



**Development Research Group Studies
2013 - 14**

Securities and Exchange Board of India

Development Research Group Studies
2013 - 14

Securities and Exchange Board of India

Penetration of Mutual Funds in India: Opportunities and Challenges

Rajesh Chakrabarti*

Sarat Malik

Sudhakar Khairnar

Aadhaar Verma

We carry out a preliminary enquiry into the nature of geographical penetration and distribution of mutual funds in India as well as their likely determinants. Using a questionnaire survey we collect qualitative and quantitative evidence from fund managers on the nature and determinants of their geographical presence throughout the country. Distribution channels seem to play a major role in fund penetration and facilitating these rather than trying to boost demand through financial literacy may be a more effective way of achieving better fund penetration.

The Indian mutual fund industry is one of the fastest growing and most competitive segments of the financial sector. As of August 2013, the total AUM stood at Rs. 7.66 trillion. However, growth rates of AMCs have come down from the peak levels seen in the early 2000s. One of the biggest reasons behind this is the lack of healthy participation from a large part of the country. This lack of penetration can be due to two reasons: a) Low demand of mutual funds from the public outside the major (T-15) cities. This low demand in turn could be caused by low levels of financial literacy, cultural attitudes towards savings and investments etc., and b) Low supply of mutual funds from AMCs outside the major cities. The low supply could be due to perceived lack of demand from the general retail investor or due to lack of available manpower in these areas.

The study first documents how Assets under Management (AUM) are unevenly distributed across the country and then proceed to scrutinize the reasons behind this uneven penetration. It focuses on the AMCs distribution networks using proxies such as the distribution of independent financial agents (IFAs) across the country, sales made by IFAs, distributional efficiency of AMCs etc., A survey of fund houses was carried out to gain a better understanding of the causes holding them back from expanding beyond top 15 cities.

The study found that low number of agents (per capita) in sub-urban and rural areas and the slow growth rates in mutual fund sales in the corresponding areas are closely associated with each other.

* The authors are respectively, as follows: Executive Director, Bharti Institute of Public Policy and Clinical Associate Professor, Indian School of Business, Mohali, India; Joint Director, Department of Economic and Policy Analysis, Securities and Exchange Board of India, Mumbai; Assistant Director, Department of Economic and Policy Analysis, Securities and Exchange Board of India, Mumbai; Research Associate, Bharti Institute of Public Policy, Indian School of Business. We are thankful to Avijeet Boparai, Manasa Gopal, and Tathagatha Biswas for their useful comments and assistance throughout the writing of this paper. The authors alone are responsible for errors, if any. Opinions expressed here are strictly personal and do not reflect the opinions of the organizations the authors are associated with.

1. Introduction

Although a large number of studies have been carried out on the growth and financial performance of mutual funds in India (Boston Analytics, 2010), (PWC, 2013), not much light has been shed on the causes for the low penetration of mutual funds outside the top fifteen cities. There is research looking at the causes for the variation of mutual funds industry across developed countries. However, such work typically does not differentiate between the various regions of the nations included (Khorana et al., 2005). While such studies may help policymakers in determining the ideal inter-regional macroeconomic conditions to develop a healthy mutual fund industry, they rarely explain the differences in mutual fund penetration within a country.

It is well known that mutual funds offer their investors benefits difficult to obtain through other investment vehicles. Benefits such as diversification, access to equity and debt markets at low transaction costs and liquidity are some such advantages. Given these benefits, one would imagine that Indian households, characterized with gross domestic savings of close to 28% of the total Gross Domestic Product (World Bank, 2012), one of the highest in the world, would flock to invest their savings in mutual funds. However, a recent report (PWC, 2013) points out that the distribution of assets under management (AUM) across cities is highly skewed in favor of the top fifteen (T-15) cities of India. The top 15 cities identified by AMFI as major investment hubs. The cities include Mumbai (including Thane & Navi Mumbai), Delhi (including NCR), Bangalore, Kolkata, Chennai, Pune, Ahmedabad, Hyderabad, Baroda, Panjim, Jaipur, Lucknow, Surat, Kanpur and Chandigarh. The T-15 cities contribute to 87% of the entire AUM in the country. Even within the T-15 cities, the top five cities (Mumbai, Delhi, Chennai, Kolkata and Bangalore) contribute 85% of the entire AUM at the T-15 level i.e. 74% of the entire AUM in the country (PWC, 2013).

