THE RELATIONSHIP BETWEEN MUTUAL FUND FLOWS AND MARKET VARIABLES

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ABSTRACT

The mutual fund industry has become an important investment choice, especially in high and middle-income countries, because of the investment considerations, such as safety, information, liquidity and diversification. The existing literature, however, has been more focused towards mutual funds' performance at the micro level in advanced economies. On the other hand, the literature on the macro aspects of mutual funds in developing economies is scarce and inconclusive.

This study investigates the empirical relationship between aggregate mutual fund flows, stock market variables and macroeconomic variables for developing countries from the Association of South East Asian Nations (ASEAN), the Middle East and North African region (MENA), Brazil, Russia, India, China and South Africa (BRICS), and the South Asian Association for Regional Cooperation (SAARC). The three popular theories in flow-market-economy relationship are examined using four mutual fund flows classes, two stock market variables, and selected macroeconomic variables. Moreover, the study also examines the ability of mutual funds to predict macroeconomic conditions.

For the flow-returns relationship, there is bidirectional causality between all fund flow classes (except for the bond fund flow) and stock market returns. Stock returns move parallel to equity and balanced fund flows, and contrary to money market flows. For bond fund flows, the causality runs from the stock market to bond fund flows such that the increase in lagged returns decreases the growth of bond fund flows. For the flow-volatility relationship, there is a bidirectional causality between all classes of mutual funds (except for the bond funds) and stock market volatility. Market volatility increases with increase in money market funds and decreases with increase in equity and balanced flows. Furthermore, the fund flows are linked with both the current and the lagged volatility. The mutual funds respond concurrently to the risk-related information as compared to the

return-related information in the stock market. In addition, risky securities have a stronger relationship with market variables than the less risky securities do.

With respect to the flow-market returns-economy relationship, causality runs from market returns to mutual fund flows such that mutual fund flows react positively to the past performance of the market. In case of flow-market volatility-economy relationship, the bidirectional causality exists even after incorporating macroeconomic variables. The findings also suggest that macroeconomic variables influence fund flows, market returns and market volatility. Macroeconomic variables that possess good (bad) news are positively (negatively) associated with the fund flows and market returns (market volatility). Fund flows are forward-looking and assist in forecasting real economic conditions. Furthermore, the risky funds invest more in times of good economic conditions, while the less risky funds invest more in times of poor economic conditions: for instance, good (bad) macroeconomic news is positively (negatively) associated with the risky fund flows (less risky fund flows). The research inference is that investors in these markets direct flows away from the equity-based funds to the fixed income-type funds in times of high market and macroeconomic risk.

ABSTRAK

Industri dana bersama mendapat perhatian, terutama di negara-negara yang maju dan berpendapatan sederhana kerana pertimbangan pelaburan seperti keselamatan, maklumat, kecairan dan kepelbagaian. Kesusasteraan yang sedia ada, bagaimanapun, telah lebih menumpukan kepada prestasi dana bersama pada peringkat mikro dalam ekonomi terlebih dahulu. Dalam hal ini, kesusasteraan kepada aspek makro daripada dana bersama di negara-negara membangun adalah terhad dan tidak meyakinkan. Kajian ini mengkaji hubungan empirikal antara dana agregat bersama mengalir, pasaran saham dan pembolehubah makroekonomi bagi sampel negara-negara membangun terpilih termasuk Pertubuhan Negara-negara Asia Tenggara (ASEAN), Timur Tengah dan Afrika Utara (MENA), BRICS (Brazil, Rusia , India dan China, Afrika Selatan) dan Persatuan Asia Selatan bagi Kerjasama Serantau (SAARC). Tiga hipotesis terkenal yang berkaitan dengan aliran-pasaran-ekonomi iaitu tekanan Harga, perdagangan Maklumbalas, dan hipotesis respon Maklumat diuji menggunakan dana bersama dari empat kelas aliran kelas (Ekuiti, Bon, dana pasaran Seimbang dan Wang mengalir), dua pembolehubah prestasi pasaran (pulangan pasaran saham dan volatility pasaran saham) dan pembolehubah makroekonomi. Selain itu, kajian ini juga mengkaji keupayaan ramalan dana bersama bagi meramal keadaan makroekonomi.

Bagi hubungan aliran pulangan, ada sebab-musabab dwiarah antara semua kelas aliran dana (kecuali aliran dana bon) dan pasaran saham. pulangan saham bergerak selari dengan ekuiti dan aliran dana seimbang, dan bertentangan dengan aliran pasaran wang. Bagi dana bon mengalir, sebab akibat yang berlangsung dari pasaran saham untuk bon dana mengalir seperti bahawa peningkatan dalam pulangan tertinggal mengurangkan pertumbuhan dana bon mengalir. Bagi hubungan aliran volatility, ada sebab-musabab dwiarah antara semua kelas dana bersama (kecuali dana bon) dan volatility pasaran

saham. Volatility pasaran meningkat dengan peningkatan dalam dana pasaran wang dan berkurangan dengan peningkatan aliran ekuiti dan seimbang. Tambahan pula, aliran dana dikaitkan dengan kedua-dua semasa dan volatility yang tertinggal. Dana bersama bertindak balas secara serentak kepada maklumat berkaitan risiko berbanding dengan maklumat yang berkaitan dengan pulangan dalam pasaran saham. Di samping itu, sekuriti berisiko mempunyai hubungan yang kuat dengan pembolehubah pasaran daripada sekuriti kurang berisiko.

Berkenaan dengan hubungan aliran pasaran dan pulangan ekonomi, sebab daripada pulangan pasaran untuk dana bersama mengalir itu bahawa aliran dana bersama bertindak balas secara positif kepada prestasi lalu pasaran. Sekiranya aliran pasaran dan hubungan volatility ekonomi, yang dwiarah wujud walaupun selepas menggabungkan pembolehubah makroekonomi. Dapatan kajian juga menunjukkan bahawa dana pembolehubah makroekonomi pengaruh mengalir, pulangan pasaran dan volatility pasaran. pembolehubah makroekonomi yang mempunyai baik (buruk) berita yang positif (negatif) yang dikaitkan dengan aliran dana dan pulangan pasaran (volatility pasaran). Mengenai pembolehubah dana aliran-hubungan, wujud satu sebab akibat dua arah membayangkan bahawa aliran dana yang berpandangan ke hadapan dan membantu dalam meramalkan keadaan ekonomi sebenar. Tambahan pula, dana berisiko melabur lebih banyak dalam masa keadaan ekonomi yang baik, manakala dana kurang berisiko melabur lebih banyak dalam masa keadaan ekonomi yang lemah: misalnya, baik (buruk) berita makroekonomi adalah positif (negatif) yang berkaitan dengan dana berisiko mengalir (kurang dana berisiko mengalir). Kesimpulan kajian ialah pelabur dalam pasaran ini mengarahkan pengaliran daripada dana berasaskan ekuiti kepada dana pendapatan-jenis tetap dalam masa pasaran yang tinggi dan risiko makroekonomi.

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LIST OF SYMBOLS AND ABBREVIATIONS

ASEAN	:	Association of Southeast Asian Nations
BRICS	:	Brazil, Russia, India and China, South Africa
DG	:	Deficit to GDP ratio
EMH	:	Efficient Market Theory
Ex	:	Exchange growth rate
FB	:	Feedback trading theory
FEVD	:	Factor error variance decomposition
Inv	:	Investment growth rate
Inf	:	CPI growth rate (inflation)
GDP	:	Gross domestic product
GMM	:	Generalized Methods of Moments
IR	:	Information Response theory
IRF	:	Impulse response function
MF	:	Mutual fund
MR	:	Market returns
MS	:	Money Supply
MV	:	Market volatility
MENA	:	Middle East and North Africa
NAV	:	Net Asset Value
OIRF	:	Orthogonalized impulse response function
PP	:	Price Pressure theory
PVAR	:	Panel Vector Autoregressive
SAARC	:	The South Asian Association for Regional Cooperation
UE	:	Unemployment growth rate

CHAPTER 1: INTRODUCTION

1.1 Introduction

The Asian Financial Crisis 1997-1998 and the Global Financial Crisis 2008-2009 shook investors' confidence and compelled them to look for more secure investment alternatives. Consequently, mutual funds – which are characterized by diversification, liquidity and economies of scale – became the focus of practitioners and academicians. In the context of an uncertain state of affairs and volatile stock markets, the benefits offered by mutual funds always entice investors to invest through mutual funds rather than investing directly in companies' securities (Dave, 1992; Mehru, 2004). The shift towards mutual funds is evident from rising investment patterns of the mutual fund industry in the developing economies after stock market crashes and financial crises. This phenomenon is more pronounced for developing countries because they have insufficient information mechanisms and less efficient market structures to facilitate investors.

This study investigates the empirical relationship between aggregate mutual fund (MF) flows, stock market variables and macro-economic variables for the sample of selected developing countries, consisting of the economies of the Association of South East Asian Nations (ASEAN), the Middle East and North African region (MENA), Brazil, Russia, India, and China, South Africa (BRICS), and the South Asian Association for Regional Cooperation (SAARC). The study proposes to test three established and testable theories (the price pressure theory, feedback trading/herding theory and information response/revelation theory) related to MFs (equity, bond, balanced and money market MFs), stock market variables (market returns and market volatility) and macroeconomic variables. The price pressure (PP) theory explains that the MF flows affect the market returns by trading excessively. Excessive buying (or selling) by MF pushes the prices upward (or downward) in the market the next day. The feedback trading (FT) theory states that the MFs chase the past performance of the market and react accordingly. Lastly, the

information response (IR) theory entails that market returns and fund flows react simultaneously to the new macroeconomic information. (For further discussion and explanation of the theories, see Sections 2.5 and 3.1).

1.2 Background of the Study

The role of MFs and financial markets in economic growth and development cannot be refuted. MFs have the capability of providing an impetus and boost to both the financial market and the real economy. They play an important and crucial role in the economic and financial hub, with their tremendous growth all around the world. Khorana, Servaes, and Tufano (2005) and Ferreira, Keswani, Miguel, and Ramos (2012) find that in the developed countries such as the USA, UK and European countries, the MF industry is used as one of the indicators of development to determine the investors' sophistication and participation cost. They conclude that developed countries have higher levels of development in terms of economic growth, financial market stability and a well-established MF industry. However, in developing markets, MFs are at an embryonic stage. Nevertheless, MFs are continuing to grow, as evidenced by their average annual growth of 15% since 1989 being higher in comparison to bank assets and equities (Ramasamy & Yeung, 2003). Although the number of MFs in other economies is lower compared to the US market, the growth has nonetheless shown a phenomenal increase.[1]

The total number of MFs has increased by 100% from last one and half decade globally from 1998 to 2015.[2] Moreover, statistics shows that MF assets increased worldwide by 211% from 2000 to 2015 and reached up to $37.38 trillion, an all-time high, at the end of the last quarter of 2015.[3] Cao, Chang, and Wang (2008) state that MFs are the key financial institutions for investment and savings in the developed countries. The study

[1] See Figure 1.2 for percentage differences between the US market and those of other economies in the world.
[2] See Figure 1.1 and Table 1.1 for trends and growth of MFs.
[3] Data from Investment Company Institute (ICI), Mutual Funds Worldwide Market, Statistics, 2015

states that MFs represent a major portion of households and investors. US households invest their main component of wealth in MFs: in 2015 they invested 44 percent of their wealth in MFs. The USA has the largest MF industry, accounting for more than 48 percent of total MF industry worldwide. Total worldwide MF assets remain at $37 trillion with the remaining share of 34 percent in Europe, 13 percent in Africa and Asia Pacific and 5 percent in other parts of the world, at the end of 2015.[4] Considering this huge phenomenal growth in developing markets, questions may arise: for instance, what is the performance of MFs in the financial markets and developing economies? What is the impact of MF investment in the financial markets? Does their investment affect stock market returns and stock market volatility? What is the impact of MF investment in the overall economy? Which fund category performs better in times of high market risk and deteriorating economic conditions? Can MFs forecast macroeconomic conditions? Our research attempts to address these questions. The study aims to determine the relationship among MFs, stock market variables and macroeconomic variables.

[4] Data is taken from the Investment Company Institute (ICI), Mutual Funds Worldwide Market, Statistics, 2015

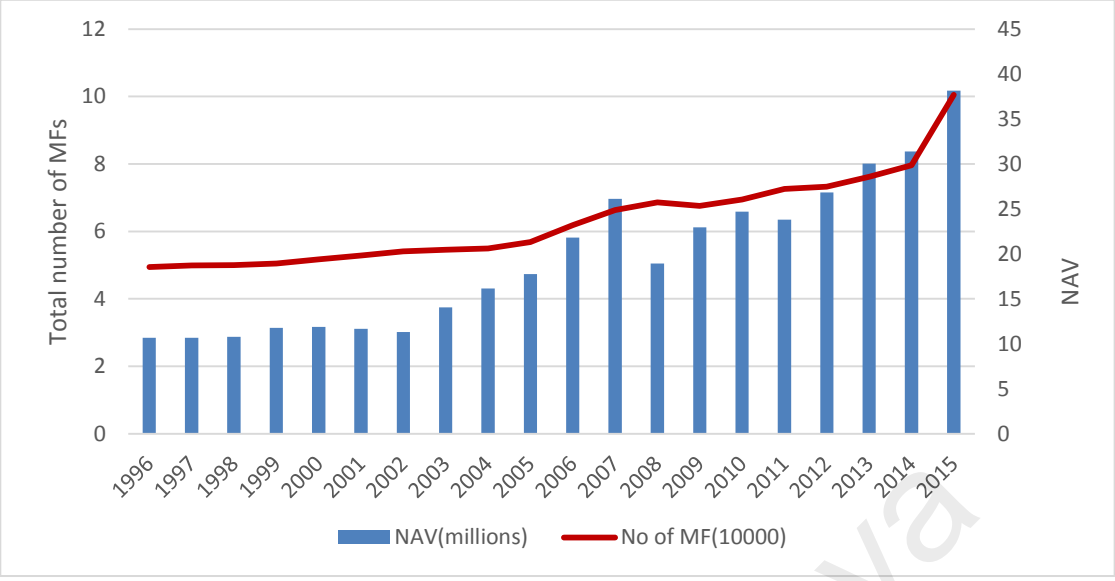

Figure 1.1: The total number of MFs worldwide and the worldwide growth in the total Net Asset Values (NAVs) of MFs (Millions of US dollars, year-end)

Source: Author calculations based on data collected from Investment Company Institute (ICI), Mutual Funds Worldwide Market, Statistics, 2015

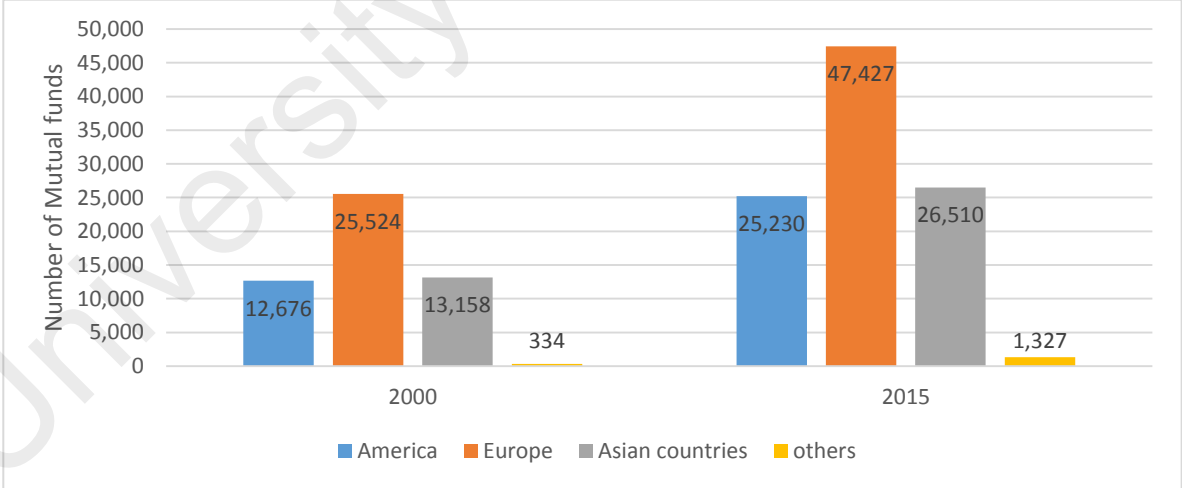

Figure 1.2: The total number of MFs in different regions of the world at the end of years 2000 and 2015

Source: Author calculations based on data collected from Investment Company Institute (ICI), Mutual funds Worldwide Market, Statistics, 2015

Table 1.1: Regional Share of Net Asset Value (%)

Years	America	Europe	Asia	Others
2000	63.5	27.8	9.6	0.14
2001	63.7	27.2	8.9	0.124
2002	59.8	30.6	9.4	0.185
2003	56.7	33.4	9.7	0.246
2004	54.4	34.9	10.4	0.334
2005	54.9	33.8	11	0.369
2006	52.6	35.8	11.3	0.358
2007	51.4	34.2	14.1	0.364
2008	55.9	32.9	10.8	0.367
2009	54.8	32.9	11.8	0.463
2010	55	31.9	12.4	0.573
2011	56.8	30.4	12.3	0.525
2012	56.4	30.7	12.4	0.541
2013	57.1	31.2	11.2	0.475
2014	57.4	30.6	11.6	0.467
2015	47.1	33.7	13.9	5

Table 1.1 shows the regional share of NAV of MF with respect to worldwide total NAV of MFs. Source: Investment Company Institute (ICI), Mutual funds Worldwide Market, Statistics, 2015

1.2.1 Definition of MFs and Types of MFs

A mutual fund (MF) is an investment company in which investors pool their savings that are to be invested in a diverse portfolio of securities under the management of a group of experts. It is invested in a way that not only reduces risk but also ensures safety and stable returns of investment (Dave, 1992; Mehru, 2004). In other words, a MF takes investment decisions on behalf of investors by pooling money from many investors and investing it in stocks, bonds, short-term money-market instruments, or other securities (Reilly & Brown, 2011). The purpose of MFs is to provide diversification, liquidity and economies of scale that give a competitive advantage to mutual funds over other financial institutions. Moreover, MFs provides a convenient way for investors to invest their money, adjust their investment objective, and track their portfolio's performance. Mishra et al. (2009) state that the MF is the most appropriate investment for the general public because it offers an opportunity to invest in both diversified and professionally managed portfolios of securities with lower costs. These benefits provided by funds tend to entice investors to invest indirectly through mutual funds rather than directly in companies' securities.

This study takes into account the four group of fund class: namely, equity funds, bond funds, money market funds and balanced funds. These are categorized on the basis of investment objectives. Equity MFs are defined as investment by funds in medium to long term equities and equity-related-securities. Generally these investments tend to be risky investments and provide returns in the form of dividend and capital gain (Khalid, Abbas, & Shah, 2010). Bond MFs are one of the types of income funds/debt funds which invest specifically in corporate bonds and other debt instruments (Baid, 2007). Balanced funds are investments in a combination of both equity and bond securities. The main objective of balanced funds is provide a fixed return with moderate capital appreciation. Generally, investment in these hybrid funds ranges from either a moderate (higher equity) component or a conservative (higher fixed) component (Baid, 2007). Money market funds invest in liquid, short term, low risk securities. These short term securities include commercial papers, treasury bills, and government securities with maturity up to one year (Baid, 2007).

1.2.1.1 Choice of MF Classes

The study focuses on these fund categories mentioned above for several reasons. First, they are the main classification of MFs based on investment objectives. Besides this, the equity, bond, balanced and money market securities are major avenues of investment by MFs (Baid, 2007). Second, it is evident that both households' and institutional investors' demands for investment have been higher in those MFs which invest primarily in equity, bond, balanced and money market securities. For example in the USA, households depend on equity, bond, and balanced MFs to manage their personal long-term financial goals such as retirement plans. Those households, businesses and other financial institutions invest in money market funds for cash management as these funds provide short-term yields and high level of liquidity. Moreover, statistics show that the majority of US MF investments are in long-term securities. Equity funds comprised 52 % of US

MF assets at the end of 2015. Bond funds consist of 22 % of total US MF assets, whereas money market funds and hybrid funds comprise of 18 and 8 % respectively.[5] These investment patterns are observed at a worldwide level among investors, due to the changing demographics and investors' reactions to global economic and financial conditions. These conditions play an important role in assessing investment choice and decision-making for the selection of particular types of MFs.

Third, these fund categories have some common return and risk factors, as explained by (Fama & French, 1993), who find that stock returns have shared variations due to the three common share factors (firm size factor, book to market factor, excess market returns) and their variation shared with bond returns is through two term structure factors (default risk and maturity risk). In other words, Fama and French (1993) identify the linkage of the term structure factors as being between the stock and bond portfolio returns.

Last, these fund categories are related to economic variables (Kaul & Phillips, 2008).[6] For instance, Kaul and Phillips (2008) find that money market, bond, balanced, dividend and income, domestic and foreign equity funds categories have a relationship with economic variables. Hence, studying a combination of fund categories provides analyses of the allocative efficiency of each group of funds in a dynamic macro environment. Moreover, studying different types of MFs in the perspective of financial market and macroeconomic conditions has been highlighted as a future avenue for research (Chordia, Sarkar, & Subrahmanyam, 2005; Jank, 2012). This is due to the fact that Jank (2012) conducted tests on the information response theory, mainly on equity funds, and confirmed that the equity flows are significantly correlated with market equity premium and macroeconomic variables. Thus the present researcher suggests that investigating

[5] Data is taken from Investment Company Institute (ICI), Mutual funds Worldwide Market, Statistics, 2015
[6] Details of linkage of MFs and economic variables are given in section 1.2.1.2.

other groups of funds in relation to financial market and macroeconomic variables will provide more directions and guidelines to investors and portfolio managers for better portfolio selection, allocation and investment decision making.

1.2.1.2 Linkage of MF Classes with Stock Market Variables and the Economy

Mutual funds invest in different types of assets including stocks, bonds, commodities and even real estate. As institutional investors, MFs greatly influence the stock market variables through their trading activities (Edwards & Zhang, 1998). On the other hand, the performance of financial markets also influences mutual fund trading (see section 1.2.2. for a detailed discussion on mutual funds and stock market relationship). Since the stock market shocks have had a widespread impact on all the sectors, markets and industries of the economy (Chen, Roll, & Ross, 1986), the stock market variations also influence other financial markets such as bond markets and money markets. For example, Fama and French (1989) argue that stock and bond markets are correlated and that the variations in expected returns of bond and stock move together. Moreover, this variation in expected returns is associated with business conditions. Similarly, Chordia et al. (2005) find a correlation between liquidity and volatility of both stock and bond markets. This also implies that there are common factors that influence the liquidity and volatility in these markets. Moreover, Chordia et al. (2005) argue that innovations to bond fund flows are helpful in forecasting both stock and bond market liquidity.

Additionally, the variations in stock market securities also influence other securities such as long term and short term corporate debt securities, treasury securities, real estate and commodity securities (Ferson & Kim, 2012). For example, a bearish trend in the stock market diverts investors to fly to quality allocating decisions. Accordingly, they increase their portfolio returns by shifting their investments from equity to fixed income securities (Ferson & Kim, 2012). Similarly, investors in the financial markets reallocate

their money from risky (equity-based) securities to less risky (fixed-income based) securities and safe havens in case of high market volatility and risk (Sias, 1996; Faugere & Shawky, 2003). Consequently, the shift of investment from equity to fixed income securities (such as bonds) also influences the stock market variables, which in turn puts pressure on the stock market by reducing market returns and volatility (Schwert, 1990; Cao et al., 2008).

In addition, Ferson and Kim (2012) imply that the factor structure of mutual funds is common among bond, equity and money market mutual funds that have an impact on both stock market and macroeconomic variables. Besides this, the expected common characteristics of mutual funds flows are predictable based on current economic conditions. Regarding bond MFs and money market MFs, Ferson and Kim (2012) find that both are positively related to stock market volatility and that the investors purchase bond or money market securities rather than equity when the stock market is more volatile. The overall inference is that it is not only equity MF flows but also bond and money market ones that affect stock market variables and the economy. Therefore, this study examines the relationship between aggregate MF flows (equity, bond, balanced and money market), stock market variables, and the macro economy.

1.2.2 Relationship of MFs with Financial Markets

MFs can influence the market returns substantially through their trading behavior (Edelen & Warner, 2001; Ferson & Kim, 2012; Thomas, Spataro, & Mathew, 2014). Being the financial intermediary, MFs pool money from households and channel the funds to investors in the financial markets. Financial markets, on the other hand, help to channel the collected funds from the households to the borrowers and promote efficient capital accumulation and allocation. However, the proper mechanism and smooth functioning of the financial markets is considerably hindered by market risk and

volatility. The financial market risk may hinder the smooth functioning of the economic system in general and financial mechanism in particular. MFs, being the institutional investors, help in controlling the risk through diversification, information and liquidity (Edelen & Warner, 2001; Ferson & Kim, 2012; Thomas et al., 2014).

Empirical evidence suggests that MFs can help stabilize the financial markets' equilibrium by avoiding large market volatilities (Faugere & Shawky, 2003). MFs are regarded as informed institutional investors who can control the financial markets through their timely decisions (Edelen & Warner, 2001; Ferson & Kim, 2012; Thomas et al., 2014). Thomas et al. (2014) also explain that institutional investors are known as informed investors who can control and reduce financial market volatility and increase returns by gathering and processing available information effectively, hence compensating for irrational trading by individual investors. They can influence the returns and risks of financial markets by investment and asset allocation decisions. For instance, MFs may reduce the volatility (risk) in the market by increasing their investments and directing flows to other safer avenues in times of economic crisis (Schwert, 1990; Cao et al., 2008). Moreover, evaluating the volatility helps MFs to evaluate the risk adjusted returns. Goetzmann and Massa (1999) state that volatility explains the flows because risk affects the investors' returns and portfolio decision choices. In addition, Ferson and Kim (2012) state that volatility in the stock market appears to be an imperative determinant in equity fund flows. They further elaborate that institutional trading substantially reduces volatility in the market compared to retail trading.

1.2.3 Relationship of MFs with the Economy

MFs consider macroeconomic information in their portfolio and asset allocation decisions. For instance, MFs forecast expected deteriorating economic conditions and

divert or re-allocate their investments to safer investment avenues to safeguard themselves from expected losses. Besides, MF flows are found to have a predictive ability which enables policy makers to forecast the future state of economic health (see for example, (Ferson & Kim, 2012; Jank, 2012). Ferson and Kim (2012) and Jank (2012) find that lagged flows have a predictive ability in relation to future economic variables. They find that the aggregate behavior of equity, bond, and money market fund flows predict financial market and future economic conditions. Moreover, Ferson and Kim (2012) suggest that determinants of fund flows are imperative in order to understand micro and macro variables. Fund flows are strongly related to macroeconomic variables. Ferson and Kim (2012) also find that the common factors in fund flows help in explaining investors' sentiments and economic conditions. While making asset allocation decisions, MFs consider the economic information captured by predictive variables (Kaul & Phillips, 2008).

On the other hand, Flannery and Protopapadakis (2002) observe that some of the macro-economic variables (such as inflation, unemployment, balance of trade, or money supply) have a substantial influence on the flows of MFs in the market. Macroeconomic variables and related information affect the whole economy including both the household and industrial sectors. In particular, these affect the financial sector and markets. Macroeconomic variables affect a company's cash flows and risk adjusted returns. Moreover, macroeconomic environment, corporate sector and financial market variables are closely linked with each other and thus understanding the financial market variables helps to judge the macroeconomic risks (Fama, 1990; Du, 2006; Chatziantoniou et al., 2013). Flannery and Protopapadakis (2002) explain that studying macro information on evaluating decisions regarding stock returns is very important and policy makers use this information for hedging purposes. For example, if policy makers and investors forecast

expected deteriorating economic conditions in the near future, they divert their investments to safer investment avenues to safeguard themselves from expected losses.

1.2.4 Importance of MFs in the Stock Market and the Economy

Studying MF flows with respect to the financial market and macroeconomic variables provides a better understanding of the relationship between these variables and also aids policy makers and portfolio analysts in creating optimal portfolio strategies. Fortune (1998) explains that flows of funds influence the market returns. For examples, MFs may bring price pressure and inflate the prices and returns in the market by excessive trading flows. Similarly, market returns may affect fund flows as MFs may follow and trade in the market based on past performance (see details of the relationship between MFs and market variables in section 1.2.2 above and section 2.5 below). Kopsch, Song, Wilhelmsson, and Johnson (2015) identify the casual relationship of MFs with economic variables.

Understanding the link between MF flow and economic variables provides additional information about investors' heterogeneity and preferences and thus helps the portfolio managers and analysts to formulate their portfolio strategies and make decisions on behalf of their investors (Chan & Kogan, 2002; Jank, 2012). Goetzmann, Massa, and Rouwenhorst (2000) state that fund flows are used as a source of information in assessing investment and re-balancing decisions. Kacperczyk, Van Nieuwerburgh, and Veldkamp (2013) find that the investment strategies of fund managers – such as holding more cash in recession, lowering their portfolio's beta and sector rotation (investing more in defensive industries in recession and cyclical industries in boom period) – entail that MFs formulate investment modifications over business cycle.

It is evident that MF flows, market returns, market volatility, and fundamental variables are correlated with each other (Kaul & Phillips, 2008; Ferson & Kim, 2012;

Jank, 2012). Ferson and Kim (2012) find that 40 percent of equity fund flows is explained by macro-economic variables. Jank (2012) reports that economic variables explain about 51.7 % of deviations in unexpected fund flows compared to 40.8 % explanation by stock market return.

The study helps policy makers and portfolio managers to make better planning, hedging and forecasting decisions and implement their investment and asset allocation decisions. The findings could be of help to investors and portfolio managers in making efficient investment and asset allocation decisions at a worldwide and international level, particularly in regional developing countries. Professional managers need a detailed understanding, as well as sufficient experience, knowledge, evaluation and assessment of the financial security market and the business sector in the economy. The findings provide significant information to portfolio managers concerning flight to quality since investors make flight-to-quality allocating decisions and increase their portfolio returns by shifting investment from equity to fixed income securities in the case of an economic downturn and vice versa in boom times. Moreover, determination of predictive ability of mutual fund flows may facilitate the policy makers' and investors' ability to forecast and plan the future state of economic health. Economic conditions influence investors' decisions on investment and help them to transfer their investments to safe havens in the case of poor economic prospects.

1.3 Problem Statement

The choice of investment in safer opportunities is of great concern to policy makers and portfolio managers, especially in the wake of the stock market bubble episode. Because of safety, information, liquidity and diversification, the MF industry has come into the limelight, mostly in high and middle-income countries. Although the USA has the major share of investment in the MF industry, accounting for 50% of total MFs

worldwide,[7] the rising investment patterns of this industry are perceptible globally, particularly in the developing economies in the aftermath of the Asian and Global financial crises. Garay (2003) states that Indonesia, Philippines, Malaysia, Singapore, Taiwan, Thailand and South Korea were the worst hit by these crises.

The financial markets of developing countries are in the limelight due to recent financial policy reforms targeted at assisting with smooth cross-border transactions and investments.[8] The emerging markets characterized by high volatility and high profits are often inclined towards trade and foreign investments, and this has provided significant opportunities for foreign investors. The analysis of MFs and stock market volatility in developing emerging markets provides further enlightenment regarding the risk associated with investment in these risky economies. Owing to the importance of investment in financial markets, investigating the role of MFs as institutional investors in developing markets is relevant and interesting.

MFs influence the financial market and economy in three different ways. First, MFs, being informed institutional investors, influence and control the risk and return of financial markets considerably through their timely investment decisions (Edelen & Warner, 2001; Ferson & Kim, 2012; Thomas et al., 2014). Second, MFs consider macroeconomic information in their portfolio and asset allocation decisions and reallocate their investments to safer investment avenues to safeguard themselves from expected losses (Flannery & Protopapadakis, 2002; Kaul & Phillips, 2008). Moreover, MF flows predict future economic activity, which facilitates the policy makers' forecasting of macroeconomic conditions[9] (Ferson & Kim, 2012; Jank, 2012). Lastly,

[7] Details of the size of mutual fund flows are provided in Table 1.1.

[8] See Beirne, Caporale, Schulze-Ghattas, and Spagnolo (2010); Wang, Liu, and Lu (2012)

[9] See section 1.2.3 on the impact of MFs on the economy.

MFs provide capital to financial markets and the economy, as they invest in stocks, bonds and other financial securities both at the domestic and international level, thus providing liquidity and diversification to both the capital market and the real economy (Halim, 2007).

Despite the importance of MFs in the economy, there are only a limited number of studies on the relationship between MFs and macroeconomic variables. Previous research has extensively relied on the linkages between stock market variables and macroeconomic variables (see for example, (Fama, 1981; Geske & Roll, 1983; Kaul, 1987; Barro, 1990; Fama, 1990). Due to the frequent turbulences in the world economy in recent years, however, numerous studies have been produced on the issues of troubling stock markets and the macro economy. These studies find a strong linkage between current financial market returns and future real activity. They find that market variables respond to new macroeconomic information. However, there is a scarcity of studies on MFs and stock market variables with respect to the real economy (Jank, 2012; Thomas et al., 2014) and it is imperative to identify such a relationship in order to know how MFs formulate their investment decisions based on exposure to both financial and macroeconomic risk and whether MFs have any impact on the economy (Bali, Brown, & Caglayan, 2014). This study therefore aims to fill this gap by examining the relationship between MF flows, stock market variables and macroeconomic variables.

Secondly, there have been mixed results relating to MF flows, market returns and macroeconomic variables. The findings of these studies are explained by three major theories (the PP, FT and IR theories). The findings from studies (Warther, 1995; Edelen & Warner, 2001) regarding these theories are inconsistent and contradictory. Warther (1995) discovers that unexpected MFs' cash flows are highly correlated with aggregate market returns and concludes that this relationship is due to either the price pressure

effects or effect of information, while Edelen and Warner (2001) identify MFs flow as being correlated with concurrent market returns at aggregate level. However, their findings are inconclusive because they assert that the relationship exists due to either feedback trading theory or the information driving returns (details of these theories are discussed in section 2.5). In addition, the work done on testing all three theories together is inadequate.

Moreover, the empirical studies on the three theories focus on the relationship between MF flows and stock market returns, but they do not appear to have addressed and tested the stock market volatility along with stock market returns and MF flows. It is evident that market volatility has an influence on fund flows (Cao et al., 2008). For example, positive flows (inflows) are associated with lower market volatility and negative flows (outflows) are linked with higher market volatility (Thomas et al., 2014).[10]

In another context of research, it is observed that limited work has been done on addressing the questions regarding the predictive ability of MF flows. For example, whether MF flows have an impact on financial and economic variables and whether fund flows contain any information about future economic activity. Jank (2012) identifies that equity MF flows forecast future economic conditions and are forward looking, which is consistent with the IR theory. Ferson and Kim (2012) find that lagged flows are able to predict future economic conditions, indicating that fund flows not only follow the past market performance but also forecast the future conditions of variables symbolizing economic conditions (see section 1.2.3 for the role of MFs in predicting the economy).

In addition, despite the important role played by MFs in the economy, such studies do not appear to have been done for developing economies. It is observed that the majority

[10] See section 1.2.1 for the impact of MFs on stock market volatility.

of the studies that have been conducted related to the relationship between stock returns and real economic activity in developed countries such as the USA, Germany, the UK, G7 countries and OECD countries (Binswanger, 2004; Ferreira et al., 2012; Chatziantoniou, Duffy, & Filis, 2013; Thomas et al., 2014). Ferreira et al. (2012) also confirm that there is a limited of research on flows of MFs except for the US market. Therefore, the present study aims to contribute towards such research into the developing regional blocks and to add to the knowledge in this field (Khorana et al., 2005; Halim, 2007). [11]

Moreover, many previous studies (Shah, Hijazi, & Hamdani, 2005; Trainor, 2010; Baghdadabad, Matnor, & Ibrahim, 2012; Jamaludin, Smith, & Gerrans, 2012) have been conducted on the determinants of fund performance and growth of MFs at micro level or firm level. However, only a limited amount of work has been done on testing the relationship between different asset categories of MFs and the financial markets at macro level (Kaul & Phillips, 2008).[12] Thus the aim of this study is to fill this void.

1.4 Research Questions

Considering the importance and ongoing growth in MFs, a general question may arise as to whether MF have any important role to play in the financial markets and the overall economy and whether MFs can help predict future economic activities. The answer to this question is difficult to find, due to high volatility in the securities market and the unpredictable nature of risk in fragile emerging economies (Kacperczyk et al., 2013). Nevertheless, the study attempts to answer these questions by identifying the consistent

[11] See section 4.4.1 for a detailed explanation on the choice of developing countries and the difference between developing and developed markets.
[12] Details of each fund class and their differences are given in section 1.2.1.

relations of funds with stock markets and macro-economic variables under the three theories mentioned (PP theory, FT theory and IR theory).

Hence, the present study seeks to answer specific questions regarding the sequence of relationships: that is, the relationship of fund flows with market returns and market volatility (PP and FT theory), and the relationships of fund flows and market returns/volatility with macroeconomic variables (IR theory). The study therefore addresses the following research questions:

1. What are the causalities between MF flows and stock market variables?
2. What is the influence of macroeconomic variables on the causalities between MF flows and stock market variables?

Here in the research questions above, MFs are categorized into equity MFs, bond MFs, balanced MFs and money market MFs. Macroeconomic activity is measured by proxies referred to as macroeconomic variables, such as Gross Domestic Product (GDP) growth rate, inflation rate, exchange rate, unemployment growth rate, money supply growth rate, budget deficit ratio and real investment rate.

1.5 Objectives of the Study

In consonance with the research problems and questions above, the following five research objectives (ROs) are specified:

1. To determine the causalities between MF flows and stock market returns
2. To examine the causalities between MF flows and stock market volatility.
3. To evaluate whether the causality between MF flows and stock market returns is conditional on the presence or absence of macroeconomic variables.
4. To investigate the possibility that the causality between MF flows and stock market volatility is explained by macroeconomic variables.

1.6 Significance of the study

Oh and Parwada (2007) witnessed the concurrent growth of the MF industry, stock market index and the economy. This concurrent growth has attracted the attention of academics and practitioners in understanding the influence of MFs on the stock markets and the economy. This study aims to make a wider contribution in terms of scope and area by determining the relationship of MFs, financial markets and the economy of developing regional blocks at a broader macroeconomic level. The findings of previous studies (Warther, 1995; Edelen & Warner, 2001; Rakowski & Wang, 2009) on MFs, market return and macroeconomic variables appear to have been inconsistent and ambiguous due to the limited amount of research done on various MF classes (Jank, 2012). In addition, most of the previous studies (Binswanger, 2004; Ferreira et al., 2012; Chatziantoniou et al., 2013; Thomas et al., 2014) have been conducted on developed countries, such as the USA, and thus provide little input for the investors and portfolio managers regarding efficient portfolio policies at the worldwide and international level. Thus this study aims to be a comprehensive one in determining collectively the relationship of four major MFs, stock market variables and real economic variables together under the PP, FT and IR theories, which does not appear to have been conducted before. The current study takes into account the four categories of MFs along with stock market volatility and new macro-economic variables, which have not been considered by previous studies. The new macroeconomic variables include budget deficit, money supply, real investment, unemployment (see section 4.3.3 for details of macroeconomic variables).

This study contributes to the existing literature in several ways. First, the study proposes to look at four major MF classes as mentioned: equity, bonds, balanced funds and money market funds) in relation to financial markets and macroeconomic variables on which studies do not seem to have been conducted so far. Moreover, studying the

different MF asset class has been highlighted as a future avenue for research by Jank (2012), who conducted a study on the information response theory and confirmed the result in support of this theory on mainly US equity MFs. In addition, studying the relationship of equity, bond, balanced and money market MF flows and financial market returns and risk together under the PP, FT and IR theories is a comprehensive study which does not appear to have been conducted before. The study assists fund managers and portfolio analysts to better understand the behavior and relationship of these variables and helps in formulating efficient portfolio decision making at the broader macroeconomic level. Fund managers may take advantage of risk and return by assessing wealth allocation across major asset classes in various economic situations. For example, fund managers may perceive equity flows as negatively related to poor economic conditions. They may therefore decide on reallocation and increase their portfolio returns by shifting investment from equity to fixed income securities in case of economic downturn and vice versa in boom times (Kaul & Phillips, 2008).

Second, studying four major MF flows with respect to both financial market return and risk (volatility) will be another contribution to existing knowledge as it includes a new market variable in the study model: stock market volatility. Thus, besides the stock market returns, this study also investigates stock market volatility in the context of the fund-market-economy relationship. As far as is known, this has not been considered by previous studies using the three testable theories and has been highlighted by Thomas et al. (2014) as an area for future research area. Thomas et al. (2014) conducted a study on the impact of pension MFs on financial market volatility. However, this study investigates the association of equity, bond, balanced and money market fund flows with the volatility of stock markets. Calculating market volatility means measuring the timing ability and efficiency of MF managers in trading decisions. For example, investors and portfolio managers may decrease volatility in the market by investing in fixed income securities in

times of economic crisis (Schwert, 1990; Cao et al., 2008) . Understanding the volatility (risk) of the market will facilitate the investors' and portfolio managers' task of making efficient investment and asset allocation decisions, and evaluating the volatility helps to evaluate the risk adjusted returns. Volatility explains the flows, since risk affects investors' returns and portfolio decision choices (Goetzmann & Massa, 1999). In addition, Ferson and Kim (2012) state that volatility of the stock market appears to be an imperative determinant in fund flows. Since professional managers manage efficient and active funds and portfolios, they need in-depth information, sufficient experience, knowledge, evaluation and assessment of the financial security market and business sector in the economy through both a risk and return analysis of the market.

