Dynamics of the Relationship between Mutual Funds Investment Flow and Stock Market Returns in India

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Abstract

In recent years, the study of causality between mutual funds investment flow and stock market returns has attracted the attention of researchers and academicians world over. But the existing empirical evidence on this issue is rather mixed. Furthermore, there exist a few studies that include the case of India. Thus, this article is an attempt to investigate the dynamics of the relationship between mutual funds investment flow and stock market returns in India for the period January 2000 to May 2010. The application of Toda and Yamamoto approach to the Granger causality tests provides the evidence of unidirectional causality running from the stock market returns to mutual funds investment flow. This indicates that in India increase in stock market activities attract the mutual funds to the capital market. And, hence, necessary steps should be taken by the government as well as monetary authorities to make the capital market less volatile and more efficient.

Key Words

Mutual Funds Investment, Stock Market Returns, India, Causality, Toda–Yamamoto Approach

Introduction

In the last few decades, numerous empirical studies have been undertaken to determine the key factors that drive capital market growth in a country. In this context, the relation between mutual fund investment flow and stock market returns constitutes a substantial part of the total problem of capital market growth. The capital market growth in a country immensely needs investment flow to cater to the needs of financing investment projects. And, the flow of mutual funds investments can be considered very significant in this direction. It is the financial market that contributes to the real economic growth of a country.

Researchers and financial economists have identified two important channels through which an improvement in the financial system can affect economic growth. First, financial sector development can lead to economic growth through the capital accumulation channel. Economic growth depends on capital accumulation through both domestic and foreign capital investment. To mobilize savings and channel them to capital accumulation, an efficient financial system is essential. In this way, financial development and economic growth are linked. Second, the total factor productivity channel suggests that an efficient financial system facilitates the adoption of modern technology to boost development of the knowledge- and technology-intensive industries, through the provision of efficient credit facilities and other financial services. Thus, financial market truly finances the real economic growth of a country. In this direction, the foreign investors, local institutions and mutual funds play a vital role. In contributing to aforesaid channels, the role of domestic mutual funds inflow cannot be overemphasized. Mutual funds by mobilizing the small savings in the country strengthen the capital accumulation channel thereby providing avenues for huge developmental investments. During last few decades, the role of Indian mutual funds industry as a crucial financial service in the financial market has really been noteworthy.

Mutual fund is an instrument of investing money. The Securities and Exchange Board of India (Mutual Funds) Regulations, 1996 defines a mutual fund as a 'a fund established in the form of a trust to raise money through the sale of units to the public or a section of the public under one or more schemes for investing in securities, including money market instruments'. A mutual fund is, thus, a trust that pools the savings of a number of investors who share a common financial goal. Anybody with an investible surplus of as little as a few hundred rupees can invest in mutual funds. These investors buy units of a particular mutual fund scheme that has a defined investment objective and strategy.

The fund's manager uses the money collected to purchase securities such as stocks and bonds. The securities purchased are referred to as the fund's portfolio. The income earned through these investments and capital appreciations realized by the scheme are shared by its unit holders in proportion to the number of units owned by them. Thus, a mutual fund is the most suitable investment for the common man as it offers an opportunity to invest in a diversified, professionally managed basket of securities at a relatively low cost (Mishra et al., 2009). The mutual fund is structured around a fairly simple concept, the mitigation of risk through the spreading of investments across multiple entities, which is achieved by the pooling of a number of small investments into a large bucket. There are many advantages of mutual funds. Mutual fund is a special type of institutional device or an investment vehicle through which the investors pool their savings which are to be invested under the guidance of a team of experts in a wide variety of portfolios of corporate securities in such a way, so as to minimize risk, while ensuring safety and steady return on investment (Dave, 1992; Mehru, 2004). It forms an important segment of the capital market, providing the benefits of a diversified portfolio and expert fund management to a large number, particularly small investors. Mutual fund investment increases the purchasing power of investors. It ensures reduction in the transactions cost as the economies of operation are at a large scale. It facilitates money management by professionals at a low cost. It is also convenient for the investors to invest the money and track the performance of the money invested. It provides flexibility for the investor to change the investment objective.

Therefore, mutual funds play an important role in mobilizing the savings of small investors and channelizing the same for productive ventures in a developing economy like India (Sarkar, 1991; Vidyashankar, 1990). And, because of its specialized functions that it performs in the capital market of a country, it contributes to the capital market growth in particular and financial sector development in general. However, the empirical evidence in this line is rather conflicting. Most of the studies (Potter, 1996; Potter and Schneeweis, 1998; Remolona et al., 1997; Warther, 1995) show that fund flows do not appear to be affected by past security returns. Some studies (Alexakis et al., 2005; Mosebach and Najand, 1999) provide evidence of bi-directional causality between mutual fund flows and stock returns; few studies (Edelen and Warner, 2001; Papadamou and Siriopoulos, 2002) have shown limited evidence of mutual fund causing stock market to rise and fall.

Moreover, the extant literature provides the evidence that the earlier studies have been carried out in the context of developed financial markets, usually the US markets ignoring the significance of emerging markets like India. There has been relatively little research performed on mutual funds outside the US (Khorana et al., 2005). When compared to developed markets, emerging markets are considerably smaller and less liquid. This dearth of liquidity can play an important role in determining the relationship between stock returns and mutual fund flows; it can potentially alter the previous findings for the developed markets.