It is important to inquire into the causes of this skewed investor participation rate. There are several factors

which could possibly explain this variation. Cross-country studies have pointed out that laws, regulations and governance, supply side factors, demand side factors and technological issues could all affect the size of mutual industry in a given country (Khorana et al. 2005). Some of these factors such as laws and regulations are not applicable to our study since they are uniform across India and do not vary from one state to another. The factors that we focus in our study are therefore mainly supply and demand side factors.

Our study divides the supply side i.e. delivery mechanisms into three alternative channels: independent financial advisors (IFAs), banks and in-house distributors. We focus on these delivery channels used by Indian mutual fund houses. To begin with, we document relationships between demographic and economic variables on one hand and mutual fund penetration on the other to discern the underlying factors which could help explain the success of a mutual fund in a given part of the country. We do this using data collected from all the mutual funds aggregated at district levels and by observing time-series data.

We next survey Indian mutual fund houses to identify the regulatory and distributional challenges that according to them hold them back from increasing their business in areas which presently have a low number of mutual funds. We also inquire into human resource problems that could be holding back their penetration even if the fund houses did want to increase their presence in the less developed districts of India.

Our study brings out several interesting results which would be of considerable use to the fund houses, regulators, financial practitioners and scholars in general. We confirm that bulk of the mutual fund sales outside the T-15 cities are caused by IFAs. We also find that demographic and social indicators such as adult literacy and bank penetration are only weakly correlated with mutual fund penetration in a given area. Areas with the highest mutual fund presence tend to be those where the proportion of households with more than Rs. 300,000 income and

IFA presence happen to coincide. We also find that IFAs do not usually focus on those areas which have the highest propensity to invest in mutual funds (as reflected by the districts with the highest proportion of the families earning more than Rs. 300,000 per annum). This suggests that the present AUM levels can be increased by several percentage points if IFAs were made to apply their efforts in the right areas.

The rest of this study is organized in four sections. The next section presents the opportunities and challenges in investing in mutual funds. The third section describes the methodology and the source of our data gathered for the study together with the statistical analysis of the data. The fourth section presents the responses of the fund houses on what is holding the industry back from increasing its penetration outside the T-15 cities. The final section of the report presents the conclusions and suggests directions for future studies.

2. Literature Survey

While discussing about various channels of distributions (PWC, CII, June 2013) points out that Independent Financial Advisors (IFAs) play a crucial role in fund distribution. They interact with the investors on a regular basis and provide advice on scheme selection to asset allocation and asset diversification. Thus, they have the potential to influence the investors' decision and sell the MF products. This approach has its risks as well. If the IFAs are not empowered with professional training and education, they run the risk of mis-selling schemes. Without proper training, it would be difficult for IFAs to explain or convince small town investors about the advantages of mutual funds over traditional investments like savings accounts, FDs etc. The AMCs and the regulator need to enhance the financial literacy across the country through regular programs and campaigns beyond top 15 cities.

Laws, regulation and governance characteristics play an important role in the development of financial sector. La Porta et al. (1998) examine the role of laws governing investor protection, transparency of

reporting, Insider trading, Taxation, the quality of enforcement of the laws, potential conflicts of interest between the fund and the fund investors (Thompson & Choi, 2001) and the ownership concentration across several countries and their financial development.

Supply side issues, by which we mean the characteristics of the financial services sector, will affect the size of the mutual fund Industry. Issues like bank concentration (Nicola & Michele, 2001), breadth of the distribution channels, restrictions from entering securities business (Barth et. al, 2001), ease of entry into the fund industry like cost of setting up a new fund, time required to set up a new fund and presence of government supported competitive financial products are noted in the literature for their contribution to the growth of the industry.

Several demand side factors can be used to explain the size and diversification of mutual fund industry in a country. Some of these factors include education, literacy, presence of information sources, industry age etc. At the same time, there are some trading characteristics like transparency and transaction costs (Chiyachantana et. al, 2004) which also can be used to determine some of the characteristics of the mutual fund industry.

Barber et al., 2005 argue that the purchase decisions of mutual fund investors are influenced by salient, attention-grabbing information. Investors are more sensitive to salient in-your-face fees, like front-end loads and commissions, than operating expenses; they are likely to buy funds that attract their attention through exceptional performance, marketing, or advertising. They found consistently negative relations between fund flows and front-end load fees. A negative relation between fund flows and commissions charged by brokerage firms was also documented. In contrast, no relation (or a perverse positive relation) was found between operating expenses and fund flows. Additional analyses indicate that mutual fund marketing and advertising, the costs of which are often embedded in a fund's operating expenses, account for this surprising result.

