in developed economies. As Merton, R.C., 1980 reported a positive relation between expected return and volatility. French et al. (1987) also found that there was positive relationship between expected return and expected volatility and negative relation between expected return and unexpected volatility by using ARIMA, GARCH-in-the-mean Model. While Baillie and De Gennarro (1990) reported that, in US stock market, positive relationship is weak and almost nonexistent. Nelson (1991) by using EGARCH Model, found a negative yet insignificant relationship. He explained this relationship through the volatility feedback effect.

Glosten et al. 1993 reported that there existed a significant negative relationship between expected return and their volatility in US market with the use of GJR-GARCH model. While Hany A. Shawky and Achala Marathy (1995) reported that in the rising market regime found no significant relation between excess return and volatility whereas, in falling market regime, a highly significant negative relationship was examined by using ARIMA, GARCH-in-the-mean Model. Theodossiou and Lee (1995) reported that there exists a positive but insignificant relationship between stock market returns and the conditional variance in many international stock markets.

Whitelaw, R., 2000, reported that the stock return volatility were negatively correlated with stock return by using a Regime-switching consumption process. Nam, Py and Arize (2002,) used asymmetric GARCH-M model for US market indices during the period from 1926 to 1997 and found that the positive returns reverted more slowly to the long term average negative returns then that negative returns. Under the conditional correlation, Brant and Kang (2004) reported a negative relationship, but a positive tradeoff under unconditional correlation.

Li et al. (2005) repoted that there seemed to be a significant negative trade off between the expected returns and volatility in six out of twelve largest international stock markets by using semi parametric GARCH-M Model. For examining the risk and return tradeoffs, Bali and Peng (2006) used the daily data of several stock market indices. They found a significant positive relationship.

Lanne and Saikkonen (2006) employed a GARCH-M model and found that in the monthly US data, there was no risk and return relationship due to unnecessary intercept in the ICAPM.

By using a 30 years of daily data of nineteen major international stock exchanges, including the world market, Guo and Neely (2008) reported a positive risk and return relationship by using the component GARCH (CGARCH) model by using a monthly U.S stock market return for the period from 1928-2004. Lanne and Luoto (2008) reported robust results of the positive relationship between risk and return, but the strength of this relationship depends upon the prior belief concerning the intercept in the ICAPM.

By using earnings and dividends as firm fundamentals alternative proxies for the expected return and the conditional variances, Jiang and Lee (2009) also reported a positive risk and return relationship.

Henri Nyberg (2010) reported that there exists a positive relationship between volatility and the expected return irrespective what the state of the economy exists by using QR-GARCH-M Model. There was a positive risk and return relationship when the volatility is at low and medium levels, but at high levels of volatility this relationship was reversed by using Flexible Regression approach founded by Alberto Rossi et al. (2010).

Dimitrios and Theodore (2011) also reported a negative relationship between return and volatility. Komain Jiranyakul (2011) reported that the integration between stock prices and dividend series was not founded; the excess returns were separately calculated as capital gain and dividend excess returns. When the market dividend yields were used to obtain the excess return, the value of the risk and return relationship was higher and positively significant in Thailand.

The study of Theodossiou et al. (2014) reported that by applying specified parametric models that take into account the effects of skewness delivered a positive risk and return relationship in line with the theory by using SGT distribution, rolling window regressions.

As mentioned above, all the empirical studies determined the relationship between return and volatility in developed economies while the characteristics of developing markets are different from the developed one. As Harvey (1995) indicated that in the emerging stock markets the risk and return relation displayed different patterns when compare with the mature stock markets. The high expected returns and risk in the emerging markets may also be the reason for that. Michelfeder and Pandya (2005) also found that stock returns were more volatile in emerging markets than those of the mature markets; those were same with the finding of Arora, Das, and Jain (2009). So, it is important to know what the relationship between return and volatility exists in developing economies.

Now, the studies that determined the relationship between return and volatility in developing economies will be discussed. De Santis and Imrohoroglu (1997) employed a GARCH (1, 1) model and reported that in Asian stock markets there was no evidence on the positive tradeoff. Chiang and Doong (2001) conducted a study on Hong Kong, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand. In daily data they showed a significant positive relationship, but weak impact of volatility (or risk) on market returns the weekly data and was insignificant in monthly data by using TAR GARCH (1, 1)-M model.

Shin (2005), studied the Asian Stock Markets and reported a positive but insignificant tradeoff in most of the cases exists by using Parametric and semi parametric GARCH-in-Mean model. However, a little support has been given by these results to the recent asymmetric volatility argument that the stock return volatility should be negatively correlated with the stock returns. The Asian markets included India, Korea, Malaysia, the Philippines, Taiwan, and Thailand.

Similarly, Karmakar (2007) with the use of EGARCH model found no relationship between return and risk in India. In the regional stock market of the West African Economic and Monetary

Union called the BRVM there was a positive but not statistically significant relationship between expected stock return and expected volatility by using EGARCH-in-Mean model investigated by N'dri, Konan Léon (2007).

In the same way Kong, Liu, and Wang (2008) reported that there exists a positive risk return relationship in the Chinese Stock Market. They claimed that when the stock markets were more mature, the risk was priced properly by using GARCH-M Model. Similarly, in most of the markets the results indicated that volatility as the measure of risk did not have a significant impact on the returns and for a few markets the return volatility had a statistically significant negative correlation with the equity returns by using GARCH-M model, as studied by Al Janabi, (2010) on GCC countries.

Enrique Salvador (2012) studied the relationship in 5 Latin American, 9 Asian, 3 Eastern Europe and 3 African countries by using Regime-Switching GARCH frame work and found that in low volatility period favorable evidence was obtained in most of the emerging markets but not for periods of high volatility or using the traditional linear GARCH-M approach. In Australia, Honk Kong, India, Japan, Korea and Taiwan risk return relationship was negative and highly insignificant. Where as in Pakistan case, the coefficient was negative and highly significant, while a positive risk and return relationship was reported in case of china, Malaysia and Indonesia as reported by Usman Bashir et al. (2013).

Blitz et al. (2013) used a more comprehensive sample by using 30 emerging markets monthly firm level returns for a period between 1988 and 2010. By ranking stocks on their past volatility, the authors constructed equally weighted quintile portfolios while in their study the volatility was calculated as the standard deviation of monthly returns over past three years. He showed that the high volatility quintile portfolio alpha was significantly lower than that of the low volatility quintile portfolio. Kenneth A Tah (2013) reported that for Zambia stock market the relationship between conditional variance and expected return was a negative and significant. They used GARCH-in-mean in order to determine the relation.