Third, the study also includes the new macro-economic variables, such as budget deficit, money supply, real investment, and unemployment (see section 4.3.3 for details of macroeconomic variables), to identify their impact on fund flows and market returns and to find out their relation with fund flows and financial market variables. The inclusion of new macroeconomic variables in the relationship model of the study provides a stronger base for understanding the reactions of MFs and market variables. It is observed that changes in the asset allocation and portfolio re-balancing decisions occur in response to the fluctuations in business and economic conditions. Economic conditions influence investors' decisions of allocation and investment. Moreover, the economic information helps to transfer their investments to safe havens in case of poor economic prospects. If MFs react to the macroeconomic information – for instance, more inflows are observed at good news and more outflows occur at bad news – then it would mean that MFs have significant macro-timing ability (Bali et al., 2014). Moreover, Kaul and Phillips (2008) elaborate that studying the economic conditions is imperative in securities flows and investment as it helps the fund and portfolio managers to switch from riskier investment avenues to safer ones in case of deteriorating economic conditions. This study also helps

to identify the return risk factors associated with each MF class. For instance, it is evident that riskier fund classes are significantly related to information about the macroeconomic variables and have a higher association with market returns (Jank, 2012). The expected implication of understanding macroeconomic variables in the model assists in the predictability of MF flows and expected market returns and risks. The behavior of fund flows can be used as proxy of aggregate investor behavior and this behavior can be envisaged by policy makers as a function of economic conditions. Thus, this is beneficial in planning the deployment of regulatory and managerial resources. For example, the ability to forecast future sales is useful for planning marketing strategies, managing cash inventories and forming investment strategies (Ferson & Kim, 2012). In addition, studying macroeconomic variables helps to identify the information (in terms of risk) associated with these variables. It enables the fund managers to create better investment planning, hedging and forecasting strategies. This study helps both managers and investors to formulate efficient portfolios and investment decisions.

Finally, several studies have been conducted at the micro level in identifying the determinants and performance of MFs at individual firm or sector level (Shah et al., 2005; Nazir & Nawaz, 2010; Trainor, 2010; Baghdadabad et al., 2012; Jamaludin et al., 2012), whereas as mentioned, the macroeconomic aspect has been addressed only to a limited extent so far. In this research, the macro approach is considered by studying aggregate flows of equity, bond, balance and money market funds. Since investment by MFs affects the overall economy, household savings, individuals' and welfare's future wealth, and fund managers' earnings and incentives; therefore, funds trading and flows have a huge impact at both macroeconomic and microeconomic levels (Ferson & Kim, 2012). Moreover, the findings of the previous studies have been limited to data based on a single country, mostly a developed country (Khorana et al., 2005; Cao et al., 2008). In fact, the majority of the studies have been conducted on the USA and other developed countries

and limited research has been done on other parts of the world (Cao et al., 2008). Khorana et al. (2005) state that although MFs have expanded around the globe, academic studies have been scarce and narrow in the geographical context. In addition, the study in the context of developing economies seems to have been non-existent so far. This study is conducted on sample countries of regional developing blocks i.e, MENA, ASEAN, BRICS and SAARC which is the comprehensive study of such geographical scope according to best estimate. Thus the study contributes in the geographical context by determining the relationship between the four main MFs, financial markets and macroeconomic variables of the developing regional blocks.

The results suggest that there is bidirectional causality between all fund flow classes and stock market returns, and stock market volatility except for the bond fund flow. Furthermore, the fund flows are linked with both the current and the lagged volatility. With respect to the flow-market returns-economy relationship, there is unidirectional causality running from market returns to mutual fund flows such that mutual fund flows react positively to the past performance of the market. This relationship can be explained in terms of the risk aversion of the mutual funds and the high volatility of the stock markets in developing countries. With respect to the flow-market volatility-economy relationship, the bidirectional causality between mutual fund flows and market volatility remains the same even after incorporating macroeconomic variables. The findings also suggest that macroeconomic variables influence fund flows, market returns and market volatility.

1.7 Organization of Study

The study has been structured as follows. Chapter 1 is devoted to the introduction, background and significance of the relationship between MFs, financial markets and macroeconomic variables. Chapter 2 discusses detailed literature on these factors, with

the main focus being on the price pressure theory (PP), the feedback trading theory (FT) and the information response theory (IR) as it is proposed to test the relationships among them. The literature on the relationship between financial market variables and macroeconomic variables is also part of this chapter. Chapter 3 discusses the theoretical framework and research model of the study, while Chapter 4 addresses the methodology and measures of variables used in it. Chapter 5 reports the results and discusses Objectives 1 and 2 of the study, Chapter 6 does the same for Objectives 3 and 4. Finally, Chapter 7 concludes the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Financial institutions, markets and macro economy are well-known topics but still remain as perplexing relations for many to resolve. This section elaborates the literature related to the connection between MF, market variables and market economy variables. The section also sheds some light on performance-based studies at micro-level on MFs. The literature review is segmented into five parts. Section 2.2 sheds light on the theory on Mutual funds. Theories on the classes of MFs are discussed in section 2.3. Section 2.4 elaborates the empirical studies on the performance of MFs, section 2.5 presents the empirical studies on MFs and financial market returns, section 2.6 elaborates the empirical studies on MF and financial market volatility, section 2.7 focuses on the empirical studies on MF and macro-economy. Finally, section 2.8 discusses the empirical studies on financial market and macro-economy.

2.2 Theory on Mutual Funds

The theoretical development and evaluation of MFs are derived from the modern portfolio theory called Markowitz's Mean-Variance Portfolio Theory. The theory seeks to maximize the expected return of portfolio (MFs) for a given quantity of portfolio risk by carefully selecting the ratios of different assets. MPT refers to mathematical explanation of the theory of diversification in investment. It aims at opting for a combination of financial assets that has lower risk rather than selecting individual assets. MPT attempts to decrease the total risk of portfolio return by merging various assets whose returns are perfectly negatively correlated. It also presumes that markets are efficient and investors are rational. Markowitz (1952) states that selection process of portfolio (MFs) is based on two steps. The first is the experience and observation of the performance of accessible securities in future. The second step is the appropriate belief about expected performance and choice of optimal portfolio. He discusses that the

decision of investors are based on mean and variance in returns of assets (Sencicek, 2005).

Markowitz's portfolio theory was extended by Capital Asset Pricing Model (CAPM) by introducing unsystematic and systematic risk (Sharpe, 1964; Lintner, 1965)**.** In this model, all investors hold a mix portfolio consisting of risky assets and risk-free assets (MFs) in the market. Numerous studies[13] on MF performance based on firm performance level evaluates the performance of MFs on the basis of three risk adjusted performance measures; the Treynor Index (1965), the Sharpe Ratio (1966) and Jensen's 'alpha' (1968). These performance measures were based on Capital Asset Pricing Model and Markowitz's Portfolio Theory. These measures intend to reduce the risk-reward dimensions of MFs' performance to a risk-adjusted returns. Treynor (1965) incorporated risk into a MFs' performance measure by considering the portfolio's rate of return with respect to the market rate of return. The Sharpe Ratio is defined as the ratio of a portfolio's return in excess of the risk-free rate to the portfolio's standard deviation of returns over a period of time (Sharpe, 1966). The Sharpe Ratio evaluates the ability of MFs' manager on the basis of both rates of return on performance and diversification by calculating the total risk of portfolio using standard deviation of returns. The Jensen alpha is a measure of that part on MFs' returns that are attributable to the fund manager's ability to time the market (Jensen, 1968).

[13] Sirri and Tufano (1998); Jain and Wu (2000); Edwards and Samant (2003); Lynch and Musto (2003); Artikis (2004); Shah et al. (2005); Boasson, Boasson, and Cheng (2006); Cashman, Deli, Nardari, and Villupuram (2006); Abdullah, Hassan, and Mohamad (2007); Arugaslan, Edwards, and Samant (2007); Lukashin and Lukashin (2009); Morri and Lee (2009); Swinkels and Rzezniczak (2009); Chen (2010b); Hassan, Khan, and Ngow (2010); Khalid et al. (2010); Nazir and Nawaz (2010); Rodríguez (2010); Trainor (2010); Alam (2011); Belgacem and Hellara (2011); Baghdadabad et al. (2012); Chang, Nelson, and Witte (2012); Jamaludin et al. (2012); Ashraf (2013); Baghdadabad (2013); Cumming, Schwienbacher, and Zhan (2015); D'Arcangelis and Rotundo (2015); Mansor, Bhatti, and Ariff (2015).

2.3 Theory Related to Classes of Mutual Funds

Theoretical linkages of research on institutional investors is closely related to the well-developed Fisher separation theorem (Fisher, 1965) and Mutual fund theorem (Tobin, 1958). Fisher's separation theorem, which is also called as 'Separation Theorem' states that the construction of risk-free and risky asset portfolios are independent of the investor's taste and preferences. In other words, investors make investment decisions based on the net present value of expected returns rather than investor's acceptable level of risk. Separation theorem cuts across the mutual fund theorem, stating that an optimal portfolio can be developed by mixing certain amount of MFs (for instance, equity, bond, balanced and money market MFs) in appropriate ratio in portfolio where one set consists of risk-free assets and the other consists of tangency portfolio (Elton & Gruber, 1997). A tangency portfolio is defined as a portfolio that maximizes the anticipated returns minus risk free assets' returns to the standard deviation. Under this condition, MFs indicate particular benchmark selection of the portfolio of accessible assets. The area of theoretical research deals with the number of MFs that are needed to make portfolio and the nature of portfolio that includes the MFs under different assumptions of utility function and asset's characteristics [for example, (Ross, 1978)]. Elton and Gruber (1997) state that it is imperative to study the mutual fund theorem because it provides guidance to financial institutions such as banks and insurance companies, and financial markets (investor, market analysts, portfolio managers) regarding the types of combined funds and portfolios to be constructed. Mamaysky and Spiegel (2002) state that investors cannot trade and stay in the market at all times hence they pursue financial intermediaries to trade on their behalf.

2.4 Empirical Studies on Performance of MFs

Several studies[14] determined the factors affecting the growth and performance of different types of MFs. A vast amount of literature has been devoted to study the determinants of MFs at the individual level (Kaul & Phillips, 2008). The studies' findings report a positive relationship between MF flows and past performance of funds. This relationship suggests that MFs chase the past performance and invest money in those securities that reported peak performance in the previous year. The statistical techniques used in these studies are mainly Sharpe, Treynor, Jensen's alpha, M Squared measures, CAPM model and four factor Carhart model.

Similar studies by Gruber (1996), Sirri and Tufano (1998), and Lynch and Musto (2003) discover significant association between flows and performance of firm, and conclude that investors invest money in high-performing funds excessively but fail to safeguard themselves from poor performing funds. Contradictorily, Cashman, Deli, Nardari, and Villupuram (2012) present evidence that proves investors not only increasing their investments to well performing funds but also equally monitoring poor performing funds by reducing inflows. Moreover, it is identified that MFs achieve an asymmetric volume of inflows due to strong performance achievements advertised by funds. However, authenticity of advertisement is questionable (Huhmann & Bhattacharyya, 2005).

[14] For example, Sirri and Tufano (1998); Jain and Wu (2000); Edwards and Samant (2003); Lynch and Musto (2003); Artikis (2004); Shah et al. (2005); Boasson et al. (2006); Cashman et al. (2006); (2006); Abdullah et al. (2007); Arugaslan et al. (2007); Lukashin and Lukashin (2009); Morri and Lee (2009); Swinkels and Rzezniczak (2009); Chen (2010b); Hassan et al. (2010); Khalid et al. (2010); Nazir and Nawaz (2010); Rodríguez (2010); Trainor (2010); Alam (2011); Belgacem and Hellara (2011); Baghdadabad et al. (2012); (Chang et al., 2012); Jamaludin et al. (2012); Ashraf (2013); Baghdadabad (2013); Cumming et al. (2015); D'Arcangelis and Rotundo (2015); Mansor et al. (2015).

In contrast to earlier studies, Edwards and Samant (2003) find that investors are least convinced when the average return of funds rises as they take the degree of risk into consideration. Relatively, a similar study is conducted at cross-country level by Khorana et al. (2005) to determine the reason of MFs growth around the world. With the sample of 56 countries, it is found that the fund industry has flourished in the developed countries having proper laws, rules and regulations of investor's rights, stringent bank secrecy laws and favorable tax system.

Edelen (1999) states that the performance of MFs is generally measured at systematic and individual levels. To assess the market timing ability at systematic level and to determine component of returns at individual level. However, keeping the amount of work in previous studies in view, there are limited amount of studies to assess the behavior and performance of MFs at macro level. The main focus of past studies have been on the determinants of growth and performance of MFs either at a domestic or international level. However, limited studies have been conducted to identify the determinants of MF flows at a macro level, the relationship of MFs with macroeconomic variables, and the impact and interaction of both MF and financial market from a macroeconomic perspective.

2.5 MFs and Financial Market Returns

A large number of studies is devoted to research on the determinants of risk-adjusted performance of MFs at the micro firm/sector level (Sirri & Tufano, 1998). However, limited studies are conducted on the determinant of MF flows at macro level in order to assess the role of MFs in the real economy and financial markets. The fundamental difference between micro and macro analysis lies in the micro-analysis which helps to evaluate funds' performance in terms of competitors and industry averages. Typically, investors divert their money from one fund to another based on micro-analysis. However,

the focus in macro analysis is on the aggregate flows where inflows and outflows among competing funds are cancelled out.

Warther (1995) is the pioneer study on relationships between aggregate fund flows and market returns. The author finds positive concurrent relationship between flows and market returns. Warther (1995) explains the relations of MF flows and market returns in three theories which are 'price-pressure theory/ investor sentiment theory (PP)', 'feedback trading/herding theory (FT)' and 'information response/revelation theory (IR)'. Ben-Rephael, Kandel, and Wohl (2011) also mention these theories in explaining the relationship of MF flows and market returns.

Empirically, two main questions are asked in the literature related to flow-return relationship. The first is whether fund managers allocate funds on the basis of current market performance and the second is whether the fund flow influences security prices concurrently. Answers to these questions lie in the following three main explanations. Firstly, flows may put a transitory pressure on security prices; affecting prices positively. Thus, flows may represent investors' emotions and attitudes (investor sentiment/PP theory). Secondly, fund flow reacts to changes in market returns with strong relationship between flow of funds and the market returns of previous day (FT theory). Thirdly, if fund managers are equipped with information, flows will reflect this new information by bringing about permanent changes in prices, resulting in positive correlation between flows and prices (IR theory).

The study by Warther (1995) contributes to the documentation of the relationship of aggregate market returns and fund flows but fails to draw a conclusive evidence and thorough explanation of the phenomena. The literature on dynamic linkage between mutual fund flows and market return is inconclusive. The existing literature explain that investment by funds are mostly driven by investors' sentiments more than the real

fundamentals of economy (Harris & Gurel, 1986; Edelen, 1999; Kaul & Phillips, 2008; Ben-Rephael et al., 2011). Other studies[15] explain that investors make their investment decision based on recent performance. Potter (1996) conduct the study on lead and lag association between fund flows and market returns for classes of equity funds. The study finds that aggressive growth of fund flows is forecasted by stock market returns. However, the same cannot applied in the case of income fund flows. Recently, Watson and Wickramanayake (2012) find positive relationship between aggregate fund flows and market returns. They concluded that fund flows react to changes in market returns of previous day. On the contrary, another research find strong evidence to prove that MF flows are correlated to macro-economy fundamentals (Jank, 2012; Kopsch et al., 2015). Furthermore, some studies find causal relationship between MF flows and market returns (Aydogan, Vardar, & Tunç, 2014). For example, Fortune (1998) and Alexakis, Niarchos, Patra, and Poshakwale (2005) identify mixed causal relationship between mutual fund flows and market returns. The study concludes that some mutual fund flows pose an impact on future market returns, while other fund flows are affected by past market returns. Furthermore, Mosebach and Najand (1999), and Cha and Kim (2007) find positive relationship between mutual fund flows and market returns. Whereas, Braverman, Kandel, and Wohl (2005) concluded that flow-return relationship is negative. Alexakis, Dasilas, and Grose (2013) find mixed bi-directional causality between mutual fund flow and stock market return.

Overall, it is evident that the researches related to determination of relationship between MF flows and market returns have been mostly mixed and inconclusive.

[15] Such as Davidson and Dutia (1989); Hendricks, Patel, and Zeckhauser (1993); Warther (1995); Edwards and Zhang (1998), Goetzmann et al. (2000); Patro (2006); Oh and Parwada (2007)

2.5.1 Price Pressure Theory

Studies on the PP theory assert that the MF flows bring price pressure (PP) to the stock market, thereby affecting the stock market returns. The effect of PP is seen in situations where MF acts as a proxy of investor sentiment. The effect is transitory and is induced by uninformed investors in which higher demand triggers up the prices temporarily and deviates them from their fundamental price value. In this scenario, investors being pessimists or optimists is not related to information (Jank, 2012).

The pioneer study on PP theory is conducted by Harris and Gurel (1986). The study confirms the temporary PP phenomena between fund flows and market returns. However, it is observed that half of the price changes are reversed within 10 days of trading session. Moreover, the study suggests that the major increase in demand of shares influence the prices of shares irrespective of presence or absence of information in the market. It is observed that MFs not only chase market returns but also influence security prices and shift prices from fundamentals values temporarily. Edelen (1999) finds that MFs are pressurized by their investor's flows and thereby perform poorly in term of market timings. They invest in the market immediately after the investor's flow in the funds and thus bring PP in the market. Indro (2004) conducts study on the relationship between net aggregate equity fund flow and investor sentiment. The study concludes that net aggregate equity fund flow is influenced by bullish behavior of individual investors in both the previous and current period. In addition, the study concludes that the investment of equity funds is also influenced by economic fundamentals.

A similar study is conducted by Ben-Rephael et al. (2011) who investigated the PP theory on MF equity aggregate flows. The study states that under PP theory, the lagged inflows and outflows should foretell negative and positive returns, respectively. This is due to the fact that the PP effect is temporary and will be reversed subsequently in over

time. Initially, it is observed that huge inflows of the funds will push the prices of securities up and vice versa. However, the trend is reversed, implying a negative relationship between lagged fund flows and future returns. Ben-Rephael et al. (2011) test on whether or not investors are informed or owing to the fact that the PP is temporary. They find that the investors of MFs are uninformed and they are mostly retail investors. The investments in MFs are in turn, being invested financial market trading due to the fact that funds are required to invest and hold securities, primarily in the security market. The uninformed investors influence the market prices and drive away the market from the fundamental prices. Practically, this effect is reversed (as opposite to the price effect by information permanently) after some time mostly because the effect is temporary in nature. The study finds that nearly 85 percent of the simultaneous relation is reverted a within period of 4 months. Thus, this leads to the inverse relation between lagged positive flows and negative market returns, and vice versa.

In addition, Ben-Rephael et al. (2011) have also shown that MFs seem to be bad market timer in case of PP effect. It is due to the fact that MFs are driven by investors and react according to investor flows. The PP effect occurs due to investor flows in MF that forces the MF to sell "low" and buy “high". The study's findings are consistent with Edelen (1999) who also find that due to pressure developed by investor's flows in MFs, it is proven that fund possesses poor timing ability. Overall, findings from the study by Ben-Rephael et al. (2011) support the PP theory which was rejected earlier by Warther (1995) and Franklin Fant (1999).

Ben-Rephael et al. (2011) find that the contemporaneous correlation between flows and relation is mainly due to the unexpected component of flow. The result is consistent with Warther (1995)’s findings. However, Ben-Rephael et al. (2011) also report some evidences of positive relation between market returns and subsequent fund flows, thereby

providing evidence of feedback trading effect. Thus, findings from the study seem to be mixed and inconclusive.

Researchers such as Warther (1995), Franklin Fant (1999), Rakowski and Wang (2009), Jank (2012) did not find sufficient evidences in support of PP theory. Rakowski and Wang (2009) concluded that past flows have a positive impact on future returns with an information effect as compared to the PP effect driving this link. Jank (2012) and Kopsch et al. (2015) reject the PP theory in their studies and subsequently find support for IR theory although the effect of IR and PP theories is the same as both theories forecast a positive association between simultaneous returns and flows. The IR theory forecasts no relation between lagged flows and returns because information is swiftly incorporated by prices. Whereas, the PP theory expects a negative linkage between lagged flows and returns because prices reduce once the pressure is diminished. The major distinction between both theories is that under the IR theory, fund flows are determined by price fundamentals whereas under the PP theory, fund flows are unaffected from fundamentals.

2.5.2 Feedback Trading Theory

Studies on feedback trading/herding (FT) theory state that MFs respond to the past market performance through inflows and outflows under feedback effect in the market. The theory asserts that market returns affect the MF flows. The investors buy and sell securities with rise and fall in security price. In other words, funds chase the past performance of market and invest in high performing securities. Ben-Rephael et al. (2011) state that under FT theory, investors chase the previous-day market returns positively with increase in flows and vice versa. The FT theory envisages positive association between lagged returns and current flows. For instance, Warther (1995), Papadamou and Siriopoulos (2002) and Patro (2006) explain that investors make their investment decision based on recent performance. However, fund investors fail to

safeguard themselves from poor performance (Sirri & Tufano, 1998; Lynch & Musto, 2003).

Potter and Schneeweis (1998) state that security market returns predict flows into growth funds and aggressive growth funds. Fant (1999) segregates the components of flows and performed the separate test with each components. For example, new sales, redemptions, exchanges-in and exchanges-out. The study find support in favor of feedback trading theory between relationship of returns and exchanges-in and-out. Edwards and Zhang (1998), Cha and Kim (2005), Cha and Kim (2007) and Oh and Parwada (2007) find the supporting evidence related to the theory and concluded that there is a strong relationship between fund flows and the market returns of previous day. Studies in support of FT theory further provided evidences of positive FT theory (also known as momentum behavior) and negative FT theory (also known as contrarian behavior) of MF flows with market returns. Goetzmann et al. (2000) conduct a study on the behavioral factors based on momentum and contrarian MF flows by examining investment and trading behavior of investors. They conclude that flows move positively with the market returns. Cha and Lee (2001) stated that the stock market performance has direct influence on the equity fund flows. However, Edelen and Warner (2001) and Boasson et al. (2006) find that the MF may buy/sell at the information of good/bad news but some informed funds may take the other way around (contrarian behavior). This behavior is further explained by Oh and Parwada (2007) who categorize the MF flows into purchases flows, sales flows and net trading flows. The study finds the stock market returns force MF flows to react positively in terms of purchases and sales, hence, confirming the notion of positive FT theory (momentum behavior). However, in terms of net trading flows, there exist a negative relationship between the stock market returns and MF flows suggesting the contrarian behavior of MF investors (negative feedback trader). In contrast to earlier studies, Rakowski and Wang (2009) find that MFs may exhibit

contrarian behavior (may go against market) rather than momentum behavior (mutually may follow the market) in the market. Jank (2012) and Kopsch et al. (2015) reject FT theory upon finding that flows and market returns are contemporaneously correlated due to macroeconomic information.

Overall, it is observed that the studies contradict with each other. Studies could not identify the true effect of FT theory and relation of MFs with market returns. Although the studies have done their best to determine the relationship and identify the impact of feedback effect in the financial market, the lack of consistency still prevails in the findings.

2.5.3 Information Response Theory

The studies on information response (IR) theory state that neither the market variables affect the fund flows to react nor do the fund flows causing pressure in the market variables. However, there is a third variable known as macro-economic variable that causes both stock market variables and fund flows to react simultaneously to new information. Ben-Rephael et al. (2011) explain that under IR theory, positive/negative information in the financial market results in positive/negative security returns and inflows/outflows by MFs.

Remolona, Kleiman, and Gruenstein Bocain (1997) examine the association between fund flows and market performance using four macroeconomic variables: capacity utilization, domestic employment, the consumer price index and the Federal Reserve's target federal funds rate. The study findings suggest that market returns are highly correlated with aggregate mutual fund flows. Boyer and Zheng (2004) and Cha and Kim (2010) determine the link between mutual fund flows and stock market returns. They find positive link between aggregate mutual fund flows and stock market returns at the macro level. Moreover, Jank (2012) examines IR theory on US equity fund and stock market

returns and finds results in favor of IR theory. The study rejects the PP and FT theory, and provides strong evidence indicating that MF flows are correlated to macro-economy fundamentals. Moreover, the study finds high correlation among high-risk funds flows, market returns and macroeconomic variables. It is identified that the high-risk funds are highly affected by macroeconomic information which supports the IR theory. Jank (2012) identified the interaction of third variable as macroeconomic variable affecting both fund flows and market returns simultaneously. In that case, both market and MFs react together to the new macroeconomic information and this new information is reflected in both market price and fund flows. Similar study in support of IR theory is conducted by Kopsch et al. (2015) who find that there is a co-movement existing between fund flows and stock market returns. The study results also validate the findings of Warther (1995) who find correlation of market returns with unexpected flows. In addition, the results also affirmed Jank (2012) findings indicating that predictable variables can forecast the variations in MF flows better than the market returns.

Ben-Rephael et al. (2011) compare differences between the three theories (PT, FT and IR theories). They explain that IR and FT theory entail no association between future returns and lagged flows. The empirical findings of both theories are very much related. In case of PP and IR theory, the major distinction between both theories is; under the IR theory, fund flows are determined by fundamentals whereas under PP theory, fund flows are distinct from fundamentals. However, both theories forecast a positive association between simultaneous returns and flows. The IR theory forecast no relation between lagged flows and returns because information will be swiftly incorporated by prices while the PP theory expects a negative linkage between lagged flows and returns because prices will repeal once the pressure vanishes.

The initial study by Warther (1995) emphasizes on the documentation of the association of aggregate market returns and fund flows rather than drawing the conclusive evidence and thorough explanation of the phenomena. Thus, the study's contribution lies in identification and documentation of three theories to explain the relation of fund flow and market returns. The findings of the study support neither the PP theory nor the FT theory. Warther (1995) concludes that although the MF flows have impact on the rise and fall of security prices, this impact may be due to a combined response of flows and market returns to information, or flows chasing lagged market returns. Thus, the findings are indecisive and unconvincing as the study fails to test the theories empirically. In addition, there are also contradictory findings in the previous studies related to MF flows and market returns. For example, Edelen (1999) document negative relation between market returns and equity fund flows whereas the study by Goetzmann et al. (2000) identify that the aggregate demand of MF investors for stocks are positively correlated with concurrent security price and the changes in the prices.

Overall, it is evident that the research related to determine the relationship between MF flows and market returns under these theories (PP, FT, IR theory) have been inconclusive.

2.6 MF and Financial Market Volatility

Earlier studies document two conduits of relationship of market volatility and fund flows. The first being that fund flows follow the markets' past performance. The fund managers envisage future returns based on past performance and often follow positive feedback strategy by buying from up-market and selling in-down market. Other fund managers may take it the other way round (may follow contrarian/negative feedback strategies) which may reduce the market volatility by increasing their investment. This implies that the increase in market volatility reduces the fund flows, and reduced market

volatility increases the fund flows in the financial market (Cao et al., 2008). Since different strategies opted by MFs may be offsetting, the overall effect of flows on stock market return fluctuations is an important empirical question which is examined in this study. The second is that, studies in noise traders/investors sentiments are the main causes that drag away market from its fundamental values (Black, 1986; Lee, Shleifer, & Thaler, 1991). This is true considering MF flows are used as proxy for investors' sentiments. Hence, positive or negative flows will affect the market returns and volatility (Cao et al., 2008).

Pioneer theoretical work[16] states that sophisticated institutional investors respond rationally to the stock market volatility and are less likely to be affected. They are called 'smart investors' who counterbalance individual irrational investment and reduce market noises (Friedman, 1953; Fama, 1965; Grier & Albin, 1973; Reilly, 1977; Reilly & Wachowicz Jr, 1979; Cao et al., 2008). Goetzmann and Massa (1999) and Zheng (1999) find that institutional investor flows are concurrently associated with stock market variables as compared to retail investors flows. It is argued that prudent behavior of institutional investors should result in market stability due to the highly-accessible information that helps in controlling price deviation from the fundamentals. (Brown, Harlow, & Starks, 1996; Sias, 1996; Dennis & Strickland, 2002; Bohl, Brzeszczyński, & Wilfling, 2009). Friedman (1953) states that rational investors stabilize the prices of securities. Fama (1965) also confirms that institutional investors can alleviate large deviations in asset prices. Moreover, the well-informed MF investors often correctly time the market (Cao et al., 2008). However, certain studies provide contradictory evidences. For instance, institutional investors may find riskier and volatile securities more attractive

[16] For example, Aggarwal and Rao (1990); Daigler and Wiley (1999); Kaniel, Saar, and Titman (2008), Sias (1996).

as they are likely to outperform the average market securities[17]. Sias (1996) suggests that institutional investors exhibit momentum behavior with the market and increase their trading in times of high market volatility. This is also true for MFs which, as institutional investors, may engage in positive feedback trading and herding that may accelerate price movements and increase volatility[18]. Previous studies (Brown et al., 1996; Sias, 1996; Dennis & Strickland, 2002) find positive association between MFs and market volatility. However, others find inverse relationship between the institutional trading and market volatility (Grier & Albin, 1973; Reilly, 1977; Reilly & Wachowicz Jr, 1979).

A study by Busse (1999) assesses whether funds manager time the financial market volatility. Busse (1999) concludes that MFs do influence and capture the market volatility. This work is extended by Cao et al. (2008) who determined the link between aggregate MF flows and return volatility in market and find negative association between flows and previous day volatility. They conclude that positive flows are associated with lower market volatility and negative flows are linked with high market volatility. Furthermore, fluctuations in flows negatively influence the market volatility i.e, inflows forecast decreased market volatility and outflows forecast increased market volatility.

Thomas et al. (2014) investigate empirical relationship between investment of pension funds in stock and stock market volatility in OECD market. They find negative relationship between pension funds and stock market volatility. The negative relationship is due to highly-accessible information available to pension funds being large institutional investors. This information helps in controlling prices deviation from the fundamentals. Whereas, another study conducted by Gökçen and Yalçın (2015) on pension funds find

[17] See for example Falkenstein (1996); Gompers and Metrick (2001); Gabaix, Gopikrishnan, Plerou, and Stanley (2006), Klemkosky (1977); De Long, Shleifer, Summers, and Waldmann (1990); Falkenstein (1996); Nofsinger and Sias (1999); Gompers and Metrick (2001); Sias (2004); Gabaix et al. (2006).

[18] See for example Klemkosky (1977); De Long et al. (1990); Nofsinger and Sias (1999); Sias (2004); Bohl et al. (2009).

that active funds perform poorly in market as compared to passive funds. Overall, there are limited studies on flow-volatility link and the findings of these studies have been inconclusive and ambiguous. One can recognize the difficulty to infer clear cut conclusion in the prevailing theoretical and empirical debate as studies yield ambiguous results and findings that have been inconclusive and contradictory. Furthermore, there are existing evidence[19] on the relationship among stock market returns, market volume and volatility, but the literature on MF flows and market volatility has received scant attention despite the importance of MFs in stock trading. In addition, researchers' interest in micro-analysis of MFs and market volatility has been on the rise over the last two decades[20]. However, literature on macro analysis of this relationship remain embryonic and scarce[21]. Furthermore, the studies are conducted mostly in the context of developed countries such as USA, Norway, China, Korea, Japan, Egypt [Wermers (1999), Gjerde and Saettem (1999), Demirer and Kutan (2006), Barber and Odean (2008), Rubin and Smith (2009), Zhou and Peng (2007), Li and Wang (2010), Choe, Kho, and Stulz (1999), Karolyi (2002), Azzam (2010) and Park (2015)]. There is hardly any literature on MF flows and market volatility from the perspective of developing markets. Moreover, this study seeks to identify the relationship of other types of MFs (for example; bond MFs, balanced funds, money market funds) in the context of market volatility, which is non-existent to the best of the researcher's knowledge.

[19] Studies such as French, Schwert, and Stambaugh (1987); Baillie and DeGennaro (1990); Poon and Taylor (1992); Duffee (1995); De Santis (1997); Adrian and Rosenberg (2008); Azevedo, Karim, Gregoriou, and Rhodes (2014), Shahzad, Duong, Kalev, and Singh (2014), Koulakiotis, Babalos, and Papasyriopoulos (2015).

[20] For instance Grier and Albin (1973); Reilly (1977); Reilly and Wachowicz Jr (1979); Cohen, Gompers, and Vuolteenaho (2002)

[21] Few studies exists on pension funds and market volatility on macro-level, for example Studies by,Davis and Hu (2004) ,Thomas et al. (2014).

2.7 MFs and Macroeconomic Information

Despite having extensive literature that focuses on the relationship of financial market and macro economy, studies investigating the relationship between financial market investors (e.g., MFs) and macro economy are scarce, less comprehensive and mixed. Some of the existing literatures explain that investment by funds are mostly driven by investors' sentiments more than the real fundaments of economy (Kaul & Phillips, 2008). Oh and Parwada (2007) state that the determination of MFs being either fundamentals or non-fundamentals remain controversial. In other words, whether flows contain information reflecting the real economy activity or not is still being debated on. However, in contrast to the earlier findings, Kaul and Phillips (2008) conduct a study to determine the variations in MF flows, specifically in terms of economic conditions. The study's findings suggest that development in economic conditions are likely to affect the investors to reshuffle their investments and move away the funds from fixed income-type funds to equity-based funds and vice versa. Ferson and Schadt (1996) conduct study on fund manager performance and influence of economic situations on fund performance. The study suggests that the determination of fund manager performance should consider the macroeconomic conditioning. A similar study on timing ability of MF managers is conducted by Kacperczyk et al. (2013) who find that manager have ability of generating higher risk-adjusted returns using both private and public information. Researchers conduct test on how manager use skills over different period of business cycles. Kacperczyk et al. (2013) have tested market efficiency and time-varying ability of fund manager by channeling fund manager's performance into stock picking and market timing skills during recessionary and expansionary economic times. They find that MFs managers mold the skills based on different period of business cycles and formulate prudent investment strategies to time the market by investing more in defensive industries during recession and holding more cash during bad economic times.

Bali et al. (2014) conduct a study on the influence of macroeconomic risk on hedge funds and argue that individual hedge funds are highly exposed to macroeconomic shocks and earn higher returns than other form of funds. This finding is consistent with ICAPM of Merton (1973), which proposes that such exposure to macro-economy should be compensated with higher returns. Bali et al. (2014) concluded that macroeconomic risk is a stronger determinant to cross-sectional deviation of hedge fund returns as compared to standard financial risks. Moreover, the study identify that the prices of risky financial securities such as stock, bond and their derivatives are highly influenced by macroeconomic fundamentals such as inflation, interest rates, unemployment and economic growth.

In another context of research, it is observed that limited studies have been devoted on addressing the question pertaining to the predictability of MF flows. This includes, for example, whether MF flows have any impact on the determination of economic variable and whether fund flows contain any information for future economic conditions. Jank (2012) identifies that equity MF flows forecast future economic conditions, consistent with the IR theory. Ferson and Kim (2012) find that lagged flows have predictability for future economic conditions indicating that fund flows not only follow the past market performance but also forecast the future conditions of variables representing economic conditions.

Finally, limited studies are available to study the relationship of various types of MFs with macroeconomic variables except the studies by Kaul and Phillips (2008) and Ferson and Kim (2012). Kaul and Phillips (2008) identify the variations in MF flows that occurs due to variation in economic conditions. Ferson and Kim (2012) find that lagged flows have predictability for future economic conditions indicating that fund flows not only follow the past market performance but also forecast the future conditions of variables

representing economic conditions. Ferson and Kim (2012) identify that the factor structure of MFs is common for bond equity and money market MFs that have impact on both financial market and macroeconomic variables. Jank (2012) discover that equity fund flows forecast future economic conditions and are forward-looking. Bali et al. (2014) find that the prices of risky financial securities such as stock, bond and their derivatives are highly influenced by macroeconomic fundamentals such as inflation, interest rates, unemployment and economic growth.

2.8 Financial Market and Macroeconomic Information

The finance theory suggests that the economic information and news affect the asset prices. Numerous channels highlight the relationship between macro-economic variables such as gross domestic products (GDP), inflation, unemployment, interest rate, and the securities of financial markets such as stock, bonds, money market and other market securities[22]. Prior studies on fundamental macroeconomic variables and stock market are those of Tobin (1969), Bodie (1976) and Fama (1981) who explain the relationship of inflation and stock returns with respect to real economic activity. Tobin (1969) defines the role of stock market which is to build the link between real economy and financial sector. He states that stock market is influenced by both money growth and budgetary deficit. A study by Fama (1981) explains the relationship of inflation and stock returns with respect to actual economic activity and concludes that inflation and real economic activity has negative relationship. The study also finds that the negative stock return-inflation relationship is due to negative inflation-real economic activity relationship. Later, Geske and Roll (1983) argued the study by Fama (1981) by evaluating the possible link of stock returns and inflation with respect to fiscal and monetary linkages. The study

[22] See for example Fama (1981); Geske and Roll (1983); Chen et al. (1986); Kaul (1987); Barro (1990); Fama (1990); Schwert (1990); Choi, Hauser, and Kopecky (1999); Goetzmann and Massa (1999); Lettau and Ludvigson (2001); Du (2006); Du, Denning, and Zhao (2012); Narayan, Narayan, and Thuraisamy (2014)..

states that stock market signal shocks to real economic activity is predicted to cause a chain of fiscal and monetary responses. The study criticizes the methodology used by Fama (1981) and tests additional macroeconomic variables such as government debt, revenue, corporate earnings, employment rate to forecast the stock market returns.

Similarly, Kaul (1987) and Du (2006) investigate the relationship between inflation and stock returns considering the monetary policy effect (demand and supply shocks). The study by Kaul (1987) came up with different findings and concludes that the stock return-inflation relationship depends on the equilibrium process of monetary policy and the relation could be positive, negative or insignificant based on the money demand and supply effect. Kaul (1987) states that the rational stock market forecast the economy. Moreover, information of real variables is displayed in current stock prices. Kaul (1987)'s study is supported by Du (2006) who concludes that stock returns and inflation are positively related to each other due to pro-cyclical monetary policy in times of great depression. However, the relationship turns to be negative due to inflation caused by supply shocks.

Later on, Fama (1990) conducts another study to identify how market and macroeconomic variables relate with each other. For instances, Fama (1990) states news about cash flows in output/production explains the association between future production and market returns. The study finds that stock returns are predicted by dividend yield, default spread and term spread. The study also states that single macro variable such as production is not sufficient to explain the return variations. Fama (1990)'s work is extended by Schwert (1990). He explains that stock price contains the information and is a leading indicator of real economic activity. The study concludes that significant positive linkage occurs between real stock returns and future production growth rates even after including the proxy of variations and shocks to expected returns as control

variables. Barro (1990) asserts that market prices and industrial production react together in response to other variables i.e., discount rate and increase in security prices subsequently bringing increase in real activity such as wealth, consumption and investment. Goetzmann and Massa (1999) state that macroeconomic variables assist in explaining the changes in equity premium. Later, Lettau and Ludvigson (2001) adopt new approach of determining relation between macroeconomics and financial markets by investigating consumption, asset holdings and labor income for forecasting stock market volatility. Studies by Bloom, Bond, and Van Reenen (2007) and Bloom (2009) also shows that the macroeconomic risk is highly related to aggregate investments, employment and output dynamics. Du et al. (2012) find the relationship of macro variables and stock returns by using proxy of 85 macro variables. The study concludes that stock market returns react to the unexpected news regarding real economic activity. All these potential links suggest that the prices of financial securities are associated with the changes in macroeconomic variables. Hence, the expected performance of the market participants in the financial markets is likely to be influenced by macroeconomic news.

A study on the impact of both fiscal and monetary policy on stock market returns is conducted by Laopodis (2009) who determines the impact of fiscal policy action on stock market behavior and the efficiency of stock market to fully incorporate the changes using the information on fiscal policy changes. With the use of monthly observation of variables from 1968 to 2005, it is identified that the market gives more weightage to the news of monetary policy rather the news of fiscal policy like budget deficit because the market believes that budget deficit and interest rates have weak relationship. However, contrasting findings is inferred by Chatziantoniou et al. (2013) who identify that the inclusion of both fiscal and monetary policy helps in explaining the behavior of stock market either directly or indirectly.

Overall, the focus of the 'literature on financial and macroeconomic variables' is to provide deeper understanding of the relationship of major macroeconomic variables and market returns (Fama, 1981; Chen et al., 1986; Fama, 1990). The studies on stock market [such as (Galí & Gertler, 2007; Bjørnland & Leitemo, 2009; Bjørnland & Jacobsen, 2010; Castelnuovo & Nistico, 2010; Chatziantoniou et al., 2013)] report that prices of stock market capture appropriate future information and are futuristic in nature. However, some studies find the weakening relationship of stock market returns and real economic activity. For example, Binswanger (2000, 2004) investigate the reason for the breakdown of relationship between aggregate stock returns and real activity in USA and European G7 countries. The researcher finds that the emergence of speculative bubble leads to weakening of the relation between stock market and actual activity in US, Japan and Europe due to the international phenomena, leading to breakdown of the relation.