Müller & Weber, 2010 investigate the consequences of financial literacy in the context of mutual fund investments. They found that the level of financial literacy is not related to the performance of the actively managed funds. In contrast, overconfidence might prevent subjects from investing passively. A positive relation was found between the belief of being better than average in identifying superior investments and the likelihood of buying an active fund, thus confirming this notion. Also, better-than-average thinking is positively correlated with financial expertise.

Massa et al., 1999 identify a set of systematic factors that explain a significant amount of the variation in flows. They examined common component to mutual fund investor behaviour and tried to find out which asset classes may be regarded as economic substitutes by the participants in the market for mutual fund shares. They found that flows into equity funds, both domestic and international, are negatively correlated to flows to money market funds and precious metals funds. This suggests that investor rebalancing between cash and equity explains a significant amount of trade in mutual fund shares. The negative correlation of equities to metals suggests that this timing is not simply due to liquidity concerns, but rather to sentiment about the equity premium. This paper also finds that the factors derived from flows alone explain as much as 45 per cent of the cross-sectional variation in mutual fund returns.

There has been a debate in the mutual fund industry that the abolition of entry load has reduced the incentives for the distributors to go after new clients. The restriction of entry load on existing and new mutual funds in 2009 affected the functioning of the mutual fund industry and leading fund houses and distributors had to restructure their business and operating models in order to arrive at a profitable solution. However, researchers (Anagol & Kim, 2012) who have examined the claim that abolition of

entry loads had hampered the penetration of mutual funds have found no evidence behind such claims.

A study by Anagol et al. (2013), evaluated a major Indian investor protection reform that reduced commissions tied to mutual fund sales by banning the distribution fees that mutual funds had previously earmarked for commissions. They identified the policy impact by comparing funds charging high versus low distribution fees pre-reform. The researchers argued that contrary to industry claims that limiting commissions would dramatically reduce mutual fund investment; there was no evidence that the reform reduced asset growth in mutual funds.

Apart from the macro economic factors the anecdotal evidence says that Indian Mutual fund Industry is incapacitated by the lack of proper distribution channels¹, entry loads, investor awareness, governance and risk management, technology and low retail participations².

Zechner et al., 2011 study the interface between intermediaries and portfolio managers (including mutual funds) and investors. There are often multiple financial advisors between portfolio managers and investors. Portfolio managers pay significant “kickbacks” to compensate advisors for price discrimination or marketing. Kickback payments increase portfolio manager fees and reduce returns. Portfolio manager competition reduces kickbacks, but increases independent advisory services. The study focuses on financial intermediaries as distinct agents and the economic roles they play. Their analysis of financial intermediation also provides six major findings:

1. Financial advisers facilitate small investor use of actively managed funds by minimizing information search costs. With rational investors and competitive advisors, fund management fees are reduced. Advisers that do not receive kickbacks increase investor welfare.

¹ *Distribution Spectrum and the changing Business Environment: Indian Mutual Fund Industry (PWC, 2011).*

² *Indian Mutual Fund Industry-Towards 2015*

2. Mutual funds make widespread use of kickbacks to compensate financial advisors. With sophisticated investors, fund kickbacks subsidize advice costs for smaller investors. With unsophisticated investors, kickbacks support aggressive advisor marketing. When advisors receive fund kickbacks, investors use additional advisory services.
3. Mutual fund payments of kickbacks are associated with higher management fees and lower fund performance. When investors are sophisticated, kickbacks affect only high net worth investors. When investors are unsophisticated, all investors are negatively impacted.
4. Mutual fund distribution channels impact fund performance. Indirect channels distribute underperforming funds. Direct and indirect channels distribute actively managed funds with equal or higher performance than passive funds.
5. Kickbacks are reduced by competition among actively managed funds. Increasing fund competition generates additional advisory services.
6. Lastly, fund investors would benefit from better disclosure of kickbacks. Kickbacks should be paid with transparent cash payments, rather than for specific sales related activities.