Hence, it is imperative to examine the relationship between the flow of mutual fund investments and stock market returns in an emerging market economy like India. It is with this objective, this article is organized as follows: The second section is a snapshot of mutual funds growth in India; the following section reviews the existing literature; the fourth section describes the data and methodology of the study; the fifth section makes the empirical analysis; and the last and sixth section concludes this article.

Growth of Mutual Funds in India

The origin of mutual funds in India can be traced back to the introduction of unit trusts. In 1954, the committee on finance for the private sector recommended mobilization of savings of the middle class investors through unit trusts in India. Thus, in 1963 the concept of mutual fund took root in India when Unit Trust of India (UTI) was set up with the twin objective of mobilizing household savings and investing the funds in the capital market for industrial growth (Tripathy, 1996). The UTI was the first mutual fund set up under the UTI Act, 1963, a special act of the Parliament. It became operational in July 1964. The first scheme launched by UTI was Unit Scheme 1964 (US-64), the first open-ended and the most popular scheme. And, by the end of 1988, UTI had ₹ 6,700 crore of assets under management.

Over a period of 25 years UTI funds grew fairly successfully and gave investors a good return, and therefore, in 1989, as the next logical step, public sector banks and financial institutions were allowed to float mutual funds and their success emboldened the government to allow the private sector to foray into this area. Since then Indian mutual fund industry had seen dramatic improvements, both quality-wise as well as quantity-wise. The late 1980s and early 1990s marked the entry of public sector mutual funds set up by public sector banks and Life Insurance Corporation of India (LIC) and General Insurance Corporation of India (GIC). SBI mutual fund was set up in June 1987 followed by Canara Bank mutual fund in December 1987, Punjab National Bank mutual fund in August 1989, Indian Bank mutual fund in November 1989, Bank of India mutual fund in June 1990 and Bank of Baroda mutual fund in October 1992. LIC established its mutual fund in June 1989 while GIC had set up its mutual fund in December 1990.

A new era was started in the Indian mutual fund industry with the introduction of private sector mutual funds in 1993. In January 1993, the first Mutual Fund Regulations by the Security and Exchange Board of India (SEBI) came into being, under which all mutual funds, except UTI, were required to be registered and governed. The erstwhile Kothari Pioneer (now merged with Franklin Templeton) was the first private sector mutual fund registered in July 1993. Thereafter, the number of mutual fund houses went on increasing, with many foreign mutual funds setting up funds in India and also the industry has witnessed several mergers and acquisitions. This significant growth has been aided by a more positive sentiment in the capital market, significant tax benefits and improvement in the quality of investor service.

The Indian mutual fund industry is one of the fastest growing segments of the Indian economy. During the last 10 years period the industry has grown at nearly 22 per cent compounded annual growth rate (CAGR). With assets of US$ 125 billion, India ranks 19th and one of the fastest growing, among the countries of the world. The factors contributing to the growth of the industry are large market potential—high savings rate, comprehensive regulatory framework, favourable tax policies, introduction of new products, role of distributors, investor education campaign and past performance record.

The Indian mutual fund industry currently consists of 38 players that have been given regulatory approval by SEBI (see Figure 1). The industry has witnessed a paradigm shift in favour of private sector players as the number of public sector players reduced from 11 in 2001 to 5 in 2009.

Figure 1. Growth of Asset Management Companies in India
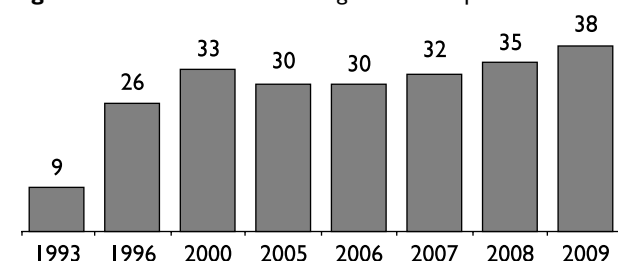
Source: Association of Mutual Funds in India (AMFI) data.

From the plain vanilla equity and debt products the industry now have an array of different products such as thematic funds, exchange traded funds, gold funds, capital protection-oriented funds, funds based on analytical models and even funds investing in overseas markets. Due credit for this evolution goes to the regulators for creating appropriate enabling regulations for these products and the fund houses for effectively launching such products in the Indian markets.

The Indian mutual fund industry is in a relatively nascent stage in terms of its product offerings, and tends to compete with products offered by the government providing fixed guaranteed returns. As of December 2008, the total number of mutual fund schemes was 1,002 in comparison to 10,349 in USA. Debt products dominate the product mix and comprised 49 per cent of the total industry assets under management (AUM) as of financial year 2009, while the equity and liquid funds comprised 26 per cent and 22 per cent respectively. Open-ended funds comprised 99 per cent of the total industry AUM as of March 2009.

As of December 2008, the USA mutual fund market comprised money market funds, equity funds, debt/bond funds and hybrid funds at 40, 39, 16 and 5 per cent of the total AUM, respectively. While traditional vanilla products dominate in India, new product categories, namely, exchange traded funds, gold exchange traded funds, capital protection and overseas funds have gradually been gaining popularity. As of March 2009, India had a total of 16 Exchange Traded Funds (ETFs) (0.3 per cent of total AUM) while the USA had a total of 728 ETFs as of December 2008.