As mentioned above some of the studies found that there exists a positive relationship between expected return and volatility that is in consistent with the ICAPM, while some found the negative one. There are also some who found insignificant relationship. So, the relationship between risk and return is still controversial. Although, a positive relationship between the stock portfolios expected returns and its volatility is implied by most of the asset pricing models as earlier founded by(Baillie and DeGennarro 1990) under the assumption that investors are risk averse. Similarly, the stock return volatility was negatively correlated with the stock returns as stated by long tradition in the empirical finance (Cox and Ross 1976; Whitelaw 2000).

Santa Clara and Valkanov (2005) gave an argument that different approaches used to model the conditional variance may result in different risk and return tradeoff. However, the time span of observations being used is also the reason for mixed results as founded by Lundblad (2007). The imposition of a linear relation between risk and return imposed by the GARCH-M Model is also the reason for the flat or negative relation between the market risk premium and its expected volatility as argued by Salvador (2012).

More studies have used GARCH-in-Mean models (Engle et al., 1987) to capture the time varying behavior of the volatility. Surprisingly, by using this model most of the studies reported an insignificant relationship between returns and its conditional variance in the international stock markets.

Measurement of volatility in the literature

An important aspect of relationship between risk and return is the volatility. Reliable estimations of volatility are essential for hedging against the risk. Autoregressive Integrated Moving Average (ARIMA) model developed by Box and Jenkins (1976) was frequently used by the researchers for the assessment of volatility in the financial assets before focusing on the heteroskedasticity and its effects on forecasting and also on investment decision. Although for determining the implied volatility, an equation for option pricing was developed by Black and Scholes (1973). The base of these approaches was upon the erroneous hypothesis of constant variance for time series of the financial returns. Consequently, they were unable to capture the stylized facts of the financial returns such as, leptokurtosis, volatility clustering, fat tails, leverage effect etc.

The first stylized fact of the volatility states that in the financial time series the tails of the data tend to be flatter than those of the normal distribution, that excess kurtosis in the financial time series was firstly observed by Mandelbrot (1963) and now it is accepted as a stylized fact about the volatility (Aydemir, 2002).

The other stylized fact of the volatility is the persistence in it i.e. large movements in the security returns tend to be followed by the large movements and vice versa.

Poterba and Summers (1988) reported that the returns are positively auto correlated over a short periods of time, while they are negatively auto correlated over the longer periods of time. This implied that the stocks had the mean reverting patterns over the time. That mean reversion was generally considered as another stylized fact about the volatility.

Finally, a notable stylized fact of volatility is the phenomenon that the positive innovations in return have less affect on the conditional volatility than the negative one. The researchers agreed that this can be described as leverage.

The standard deviation of returns is often used as a measure in order to estimate the volatility of a certain asset. While the unconditional standard deviation over the (relatively long) sample period is used as a forecast for the future volatility.

By taking average of the historic data, a problem is that all data has been equally weighted. Although, more recent data will have more influence than that of the older data. In order to overcome this problem, a method called the Exponentially Weighted Moving Average (EWMA) was used. A drawback of this model was that it did not provide forecasts that lead towards unconditional variance of the time series when the prediction horizon increased (Brooks, 2008). While the time series models like GARCH, by Bollerslev (1986) do account for this feature.

Many models of the conditional volatility have been proposed for capturing volatility in the financial time series. Engle (1982) introduced an outperforming class of these models with the name known as the ARCH (autoregressive conditional heteroskedasticity) model. This model basically presented that a variance of error terms at a specific time period relies upon the squared error terms of the previous periods. It indicates that the variance is not constant so, having the quality of heteroskedasticity.

GARCH model was introduced by Bollerslev (1986). As defined by Engle (1982), this model is a generalized form of the ARCH. As the ARCH model illustrates the variance dependents on the previous values of the squared errors. So, the GARCH model allows the conditional variance to be modeled from the previous values of itself in addition to the squared error terms. In this way it is differentiated from the ARCH.

In order to capture the asymmetries, the asymmetric models such as the exponential GARCH (EGARCH) of Nelson (1991), GJR-GARCH model introduced by Glosten, Jagannathan, and Runkle (1993), threshold GARCH (GJR-GARCH) model introduced by Zakoian (1994) and so many other models have been proposed. In comparison to the symmetric GARCH models, the asymmetric models are quite purposeful and useful because good news and the bad news have a different effect upon the volatility in these models.

A thorough study of literature on the relationship between return and expected volatility illustrated that a vast work has been done in this field by using different models, different frequencies of data and in different markets. But, the results of these studies are inconclusive. Some found positive relationship between expected return and volatility while other founds negative relationship and some of the studies found no relationship. So, there is still ambiguity in that relationship. Still many studies are being conducted by using different techniques to find the relationship as proposed by the CAPM.

Although many studies focused on the relationship between expected return and expected volatility. But, a little work has been done to find the relationship between expected return and unexpected volatility especially in developing economies. While most of the studies especially in developing economies have used return instead of risk premium where as the investor is more interested in the risk premium rather than return. As the risk premium tells the investors that how much the excess return he drives for the extra risk he bears by not investing in the risk free asset. So, he is more interested to find the direct relationship between risk premium and volatility rather than return and volatility.

So, these two issues have been little explored in the literature especially in the developing economies. By keeping in views these things this study explored the time-varying risk premiums and their relationship to volatility with ARIMA and TGARCH-M (Generalized Autoregressive Conditional Heteroskedasticity) kind of models in both the developing and developed economies. The TGARCH-M model as illustrated above is performing better as compare to other GARCH models.

Data collection

The data is composed of daily and monthly market values of the indices of developing and developed economies. The data for risk free daily and monthly rates of all the countries have also been used. The sample for this research includes major stock market indices of 5 developing countries Pakistan, India, Malaysia, Indonesia and China (Table1) and 5 developed countries USA, UK, Germen, France and Canada (Table2) to which the data is available easily on yahoo finance for the period starting from January, 2000 and ending December, 2014.

Table 1: List of Stock Market Indices and Risk Free Rate Used for Developing Countries.