The impact of macroeconomic risk on financial market is also documented by previous studies. For example, Bloom et al. (2007) and Bloom (2009) conclude that macroeconomic risk is significantly related to aggregate investments, employment and output dynamics. Chen (2010a) establishes a model that documents how variation in business cycle, economic uncertainty and risk premiums has impact on financing decisions of firm. The model also exhibits that due to firm's reaction to macroeconomic conditions, countercyclical variations in risk prices occur. Allen, Bali, and Tang (2012) identify the link of future opportunity's set of investment to economic uncertainty and conclude that the future economic shocks are forecasted by downside risk in the financial and business sector. Bali et al. (2014) state that the macroeconomic news substantially affects future investment and consumption decisions of both households and investors.

Another segment of literature popularly known as 'literature on return predictability' which documents 'predictive variables ' such as, book-to-market ratio, dividend yield,

default spread, term spread are closely linked to economic variables. These predictive variables forecast changes in returns of securities in the market (Fama & French, 1989; Campbell & Thompson, 2008). These variables are for example; dividend yield as a predictor of macroeconomic information (Keim & Stambaugh, 1986; Fama & French, 1989; Hodrick, 1992; Lamont, 1998; Lettau & Ludvigson, 2001; Lettau & Ludvigson, 2005), default spread (Fama & French, 1989; Schwert, 1990), term spread (Fama & French, 1989; Schwert, 1990), dividend payout ratio (Lamont, 1998), book-to-market ratio (Kothari & Shanken, 1997; Pontiff & Schall, 1998), and treasury bill rate (Campbell & Viceira, 1996) which have been documented by previous studies and help in capturing not only the expectations of investors on future returns but also in establishing link between market returns and fundamental economic variables (Chen et al., 1986).

Overall, although an extensive amount of literature related to the relationship of financial market returns and macro economy is available, some important macroeconomic variables that are closely linked to real economic activity and financial market, especially in context of flow-market-economy relationship, have been ignored by previous studies. These are for example, investment (Barro, 1990), money supply (Laopodis, 2009), inflation (Laopodis, 2009), unemployment (Du et al., 2012), exchange rate (Kopsch et al., 2015) etc. Moreover, the findings from all these studies have been mixed and ambiguous. In addition, studies at cross-country level are scarce and only Ferreira et al. (2012) and Khorana et al. (2005) have conducted studies to determine the role of MFs in different economies. Although the MF has expanded around the globe, academic studies have been scarce and narrow in geographical context. Majority of the researches were conducted in developed economies and restricted by data based on a single country (Khorana et al., 2005; Cao et al., 2008; Ferreira et al., 2012; Jank, 2012; Bali et al., 2014). However there are scarce studies made in the context of developing markets.

CHAPTER 3: THEORETICAL AND CONCEPTUAL FRAMEWORK

Literature has provided various theories to explain the relationship among mutual funds and stock market variables and macroeconomic variables. This chapter discusses theoretical framework of the study that includes the theoretical linkages of mutual funds, financial markets, and macroeconomic variables. Section 3.1 provides description of theories related to mutual fund flows and market variables relationship. Section 3.2 discusses the theories of flow-market-economy relationship. Section 3.3 discusses the evolution of theories. Finally chapter concludes with the discussion related to conceptual framework in section 3.4. For further details on theoretical evolution of mutual funds and its classes, refer to section 2.1 and 2.2.

3.1. Theories on Mutual Funds and Financial Markets

Prior studies discusses two theories to explain the relationship between mutual funds and stock market variables. Warther (1995) explains that the price pressure theory and the feedback trading theory explain the relationship of mutual funds and financial markets nexus.

3.1.1 Price Pressure (PP) Theory

Price pressure theory states that mutual fund flows bring price pressure in the financial market by trading excessively. Excessive buying (selling) by mutual fund pushes the prices upward (downward) in the market the next day. As a result, flows cause the market return to move and react. This reaction of market occurs due to demand and supply effects on prices rather than permanent fundamental information effect. The theory is also called investor's sentiment theory which proposes that mutual fund flows bring price pressure in the financial market by trading excessively. However, price reverts back to its original position after perceiving short term price effect triggered by fund flows (Harris & Gurel,

1986; Warther, 1995; Goetzmann & Massa, 1999; Zheng, 1999; Goetzmann et al., 2000; Ben-Rephael et al., 2011). Goetzmann and Massa (1999) test the PP theory on index funds to S&P market Index to check whether the market reacts temporary on investors' flows or due to the permanent change. Mean reversion of prices takes place if flow of information is transitory. Ben-Rephael et al. (2011) evaluated whether the investors are informed under PP effect as the pressure is temporarily and it indicates that investor are uninformed. Mutual fund managers are forced to react to the demand from their investors as they are supposed to invest money in respective securities.

3.1.2 Feedback Trading (FT) Theory

The Feedback trading (FT) theory is also called the feedback herding theory or performance chasing theory. It explains that funds chase the past performance of market and react accordingly. The theory states that market returns influence the mutual fund flows. The investors buy securities when the security market price rises and sell them when it falls. Hence, it can be inferred that it is the market that brings reaction and movement in the fund flows (Warther, 1995; Sirri & Tufano, 1998; Edelen & Warner, 2001; Oh & Parwada, 2007).

Feedback trading theory asserts the relationship of mutual funds with financial market returns in context of "performance chasing behavior" of funds. Furthermore, Goetzmann et al. (2000) provide three potential explanations on the evidence of concurrent relation between flows and returns. First, the buying behavior of the investors in particular type of mutual funds lead to massive increase in the asset price in that fund (price pressure theory). Second, the positive movement in the market returns and assets' prices trigger the investors to buy more equities and increase the size of their portfolios (Feedback trading theory). The third possible explanation is that there is another factor that influence both price and flows (Information response theory).

3.2 Theory on Mutual Funds and Macro economy

The finance theory suggests that the economic information and the news affect the asset prices. Numerous channels highlight the relationship between macroeconomic variables (such as Gross domestic products (GDP), inflation, unemployment, interest rate) and the securities of financial markets (such as stock, bonds, money market and other market securities).[23] The early studies on fundamental macroeconomic variables and stock market are those of Bodie (1976) and Fama (1981) who explain the relationship of inflation and stock returns with respect of real economic activity. Similarly, Kaul (1987) and Du (2006) consider the relationship between inflation and stock returns given the monetary policy effect (demand and supply shocks). Studies by Bloom et al. (2007) and (Bloom, 2009) also show that the macroeconomic risk is highly related to aggregate investments, employment, and output dynamics. All these potential links suggest that the prices of financial securities are associated with the changes in macroeconomic variables.[24] Hence, the expected performance of the market participants (for example institutional investors like mutual funds) in the financial markets is likely to get influenced by macroeconomic news. Jank (2012) identifies that mutual funds react to the new macroeconomic information and this new information is reflected in both fund flows and market price.

[23] See for example Fama (1981); Geske and Roll (1983); Chen et al. (1986); Kaul (1987); Barro (1990); Fama (1990); Schwert (1990); Choi et al. (1999); Goetzmann and Massa (1999); Lettau and Ludvigson (2001); Du (2006); Du et al. (2012); Narayan et al. (2014).

[24] Another amount of literature popularly known as "literature on return predictability" which documents that "predictive variables are closely linked with economic variables. These predictive variables forecast changes in the returns of securities in the market (Fama & French, 1989; Campbell & Thompson, 2008). These variables are for example; dividend yield (Keim & Stambaugh, 1986; Fama & French, 1989; Hodrick, 1992; Lamont, 1998; Lettau & Ludvigson, 2001; Lettau & Ludvigson, 2005; Westerlund, Narayan, & Zheng, 2015), term spread (Fama & French, 1989; Schwert, 1990), treasury bill rate (Campbell & Viceira, 1996) are some of the common predictive variables documented by previous studies which capture not only the expectation of investor about future returns but also establish link between market returns and fundamental economic variables (Chen et al., 1986).

3.2.1 Information Response Theory (IR)

The Information Response theory emphasizes on the permanent changes (rather than temporary) in the behavior of market prices and fund flows to new macroeconomic information in the market. It entails that market returns and fund flows react simultaneously to the new information. The researchers who reject both PP and FT theory [such as, (Warther, 1995; Jank, 2012)] state that neither the fund flows moves the market (PP theory) nor the market moves the fund flows (FT theory), but instead, there is a third variable which is the macroeconomic variable (IR theory) which brings reactions and movements concurrently to both market returns and fund flows (Warther, 1995; Jank, 2012). Ben-Rephael et al. (2011) explain that under the information response theory, positive (negative) information in the financial market results in positive (negative) securities returns and inflows (outflows) by mutual funds. The initial test on IR theory is conducted by Fama (1981) on stock market in which it is determined that one of the reaction of stock market returns is due to the new information regarding real investment. Goetzmann and Massa (1999) also find that prices do not mean revert if the information is based on permanent macroeconomic news and no correlation exist between flows and future returns.

IR theory has two assumptions. First, the mutual fund flows react to the macroeconomic information. Second, mutual fund flows predict macroeconomic conditions. IR theory states that fund flows respond positively to the new superior information. Fama (1981) tests information response theory in stock market and discovers that stock market returns react to new information regarding real investment. Further, the information response theory is supported by Jank (2012) who suggests that strong correlation exists between equity mutual fund flows and stock market returns concurrently due to the news regarding macroeconomic information. Moreover, Jank (2012) states that under information response theory, mutual fund flows should be able

to forecast the economic conditions if they make their investment decisions based on the information about economic activity.

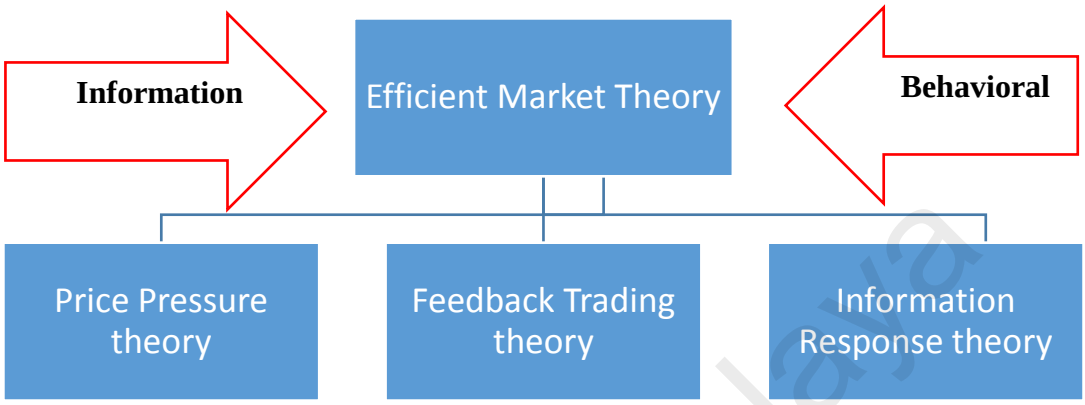

Figure 3.1: Efficient market theory and related theories

[Source: Harmes (2000)]

3.3 Evolution of Flow-Return-Economy Theories

Theoretical linkages of theories on mutual funds, financial market variables, and macroeconomic mechanism are linked with the well-known "Efficient market theory" (Fama, 1970). The three established and testable theories (price pressure, feedback trading, and information response discussed earlier) related to the relationship of flow-market-economy nexus are linked to the neoclassical efficient market theory. The efficient markets theory states that the stock prices fully reflect the information and investors are able to respond to the market information efficiently. Under the efficient market theory, one cannot earn return in excess of average returns in market given the information is quickly available to everyone in the financial market as market are is efficient in incorporating information. In other words, security prices reflect complete information about overall market as prices adjust swiftly to the new information arriving in the market. Particularly, the semi-strong efficiency form explains that stock prices must

contain all available information including public information. This information has imperative implications for financial analysts and policy makers. For instance, it is stated that stock prices should reflect the expectations about corporate world performance and that performance is dependent on the level of macroeconomic conditions. This would means that if security prices and trade accurately reflect the economic fundamentals, then trading in security market should be considered as predicting indicator of economic activities. Therefore studying the trading practices (reflected in fund flows and security prices/NAVs) of institutional investors (Mutual funds) and financial market variables would be considered indispensable in devising an economy's macroeconomic policies.

Neoclassical efficient market theory asserts that independent institutional investors and decentralized markets are able to efficiently exercise influence over investment and allocation decision making. This is happening due to the growing trend of disintermediation, liquidation, and securitization. However, in spite of this trend, the efficient market theory has been challenged from taking into account the "information asymmetries" and cognitive biases of individual investors (behavioral finance). [25] The former states that investors are unable to make accurate investment decisions about securities future returns due to lack of information which can lead to "adverse selection" problem (Brealey et al., 1977) . On the other hand, behavioral finance argues that some investors (Mutual funds) are not fully rational, and their trades (flows) are affected either by their sentiments and beliefs (price pressure theory) or by following other investors and trends, (feedback trading theory) rather than trading process being fully justified by economic fundamentals (information response theory).

[25] Stiglitz (1990) states that the confidence of market analyst and economist is shaken in the situation when security prices in market do not depict fundaments accurately and those prices have important influence on resource allocation. For details discussion on information asymmetries and behavioral finance refer to Brealey, Leland, and Pyle (1977) and Shiller (2003).

Furthermore, neoclassical efficient market states that institutional autonomous investors contribute in asset allocation in three ways. First, institutional investors make centralized investment decision-making and influence the overall security market (price pressure theory). Second, institutional investors observe and follow the behavior of others and ignore economic fundamentals (Feedback trading theory). Finally, they evaluate economic fundamentals and incorporate information in their decision making (Information response theory). Thus, the neoclassical efficient market theory assumption indirectly relates with the mutual funds behavior of how efficiently they incorporate both market and economic related information which is depicted in the trading behavior (fund flows) of mutual funds (Harmes, 2000).

3.3.1 Price Pressure Theory and Efficient Market Theory

Neoclassical assumption states that institutional investors may make centralizing investment decision-making and influence the market by increasing and decreasing the price with their trading. This assumption is reflected under PP theory which states that institutional investors bring price pressure in the financial market by trading excessively. Excessive buying (selling) by them pushes the prices upward (downward) in the market the next day. As a result, excessive trading causes the market return to move and react. This reaction of market occurs due to demand and supply effect on prices rather than permanent fundamental information effect. This happens due to higher capital inflows (outflows) in market which lead the price of the asset to surge (decline), which further reinforces the investors' favorable (unfavorable) view for further investment in the asset. Thus, it becomes obvious for arbitragers to not only chase the herd, but to also give rise to trend-following behavior of traders.

However, the neo classical assumption states that unfettered financial markets may remain efficient even if some investors do not adopt rationalism in their investment

policies. Specifically, it argues that liberalized financial markets will always allocate capital efficiently due to the existence of 'arbitragers'. Arbitragers are rational investors who buy and sell financial assets which have been mispriced by other investors, thereby bringing prices towards fundamentals and thus offset the price imbalances by non-rational investors (price pressurers).

3.3.2 Feedback Trading Theory and Efficient Market Theory

Earlier[26], it is stated that efficient market theory is challenged on the basis of not considering information asymmetries which can create opportunity for herding behavior (feedback trading effect) and market overreaction (price pressure effect). Under this situation, it becomes rational for the investors to chase or herd the trading behavior of other investors who have better information about underlying economic fundamentals. Thus, the investor trade based on past information and feedback of overall market and chase the trend accordingly. This also happens because institutional investors lack expertise and when the costs of collecting information are high. Taking this as a whole, FT theory explains that investors chase the past performance of overall market investors and react accordingly. The investors buy and sell securities with rise and fall in market price. It is the market that brings reaction and movement in the fund flows (Warther, 1995; Sirri & Tufano, 1998; Edelen & Warner, 2001; Oh & Parwada, 2007).

3.3.3 Information Response Theory and Efficient Market Theory

Conventional view suggests that investors under efficient market situation incorporate all underlying information comprising of market-related, micro-related, and macro-related information in their investment decision making. Keeping this view, MFs being professional investors are more seemingly and fully becoming rational due to better

[26] Refer to section 3.3 and 3.3.1.

market and economic information, thus is able to suppress noise trading through arbitrage. In other words, professional mutual fund managers (and the analysts who serve them) can lessen information asymmetries through their aggressive information gathering about underlying economic fundamentals. Neoclassical 'efficient markets theory' argues that security prices will always reflect economic fundamentals because some market investors may act irrationally and may move prices away from their fundamentals, however, there will always be others to move them in the opposite direction.

Efficient market theory was challenged and criticized on the basis of information asymmetries and behavioral biases. However, this gave new rise to theories e.g. PP, FT, and IR theory. Figure 3.1 explains the relationship of efficient market theory with other related theories. Davis (1998) states that national financial markets are gradually tending to be chosen strategically with prompt changing in response to macroeconomic conditions. Fama (1981) tests IR theory in stock markets and discovers that stock market returns react to new information regarding real investment. Further, the IR theory is supported by Jank (2012) who suggests that strong correlation exists between equity mutual fund flows and stock market returns concurrently due to the news regarding macroeconomic information. Overall, the neoclassical 'efficient markets theory' contends that any centralization or concentration of power does not exist within the financial markets that may influence funds to be allocated in a collective (PP theory) or, herd fashion (FT theory) or in such a way that neglects economic fundamentals (IR theory).

Neoclassical Efficient market states that institutional autonomous investors contribute in asset allocation in three ways. First, institutional investors make centralizing investment decision-making and influence the overall security market (price pressure theory). Second, institutional investors observe and follow the behavior of others and ignore economic fundamentals (FT theory). Finally, they evaluate economic

fundamentals and incorporate information in their decision making (IR theory). Thus, the neoclassical efficient market theory assumption relates with the Mutual funds behavior of how efficiently they incorporate both market and economic related information which is depicted in the trading behavior (fund flows) of Mutual funds.

3.4 Conceptual Framework

The current study focuses on the relationship of MFs, stock market variables and macro economy in order to examine the investment behavior of mutual funds in the market keeping in view market-related and economic-related information. It seeks to know whether mutual fund efficiently incorporate new information in their trading decisions coming from the financial market and related to economic news. Moreover, the study aims to check the performance of both market and mutual funds with respect to innovation in economic information. Figure 3.2 depicts the relationship among the different variables in this study. Following Jank (2012) and Kopsch et al. (2015), the relationship between mutual fund flows and market variables is determined under PP and FT theories displayed in path 1 and 2. Furthermore, the study tests IR theory to determine concurrent relationship among mutual fund flows, stock market, and macroeconomic variables depicted in path 3a and 4a through path 3b and 4b.

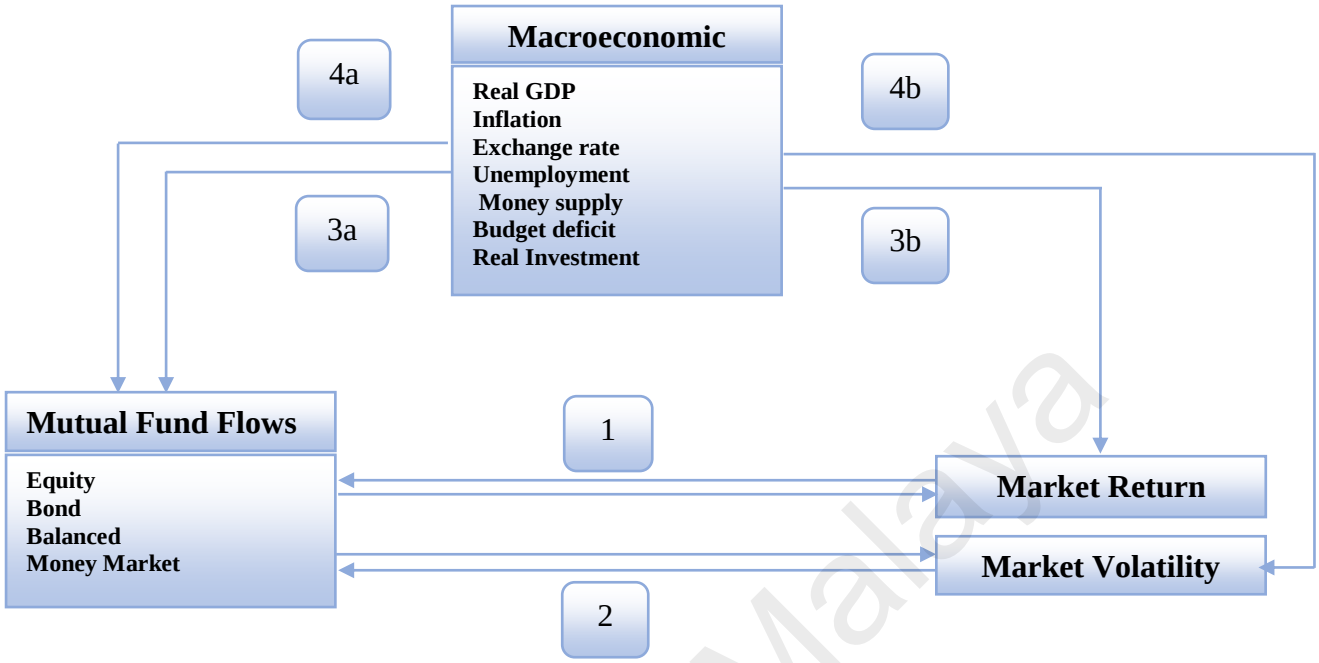

Figure 3.2: Conceptual Framework

Path 1 = Determine the relationship between mutual fund flows and market returns under price pressure theory and feedback trading theory.

Path 2 = Shows the relationship between mutual fund flows and market volatility in context of feedback trading theory and price pressure theory.

Path 3a= Tests information response theory to determine concurrent relationship among mutual fund flows, market returns and macroeconomic variables linked with path 3b.

Path 3b = Test information response theory to determine concurrent relationship among mutual fund flows, market returns and macroeconomic variables linked with path 3a.

Path 4a= Tests information response theory to determine concurrent relationship among mutual fund flows, market volatility and macroeconomic variables linked with path 4b.

Path 4b = Test information response theory to determine concurrent relationship among mutual fund flows, market volatility and macroeconomic variables linked with path 4a.

CHAPTER 4: METHODOLOGY

4.1 Introduction

The choice of an appropriate methodology is one of the most important component of a research study. Even a well-established theory may provide misleading findings if tested through inappropriate methodology. The research methodology consists of several important steps such as choice of sample, sample period, identification of suitable variables, data collection, data cleaning, application of estimation techniques and testing the suitability of estimation models (Neuman, 2002; Kumar & Phrommathed, 2005). This chapter discusses the methodology of this study. It includes the definition of variables, estimation techniques and sample data discussion. Section 4.2 discusses the estimation techniques used under study. In section 4.3, the study methodology to accomplish the objectives of this study is presented. This includes the related equations, dependent and independent variables along with expected outcomes for such variables. Section 4.4 concludes the methodology section by discussing the sample study, justification for selected sample, data period and data source in detail.

The first objective of the study is to find causality between MFs and market returns. That is to examine the relationship between MF flows—i.e. equity, bond, balanced and money market—and stock market returns (price pressure theory and feedback trading theory). The second objective is to find causality between MFs and market volatility. That is to examine the relationship between MF flows—i.e. equity, bond, balanced and money market—and stock market volatility (price pressure theory and feedback trading theory). The third objective is to find out whether macroeconomic variables (GDP, inflation, investment, unemployment rate, etc.) have any influence on the causality between fund flows and stock market returns (information response theory). The fourth objective is to find out whether macroeconomic variables have any influence on the causality between fund flows and stock market volatility (information response theory).

4.2 Econometric Models

This section provides details of the estimation techniques. The study applies Panel vector autoregressive model (PVAR) model to achieve objectives of the study. PVAR helps to evaluate the interaction between endogenous variables and permits an unobserved heterogeneity (Love & Zicchino, 2006). Prior studies on this topic, such as Edwards and Zhang (1998), Ben-Rephael, Kandel, and Wohl (2012) Jank (2012) and Kopsch et al. (2015) also use the VAR model. However, they applies VAR in the time series setting. Development of PVAR model is discussed in detail in the following section.

4.2.1 Vector Autoregressive Model (VAR)

The vector autoregression (VAR) is an econometric model used to capture linear interdependencies among multiple time series. VAR models generalize the univariate autoregressive model (AR model) by allowing more than one evolving variable. All variables in a VAR are treated symmetrically in a structural sense (although the estimated quantitative response coefficients will not be the same in general); each variable has an equation explaining its evolution based on its own lags and the lags of the other model variables.

The VAR framework treats all variables in the system as endogenous and does not necessitate a prior theory to integrate variables in the model, which makes VAR modeling effective in financial markets and macroeconomics (Bernanke & Blinder, 1992; Bernanke & Gertler, 1995). The VAR modeling does not require as much knowledge about the forces influencing a variable as structural models with simultaneous equations do. The only prior knowledge required is a list of variables which can be hypothesized to affect each other intertemporally. A VAR model describes the evolution of a set of k variables (called endogenous variables) over the same sample period of time (t = 1... T) as a

linear function of only their past values. The equation of a bivariate auto regression in usual time setting is represented as follows:

$$y_t = \alpha_0 + \sum_{p=1}^{m} \alpha_p y_{t-1} + \sum_{q=1}^{n} \delta_q x_{t-1} + u_t \tag{4.1}$$

Where the $a's$ and $\delta's$ are the coefficients of the linear prediction of y_t onto past value of y_t and $x_t; u_t$ is normal but not iid; y_t and x_t are stationary. In contrast to time series applications, a panel data generally has a smaller number of time series units and a large number of cross sectional observations. A modified model presented by Chamberlain (1982) relaxes time stationarity assumption with individual effects and posits that there are N cross sectional units perceived over T period represented as follows:

$$y_{it} = \alpha_{0t} + \sum_{p=1}^{m} \alpha_{pt} y_{it-1} + \sum_{q=1}^{n} \delta_{qt} x_{it-1} + \psi_t f_i + u_{it} \tag{4.2}$$

Where f_i is an unobserved individual effect and the coefficients $\alpha_{0t}, \alpha_{1t}, \ldots\ldots\ldots,$ $\alpha_{mt}, \delta_{lt}, \ldots\ldots\delta_{nt}, \psi_t$ are the coefficients of the linear estimate of y_{it} on a constant past value of y_{it} and x_{it}, and the individual effect f_i.[27]

4.2.2 Panel Vector Autoregressive Model (PVAR)

PVAR model combines the customary VAR methodology, which considers all variables in the system as endogenous in the panel data that permits unobserved individual heterogeneity (Love & Zicchino, 2006). The study avoids the standard fixed effect estimator, which is known to be biased in panels comprising of lagged endogenous

[27] Refer to Chamberlain (1982) and Holtz-Eakin, Newey, and Rosen (1988) for detail discussion on Panel VAR.

variables (Holtz-Eakin et al., 1988; Canova & Ciccarelli, 2013). This bias becomes extreme if the time dimension is small. However, this bias can be overcome by using generalized methods of moments (GMM) or instrumental-variables estimators. It is observed that even if the time dimension is large, the standard fixed-effects estimator is unreliable in dynamic panels if the coefficients on the lagged endogenous variables vary across countries. The reason for this inconsistency is that limiting the slope coefficients to be the same across groups creates serial correlation problem in the residuals when the regressors are auto-correlated (Assenmacher & Gerlach, 2008). This serial correlation does not disappear when instrumental variable estimation is applied (Pesaran & Smith, 1995).

Following Abrigo and Love (2016), the study considers a k-variate identical PVAR of order p with panel-specific fixed effects by the linear equations as shown below:

$$Y_{it} = Y_{it-1}A_1 + \cdots + Y_{it-p}A_p + X_{it}B + u_i + e_{it} \quad (4.3)$$

Where Y_{it} is a $(1xk)$ vector of dependent variables; X_{it} is a $(1xl)$ vector of independent variables; u_i and e_{it} are $(1xk)$ vectors of dependent variable-specific panel fixed-effects and idiosyncratic errors, respectively. The (kxk) matrices $A_1 \ldots \ldots A_p$ and the (lxk) matrix B are coefficients to be estimated. In PVAR setting, it is important to impose certain restrictions so that the cross sections have homogenous structure. However, practically it is difficult to identify these constraints. An alternative approach to avoid such restrictions on parameters is to allow individual heterogeneity by introducing fixed effects. We use Helmert procedure (Arellano and Bover, 1995) to eliminate the fixed effects instead of mean differencing.[28] Accordingly, a reduced-form

[28] The mean differencing used to eliminate fixed effects from dynamic panel models creates biased coefficients due to the correlation between fixed effects and lags of dependent variables. On the other hand, forward mean differencing (Helmert procedure) removes the mean of all future observations. The Helmert transformation conserves the orthogonality of the transformed variables and lagged regressors which can be used as instruments.

PVAR in a generalized method of moments (GMM)[29] environment is used following Love and Zicchino (2006).[30] The purpose is to find the dynamic relationship of mutual funds and market returns. PVAR in GMM environment is discussed in the following section.

4.2.2.1 PVAR Model by GMM Estimation

Holtz-Eakin et al. (1988) identify that equation-by-equation GMM estimation yields consistent estimates of PVAR and provides efficient estimates. Suppose the common set of $L \geq kp + l$ instruments is given by the row vector Z_{it}, where $X_{it} \in Z_{it}$, and equations are indexed by a number in superscript. Where K is the number of parameter, p stands for number of lags. This indicates that number of instruments are either equal to or greater than the unknown parameters.

Consider the following transformed PVAR represented in a more compact form.

[29] Wooldridge (2001) and Assenmacher and Gerlach (2008) state that GMM is feasible for estimating interesting extensions of the basic unobserved effects model, for example, models where unobserved heterogeneity interacts with observed covariates.

[30] To avoid the problem of mean-differencing procedure to eliminate fixed effects, Helmert procedure transformation is used to estimate coefficients by GMM. For detail discussion, refer to Arellano and Bover (1995), Love and Zicchino (2006) and Assenmacher and Gerlach (2008).

$$Y_{it}^{*} = \overline{Y_{it}^{*}}A + e_{it}^{*}$$

$$Y_{it}^{*} = [Y_{i,t}^{1*} \dots \dots . Y_{i,t}^{k*}]$$

$$\overline{Y_{it}^{*}} = [Y_{i,t-1}^{*} \dots \dots . Y_{i,t-p}^{*} \quad X_{i,t}^{*}] \tag{4.4}$$

$$e_{it}^{*} = [e_{it}^{1*} \quad \dots \dots e_{i,t}^{k*}]$$

$$A' = \left[A_1' \ \dots . . A_p' \qquad B'\right]$$

Where the asterisk denotes some transformation of the original variable. If we denote the original variable as m_{it}, then the first difference transformation imply that $m_{it}^{*} = m_{it} - m_{it-1}$, while for the forward orthogonal deviation $m_{it}^{*} = (m_{it} - \overline{m_{it}})\sqrt{T_{it}/(T_{it}+1)}$, where T_{it} is the number of available future observations for panel i at time t, and $\overline{m_{it}}$ is its average.

If we consider observations over panels then over time then the GMM estimator is given by

$$A = \left(\overline{Y^{*}}' Z \, \widehat{W} \, Z' \overline{Y^{*}}\right)^{-1} (\overline{Y^{*}}' Z \, \widehat{W} \, Z' Y^{*}) \tag{4.5}$$

Where (W)ˆis a (L x L) weighting matrix assumed to be non-singular, symmetric and positive semi-definite (L is lower triangular matrix). Assuming that E[Z^' e]=0, i.e. instruments are exogenous and rank E[(Y^*)¯^' Z]=kp+l, the GMM estimator is consistent. Where ^ stands for "and". The weighting matrix (W) may be selected to maximize efficiency (Hansen, 1982). [31]

To determine the relationship between MF flows, market variables and macroeconomic variables, the study applies panel vector autoregressive model (PVAR). PVAR helps to evaluate the interaction between endogenous variables and permit for

[31] Roodman (2006) provides detailed explanation of GMM estimation using stata in a dynamic panel setting.

unobserved heterogeneity (Love & Zicchino, 2006). Earlier studies on this topic such as Edwards and Zhang (1998), Ben-Rephael et al. (2012) Jank (2012) and Kopsch et al. (2015) also use VAR model however they apply VAR in time series setting. The study uses reduced-form PVAR in generalized method of moments (GMM)[32] environment following Love and Zicchino (2006).[33] The purpose is to test the three conventional theories related to dynamic relationship of MFs, market variables and macroeconomic variables. Granger causality Wald test[34] is also estimated to validate the results.

4.2.2.2 *Impulse Response Function*

The impulse-response function is a post-estimation analysis which describes the reaction of one variable to the innovations in another variable in the system, while holding all other shocks equal to zero. The analysis of the study is indirectly based on fund flows in which, after controlling the macroeconomic variables, the effect of market returns on fund flows is interpreted. This can be done by orthogonalizing the impulse responses of one variable with another. Because the shocks are orthogonalized, i.e. 'fundamentals' are kept constant, the impulse response of fund flows to market returns isolates the effect of the macroeconomic variables. The impulse response function (IRF) captures the response of one variable to shock in another variable in a system of equations by controlling all other shocks. However, it is important to segregate the shocks in the system to study the impact of a particular shock. Unfortunately, the variance-covariance matrix of the residuals is not necessarily a diagonal matrix. The conventional method to get orthogonal

[32] Wooldridge (2001) and Assenmacher and Gerlach (2008) state that GMM is feasible for estimating interesting extensions of the basic unobserved effects model, for example, models where unobserved heterogeneity interacts with observed covariates.

[33] To avoid the problem of mean-differencing procedure to eliminate fixed effects, Helmert procedure transformation is used to estimate coefficients by GMM. For detail discussion, refer to Arellano and Bover (1995), Love and Zicchino (2006) and Assenmacher and Gerlach (2008)

[34] The study follows Holtz-Eakin et al. (1988), Podrecca and Carmeci (2001), Nair-Reichert and Weinhold (2001) who report Granger causality using panel data.

residuals is to follow a particular ordering of the variables. In this way, any correlation between residuals is allocated to a variable that appears early in the system. The underlying assumption is that the first variables are more exogenous than those appearing later in the system.

4.2.2.3 Forecast Error Variance Decomposition

The factor error variance decomposition calculates and segregates the variation in one variable caused by other variables in percentage. It describes the variation into different periods of time ahead. In other words, it specifies the amount of information of the relative contribution for each variable by providing forecast error variance of the desired variable in the system. The variance decompositions show the total effect magnitude. The study calculates the total effect accumulated over the 10 years following Love and Zicchino (2006). After the estimation of orthogonalized impulse response functions, pvarfevd command is applied to compute factor error variance decomposition (FEVD).

4.2.3 Models for Additional Check

The study estimates another empirical model which is 'Panel model' for additional test to see contemporaneous relations among variables. Hausman test and Breusch-pagan Lagrange Multiplier test help to decide that which panel model is applicable.

The panel data refers to multi-dimensional data comprising measurements over time. Panel data include multiple phenomena observations acquired over several time periods for the same individuals or entity. It is also called longitudinal data wherein a subject or cluster includes a member or individual in a longitudinal study.

The study estimates empirical model with the following specification.

$$y_{it} = \alpha_i + \beta_i x_{it} + \varepsilon_{it} \qquad (4.6)$$
$$i=1\ldots..,\ N,\ t=1,\ldots.\ T$$

Where y_{it} is the dependent variable and $x_{it} = (x_{1it}, x_{2it}, \ldots\ldots x_{mit})$ is the vector of explanatory variable. t denotes the time dimension and i is the cross sectional dimension for individual markets. α_{it} is specific country intercept and $\beta = (\beta_1, \beta_2, \ldots\ldots\ldots \beta_m)$ is the vector of m parameters to be estimated and ε_{it} is the error term.

4.3 Methodology

Generally, the study aims to determine the role of MFs in financial market and in overall economy. However, specifically the study attempts to identify the consistent relation of funds with financial market and macro-economic variables under three theories (PP theory, FT theory and IR theory). Hence, the study seeks to answer specific questions in sequence of relationships that is relationship of fund flows with market returns and market volatility (PP and FT theory) and relationships of fund flows with macroeconomic variables (IR theory). In addition, the study addresses the question of whether MF flows can be used as one of the measure of predicting future economic conditions. Table 4.2 provides summary of the variables, definitions and data sources.

4.3.1 MF Flows and Stock Market Returns

To achieve the first objective, the study estimates panel bivariate VAR model i.e., to determine the relationship between equity, bond, balanced and money market fund flows and market returns. The study constructs the two equations.

$$Flows_{i,t} = \alpha_1 + \sum_{j=1}^{m} \beta_{1,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{2,k} MR_{i,t-k} + \varepsilon_{1i,t} \quad (4.7)$$

$$MR_{i,t} = \alpha_2 + \sum_{j=1}^{m} \beta_{3,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{4,k} MR_{i,t-k} + \varepsilon_{2i,t} \quad (4.8)$$

Equation 4.7 is set to determine the relationship of MF flows with market returns under feedback trading theory which states that MF flows follow the lagged market returns (past

performance). Equation 4.8 shows the relationship of MF flows and market returns under price pressure theory which states that MF flows bring price pressure in the market prices by investing excessively. MF flows shown as $Flows_{i,t}$ in equations 4.7 and 4.8 are proxy for MF trading behavior in the financial market.

4.3.1.1 Fund Flows

The study calculates aggregate fund flows on a monthly and quarterly basis. According to Sirri and Tufano (1998), flows are defined as the net growth in mutual fund assets excluding reinvested dividends. Net flows are explained as net sales or net trading (net buying less net selling), which is a proxy of mutual fund trading behavior in financial markets (Warther, 1995; Ferreira et al., 2012; Thomas et al., 2014). This shows that fund flows represent net trading or net investment by mutual funds in financial markets. Moreover, flows represent the growth of funds in surplus of the growth that would have arisen if new funds have flowed in and all dividends have been reinvested. According to Ferreira et al. (2012), the flows are defined as new money growth rate, since the net growth in total net assets (TNAs) is not dominated due to dividends and capital gains on the assets under management but is due to new external money earned through investment (net trading by mutual funds) in the financial markets. Thus, flows are a proxy of mutual funds' investment or trading behavior. Monthly data has been used to perform tests to check the dynamics of the flow-return-volatility relationship. We follow Sirri and Tufano (1998), Ferreira et al. (2012) and Ferson and Kim (2012), to calculate fund flows through equation 4.9:

$$Flows_{i,t} = [TNA_{i,t} - TNA_{i,t-1}(1 + R_{i,t})]/TNA_{i,t-1} \quad (4.9)$$

where $TNA_{i,t}$ is the total net asset in dollar amount of fund i at the end of period t, and $R_{i,t}$ is fund i's raw return in dollar value in period t. Monthly and quarterly TNA and fund returns' data of each individual fund of each fund category (equity, bond, balanced

and money market funds) have been extracted. Then, flows of each individual fund are calculated through equation 4.9 of each country. Finally, the flows of each period of all individual funds of each country are summed up to obtain the aggregated fund flows of each period (such as one month or one quarter). For instance, the flows of the sample of 189 equity mutual funds in Indonesia has been summed up for each period (i.e., January 2000 to December 2015), to obtain the aggregated equity fund flows of Indonesia. [35]

Market returns are represented by Index returns which are calculated as ln [I (t)/I (t-1)]. $MR_{i,t-1}$ stands for market returns with lagged value as indicated by subscript *t-1*. Final term "$\epsilon_{i,t}$" in all equations is a random error term. Relationship between MF flows and market returns is expected to be positive with current fund flows and lagged returns because FT theory suggests that positive lagged returns bring inflows in the markets and vice versa.

Equation 4.8 tests relationship of MF flows and market returns under price pressure theory. Here in equation 4.8, independent variable is MF flows and dependent variable is market returns. Under the price pressure theory, it is observed that fund flows bring pressure in the security price, thereby affecting the market returns. Independent variable is MF flows ($flows_{i,t-1}$) which is used as proxy for MF trading behavior in the financial market with lag value. To calculate the market returns, market indices are taken as proxy of market returns whereas, $MR_{i,t-1}$ stands for market returns with lag value as indicated by subscript *t-1*. "$\epsilon_{i,t}$" in all equations is a random error term. According to the price pressure paradigm, huge inflows into the funds will push up the prices of securities and vice versa. However, it is reversed back, implying a negative relationship between lagged fund flows and future returns. Thus, the relationship between MF flows and market return

[35] See Table 4.1 for details of total number of mutual funds in each country.

is expected to be negative because the prices changes are transitory and will revert back once the pressure will vanish. Over all, the equity fund flows are expected to be positively associated with stock market returns whereas, bond, balanced and money market MFs are presumed to have negative relationship with stock market return. It is due to the fact that higher market returns entail higher flows of equity funds and lower fixed income/balanced fund flows, and vice versa. For deeper analysis of fund flows and robustness check, the study adopts the approach of Warther (2005) and Jank (2012) by splitting the fund flows into expected component and unexpected component. Where unexpected component is represented by estimated residuals and expected fund flows is represented by fitted values of panel regression fixed effect model,[36] where fund flows are dependent variable.

4.3.2 MF Flows and Market Volatility

The second objective of this study is to determine the impact of equity, bond, balanced and money market MFs on the volatility of financial market. To achieve this objective, the study constructs two equations to test feedback trading theory and price pressure theory in the context of relationship of fund flows with market volatility (Risk). It is observed that PP theory and FT theory have been tested in the context of determining the relation of market return with MF flows. However, limited studies [such as, (Oh & Parwada, 2007; Thomas et al., 2014)] have tested the relationship of MF flows with market volatility. Testing the relation of market volatility with equity, bond, balanced and money market fund flows is an addition in the empirical literature as highlighted by Thomas et al. (2014).

[36] Jank (2012) states that changes in the predictive variables (unexpected) determine the unexpected changes in mutual fund flows.