As on 31 March 2010, there were a total number of 4.77 crores investors accounts (it is likely that there may be more than one folio of an investor which might have been counted more than once and actual number of investors would be less) holding units of ₹ 616,966.72 crores. Out of this total number of investors accounts, 4.63 crores are individual investors accounts, accounting for 97.07 per cent of the total number of investors accounts and contribute ₹ 2,45,390.28 crores which is 39.77 per cent of the total net assets. Corporate and institutions who form only 0.95 per cent of the total number of investors' accounts in the mutual funds industry contribute a sizeable amount of ₹ 337,812.58 crores which is 54.75 per cent of the total net assets in the mutual funds industry. The NRIs and FIIs constitute a very small percentage of investors accounts (1.98 per cent) and contribute ₹ 33,763.85 crores (5.47 per cent) of net assets. The details of unit holding pattern are given in Table 1.

All this has prompted the mutual fund investors to come out of their comfort zone of fixed deposits and government savings schemes with assured returns in search of green pastures in terms of additional returns. The trend is encouraging and is drawing more and more participants to the investment management industry. Participants can visibly see the underlying potential in the Indian markets and are keen to participate. But as competition intensifies and investors mature, the challenges to growth and sustainability pose a major challenge to the success of the industry. Recent volatility in markets, rising prices of commodities and the uncertainties in global and local political environments have dented the capital market performance and

**Table 1.** Unit Holding Pattern of Mutual Funds Industry (as on 31 March 2010)

| Category	Number of Investors Accounts	% to Total Investors Accounts	Net Assets (₹ crore)	% to Total Net Assets
Individuals	46,327,683	97.07	245,390.28	39.77
NRIs	943,482	1.98	27,428.86	4.45
FIIs	216	0.00	6,335.00	1.03
Corporate/Institutions/Others	452,330	0.95	337,812.58	54.75
Total	47,723,711	100.00	616,966.72	100.00

Source: SEBI database.

the real threat lies in the ability of fund houses to deliver consistently irrespective of high fluctuations and volatility in market conditions. Competition from other segments, such as insurance and the good old assured returns savings schemes, pose a competitive threat to the industry.

Capital markets all over the world were on a high for most part of the previous year when suddenly the pitfalls emerged in the form of the infamous sub-prime crisis causing billions of dollars in losses to some of the biggest names in the financial services industry. Fierce political battle lines were drawn in the world's largest economy and the world's largest democracy, thereby causing political uncertainties. Global commodity prices and the resulting inflationary pressures are giving sleepless nights to governments across the globe. India is no exception. With galloping inflation, slowdown in industrial production and an uncertain political environment, the equity and debt markets have taken a beating. However, amidst all the global and local noises, wherein every analyst or research expert had only one advice...sell sell sell, the Indian mutual fund industry was actually able to buck the trend and show an increase in assets under management.

The AUM have grown at a rapid pace over the past few years, at a CAGR of 35 per cent for the 5-year period from 31 March 2005 to 31 March 2009 (see Figures 2 and 3). Over the 10-year period from 1999 to 2009 encompassing varied economic cycles, the industry grew at 22 per cent CAGR. This growth was despite two falls in the AUM—first in 2002–2003 due to the dotcom bubble burst, and second in 2008 consequent to the global economic crisis.

Figure 2. Growth Rate across Product Categories (CAGR from 2005 to 2009)
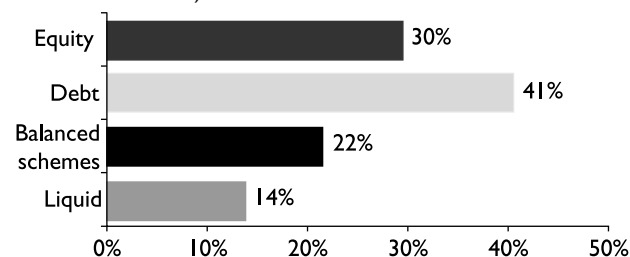
Source: AMFI data.

**Figure 3.** Growth in AUM in Indian Mutual Fund Industry (average AUM in ₹ billion)
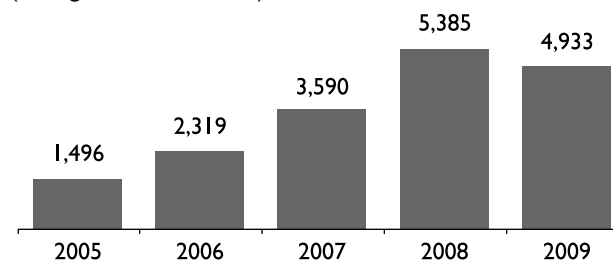
Source: AMFI data.

India has been among the fastest growing markets for mutual funds since 2004. In the 5-year period from 2004 to 2008, the Indian mutual fund industry grew at 29 per cent CAGR as against the global average of 4 per cent. Over this period, the mutual fund industry in mature markets like the US and France grew at 4 per cent, while some of the emerging markets, namely China, exceeded the growth witnessed in the Indian market (see Figure 4).
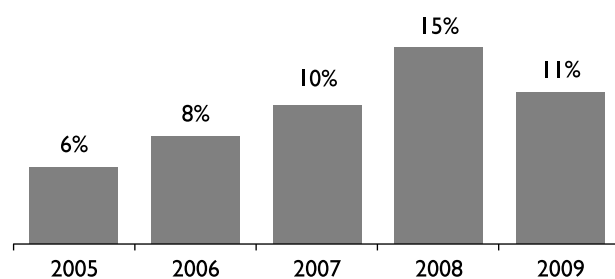
However, despite clocking growth rates that are amongst the highest in the world, the Indian mutual fund industry continues to be a very small market which comprises 0.32 per cent share of the global AUM of $18.97 trillion as of December 2008.