Sr no.	Name of country	Name of stock market index (proxy for market return) and source	Name of proxy for risk free rate and source
1	Pakistan	KSE-100 Index Finance.yahoo.com	3 month T. bill www.sbp.org.pk
2	India	S & P BSE SenSex Finance.yahoo.com	91 day treasury bill www.rbi.org.in
3	Malaysia	Kuala Lampur Composite Index Finance.yahoo.com	68-91 days treasury bill www.bnm.gov.my
4	Indonesia	Jakarta Stock Exchange composite index Finance.yahoo.com	90 day bank certificates www.bi.go.id
5	China	SSE Composite Index Finance.yahoo.com	3 month relending rate www.pbc.gov.cn

Table 2: List of Stock Market Indices and Risk Free Rate Used for Developed Countries.

Sr no.	Name of country	Name of stock market index (proxy for market return) and source	Name of proxy for risk free rate and source
1	USA	S & P 500 Index Finance.yahoo.com	3 month treasury bills www.stlouisfed.org
2	UK	The Financial Stock Exchange 100 Index Finance.yahoo.com	3 month treasury bills www.stlouisfed.org
3	Germen	Deutscher Aktien index Finance.yahoo.com	3 month interbank rate www.stlouisfed.org
4	France	Cotation Assistee en continu (CAC 40) Finance.yahoo.com	3 month interbank rate www.stlouisfed.org
5	Canada	S & P TSX Composite Index Finance.yahoo.com	3 month treasury bills www.bankofcanada.ca

The data for all the indices of the developing and developed economies was obtained from Data Stream while Data of Proxies for risk free rate was obtained from official websites of the central bank of the respective country. This study is limited only to five developing economies due to difficulties in availability of risk free rate data.

In this research, both the daily and monthly returns were used because monthly returns have less noise and have better ability to reveal volatility clustering; similarly it is most popular in stock volatility literature as this problem was noted in previous studies (Poon and Taylor, 1992; Choudhry, 1996; Tah, 2013). In this way, this study will help both the long time horizon and short time horizon investors.

Market returns

Market Returns were estimated by using this formula:

Rt = log (Pt/Pt-1),

Pt = Closing value of index on day/ month 't', Pt-1 = Closing value of index on day/ month 't-1' an Pt and Pt–1 are closing values on Day t and t-1 respectively.

Risk free rate

Monthly yield and daily yield of risk free rate were calculated by using the following formulae:

"Monthly rate" = $(1 + \text{Annual rate})^{1/12}$ - 1

"Daily rate" = $(1 + \text{Annual rate})^{1/252}$ – 1

Risk premium

The difference between return on stock market portfolio and risk free interest rate is the risk premium which was calculated by using the formulae:

"Risk Premium" = R_m - R_f

Volatility estimates

In this research, daily values of the returns of indices from January 2000 to December 2014 have been used for estimation of the monthly standards deviation of risk premium. The estimation through daily values has three advantages over the rolling twelve month standard deviation used by Officer (1973) and by Merton (1980). First, for any particular interval it will increase the accuracy of the standard deviation estimate because sampling the return process more frequently. Second, the volatility of risk premium is not constant. In this way, a more precise estimate of standard deviation for month will be obtained by using only returns with in that month. Finally, the non overlapping sample of returns is the key of these monthly standard deviation estimates, whereas eleven returns are shared in adjacent rolling twelve month estimators.

Daily portfolio returns are auto correlated, particularly at lag one due to non-synchronous trading of securities this was noted in previous studies(Fisher (1966) and Scholes and Williams (1977). Due to this autocorrelation, the standard deviation will be estimated by introducing a term 1+2r_1 in the formulae of standard deviation. In this research Standard deviation has been used for the measurement of volatility instead of variance because French et al. (1987) estimated that standard deviation best describes volatility as compare to Variance. Blitz et al. (2013) also used standard deviation as a proxy for volatility. Theoretically standard deviation is the best measure of data dispersion as compared to variance. In variance the unit is squared while the investor is interested in the unit change not in the squared unit change. The following formulae will be used.

$$\boldsymbol{\sigma_t^2 = \frac{1+2r_1}{n_t-1}\sum_{d=1}^{t} R_{d,t} - \bar{R}_t}$$

This was used by Ser-Huang Poon and Stephen J. Taylor (1992) where $\boldsymbol{r_1}$ indicates autocorrelation between returns at a lag of one day and R is the mean daily return in any month t.

Expected and unexpected volatility

Estimates of monthly volatility were computed from daily returns. By using an autoregressive integrated moving average (ARIMA) model; these estimates were then split into expected and unexpected components.

Methodology

ARIMA model

ARIMA model was firstly introduced by Box and Jenkins (1976). This methodology is popularly known as the Box and Jenkins (BJ) methodology but technically it is known as the ARIMA methodology. The term deriving from AR = Autoregressive, I = Integrated MA = Moving Average. These models focus on analyzing the probabilistic or stochastic properties of economic time series on their own rather than constructing a single equation or a simultaneous equation models. They work under the philosophy that data speak for themselves.

By using the ARIMA model, the fitted value of standard deviation was calculated first in this study.

$$ln\sigma_{mt} = \theta + a_1\sigma_{mt-1} + \beta_1 \text{ut}-1 + \epsilon_t \quad (1)$$

The fitted part is predictable component of volatility while the residual part is unpredictable component of volatility. Used by HanyA.Shawky and Achla Marathy (1995).

In this way monthly predictable and unpredictable volatility have been calculated.

Relationship of risk premium with expected volatility and unexpected volatility

After the calculation of monthly expected and unexpected volatility and monthly risk premium the following regression model was used to find the relationship.

$$\boldsymbol{R_{mt} - R_{ft} = \alpha + \alpha_1\hat{\sigma}_{mt}^{p} + \beta_1\sigma_{mt}^{pu} + \varepsilon_t} \quad (2)$$

The second equation shows the relationship of risk premium with expected volatility and unexpected volatility.