The following equations are proposed to achieve the second objective.

$$Flows_{i,t} = \alpha_1 + \sum_{j=1}^{m} \beta_{1,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{2,k} MV_{i,t-k} + \varepsilon_{1i,t} \quad (4.10)$$

$$MV_{i,t} = \alpha_2 + \sum_{j=1}^{m} \beta_{3,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{4,k} MV_{i,t-k} + \varepsilon_{2i,t} \quad (4.11)$$

Equation 4.10 is set to ascertain the impact of market volatility on fund flow. Where $MV_{i,t-1}$ stands for market volatility of *i* country index at the time period *t*. It indicates the impact of previous period volatility on current flows of fund. Oh and Parwada (2007) define volatility as a measurement of the square of the natural logarithm of return. The independent variable is market volatility which is defined as standard deviation of log of stock prices on a particular period of time. Following Cao et al. (2008), the study estimates the stock market volatility by GARCH model. Previous literature explains that the stock market returns reveal conditional heteroscedasticity (French et al., 1987; Nelson, 1991; Bekaert & Harvey, 1997), thus the study adopts a two-step procedure to estimate the volatility. First, the GARCH (1, 1) model is estimated with an AR (2) specification for the daily return on stock markets index. Second, conditional variance is estimated to obtain volatility estimators. The study takes the stock price index on a daily basis. In each country, this index is computed by the respective stock markets or central banks, and it covers more than 85% of total market capitalization.[37] The expected relation between market volatility and fund flows appears to be negative since increase in market volatility and risk reduces the trading activities by MFs. Thus, the MFs will opt for contrarian behavior (negative feedback trader) in the market.

[37] The Thomson Reuters DataStream database provides detailed information on the characteristics of the variable.

Equation 4.11 measures the impact of MFs trading on market volatility. Thomas et al. (2014) find that the significant reduction in market volatility occurs by the increase in investment of pension funds in stock. The impact of lagged flow (independent variable) on the current market volatility (dependent variable) is expected to be negative due to the information accessible to MFs that helps in controlling prices from deviating market fundaments. Under the price pressure theory, fund flows bring pressure in the market by increasing or decreasing the security prices. In context of market volatility, it is expected to reduce the market volatility with increased investment by funds.

4.3.3 Impact of Macroeconomic Variables on MF Flows and Market Returns

The third objective is to find out whether macroeconomic variables have any influence on the relationship between equity fund flows, bond fund flows, balanced fund flows, money market fund flows and financial market returns. To determine the flow-return-economy relationship, following equations are proposed.

$$Flows_{i,t} = \alpha_1 + \sum_{j=1}^{m} \beta_{1,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{2,k} MR_{i,t-k} + \sum_{p=1}^{r} \beta_{3,p} X_{i,t-p} + \varepsilon_{1i,t} \quad (4.12)$$

$$X_{i,t} = \alpha_2 + \sum_{j=1}^{m} \beta_{4,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{5,k} MR_{i,t-k} + \sum_{p=1}^{r} \beta_{6,p} X_{i,t-p} + \varepsilon_{2i,t} \quad (4.13)$$

$$MR_{i,t} = \alpha_3 + \sum_{j=1}^{m} \beta_{7,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{8,k} X_{i,t-k} + \sum_{p=1}^{r} \beta_{9,p} X_{i,t-p} + \varepsilon_{3i,t} \quad (4.14)$$

Equation 4.12, 4.13 and 4.14 are set to ascertain the relationship among MF flows, market returns and macroeconomic variables simultaneously. Since, endogeneity problem among fund flows, market returns and macroeconomic variables is suspected as reported by earlier studies,[38] the study estimates the PVAR model. Where *X* refers to the

[38] See studies by Bali et al. (2014) and Kopsch et al. (2015) who found causal relationship among fund flows, financial market and macroeconomic variables.

vector of macroeconomic variables (GDP, Inf, UE, Ex, TB, TS, DY, Inv, MS and DG).[39] The expected outcome is a positive relationship among fund flows, market returns and macroeconomic variables because fund flows and market returns increase with good economic news, and vice versa. The first difference in variables is taken into account while identifying the relationship in macroeconomic variables to fund flows.[40]

GDP stands for gross domestic production growth rate, Inf stands for inflation rate which is growth rate of Consumer price index (CPI) index and Ex stands for exchange rate in Home/USD currency. The study contributes by adding some novel variables. *UE* stands for unemployment rate, *Inv* for investment growth rate, MS for money supply measured as *M1*, and *DG* for budget deficit to the GDP ratio.

This study captures proxies of economic activity which are mainly associated with stock market variables and fund flows. Particularly, GDP growth rate and inflation rate captured by Jank (2012) along with other variables identified as gap in research for robustness check (for example, investment growth, money supply, fiscal policy, unemployment and exchange rate). GDP growth is mainly used as macroeconomic variable and is shown as actual measure to macroeconomic activity (Jank, 2012; Chatziantoniou et al., 2013; Bali et al., 2014). However, for robustness, other macroeconomic variables like investment growth, money supply, fiscal policy, unemployment, inflation and exchange rate are used. The other macroeconomic variables are found to have strong linkage with market variables, and therefore are considered under study. For example, the studies such as Bali et al. (2014) conclude that the equity market index, unemployment rate, inflation rate, and the growth rate of real gross

[39] Refer to table 4.2 for details of macroeconomic variables.

[40] Jank (2012) follow the approach of Chen et al. (1986) using the first difference of all predictive variables to identify the fund flows reaction to the news (changes in predictive variables) about real economy.

domestic product (GDP) per capita as macroeconomic variables are associated with business cycle fluctuations and significantly influence the fund returns. Fama (1981), Geske and Roll (1983), Kaul (1987), Barro (1990) and Fama (1990) conclude that greater variation in stock returns can be captured by prediction of economic variables like real GNP, investment and industrial production that are also considered as major determinants of firm's cash flow. Barro (1990) discovers that the fluctuations in stock prices have considerable explanatory influence for U.S. investment.

The studies on money supply, for example Kaul (1987) finds that the money supply policy through government revenue, expenditure and taxes has influence on the stock market movements. Geske and Roll (1983) state that stock market returns and government revenue fluctuations are closely related. Moreover, Laopodis (2009) identifies that large budgetary deficit has unfavorable impact on stock and bond prices due to raise in interest rates. Chatziantoniou et al. (2013) find that monetary policy and fiscal policy both have negative influence on stock market performance. Following Kaul (1987) and Laopodis (2009), M1 measure of money supply is used to calculate money supply growth rate. Government budget deficit is used as proxy for fiscal policy following Geske and Roll (1983) and Laopodis (2009). Studies on unemployment such as Geske and Roll (1983) and Bali et al. (2014) find that unemployment is associated with business cycle fluctuations and stock market reaction, and it also influences the MF returns. It also implies that higher unemployment signals negative shocks in the stock market. Flannery and Protopapadakis (2002) find that unemployment affect market return and conditional market volatility.

The previous studies on inflation has taken growth rate of CPI index as proxy for inflation (measure of price level). Fama (1981) concludes that there is a negative correlation between stock returns and inflation, and this correlation is indicated as proxy

for positive relation of stock returns and real economic variables. Furthermore, Kaul (1987) states that inflation and stock market return relationship varies on the basis of equilibrium process in the monetary policy and changing effect of money demand and supply factor. Other variables such as exchange rate is related to stock market returns and volatility. For example, Kopsch et al. (2015) find that exchange rate fluctuations (particularly exchange rate with dollar) has strong effect on international trading, stock market returns and flows to MFs. The expected relation between fund flows, market returns and macroeconomic variables appears to be positive since good economic news will increase fund flows and market returns concurrently, and vice versa. Therefore, the macroeconomic variables along with market returns may be considered as another determinant of MF flows under information response theory (Jank, 2012). The first difference of variables is taken into account while identifying the relationship of macroeconomic variables to fund flows.[41]

4.3.4 Impact of Macroeconomic Variables on MF Flows and Market Volatility

To determine the flows-volatility-economy relationship, the study estimates equation 4.15, 4.16 and 4.17.

$$Flows_{i,t} = \alpha_1 + \sum_{j=1}^{m} \beta_{1,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{2,k} MV_{i,t-k} + \sum_{p=1}^{r} \gamma_{1,p} X_{i,t-p} + \varepsilon_{1i,t} \quad (4.15)$$

$$X_{i,t} = \alpha_2 + \sum_{j=1}^{m} \beta_{3.j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{4,k} MV_{i,t-k} + \sum_{p=1}^{r} \gamma_{2,p} X_{i,t-p} + \varepsilon_{2i,t} \quad (4.16)$$

$$MV_{i,t} = \alpha_3 + \sum_{j=1}^{m} \beta_{5,j} Flows_{i,t-j} + \sum_{k=1}^{n} \beta_{6,k} MV_{i,t-k} + \sum_{p=1}^{r} \gamma_{3,p} X_{i,t-p} + \varepsilon_{3i,t} \quad (4.17)$$

Where $MV_{i,t}$ for market volatility for country *i* at the end of quarter *t* and *X* for vector of macroeconomic variables (GDP, Inf, UE, Ex, Inv, MS and DG). Fund flows

[41] Jank (2012) follows the approach of Chen et al. (1986) who used the first difference of all predictive variables to identify the fund flow reaction to the news (changes in predictive variables) about real economy.

and macroeconomic variables are expected to be positively related because fund flows increase with good economic news and vice versa. However, volatility and fund flows are expected to have negative relationship because increasing volatility indicates adverse economic conditions ahead.

In all estimations of section 4.3, time varying heterogeneity has been accounted for by introducing time dummies for each year. Inclusion of time dummies for year 2008 and 2009 also correspond to the global financial crisis. The coefficients on time dummies have not been reported to make results more representable. However, none of the coefficients on time dummies is significant. This also indicates that there are no structural breaks in variables corresponding to global financial crisis.

4.4 Sample and Data

The study uses data on MF flows for sample of selected developing countries including the Association of South East Asian Nations (ASEAN), Middle East and North Africa region (MENA), BRICS (Brazil, Russia, India and China, South Africa) and South Asian Association for Regional Cooperation (SAARC). ASEAN, MENA, BRICS and SAARC include Malaysia, Indonesia, Thailand, Singapore, the Philippines, Brazil, Russia, India, China, South Africa, Saudi Arabia, Israel, United Arab Emirates, Pakistan and Sri Lanka.[42]

4.4.1 Regional Developing Blocks

The stock market risk and return topic is of special interest to international portfolio managers particularly in emerging markets. The emergent interdependence of stock markets has been the subject of attention to researchers and practitioners over last two

[42] Figures 4.1, 4.2 and 4.3 show data of assets under management (AuM) of mutual funds relative to stock market capitalization of each country in the sample to better gauge the mutual fund industry growth of each country.

decades. This growing interdependence is attributed to surge in capital flows and prospective benefits of investment diversification across national boundaries and international level (Raza & Jawaid, 2014). After the financial reforms that erupts out of deregulation, the growth rate in ASEAN and BRICS economies are the highest in the world (Roca, Selvanathan, & Shepherd, 1998). ASEAN and MENA stock market integration has been in the limelight and focus of attention, specifically after the Asian financial crises. Studies suggest that integrated regional markets are more proficient as compared to fragmented national markets (Click & Plummer, 2005). Azman-Saini, Azali, Habibullah, and Matthews (2002) find the existence of opportunities for beneficial international portfolio diversification within the context of ASEAN equity market.

Moreover, the BRICS economies are the chief beneficiaries of international investments and capital flows. International investors pay special attention on the co-movement of the BRICS stock markets with international economic factors and global economic financial conditions given the opportunities of investment and risk diversification (Mensi, Hammoudeh, Reboredo, & Nguyen, 2014). Studies suggest that the integrated regional markets are more proficient as compared to fragmented national markets (Click & Plummer, 2005). While many developed countries faced severe adverse economic problems and recessions, emerging economies such as ASEAN and BRICS countries were less affected by the economic and financial crunches, and maintained vigorous growths (Samargandi & Kutan, 2016). Moreover, the financial sector of BRICS has developed noticeably over the last two decades. The growing international ties and financial trades among the BRICS economies has termed BRICS as potential economic world superpower (O'neill, 2011). Given the progressive role of these regional blocks as emergent developing economies in the world, investigating the role of MFs as institutional investors in developing economies would be relevant and interesting.

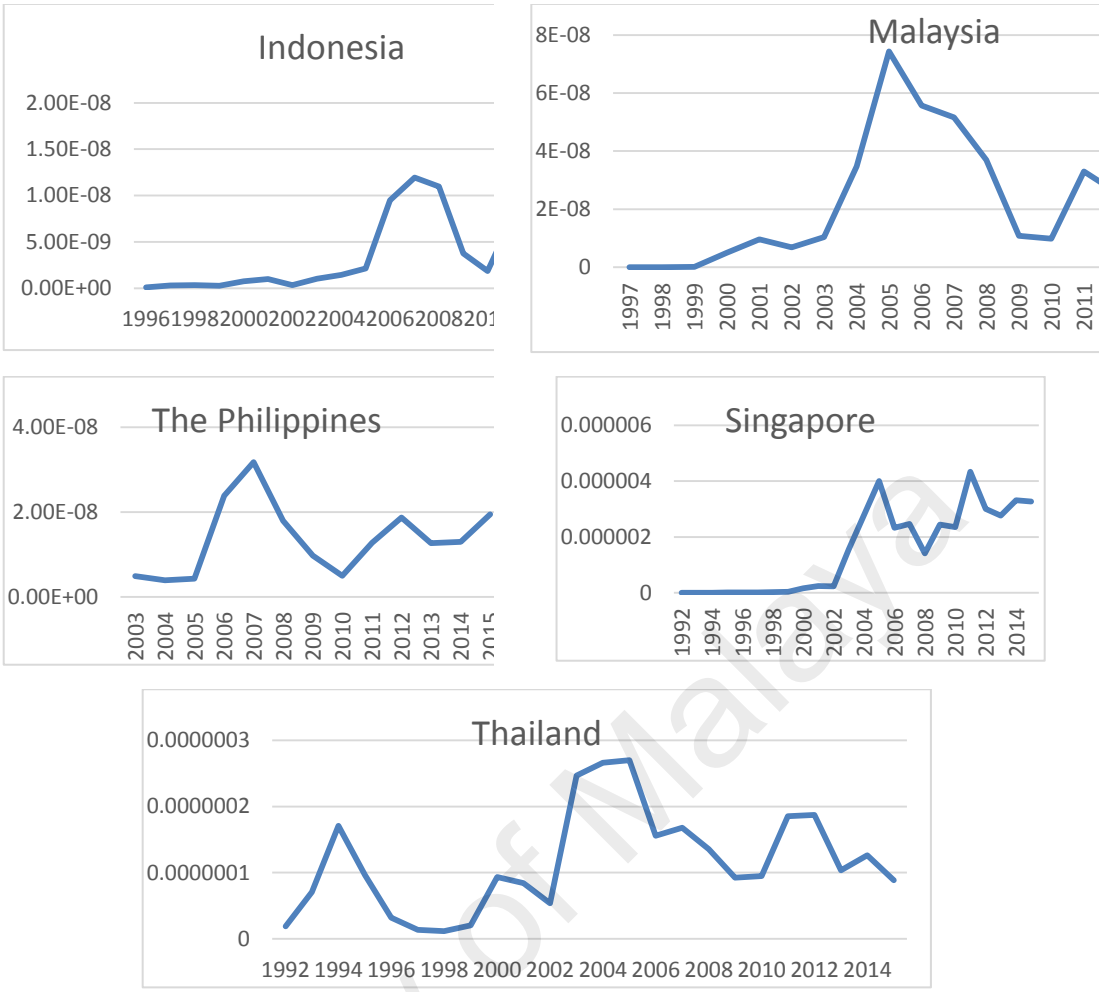

Figure 4.1: Total asset under management (AuM) relative to total stock market capitalization for ASEAN

Note: The X-axis shows the number of time periods and Y-axis shows the total asset under management to total stock capitalization.

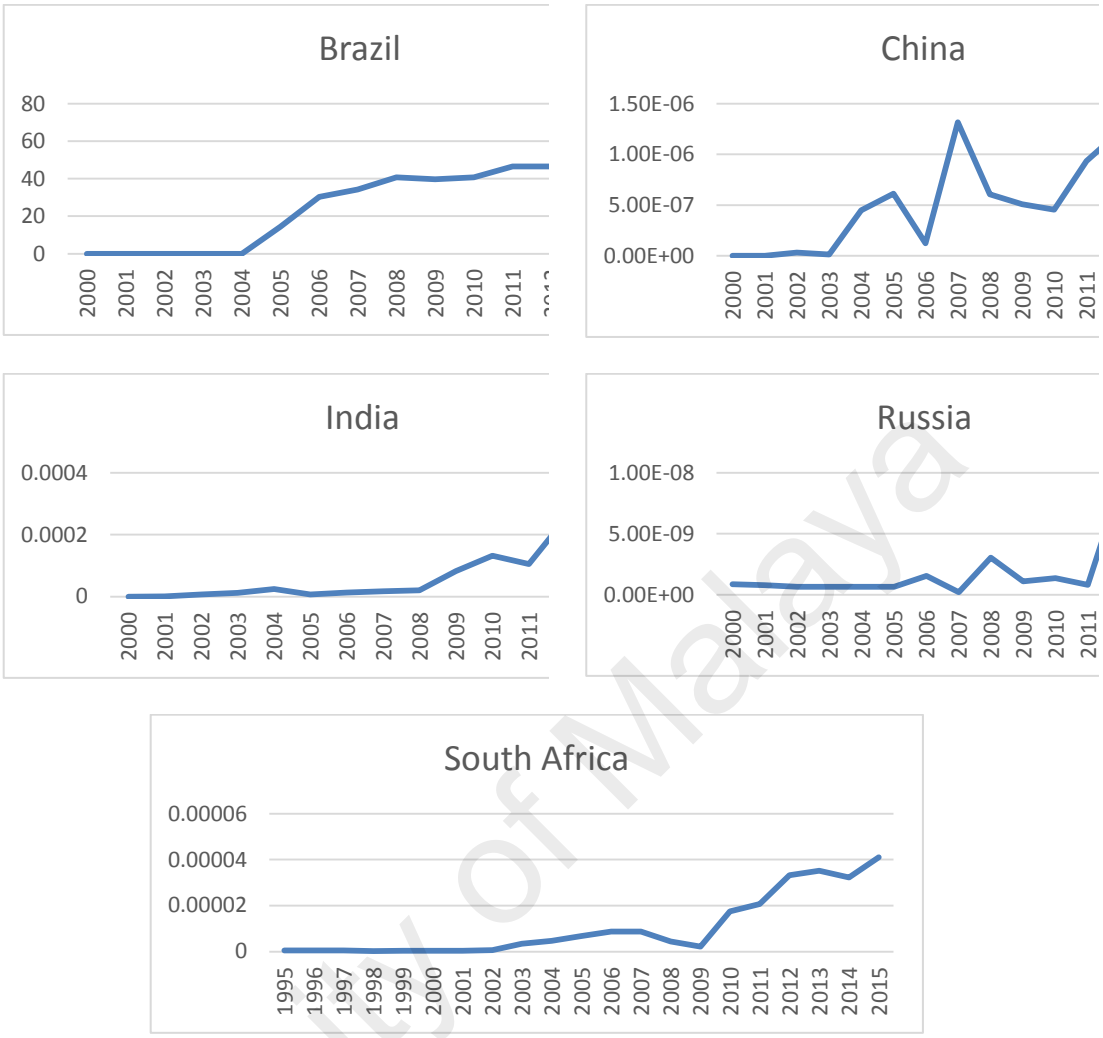

Figure 4.2: Total asset under management (AuM) relative to total stock market capitalization for BRICS

Note: The X-axis shows the number of time periods and Y-axis shows the total asset under management to total stock capitalization.

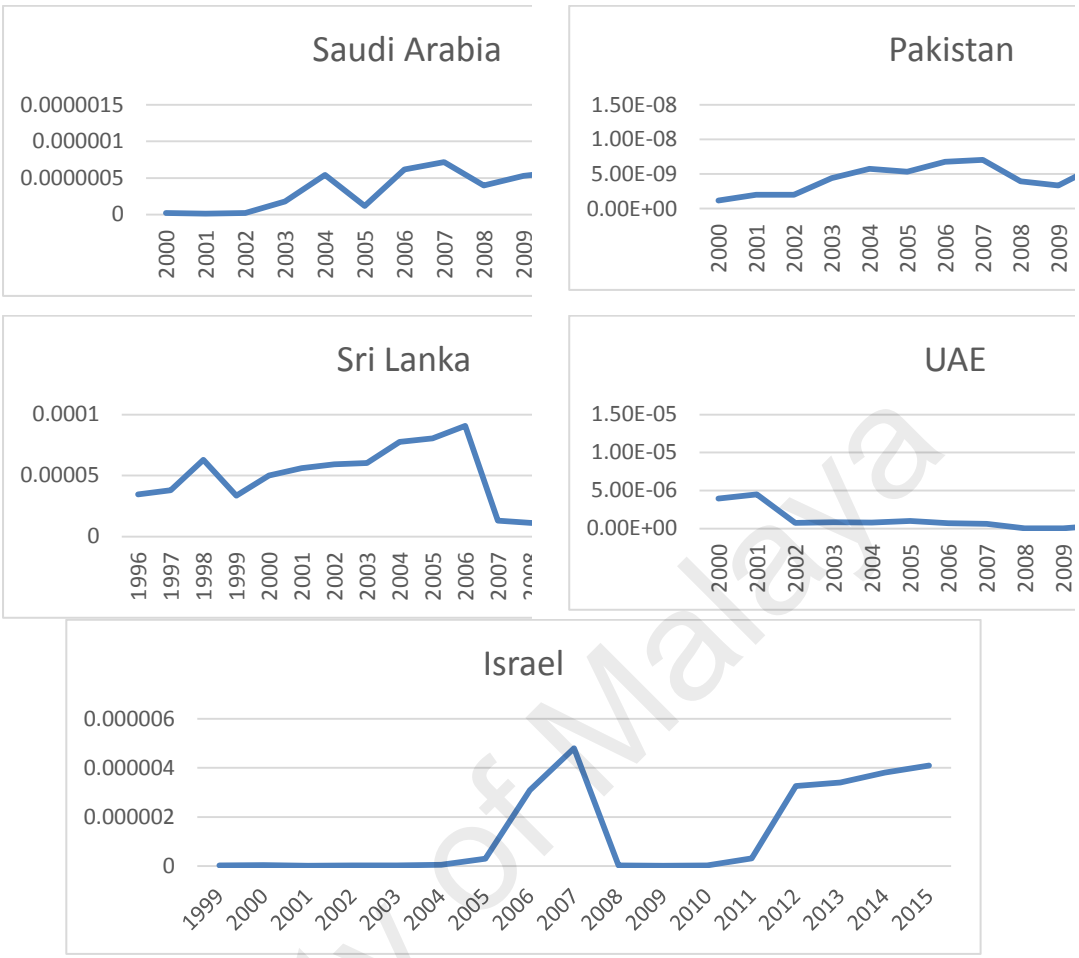

Figure 4.3: Total asset under management (AuM) relative to total stock market capitalization for MENA & SAARC

Note: The X-axis shows the number of time periods and Y-axis shows the total asset under management to total stock capitalization. Source: Total asset under management (total net assets) data is taken from Bloomberg database. Stock market capitalization data is taken from Thomson Reuter DataStream.

4.4.1.1 Difference between Developed and Developing Economies

The majority of studies on mutual funds mainly focused on developed countries [e.g., (Binswanger, 2004; Alexakis et al., 2013; Chatziantoniou et al., 2013; Thomas et al., 2014)].[43] These studies conclude that MFs are more sophisticated in their investment decision and will tend to be less behaviorally biased. They do not chase the market by putting more focus on the latest performance of MFs in more developed countries. It is due to the fact that developed countries have developed financial markets, higher access to information, lower participation cost and highly secured regulatory system (Ferreira et al., 2012). However, financial market structure of developing countries is different; characterized by fragile market mechanism, reduced access to information, higher participation cost, improper regulatory system and high volatility (Khorana et al., 2005; Halim, 2007). Although the MF has expanded around the globe, academic studies have been scarce and narrow in geographical context. The rising investment patterns of MF industry can be witnessed in recent times in the developing economies since the aftermath of Asian and Global financial crises.[44] Klapper, Sulla, and Vittas (2004) state that the mutual fund industry has erupted into the limelight around the world and mostly in middle-income countries during the 1990s after the Asian financial crises. It is because mutual funds provide safety liquidity and diversification to investors thus reduce risk. This has grabed the attention of investors towards mutual funds after facing financial crises repurcussions specially in developing countries that lack proper information mechanism and market structure to facilatiate investors.

[43] For instances, the studies in USA, China, Korea, Japan, Egypt and Turkey by Wermers (1999); Barber and Odean (2008); Rubin and Smith (2009); Zhou and Peng (2007); Li and Wang (2010); Choe et al. (1999); Karolyi (2002); Azzam (2010); and Aydogan et al. (2014).

[44] Garay (2003) states that Indonesia, Philippines, Malaysia, Singapore, Taiwan, Thailand and South Korea were the worst hits of Asian financial crises.

Choice of regional developing markets for the purpose of this study is justified by the reason that the regional developing markets are generally confronting rapid informationalization, institutional transformation, gradual global market integration and transition of economic freedom. As the regional markets are popularly known to be by-product of globalization, looking at them from the perspective of the impact of changing market scenario of financial institutions, financial market and economy will interesting to conduct research which is rare in recent times so far. Therefore, the current study is conducted on the sample countries from regional developing blocks including MENA, ASEAN, BRICS and SAARC which are comprehensive in terms of geographical and empirical context.

4.4.2 Data Collection and Sample Period

Data is collected from financial statement and data reports of MFs from the year starting from 2000 to 2015. The choice of this time span is due to explosive growth in MF industry across the globe specifically in developing economies after the Asian financial crisis (Klapper et al., 2004). MFs have witnessed rapid growth during this time span in developing countries which permits us to have sufficient variability to get robust results. The study calculates aggregate fund flows for each country on monthly and quarterly basis. Monthly data has been used to perform to check dynamics of flow-return and flow-volatility relationship to achieve objectives 1 and 2. However, quarterly data is used to investigate empirical relationships of flow-return-economy, flow-volatility-economy and flow-economy to achieve objectives 3 and 4. The quarterly data captures the macroeconomic behavior over long horizon and usually the effects of changing economic variables or economic policies are perceptible over the quarter of the year or annually. For example, Fama (1981), Fama (1990), and Binswanger (2000) identify that stock returns on monthly basis contain lower predicting ability for succeeding real activity growth rates. This is because the effect of certain production period is extended

over many prior periods. Moreover, Fama (1981) suggests that annual data may not be feasible because some of subsample periods under investigations are short and using annual data may lead to the overlapping issue in observations in regression.

The source of MF data variables come from Osiris and Bloomberg financial databases that possess key financial market information in the areas of stocks, bonds, MFs, interest rates and commodities. Stock market data is collected from Thomson One DataStream. Stock market returns are calculated using the popular stock market index of each country used as proxy of the market returns. Stock market index data includes Shanghai composite index, Indian SENSEX Index, Ibovespa Brazil Sao Paulo Stock Exchange Index, Russia MICEX Stock Market Index, South Africa FTSE/JSE Index, Jakarta stock exchange composite index, FTSE Bursa Malaysia Kuala Lumpur Composite Index, Philippines stock exchange composite index, Stock exchange of Thailand index, FTSE Straits Times Index, Tel Aviv 25 Index, Saudi Arabia's Tadawul All Share Index, United Arab Emirates Stock Market ADX General, Karachi stock exchange 100 index, All Share Price Colombo Stock Exchange Index.

Macroeconomic variables data (GDP, inflation, exchange rate etc.) are taken from International Monetary Fund website and Thomson One DataStream. Seasonally adjusted macroeconomic data is extracted from data sources. Seasonal dummies are included in the data to capture the seasonal effects (Franses, 1991). The dummy is used to capture the global financial crises of the year 2008-2009. Total sample consists of 4,873 equity MFs, 6546 balanced MFs, 4784 bond MFs and 857 money market MFs. Brazil has the highest number of MFs followed by Singapore and China. The study could not find money market data for Israel, UAE and Sri Lanka (Refer to Table 4.1 for details of total number of MFs in each country). MF data is winsorized at 1% to counter the problem of outliers (Verardi

& Dehon, 2010). Macroeconomic data are extracted from seasonally adjusted data sources.[45]

Table 4.1: Total number of Mutual Funds

Countries	Equity funds	Bond funds	Balanced Funds	MM funds
ASEAN				
Indonesia	189	191	140	54
Malaysia	315	124	143	58
Philippines	27	73	19	13
Singapore	963	418	238	71
Thailand	369	241	137	30
BRICS				
China	806	479	378	151
India	375	335	116	65
Russia	192	58	84	8
Brazil	1276	2641	5000	349
South Africa	202	77	200	33
MENA				
Israel	39	20	6	NA
Saudi Arabia	44	2	27	5
UAE	21	3	9	NA
SAARC				
Pakistan	30	39	29	20
Sri Lanka	25	83	49	NA
Total	4873	4784	6546	857

Note: The Table shows the number of MFs in each country. The sample time starts from 2000 to 2015. The data source is Bloomberg and Osiris.

[45] The study takes macroeconomic data from Thomson DataStream and international monetary fund website.

Table 4.2: Variable Description, Sources and Statistics

Variables	Definition	Sources
Fund flows	Percent change in flows calculated with formula $[Flows_{i,t} = [TNA_{i,t} - TNA_{i,t-1}(1 + R_{i,t})]/ TNA_{i,t-1}]$ Where $TNA_{i,t}$ is the total net asset of fund i at the end of quarter t, and $R_{i,t}$ is fund i's raw return in quarter t.	Osiris/Bloomberg
Market returns	Returns (in percent) of Stock market indices for each country calculated by taking the natural log of stock prices	Thomson DataStream
Market Volatility (MV)	GARCH (1, 1) model with an AR (2) specifications	Thomson DataStream
	Macroeconomic variables	
GDP growth(ΔGDP)	Real gross domestic product growth rate	IMF
Inflation rate (ΔInf)	Rate of inflation based on consumer price index	IMF
Exchange Rate (ΔEx)	Percentage change in the exchange rate home/USD	IMF
Unemployment rate (ΔUE)	Unemployment rate defined as the number of unemployed as percentage of the labor force.	IMF
Money supply growth (ΔMS)	Growth rate of Money supply (M1)	IMF
Deficit to GDP ratio (ΔDG)	Budget deficit as percentage of GDP	Thomson DataStream
Investment rate (ΔInv)	Growth rate of net investment i.e. Gross investment minus depreciation.	Thomson DataStream

Table 4.2 shows variables definition, sources and basic statistics.

CHAPTER 5: MUTUAL FUND FLOWS AND MARKET VARIABLES

This chapter discusses results and discussion of objectives 1 and 2 of the study. Objective 1 of the study is to find causality between MFs and stock market returns. Objective 2 is to find causality between MFs and stock market volatility. These include analysis of objectives, basic statistics, unit root test and PVAR estimates. In section 5.1, the study discusses preliminary analysis, basic statistics, and correlation matrix and unit root test. In section 5.2 the study presents estimation model results, discussion and analysis of each objective in detail.

5.1.Preliminary Analysis

This section consist of the descriptive statistics, correlation analysis and unit root test of all variables.

5.1.1. The Descriptive Statistics

This section provides descriptive statistics of variables. Total averages, standard deviations, and minimum and maximum values on important variables are reported. Table 5.1 presents the summary statistics of the aggregate net fund flows, market returns and market volatility in percentages. The mean of aggregate equity fund flows over the sample period is 0.063 per month, which is marginally higher than the mean of other fund flows (0.0431, 0.0201, and 0.0234). This indicates that the equity funds net trading behavior has been the highest in the sample period. The standard deviation of equity fund flows and money market fund flows is 0.0976 and 0.970, which is slightly greater as compared to the balanced and bond flows (0.0813, 0.0651). A plausible reason may be the higher liquidity factor in these asset classes, which implies more fluctuations in their flows or trade. The study finds that the mean is positive in all the mutual fund flows class which indicates more inflows than outflows during the sample time period. The mean of

market returns is approximately 0.03; however, the mean of market volatility is the highest (1.246). Moreover, the standard deviation of market volatility is also the highest (2.22), which is obviously due to the market crashes and the effect of the world financial crises in the emerging economies.

Table 5.1: Descriptive Statistics

	Mean	Std	Min	Max	Skewness	Kurtosis	JB stat
Equity Flows	0.0631	0.0976	0.0234	1.03	5.89079	13.4091	2894.99
Balanced Flows	0.0431	0.0813	0.0204	0.99	5.99642	127.819	4159.0
Bond Flows	0.0201	0.0651	0.0234	0.13	5.45136	117.427	3491.2
Money market Flows	0.0234	0.0970	0.0234	1.43	5.4410	116.808	3457.7
Market Returns	0.0276	0.1174	0.0106	0.504	0.91152	14.4365	3545.3
Market Volatility	1.246	2.221	1.190	2.36	0.4968	16.4365	3429.1

Table reports descriptive statistics for each variable. Each column in the table shows average value, standard deviation, and minimum value, maximum value, skewness, kurtosis and Jarque Bera statistics for fund flows, market returns and market volatility. Where flows refer to aggregate net flows (%), Returns refers to monthly market returns (%) which are calculated using market indices of each country and volatility refers to monthly stock market volatility (%) calculated using daily returns of each country index returns. The data is from January 2000 to December 2015.

5.1.2. Correlation Matrix

Table 5.2 presents the correlation matrix for the preliminary analysis of all the variables. The correlations between the dependent variables (fund flows) and the explanatory ones (market returns and market volatility) are significant and show a rough picture of the relationships. The coefficient of correlation confirms the co-movement of the fund flow and stock market variables. Equity fund flows and market returns are positively correlated (0.49). The same applies to the balanced fund flows and market returns (0.45). However, a negative correlation is observed between the bond fund flows and market returns, which is significant at 0.42. Similarly, the money market fund flows and market returns are significant at 0.40. It is observed that equity and balanced are negatively correlated with market volatility whereas bond and money markets are positively correlated with market volatility. A higher correlation is also observed between equity mutual funds and balanced mutual funds at 0.75, which is significant. A higher proximity between equity funds and balanced funds implies that balanced funds follow a moderate investment approach. Moreover, correlation with market returns and market

volatility is negatively significant at 0.55, which is not so high as to create the problem of multicollinearity.

Table 5.2: Correlation Matrix

	1	2	3	4	5	6
Equity flows	1					
Balanced flows	0.75**	1				
Bond flows	0.498	0.290	1			
Money market flows	0.253	0.354	0.38	1		
Returns	0.494*	0.453*	-0.421*	-0.40**	1	
Volatility	-0.421*	-0.462*	0.36*	0.27*	-0.55*	1

Table shows the correlations among fund flows and market variables, where flow is the net aggregated fund flows of equity, balanced, bond and money market funds (%), returns refers to monthly market returns (%) and volatility refers to monthly stock market volatility (%). Indicators "**" and "*" show the statistical significance of correlations at 1% and 5% levels respectively.

5.1.3. Unit Root Test

Table 5.3 provides the results from unit root test/stationarity test. The stationarity of variables is checked by Fisher type augmented dickey fuller test and Philips Perron test. It can be seen from Table 5.3 that all variables are stationary at level and integrated of order 0 i.e. I (0). The results shows that all variables does not contain the unit root at levels, and they are stationary at first level.

Table 5.3: Unit Root Test

	Fisher Type Panel Unit Root Test				
Variables	Augmented Dickey Fuller test (at level)			Philip Perron test (at level)	
	None	Time trend	Drift term	None	Time trend
Fund flows	371.222***	334.792***	357.345***	371.222***	334.792***
Market returns	239.371***	194.291***	257.955***	239.371***	194.291***
Market volatility	223.713***	154.951***	287.515***	139.491***	199.4562***

Note: Subscript *** indicates significant level at 1%, ** at 5% respectively.

5.1.4. Selection Order Criteria

The selection of the model is supported by the maximum likelihood-based Bayesian Information Criteria (MBIC), maximum likelihood-based Akaike Information Criteria (MAIC) and maximum likelihood-based Hannan-Quinn Information Criteria (MQIC) by Andrews and Lu (2001) reported in Table 5.4 and 5.5. Based on the results and the over-all coefficient of determination, second-order panel VAR is the preferred model, since

this has the smallest MBIC, MAIC and MQIC. The Hansen's J statistic is also reported which shows that validity of the instruments.[46]

Table 5.4: Selection Order Criteria for Flow-Return Model

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.07297	47.95218	0.087867	-156.1635	-24.0478	-76.9799
2	0.10944	32.76468	0.429312	-159.6715	-31.2353	-78.2861
3	0.108052	31.3733	0.300756	-127.3834	-24.6267	-65.7961
4	0.201099	21.15765	0.629408	-114.9195	-26.8424	-62.1304
5	0.204563	13.91321	0.834869	-99.48441	-26.0868	-55.4935
6	0.215497	13.15397	0.661469	-77.56413	-18.846	-42.3714
7	0.225412	11.28154	0.504957	-56.75703	-12.7185	-30.3625
8	0.271078	3.599454	0.891336	-41.75959	-12.4006	-24.1632
9	0.276616	1.024437	0.906068	-21.65509	-6.97556	-12.8569
10	0.29457	8.37E-31	.	8.37E-31	8.37E-31	8.37E-31

Table reports the lag selection criteria of flow-return PVAR model. CD stands for coefficient of determination, J statistic stands Hansen's J statistic and p value which determines the validity of the instruments. MBIC stands for maximum likelihood-based Bayesian Information Criteria (MBIC), MAIC for maximum likelihood-based Akaike Information Criteria (MAIC) and MQIC for maximum likelihood-based Hannan-Quinn Information Criteria.

Table 5.5: Selection Order Criteria for Flow-Volatility Model

lag	CD	J	J p value	MBIC	MAIC	MQIC
1	0.087785	55.85378	0.09478	-145.262	-13.1462	-66.0783
2	0.060974	28.71114	0.5828	-155.725	-24.2886	-75.3396
3	0.121451	41.56261	0.047648	-117.194	-14.4374	-55.6068
4	0.196299	23.42153	0.495042	-112.656	-14.5785	-59.8665
5	0.195067	22.13772	0.333085	-91.2599	-17.8623	-47.269
6	0.199847	15.40425	0.495253	-75.3138	-16.5958	-40.1211
7	0.186351	9.600256	0.650984	-58.4383	-14.3997	-32.0438
8	0.211824	5.40267	0.713798	-39.9564	-10.5973	-22.36
9	0.231724	3.003567	0.557229	-19.676	-4.99643	-10.8778
10	0.274535	1.38E-30	.	1.38E-30	1.38E-30	1.38E-30

Table reports the lag selection criteria of flow-volatility PVAR model. CD stands for coefficient of determination, J statistic stands Hansen's J statistic and p value which determines the validity of the instruments. MBIC stands for maximum likelihood-based Bayesian Information Criteria (MBIC), MAIC for maximum likelihood-based Akaike Information Criteria (MAIC) and MQIC for maximum likelihood-based Hannan-Quinn Information Criteria.

[46] The selection criteria for all fund flows, returns and volatility models are same. The second order PVAR model is preferred based on the selection criteria. The results are not reported for brevity purpose.

5.2. Results and Discussions

This section provides the details of results, analysis and discussion of each objectives.

5.2.1. Flow-Return Relationship

Table 5.6 presents the PVAR results of all classes of fund flows and market returns. Monthly data is being used to check the dynamic flow-return relationship.[47] It is shown that equity fund flows are positively associated with market returns. The lags of equity flows affect market returns. Moreover, previous period market returns also affect equity fund flows. This indicates that there is bi-directional causal relationship between equity fund flows and market returns. This implies that not only fund flows chase the past market performance but also market performance is affected by the equity funds' investments. PVAR estimates on basic model support price-pressure and feedback trading theory. This finding corroborates with Ben-Rephael et al. (2011) and Aydogan et al. (2014) who find evidence of both temporary price pressure and feedback trading theories. The study performs the Granger causality Wald test and reports the results to validate the VAR estimates. The Wald p-value confirms that equity flows and market returns Granger cause each other. In contrast to equity fund flows, the study does not find the bi-directional causal relationship between bond fund flows and market returns. However, it is observed that lags of market returns are negatively correlated with bond flows. This implies that bond fund flows follows the market returns negatively confirming feedback trading effect in the market. To confirm the effect, Granger causality Wald test is performed of bond flows and market returns. The results do not find a significant bi-directional causal relationship. Table 5.6 depicts the results of balanced fund flows and market returns. It is observed that balanced fund flows are positively associated with market returns. Lagged flows are positively related to current market returns. On the other hand, previous-period

[47] Refer to section 4.3.1, equations 4.7 and 4.8

market returns are also linked with subsequent balanced flows. Thus, the results shows bi-directional causality between balanced fund flows and market returns. This implies that not only flows chase the past market returns but also market returns are affected by balanced funds' investments.