Khorana et al. find that consistent with related findings from the law and economics literature, the mutual fund industry is larger in countries with stronger rules, laws, and regulations, specifically where mutual fund investors' rights are better protected. The industry is smaller in countries where barriers to entry are higher, measured by the effort required to set up a new fund. The fund industry is larger in countries with a wealthier and more educated population, and where the industry itself is older. Finally, the fund industry is larger in countries in which defined contribution pension plans are more prevalent. These results indicate that laws and regulation, supply-side, and demand-side factors simultaneously affect the size of the mutual fund industry.

Investor reaction to mutual fund performance conditions the behavior of mutual fund managers and fund complexes. It has wide-reaching ramifications for the trading of assets across the globe. (Keswani

& Stolin, 2012) have few observations using UK data on monthly fund sales and purchases made via seven distinct distribution channels. Their paper seeks to examine differences in the way different types of investors respond to fund performance information, and in particular, the extent of non-linearity in their response functions.

Where mutual fund investments are deployed and how they are managed are perennial issues that are largely determined by investor reaction to fund performance. Yet the population of investors is heterogeneous and liable to be influenced by the intermediation process (if any) of their fund purchases and redemptions. Their investigation shows that the way investors respond to prior fund performance has a great deal to do with who the investors are and how the fund is being sold. Although both individuals and institutions buy into funds in a "convex" manner, that is, they are more influenced by investment performance when a fund has done well than when it has done poorly, this effect is much more pronounced for retail investors. Yet among retail investors, too, sharp differences exist: the flow performance relation is linear and rather flat, for buys made through fund company affiliated sales force, while it is both steep and strongly convex for fund purchases that are either un-intermediated, or intermediated by independent advisors.

Consistent with the notion that investors take more care with making their investments initially than with monitoring subsequently, the sensitivity of aggregate outflows to performance is quite a bit lower than that of inflows. Investor outflows increase at a faster rate when performance declines in the region of below-average fund performance than they decrease when fund performance improves in the region of above-average performance. Retail and institutional investors behave comparably in this regard.

Performance of a mutual fund matters a great deal more while investors decide whether to invest rather than whether to redeem. Nevertheless, several investor types behave in an inconsistent manner with respect to the aspects of performance they consider important. Specifically, independently advised investors react to

the non-alpha portion of performance when buying funds but not when selling them, while insurance companies do the opposite.

The paper suggests that from the perspective of regulators the best active fund investors are those who induce the most intense competition for superior performance among fund managers, i.e. those whose reaction to fund performance is especially strong. At the same time, strong reaction to past performance tends to be convex, thus inducing excess risk-taking. It also tends to spill over into sensitivity to non-alpha performance, rewarding active fund managers for actions unrelated to stock-picking, which is the activity that justifies active fees in the first place.

3. The Mutual Fund Industry in India: Opportunities and Challenges

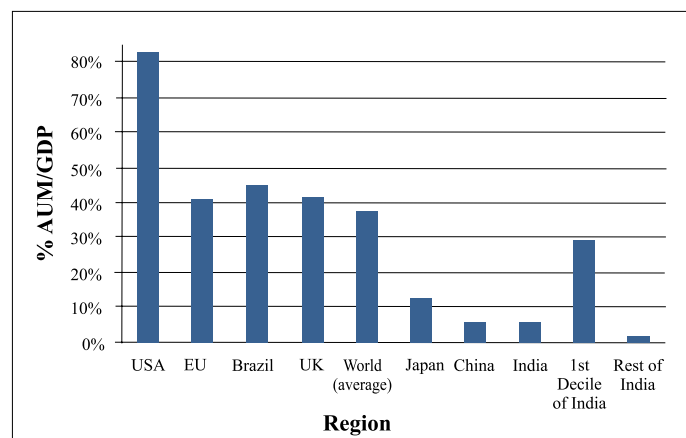
The Indian mutual fund industry finds itself in an economic landscape which has undergone rapid changes over the past three years. The industry achieved a high water mark when it doubled its AUM from Rs. 3.6 trillion in FY2007 to Rs. 6.13 trillion in FY2010 – clocking an impressive growth rate of 16.2% per year. Since then the Indian economy (coupled with the emerging economies) has faced a slowdown – the most severe of which are happening as this report is being written. From an average Gross Domestic Product (GDP) growth rate of 8-9% during the 2008-2011 years, the Indian economy is now growing at a lackluster 4.8% growth rate in Q2 2013. Coupled with a steep decline in the value of the Indian rupee, the mutual fund industry now finds itself in a capricious global economic environment. However, there is strong reason to believe that the Indian mutual fund industry has not yet seen its global peak and if proper measures are taken, the industry could get back on its former growth path.