TGARCH-M model

This study uses two equations in order to apply the TGARCH-M; model one for mean and other for variance as follows:

$$\boldsymbol{(R_{mt} - R_{ft}) = \alpha_0} + \alpha_2 R_{t-1} + \boldsymbol{\beta_2\,\sigma_t^2 + \varepsilon_t} \quad (3)$$

$$\boldsymbol{\sigma_t^2 = \omega + \alpha_3\varepsilon_{t-1}^2 + \beta_3\sigma_{t-1}^2 + \gamma\varepsilon_{t-1}^2 I_{t-1}} \quad (4)$$

In third equation risk premium depends upon its previous value and its own variance. While in the fourth equation $\boldsymbol{\gamma}$ is an asymmetric or leverage effect and dummy variable used to differentiate the good and bad news, i.e. $\boldsymbol{I_{t-1} = 1}$ if $\boldsymbol{\varepsilon_{t-1}^2} < 0$ indicating bad news, and $\boldsymbol{I_{t-1}} =$

$\mathbf{0}$if$\boldsymbol{\varepsilon}_{t-1}^{2} \geq \mathbf{0}$indicating good news. The TGARCH model specification assumes that unexpected changes in the market returns or $\varepsilon_t$will have different effect on the volatility of stock return $\boldsymbol{\sigma}_t^2$, Good news will lead to higher return, and hence it is associated with higher variance through $\boldsymbol{\gamma}$. According to Ahmed and Suliman (2011), a non-zero value of $\boldsymbol{\gamma}$ indicates an asymmetric nature of the returns. On the other hand, when $\boldsymbol{\gamma}$is zero, we get back to the standard symmetric GARCH model. When $\boldsymbol{\gamma}$is positive, there is a leverage effect.

Results

Descriptive statistics

Table 3: Descriptive statistics for the daily Risk Premium of Developing and Developed countries.

Developing countries						
Country	Mean	Std. Dev	Skweness	Kurtosis	Jerque Bera	Prob.
Pakistan	0.000525	0.014029	0.263395	6.280089	1711.116	0.000000
India	0.000168	0.015712	-0.186633	9.837691	7415.011	0.000000
Malaysia	9.71E-05	0.009750	-0.518549	6.01679	5244.9	0.000000
Indonesia	0.000199	0.014371	-0.691005	9.240481	6248.892	0.000000
China	0.000171	0.015438	-0.126883	7.727013	3591.984	0.000000
Developed countries						
USA	2.68E-05	0.012805	-0.182015	11.02789	10254.70	0.00000
UK	-0.004571	0.012499	-0.225947	8.777351	5580.208	0.00000
Germen	4.60E-05	0.015452	0.007518	7.258898	2919.533	0.00000
France	6.27E-05	0.011537	-0.660419	12.31606	14301.86	0.00000
Canada	6.27E-05	0.011537	-0.660419	12.31606	14301.86	0.00000

Table 3 provides summary statistics of daily risk premium series for five developing and developed countries. The first part shows the average returns of all the developing countries while they are not too much high. The standard deviation in all the countries is high as compare to return. In Malaysia the standard deviation is low as compare to other four countries that show Malaysian market is less risky. The positive skewness of Pakistan suggests that the returns distribution of markets have a higher probability of providing positive return while the skewness of other four countries India, Malaysia, Indonesia and China is negative which suggests that these markets have chances of negative returns. Although these skew nesses are not much more. The value of kurtosis that measures whether data is peaked or flat relative to normal distribution is high in all five cases which indicates that data is leptokurtic i.e. it is characterized by occurrence of distinct peak near the mean and exhibit fat tails. This shows that the risk premiums are concentrated on one level. The above statistics show that risk premium is not normally distributed. This conclusion is further validated by the significant values of Jarque- Bera test for normality.

The second part of table indicates descriptive statistics for developed countries. There are average positive returns for USA, Germen, France and Canada while the UK has negative average returns which show this market has become mature and the scope for positive returns eliminated. The average returns are low in all the countries as compare to standard deviation. There is no much difference in the risk of all these countries markets. The positive skewness of Germen suggests that returns distribution of the markets have a higher probability of providing positive return while the skewness of other four countries USA, UK, France and Canada is negative which indicates that these markets have the probability of negative returns. Although these skew nesses are not much high even near to zero in case of Germen.

Table 4: Autocorrelation at lags.

Country	Developing				Country	Developed			
		AC	Q-State	Prob			AC	Q-State	Prob
Pakistan	1	0.100	37.612	0.000	USA	1	-0.081	25.233	0.000
	2	0.053	47.996	0.000		2	-0.053	35.973	0.000
	3	0.051	57.702	0.000		3	0.024	38.131	0.000
	4	0.027	60.473	0.000		4	-0.007	38.299	0.000
	5	0.031	64.000	0.000		5	-0.044	45.737	0.000
	6	0.001	64.001	0.000		6	0.004	45.785	0.000
	7	0.027	66.816	0.000		7	-0.029	48.985	0.000
	8	0.007	67.012	0.000		8	0.023	50.973	0.000
India	1	0.074	20.585	0.000	UK	1	-0.016	0.9575	0.328
	2	-0.032	24.500	0.000		2	-0.014	1.6845	0.431
	3	-0.015	25.316	0.000		3	-0.036	6.5764	0.087
	4	0.012	25.868	0.000		4	0.038	12.057	0.017
	5	-0.025	28.236	0.000		5	-0.047	20.541	0.001
	6	-0.041	34.475	0.000		6	-0.017	21.672	0.001
	7	0.018	35.662	0.000		7	0.001	21.674	0.003
	8	0.036	40.551	0.000		8	0.031	25.500	0.001
Malaysia	1	0.005	0.0978	0.754	Germen	1	0.015	0.9388	0.333
	2	0.018	1.2654	0.531		2	0.012	1.5168	0.468
	3	0.015	2.1478	0.542		3	-0.012	2.1114	0.550
	4	0.014	2.8688	0.580		4	0.120	59.359	0.000
	5	-0.007	3.0415	0.694		5	0.009	59.717	0.000
	6	-0.001	3.0443	0.803		6	0.023	61.863	0.000
	7	0.012	3.5675	0.828		7	0.083	89.129	0.000
	8	0.016	4.4733	0.812		8	0.091	122.22	0.000
Indonesia	1	0.109	43.315	0.000	France	1	0.000	0.0009	0.976
	2	0.018	44.511	0.000		2	-0.009	0.3607	0.835
	3	-0.020	45.997	0.000		3	-0.027	3.4810	0.323
	4	-0.010	46.399	0.000		4	0.049	13.551	0.009
	5	-0.012	46.935	0.000		5	-0.029	17.070	0.004
	6	-0.020	48.479	0.000		6	0.005	17.159	0.009
	7	-0.003	48.503	0.000		7	0.045	25.434	0.001
	8	-0.002	48.511	0.000		8	0.060	40.198	0.000
China	1	0.007	0.2164	0.642	Canada	1	-0.011	0.5108	0.475
	2	-0.014	0.9568	0.620		2	-0.053	11.331	0.003
	3	0.028	3.9224	0.270		3	0.008	11.606	0.009
	4	0.048	12.733	0.013		4	0.034	16.056	0.003
	5	-0.008	12.966	0.024		5	-0.070	35.068	0.000
	6	-0.041	19.533	0.003		6	-0.045	42.991	0.000
	7	0.024	21.845	0.003		7	0.009	43.273	0.000
	8	-0.003	21.872	0.005		8	0.042	50.269	0.000

The value of kurtosis is high in all five cases which indicate that data is leptokurtic. This illustrates that the risk premiums are concentrated on one level. The above statistics show that risk premium is not normally distributed. It is confirmed by the significant values of Jarque- Bera test.