Table 5.6: Main Results of the PVAR Model of Net Fund Flows and Market Returns

Response to	Responses of							
	Equity funds		Bond funds		Balanced funds		Money Market funds	
	Flows	MR	Flows	MR	Flows	MR	Flows	MR
Flows (t-1)	0.113	1.357	0.040	-0.030	-0.318	0.222	-0.020	-0.223
	(1.68)	(2.42)*	(0.48)	(1.09)	(0.84)	(3.77)**	(2.09)*	(3.32)**
Flows (t-2)	0.153	0.682	0.103	-0.030	-0.515	-0.066	-0.032	-0.054
	(2.43)*	(2.15)*	(1.32)	(1.33)	(0.97)	(1.01)	(3.74)**	(0.80)
Wald test p-value	0.00	0.01	0.11	0.12	0.47	0.00	0.00	0.00
MR (t-1)	0.001	-0.054	-0.358	0.253	0.253	-0.030	-0.266	-0.043
	(0.14)	(4.14)**	(2.92)**	(3.73)**	(3.73)**	(2.90)**	(5.09)**	(2.10)*
MR (t-2)	0.004	-0.277	-0.377	-0.240	0.049	-0.030	-0.007	-0.991
	(2.59)*	(4.87)**	(2.12)*	(3.79)**	(0.75)	(2.33)*	(0.12)	(2.66)**
Wald test p-value	0.05	0.00	0.00	0.00	0.00	0.03	0.00	0.05

Table displays the estimation result of the PVAR model by GMM for net fund flows and market returns. The result of each fund flow classes are shown. Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

The Granger causality Wald test confirms that balanced fund flows Granger cause market returns. Similar results can be witnessed in case of equity funds which are found to Granger-cause market returns. The results of money market fund flows and market returns suggest that money market fund flows have negative causal relationship with market returns. Money market flows are negatively associated with lags of market returns which shows that money market flows chase the past market returns negatively. Moreover, the lagged money market flows cause market returns to decline. This indicate that excessive trading by short term securities (for example, money market funds) leads to the reduction in stock market trading thus reduce market returns.

5.2.1.1. Robustness Check

For robustness check, the fund flows are split into expected and unexpected component for deeper analysis of fund flows by adopting the approach of Warther (2005) and Jank (2012). The unexpected components are represented by estimated residuals and expected fund flows are represented by the fitted values of the panel regression fixed effect model, where fund flows are a dependent variable.[48] The Table 5.7 shows the result of expected flows and market returns whereas Table 5.8 depicts the result of unexpected flows and market returns. The results of Table 5.7 shows that expected fund flows of all classes (equity, bond, balanced, money market) are not related with market returns. However, unexpected equity flows are highly correlated with market returns (see Table 5.8). The results shows positive causal relationship between unexpected equity and balanced and market returns. The results also depicts negative causal relationship between unexpected money market and market returns. These findings are consistent with Warther (1995), Jank (2012) and Kopsch et al. (2015). This implies that not only fund flows follow the past market performance but also market returns are affected by the fund flows. PVAR estimates on basic model support price-pressure and feedback trading theory. In contrast to equity fund flows, the study does not find the bi-directional causal relationship between expected and unexpected bond fund flows and market returns. The plausible reason can be due to the lesser impact of investment by bond funds which may not be directly linked to stock market. However, it is observed that lags of market returns flows are negatively correlated with bond flows. This implies that increase in market returns reduce the investment by bond fund flows thus confirming negative feedback trading theory. However, in case of money market funds, the result shows negative bi-directional causal relationship between fund flows and market returns. This

[48] Details of expected and unexpected fund flows are given in section 4.3.1.1.

suggest that money market being short term and highly liquid securities is safe heavens in times of financial market crisis and can also become one of the cause of temporary reduction in market activities. A noticeable observation is that bond flows and market returns are inversely related. This implies that a decline in stock market prices and returns reduces the equity investment in the stock market which thus increases investments in bond and money market securities. This also shows that investors direct flows away from equity based funds to fixed income-type funds in times of low market returns and reduced market activity. However, the analysis in this section is based on a simple flow-return relationship and section 6.2 provides in-depth of flow-return relationship, where macroeconomic variables are added to the model.

Table 5.7: Main Results of the PVAR model of Expected Fund Flows and Market Returns

Response to	Responses of							
	Equity funds		Bond funds		Balanced funds		Money Market funds	
	Flows	MR	Flows	MR	Flows	MR	Flows	MR
Flows (t-1)	0.106	0.230	-0.222	-0.009	0.106	0.230	-0.222	-0.009
	(1.06)	(0.42)	(3.77)**	(0.83)	(1.96)*	(0.23)	(3.77)**	(0.83)
Flows (t-2)	-0.116	0.209	-0.066	-0.008	-0.116	0.209	-0.066	-0.008
	(2.97)**	(0.97)	(1.01)	(0.75)	(2.07)*	(0.29)	(1.01)	(0.75)
Wald test p-value	0.00	0.2	0.00	0.14	0.00	0.12	0.00	0.14
MR (t-1)	0.001	-0.265	0.358	0.268	0.001	-0.265	0.358	0.268
	(0.14)	(4.68)**	(0.98)	(4.07)**	(0.14)	(4.38)**	(0.98)	(4.07)**
MR (t-2)	0.005	-0.137	0.357	-0.243	0.005	-0.137	0.357	-0.243
	(0.76)	(2.43)*	(0.94)	(3.95)**	(0.76)	(2.13)*	(0.94)	(3.95)**
Wald test p-value	0.19	0.00	0.13	0.00	0.17	0.00	0.13	0.00

Table displays the estimation result of the PVAR model by GMM for expected fund flows and market returns. The result of each fund flow classes are shown. Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

Table 5.8: Main Results of the PVAR Model of Unexpected Fund Flows and Market Returns

Response to	Responses of							
	Equity funds		Bond funds		Balanced funds		Money Market funds	
	Flows	MR	Flows	MR	Flows	MR	Flows	MR
Flows (t-1)	0.246	0.813	-0.451	-0.286	0.236	0.834	-0.451	-0.286
	(2.18)*	(2.55)*	(0.59)	(1.58)	(2.08)*	(2.45)*	(0.59)	(2.58)*
Flows (t-2)	0.165	1.373	-0.318	0.264	0.165	1.373	-0.318	-0.264
	(1.91)	(5.06)**	(0.84)	(1.72)	(1.91)	(4.06)**	(0.84)	(2.72)*
Wald test p-value	0.00	0.00	0.34	0.11	0.00	0.00	0.34	0.00
MR (t-1)	0.049	0.143	-0.271	-0.204	0.049	0.143	-0.271	-0.204
	(2.26)*	(2.11)*	(2.45)*	(0.50)	(2.26)*	(2.11)*	(2.45)*	(0.50)
MR (t-2)	0.078	-0.228	-0.347	-0.212	0.078	-0.228	-0.347	-0.212
	(3.54)**	(4.21)**	(2.95**)	(0.85)	(3.54)**	(4.21)**	(2.95)**	(0.85)
Wald test p-value	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.41

Table displays the estimation result of the PVAR model by GMM for net fund flows and market returns. The result of each fund flow classes are shown. Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

5.2.1.2. Stability of PVAR model

Before the estimation of impulse-response functions (IRF) and forecast-error variance decompositions (FEVD), the stability condition of the estimated PVAR is checked. The Figure 5.1 of eigenvalues confirms that the estimates are stable. PVAR satisfies stability condition. All the eigenvalues lie inside the unit circle. [49]

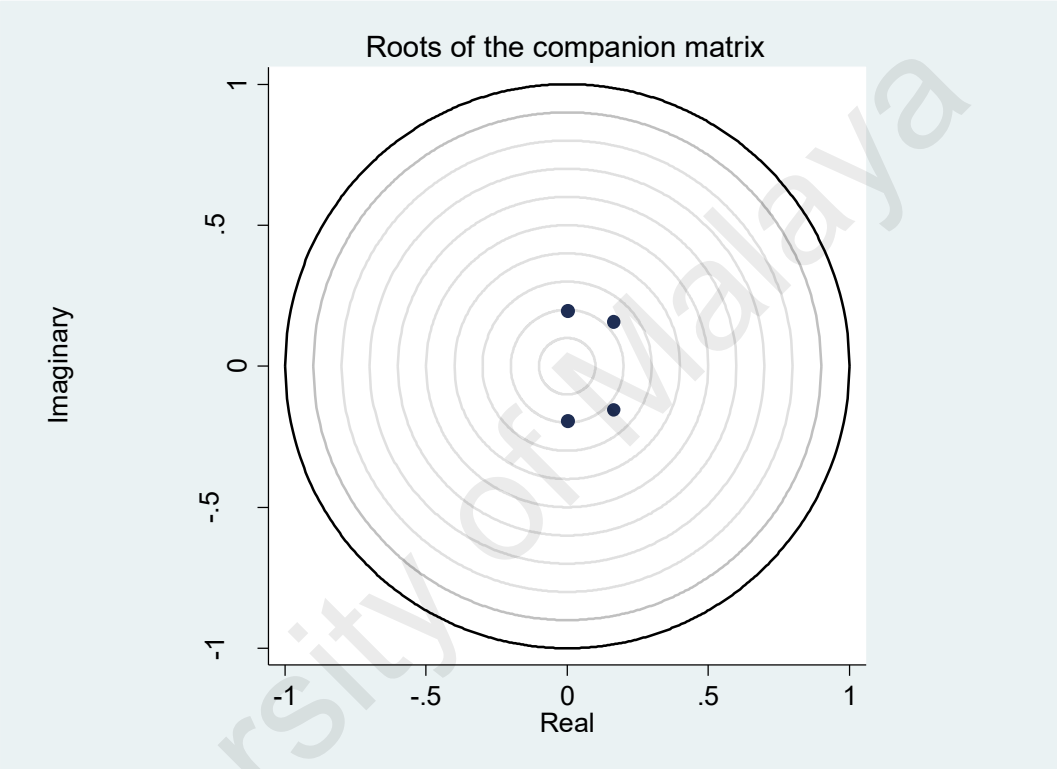

Figure 5.1: PVAR Stability Check.

Note: The values inside the circle are the eigenvalues which show the stability of PVAR model.

5.2.1.3. Impulse Response Function

Graph of Orthogonalised impulse response functions (OIRFs) is presented in Figure 5.2 and the 5% error bands are estimated using the Gaussian approximation generated by

[49] The result of stability is same for all PVAR models reported in Table 5.6 to 5.8. All PVAR model are stable. The figures are not shown for brevity purpose.

the Monte Carlo simulation with 1000 reps.[50] Fig 5.2 depicts the impulses and responses of all fund flows and market returns over 10-months period. To investigate the inter-temporal association between shocks in returns and flows in both directions, the impulse response functions (IRFs) are studied which provide the dynamic response of a variable to a shock in another variable. The blue colored line shows the orthogonalized shock and response of one variable on another variable. The red colored lines represent the plus and minus two standard deviation bands in order to evaluate the significance of impact of variables on each other's. The Figure displays that return shocks have increasing impact on equity fund flows. It increases up to 0.017 standard deviation during the next 3 period, gradually declines and remain stagnant thereafter. The impulse response function of market return to a unit shock in equity flows over 10-months period is also positive and increases by 0.05 standard deviation for the first 4 periods, further declines to 5th period and remain insignificant to next periods. The findings substantiate with PVAR estimates that equity flows have bidirectional causality with market returns initially.

The response of bond flows to a unit shock by market returns over 10-months period is found to be slightly negative. The unit shock by bond flows to market returns is completely insignificant. This shows that bond flows do not affect stock market returns. The IRF of balanced flows to a unit shock in market returns displays that market return shocks has positive effect on flows initially by 0.007 standard deviation. However, after the 4th period it gradually declines during the next period. The IRF of market returns to a unit shock in balanced flows is slight insignificant initially however it shows positive and significant increase in the 4th period up to 0.01 standard deviation and declines gradually over the next periods. The IRF of money market flows to a unit shock in market returns

[50] The study follows the procedure of generating impulse response function by Love and Zicchino (2006) and Abrigo and Love (2016).

over 10-months period have pronounced negative impact on money market fund flows for the subsequent 3 months of up to 0.06 standard deviation and remain stagnant thereafter. On the other hand, the IRF of market return to a unit shock in money market flows over 10-months is observed to have negative impact up to 0.01 standard deviation in the first periods which increase to next period and then remain insignificant to the rest of the time period. Overall, equity, balanced and money market fund flows have greater shocks with market returns whereas bond flows have insignificant impact with market returns. Particularly, equity flows and money market flows have greater impact of shocks of market returns. It is due to the fact that equity flows are directly linked with stock market returns whereas money market are short term and highly liquid securities and their investment fluctuates in response to the fluctuations in the stock market.

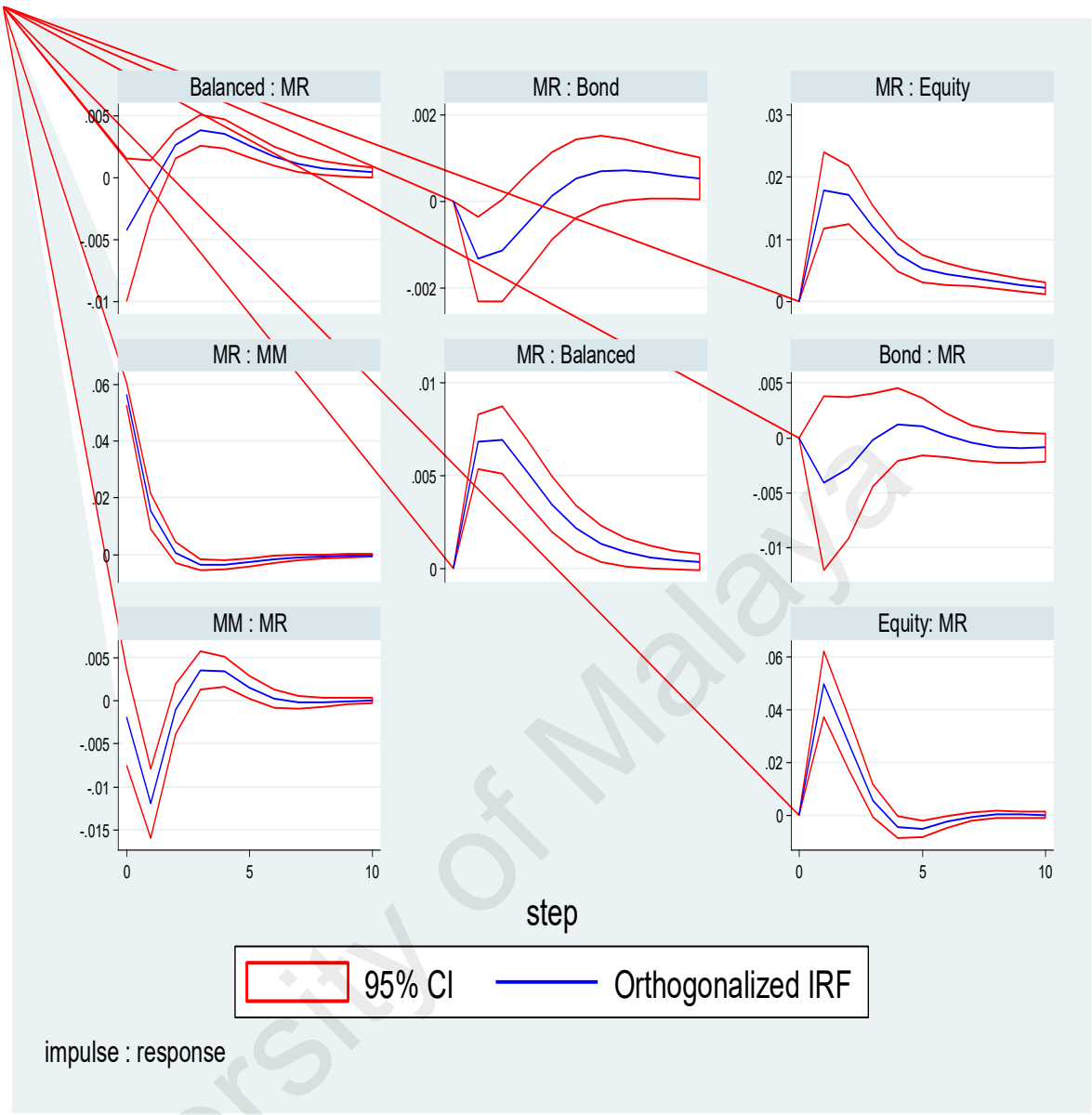

Figure 5.2: The Impulses and Responses of MF flows and Market returns.

Note: The X-axis shows the number of time periods and Y-axis shows the unit shock standard deviations. The blue colored line shows the orthogonalized shock and response of one variable on another variable. The red colored lines represent the plus and minus two standard deviation bands.

5.2.1.4. Factor Error Variance Decomposition (FEVD)

The FEVD for the PVAR model is presented in Table 5.9. It is observed that most of variations in fund flows are explained by themselves for 10 period head. Moreover, market returns explains more of the equity fund flows variations of about 35%, followed by balanced flows 30%, and money market fund flows 22%. However, the magnitude of the effect is small in case of bond flows where market return explain only about 16% of total variation in flows. It is due to indirect impact of market returns on bonds funds and one way causal relationship of bond flows with market returns. The findings are almost consistent with PVAR results reported in section 5.2.1.

Table 5.9: Factor Error Variance Decomposition of Fund Flows and Market Returns

	Equity funds		Bond Funds		Balanced funds		Money market funds	
	Flows	MR	Flows	MR	Flows	MR	Flows	MR
Flows	0.65	0.35	0.84	0.16	0.70	0.30	0.78	0.22
MR	0.45	0.55	0.06	0.94	0.40	0.60	0.43	0.57

Percent of variation in the row variable (10 periods ahead) explained by column variable. FEVD standard errors and confidence intervals based on Monte Carlo simulations.

5.2.2. Flow-Volatility Relationship

The study estimates a panel bivariate model to get an idea on the dynamic relationship between fund flows and market volatility by using monthly data. Table 5.10 depicts PVAR results of total fund flows of four MFs and stock market volatility.[51] It is discovered that market volatility is negatively related to lagged flows, suggesting that equity flows have negative impact on subsequent market volatility. Moreover, equity flows are also negatively related to previous period market volatility. This shows that equity funds not only follows the lagged market volatility but also have dampening effect on market volatility. Similar patterns can be witnessed in balanced fund flows. It is shown that market volatility is negatively associated to previous period balanced flows.

[51] Refer to equations 4.10 and 4.11 in section 4.3.2.

Moreover, balanced flows are also negatively associated with lagged market volatility. Overall, it is observed that negative causal relationship of equity fund flows and balanced fund flows with market volatility which suggest that both equity and balanced fund are found to have contrarian behavior (negative feedback trading) in the market. This also suggests that equity and balanced funds may time the market volatility. A theoretical explanation that may be offered is that equity and balanced funds are risky securities and investment in these securities reduces in times of high financial market crises. In addition investment by these funds may reduce the market volatility temporarily. The overall result suggests that equity and balanced fund flows have negative causal relationship with market volatility which is consistent with the findings by Cao et al. (2008) and Thomas et al. (2014).

However, in the case of bond flow-volatility relation, it is found that bond flows are positively related to previous period volatility. However, the results do not show any relation with lagged bond flows and succeeding market volatility. Relatively similar pattern can be observed in money market flows which follow the market volatility positively associated with previous-period lags. However, it can be witnessed that lagged money market flows have negative association with subsequent market volatility. This implies that money market fund flows may create hype in the market and lead stock prices to fluctuate abnormally due to their excessive speculation and investment. Overall, it is inferred that bond funds and money market funds have momentum behavior (positive feedback trading) with market volatility. A plausible explanation of this behavior can be due to risk averse nature of investors who reallocate the funds from risky securities to less risky securities and safe heavens in case of high market volatility and risk.

Table 5.10: Panel Bivariate VAR Model of Total Fund Flows and Market Volatility

	Equity funds		Bond funds	
	Flows	Volatility	Flows	Volatility
Flows (t-1)	0.003	-0.004	0.187	0.023
	(0.13)	(2.26)*	(3.16)**	(1.51)
Flows (t-2)	0.050	-0.021	0.270	0.030
	(2.62)*	(2.35)*	(3.85)**	(1.09)
Wald test p-value	0.00	0.02	0.00	0.14
Volatility (t-1)	-0.798	0.345	0.398	0.424
	(2.45)*	(3.10)**	(3.25)**	(4.98)**
Volatility (t-2)	-1.564	0.414	0.360	0.264
	(2.20)*	(4.29)**	(3.18)**	(4.38)**
Wald test p-value	0.02	0.00	0.00	0.00
	Balanced funds		Money market funds	
	Flows	Volatility	Flows	Volatility
Flows (t-1)	0.021	-0.015	-0.026	0.024
	(0.41)	(2.24)*	(0.50)	(2.25)*
Flows (t-2)	-0.039	-0.226	0.127	0.030
	(2.25)*	(2.39)*	(2.85)*	(2.62)*
Wald test p-value	0.00	0.03	0.04	0.01
Volatility (t-1)	-0.561	0.243	0.034	0.044
	(2.97)**	(3.17)**	(2.78)**	(3.42)**
Volatility (t-2)	-0.188	0.144	0.218	0.136
	(2.41)*	(4.32)**	(2.43)*	(4.27)**
Wald test p-value	0.01	0.00	0.01	0.00

Table reports the estimation result of PVAR model by GMM. The bivariate model consists of net flow-volatility relation. Where volatility refers to stock market volatility (%) and flows refer to aggregate net flows (%) of each fund class.

Table 5.11: Panel Bivariate VAR Model of Unexpected Fund Flows and Market Volatility

	Equity funds		Bond funds	
	Flows	Volatility	Flows	Volatility
Flows (t-1)	0.007	-0.006	0.197	-0.063
	(0.14)	(2.28)*	(3.26)**	(0.98)
Flows (t-2)	0.060	-0.059	0.280	-0.030
	(2.72)*	(2.45)*	(3.95)**	(1.07)
Wald test p-value	0.00	0.03	0.00	0.34
Volatility (t-1)	-0.998	0.245	0.498	0.134
	(2.55)*	(3.30)**	(3.50)**	(3.89)**
Volatility (t-2)	-1.264	0.414	0.370	0.264
	(2.08)*	(3.91)**	(3.28)**	(3.23)**
Wald test p-value	0.02	0.00	0.00	0.00
	Balanced funds		Money market funds	
	Flows	Volatility	Flows	Volatility
Flows (t-1)	0.031	-0.010	-0.026	0.024
	(0.61)	(2.15)*	(0.60)	(2.43)*
Flows (t-2)	-0.019	-0.196	0.117	0.030
	(2.35)*	(2.43)*	(2.82)*	(2.97)**
Wald test p-value	0.00	0.04	0.04	0.01
Volatility (t-1)	-0.561	0.233	0.044	0.044
	(2.86)**	(2.95)**	(2.97)**	(2.92)**
Volatility (t-2)	-0.181	0.324	0.148	0.136
	(2.42)*	(3.22)**	(2.57)*	(3.27)**
Wald test p-value	0.00	0.00	0.01	0.00

Table reports the estimation result of PVAR model by GMM. The bivariate model consists of unexpected flow-volatility relation. Where volatility refers to stock market volatility (%) and flows refer to aggregate net flows (%) of each fund class.

5.2.2.1. Robustness Check

The PVAR is separately estimated on unexpected fund flows and market volatility as robustness check. The results are presented in Table 5.11. This test is conducted owing to the fact the unexpected component of fund flows is highly correlated with market returns.[52] The results discover almost similar results. Stock market volatility is negatively related to lagged unexpected equity flows, suggesting that equity flows have negative impact on subsequent market volatility. Moreover, unexpected flows are also negatively related to lagged market volatility. Similar patterns can be witnessed in balanced fund flows. Overall, it is found negative causal relationship of equity fund flows and balanced fund flows with market volatility which suggest that both equity and balanced fund have

[52] Refer to section 5.2.1 for results of unexpected fund flows and market returns.

lessening effect on market volatility. It is also observed that bond unexpected flows are positively associated to lagged volatility. However the results do not show any relation with lagged bond flows and succeeding market volatility. Money market unexpected flows are found to have positive causal relationship. Overall, PVAR estimates support both price-pressure and feedback trading theory except in case of bond funds. Feedback trading behavior in bond funds is observed with market volatility. The possible reason can be due to the indirect effect of bond funds' investment variables which may not be clearly perceptible on stock market volatility. The finding corroborates with Ben-Rephael et al. (2011) and Aydogan et al. (2014) who find evidence of both temporary price pressure and feedback trading theories.

5.2.2.2. Stability of PVAR Model

The Figure 5.3 shows eigenvalues which lie inside the unit circle. This confirms PVAR model is stable. The stability condition of the estimated PVAR is checked before the estimation of IRF and FEVD.

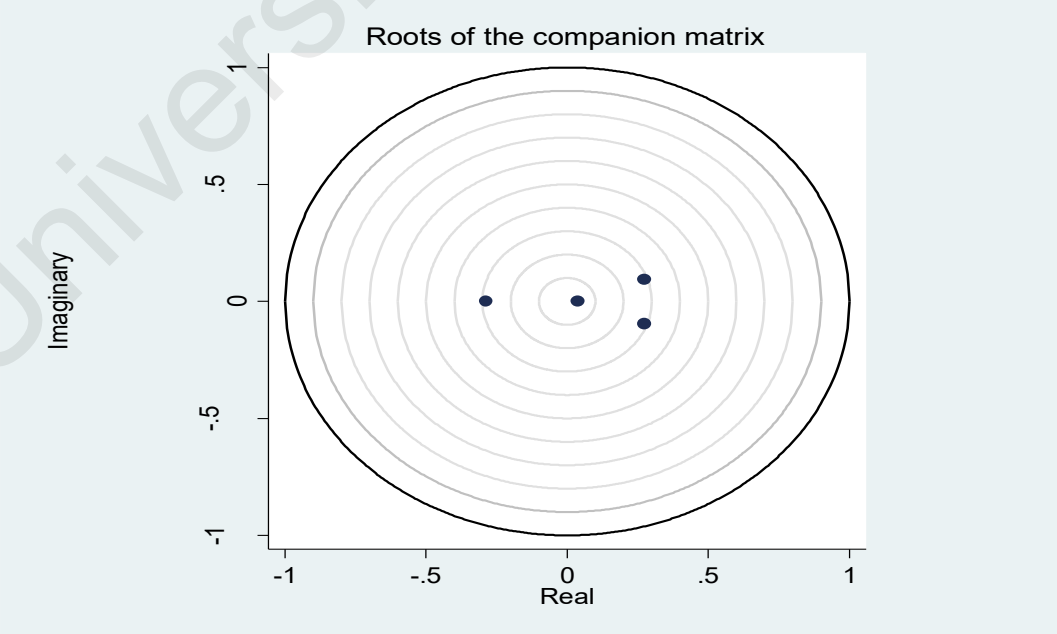

Figure 5.3: PVAR Stability Check

Note: The values inside the circle are the eigenvalues which determine the stability of PVAR model.

5.2.2.3. Impulse Response Function

To investigate the inter-temporal association between shocks in market volatility and flows in both directions, the IRFs are computed which provide the dynamic response of a variable to a shock in another variable. The blue colored line shows the orthogonalized shock and response of one variable on another variable. The red colored lines represent the plus and minus two standard deviation bands. Fig 5.4 depicts the impulses and responses of MF flows and market volatility over 10-months period. The Figure displays that volatility shocks have evident negative impact on equity fund flows for the subsequent 5 month. It decreases to 0.022 of standard deviation up to the next 5th period. The IRF of market volatility to a unit shock in equity flows also declines by 0.005 standard deviation at the first two period and remain insignificant thereafter. This shows that equity flows and market volatility respond with each other in such a way that increase in market volatility leads to decrease to equity flows and vice versa.

The IRF of bond flows to a unit shock in market volatility is positive to next 5 periods up to 0.002 standard deviation and then gradually declines thereafter. On the other hand, an almost insignificant relation is observed on the impact of shock by bond flows to market volatility with greater standard deviation bands. This shows that bond flows do not affect or have little effect on stock market volatility. This is in line with the results reported in section 5.2.2. The impulse response function of balanced flows to a unit shock in market volatility has declining effect for the first month to 0.01 of standard deviation. However, it gradually increases to the subsequent time ahead. The IRF of market volatility to a unit shock in balanced flows shows that market volatility decreases to 0.01 standard deviation in the 10th period.

The IRF of money market flows to a unit shock in market volatility displays that market volatility shocks have pronounced positive impact on money market fund flows

for the subsequent 2 months up to 0.01 standard deviation but declines thereafter. Lastly, IRF of market volatility to a unit shock in money market flows remain slightly increased to 0.01 standard deviation to 5th period and remain insignificant to the subsequent periods. This shows short term effect of money market flows and market volatility on each other. Overall, it is observed that equity flows and money market flows have greater influence from market volatility. It is because money market are highly liquid and short term securities and their investment fluctuates in response to the fluctuations in the stock market. Equity flows have impact from the shocks of market volatility because equity flows are directly linked with market variables. Whereas bond flows have insignificant influence on market volatility due to their indirect linkage with stock market variables. These flow-volatility results are consistent with results in section 5.2.2. Overall, patterns in the Figures are similar to what is previously reported PVAR coefficients.

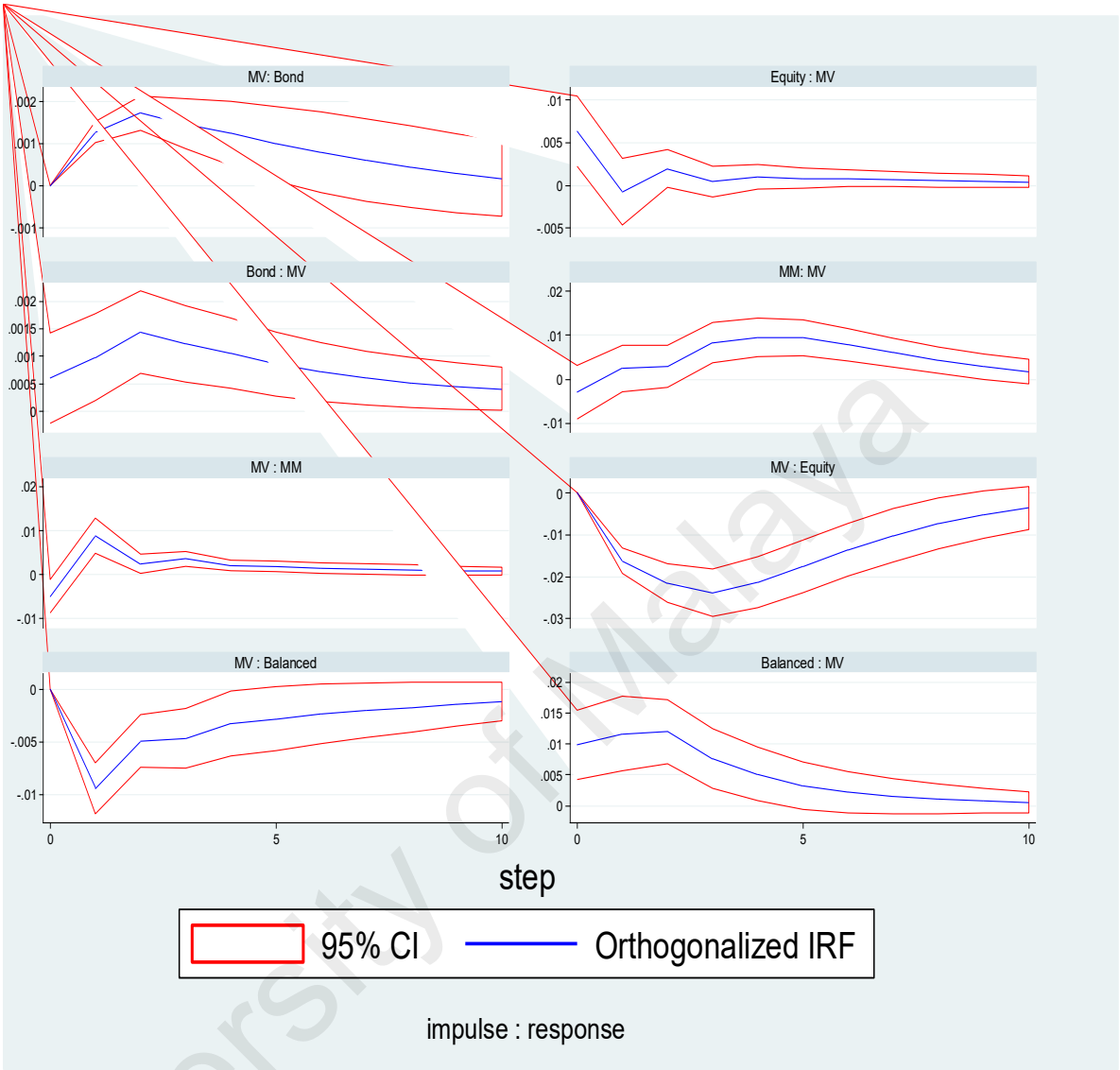

Figure 5.4: Impulses and Response of MF flows and Market volatility

Note: The X-axis shows the number of time periods and Y-axis shows the unit shock standard deviations. The blue colored line shows the orthogonalized shock and response of one variable on another variable. The red colored lines represent the plus and minus two standard deviation bands.

5.2.2.4. Factor Error Variance Decomposition (FEVD)

The FEVD for the PVAR model is presented in Table 5.12. It is observed that most of variations in fund flows are explained by themselves for 10 period head. Market volatility explains more of the money market flows variations of about 40%, followed by equity flows 35%, and balanced flows 29%. However, the magnitude of the effect is small in case of bond flows where market volatility explains only about 18% of total variation in flows. It is due to indirect impact of market volatility on bonds flows and one way causal relationship of bond flows with market returns. Moreover, equity flows and money market flows exhibit greater variation in market volatility about 49% and 48% respectively due to being highly liquid securities. The findings are almost consistent with PVAR results reported in section 5.2.2.

Table 5.12: Factor Error Variance Decomposition of Fund Flows and Market Volatility

	Equity funds		Bond Funds		Balanced funds		Money market funds	
	Flows	MV	Flows	MV	Flows	MV	Flows	MV
Flows	0.65	0.35	0.82	0.18	.71	.29	0.60	0.40
MV	0.49	0.51	0.22	0.78	0.44	0.56	0.48	0.52

Percent of variation in the row variable (10 periods ahead) explained by column variable. FEVD standard errors and confidence intervals based on Monte Carlo simulations.

5.2.3. Flow-Return-Volatility Relationship

The study performs an additional test to check combine flow-return-volatility relationship using monthly data. The result might get affected by flow-return relation documented by Edelen and Warner (2001) and return-volatility relationship reported by French et al. (1987) and Nelson (1991). To investigate this, market returns along with flow-volatility relation in three factor PVAR model is examined to avoid biased and spurious results (Cao et al., 2008) in Table 5.13. Additional evidence is observed from the estimation results of three-factor PVAR model of flow-volatility relation, when market returns variable is controlled. First, the estimation results of bivariate model still hold thus it is inferred that exposed flow-volatility relationship is not driven by the flow-return relationship. Second, it is found that the contemporaneous equity flows and

balanced flows are negatively associated with the lagged market returns while money market flows are negatively associated with the lagged returns. However, the results do not find any relation between concurrent returns and lagged bond flows. Third, it is witnessed that negative causal relationship between market returns and market volatility, indicating higher returns leads to lower volatility and vice versa. In overall, three factor PVAR model does not only validate self-constructed flow data, but it also extends the test by Cao et al. (2008) to more recent time period and to new dynamic panel settings. Granger-causality test is also estimated to validate PVAR estimates. Table 5.13 also presents the Wald test p-values. Test results of three factor model suggest that flow and volatility granger-cause each other. These results confirm earlier findings that volatility has significant impact on flows and vice versa.

The study also applies the fixed effect model as an alternative test to estimate the relationship of flows, stock market returns and stock market volatility.[53] Table 5.14 reports the all four classes of fund flows (equity flows, bond flows, balanced flows and money market flows) respectively with explanatory variables i.e., stock market returns and stock market volatility. The findings are similar to what is witnessed in PVAR model. Equity flows have causal relationship with market returns. It can be observed that the lagged returns are significantly associated with current flows and lagged flows are related with current market returns. However, the results do not show a significant relationship between the contemporaneous equity flow-return relationships. Similar to equity flows, balanced flows are found to have positive temporal relationship with market returns which signals momentum behavior of both equity and balanced funds in the market.[54] On

[53] BP LM test and Hausman test reported in Table 6.10.

[54] Oh and Parwada (2007) state that positive relationship between stock market returns and mutual fund flows suggests the positive feedback trading of mutual funds.

the contrary, negative temporal relationship of bond flows and market returns is found indicating that bond flows follows the past performance of market negatively. Similar to bond flows, money market flows also have negative relationship with market returns. The findings suggest that the equity and balanced MF flows and market returns have positive relationship whereas bond and money market fund flows have negative association confirming price pressure theory and feedback trading/return chasing theory.

With the respect to flow-volatility relationship, negative causal association of market volatility is observed with equity flows and balanced flows. The coefficient of lagged market volatility is negative, confirming that decrease in market volatility accelerate the net trading by both equity funds and balanced funds in the market. Furthermore, it is noticed that coefficients of lagged equity flows are negative confirming that investment by equity funds bring dampening effect on the equity market volatility. Similar results are found in case of balanced fund flows which have negative impact on the subsequent market volatility. Moreover, it is identified that lagged volatility affects balanced flows negatively implying that decrease in market volatility increase net trading by balanced funds in the market. However, in the case of bond funds and money market funds, there exist positive association between flows and market volatility. Lagged volatility is positively related to bond flows and money market flows suggesting that bond flows and money market flows surge with rise in market volatility. Moreover, lagged money market flows are also positively related to current market volatility. The results do not find any relation to the lagged bond flows and market volatility.

Additional evidence is observed from the estimation results of fixed effect model. First, it is also witnessed that there exist concurrent association of flows and market volatility. The current volatility is positively associated with all classes of fund flows whereas lagged volatility is negatively (positively) related to both equity and balanced

flows (bond flows and money market flows) indicating that all funds augment their trading behavior when market volatility is high simultaneously. However, equity funds and balanced funds reduce their trading the next time period due to high risk and possible losses in the financial markets in developing countries.[55] The findings is consistent by Jank (2012) that risky securities decrease their trading as compared to less risky securities in times of high market crises and deteriorating economic conditions. The concurrent relationship of volatility and fund flows implies that MFs being institutional investors respond quickly to risk-related information as compared to returns related information in the stock market. Sudden fluctuations in the market may create hype in the market which may trigger increased speculations and investments. However, volatility hype remains for short period of time and fund classes according to their investment objectives, adjust their investment strategies to the very next period. This is true in case of developing markets due to being highly risky emerging markets which prompt the investors to respond swiftly to the risk related information.

Second, by looking at the results of Table 5.14, it is concluded that the estimation results of bivariate model still hold thus the flow-return relationship is not driven by the flow-volatility relationship and vice versa. Third, negative causal relationship is observed between market returns and market volatility, indicating higher returns leads to lower volatility and vice versa. Overall, the fixed effect model does validate previous PVAR models. From Table 5.14, no evidence of any noticeable difference is observed in the sign of the estimated coefficients and their respective t-values by comparing the PVAR results (Refer to Table 5.10, 5.11, 5.13).

[55] Klapper et al. (2004) find that developing economies have poor information mechanism and are found to have high information asymmetries. Because of this, it is possible that mutual fund may be not able to make rational contemporaneous decision making due to abrupt volatility in stock markets.

Overall, it is found that equity and balanced flows are positively (negatively) associated with the market returns (market volatility) while bond and money market flows are negatively (positively) associated with the market returns (market volatility). The results confirm that fund flows and market variables exert their effect on each other. The findings corroborate with Cao et al. (2008), Ben-Rephael et al. (2011) and Aydogan et al. (2014) who find evidence of both temporary price pressure and feedback trading theories.

Table 5.13: Three Factor PVAR Model of Fund Flows, Market Volatility and Market Returns

	Equity funds			Bond funds		
	volatility	Flows	returns	volatility	Flows	returns
Flows (t-1)	0.001	0.005	0.007	-0.002	0.242	-0.007
	(2.12)*	(0.10)	(1.03)	(0.12)	(4.22)**	(0.25)
Flows (t-2)	0.002	0.052	-0.005	-0.018	0.274	0.040
	(2.94)*	(0.99)	(0.80)	(0.91)	(3.81)**	(1.27)
Wald test	0.03	0.00	0.44	0.12	0.00	0.14
Volatility(t-1)	0.355	1.194	-0.055	-0.076	-0.204	0.287
	(3.69)**	(1.96)*	(0.70)	(1.64)	(2.04)*	(5.18)**
Volatility(t-2)	0.220	1.163	-0.322	-0.034	0.062	0.076
	(2.58)**	(1.97)*	(4.84)**	(0.70)	(0.56)	(1.30)
Wald test	0.00	0.00	0.04	0.00	0.05	0.00
Return (t-1)	-0.054	0.301	0.270	0.307	-0.519	0.040
	(2.65)*	(2.68)*	(5.03)**	(4.07)**	(4.00)**	(0.54)
Return(t-2)	-0.053	0.069	0.034	0.370	0.444	0.278
	(2.55)*	(2.15)*	(0.63)	(5.68)**	(3.94)**	(4.10)**
Wald test	0.00	0.03	0.04	0.00	0.00	0.03
	Balanced funds			Money market funds		
	volatility	Flows	returns	volatility	Flows	returns
Flows (t-1)	-0.011	0.163	0.006	0.034	-0.036	0.037
	(2.13)*	(1.43)	(0.94)	(2.29)*	(0.60)	(1.56)
Flows (t-2)	-0.005	-0.023	-0.002	0.054	0.079	-0.116
	(2.94)**	(0.38)	(0.34)	(3.41)**	(1.40)	(5.14)**
Wald test	0.00	0.45	0.12	0.00	0.14	0.00
Volatility(t-1)	0.050	-0.367	-0.227	0.236	-0.044	-0.000
	(2.16)*	(2.14)*	(4.26)**	(4.17)**	(0.98)	(0.00)
Volatility(t-2)	0.004	-0.274	-0.059	0.024	-0.118	-0.023
	(0.07)	(1.65)	(1.10)	(0.42)	(2.53)*	(0.14)
Wald test	0.01	0.01	0.02	0.01	0.791	0.00
Return (t-1)	-0.230	-0.518	0.059	0.176	0.052	0.351
	(3.71)**	(2.56)*	(0.79)	(2.61)**	(0.21)	(4.49)**
Return (t-2)	-0.278	-0.222	0.334	0.149	-0.015	0.096
	(3.51)**	(2.05)*	(5.13)**	(2.76)**	(0.08)	(1.24)
Wald test	0.00	0.00	0.00	0.007	0.069	0.00

Table reports the estimation result of PVAR model by GMM. The three factor model consists of flow-return-volatility relationship. Where volatility refers to monthly stock market volatility and flows refer to aggregate net flows (%). Market returns are in percentage.