The ratio of AUM to India's GDP gradually increased from 6 per cent in 2005 to 11 per cent in 2009 (see Figure 5). But it continues to be significantly lower than the ratio in developed countries where the AUM accounts for 20 to 70 per cent of the GDP. However, India's low penetration level (AUM to GDP ratio) indicates significant scope for future growth.

The tremendous growth of Indian mutual funds industry is an indicator of the efficient financial market we are currently having. Now, the industry is playing a very significant role in channelizing the savings of millions of individuals into investment in equity and debt instruments. Thus, resource mobilization by mutual funds is an important activity in the Indian capital market. India's mutual fund and capital market have witnessed phenomenal growth over the last few years. Therefore, it appears that a kind of relationship is running between the growth of Indian mutual fund industry and the growth of Indian capital market.

Figure 4. AUM Growth Rate in Select Countries (CAGR for 2004–2008)

China	Brazil	Russia	Japan	France	USA	UK	Europe	World	India
63%	21%	11%	10%	4%	4%	2%	3%	4%	29%
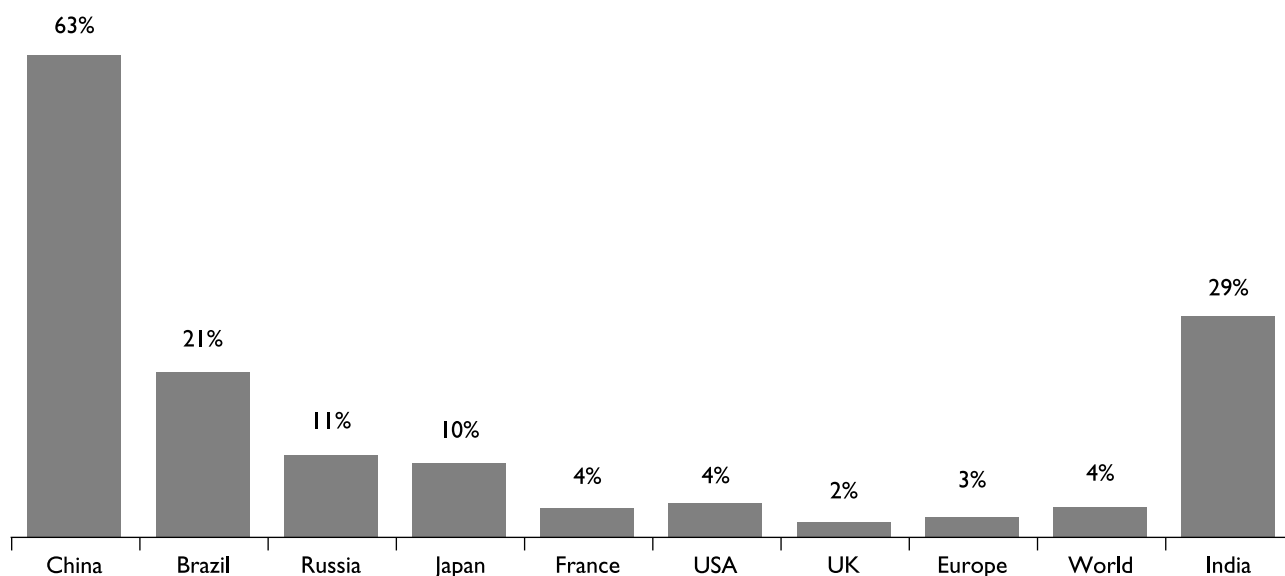
Source: AMFI data.

Figure 5. AUM to GDP Ratio in India

2005	2006	2007	2008	2009
6%	8%	10%	15%	11%

Source: AMFI data.

Thus, this study is an attempt to investigate the long-run relationship that may exist between the mutual funds investment flow and the stock market returns in India.

Literature Review

The existing literature on the study of the relationship between mutual funds investment flow and stock market returns basically focuses on the cases of developed countries and only a few studies are there concerning the emerging market economies.

At the aggregate mutual fund level, Warther (1995) pioneers the study of security returns and aggregate mutual fund cash flows. The study finds that aggregate security returns are highly correlated with concurrent unexpected cash flows into mutual funds but unrelated to concurrent expected flows. This result supports the popular belief that fund inflows and returns are positively related. It also reports that fund flows are correlated with the returns of the securities held by the funds but not with the returns of other types of the securities. It finds evidence of a positive relation between flows and subsequent returns and evidence of a negative relation between returns and subsequent flows. The study rejects both sides of a feedback trading model, arguing that security returns neither lag nor lead mutual fund flows.

Potter (1996) uses Granger causality tests to investigate the lead–lag relationship between returns and fund flows for several categories of equity funds. The result provides the evidence that stock returns can be used to predict the flows into aggressive growth funds, but the same does not apply in the case of income funds. Moreover, the result also rejects the hypothesis that the fund flows in the four fund groups lead the security returns.

Remolona et al. (1997) find that, in general, net flows into the various mutual fund groups are highly correlated with market performance. These findings are consistent with those of Warther in that aggregate mutual fund flows are highly correlated with market returns. Their instrumental variable analysis suggests that, on an average, the effects of short-term returns on mutual fund flows have been weak.