As indicated above there are not much differences in the daily risk premium of both developing and developed economies although up to some extent the risk and average returns are higher in developing economies as compare to developed.

Table four indicates autocorrelation coefficients for the corresponding developing and developed countries. In the first part significant autocorrelation is detected at a lag of one time period for daily risk premium series of Pakistan, India and Indonesia while the risk premium series indicates that today return of these countries depend upon their own previous values. Akgiray (1989) also reported that there is autocorrelation in the daily return data. This Phenomenon is due to non-synchronous trading of securities which causes daily portfolio returns to be auto correlated, particularly at lag one as noted in the previous studies (Fisher (1966) and Scholes and Williams (1977).This indicates that large (small) changes in daily index values tend to be followed by large (small) changes and this phenomenon is more marked for higher frequency series. While in case of China and Malaysia the autocorrelation is insignificant at a lag of one time period. This indicates that in these markets the return is randomly moving; they do not depend upon the previous value.

Further in the table autocorrelation coefficients of daily risk premium of 5 developed countries have also been demonstrated. It shows the autocorrelation and Q-State at lag 8 of five developed countries and significant autocorrelation at a lag of one time period for daily risk premium series of USA which indicates that today return of this country depends upon its own previous values. Non-synchronous trading of securities also affecting the USA (Fisher (1966) and Sholes and Williams (1977). While in case of other four countries the autocorrelation is insignificant at a lag of one time period.

So, it is clear from above that in developing countries the previous day returns has greater ability to predict the next day return compare to developed countries on daily basis data.

Table 5: Descriptive statistics of the monthly risk premium

Developing Countries						
Countries	Mean	Std. Dev	Skweness	Kurtosis	Jerque Bera	Prob.
Pakistan	0.010628	0.082313	-1.077921	8.759469	285.2193	0.00000
India	0.004276	0.070883	-0.501893	4.490731	24.49315	0.000005
Malaysia	-0.006112	0.043532	0.537941	4.409337	23.70913	0.000007
Indonesia	0.011090	0.068627	-1.140756	7.765776	211.7108	0.000000
China	0.003622	0.079047	-0.500198	4.594498	26.86937	0.000001
Developed Countries						
USA	-0.003756	0.044374	0.782929	4.473103	34.85716	0.000000
UK	-0.002356	0.041680	-0.69996	3.753050	19.16238	0.000069
Germen	0.000818	0.064357	-1.002203	6.070988	101.9853	0.000000
France	-0.002913	0.053500	-0.654221	3.796817	17.79763	0.000137
Canada	0.001366	0.042763	-1.148126	5.753459	97.47855	0.000000

Table 5 illustrates the summary statistics of monthly risk premium series for five developing and developed countries. The first part indicates positive average returns of all the developing countries except Malaysia in which average return is negative which shows Malaysian stock market has been merged with World market and much of its returns already adjusted. The standard deviation in all the countries is high as compare to return.

Table 6: autocorrelation of monthly risk premium up to lag 8.

Country	Developing				Country	Developed			
		AC	Q-State	Prob			AC	Q-State	Prob
Pakistan	1	0.098	1.7707	0.183	USA	1	0.120	2.6453	0.104
	2	-0.041	2.0834	0.353		2	-0.038	2.9181	0.232
	3	-0.028	2.2332	0.525		3	0.118	5.5214	0.137
	4	0.011	2.2574	0.689		4	0.110	7.7947	0.099
	5	0.122	5.0438	0.411		5	0.027	7.9364	0.160
	6	0.097	6.8230	0.338		6	-0.092	9.5321	0.146
	7	-0.063	7.5804	0.371		7	0.011	9.5558	0.215
	8	0.037	7.8373	0.450		8	0.034	9.7802	0.281
		AC	Q-State	Prob			AC	Q-State	Prob
India	1	0.093	1.6172	0.203	UK	1	0.017	0.0564	0.812
	2	0.025	1.7337	0.420		2	-0.016	0.1067	0.948
	3	0.093	3.3600	0.339		3	0.048	0.5450	0.909
	4	0.091	4.9228	0.295		4	0.169	5.9049	0.206
	5	-0.012	4.9483	0.422		5	0.020	5.9780	0.308
	6	-0.025	5.0706	0.535		6	0.016	6.0278	0.420
	7	-0.023	5.1762	0.638		7	0.036	6.2759	0.508
	8	-0.083	6.4916	0.592		8	0.055	6.8618	0.552
		AC	Q-State	Prob			AC	Q-State	Prob
Malaysia	1	0.121	2.6753	0.102	Germen	1	0.086	1.3676	0.242
	2	0.045	3.0514	0.217		2	-0.023	1.4643	0.481
	3	0.084	4.3694	0.224		3	0.119	4.1351	0.247
	4	0.021	4.4492	0.349		4	0.019	4.2018	0.379
	5	0.187	11.003	0.051		5	0.053	4.7377	0.449
	6	-0.029	11.159	0.084		6	0.033	4.9505	0.550
	7	0.023	11.259	0.128		7	-0.045	5.3366	0.619
	8	-0.034	11.476	0.176		8	0.104	7.4266	0.491
		AC	Q-State	Prob			AC	Q-State	Prob
Indonesia	1	0.232	9.9990	0.002	France	1	0.115	2.4464	0.118
	2	0.003	10.001	0.007		2	-0.020	2.5245	0.283
	3	0.132	13.277	0.004		3	0.099	4.3636	0.225
	4	0.031	13.454	0.009		4	0.102	6.3220	0.176
	5	-0.023	13.555	0.019		5	0.020	6.3986	0.269
	6	-0.046	13.961	0.030		6	0.030	6.5732	0.362
	7	0.034	14.184	0.048		7	-0.015	6.6188	0.470
	8	0.008	14.197	0.077		8	0.100	8.5591	0.381
		AC	Q-State	Prob			AC	Q-State	Prob
China	1	0.090	1.5023	0.220	Canada	1	0.223	9.1791	0.002
	2	0.201	9.0501	0.011		2	0.074	10.192	0.006
	3	0.084	10.360	0.016		3	0.066	11.006	0.012
	4	0.234	20.642	0.000		4	0.084	12.343	0.015
	5	0.080	21.841	0.001		5	-0.040	12.643	0.027
	6	-0.081	23.095	0.001		6	-0.081	13.883	0.031
	7	0.112	25.504	0.001		7	-0.076	14.990	0.036
	8	-0.014	25.542	0.001		8	-0.117	17.615	0.024