Table 5.14: MF Flows, Market Returns, and Market Volatility

	Equity fund flows			Bond fund flows		
	Dependent Variables					
	Flows	Returns	Volatility	Flows	Returns	Volatility
Return t	0.710	-	-0.250	-0.275	-	-0.018
	(1.22)	-	(2.99)**	(0.47)	-	(3.47)**
Return t-1	0.165	-0.382	-0.006	-0.308	0.272	-0.308
	(2.52)*	(2.20)*	(2.28)*	(3.47)**	(2.81)**	(2.47)*
Volatility t	0.06	-0.016	-	0.346	0.217	-
	(2.28)*	(0.02)	-	(2.54)*	(0.02)	-
Volatility t-1	-0.036	-0.436	0.308	0.202	-0.232	0.016
	(2.58)*	(2.02)*	(3.47)**	(3.02)**	(2.71)**	(2.12)*
	Balanced fund flows			Money market fund flows		
	Dependent variables					
	Flows	Returns	Volatility	Flows	Returns	Volatility
Return t	0.130	-	-0.170	0.710	-	-0.370
	(1.47)	-	(2.65)*	(1.22)	-	(2.42)*
Return t-1	0.021	-0.374	0.216	-0.216	-0.216	-0.320
	(2.60)*	(3.27)**	(2.44)*	(2.64)*	(-1.64)	(2.12)*
Volatility t	0.124	0.576	-	0.237	0.016	-
	(2.34)*	(0.42)	-	(2.43)*	(0.02)	-
Volatility t-1	-0.0021	-0.374	-0.216	-0.112	-0.452	0.216
	(2.60)*	(3.27)**	(1.64)	(2.64)*	(2.15)*	(4.64)**

Table shows the results of a regression of net aggregate fund flows, market returns and market volatility. "**" Significance at the 1% level,"*" Significance at the 5% level.

CHAPTER 6: MUTUAL FUND FLOWS, MARKET VARIABLES AND MACRO ECONOMY

This chapter presents the results, discussion and analysis of the third and fourth objectives. The third objective is to find out whether macroeconomic variables have any influence on the relationship between fund flows and stock market returns. The fourth objective is to identify whether macroeconomic variables have any influence on the relationship between fund flows and stock market volatility. These include analysis of objectives, basic statistics, unit root test and PVAR estimates. In section 6.1, the study discusses preliminary analysis, basic statistics, and correlation matrix and unit root test. In section 6.2, the study presents estimation model results, discussion and analysis of each objective in detail.

6.1 Preliminary Analysis

This section consists of the descriptive statistics, correlation analysis and unit root test of all variables.

6.1.1. The Descriptive Statistics

This section provides descriptive account of variables. Table 6.1 presents the summary statistics of aggregate net fund flows, market returns, market volatility, and macroeconomic variables. Total averages, standard deviations, minimum and maximum values are reported. Mean of all macroeconomic variables are positive except Deficit to GDP ratio at -0.125, which is obvious as fiscal deficit problem and financial crunch is being witnessed among developing countries during the sample time span.[56] The highest standard deviation among macroeconomic variables is observed in deficit to GDP ratio followed by inflation rate, unemployment rate at 0.293, 0.280 and 0.142, respectively.

[56] For details of fiscal deficit data, refer to IMF website.

The plausible explanation could be due to higher fiscal deficit, higher inflation, more unemployment and worsening macroeconomic conditions that are expected as indicated by dividend yield and term spread.

Table 6.1: Descriptive Statistics

	Mean	Std	Min	Max	Skewness	Kurtosis	JB stat
Equity Flows	0.0631	0.0976	0.0234	1.03	5.89079	13.4091	2891.99
Balanced Flows	0.0438	0.0813	0.0204	0.99	5.99642	127.819	4159.1
Bond Flows	0.0201	0.0651	0.0234	0.13	5.45136	117.427	3495.2
Money market Flows	0.0234	0.0970	0.0234	1.43	5.441079	116.808	3457.2
Market returns (MR)	0.0276	0.1174	0.0106	0.504	0.91152	14.4365	3547.3
Market Volatility (MV)	0.246	1.2176	0.160	2.36	0.4968	16.4365	3425.1
GDP growth (ΔGDP)	0.0373	0.0438	-0.018	0.147	0.3013	9.1091	9797.77
Inflation rate (ΔInf)	0.0497	0.2804	0.0479	0.138	-0.4143	156.9537	6162.2
Exchange Rate (ΔEx)	0.012	0.0389	-0.116	0.3115	-0.0351	11.9164	1868.7
Money supply growth (ΔMS)	0.0314	0.0390	-0.041	0.1089	0.5139	15.6989	4213.84
Deficit to GDP ratio (ΔDG)	-0.125	0.2925	-0.991	0.3729	-7.4848	1013.68	2784.18
Investment rate (ΔInv)	0.0314	.07185	0.024	.08115	-1.0446	230.1862	1342.6
Unemployment rate (ΔUE)	0.101	.142719	0.0047	0.687	0.0754	29.3096	1799.4

Table 6.1 presents summary statistics of aggregate fund flows, market returns, market volatility and macroeconomic variables. Each column in the table shows average value, standard deviation, and minimum value, maximum value, skewness, kurtosis and Jarque Bera statistics for variables. The data is from January 2000 to December 2015.

6.1.2. Correlation Matrix

Table 6.2 presents the correlation matrix for preliminary analysis of all variables. First, the correlation among the variables are not too high to create problems of multicollinearity. Second, Column 1, table 6.2 displays the correlation between the dependent variable and explanatory variables. The correlations between the dependent (fund flows) and explanatory variables (market returns, market volatility and macroeconomic variables) are significant and show a rough picture of relationships. [57] Coefficient of correlation confirms co-movement of fund flows and stock market variables. Equity fund flows and market returns are positively correlated (0.49). Same is the case with balanced fund flows and market returns (0.45). However, negative correlation is observed between bond fund flows and market returns, which is significant at 0.42. Similar is the case with money market fund flows and market returns, significant at 0.40. In addition, the coefficient of correlation also confirms co-movement of fund flows and stock market volatility. The results show that equity and balanced fund flows are negatively correlated with market volatility whereas bond and money markets are positively correlated with market volatility. It is also observed that there is a higher correlation between equity MF and balanced MFs at 0.75, which is significant. A higher proximity between equity funds and balanced funds implies that balanced funds follow moderate investment approach. [58] Moreover, correlation with market returns and market volatility is negatively significant at 0.55, which is not high enough to create the multicollinearity problem.[59] Besides, both MF flows and market returns are positively

[57] This analysis is important in estimating fixed effect regression model for additional check. For details, refer to section 5.2.3.

[58] A moderate investment approach entails higher equity component in mix of securities by balanced funds/hybrid funds. An opposite investment strategy is a conservative investment approach which implies higher fixed-income component in hybrid securities.

[59] The study runs fixed effect regression model on flow-return-volatility relationship. For details discussion of it, refer to section 5.2.3.

correlated to GDP growth. Other variables, such as money supply and deficit to the GDP ratio, also exhibit a notable correlation with fund flows. Inflation has significant correlation with GDP and money supply. Although, most of the macroeconomic variables are positively correlated with each other, it is still too early to draw any conclusions based on a mere simple correlation result.

Table 6.2: Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	1
(1) Equity Flows	1										
(2) Balanced Flows	0.75**	1									
(3)Bond funds	0.498	0.290	1								
(4) MM funds	0.253	0.354	0.38	1							
(5) MR	0.494*	0.453*	-0.421*	-0.40**	1						
(6) MV	-0.421*	-0.462*	0.36*	0.27*	-0.55*	1					
(7) ΔGDP	.253	0.38	0.354	0.34	.38	.38	1				
(8) ΔInf	.200	0.251	0.303	0.31	.251	.251	.776*	1			
(9) ΔEX	.053	0.484**	0.040	0.03	.484**	.484**	-.103	-.097	1		
(10) ΔUE	.214**	-0.070	0.162**	0.12	-.070	-.070	-.087	-.119	-.0501	1	
(11) ΔMS	.510*	0.136	0.312	0.34	.136	.136	.772	.630*	.014	-.024	
(12) ΔDG	.360*	0.079	0.320*	0.35*	.079	.079	-.043	.111*	-.027	.119*	-.(
(13) ΔInv	0.21	0.060	0.22	0.20	.060	.060	.381**	.376**	-.052	.011	-.15

The table reports the correlation among variables. Flows stands for net flows or net sales (in percent). MR is market returns. Market returns are calculated using r country.MV stands for market volatility. ΔGDP is Gross domestic product growth rate, Δ Inf is inflation rate, ΔMS is money supply growth rate, ΔUE is unemployment rate, ΔDG is deficit to GDP ratio, ΔInv is Investment growth rate . Indicators "**" and "*" show the statistical significance of correlations at 1% and 5% levels respect percentage change in variables.

6.1.3. Unit Root Test

Table 6.3 provides the results from unit root test/stationarity test. The stationarity of variables is checked by Fisher type augmented dickey fuller test unit root test and Philips Perron test. It can be seen from Table 6.3 that all variables are stationary at level and integrated of order 0 i.e. I (0). The results show that all variables does not contain the unit root at levels, and they are stationary at first level.

Table 6.3: Unit Root Table

	Fisher Type Panel Unit Root Test				
Variables	Augmented Dickey Fuller test (at level)			Philip Perron test (at level)	
	None	Time trend	Drift term	None	Time trend
Fund flows	371.2221***	334.7918***	357.3453***	371.2221***	334.7918***
Market returns	239.3714***	194.2912***	257.9547***	239.3714***	194.2912***
Market volatility	223.7134***	154.9512***	87.5147***	139.4914***	199.4562***
GDP growth rate	150.6993***	129.987***	172.8323***	150.6993***	129.9877***
Inflation	57.9172***	52.8311***	106.9015***	57.9172***	52.8311***
Exchange rate	208.4309***	178.6361***	229.2253***	208.4309***	178.6361***
Unemployment rate	74.0398***	88.7273***	109.6169***	74.0398***	88.7273***
Money supply	444.3355***	416.8386***	400.2436***	444.3355***	416.8386***
Budget Deficit to GDP	226.9365***	269.8404***	226.3941***	226.965***	269.8404***
Investment	361.4995***	340.4664***	331.2487***	361.4995***	340.4664***

Note: Subscript *** indicates significant level at 1%, ** at 5% respectively.

6.1.4. Selection Order Criteria

Based on the selection criteria, a second-order panel VAR model is fit. It is because it has smallest MBIC, MAIC and MQIC and Hensen J statistics specifications of instruments using GMM estimation implemented by PVAR in Table 6.4 and 6.5. [60]

Table 6.4: Selection Order Criteria for Flow-Return-Economy model

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.021308	36.32169	0.274185	-148.164	-27.6783	-75.796
2	0.017774	31.08726	0.257456	-166.46	-30.9127	-85.0451
3	0.042148	30.07272	0.35975	-131.353	-25.9273	-68.0302
4	0.10915	19.01004	0.751454	-119.355	-28.99	-65.0782
5	0.109865	16.16605	0.706271	-99.1378	-23.834	-53.9075
6	0.108968	14.69434	0.547129	-77.5487	-17.3057	-41.3645
7	0.105029	13.48383	0.334876	-55.6985	-10.5162	-28.5603
8	0.145837	6.234103	0.621027	-39.8874	-9.7659	-21.7953
9	0.153616	2.668903	0.614667	-20.3919	-5.3311	-11.3458
10	0.193313	7.92E-31	-	7.92E-31	7.92E-31	7.92E-31

Table reports the lag selection criteria of flow-return-economy PVAR model. CD stands for coefficient of determination, J statistic stands Hansen's J statistic and p value which determines the validity of the instruments. MBIC stands for maximum likelihood-based Bayesian Information Criteria (MBIC), MAIC for maximum likelihood-based Akaike Information Criteria (MAIC) and MQIC for maximum likelihood-based Hannan-Quinn Information Criteria.

Table 6.5: Selection Order Criteria for Flow-Volatility-Economy model

lag	CD	J	J p value	MBIC	MAIC	MQIC
1	0.091785	59.85378	0.10478	-149.262	-15.2462	-66.0783
2	0.070974	25.32114	0.5828	-175.125	-28.2886	-74.1396
3	0.131451	41.56261	0.047648	-117.194	-14.4374	-55.6068
4	0.201299	23.42153	0.495042	-112.656	-24.5785	-59.8665
5	0.192067	22.13772	0.333085	-91.2599	-17.8623	-47.269
6	0.193847	15.40425	0.495253	-75.3138	-16.5958	-40.1211
7	0.186351	9.600256	0.650984	-58.4383	-14.3997	-32.0438
8	0.211824	5.40267	0.713798	-39.9564	-10.5973	-22.36
9	0.221724	3.103567	0.547229	-19.476	-4.98643	-11.9778
10	0.284535	1.29E-30	.	1.29E-30	1.29E-30	1.29E-30

Table reports the lag selection criteria of flow-volatility-economy model. CD stands for coefficient of determination, J statistic stands Hansen's J statistic and p value which determines the validity of the instruments. MBIC stands for maximum likelihood-based Bayesian Information Criteria (MBIC), MAIC for maximum likelihood-based Akaike Information Criteria (MAIC) and MQIC for maximum likelihood-based Hannan-Quinn Information Criteria.

[60] The selection criteria for all other PVAR models is quantitatively same. The second order PVAR model is preferred based on the selection criteria. Results are not reported for brevity purpose.

6.2 Flow-Return-Economy model

This section presents the results, discussion and analysis of the third objectives. The third objective is to find out whether macroeconomic variables have any influence on the relationship between fund flows and financial market returns. Table 6.6 presents the results of flow-return-economy relationship by using quarterly data.[61]

6.2.1 Equity Flow-Return-Economy Relationship

In order to test all variables in one model, the study applies the PVAR model to determine the relationship among fund flows, market returns, and macroeconomic variables. Table 6.6 presents the results that the lagged flows are not related to market returns when macroeconomic variables are included in the model. This indicates that the price pressure effect vanishes when fundamental variables are taken into account and supports the notion that investment by funds is mostly driven by the real fundamentals of economy in contrast to investors' sentiments (non-fundamental).[62] Interestingly, this relationship cannot be witnessed when a separate test of equity flows and market returns is performed (see table 5.5). However, a significant relationship of lagged market returns and lagged macro variables is observed with fund flows.[63] This implies that MFs incorporate past financial and macroeconomic information when making investment decisions.

A separate test is conducted on the flow-economy relationship to ascertain whether the

[61] Refer to equations 4.12, 4.13 and 4.14 in section 4.3.3.

[62] The study earlier finds support for price pressure theory when separate PVAR test is conducted on simple equity flow-return relationship. See Table 5.6.

[63] PVAR results of macroeconomic variables are not shown for brevity purpose.

MF flows carry macroeconomic information in themselves.[64] If MF flows respond to the information about real economy, then MFs should be able to predict economic activity.[65] For almost all proxies of economic activity, the study finds consistent patterns: equity flows not only react to the changes in macroeconomic information, but also contain information of the real economy which assists in predicting economic conditions. These findings, supported by the Granger causality Wald test which suggests that equity flows and macroeconomic variables, Granger-cause each other. Moreover, the market returns Granger-cause equity flows but equity flows do not Granger-cause market returns which signals a feedback trading effect. These results also provide sufficient evidence to support an information response theory and suggest that MFs not only incorporate market and economic information in their investment decisions but also help in predicting prospective economic conditions.

6.2.2 Bond Flow-Return-Economy Relationship

Table 6.6 reports the VAR model and the Granger causality Wald test respectively for bond fund flows, market returns and all macroeconomic variables. The joint Granger causality test shows one-way causal relationship and finds that the market returns negatively influence bond flows. This relationship is similarly witnessed when a separate test of bond flows and market returns is performed (see table 5.6). The results also show that macroeconomic variables influence both flows and market returns which provide strong evidence for the information response theory. Moreover, similar to equity fund flows, bond fund flows also possess the predictive ability of real economic activity.[66] The

[64] It is imperative to include results of flow-economy relationship here in order to know the true information response effect. For details of IR theory refer to section 2.2 and 3.2.1.

[65] Jank (2012) states that under information response theory, mutual fund flows along with stock market returns should be able to forecast the economic conditions if they make their investment decisions based on the information about economic activity.

finding validates Kopsch et al. (2015) who find empirical evidence of the information response theory. This is also consistent with the findings of Jank (2012) who finds that MFs are forward looking and predict expected real economic activity. This finding also substantiates with Ferson and Kim (2012) who confirm that equity and bond flows can predict the economic variables. A noticeable observation is that bond flows and market returns are inversely related. This implies that a decline in stock market prices and returns reduces the equity investment in the stock market which therefore increases investments in bond funds. This shows that investors direct flows away from equity based funds to fixed income-type funds in times of high market risk and deteriorating economic conditions.

6.2.3 Balanced Flow-Return-Economy Relationship

Table 6.6 presents results of relationship among balanced fund flows, market returns, and macroeconomic variables. The results suggest that there is a positive association of balanced flows and market returns in such a way that lagged market returns affect the subsequent fund flows. However, the lagged flows are not related to market returns when macroeconomic variables are included in the model favoring feedback trading effect even in case of inclusion of macroeconomic variables. Moreover, it is found that price pressure effect disappears when fundamental variables are taken into account and supports the notion that fund flows are mostly driven by the real fundamentals of economy in contrast to investors' sentiments (non-fundamental). However, the results suggest a significant relationship of lagged market returns and lagged macro variables with fund flows. This implies that MFs incorporate past financial and macroeconomic information when making investment decisions. The results are similar to what is observed in equity fund flows. The study finds consistent patterns: balanced flows not only react to the changes in macroeconomic information but also contain information of real economy which assists in predicting economic conditions. These findings, supported by the Granger

causality Wald test suggests that balanced flows and macroeconomic variables, Granger-cause each other.

6.2.4 Money Market Flow-Return-Economy Relationship

Table 6.6 reports the VAR model and the Granger causality Wald test respectively for money market fund flows, market returns and all macroeconomic variables. The joint Granger causality test shows one-way causal relationship and finds that the market returns negatively influence money market flows. The results also show that macroeconomic variables influence both flows and a market return which provides evidence for the information response theory. Moreover, similar to equity, bond and balanced fund flows, money market fund flows also possess the predictive ability of real economic activity. This is also consistent with the findings of Jank (2012) who finds that MFs are forward looking and predict expected real economic activity. This finding also substantiates with Ferson and Kim (2012) who confirm that money market fund flows can predict the economic variables. A noticeable observation is that money market fund flows and market returns are inversely related. This implies that a decline in stock market prices and returns increase money market investments in the stock market, thus showing that money market securities are safe havens for investors in times of high market risk and deteriorating economic conditions.

Table 6.6: PVAR Model of Fund Flows, Market Returns, Macroeconomic Variables.

	Equity funds		Bond funds		Balanced funds		Money market funds	
	Flows	**MR**	**Flows**	**MR**	**Flows**	**MR**	**Flows**	**MR**
Flows t-1	0.710	0.001	0.156	-0.098	0.110	0.003	0.256	-0.098
	(8.82)**	(0.22)	(3.96)**	(0.07)	(1.82)	(0.21)	(2.96)**	(0.23)
Wald test p-	0.00	0.12	0.05	0.12	0.1	0.2	0.05	0.1
MR t-1	4.630	0.719	-0.937	0.962	3.230	0.723	-0.537	0.962
	(5.28)**	(8.98)**	(3.43)**	(3.99)**	(3.18)**	(5.98)**	(2.43)*	(3.99)**
Wald test p-	0.00	0.00	0.05	0.12	0.01	0.2	0.05	0.00
GDP t-1	5.231	3.562	3.393	0.725	3.231	3.462	3.332	0.725
	(3.32)**	(4.77)**	(3.72)**	(2.83)**	(4.32)**	(4.77)**	(3.82)**	(2.83)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.03	0.00
Inf t-1	3.124	1.224	-2.469	0.240	1.146	7.10	-2.469	0.240
	(1.31)	(2.31)*	(0.26)	(4.02)**	(1.52)	(1.31)	(1.96)	(1.02)
Wald test p-	0.10	0.02	0.15	0.00	0.10	0.20	0.14	0.10
Ex t-1	5.748	1.665	3.354	2.099	14.748	0.265	2.454	2.099
	(3.86)**	(4.00)**	(4.85)**	(5.18)**	(5.86)**	(5.00)**	(2.85)**	(5.18)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00
UE t-1	-7.146	4.024	3.436	6.395	-1.530	4.314	2.431	6.395
	(4.521)**	(4.52)**	(5.17)**	(3.30)**	(2.50)*	(3.52)**	(4.17)**	(3.30)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00
MS t-1	16.483	2.382	-1.752	-4.066	12.453	2.821	-1.652	-4.066
	(3.48)**	(5.07)**	(2.56)*	(6.90)**	(4.48)**	(4.07)**	(2.76)*	(3.90)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00
DG t-1	-3.251	0.015	1.023	-0.572	-4.251	0.015	1.023	-0.572
	(3.66)**	(0.24)	(3.51)**	(6.79)**	(2.96)**	(2.24)*	(3.51)**	(3.79)**
Wald test p-	0.00	0.12	0.00	0.00	0.00	0.00	0.05	0.00
Inv t-1	7.118	0.529	1.560	-2.151	4.118	0.329	1.460	-2.151
	(3.73)**	(3.54)**	(15.28)**	(3.04)**	(3.43)**	(2.54)**	(5.28)**	(3.04)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00

Table reports the result of the PVAR model estimated by GMM of net fund flows, market returns and macroeconomic variables. Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

6.2.5 Stability of PVAR model

The stability condition of the estimated PVAR is checked before the estimation of IRF and FEVD. The Figure 6.1 of eigenvalues confirms that the estimates are stable. All the eigenvalues lie inside the unit circle. PVAR satisfies stability condition. [67]

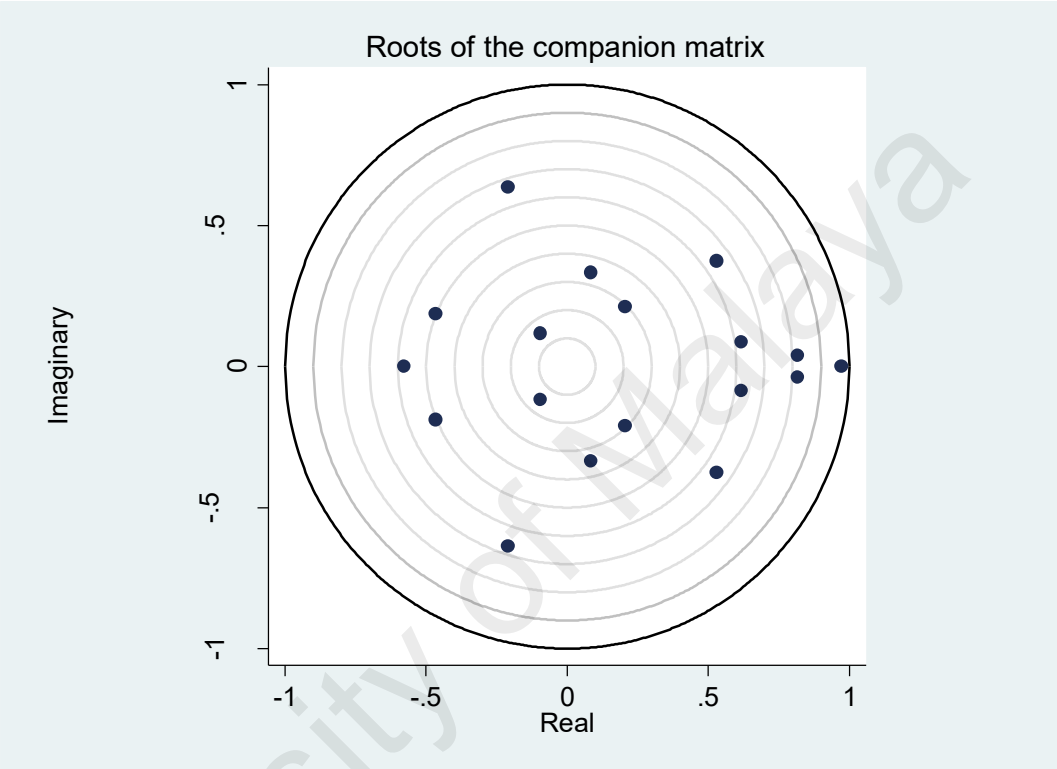

Figure 6.1: PVAR Stability Check

Note: The values inside the circle are the eigenvalues which determine the stability of PVAR model.

6.2.6 Impulse Response Function

Graph of ORIFs is presented in Figure 6.2. The 5% error bands are estimated using the Gaussian approximation generated by the Monte Carlo simulation with 1000 reps.[68] Figure 6.2 depicts graphs of impulses and responses of MF flows, market returns and

[67] The result of stability is same for all PVAR models reported in Table 6.6 to 6.7. All PVAR model are stable. The figures are not shown for brevity purpose.

[68] The study follows the procedure of generating impulse response function by Love and Zicchino (2006) and Abrigo and Love (2016).

macroeconomic variables. The response of equity flows to market returns shocks is positive in the estimated coefficients to 0.01 standard deviation to the 5th period. This is expected as equity flows and market returns are positively correlated. Similar patterns can be observed in the response of flows to GDP, money supply, investment and Exchange rate shocks, since these variables signal good economic conditions. However, inflation shocks have insignificant effect on the equity flows. The response of equity flows is negative to unemployment rate shocks and deficit to GDP rate shocks. This is obvious as the unemployment and deficit to GDP ratio signals poor economic conditions. Similar behavior can be witnessed in response to balanced flows to shocks of market returns and macroeconomic variables. The response of balanced flows to market returns is initially positive in the estimated coefficients and impulse responses. This is expected as balanced flows and market returns are positively correlated.

The response of bond flows to market returns turns out to be negative in the subsequent period in the estimated coefficients and impulse responses. This is expected as bond flows and market returns are inversely related. The response of bond flows to macroeconomic shocks is positive with the exception of money supply. The response of money market flows to market returns turns out to be negative and declines 0.05 standard deviation in the subsequent 5 periods in the estimated coefficients and impulse responses. This is expected as money market flows and market returns are inversely related. The response of money market flows to macroeconomic shocks is positive with the exception of money supply and inflation. Inflation shocks have almost insignificant effects on all classes of fund flows due to its explanatory captured mostly by GDP and money supply.

The response of market returns to shocks of equity flows is slightly increased in the first 2 periods to 0.0015 standard deviation with higher standard bands, and thereafter remain insignificant to the subsequent periods. This implies that equity flows may not

influence market returns when macroeconomic variables are taken into account. Moreover, the response of macroeconomic variables to shocks of equity flows is mixed with a negative reaction towards unemployment, budget deficit and a positive response of GDP, money supply and exchange rates. The response of market returns to shocks of bond flows is also insignificant and relatively similar to what is observed in the case of equity flows. A similar case is observed with inflation. The responses of all macroeconomic variables shocks are significant except inflation. The response of unemployment and budget deficit is positive on shock of bond flows. The response of market returns remains insignificant to shocks of both balanced flows and money market flows. This is expected as effect of flows on market returns vanishes when macroeconomic variables are taken into account. This entails that price pressure remains invalid. Fund flows are affected from past performance of market returns, which support feedback trading theory. Overall, the results are consistent with PVAR estimates.

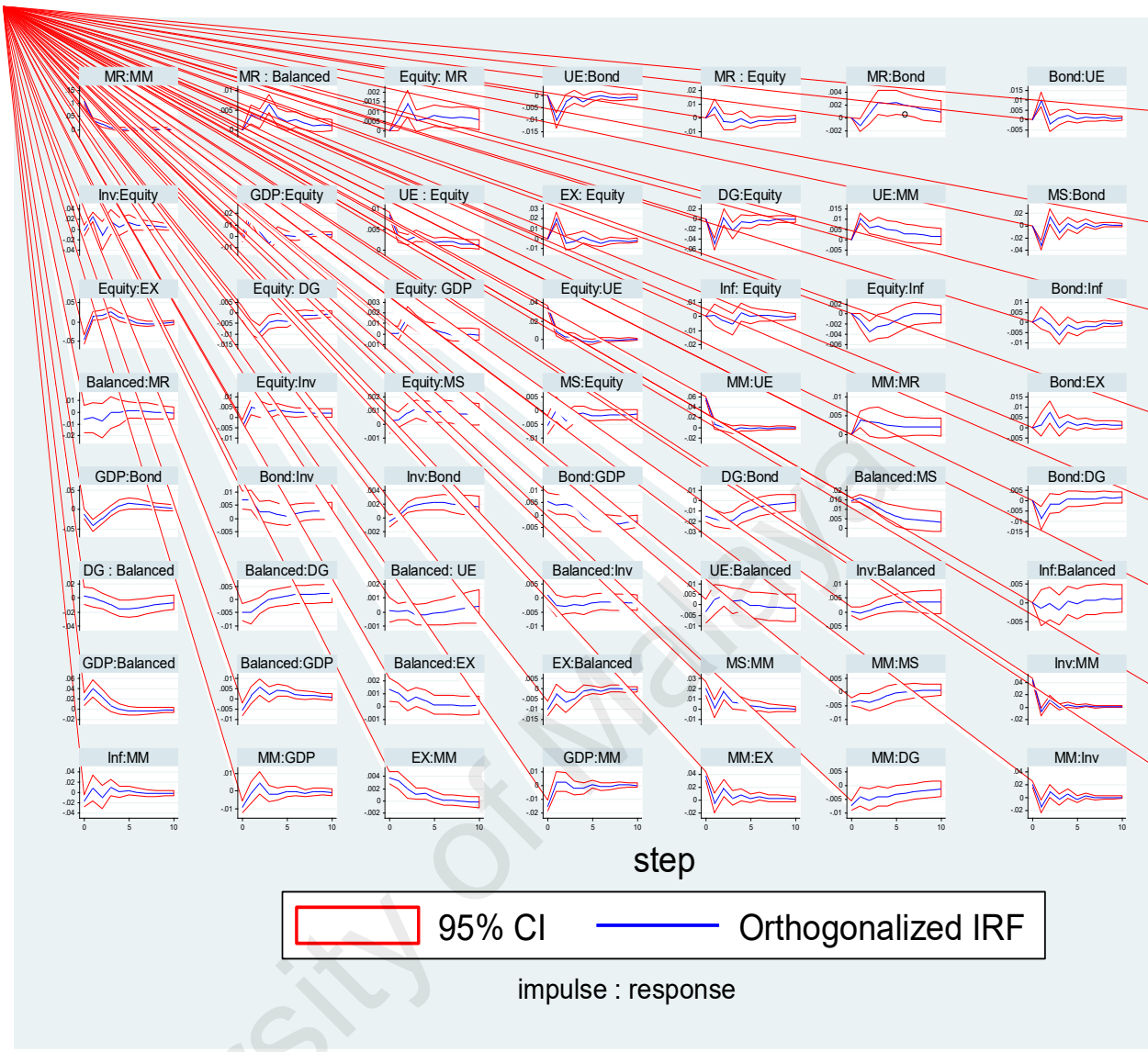

Figure 6.2: Impulses and Responses of MF flows, Market returns and Macroeconomic Variables

Note: The X-axis shows the number of time periods and Y-axis shows the unit shock standard deviations. The blue colored line shows the orthogonalized shock and response of one variable on another variable. The red colored lines represent the plus and minus two standard deviation bands.

6.2.7 Factor Error Variance Decomposition (FEVD)

The FEVD for the PVAR model is presented in Table 6.7. Market returns and macroeconomic variables explain more of the fund flows' variations, 10 periods ahead. It is observed that equity flows 50% of total variations by flows themselves, bond flows 70%, balanced 49% and money market 60%. The market returns 18% of equity flows followed by balanced and money market flows 17%. However, the magnitude of the effect is small in case of bond flows where market returns explains only about 10% of total variation in flows. It is due to indirect impact of market return on bond flows and one-way causal relationship of bond flows with market returns. GDP explain 10% and 11% of equity and balanced flows. Exchange rate and money supply rate explain greater variation in equity flows of about 5% and 4% compared to other flows. This is due to the fact that exchange rate and money supply encompasses positive economic news and equity flows increase with the better economic news. Inflation has very small impact on the variation of fund flows. Unemployment rate has a greater impact on bond and money market flows, about 5% and 6%, respectively. In addition, deficit to GDP explains 5% of bond and money market flows each. Unemployment rate and deficit to GDP signal negative news about economy and bond flows, and money market flows increase in times of expected worse economic situation. Investment explains 8% and 7% of the balanced and equity flows variations. Overall, the findings corroborate with PVAR results reported in section 6.2.

Table 6.7: FEVD of Fund Flows, Market Returns and Macroeconomic Variables

Flows	Flows	MR	GDP	Inf	Ex	UE	MS	DG	Inv
Equity	0.50	0.18	0.10	0.001	0.05	0.03	0.04	0.03	0.069
Bond	0.70	0.10	0.039	0.001	0.02	0.05	0.02	0.05	0.02
Balanced	0.49	0.17	0.11	0.002	0.039	0.04	0.03	0.04	0.079
Money Market	0.60	0.17	0.06	0.001	0.02	0.059	0.02	0.05	0.02

Percent of variation in the row variable (10 periods ahead) explained by column variable. FEVD standard errors and confidence intervals based on Monte Carlo simulations.

6.2.8 Robustness Check

For robustness check, the fund flows are split into expected and unexpected component for deeper analysis of fund flows by adopting the approach of Warther (2005) and Jank (2012). The unexpected components are represented by estimated residuals and expected fund flows are represented by the fitted values of panel regression fixed effect model, where fund flows are a dependent variable. Table 6.8 shows the result of expected flows and market returns whereas table 6.9 depicts the result of unexpected flows and market returns. The results of table 6.8 shows that expected fund flows of all classes (equity, bond, balanced, money market) are not related to market returns and macroeconomic variables. However, unexpected flows are highly correlated with market returns and macroeconomic variables (see table 6.9). These findings are consistent with Warther (1995), Jank (2012) and Kopsch et al. (2015) who find that unexpected flows are associated with market returns. The price pressure effect vanishes when fundamental variables are taken into account and supports the notion that investment by funds is mostly driven by the real fundamentals of economy in contrast to investors' sentiments (non-fundamental). A significant relationship of lagged market returns and lagged macro variables is observed with unexpected flows. This implies that MFs incorporate past financial and macroeconomic information when making investment decisions.

Table 6.8: PVAR Model of Expected Fund Flows, Market Returns, Macroeconomic Variables.

	Equity funds		Bond funds		Balanced funds		Money market funds	
	Flows	**MR**	**Flows**	**MR**	**Flows**	**MR**	**Flows**	**MR**
Flows t-1	0.310	0.001	0.256	-0.098	0.110	0.003	0.256	-0.098
	(2.92)**	(0.22)	(1.96)	(0.07)	(1.82)	(0.21)	(2.96)**	(0.23)
Wald test p-	0.00	0.12	0.05	0.12	0.1	0.2	0.00	0.1
MR t-1	1.630	0.719	-0.937	0.962	3.230	0.723	-0.537	0.962
	(1.28)	(4.98)**	(1.43)	(3.99)**	(2.18)*	(3.98)**	(1.43)	(2.98)**
Wald test p-	0.10	0.00	0.10	0.12	0.05	0.2	0.08	0.00
GDP t-1	1.231	3.562	3.93	0.725	3.231	1.462	3.32	0.725
	(1.32)	(3.77)**	(1.72)	(2.83)**	(1.32)	(3.77)**	(2.92)**	(2.83)**
Wald test p-	0.07	0.00	0.09	0.00	0.11	0.00	0.03	0.00
Inf t-1	3.124	1.224	-2.469	0.240	1.146	7.10	-2.469	0.240
	(1.31)	(2.31)*	(0.26)	(4.02)**	(1.52)	(1.31)	(1.96)	(1.02)
Wald test p-	0.10	0.02	0.15	0.00	0.10	0.20	0.14	0.10
Ex t-1	3.48	1.165	1.354	2.099	1.748	0.265	2.454	2.99
	(1.86)	(3.00)**	(1.85)	(5.18)**	(0.86)	(1.00)	(2.85)**	(3.18)**
Wald test p-	0.20	0.00	0.08	0.00	0.09	0.09	0.05	0.00
UE t-1	-2.146	2.024	2.436	6.395	-1.530	4.314	2.431	6.395
	(2.21)*	(3.52)**	(3.17)**	(3.30)**	(1.50)	(3.52)**	(2.17)*	(2.30)*
Wald test p-	0.00	0.00	0.05	0.00	0.10	0.00	0.05	0.00
MS t-1	6.483	1.382	-1.752	-4.066	1.453	2.821	-1.652	-4.066
	(2.48)*	(3.07)**	(2.56)*	(6.90)**	(0.48)	(2.07)*	(2.76)*	(3.90)**
Wald test p-	0.02	0.00	0.05	0.00	0.20	0.01	0.05	0.00
DG t-1	-3.251	0.015	1.023	-0.572	-4.251	0.015	1.023	-0.572
	(3.66)**	(0.24)	(1.51)	(6.79)**	(1.96)	(2.24)*	(3.51)**	(2.79)*
Wald test p-	0.00	0.12	0.12	0.00	0.08	0.00	0.05	0.00
Inv t-1	7.118	0.529	1.460	-2.151	4.118	0.329	1.460	-2.151
	(3.73)**	(3.54)**	(15.28)**	(3.04)**	(3.43)**	(1.54)	(1.28)	(2.04)*
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.10	0.05	0.00

Table reports the result of the PVAR model estimated by GMM of expected fund flows, market returns and macroeconomic variables. Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

Table 6.9: PVAR Model of Unexpected Fund Flows, Market Returns, Macroeconomic Variables

	Equity funds		Bond funds		Balanced funds		Money market funds	
	Flows	**MR**	**Flows**	**MR**	**Flows**	**MR**	**Flows**	**MR**
Flows t-1	0.710	0.001	0.156	-0.098	0.110	0.003	0.256	-0.098
	(8.82)**	(0.22)	(3.96)**	(0.07)	(1.82)	(0.21)	(2.96)**	(0.23)
Wald test p-	0.00	0.12	0.05	0.12	0.1	0.2	0.05	0.1
MR t-1	4.630	0.719	-0.937	0.962	3.230	0.723	-0.537	0.962
	(5.28)**	(8.98)**	(3.43)**	(3.99)**	(3.18)**	(5.98)**	(2.43)*	(3.99)**
Wald test p-	0.00	0.12	0.05	0.12	0.01	0.2	0.05	0.1
GDP t-1	5.231	3.562	3.393	0.725	3.231	3.462	3.332	0.725
	(3.32)**	(4.77)**	(3.72)**	(2.83)**	(4.32)**	(4.77)**	(3.82)**	(2.83)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.03	0.00
Inf t-1	3.124	1.224	-2.469	0.240	1.146	7.10	-2.469	0.240
	(1.31)	(2.31)*	(0.26)	(4.02)**	(1.52)	(1.31)	(1.96)	(1.02)
Wald test p-	0.10	0.02	0.15	0.00	0.10	0.20	0.14	0.10
Ex t-1	5.748	1.665	3.354	2.099	14.748	0.265	2.454	2.099
	(3.86)**	(4.00)**	(4.85)**	(5.18)**	(5.86)**	(5.00)**	(2.85)**	(5.18)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00
UE t-1	-7.146	4.024	21.436	6.395	-1.530	4.314	2.431	6.395
	(4.521)**	(4.52)**	(15.17)**	(3.30)**	(2.50)*	(3.52)**	(4.17)**	(3.30)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00
MS t-1	16.483	2.382	-1.752	-4.066	12.453	2.821	-1.652	-4.066
	(3.48)**	(5.07)**	(2.56)*	(6.90)**	(4.48)**	(4.07)**	(2.76)*	(3.90)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00
DG t-1	-3.251	0.015	1.023	-0.572	-4.251	0.015	1.023	-0.572
	(3.66)**	(0.24)	(3.51)**	(6.79)**	(2.96)**	(2.24)*	(3.51)**	(3.79)**
Wald test p-	0.00	0.12	0.00	0.00	0.00	0.00	0.05	0.00
Inv t-1	7.118	0.529	10.460	-2.151	4.118	0.329	10.460	-2.151
	(3.73)**	(3.54)**	(15.28)**	(3.04)**	(3.43)**	(2.54)**	(5.28)**	(3.04)**
Wald test p-	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00

Table reports the result of the PVAR model estimated by GMM of unexpected fund flows, market returns and macroeconomic variables. Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

6.2.9 Contemporaneous Flow-Return-Economy Relationship (Additional Check)

The study applies the fixed effect model as an alternative test to estimate the contemporaneous relationship of flows, market returns and the economy. Hausman test and Breusch-pagan Lagrange Multiplier test are performed (reported in table 6.10a), which help to decide the appropriateness of fixed-effect model to the data in this study. The study also performed diagnostic check to determine autocorrelation, cross-sectional dependence and heteroscedasticity problem in Table 6.10(b).[69] The results suggest that there is no autocorrelation, cross-sectional dependence and heteroscedasticity. The test results show that there is evidence to reject the null theory and hence the fixed-effects model is applicable. Table 6.11 report the net fund flows with other explanatory variables. The study extends model (a) into model (b) using novel economic variables to check if they influence the flow-return relationship.[70] Model (a) imitates Jank (2012) and Kopsch et al. (2015) to test other macroeconomic variables. Model (b) is extended model comprising new variables such as money supply, fiscal deficit, investment and unemployment.