Fortune (1998) uses VAR models with seven variables and monthly data for the period January 1984 through December 1996 to examine the relationship between fund flows and returns. The result provided evidence of positive correlation between fund flows and contemporaneous returns. However, the results show that feedback do exists. Security returns do affect future fund flows and some fund flows do affect future security returns. Overall, the evidence on causal relationship between stock returns and mutual

fund flows is mixed. The results of Fortune (1998) are in strong contrast with the conclusions of Warther (1995), Potter (1996) and Remolona et al. (1997) that flows do not appear to be affected by past security returns.

Edwards and Zhang (1998) investigate the relationship between aggregate monthly mutual fund flows and stock and bond monthly returns utilizing Granger causality and instrumental variables analysis. With one exception, flows into stock and bond funds have not affected either stock or bond returns. In contrast, the magnitude of flows into both stock and bond funds are affected significantly by stock and bond returns.

Fant (1999) examines the relationship of stock market returns with components of aggregate equity mutual fund flows. From a Granger causality perspective, his study provides evidence of feedback from returns to exchanges-out, as well as instantaneous feedback (of unknown direction) in a given month between returns and exchanges-in and -out. These findings indicate that mutual fund investors use new sales/redemptions differently from exchanges, while results in the components reflect different information. He reports that the flow–return relation documented by Warther (1995) actually exists solely between returns and exchanges.

Mosebach and Najand (1999) apply Engle and Granger error correction model, followed by a state space procedure to examine the long-run equilibrium relation between the net flow of funds into equity mutual funds and the S&P 500 index using monthly data from January 1984 to July 1998. The results provide evidence of causal relation between the net inflow of funds and the stock market. The result shows that the net flow of funds invested in the stock market is influenced by the level of the stock market in the previous month. The result also shows that a current strong equity market encourages more investment in the market. This implies that the causality between the level of the stock market and flow of funds into the market is bi-directional.

Using long-term data on stock market and institutional cash flows, Zheng (1999) identifies some investment sectors as marginal investors—those who effectively set prices. These sectors include mutual funds and pension funds. The study finds evidence that only the unexpected cash flows of the market movers positively relate to contemporaneous stock market returns. It finds no Granger causality between quarterly stock market returns and the sector cash flows in either direction. It asserts that investor demand is a fundamental determinant of aggregate stock prices.

Edelen and Warner (2001) study the relation between market returns and unexpected aggregate flow into US equity funds using high frequency daily data. They report that the reaction of flows and return is fast and strong. The flow–return relation is mainly concurrent, but flow also follows returns with a one-day lag. The lagged response of flow indicates either a common response of both returns and flow to new information or positive feedback trading. Their test suggests that the concurrent relation reflects flow driving returns.

Edelen and Warner (2001) examined the relation between stock market returns and aggregate flows into US equity mutual funds using high frequency daily data for the period 2 February 1998–30 June 1999. Their major findings are as follows. First, aggregate mutual fund flow is correlated with concurrent market returns at a daily frequency. This concurrent relation suggests that funds flow and institutional trading affect returns. Second, the results provide limited empirical evidence that mutual fund flow causes security prices to rise and fall (Warther, 1995). Third, the results also find a very strong association between funds flow and the previous days' return. This association indicates funds flow reacting to returns or to the information driving returns mainly with a one-day lag, but that investors generally require an overnight period to react.

Cha and Lee (2001) contradict Edelen and Warner (2001) with regards to positive feedback. Their study did not detect the price pressure effect, or ability of fund flows to move stock prices, finding, instead, return-induced flow reactions.

Papadamou and Siriopoulos (2002) used similar methodology to Warther's (1995) to examine the effect of market returns on aggregate fund flows using monthly data from the Greek equity mutual fund investing spanning January 1998 to March 2002. The result shows that there is small positive concurrent relation between unexpected net flows and market returns, which the author attributed to information revelation. The results also suggest some evidence that mutual fund flows cause prices to rise and to fall. The author finally concludes that there is low correlation between fund flows and returns.

Goetzmann and Massa (2003) analyze the relationship between daily index fund flows and asset prices. Their analysis indicates a strong contemporaneous correlation between fund inflows and S&P market returns. They also examine shocks to prices originated by demand flows into index funds (typically 'liquidity trading' types of shocks). Their results suggest that the market reacts to daily demand, while only negative reactions appear due to past returns, and that the investors' behaviour appears to be mainly motivated by risk aversion instead of return-chasing. Finally, they support the hypothesis that index investor demand shocks ('liquidity shocks') are permanent, finding no correlation between flows and overnight returns.

Alexakis et al. (2005) examine the interaction between mutual fund flows and stock returns in Greece. The statistical evidence derived from the error correction model

indicates that there is bi-directional causality between mutual fund flows and stock returns. Cointegration results show that mutual funds flow causes stock returns to rise or fall. Thus, inflows and outflows of cash in equity funds seem to cause higher and lower stock returns in Greek stock market.

Cha and Kim (2005) examine the short- and long-run dynamic relationship between security returns and mutual fund flows. Several asset classes are examined, including stock, bond and money markets by using system approach. Employing various empirical methods, including iterative SURDAF tests, DOLS, DSUR analyses, SURECM and Granger causality tests, the findings provide the evidence that there is positive long-run relationship between security returns and mutual fund flows. The empirical research using the macro approach, in general, indicates that there exists a high positive correlation between aggregate mutual fund flows and stock market returns (Cha and Kim, 2007).