The standard deviation for Pakistan (8%) is highest that indicates Pakistani Stock Market is more risky while in case of Malaysia the standard deviation (4%) is low as compare to other four countries that shows Malaysian market is less risky. The high skewness in the series indicates that data have non normal distribution. The value of kurtosis is also high in all five cases discussed above which indicates that the data is leptokurtic i.e. fat tails. So, it indicates that the risk premiums are concentrated on one level rather than normally distributed. The point that all countries' data is not normally distributed is further confirmed by significant values of Jarque- Bera test.

In second part statistics of monthly risk premium series for developed countries indicate positive average returns for Germen and Canadian stock market investors. While these average returns are high as compare to daily average returns. The average returns for USA, UK and France are negative which shows they become more mature as compare to Germen. The standard deviation in all the countries is high as compare to return. The standard deviation for Germen (6%) is highest that indicates more risky Stock Market in developed countries. The standard deviation is high in the monthly risk premium as compare to daily risk premium. There is only positive skewness in case of USA which suggests that returns distribution of the markets have a higher probability of providing positive return for investors in USA stock market. While the skewness of other four countries is negative suggesting that these markets have probabilities of negative returns. The skewness in these series is much high which indicates the data is not normally distributed. The value of kurtosis is high in all five cases which indicate that data is leptokurtic- it means exhibit fat tails. The conclusion of not normally distribution is further validated by the significant values of Jarque- Bera test for normality.

Table 6 shows autocorrelation coefficients of monthly risk premium and Q-State up to lag 8 of 5 developing and 5 developed countries. A Significant autocorrelation is detected at a lag of one time period for monthly risk premium series of Indonesia, the risk premium series indicates that today return of this country depends upon its own previous values. It is evidenced that large (small) changes in monthly index values tend to be followed by large (small) changes. In case of China there is no autocorrelation at lag 1 but after that a significant autocorrelation. And in the other three countries the autocorrelation is insignificant at a lag of one time period and thereafter.

Similarly, the above table shows autocorrelation coefficients of monthly risk premium of 5 developed countries. It indicates that significant autocorrelation is present from lag of one time period to lag 8for monthly risk premium series, it also indicates that the today return of this country depend upon its own previous day returns and also till the day 8 return. While in case of other four countries there is no autocorrelation at any lag.

So, it is clear from above that as the time horizon of data increases the return moves towards Efficient Market Hypothesis. Because if we see in daily data there was autocorrelation for most of the countries while in monthly data autocorrelation is present only in one of developed and developing country.

Results of ARIMA model

The results of ARIMA model are as under. ARIMA model is used for forecasting of return of developing countries.

Table 7: Arima for developing countries.

Country	ARMA Model	Adj. R-Squared	Schwarz Criterion	Durbon-Watson Test
Pakistan	(0 , 3)	0.283826	1.850205	2.019788
India	(1 , 1)	0.239348	0.878198	1.995769
Malaysia	(0 , 1)	0.350082	1.212697	1.852155
Indonesia	(1 , 1)	0.263540	0.908895	2.020720
China	(1 , 1)	0.173408	0.695502	2.024445

The table 7 illustrates that in Pakistan ARMA (0, 3) was used to predict volatility that is best fit model with lowest Schwartz Bayesian criterion (SBC) and highest Adjusted R Square. Similarly, for India, Malaysia, Indonesia and China the best fit model is (1, 1), (0, 1) (1, 1) and (1, 1) respectively. It shows that in case of Pakistan three moving averages of residual's volatility and in Malaysia the only one moving average of residual's volatility predict future volatility while in case of India, Indonesia and China the previous one volatility and previous one moving average of residual's volatility predict future volatility itself. The adjusted R square of these models is reasonable and the Durban Watson Statistics of all the developing countries is round about 2 which show that autocorrelation has been removed.

Table 8: Arima for developed countries.

Country	ARMA Model	Adj. R-Squared	Schwarz Criterion	Durbon-Watson Test
USA	(1 , 1)	0.188496	0.843072	2.024836
UK	(1 , 1)	0.170542	-0.838472	2.003512
Germen	(1 , 1)	0.139694	0.719884	2.082461
France	(1 , 1)	0.105482	0.804796	1.992267
Canada	(1 , 1)	0.174498	0.723032	2.029350

As indicated in table 8 in all the developed countries ARMA (1, 1) was used to predict the volatility that was the best fit model with lowest SBC and highest Adjusted R Square. It shows that in the case of all developed countries the previous month volatility predict the next month volatility and also the moving average of the residual of the previous month volatility also predict the next month volatility. And the Durban Watson Statistics of all these ARIMA models is round about is 2 which is the indication that autocorrelation has been removed. The adjusted R squares of these models are reasonable.

After estimating the best ARIMA Model, in this research the fitted values were used as the predictable component of volatility while the residual part as the unpredictable component of volatility. This method was adopted by the Hany A.Shawky and Achla Marathy (1995).

Results of regression

Table 9 shows results of second equation after regressing the risk premium on expected and unexpected volatility. The relationship between risk premium and expected volatility is negative and significant in case of Pakistan which shows that leverage effect hypothesis proposed by the Black (1976) and loss aversion bias Khanman (1975) and disposition effect Shefrin (1985) exists. While the relationship between risk premium and expected volatility in case of Indonesia is positive which indicates that risk averse investors are rewarded for extra risk they bear, the CAPM and EMH market hypothesis exist in this country. There is no relationship between risk premium and expected volatility in case of India, Malaysia and China, suggesting that investors adjust their risk premium in advance for the expected volatility and they do not alter their portfolios in response to the expected variations in stock returns. These results are similar with the previous studies Shin (2005), THOMAS C. CHIANG (2001)

Relationship between risk premium and unexpected volatility is negative and significant in all developing countries except China. These results are same as found by the French et al., 1987 on USA market. So, it indicates that the investors in these countries are not rewarded for the unexpected risk. As shown above the relationship between risk premium and expected volatility is positive and significant in case of Canada which shows the market is inconsistent with the finance theory which assumes positive return is prevailing in Canada as compare to other developed countries. This relationship is same as suggested by CAPM.