[69] The table 6.10(b) shows the diagnostic tests for Autocorrelation, Cross Sectional Dependence and Heteroscedasticity of model 1 in table 6.10(a). The results suggest that there is no autocorrelation, cross-sectional dependence and heteroscedasticity. The separate diagnostic tests have been run on each model however it is difficult to handle so many tables in the thesis therefore, it is decided to report these tests only for one model. The results of all other models are quantitatively same.

[70] Ben-Rephael et al. (2011) explain that under information response theory, positive (negative) information in the financial market results in positive (negative) securities returns and inflows (outflows) by mutual funds. Furthermore, it is stated that macro-economic variables causes both stock market returns and fund flows to react simultaneously to new information (Jank, 2012).

Table 6.10: (a) BP LM Test and Hausman Test

Regression Models	Variables		BP LM Test	Hausman Test	Remarks
	DV	Main IV	Chi-Square	Chi-Square	
1	Equity Flows	Returns	7.69**	6.39**	FE
2	Bond Flows	Returns	5.08**	8.56**	FE
3	Bal. Flows	Returns	6.48**	7.42**	FE
4	MM Flows	Returns	8.13**	12.57**	FE
5	Returns	Equity Flows	9.05**	33.26**	FE
6	Returns	Bond Flows	15.99**	11.27**	FE
7	Returns	Bal. Flows	10.37**	28.21**	FE
8	Returns	MM Flows	12.25**	6.45**	FE
9	Equity Flows	Volatility	14.48**	1.49	RE
10	Bond Flows	Volatility	8.95**	2.50	RE
11	Bal. Flows	Volatility	9.39**	1.10	RE
12	MM Flows	Volatility	11.23**	1.51	RE
13	Volatility	Equity Flows	27.47**	2.60	RE
14	Volatility	Bond Flows	17.39**	1.70	RE
15	Volatility	Bal. Flows	24.57**	2.86	RE
16	Volatility	MM Flows	26.96**	2.63	RE

Note: The table reports the results of BP LM test for panel effects and the Hausman test for random and fixed effects. RE and FE respectively refer to random and fixed effects. Null theory under BLM test is that there are no panel effects, while the null theory under Hausman tests is that there are no fixed effects. Subscripts ** and * show the significance of the results at 1% and 5% levels respectively.

Table 6.10 (b): Diagnostic Checks

Problem	Method	Stat	Remarks
Autocorrelation	Wooldridge test for autocorrelation	0.218 (0.6603)	No Autocorrelation
Cross Sectional Dependence	Pesaran CSD test	1.115 (0.2479)	No Cross Sectional Dependence
Heteroscedasticity	Modified Wald Test for group wise heteroscedasticity	0.1456 (0.340)	No heteroscedasticity

Note: The table shows the diagnostic tests for Autocorrelation, Cross Sectional Dependence and Heteroscedasticity of model 1 in table 6.10a.

Table 6.11: Net Fund Flows, Market Returns and Macroeconomic Variables

	Equity flows		Bond flows		Balanced flows		Money market flows	
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b
MR t	0.114	0.140	-0.040	0.033	0.131	0.120	-0.050	0.023
	(0.15)	(0.141)	(0.08)	(0.06)	(0.13)	(0.121)	(0.12)	(0.03)
MR t-1		1.496		0.118		1.456		0.114
		(2.13)*		(2.22)*		(2.23)*		(2.45)*
ΔGDP	3.684	3.584	-0.169	0.297	3.082	3.542	-0.149	0.297
	(1.87)	(2.77)*	(0.13)	(2.22)*	(2.04)*	(2.47)*	(0.12)	(2.32)*
ΔInf	2.747	2.757	-0.076	-0.001	2.247	2.747	-0.076	-0.023
	(0.94)	(0.84)	(0.54)	(0.00)	(0.44)	(0.54)	(0.54)	(0.05)
ΔEx	0.483	0.463	0.377	0.592	0.423	0.434	0.337	0.532
	(0.21)	(2.31)*	(0.27)	(2.24)*	(0.12)	(0.32)	(0.25)	(2.14)*
ΔUE		- 1.526		0.235		- 1.326	0.981	0.235
		(2.43)*		(2.17)*		(2.44)*	(0.41)	(0.17)
ΔMS		1.765		-0.150		1.745		-0.250
		(2.07)*		(2.11)*		(2.23)*		(2.31)*
ΔDG		-0.043		0.191		-0.043		0.192
		(0.14)		(1.02)		(0.14)		(1.05)
ΔInv		0.999		0.850		0.998		0.845
		(2.90)**		(2.26)*		(2.95)**		(2.23)*

Table shows the results of a regression of net flow on past market returns, contemporaneous market returns and macroeconomic variables. Model a includes all variables proposed by Jank (2012) and Kopsch et al. (2015). Model b is extended models comprising of new macroeconomic variables. "**" Significance at the 1% level,"*" Significance at the 5% level.

The findings are similar to what is witnessed in PVAR model. It can be observed that the lagged returns and lagged flows are significantly associated with fund flows (see model 1a). However, no significant relationship between the current values of market returns and fund flows is noticed (see model 1a).

The results do not show any evidence of concurrent relationship of equity fund flows with market returns (see model 1a, 1b). In contrast, lagged flows and lagged returns are positively correlated with equity mutual flows. However, the concurrent relationship of flows with macroeconomic variables is perceived. This implies that macroeconomic information influences the fund flows but does not influence the concurrent relationship of fund flows and market returns. Rather, it is noticed that the fund flows association with lagged market returns. This result differs to those of Jank (2012) and Kopsch et al. (2015) who found the concurrent relationship of MFs and market returns due to macroeconomic

information. This implies that equity flows follow the past performance of market which confirms the feedback trading/return chasing theory. It is identified that an increase in money supply and domestic investment indicates better expected economic conditions and thus have a positive effect in equity flows whereas an increase in budget deficit and unemployment signal a poor state of economy and reduce equity flows. These findings corroborate with Kaul (1987), Barro (1990) and Laopodis (2009).

Table 6.11 also shows the estimates of bond fund flows (see model 2a, 2b). Similar to equity flows, the results provide support to the feedback trading theory. A negative relationship between the bond flows and lagged market returns is observed, which signals a negative feedback return chasing behavior.[71] Moreover, no relation is found between the concurrent fund flows and market returns. This suggests that bond funds react to the past performance of market, implying that a decrease in market returns is followed by an increase in bond flows and vice versa. In addition, poor economic conditions imply an increase in investments in bond inflows, thus providing support to the notion that investors switch to safer investment avenues (like bonds) in times of high market volatility and poor economic conditions (Ferson & Kim, 2012). All other macroeconomic variables are positively related to bond flows. A positive relationship of bond flows with budget deficit and the unemployment rate is perceived. This is expected as a higher budget deficit ratio, and an increased unemployment rate sends negative vibes to the economy, thus signaling positive bond flows. The findings are consistent with Ferson and Kim (2012), who found that investors reduce equity fund purchases and increase bond fund purchases in times of higher than expected equity premiums, higher stock market volatility and a poor economic state.

[71] Oh and Parwada (2007) state that negative relationship between stock market returns and mutual fund flows suggests the contrarian behavior of mutual fund investors (negative feedback trader).

Table 6.11 reports the balanced fund flows and money market fund flows respectively with other explanatory variables (see model 3a, 3b, 4a and 4b in Table 6.9). The findings are similar to what is witnessed in PVAR model. It can be observed that the lagged returns and lagged balanced flows are significantly associated with fund flows (see model 3a). However, no significant relationship between the current values of market returns and fund flows is observed (see model 3a). The study extends model 3a into model 3b using novel economic variables to check if they influence the flow-return relationship[72]. Model 3b are extended models comprising new variables such as money supply, fiscal deficit, investment and unemployment. The results do not show any evidence of the concurrent relationship of balanced fund flows with market returns (see model 3a, 3b). In contrast, lagged flows and lagged returns are positively correlated with balanced mutual flows. However, it is found that there exists a concurrent relationship of flows with macroeconomic variables. This implies that macroeconomic information influences the fund flows but does not influence the concurrent relationship of fund flows and market returns. Rather, the fund flows association with lagged market returns is observed. This finding is in contrast to the findings by Jank (2012) and Kopsch et al. (2015), who find the concurrent relationship of MFs and market returns due to macroeconomic information. This implies that balanced fund flows follow the past performance of the market which confirms the feedback trading/return chasing theory. It is also observed that balanced flows are concurrently associated with almost all macroeconomic variables. The results are similar to what is witnessed in equity fund flow relationship with market returns and macroeconomic variables.

[72] Ben-Rephael et al. (2011) explain that under information response theory, positive (negative) information in the financial market results in positive (negative) securities returns and inflows (outflows) by mutual funds. Furthermore, it is stated that macro-economic variables causes both stock market returns and fund flows to react simultaneously to new information (Jank, 2012).

The estimates of money market fund flows (see model 4a, 4b, 4c and 4d in Tables 6.11 and 6.12) are similar to bond flows. The results provide support to the feedback trading theory. The findings suggest a negative relationship between the money market flows and lagged market returns which signals a negative feedback return chasing behavior. [73] Moreover, no relation is found between the concurrent fund flows and market returns. This suggests that money market funds react to the past performance of the market, implying that a decrease in market returns is followed by an increase in money market flows and vice versa. Moreover, poor economic conditions imply an increase in investments in money market inflows, thus providing evidence that money market are considered safe havens for investors in times of high market volatility and poor economic conditions (Ferson & Kim, 2012). Inflation has a negative but insignificant relation with money market flows, which is similar to bond flows.

The estimation results support to feedback trading in the case of the flow-return relationship and the information response theory in the case of the flow-economy relationship. The funds follow the past performance of the market than the current performance supporting the feedback trading/return chasing theory. Moreover, fund flows are also highly correlated with current macroeconomic variables suggesting that the current economic conditions affect the flows of funds. MFs do incorporate the economic information when making investment and asset allocation decisions. The study does not find evidence of a contemporaneous relationship of market returns and fund flows. However, there is a partial support for information response theory i.e., MFs react to the news of macroeconomic information. This implies that MFs are risk averse

[73] Oh and Parwada (2007) state that negative relationship between stock market returns and mutual fund flows suggests the contrarian behavior of mutual fund investors (negative feedback trader).

investors and follow the previous market performance due to high volatility in developing countries' financial markets. [74]

6.2.9.1 Robustness Check

For robustness check, the fund flows are split into expected and unexpected component for deeper analysis of fund flows by adopting the approach of Warther (2005) and Jank (2012). The unexpected components are represented by estimated residuals and expected fund flows are represented by the fitted values of panel regression fixed effect model, where fund flows are a dependent variable. Table 6.12 depicts model 1c and 1d, which are estimated using expected flows and unexpected flows as dependent variables.

These extended models consist of new variables such as money supply, fiscal deficit, investment and unemployment. The findings are similar to what is witnessed in PVAR model. Almost all macroeconomic variables are significantly associated with unexpected equity flows but not with the expected flow (model 1c and 1d). Surprisingly, the results do not depict any relationship between changes in the inflation rate and unexpected flows.

[74] Klapper et al. (2004) find that developing economies have poor information mechanism and are found to have high information asymmetries. Because of this, it is possible that mutual fund may be not able to make contemporaneous decision making due to high volatility in stock markets.

Table 6.12: Expected and Unexpected Fund Flows, Market Returns And Macroeconomic Variables

	Equity Flows		Bond Flows		Balanced Flows		Money market Flows	
	Model 1c	Model 1d	Model 2c	Model 2d	Model 3c	Model 3d	Model 4c	Model 4d
	Expected	Unexpected	Expected	Unexpected	Expected	Unexpected	Expected	Unexpected
MR t	0.016	0.099	0.052	-0.161	0.046	0.019	0.052	-0.261
	(0.02)	(0.71)	(0.10)	(1.04)	(0.05)	(0.74)	(0.10)	(1.03)
MR t-1	1.576	1.630	-0.060	-0.019	1.536	1.320	-0.060	-0.019
	(0.24)	(5.28)**	(0.11)	(5.21)**	(2.54)*	(3.48)**	(0.11)	(5.21)**
ΔGDP	0.242	3.342	0.396	0.619	0.141	2.342	0.396	0.619
	(0.13)	(4.99)**	(0.28)	(7.56)**	(0.12)	(3.09)**	(0.28)	(4.56)**
ΔInf	2.299	2.447	0.022	0.004	2.499	2.445	0.022	0.004
	(0.10)	(1.94)	(0.14)	(0.58)	(0.20)	(1.94)	(0.14)	(0.78)
ΔEx	0.235	0.248	1.054	0.677	0.235	0.223	1.044	0.647
	(0.10)	(2.90)*	(0.39)	(4.66)**	(0.10)	(2.80)*	(0.33)	(4.66)**
ΔUE	-1.471	-0.014	0.021	0.091	-1.471	-0.015	0.021	0.091
	(0.40)	(2.04)*	(0.02)	(2.58)*	(0.40)	(3.04)**	(0.02)	(2.58)*
ΔMS	0.306	1.459	-0.649	- 0.798	0.323	1.459	-0.669	- 0.198
	(0.19)	(5.84)**	(0.45)	(3.67)**	(0.29)	(4.84)**	(0.55)	(4.57)**
ΔDG	- 0.011	-0.054	0.065	0.221	- 0.031	-0.054	0.066	0.251
	(0.04)	(2.66)*	(0.34)	(5.54)**	(0.12)	(2.66)*	(0.35)	(4.54)**
ΔInv	0.095	1.095	0.152	0.691	0.086	1.095	0.152	0.691
	(0.09)	(3.92)**	(0.22)	(4.44)**	(0.05)	(4.92)**	(0.22)	(3.44)**

Table shows the results of a regression of net flow on past market returns, contemporaneous market returns and macroeconomic variables. Model c and d are extended models with dependent variables of expected flow and unexpected flow respectively. Expected and Unexpected net flows are the fitted and residual values of the regression model. "**" Significance at the 1% level,"*" Significance at the 5% level.

Similar to the results reported in (see model 1d), there also exist significant association of unexpected bond flows with economic variables, which is clearly observed when compared to expected bond flows. In the extended model 2d, unexpected flows are negatively associated with money supply. This indicates that a lower money supply shows expected worst economic conditions and thus increase the investment in fixed income securities like bond. Inflation has a negative but insignificant relation with bond flow. One possible explanation can be that due to the GDP and money supply pick up, some of its explanatory power is correlated to inflation. All other macroeconomic variables are positively related to bond unexpected flows. A positive relationship of bond flows with budget deficit and the unemployment rate is perceived. This is expected as a higher budget deficit ratio, and an increased unemployment rate sends negative vibes to the economy thus signaling positive bond flows.

Model 3c and 3d depict the results of balanced expected and unexpected flows, market returns and macroeconomic variables. It is also observed that balanced flows are concurrently associated with almost all macroeconomic variables. GDP, inflation, investment, money supply are significantly associated with unexpected flows but not with the expected flow (model 3c and 3d). The results are similar to what is witnessed in equity fund flow relationship with market returns and macroeconomic variables.

The estimates of money market fund flows (see model 4a, 4b) are similar to bond flows. It is found that economic variables are significantly associated with unexpected money market flows than with expected flows. In the extended model 4d, all other macroeconomic variables are positively related to money market flows except money supply growth rate. The results indicate a positive relationship of money market flows with budget deficit and the unemployment rate. This is expected as a higher budget deficit ratio, and an increased unemployment rate sends negative vibes to the economy thus signaling positive money market flows.

6.2.9.2 Additional Check

To validate the results, the study applies a fixed effect model on the return-flow-economy relationship. Table 6.13 depicts the results of the market returns as dependent variables and flows, and economic variables as independent variables. Tables 6.14 shows the results of the market returns as dependent variables and expected flows, unexpected flows and economic variables as independent variables for robustness check. The results substantiate findings earlier that there is no contemporaneous relationship of equity, bond, balanced and money market flows with market returns. In addition, the results do not find an association of market returns with lagged flows, thus rejecting the price pressure theory which states that lagged flows affect market returns. In the extended models, the results show that money supply and investment growth are related to market returns.

Similar results can be observed in table 6.14. Overall, it is observed that fund flows have a temporal relationship with market returns such that the reaction of market returns comes first followed by MF flows. Nevertheless, market returns and MF flows are highly associated with new macroeconomic information.

Table 6.13: Market Returns, Fund Flows and Macroeconomic Variables

	Dependent variable: MR t							
	Equity funds		Bond funds		Balanced funds		Money Market funds	
	Model 5a	Model 5b	Model 6a	Model 6b	Model 7a	Model 7b	Model 8a	Model 8b
Flows t	0.002	0.002	-0.001	-0.001	0.009	0.003	-0.005	-0.041
	(0.43)	(0.55)	(0.17)	(0.15)	(0.41)	(0.58)	(0.80)	(0.16)
Flows t-1		0.003		-0.001		0.003		-0.003
		(0.79)		(0.17)		(0.80)		(0.16)
ΔGDP	0.029	0.011	0.136	0.099	0.024	0.014	0.112	0.010
	(0.23)	(2.09)*	(1.07)	(2.84)**	(0.23)	(2.08)*	(1.09)	(2.98)**
ΔInf	0.100	0.004	0.040	0.061	0.103	0.004	0.050	0.021
	(0.37)	(0.02)	(1.16)	(0.22)	(0.37)	(0.02)	(1.06)	(0.21)
ΔEx	0.968	0.958	0.963	0.970	0.964	0.928	0.563	0.870
	(5.12)**	(5.16)**	(5.02)**	(5.20)**	(4.12)**	(3.16)**	(4.02)**	(3.20)**
ΔUE		-0.060		-0.124		-0.050		-0.124
		(0.27)		(2.62)*		(0.24)		(2.63)*
ΔMS		0.029		0.040		0.023		0.050
		(2.26)*		(2.31)*		(2.25)*		(2.21)*
ΔDG		-0.020		-0.026		-0.080		-0.056
		(2.75)*		(1.14)		(0.72)		(2.13)*
ΔInv		0.155		0.251		0.156		0.261
		(2.52)*		(2.40)*		(2.53)*		(2.39)*

Table shows the results of a regression of market returns on past flows, contemporaneous flows and macroeconomic variables. Model a includes all variables proposed by Jank (2012) and Model b is extended models of returns with independent variables of flows and macroeconomic variables. "**" Significance at the 1% level,"*" Significance at the 5% level

Table 6.14: Market Returns, Expected and Unexpected Fund Flows and Macroeconomic Variables

	Dependent variable: MR t							
	Equity funds		Bond funds		Balanced funds		Money Market funds	
	Model 5c	Model 5d	Model 6c	Model 6d	Model 7c	Model 7d	Model 8c	Model 8d
Expected t	0.001	-	-0.001		0.001	-	-0.001	
	(0.37)	-	(0.16)		(0.27)	-	(0.16)	
Expected t-1	0.004	-	-0.002		0.007	-	-0.002	
	(1.04)	-	(0.37)		(1.08)	-	(0.37)	
Unexpected t		0.026		-0.457		0.024		-0.457
		(1.10)		(1.84)		(1.13)		(1.84)
Unexpected t-		0.040		-0.062		0.060		-0.062
		(0.89)		(1.15)		(0.19)		(1.15)
ΔGDP	0.006	0.177	0.100	0.194	0.004	0.167	0.100	0.154
	(0.05)	(2.86)**	(0.85)	(2.06)*	(0.03)	(2.46)*	(0.85)	(2.16)*
ΔInf	-0.005	-0.141	0.061	0.054	-0.009	-0.128	0.061	0.064
	(0.02)	(0.50)	(2.22)*	(2.07)*	(0.04)	(0.70)	(2.22)*	(2.09)*
ΔEx	0.955	0.938	0.971	0.865	0.952	0.918	0.971	0.815
	(5.10)**	(4.93)**	(5.20)**	(4.52)**	(3.10)**	(3.93)**	(5.20)**	(3.53)**
ΔUE	-0.062	-0.070	-0.122	-0.454	-0.062	-0.070	-0.122	-0.414
	(0.28)	(0.31)	(0.62)	(1.76)	(0.18)	(0.31)	(0.62)	(1.78)
ΔMS	0.031	0.031	0.042	0.343	0.041	0.051	0.042	0.343
	(2.27)*	(2.24)*	(2.32)*	(2.38)*	(2.17)*	(2.24)*	(2.32)*	(2.48)*
ΔDG	-0.020	-0.019	-0.026	-0.139	-0.020	-0.018	-0.026	-0.159
	(0.76)	(0.74)	(1.16)	(2.55)*	(0.76)	(0.84)	(1.16)	(2.59)*
ΔInv	0.151	0.197	0.251	0.556	0.161	0.192	0.251	0.557
	(2.49)*	(2.67)*	(2.41)*	(2.84)**	(2.49)*	(2.62)*	(2.41)*	(2.82)**

Table shows the results of a regression of market returns on past flows, contemporaneous flows and macroeconomic variables. Model 11a, 11b, 11c and 11d reports the result of balanced flows. Model c and d are extended models of returns with independent variables of flows, expected flow, unexpected flow and macroeconomic variables. Expected and Unexpected net flows are the fitted and residual values of the regression model. "**" Significance at the 1% level,"*" Significance at the 5% level.

6.3 Flow-Volatility-Economy Relationship

Following Thomas et al. (2014), the study estimates flow-volatility relationship with macroeconomic variables to check whether the relationship holds at macro level. Since the presence of endogeneity problem is suspected among fund flows, volatility and macroeconomic variables as reported by earlier studies,[75] the study therefore estimates the PVAR model using quarterly data.[76] Table 6.15 depicts the PVAR results of MF flows, market volatility and macroeconomic variables whereas, whereas Table 6.16 and 6.17 show the PVAR results of expected and unexpected MF flows, market volatility and macroeconomic variables. [77] Separate analysis on expected flows and unexpected flows is shown as robustness check. From Table 6.15, the study finds sufficient evidence of causal relationship between equity fund flows and market volatility even in the presence of macroeconomic variables. Moreover, balanced flows are also casually linked to market volatility. This indicates that there is bi-directional causality between flows and volatility in such manner that an increase in market volatility leads to reduced equity flows and balanced flows. However, there is no evidence of casual linkage between bond flows and market volatility. It is observed that bond fund flows follow the past performance of the market. Bond flows show momentum behavior (positive feedback trading) with market volatility in critical economic times. Bond fund flows seem to take risk by taking long position in higher volatile market. The result are consistent with Chau and Deesomsak (2015) who find the evidence of positive feedback trading in different macroeconomic conditions. Similar results are witnessed for money market flows, which are positively

[75] See studies by Bali et al. (2014) and Kopsch et al. (2015)

76 Refer to equations 4.15, 4.16 and 4.17 in section 4.3.4.

[77] Note that estimation results of fund flows and market are based on quarterly data as the data of macroeconomic variables are available on quarterly basis.

associated with market volatility. The study finds sufficient evidence of positive causal relationship between money market fund flows and market volatility.

An important fact can be observed from Table 6.16 and Table 6.17. The unexpected flows are more related to volatility as compared to the expected flow. These findings are consistent with the findings by Cao et al. (2008) who propose that innovations in fund flows are closely related to stock price volatility. Additional observation in terms of flow-volatility-economy suggests that fund flows are associated to all macroeconomic variables. Lags of macroeconomic variables greatly influence the fund flows. Moreover, it is observed that those macroeconomic variables which encompass news related to better economic prospects are positively associated with equity and balanced fund flows but negatively linked with bond, money market fund flows and market volatility. On the contrary, growth in unemployment rate, inflation rate and budget deficit ratio signal bad economic prospects which cause higher market volatility, increased bond and money market flows and reduced equity and balanced fund flows. This implies that investors' switch from risky securities (such as equity and balanced) to less risky securities (bond and money market funds) in deteriorating economic conditions. Higher GDP growth signals better economic prospects and indicates more fund flows and lesser market volatility. Increase in money supply indicates cheap credit availability and higher expected economy expansion. The results show positive reaction of previous period money supply growth with equity and balanced fund flows, but inverse relation with the bond, money market flows and market volatility. The coefficient of deficit to GDP ratio is significant at 5% level, implying that higher national budget deficit surges an alarm on the country's fiscal sustainability and in turn may influence the stock market volatility. Investment growth in real assets indicates higher production and growth in the economy. The real investment growth escalates flows in the market and dampens market volatility. Meanwhile, the exchange rate fluctuations have positive impact on both fund flows and

market volatility. The plausible reason can be that the high international exposure and foreign funds in domestic market which greatly affect and increase investors' trading behavior in stock market.

Table 6.15: PVAR Model of Total Fund Flows, Market Volatility and Macroeconomic Variables

	Total fund flows							
	Equity funds		Bond funds		Balanced funds		Money market funds	
	Flows	MV	Flows	MV	Flows	MV	Flows	MV
Flows t-1	-0.046	-0.008	0.044	0.004	-0.026	-0.005	0.044	0.004
	(0.85)	(2.38)*	(0.73)	(1.96)	(0.84)	(2.88)**	(0.73)	(2.96)**
Flows t-2	-0.098	-0.008	0.062	0.003	-0.091	-0.008	0.062	0.003
	(1.83)	(2.35)*	(1.03)	(0.65)	(1.81)	(2.35)*	(1.03)	(2.65)*
Wald test p value	0.12	0.05	0.11	0.12	0.12	0.00	0.11	0.02
MV t-1	-1.512	0.348	1.819	0.322	-1.510	0.348	1.819	0.322
	(2.45)*	(5.26)**	(2.55)*	(5.10)**	(2.43)*	(5.26)**	(2.55)*	(4.10)**
MV t-2	-0.954	0.189	2.138	0.216	-0.914	0.189	2.138	0.216
	(2.48)*	(2.18)*	(2.97)**	(3.52)**	(2.44)*	(2.18)*	(2.97)**	(3.52)**
Wald test p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ΔGDP t-1	-1.005	-0.284	1.998	0.131	-1.007	-0.284	1.998	0.131
	(0.74)	(1.83)	(0.77)	(1.01)	(0.73)	(1.83)	(0.77)	(1.01)
ΔGDP t-2	0.141	-0.043	2.291	-0.105	0.148	-0.043	2.291	0.105
	(2.10)*	(2.28)*	(2.05)*	(2.96)**	(2.19)*	(2.28)*	(2.05)*	(2.96)**
Wald test p value	0.05	0.05	0.05	0.00	0.00	0.05	0.05	0.00
ΔInf t-1	-2.421	5.083	1.243	0.441	-2.21	5.083	1.243	0.441
	(0.42)	(0.53)	(0.25)	(1.30)	(1.22)	(1.53)	(1.25)	(1.30)
ΔInf t-2	-1.636	3.614	-6.803	-0.039	-1.636	3.614	-6.803	-0.039
	(0.26)	(0.56)	(1.34)	(0.13)	(1.16)	(1.56)	(1.34)	(0.13)
Wald test p value	0.32	0.10	0.11	0.07	0.08	0.09	0.08	0.07
ΔEx t-1	5.274	0.896	2.547	0.533	5.474	0.896	2.547	0.533
	(3.85)**	(5.48)**	(2.53)*	(4.62)**	(3.82)**	(5.48)**	(2.53)*	(4.62)**
ΔEx t-2	3.471	0.152	3.723	0.199	3.431	0.152	3.723	0.199
	(2.56)*	(0.87)	(1.87)	(1.61)	(2.56)*	(0.87)	(1.87)	(1.61)
Wald test p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ΔUE t-1	-1.831	1.281	1.708	5.027	-1.871	1.281	2.708	5.027
	(0.34)	(2.29)*	(3.35)**	(3.67)**	(0.33)	(2.29)*	(3.35)**	(4.67)**
ΔUE t-2	-6.571	0.460	1.444	3.892	-6.521	0.460	1.344	3.892
	(2.59)*	(1.05)	(4.94)**	(4.43)**	(2.51)*	(1.05)	(2.94)**	(3.43)**
Wald test p value	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00
ΔMS t-1	0.091	0.495	-9.272	-0.269	0.051	0.495	-9.272	-0.269
	(0.06)	(2.98)**	(4.24)**	(2.08)*	(0.03)	(2.78)**	(5.24)**	(2.08)*
ΔMS t-2	3.692	0.681	-7.888	-0.251	3.692	0.681	-7.888	-0.251
	(2.34)*	(4.17)**	(4.32)**	(2.99)**	(2.35)*	(4.17)**	(4.32)**	(3.99)**
Wald test p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ΔDG t-1	-2.290	-0.088	0.965	0.048	-2.230	-0.088	0.965	0.048
	(3.51)**	(1.15)	(1.45)	(0.96)	(3.52)**	(1.15)	(1.45)	(0.96)
ΔDG t-2	-0.008	0.143	1.185	0.003	-0.008	0.143	1.185	0.003
	(0.01)	(2.36)*	(2.09)*	(2.07)*	(0.01)	(2.36)*	(2.99)**	(2.07)*
Wald test p value	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00
ΔInv t-1	2.304	0.104	0.645	0.052	2.334	0.104	0.645	0.052
	(2.05)*	(0.79)	(0.55)	(0.60)	(2.07)*	(0.79)	(0.55)	(0.60)
ΔInv t-2	1.736	-0.098	0.781	-0.047	1.786	-0.098	0.781	-0.047
	(2.60)*	(2.81)**	(2.64)*	(2.65)*	(2.63)*	(2.81)**	(2.64)*	(2.65)*
Wald test p value	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table displays the result of PVAR model estimated by GMM of net total aggregate fund flows (%), market volatility and macroeconomic variables (%). Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

Table 6.16: PVAR Model of Total Expected Fund Flows, Market Volatility and Macroeconomic Variables

	Total expected flows							
	Equity funds		Bond funds		Balanced funds		Money market funds	
	Flows	MV	Flows	MV	Flows	MV	Flows	MV
Flows t-1	0.008	-0.005	-0.020	-0.014	0.008	-0.005	-0.020	-0.002
	(0.16)	(0.99)	(0.47)	(1.10)	(0.16)	(0.99)	(0.47)	(2.19)*
Flows t-2	0.123	0.003	-0.061	-0.009	0.123	0.003	-0.061	-0.006
	(1.72)	(0.71)	(1.34)	(2.07)*	(1.72)	(0.71)	(1.34)	(0.43)
Wald test p value	0.06	0.08	0.09	0.08	0.06	0.08	0.09	0.03
MV t-1	0.307	0.372	-0.442	0.220	0.307	0.372	-0.442	0.220
	(0.56)	(6.27)**	(0.93)	(1.88)	(0.56)	(6.27)**	(0.93)	(1.88)
MV t-2	1.442	0.204	-0.549	0.088	1.442	0.204	-0.549	0.088
	(2.57)*	(2.81)**	(1.24)	(1.18)	(2.57)*	(2.81)**	(1.24)	(1.18)
Wald test p value	0.05	0.05	0.12	0.08	0.00	0.00	0.12	0.08
ΔGDP t-1	4.901	-0.319	2.569	-0.478	4.901	-0.319	2.569	-0.478
	(1.78)	(1.33)	(1.89)	(1.82)	(1.78)	(2.33)*	(1.89)	(2.89)**
ΔGDP t-2	2.441	0.159	3.847	0.342	2.441	0.159	3.847	0.342
	(1.64)	(2.29)*	(1.92)	(2.13)*	(1.64)	(2.29)*	(1.92)	(1.13)
Wald test p value	0.09	0.05	0.12	0.05	0.09	0.04	0.12	0.05
ΔInf t-1	-4.288	3.129	-7.463	1.255	-4.288	3.129	-7.463	1.255
	(1.44)	(1.58)	(1.78)	(2.88)	(1.44)	(1.58)	(1.78)	(2.88)
ΔInf t-2	9.277	3.002	-10.833	-0.322	9.277	3.002	-10.833	-0.322
	(1.90)	(1.52)	(1.44)	(0.84)	(1.90)	(1.52)	(1.44)	(0.84)
Wald test p value	0.08	0.09	0.12	0.09	0.08	0.09	0.12	0.09
ΔEx t-1	4.288	0.643	1.055	0.408	4.288	0.643	1.055	0.408
	(2.34)*	(4.73)**	(1.06)	(3.53)**	(2.34)*	(4.73)**	(1.06)	(3.53)**
ΔEx t-2	3.622	0.180	-2.235	-0.284	3.622	0.180	-2.235	-0.284
	(2.72)*	(1.21)	(1.83)	(1.94)	(2.92)**	(1.21)	(1.83)	(1.94)
Wald test p value	0.00	0.00	0.09	0.00	0.00	0.00	0.09	0.00
ΔUE t-1	-4.713	6.155	-2.207	0.750	-4.713	6.155	-2.207	0.750
	(1.58)	(1.10)	(1.90)	(2.02)*	(1.58)	(1.10)	(1.90)	(2.02)*
ΔUE t-2	4.764	5.159	-2.077	1.164	4.764	5.159	-2.077	1.164
	(1.20)	(1.46)	(1.17)	(2.01)*	(1.20)	(1.46)	(1.17)	(2.01)*
Wald test p value	0.10	0.11	0.16	0.05	0.10	0.11	0.16	0.05
ΔMS t-1	6.554	-0.266	0.370	-0.432	6.554	-0.266	0.370	-0.432
	(1.87)	(2.95)**	(0.33)	(3.25)**	(1.87)	(1.95)	(0.33)	(3.25)**
ΔMS t-2	5.066	-0.240	-2.121	-0.615	5.066	-0.240	-2.121	-0.615
	(1.80)	(2.66)*	(1.81)	(1.72)	(3.80)	(1.86)	(1.81)	(1.72)
Wald test p value	0.06	0.00	0.12	0.00	0.06	0.10	0.12	0.00
ΔDG t-1	-1.192	0.021	-0.527	-0.006	-1.192	0.021	-0.527	-0.006
	(2.32)*	(0.41)	(1.26)	(0.10)	(2.32)*	(0.41)	(1.26)	(0.10)
ΔDG t-2	-0.390	0.051	-0.220	0.120	-0.390	0.051	-0.220	0.120
	(0.85)	(1.13)	(0.62)	(2.49)*	(0.85)	(1.13)	(0.62)	(2.49)*
Wald test p value	0.05	0.10	0.08	0.05	0.05	0.10	0.08	0.05
ΔInv t-1	0.061	0.031	1.992	0.198	0.061	0.031	1.992	0.198
	(0.07)	(0.32)	(2.31)*	(1.85)	(0.07)	(0.32)	(2.31)*	(1.85)
ΔInv t-2	2.695	-0.152	3.502	0.142	2.695	-0.152	3.502	0.142
	(1.89)	(1.71)	(1.05)	(1.80)	(1.89)	(1.71)	(1.05)	(1.80)
Wald test p value	0.07	0.09	0.05	0.08	0.07	0.09	0.05	0.08

Table displays the result of PVAR model estimated by GMM of net expected fund flows (%), market volatility and macroeconomic variables (%). Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

Table 6.17: PVAR Model of Total Unexpected Fund Flows, Market Volatility and Macroeconomic Variables

	Total unexpected flows							
	Equity funds		Bond funds		Balanced funds		Money market funds	
	Flows	MV	Flows	MV	Flows	MV	Flows	MV
Flows t-1	-0.427	-0.002	0.105	0.024	-0.427	-0.002	0.105	0.014
	(4.95)**	(2.19)*	(1.71)	(1.04)	(4.95)**	(2.19)*	(1.71)	(3.10)**
Flows t-2	-0.167	-0.006	-0.061	0.019	-0.167	-0.006	-0.061	0.009
	(2.02)*	(2.43)*	(0.91)	(1.49)	(2.02)*	(2.43)*	(0.91)	(2.07)*
Wald test p value	0.00	0.03	0.10	0.09	0.00	0.03	0.10	0.00
MV t-1	-1.540	0.248	0.278	0.152	-1.540	0.248	0.278	0.152
	(5.10)**	(4.99)**	(2.98)**	(2.59)**	(5.10)**	(4.99)**	(2.98)**	(2.59)**
MV t-2	-1.464	0.198	1.490	0.251	-1.464	0.198	1.490	0.251
	(5.31)**	(3.08)**	(4.69)**	(3.92)**	(5.31)**	(3.08)**	(4.69)**	(3.92)**
Wald test p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ΔGDP t-1	2.223	-0.045	4.041	-0.614	2.223	-0.045	4.041	-0.614
	(2.59)**	(0.46)	(4.27)**	(3.79)**	(2.59)**	(0.46)	(4.27)**	(3.79)**
ΔGDP t-2	2.723	-0.127	4.705	-0.433	5.723	-0.127	4.705	-0.433
	(5.25)**	(1.40)	(4.02)**	(3.05)**	(5.25)**	(1.40)	(4.02)**	(3.05)**
Wald test p value	0.00	0.09	0.00	0.00	0.00	0.09	0.00	0.00
ΔInf t-1	-1.076	1.817	5.802	1.345	-1.076	1.817	5.802	1.345
	(1.70)	(1.65)	(1.83)	(4.04)**	(1.70)	(1.65)	(1.83)	(1.04)
ΔInf t-2	-2.290	0.808	5.664	1.625	-1.290	0.808	5.664	1.625
	(1.16)	(1.25)	(1.50)	(4.19)**	(1.16)	(1.25)	(1.50)	(1.19)
Wald test p value	0.09	0.08	0.06	0.03	0.07	0.06	0.09	0.06
ΔEx t-1	0.589	0.006	0.201	0.335	0.589	0.006	0.201	0.335
	(1.02)	(0.06)	(0.32)	(3.40)**	(1.02)	(0.06)	(0.32)	(3.40)**
ΔEx t-2	0.410	0.118	0.874	0.268	0.410	0.118	0.874	0.268
	(2.32)*	(2.13)*	(2.30)*	(2.23)*	(2.32)*	(2.13)*	(2.30)*	(2.23)*
Wald test p value	0.05	0.05	0.05	0.00	0.05	0.05	0.04	0.00
ΔUE t-1	-3.454	1.683	1.488	2.440	-1.454	1.683	2.488	2.440
	(3.76)**	(4.02)**	(3.35)**	(3.78)**	(4.76)**	(4.02)**	(3.35)**	(4.78)**
ΔUE t-2	-2.813	1.346	3.707	3.563	-2.813	1.346	3.107	3.563
	(3.58)**	(3.03)**	(3.59)**	(3.09)**	(4.58)**	(4.03)**	(3.49)**	(4.09)**
Wald test p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ΔMS t-1	0.766	-0.235	-0.721	0.027	0.766	-0.235	0.321	0.027
	(1.36)	(2.15)*	(1.09)	(0.23)	(1.36)	(2.15)*	(1.04)	(0.23)
ΔMS t-2	4.615	0.233	-1.361	-0.009	4.615	0.233	-1.321	-0.009
	(4.12)**	(1.92)	(2.07)*	(0.08)	(3.12)**	(1.92)	(2.57)*	(0.08)
Wald test p value	0.00	0.05	0.05	0.08	0.00	0.05	0.00	0.08
ΔDG t-1	-0.817	-0.002	-0.094	-0.005	-0.817	-0.002	-0.082	-0.005
	(2.99)**	(0.03)	(0.47)	(0.09)	(2.99)**	(0.03)	(0.47)	(0.09)
ΔDG t-2	-0.145	0.077	0.352	0.088	-0.145	0.077	0.322	0.088
	(0.52)	(2.98)**	(2.95)**	(2.96)**	(0.52)	(2.98)**	(2.99)**	(2.96)**
Wald test p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ΔInv t-1	0.724	0.131	0.433	0.119	0.724	0.131	0.423	0.119
	(1.71)	(1.54)	(2.93)**	(1.46)	(1.71)	(1.54)	(2.95)**	(1.46)
ΔInv t-2	0.876	-0.059	0.362	-0.149	0.876	-0.059	0.363	-0.149
	(2.92)**	(2.93)**	(2.90)**	(2.03)*	(2.99)**	(2.63)*	(2.97)**	(2.03)*
Wald test p value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05

Table displays the result of PVAR model estimated by GMM of net unexpected fund flows (%), market volatility and macroeconomic variables (%). Reported numbers display the coefficients of regressing column variables on lags of rows variables. T-statistics are parentheses. ** and * indicates significant at 1% and 5% level.

6.3.1 Stability of the PVAR Model

The stability condition from Figure 6.3 confirms that the estimates are stable as all the eigenvalues lie inside the unit circle. PVAR satisfies stability condition.