Oh and Parwada (2007) analyze relations between stock market returns and mutual fund flows in Korea. The results show that there is significant positive correlation between returns and both purchases and sales but a significant negative correlation is observed in the case of net flows. Tests on the direction of causality suggest that it is predominantly returns that contain information on flows, although flows measured as stock purchases may also contain information about returns.

It is, thus, inferred that the existing literature tried to address to two fundamental problems: First, is institutional trading related to changes in stock prices? Second, does institutional trading cause stock returns, or do institutions simply follow movements in stock prices? Most of the studies (Potter, 1996; Potter and Schneeweis, 1998; Remolona et al., 1997; Warther, 1995) show that fund flows do not appear to be affected by past security returns. Some studies (Alexakis et al., 2005; Mosebach and Najand, 1999) provide evidence of bi-directional causality between mutual fund flows and stock returns; few studies (Edelen and Warner, 2001; Papadamou and Siriopoulos, 2002) have shown limited evidence of mutual fund causing stock market to rise and fall. The empirical results on the dynamic relation between mutual funds trading and stock market returns are, therefore, mixed.

Furthermore, it is evident that the earlier studies have been performed taking into consideration the developed financial markets, usually the US markets. There has been relatively little research performed on mutual funds outside the US (Khorana et al., 2005). When compared to developed markets, emerging markets are considerably smaller and less liquid. This dearth of liquidity can play an important role in determining the relationship between stock returns and mutual fund flows; it can potentially alter the previous findings for the developed markets. Indian stock markets have received relatively little attention until recently. Now, there is more interest and research on Indian market data due to the country's rapid growth and potential opportunities for investors. Therefore, this article is an attempt to study the dynamics of the relation between mutual funds flows and stock market returns in an emerging market economy like India.

Data and Methodology

The objective of this article is to examine the dynamics of the relationship between mutual funds investment flow and stock market returns in India for the period January 2000 to May 2010. To this end, two variables have been considered. The first variable is the ratio of net mutual funds investment flows to BSE market capitalization (MFI), and second one is the month-on-month stock market returns based on monthly average of closing BSE Sensex (SMR).

Stock market return (SMR) is the logarithmic difference of monthly average BSE Sensex of the last month from the current month and is calculated by using the formula:

$$\text{SMR}_t = \ln (S_t/S_{t-1}) \qquad (1)$$

Here, SMR_t is the monthly stock return on month 't', S_t is the monthly average Sensex on month 't', and S_{t-1} is the monthly average Sensex on month '$t–1$'. For the sample period, daily closing values of BSE Sensex 30, India's leading stock price index, have been collected from the RBI database on Indian economy, the most trusted data source. Sensex data does not have the observations on Saturday, Sunday and listed holidays. Finally monthly averages are taken for the analysis.

Net mutual fund equity investment flow (MFI) is defined as the value of mutual fund investment inflows to equities in Indian capital market less that of outflows from the market in a month. The data on monthly net mutual fund investment flows have been collected from the archives of SEBI. The data on monthly BSE market capitalization has been collected from the RBI database on Indian economy over the sample period. Then the ratio of net FII flows in the Indian capital market to BSE market capitalization has been calculated.

Unlike most of empirical studies applying Granger (1988) causality test, this study is carried out in a bivariate framework using the causality test procedure as proposed by Toda and Yamamoto (1995). The Toda and Yamamoto (1995) method of Granger causality test is relatively more efficient in small sample data sizes and is particularly appropriate for time series for which the order of integration is not known or may not be necessarily the same, or the order of integration is more than two. Another advantage of this procedure is that it does not require the pre-testing of

the time series for cointegration properties as long as the order of integration of the process does not exceed the true lag length of the model.

The basic idea in the Toda and Yamamoto (1995) procedure is artificially augmenting the correct VAR order, k with d extra lags, where d is the maximum likely order of integration of the time series in the empirical system. Thus, at the outset, it is required to determine the maximum order of integration of time series, say d_{max}. Then the optimal lag length of the VAR model is to be determined using Akaike information criteria (AIC), say k. In the third step, the $(p = k + d_{max})^{th}$ order of VAR is to be estimated with seemingly unrelated regression (SUR). At last, the null hypothesis of no-causality is to be tested using a standard Wald statistic, say W. The implementation of the Toda and Yamamoto approach to Granger causality necessitates linking the two variables of the study in a bivariate system as follows:

$$Y_t = A_0 + A_1\, Y_{t-1} + \dots\dots + A_k Y_{t-k} + \varepsilon_t \qquad (2)$$

Here, $Y_t = \begin{bmatrix} Y_{1t} \\ Y_{2t} \end{bmatrix} = \begin{bmatrix} \mathrm{MFI}_t \\ \mathrm{SMR}_t \end{bmatrix}$ and $\varepsilon_t \sim i.i.d\ N(0,\,\mu)$; and A's are 2×2 matrices of coefficients. The following augmented levels VAR($p = k + d$) shall be estimated to test the null hypothesis of no-causality:

$$\begin{aligned} Y_t = \alpha &+ A_1\, Y_{t-1} + \dots\dots + A_k Y_{t-k} \\ &+ A_{k+1} Y_{t-k-1} + \dots\dots + A_p Y_{t-p} + \varepsilon_t \end{aligned} \qquad (3)$$

This augmented VAR system is to be estimated using the SUR technique. The null hypotheses of the study are:

H$_{01}$: Y_{2t} does not cause Y_{1t}, i.e., $a_{12}^1 = a_{12}^2 = \dots = a_{12}^p = 0$
H$_{02}$: Y_{1t} does not cause Y_{2t}, i.e., $a_{21}^1 = a_{21}^2 = \dots = a_{21}^p = 0$

Both the null hypotheses are to be tested by Wald test. The Wald test statistic (W) has an asymptotic χ^2 distribution with k degrees of freedom. The reason for ignoring the remaining d_{max} autoregressive parameters in testing for Granger causality is that it helps overcoming the problem of non-standard asymptotic properties associated with

standard Wald test for integrated variables. It has been shown that Wald test experience efficiency improvement when SUR models are used in the estimation (Rambaldi and Doran, 1996).