Table 9: Relationship of risk premium with expected volatility and unexpected volatility

Developing Countries					
	Pakistan	India	Malaysia	Indonesia	China
α	0.008494	0.005008	-0.005827	0.048741	0.002044
p-value	0.1357	0.3169	0.0733	0.0000	0.7305
α_1	-0.058980	-0.016938	0.002385	0.183652	0.015394
p-value	0.0003	0.4427	0.7878	0.0000	0.6336
β_1	-0.035366	-0.129066	-0.032787	-0.677080	-0.031830
p-value	0.1644	0.0003	0.0502	0.0000	0.5118
Adj-R square	0.185770	0.132239	0.023874	0.659759	0.002469
Developed Countries					
	USA	UK	Germen	France	Canada
α	0.012836	-0.014344	0.000263	-0.02683	-0.025577
p-value	0.0464	0.0027	0.9501	0.0001	0.0002
α_1	0.001183	-0.020907	-0.008507	0.034439	0.061353
p-value	0.9654	0.3553	0.7766	0.4397	0.0643
β_1	0.180551	-0.189610	-0.182837	-0.248561	-0.294855
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Adj-R square	0.192354	0.416106	0.248844	0.288533	0.305857

These results are similar with the studies which found positive relationship French et al. (1987). So, in this market the risk averse investors are rewarded for extra risk. There is no relationship between risk premium and expected volatility in case of USA, France, Germen and UK suggesting that investors adjust their risk premium in advance for the expected volatility and that they do not alter their portfolios in response to the expected variations in stock returns (Poon et al. 1992).

Relationship between risk premium and unexpected volatility which investor cannot estimate is negative and significant in case of UK, Germen, France and Canada while this relationship is positive for USA which indicates that in this market the investor is rewarded for unexpected risk. While in other countries results are same as found by the French et al., 1987 suggesting that investors do not realize the extra risk premium for taking advantage of unexpected variations in stock returns.

After forecasting volatility through ARMA model, asymmetric model TGARCH-M model has been used to forecast volatility and determined relationship between expected risk premium and expected volatility.

Results of ARCH LM Test

Table 10 indicates that there is only Indonesia from the developing countries where heteroskedasticity is present in the monthly Risk Premium data. While in all other developing countries there is no heteroskedasticity, so, we cannot apply the GARCH models on these countries. But in the case of Developed countries only in Germen heteroskedasticiy is not present while in other four countries it is. Due to this effect GARCH model was not applied on the monthly Risk Premium. For this purpose ARIMA model was used and heteroskedasticty was removed by using Weighted Least Square method.

Table 10: Results of ARCH-LM Test for Monthly Risk Premium

Developing Countries			
Heteroskedasticity Test: ARCH	F-statistic	Obs*R- squared	Prob.
Pakistan	0.011413	0.011541	0.9150
India	1.272798	1.277932	0.2583
Malaysia	0.394664	0.398216	0.5280
Indonesia	4.353082	4.297216	0.0382
China	0.108412	0.109557	0.7406
Developed Countries			
USA	16.61227	15.36496	0.0001
UK	8.293092	8.014442	0.0046
Germen	0.899955	0.905458	0.3413
France	6.259025	6.115133	0.0134
Canada	24.60614	21.87415	0.0000

Table 11 exhibits that there is significant heteroskedasticity and serial correlation in daily risk premium data of all developing and developed countries, so we can apply ARCH model. So, in this research the GARCH models were applied only on the daily risk premium data.

Table 11: Results of ARCH-LM Test for Daily Risk Premium

Developing Countries			
Heteroskedasticity Test: ARCH	F-statistic	Obs*R- squared	Prob.
Pakistan	529.4330	463.6897	0.0000
India	175.7240	168.0300	0.0000
Malaysia	959.2093	763.6143	0.0000
Indonesia	124.6147	120.5859	0.0000
China	70.51462	69.28042	0.0000
Developed Countries			
USA	164.3214	157.6067	0.0000
UK	213.1250	202.4069	0.0000
Germen	143.8190	139.0433	0.0000
France	129.7266	125.5735	0.0000
Canada	390.0201	354.5288	0.0000

After checking the presence of autocorrelation and heteroskedasticity in daily risk premium series, TGARCH-M model applied because this model captures the asymmetries in volatility.

Results of TGARCH-M model

The results of mean equation of TGARCH-M (1, 1) Model as illustrated in the table 12 exhibits that the relationship between expected risk premium and expected volatility is negative and insignificant in case of Pakistan. But there is positive and insignificant relationship in case of Malaysia, India and Indonesia.

While the second part of the equation illustrate that previous day return has positive and highly significant relationship with today’s return in all the above said developing countries except china in which the previous day returns do not affect the today’s return. So, the previous day return has the predicting power to determine today’s returns. So, it can be concluded that the Random Walk theory exist in China.

Table 12: Tgarch-m mean equation

Developing Countries					
Mean Equation	Pakistan	India	Malaysia	Indonesia	China
α_0	0.001056	0.000184	-0.000632	0.000233	-0.000812
p-value	0.0622	0.7475	0.1531	0.7643	0.2212
α_2	-0.037919	0.006650	0.074070	0.013028	0.071561
p-value	0.4690	0.8931	0.2050	0.8443	0.1705
β_2	0.098024	0.096375	0.121997	0.116202	0.012602
p-value	0.0000	0.0000	0.0000	0.0000	0.4308
Developed Countries					
Mean Equation	USA	UK	Germen	France	Canada
α_0	-0.000442	-0.002926	-9.97E-05	-0.002316	0.000146
p-value	0.2150	0.0000	0.8272	0.0000	0.6853
α_2	0.059126	-0.119389	0.023762	-0.132567	0.00336
p-value	0.1573	0.0144	0.5732	0.0045	0.9422
β_2	-0.044781	0.073517	-0.010269	0.011008	0.02253
p-value	0.0124	0.0000	0.5632	0.5226	0.2027

The results of mean equation of TGARCH-M (1, 1) Model for developed countries are also shown in table 12. This illustrates that the relationship between expected risk premium and expected volatility is negative and significant in case of UK and France. But there is positive and insignificant relationship in case of USA, Germen and Canada which suggests that investors adjust their risk premium in advance for the expected volatility and that they do not alter their portfolios in response to the expected variations in stock returns.