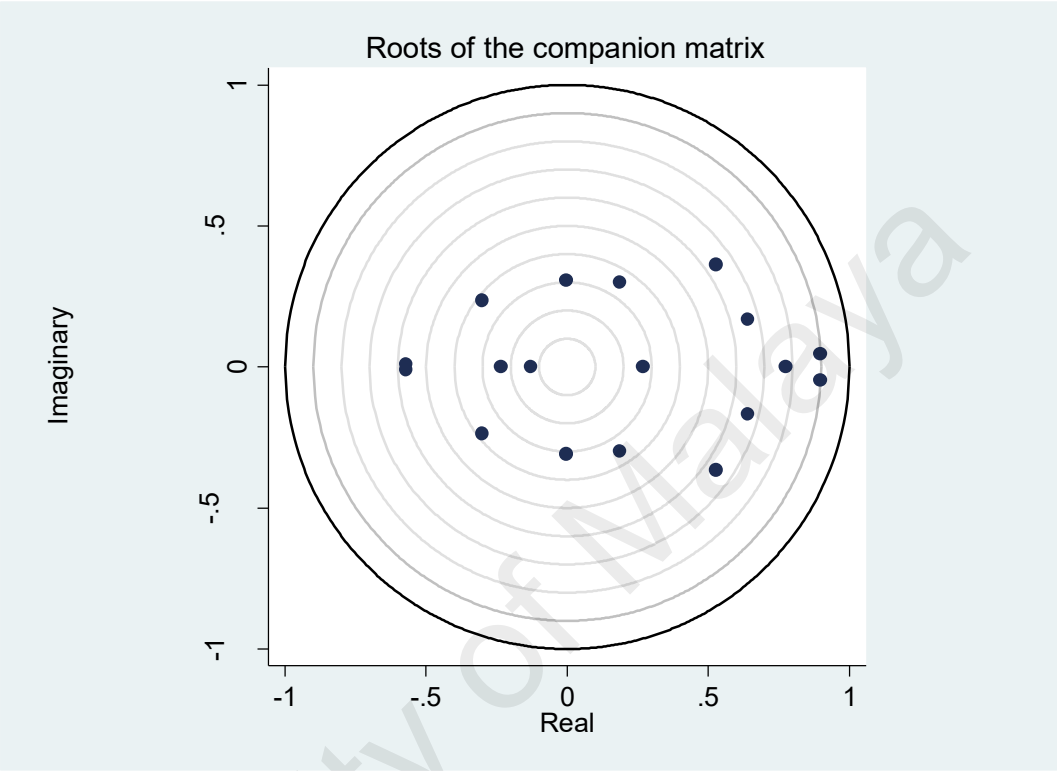

Figure 6.3: PVAR Stability Check

Note: The values inside the circle are the eigenvalues which determine the stability of PVAR model.

6.3.2 Impulse Response Function

The graph of OIRFs is presented in Figure 6.4. The 5% error bands are estimated using the Gaussian approximation generated by the Monte Carlo simulation with 1000 reps.[78] Figure 6.4 depicts graphs of impulses and responses of MF flows, market volatility and macroeconomic variables. The response of equity flows to market volatility shocks is negative in the estimated coefficients upto 0.015 standard deviation to the 10th period.

[78] The study follows the procedure of generating impulse response function by Love and Zicchino (2006) and Abrigo and Love (2016).

This is expected as equity flows and market volatility are negatively correlated. Similar patterns can be observed in the response of flows to GDP, money supply, investment and Exchange rate shocks, since these variables signal good economic conditions. However, inflation shocks have insignificant effect on the equity flows. The response of equity flows is negative to the unemployment rate shocks and deficit to GDP rate shocks. This is obvious as the unemployment and deficit to GDP ratio signals poor economic conditions. Similar behavior can be witnessed in response to balanced flows to shocks of market volatility and macroeconomic variables. The response of balanced flows to market volatility is initially negative in the estimated coefficients and impulse responses. This is expected as balanced flows and market volatility are negatively associated.

The response of bond flows to market volatility turns out to be significantly positive up to 0.005 standard deviation to the first three periods. This is expected as bond flows and market volatility are positively related. The response of bond flows to macroeconomic shocks is positive with the exception of inflation. The response of money market flows to market volatility turns out to be positive and increase to 0.01 standard deviation till the 3rd period. This is expected as money market flows and market volatility are positively associated. The response of money market flows to macroeconomic shocks is positive with the exception of inflation. Inflation shocks have almost insignificant effects on all classes of fund flows due to its explanatory captured mostly by GDP and money supply.

The response of market volatility to shocks of equity flows is declining to 0.06 standard deviation upto the 4^{th} period. This entails that equity flow influences market volatility even in the presence of macroeconomic variables. Moreover, the response of macroeconomic variables to shocks of equity flows is mixed with a negative reaction unemployment, budget deficit and a positive response of GDP, money supply and

exchange rates. This is what is observed in IRF reported in section 6.2.6. The response of market volatility to shocks of bond flows is insignificant and similar to what is observed in PVAR results in section 6.2. This is due to the indirect impact of bond flows on market volatility. A similar case is observed with inflation. The responses of all macroeconomic variables shocks are significant except inflation. The response of unemployment and budget deficit is positive on shock of bond flows. The responses of market volatility remain significant to shocks of both balanced flows and money market flows. However, the balanced flows have negative influence on market volatility and money market flows positive effect on market volatility. This is expected as similar results are reported by PVAR model (refer to section 6.2 for details of flow-market volatility-economy relationships).

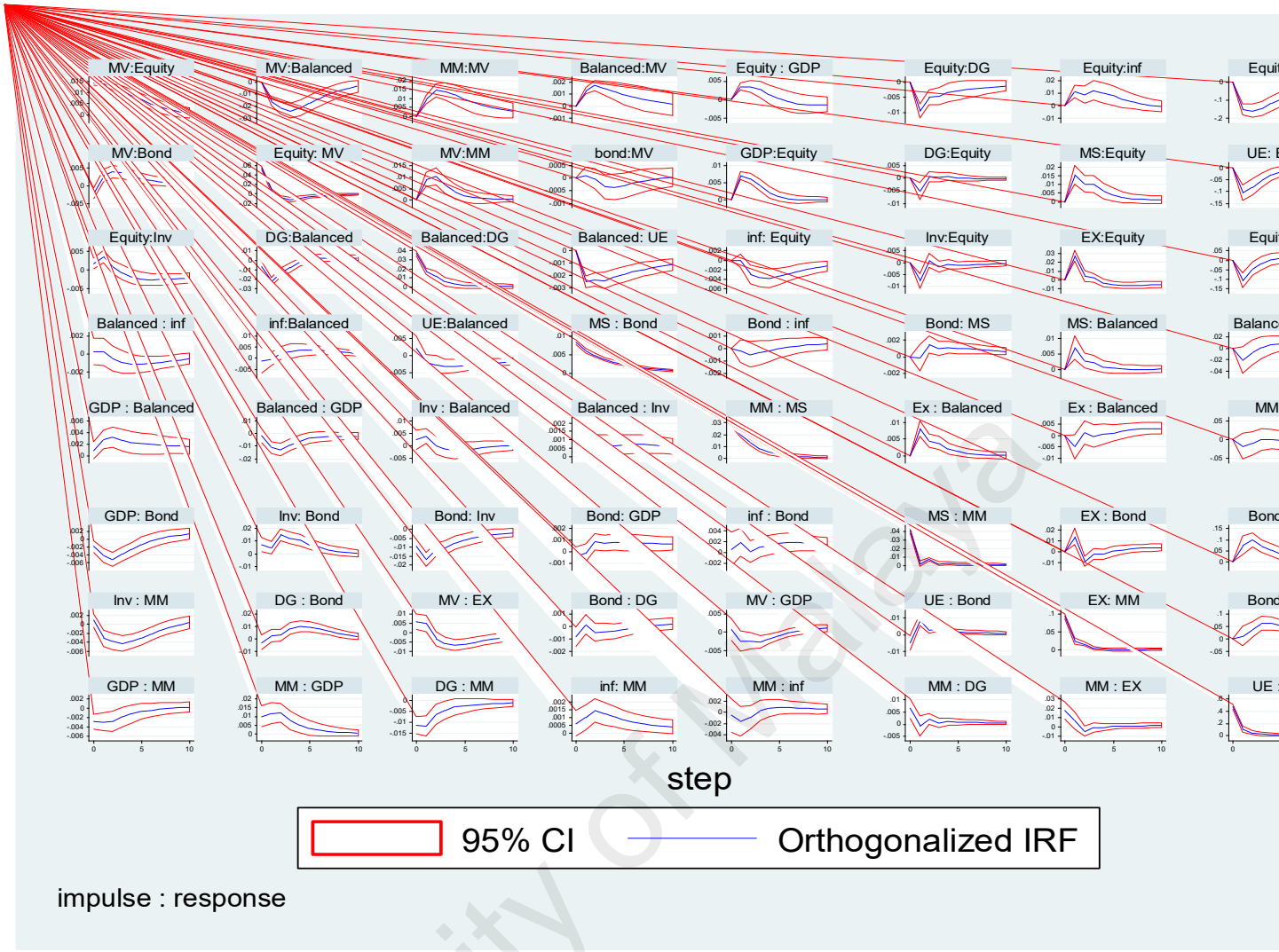

Figure 6.4: Impulses and Responses of MF flows, Market volatility and Macroeconomic Variables

Note: The X-axis shows the number of time periods and Y-axis shows the unit shock standard deviations. The blue colored line shows the orthogonalized shock and response of one variable on another variable. The red colored lines represent the plus and minus two standard deviation bands.

6.3.3 Factor Error Variance Decomposition (FEVD)

The FEVD for the PVAR model is presented in Table 6.18. Market volatility and macroeconomic variables explain more of the fund flows variation 10 periods ahead. It is observed that equity flows 49% of total variations by flows themselves, bond flows 68%, balanced 55% and money market 55%. The market volatility explains 18% of balanced flows followed by equity and money market flows 17%. However, the magnitude of effect is small in case of bond flows where market volatility explains only about 12% of total variation in flows. It is due to indirect impact of market volatility on bonds flow and one-way causal relationship of bond flows with market volatility. GDP explains 11% and 10% of equity and balanced flows. Exchange rate and money supply rate explain greater variation in equity and balanced flows about 4% and 3%, respectively as compared to other flows. This is due to the fact that exchange rate and money supply encompasses positive economic news and equity, and balanced flows increase with better economic news. Inflation has very small impact on the variations of fund flows. Unemployment rate has greater impact on bond and money market flows about 5% and 6%, respectively. In addition, deficit to GDP explains 5% and 6% of bond and money market flows each. Unemployment rate and deficit to GDP signal negative news about economy and bond flows, and money market flows increases in times of expected worse economic situation. Investment explains 7% and 8% of the balanced and equity flows variations, respectively. Overall, the findings corroborate with PVAR results reported in section 6.17.

Table 6.18: FEVD of Fund Flows, Market Volatility and Macroeconomic Variables

Flows	Flows	MV	GDP	Inf	Ex	UE	MS	DG	Inv
Equity	0.49	0.17	0.11	0.002	0.039	0.04	0.03	0.04	0.079
Bond	0.68	0.12	0.039	0.001	0.02	0.05	0.02	0.05	0.02
Balanced	0.50	0.18	0.10	0.001	0.05	0.03	0.04	0.03	0.069
Money Market	0.55	0.22	0.06	0.001	0.02	0.059	0.02	0.06	0.03

Percent of variation in the row variable (10 periods ahead) explained by column variable. FEVD standard errors and confidence intervals based on Monte Carlo simulations.

6.3.4 Concurrent Flow-Volatility-Economy Relationship (Additional check)

The study applies the random effect model to check the concurrent relationship among flow-volatility and economy.[79] Bearing the caveat of difficulties in interpreting the coefficient of random effect model[80] in mind, the study exhibits the joint significance tests which suggest that p-value of all variables are significant jointly. Table 6.19 presents the results of flows, market volatility and macroeconomic variables, where, fund flows are dependent variables and, market volatility and macroeconomic variables are the independent variables. The results suggest that both current and lagged volatility influence the fund flows. The current volatility is positively related with equity flows whereas lagged volatility is negatively related flows indicating that funds increase their trading behavior when market volatility is high simultaneously but decrease their trading the next time period due to high risk and possible losses. Same is the case with balanced flows. The results of balanced flows, market volatility and macroeconomic variables suggest that both current and lagged volatility influence the balanced flows. However, the coefficient of lagged market volatility is negative, confirming that decrease in market volatility accelerate the net trading by balanced funds in the market. In case of bond flows, the study finds that current and lagged volatility affect fund flows, indicating that funds increase their trading behavior when market volatility is high and exhibit momentum

[79] Hausman test reported in Table 6.10(a) suggests suitability of random effect model in case of flow-volatility-economy relationship.

[80] The interpretation of coefficients of random model is tricky since its analysis includes both between the entity effects and within entity effects. For details refer to Thomas et al. (2014) and Schall (1991).

behavior thereafter. Lastly, in case of money market flows, it is found that both current and lagged volatility influence the money market flows, indicating that funds increase their trading behavior when higher fluctuations are observed in market prices.

Table 6.20 presents the results of market volatility as dependent variable while the flows and macroeconomic variables as independent variables. It is observed that current flows affect positively with market volatility. However, in the case of equity and balanced flows, previous flows negatively affect market volatility. This suggests that investment by equity and balanced funds may bring dampening effect on the market volatility, similar to what is observed in PVAR model. However, the study does not find evidence that current bond flows influence market volatility. This explains that bond flows do not have direct impact on market volatility. The results are also similar with the results of equity flow-volatility-economy relationship in which equity flows are found to have negative causal relationship with market volatility at macro level. Money market flows positively affect current and lagged market volatility. It is also witnessed that there exist concurrent association of flows and market volatility. Current volatility is positively associated with all classes of fund flows whereas lagged volatility is negatively (positively) related to both equity and balanced flows (bond flows and money market flows), indicating that all funds augment their trading behavior when market volatility is high simultaneously. However, equity funds and balanced funds reduce their trading in the next time period due to high risk and possible losses in the financial markets in developing countries. The result is consistent with the results reported in Table 5.10. This implies that inclusion of macroeconomic variables does not change the relationship of flow-volatility estimated in Sections 5.2.2 and 5.2.3. Additional observations can be made. For example, the unemployment rate and budget deficit ratio positively affect market volatility, whereas money supply rate negatively affects the market volatility. Overall, it is observed that macroeconomic variables which contain good (bad) economic news in themselves are

inversely (positively) associated with market volatility. The coefficients of all macroeconomic variables are significant except for the coefficient of inflation. A possible reason can be the correlation of inflation rate and GDP growth rate which may take some explanatory power from inflation rate. Nevertheless, joint significance test suggests that all explanatory variables are significant.

Table 6.19: Random-Effect Model Estimation of Total Fund Flows, Market Volatility and Macroeconomic Variables

	Dependent Variable: Flows t			
	Equity	Bond	Balanced	Money market
Flows t-1	0.051	-0.013	0.051	-0.179
	(1.03)	(0.26)	(1.03)	(3.58)**
MV t	1.066	1.856	2.016	0.355
	(2.09)*	(2.93)**	(2.19)*	(2.75)*
MV t-1	-1.330	1.738	-3.230	1.207
	(2.46)*	(2.99)**	(2.36)*	(2.57)*
ΔGDP	0.089	2.782	0.089	0.590
	(2.07)*	(2.52)*	(0.07)	(2.51)*
ΔInf	-0.340	2.441	-0.140	-0.154
	(1.26)	(1.66)	(0.23)	(0.13)
ΔEx	1.431	0.324	1.471	-0.581
	(2.14)*	(2.18)*	(3.14)**	(2.48)*
ΔUE	-0.267	0.198	0.267	-0.086
	(2.78)*	(2.06)*	(0.78)	(0.27)
ΔMS	0.632	-1.204	0.512	-0.750
	(2.50)*	(2.76)*	(0.50)	(2.67)*
ΔDG	-0.017	0.133	-0.012	0.209
	(2.10)*	(2.50)*	(2.15)*	(2.38)*
ΔInv	1.676	0.839	1.176	0.165
	(2.61)*	(0.87)	(1.71)	(2.26)*
constant	-0.616	-0.344	-0.162	0.049
	(1.62)	(0.67)	(1.32)	(0.52)
R2 within	0.36	0.52	0.35	0.39
R2 between	0.32	0.49	0.32	0. 36
R2 overall	0.40	0.40	0.40	0. 36
Joint significance test	178.3**			

The table shows the results of a random effect regression estimates of total fund flows on past flows, past market volatility, contemporaneous market volatility and macroeconomic variables. The R2 (in percent, simple and adjusted) is provided for each regression. "**" Significance at the 1% level,"*" Significance at the 5% level

Table 6.20: Random-Effect Model Estimation of Market Volatility, Total Fund Flows, and Macroeconomic Variables

	Dependent variable: MV t			
	Equity	Bond	Balanced	Money Market
MV t-1	0.353	0.186	0.353	0.343
	(7.75)**	(2.34)*	(7.75)**	(7.13)**
Flows t	0.010	0.013	0.010	0.005
	(2.09)*	(1.75)	(2.09)*	(2.71)*
Flows t-1	-0.007	0.002	-0.007	0.006
	(2.06)*	(2.10)*	(1.56)	(2.10)*
ΔGDP	0.098	0.251	0.098	-0.091
	(2.91)**	(2.15)*	(2.91)**	(0.77)
ΔInf	0.330	0.432	-0.230	0.441
	(1.29)	(1.90)	(0.29)	(1.61)
ΔEx	0.491	0.426	0.491	0.434
	(4.19)**	(2.20)*	(4.19)**	(3.42)**
ΔUE	-0.079	0.174	-0.049	-0.036
	(2.45)*	(2.87)*	(2.65)*	(1.07)
ΔMS	-0.149	-0.104	-0.149	-0.147
	(1.30)	(0.74)	(1.30)	(1.22)
ΔDG	-0.048	0.080	-0.048	0.038
	(3.13)**	(3.27)**	(3.13)**	(2.34)*
ΔInv	0.062	0.051	0.062	0.047
	(2.94)**	(0.60)	(2.94)**	(0.69)
Constant	0.117	0.123	0.117	0.092
	(1.95)	(1.88)	(1.95)	(0.80)
R2 within	0.12	0.15	0.12	0.12
R2 between	0.44	0.37	0.44	0.35
R2 overall	0.46	0.43	0.46	0.16
Joint significance test	152.8**			

The table shows the results of a random effect regression estimates of market volatility on past and current fund flows and current macroeconomic variables. The R2 (in percent, simple and adjusted) is provided for each regression. "**" Significance at the 1% level,"*" Significance at the 5% level

6.3.5 Robustness Check

Table 6.21 presents the results of expected flows, market volatility and macroeconomic variables whereas Table 6.22 presents the results of market volatility, expected flows and macroeconomic variables. Table 6.23 exhibits the results of unexpected flows, market volatility and macroeconomic variables. Table 6.24 displays the results of market volatility, unexpected flows and macroeconomic variables. The results are almost similar to what is reported in Table 6.19 and Table 6.20. However, unexpected portion of flows are found to be more associated with market volatility and macroeconomic variables. In addition, all macroeconomic variables, which are proxy for macroeconomic stability, are significantly related with equity and balanced flows. Overall, it is identified that macroeconomic variables which contain good (bad) economic

news in themselves are inversely (positively) associated with market volatility. The joint significance test suggests that all explanatory variables are significant.

From Tables 6.19, 6.20, 6.21, 6.22, 6.23 and 6.24 the study does not observe any noticeable difference in the sign of the estimated coefficients and their respective p values by comparing the PVAR results (Table 6.15, 6.16, 6.17) and random-effects model results. Overall, the results confirm that not only market volatility has impact on fund flows but also fund flows exert their effect on stock market volatility except bond flows. The plausible reason can be due to the bonds being fixed income securities may not have direct influence on the stock market variables such as market volatility.

Table 6.21: Random-Effect Model Estimation of Expected Fund Flows, Market Volatility and Macroeconomic Variables

	Dependent Variable: Flows t			
	Equity	Bond	Balanced	Money market
Expected t-1	0.009	-0.008	0.049	0.097
	(0.18)	(0.17)	(0.48)	(0.23)
MV t	0.076	0.473	0.046	0.355
	(0.15)	(0.78)	(0.14)	(0.75)
MV t-1	-0.857	-0.990	-0.857	-1.207
	(1.72)	(1.63)	(1.72)	(1.57)
ΔGDP	0.667	-0.021	-0.717	0.113
	(2.57)*	(0.01)	(2.67)*	(0.08)
ΔInf	0.318	-0.195	0.38	0.031
	(0.25)	(0.08)	(2.26)*	(0.02)
ΔEx	0.300	0.168	0.300	-0.108
	(0.26)	(0.09)	(0.26)	(2.10)*
ΔUE	-0.067	-1.825	-0.067	-1.462
	(0.21)	(0.59)	(0.21)	(0.59)
ΔMS	0.098	-0.074	0.098	0.451
	(0.08)	(0.05)	(0.08)	(0.43)
ΔDG	-0.016	-0.028	0.016	0.076
	(0.10)	(0.11)	(0.10)	(0.45)
ΔInv	1.037	-0.177	1.037	-0.067
	(1.60)	(0.18)	(1.60)	(2.09)*
constant	0.086	0.192	0.086	0.039
	(0.55)	(0.40)	(0.55)	(0.32)
R2 within	0.22	0.13	0.22	0.13
R2 between	0.30	0.03	0.30	0. 12
R2 overall	0.39	0.12	0.39	0. 15
Joint significance test	112.3**			

The table shows the results of a random effect regression estimates of net expected flows on past flows, past market volatility, contemporaneous market volatility and macroeconomic variables. The R2 (in percent, simple and adjusted) is provided for each regression. "**" Significance at the 1% level,"*" Significance at the 5% level

Table 6.22: Random-Effect Model Estimation of Market Volatility, Expected Fund Flows, and Macroeconomic Variables

	Dependent variable: MV t			
	Equity	Bond	Balanced	Money market
MV t-1	0.413	0.169	0.413	0.412
	(9.18)**	(2.99)**	(9.18)**	(8.69)**
Expected t	0.003	0.003	0.003	0.003
	(0.54)	(0.58)	(0.54)	(0.54)
Expected t-1	-0.010	-0.003	-0.010	0.004
	(1.94)	(0.65)	(1.94)	(0.64)
ΔGDP	0.110	-0.234	0.110	-0.095
	(1.07)	(2.01)*	(1.07)	(0.80)
ΔInf	0.217	0.414	0.217	0.442
	(0.30)	(1.84)	(0.30)	(3.61)**
ΔEx	0.470	0.428	0.470	0.429
	(4.00)**	(2.26)*	(4.00)**	(3.38)**
ΔUE	-0.063	0.184	0.063	-0.035
	(1.94)	(1.00)	(1.94)	(1.03)
ΔMS	-0.157	-0.120	-0.157	-0.147
	(1.37)	(0.87)	(1.37)	(1.22)
ΔDG	0.049	0.082	0.049	0.039
	(3.15)**	(3.28)**	(3.15)**	(2.42)*
ΔInv	0.072	0.041	0.072	0.050
	(1.08)	(0.48)	(1.08)	(0.73)
constant	0.095	0.116	0.095	0.049
	(1.07)	(1.74)	(11.07)**	(0.52)
R2 within	0.15	0.36	0.15	0.12
R2 between	0.45	0.33	0.45	0.34
R2 overall	0. 48	0.37	0. 48	0.17
Joint significance test	120.4**			

The table shows the results of a random effect regression estimates of market volatility on past and current expected flows and current macroeconomic variables. The R2 (in percent, simple and adjusted) is provided for each regression. "**" Significance at the 1% level,"*" Significance at the 5% level

Table 6.23: Random-Effect Model Estimation of Unexpected Fund Flows, Market Volatility and Macroeconomic Variables

	Dependent Variable: Flows t			
	Equity	Bond	Balanced	Money market
Unexpected t-1	0.179	0.056	0.179	-0.067
	(3.70)**	(1.12)	(3.70)**	(1.34)
MV t	0.781	1.353	0.781	0.409
	(3.99)**	(6.23)**	(3.99)**	(1.34)
MV t-1	-0.552	0.841	-0.552	0.409
	(2.62)*	(4.16)**	(2.54)*	(2.38)*
ΔGDP	0.885	2.649	0.885	-0.846
	(1.81)	(4.91)**	(1.81)	(2.03)*
ΔInf	-0.207	2.145	0.207	0.180
	(2.35)*	(2.65)**	(0.35)	(0.26)
ΔEx	1.056	0.507	1.056	-0.584
	(2.21)*	(2.07)*	(2.21)*	(1.35)
ΔUE	-0.263	1.894	0.263	-1.203
	(2.99)**	(1.90)	(1.99)*	(1.19)
ΔMS	0.633	-1.101	0.633	0.537
	(1.35)	(2.25)*	(1.35)	(1.26)
ΔDG	-0.031	0.105	0.031	0.319
	(2.43)*	(2.51)*	(0.43)	(4.18)**
ΔInv	-0.026	0.647	-0.026	-0.033
	(0.09)	(1.99)*	(0.09)	(0.12)
constant	-0.609	-0.469	-0.609	0.085
	(1.37)	(1.83)	(1.37)	(0.85)
R2 within	0.16	0.14	0.16	0.49
R2 between	0.31	0.31	0.31	0.20
R2 overall	0.41	0.25	0.41	0.45
Joint significance test	124.4**			

The table shows the results of a random effect regression estimates of net unexpected flows on past flows, past market volatility, contemporaneous market volatility and macroeconomic variables. The R2 (in percent, simple and adjusted) is provided for each regression. "**" Significance at the 1% level,"*" Significance at the 5% level.

Table 6.24: Random-Effect Model Estimation of Market Volatility, Unexpected Fund Flows, and Macroeconomic Variables

	Dependent variable: **MV** t			
	Equity	Bond	Balanced	Money market
MV t-1	0.420	0.166	0.420	0.416
	(9.36)**	(2.97)**	(9.36)**	(8.71)**
Unexpected flows t	0.055	0.076	0.055	0.012
	(4.72)**	(1.49)	(4.72)**	(0.79)
Unexpected flows t-1	-0.006	0.030	-0.006	0.007
	(0.53)	(2.60)**	(0.53)	(0.50)
ΔGDP	-0.065	-0.233	-0.065	-0.080
	(2.64)*	(2.01)*	(2.64)*	(0.68)
ΔInf	0.214	0.578	0.214	0.438
	(2.34)*	(2.59)**	(0.34)	(3.59)**
ΔEx	0.415	0.413	0.415	0.440
	(3.57)**	(2.48)*	(3.57)**	(3.46)**
ΔUE	0.075	0.044	0.075	-0.038
	(2.35)*	(2.25)*	(2.35)*	(1.15)
ΔMS	-0.139	-0.007	-0.139	-0.144
	(1.23)	(0.05)	(1.23)	(1.20)
ΔDG	0.046	0.066	0.046	0.037
	(3.02)**	(2.97)**	(3.02)**	(2.29)*
ΔInv	0.069	0.093	0.069	0.046
	(2.05)*	(1.17)	(2.05)*	(0.67)
Constant	0.118	0.174	0.118	0.039
	(1.83)	(1.11)	(1.83)	(0.32)
R2 within	0.16	0.11	0.16	0.17
R2 between	0.38	0.44	0.38	0.40
R2 overall	0.43	0.39	0.43	0.45
Joint significance test	168.3**			

The table shows the results of a random effect regression estimates of market volatility on past and current unexpected flows and current macroeconomic variables. The R2 (in percent, simple and adjusted) is provided for each regression. "**" Significance at the 1% level,"*" Significance at the 5% level

CHAPTER 7: CONCLUSION AND POLICY IMPLICATIONS

7.1 Summary

The main objective of this research is to identify the relationship of four classes of mutual fund flows (namely, equity, bond, balanced and money market), with stock market variables and macro-economic variables, under three theories: the price pressure theory, the feedback trading theory and the information response theory. For analysis purposes, the main objective has been divided into five sub-objectives. The first objective examines the interdependency between mutual fund flows and market return. The second objective analyses the causality between mutual fund flows and stock market volatility. The third objective evaluates whether the causality between mutual fund flows and stock market returns is conditional on the presence or absence of macroeconomic variables. The fourth objective investigates the possibility that the causality between mutual fund flows and stock market volatility is explained by macroeconomic variables. The study specifically investigates the relationship of equity, bond, balanced and money market fund flows with stock market variables and real economic variables from a sample of developing countries consisting of ASEAN, BRICS and MENA and SAARC economies. The existing literature has been more focused on mutual fund performance at the micro level in advanced economies; however, the literature on macro aspects of mutual funds in developing economies is scarce and inconclusive. The study applies the Panel vector autoregressive (PVAR) model in a generalized methods of moment (GMM) environment and Panel regression models on panel data for the period from 2000 to 2015.

7.2 Findings of the Study

The first objective of the study is to examine the interdependency between mutual fund flows and market return. The results for this objective suggest that there is a bidirectional causality between three mutual fund flow classes (equity, balanced and money market) and market returns. The growth in equity and balanced flows is accompanied by an

increase in stock returns and vice versa. However, money market flows and market returns move in a contrary direction to each other. These results are in line with the theories of temporary price pressure and feedback trading and the findings of Ben-Rephael et al. (2011). In the case of bond fund flows, the causality runs from stock market to bond fund flows such that the increase in lagged returns decreases the growth of bond fund flows. The findings for bond fund flows are in agreement with the feedback trading/return chasing theory.

The second objective of the study is to analyze the causality between mutual fund flows and stock market volatility. The results indicate that there exists a bidirectional causality among all classes of mutual funds (except for the bond funds) and stock market volatility. The market volatility increases with an increase in trading of money market funds while it (market volatility) decreases with an increase in trading of equity and balanced flows. The results also suggest that equity and balanced funds follow the market and exhibit negative feedback trading behavior (contrarian behavior). Accordingly, this may also refer to the prudent behavior of equity and balanced funds which results in market stability. Additionally, the dampening effect of market volatility on equity and balanced funds also indicates investors switching from risky securities (equity and balanced funds) to less risky ones (bond and money market funds) in times of high market risk. The money market funds, on the other hand, follow (positively) the market volatility in accordance with positive feedback trading behavior (momentum behavior). This may also imply that money market funds (being institutional investors) find riskier and volatile securities more attractive to outperform the average market securities. The findings with respect to the relationship between market volatility and fund flows (equity, balanced and money market) conform to the earlier findings by Grier and Albin (1973) and Reilly and Wachowicz Jr (1979). With respect to bond fund flows, the causality runs from market

volatility to bond fund flows such that an increase in market volatility leads to an increase in the growth of bond fund flows.

Accordingly, the inferences are that the equity and balanced fund flows are more reactive and act rationally to market related information as compared to bond and money market fund flows. Therefore, they (equity and balanced funds) are unlikely to divert stock prices away from the fundamental values. Equity and balanced funds invest more in times of high market returns and low market volatility while bond and money market funds invest in times of low market returns and high market risk (Jank, 2012).

The third objective of the study is to evaluate whether the causality between mutual fund flows and stock market returns is conditional on the presence/absence of macroeconomic variables. The results reveal that bidirectional causality between mutual fund flows and market returns (found in the first objective) disappears with the inclusion of macroeconomic variables. However, there is a unidirectional causality running from market returns to mutual fund flows such that mutual fund flows react to the past performance of the market. This is in line with the feedback trading/return chasing theory. The lagged relationship between the fund flows and market returns (in the presence of macroeconomic variables) can be explained in terms of the high risk aversion of fund managers and the high volatility in financial markets in developing countries.

The inclusion of macroeconomic variables also provides some new insights into the flow-return-economy relationship. Market returns and mutual fund flows are significantly related to new macroeconomic information. For instance, an increase in GDP, domestic real investment and capital formation in the economy augment the fund flows and have a positive effect on both risky securities (such as equity and balanced flows) and less risky securities (bond and money market flows). In addition, changes in monetary and fiscal policy have a direct impact on both market returns and fund flows. The increase in money

supply indicates better expected economic conditions whereas an increase in the budget deficit and unemployment signals the poor state of the economy. The findings also suggest that a lower money supply curtails the purchasing power of investors and switches investors' preference towards investing in secure avenues, while an increase in budget deficit and unemployment reduces equity related investments and increases fixed income investment. Equity flows, balanced flows and market returns positively flourish in times of good economic conditions and vice versa for bond flows, money market flows and market volatility. The results render support to the theory that mutual fund investors and stock market returns are highly influenced by macroeconomic information. The findings also confirm that mutual fund flows are better explained by macroeconomic indicators than by merely stock market returns. The information response theory is partially supported by the fact that mutual flows carry economic information in themselves. Moreover, bond and money market fund flows are also related to stock market returns and the economy. This is due to the fact that developing countries have volatile emerging markets and fragile economies, which leads investors to invest in safer and more secure avenues such as bonds or other fixed income securities.

The fourth objective of the study is to investigate the possibility that the causality between mutual fund flows and stock market volatility is explained by macrocosmic variables. The results reveal that the bidirectional causality between mutual fund flows and market volatility (found in the second objective) remains unchanged even after incorporating the macroeconomic variables. However, these variables significantly influence fund flows and market volatility. The macroeconomic variables which encompass good (or bad) news related to economic prospects are positively (or negatively) associated with fund flows (or market volatility). Moreover, GDP, money supply, and investment signal better economic prospects and imply more fund flows and lesser market volatility. In contrast, unemployment, budget deficit and inflation indicate

expected worsening economic news, which in turn entail more outflows and market volatility. Exchange rate fluctuations have a positive impact on both fund flows and market volatility, due to the influx of foreign money in the domestic market and upswing in the trading behavior of investors. These findings are in concurrence with those of Cao et al. (2008), who suggest that innovations in fund flows are closely related to stock price volatility.

The overall conclusion is that all classes of mutual fund flows exhibit causal relationships with the market performance variables (market return and market volatility) and the economy. The nature of these relationships varies according to the riskiness of the mutual fund flows. Investors respond swiftly to the risk related information due to the high risk in emerging markets. Moreover, volatile financial markets like those in ASEAN, BRICS, MENA and SAARC instigate investors to invest in safer and more secure avenues like bond funds, money market funds and/or other fixed income securities in times of high market risk and deteriorating economic situations. On the other hand, investments by equity and balanced mutual funds contribute to increased market returns and dampened volatility in the developing financial markets, due to their rational behavior, which is unlikely to divert the stock prices away from the fundamental values.

7.3 Implications of the Study

The findings of this study have a number of implications for theory, methodology as well as practice. **First**, this study contributes to the knowledge in this area by studying four major MF classes (equity, bond, balanced and money market funds) in relation to stock market and macroeconomic variables. Besides this, studying the relationship of MF flows and stock market returns and risk together under the PP, FT and IR theories results in a comprehensive study and combining these theories collectively provides a broad understanding of the flow-market-economy relationship.

Second, the study includes stock market volatility as an additional market variable in the study model to gauge the performance of MFs at the macro level, which is another contribution to existing knowledge. It provides the combined analysis of market performance variables; in other words, both stock market returns and stock market risk/volatility with four different aggregate fund flows based on investment objectives. In addition, this study investigates the stock market volatility in context of fund-market-economy relationship.

Third, the study also includes the new macro-economic variables (such as budget deficit, money supply, real investment, unemployment) to identify their impact on fund flows and market variables. The results suggest that the inclusion of new macroeconomic variables in the relationship model of the study provides a stronger base in understanding the reactions of MFs and market variables. Studying the economic conditions is imperative in security flows and investment as it helps the fund and portfolio managers to switch from riskier investment avenues to safer ones in the face of deteriorating economic conditions. It is observed that changes in the asset allocation and portfolio re-balancing decisions occur in response to fluctuations in business and economic conditions. The expected implication of understanding macroeconomic variables in the model assists in the predictability of MF flows and expected market risks and returns.

Fourth, this study contributes towards determining the predictive ability of four major MF classes under the information response theory which states that MF flows can predict macroeconomic conditions. This study contributes towards determining the predictive ability of four major MFs under the information response theory which is an extension of work by Jank (2012) and Ferson and Kim (2012). MF flows are found to have a predictive ability which facilitates the task of policy makers and investors in forecasting and planning the future health of the economy.

Fifth, this research contributes towards knowledge in this field by adopting the macro approach of studying aggregate flows of equity, bond, balanced and money market funds and their relationship with market variables at the macro level. Since investment by MFs affects the overall economy, household savings, individuals' and welfare's future wealth, fund managers' earnings and incentives; therefore, fund trading and flows have a huge impact at both the macroeconomic and microeconomic level (Ferson & Kim, 2012).

Sixth, this study has been conducted on regional developing blocks which is broad and comprehensive study in terms of geographical scope. The findings of the previous studies have been limited to data based on a single country, mostly a developed country (Khorana et al., 2005; Cao et al., 2008). Moreover, the majority of the studies have been conducted on the USA and other developed countries (Cao et al., 2008). Thus the study contributes towards the geographical context by determining the relationship of the four main MFs, financial markets and macroeconomic variables of the developing regional blocks. **Finally,** this study uses panel data on multiple countries and exploits cross-country dimensions of the data set. The study applies a panel vector autoregressive model (PVAR) which helps to evaluate the interaction between endogenous variables and permits an unobserved heterogeneity (Love & Zicchino, 2006). Previous studies follow a time series approach such as those by Edwards and Zhang (1998), Ben-Rephael et al. (2012) Jank (2012) and Kopsch et al. (2015) apply VAR in the time series setting. This study uses a reduced-form PVAR in a generalized method of moments (GMM) environment.

In addition to the theoretical and methodological contributions, this study also provides a number of implications in practice.

First, the study assists fund managers and portfolio analysts to better understand the behavior and relationship of these variables and helps in formulating efficient portfolio

decision making at the broader macroeconomic level. Fund and portfolio managers will be able to take advantage of risk and return analysis at the macro level by assessing wealth allocation across major asset classes in various economic situations.

Second, evaluating market volatility in a flow-market-economy model means measuring the ability and efficiency of MF managers in trading decisions. Investors and portfolio managers may decrease volatility in the market by investing in fixed income securities in times of economic crisis (Schwert, 1990; Cao et al., 2008) . Understanding market volatility (risk) will facilitate the task of investors and portfolio managers in making efficient investment and asset allocation decisions. The study will assist professional managers to manage efficient and active funds and portfolios, and will provide sufficient knowledge, evaluation and assessment of the financial security market and the business sector in the economy through both risk and return analysis.

Third, the study also helps to identify the return risk factors associated with each MF class. It provides a comparative analysis on the role of four popular MF classes (equity, bond, balanced and money market MFs) in stock market performance. Looking at the role and behavior of risky and less risky securities in financial markets provides a complete insight into the portfolio of managers and market analysts in relation to their asset allocation decisions.

Fourth, the study helps policy makers and portfolio managers to better understand/implement the asset allocation decisions of investors. The investment and asset allocation decisions by MF investors are beneficial to the financial markets' performance and the economy of developing countries. It assists fund managers and portfolio analysts to understand better the behavior and relationship of financial market variables and macro variables and helps in formulating efficient portfolio decision making at the broader macroeconomic level.

Finally, the study helps investment practitioners to forecast expected conditions, make re-allocating decisions and increase portfolio returns by shifting investment from equity to fixed income securities when faced with the prospect of an economic downturn. It helps policy makers and portfolio managers to make better planning, hedging and forecasting decisions. The behavior of fund flows reflects the behavior of aggregate investors and this behavior can be envisaged by policy makers as a function of economic conditions. Thus, this is beneficial in planning the deployment of regulatory and managerial resources. In addition, studying macroeconomic variables helps to identify the information (in terms of risk) associated with these variables. Study helps both managers and investors to formulate efficient portfolios and investment decisions.

7.4 Limitations and Recommendations for Future Research

In addition to the contributions made by this study, there are a few limitations, which are discussed below, together with recommendations for future research.

First, this study investigates the flow-market-economy relationship in regional developing blocks. Developing countries tend to differ from developed countries in terms of their administrative, political, social, cultural, and economic characteristics including the nature of their economy, the level of technology usage, and the quality of investment and developed financial market mechanisms (Khorana et al., 2005). These differences may have a significant impact on the results of the research model used for developed countries.

Second, the non-availability of MF data for other regional developing countries (such as Iraq, Libya, Argentina, Egypt, Bangladesh, Maldives, and Afghanistan) has limited the sample for this study. This may be due to weak mechanisms and less advancement in the MF industry in these developing countries, which can be further investigated in future research. **Third,** the study takes monthly and quarterly data to investigate the flow-

market-economy relationship**.** However, due to the unavailability of daily data, it was not possible to find the timing ability of MFs by taking daily or intra-day data but the possibility of market timing ability exercised by MFs in emerging developing markets can be investigated further by taking daily data for future research. **Fourth,** it is observed that MFs may practice herding and speculation, which in turn causes an upsurge in stock price fluctuations, particularly money market MFs. The possible stock crashes in emerging markets could be a reason for further investigation. **Finally,** the role played by other MF classes in other developing economies is another interesting avenue for future research.

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LIST OF PUBLICATIONS AND PAPERS PRESENTED

1.	Research Paper Published	Qureshi, F., Ismail, I., & Gee Chan, S. (2016). Mutual funds and market performance: New evidence from ASEAN markets. Investment Analysts Journal, 1-19.
2	Research Paper Published	Qureshi, F., Kutan, A. M., Ismail, I., & Gee, C. S. (2017). Mutual funds and stock market volatility: An empirical analysis of Asian emerging markets. Emerging Markets Review.
3.	Paper Presented in PhD colloquium	18th Malaysian finance association annual conference (MFAC) and 7th (IBAF) conference held in Melaka, Malaysia on 29th May, 2016
4.	Paper presented in conference	"Mutual Fund Flows, Stock Market Returns and Real Economy: Evidence from MENA Countries" in International Symposium On Sustainable Development and Management (ISSDM) held at International Business School (IBS), Universiti Teknologi Malaysia UTM, Kuala Lumpur, Malaysia on 8-9th October, 2016.