Empirical Analysis

At the outset, the Karl Pearson's correlation coefficient matrix between variables has been calculated over the sample period and its significance has been tested by the t-test. The correlation coefficient is 0.023. This means a positive but low degree of correlation exists between variables. Furthermore, such positive correlation is significant at 5 per cent level. Correlation, however, does not say anything about causal relationship and, thus, leaves unsettled the debate concerning the causal relationship between mutual funds investment flow and stock market returns in India.

In the first step of the causality analysis, the order of integration for both the variables used in the analysis is determined. The Augmented Dickey–Fuller (ADF) unit root test is used for this purpose (Dickey and Fuller, 1979). The results of ADF unit root test are reported in Table 2. It is quite clear that the null hypothesis of no unit roots for MFI is rejected at its first difference since the ADF test statistic is less than the critical values at 5 per cent levels of significances. Thus, this variable is stationary in its first difference, and so, integrated of order one, that is, I(1). But the variable SMR is integrated of order zero, that is, I(0) as the ADF test statistic at the level form for it is less than the critical value at 5 per cent level of significance.

Thus, the results obtained from the ADF test suggest that the maximum order of integration of the series under study is one, that is, $d_{max} = 1$. Therefore, the Toda and Yamamoto test involves the addition of one extra lag of both the variables to control for potential cointegration. Then it is re-quired to select the appropriate lag length for the VAR in order to perform causality test. In this study, the AIC is used to determine the optimal lag length (Akaike, 1973). In small sample study ($n < 60$), AIC is superior to other information criteria (Liew, 2004; Lutkepohl, 1991). The optimal lag length thus selected is $k = 1$.

Table 2. Results of Unit Root Test

Variables	Augmented Dickey–Fuller (ADF) Test Statistic				Order of Integration
	Level Form with Intercept		First Difference Form with Intercept		
MFI	−2.169	1%: −3.489	−7.299	1%: −3.487	I(1)
		5%: −2.887		5%: −2.886	
		10%: −2.58		10%: −2.580	
SMR	−4.873	1%: −3.484	−	−	I(0)
		5%: −2.885			
		10%: −2.579			

In the next step, the augmented VAR of order 2 ($p = k + d_{max}$) is estimated with SUR and the Wald test is carried out using standard chi-square distribution. And, the results of Toda and Yamamoto Ganger non-causality test are reported in Table 3.

Table 3. Results of Toda and Yamamoto Granger Non-causality Test

Null Hypothesis	Chi-Square Statistic (d.f)	Critical Values	Decision
SMR does not Granger cause MFI	7.871(2)	1%: 9.210 5%: 5.991 10%: 4.605	Reject
MFI does not Granger cause SMR	1.057(2)	1%: 9.210 5%: 5.991 10%: 4.605	Accept

The results of Toda and Yamamoto non-causality test show that the null hypothesis that 'SMR does not Granger cause MFI' is rejected at 5 per cent level of significance. But the null hypothesis that 'MFI does not Granger cause SMR' is accepted. Thus, the findings indicate that the bivariate causal relation is from the stock market returns to mutual funds investment flow, but not the other way around. It may be interpreted as a case in which investors tend to move cash into funds that had the highest returns based on stock prices in the last period.

Conclusion

In this article we investigated the dynamics of the causal relationship between mutual funds investment flow and stock market returns in India using monthly data for the period January 2000 to May 2010. The application of Toda and Yamamoto procedure of Granger causality test suggests the evidence of unidirectional causality that runs from stock market returns to mutual funds investment in India. This implies that increase in market returns provides the incentive for greater investments in mutual funds in India. And, it keeps an important relevance to prospective investors. It is not surprising that the popular domestic stock price indices such as Sensex and S&P CNX Nifty constitute the barometers of investments by common investors. Looking at the movement of these indices, most often potential investors decide whether to invest or not. When stock market indices show rising trend, the investors try to put their money in profitable outlets. In search of right investment avenues small investors choose to invest in mutual funds and unknowingly strengthen the capital accumulation channel of contributing to real economic growth of the country. On the contrary, any market downsizing shall cause reverse flow of cash. And, the most recent global financial meltdown is there to support this claim. It

has been noticed that during crises, the stock market indicators show the downturn and, thus, investors' level of confidence deteriorate. As a consequence, the market experiences huge outflow of funds thereby giving rooms for further aggravation of the intensity of crises.