Table 13: Tgarch-m variance equation

Developing Countries					
	Pakistan	India	Malaysia	Indonesia	China
ω	8.84E-06	4.96E-06	4.13E-06	9.19E-06	2.84E-06
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
α_3	0.104026	0.044721	0.089128	0.066978	0.049268
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
γ	0.124621	0.125679	0.134702	0.120808	0.025125
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
β_3	0.787588	0.870264	0.825154	0.826059	0.926046
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
Developed Countries					
	USA	UK	Germen	France	Canada
ω	1.89E-06	1.90E-06	2.77E-06	2.77E-06	1.08E-06
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
α_3	-0.022512	0.038216	-0.014364	0.015269	0.005793
p-value	0.0000	0.0000	0.0000	0.0112	0.4021
γ	0.170961	0.090664	0.159450	0.111486	0.101525
p-value	0.0000	0.0000	0.0000	0.0000	0.0000
β_3	0.917380	0.901864	0.917245	0.913991	0.928075
p-value	0.0000	0.0000	0.0000	0.0000	0.0000

While the second part of the equation shows that previous day return has negative and highly significant relationship with today return in case of USA. It means today returns will be inversely affected by yesterday returns while this relationship is positive in case of UK. In all other developed countries this relationship is insignificant which shows the Random Walk theory prevails in these countries.

In case of developing countries table 13 illustrates that all coefficients of variance equation are significant and asymmetries are present in the data it means the positive and negative news have different impact on volatility. In it, the coefficient of leverage effect $\boldsymbol{\gamma}$is positive and significant at 1% level, which implies that negative shocks or bad news have greater impact on conditional variance than the positive shocks or good news. So, it is clear that volatility is asymmetric in all the developing countries. Jointly the values of α_3 and β_3 are equal to unity in all the countries which indicates persistence of volatility.

This table also shows the variance equation of the TGARCH-M model of Developed countries. All the coefficients of the variance equation are significant. The coefficient for asymmetric effect is also significant which shows that the positive and negative news have different impact on volatility. This coefficient of leverage effect $\boldsymbol{\gamma}$is positive and significant at 1% level, which indicates that negative shocks or bad news have a greater effect on the conditional variance than positive shocks or good news. It is also evident from the table that volatility is persistent in all the developed countries as both coefficients of ARCH and GARCH effects are nearly equal to unity.

Conclusion

The characteristics of developing markets are different from the developed markets like high average returns, high dispersion in the returns, and high predicting power of previous day returns to today returns. These results are in consistent with previous studies Bekaert, G. & Harvey, C. (1997), Michelfeder and Pandya (2005. The factors contributing to this may be inflation in their local currencies as noted in the previous studies (Harvey (2000) and Hussain et.al. 2012) and local firms' prospects are tied to the local economy Harvey (2000). Foreign portfolio investment is withdrawn due to political unrest Harvey (2000).

ARIMA model was used on monthly risk premium for long time horizon investors to find the relationship between return and volatility as there was no heteroskedasticity in monthly risk premium of most of the countries so we can not apply most popular GARCH family model of volatility on monthly data. After the application of ARIMA model on monthly risk premium in Pakistan the relationship between risk premium and expected volatility was negative and significant. That reveals that leverage effect hypothesis (Black 1976) based on the fundamental characteristics of firm and Loss aversion Bias and disposition effect that reflect mood of the investors and they become risk seeker in the loss domain and risk averse in the gain domain which is in lined with Prospect theory (Daniel Khanman and Amos Taversky, 1975) are present in Pakistani stock market. Positive relationship in Indonesia and Canada shows that in both markets the investors are risk averse; that proves the relationship as proposed by CAPM theory. In these markets the investors are rewarded for the extra risk they bear. In China, India, Malaysia, USA, UK, France and Germen; investors adjust their risk premium in advance for the expected volatility and that they do not alter their portfolios in response to the expected variations in stock return as no relationship was found in these countries.

The relationship between risk premium and unexpected volatility is negative and significant in all the developing and developed economies except Pakistan and China, where this relationship is insignificant which might be due to asymmetric flow of information in these countries. These are the same results as found by French et al. 1987 and also in USA this relationship was positive which shows that the investors in this market are rewarded for the unexpected variations in returns. The negative relationship shows that if the unexpected shock in the economy increases; there return will decrease and vice versa. By applying the ARIMA Model it gives results only for long time horizon investors.

For short time horizon investors the asymmetrical TGARCH-M model was applied on the daily risk premium to find the relationship between return and volatility. The asymmetry in volatility has been observed in all the developing and developed countries. The negative news has greater impact on volatility as compare to positive news and it confirms the existence of leverage effect in all the countries. The volatility is persistent in all the countries.

The relationship between expected risk premium and expected volatility is only significant and negative in UK and France which shows that people are willing to take higher risk for a lower return which leads to holding of loser securities in the hope that bad investments would become good over the period of time. These results support loss aversion bias and disposition effect in lined with the theory given by Daniel Khanman and Amosn Taversky in 1975. While in all other countries this relationship is insignificant which indicates that investor in these markets are less influenced by the loss aversion and disposition effect.

Although there was much literature on the relationship of return and expected volatility in developing economies but the relationship between return and unexpected volatility was not defined. This study contributed to already existing literature by finding this relationship. The policy makers should make policies to control the volatility as it has negative effect on return in most of the countries by keeping eyes on the application of rules in the stock markets like short sale constraints and leverage constraints David Blitz, Eric Falkenstein, and Pim Van Vliet (2014). They should also arrange training workshops for investors to avoid the loss aversion bias and disposition effect. The focus of a policy maker must also be on the relationship between risk premium and unexpected volatility. As found in this study that unexpected volatility badly affects risk premium in the economy, so policy makers should have to take measures to reduce the effect of unexpected volatility as to raise fund in order to meet the emergencies. This study will also be helpful for investors in developing economies by considering the relationship between return and unexpected volatility and also helpful for short time and long time horizon investors.

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