In this context, the role of fund managers is very crucial. They should always keep eyes on the movement of the market and accordingly diversify the portfolio. This would make the mutual funds investment more secured and liquid. Therefore, it is desirable that the policy makers and regulators should devise the prudential norms so as to make the capital market of the country less volatile, more efficient and liquid such that the stronger fundamentals of the market attract greater investments in mutual funds. For this purpose a constant surveillance mechanism is needed to distinguish between the market reactions to fundamentals vis-à-vis transitory forces to ensure financial stability while reaping the positive benefits of unidirectional causality from stock market returns to mutual funds investment in India.

References

Akaike, H. (1973). Information theory and an extension of the maximum likelihood principle. *Proceeding of the 2nd International Symposium on Information Theory* (ISIT'73), Akademiai Kiado, Budapest, pp. 267–281.

Alexakis, C., Patra, N., Niarchos, T., & Poshakwale, S. (2005). The dynamics between stock returns and mutual fund flows: Empirical evidence from the Greek market. *International Review of Financial Analysis*, *14*(5), 559–569.

Cha, Heung-Joo, & Lee, Bong-Soo (2001). The market demand curve for common stocks: Evidence from equity mutual fund flows, *Journal of Financial and Quantitative Analysis*, *36*(2), 195–220.

Cha, H., & Kim, J. (2005). Short and long run dynamic relations between security returns and mutual fund flows a system approach. Working paper, Department of Finance, College of Business, University of St. Thomas, St. Paul.

———. (2007). Stock prices and equity mutual fund flows: A macro approach. Working Paper, Department of Economics, Oklahoma State University, Stillwater, Okla.

Dave, S.A. (1992). Mutual funds: Growth and development. *The Journal of the Indian Institute of Bankers*, *63*(1), January–March, 13–15.

Dickey, D., & Fuller, W. (1979). Distributions of the estimators for autoregressive time series with a unit root. *Journal of American Statistical Association*, *74*(366), 427–431.

Edelen, Roger, & Warner, Jerold B. (2001). Aggregate price effects of institutional trading: A study of mutual fund flow and market returns. *Journal of Financial Economics*, *59*(2), 195–220.

Edwards, F., & Zhang, X. (1998). Mutual funds and stock and bond market stability. *Journal of Financial Services Research*, *13*(3), 257–282.

Fant, L. Franklin (1999). Investment behaviour of mutual fund shareholders: The evidence from aggregate fund flows. *Journal of Financial Markets*, *2*(4), 391–402.

Fortune, P. (1998). Mutual funds, Part II: Fund flows and security returns. *New England Economic Review*, January–February, 3–22.

Goetzmann, W.N., & Massa, M. (2003). Index funds and stock market growth. *Journal of Business*, *76*(1), 1–28.

Granger, C.W.J. (1988). Some recent development in a concept of causality. *Journal of Econometrics*, *39*(1–2), 199–211.

Khorana, A., Servaes, H., & Tufano, P. (2005). Explaining the size of mutual fund industry around the world. *Journal of Financial Economics*, *78*(1), 145–185.

Liew, K.S. (2004). Which lag length selection criteria should we employ? *Economic Bulletin*, *3*(33), 1–9.

Lutkepohl, H. (1991). *Introduction to multiple time series analysis*. Germany: Springer-Verlag.

Mehru, K.D. (2004). Problems of mutual funds in India. *Finance India*, *18*(1), 220–225.

Mishra, P.K., Das, K.B., & Pradhan, B.B. (2009). Role of mutual funds in India: An empirical analysis. *The Research Network*, *4*(4), 79–88.

Mosebach, M., & Najand, M. (1999). Are the structural changes in mutual funds investing driving the U.S. stock market to its current levels? *Journal of Financial Research*, *22*(3), 317–329.

Oh, N.Y., & Parwada, J.T. (2007). Relations between mutual fund flows and stock market returns in Korea. *Journal of International Financial Markets, Institutions & Money*, *17*(2), 140–151.

Papadamou, S., & Siriopoulos, C. (2002). The determinants of the flow of mutual funds of managed portfolios: The case of Greece. Working paper, University of Macedonia.

Potter, M. (1996). The dynamic relationship between security returns and mutual fund flows. University of Massachusetts-Amherst Ph.D. Dissertation Chapter, Mimeo, October.

Potter, M., & Schneeweis, T. (1998). The relationship between aggregate mutual fund flows and security returns. Working paper, Babson College, Wellesley, Massachusetts.

Rambaldi, A.N., & Doran, T.E. (1996). Testing for Granger non-causality in cointegrated system made easy. Working Papers in Econometrics and Applied Statistics No. 88, Department of Econometrics, University of New England.

Remolona, E., Kleiman, P., & Gruenstein, D. (1997). Market returns and mutual fund flows. *FRBNY Economic Policy Review*, July, pp. 3–52.

Sarkar, A.K. (1991). Mutual funds in India: Emerging trends. *Management Accountant*, *26*(3), 171–194.

Toda, H.Y., & Yamamoto, T. (1995). Statistical inference in vector auto regressions with possibly integrated processes. *Journal of Econometrics*, *66*(1–2), 225–250.

Tripathy, N.P. (1996). Mutual fund in India: A financial service in capital market. *Finance India*, *10*(1), 85–91.

Vidya Shankar, S. (1990). Mutual funds: Emerging trends in India. *Chartered Secretary*, *20*(8), 639–640.

Warther, V.A. (1995). Aggregate mutual fund flows and security returns. *Journal of Financial Economics*, *39*(2–3), 209–235.

Zheng, Lu (1999). Who moves the market? A study of stock prices and investment cash flows. Working paper, Yale University.

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