One of the biggest challenges that the mutual fund industry faces is the lack of healthy participation from a large part of the country. To illustrate this lack of participation, we first aggregated the AUMs originating out of each district of India. We then rank ordered all the districts of India in descending order

of their domestic product (GDP) and then partitioned this list into ten parts. The top 60 districts formed the first decile followed by the second decile and so on. We then aggregated the AUMs and GDPs for each of these deciles and took the ratio of these two figures. The AUM/GDP ratio is one of the best indicators of how much of the yearly income in a given district is being invested into mutual funds.

While the figure of rupees 7.5 trillion of AUM may sound impressive on paper, this figure is marred by a sharp divide in terms of investment in the first decile of districts and the rest of the country. Chart 1 on the next page presents this stark contrast. For the country as a whole, the AUM/GDP stands at approx. 6.99%. When this ratio is calculated for the first decile of districts, the ratio is 29.52% - slightly lower than the world average. However, the rest of India paints a dismal picture with the AUM/GDP ratio standing at 1.82%. This skewed origination of AUM in India is its single biggest challenge and its biggest opportunity at the same time.

Chart 1: AUM/GDP Ratio

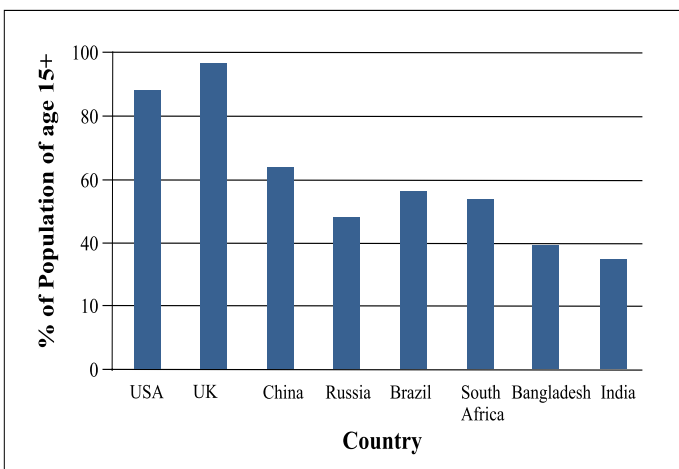


Source: ICI Fact book 2013, Authors' Survey Data

This under penetration of financial inclusion is not unique to mutual funds, but a deeper structural problem characteristic of the Indian financial sector. More than half of India's population does not have any access to formal banking services. According to 2012 World Bank Global Findex, only 35.23% of respondents in India have an account (either self or together with someone else) at a bank or some other formal financial institution. Even in savings

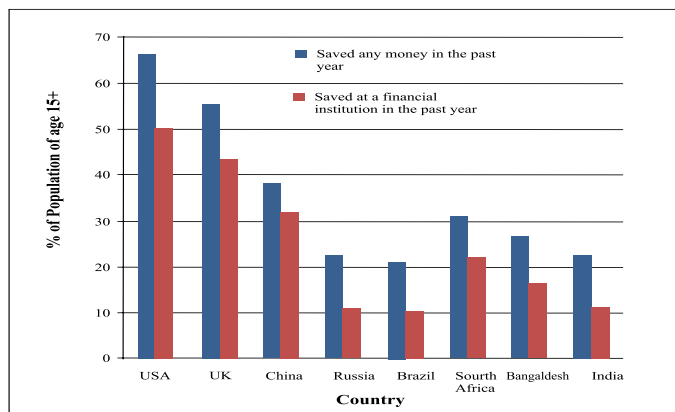
indicators at formal or informal institutions, India continues to be a laggard. Even Bangladesh with a 47% lower per-capita Gross Domestic Product (GDP) based on purchasing power parity performs better in financial inclusion parameters. We reproduce some of these financial indicators from World Bank's Global Findex survey as Charts 2 and 3 to highlight some of the key areas where India lags.

Chart 2: Percentage of people above 15 years of age operating a Saving/Checking account at a formal institution



Source: Demircuc-Kunt & Klapper, 2012

Chart 3: Saving propensity indicators



Source: Demircuc-Kunt & Klapper, 2012

Financial inclusion has for long been a priority for the policy makers in India. The Reserve Bank of India (RBI) has permitted the banks to use the services of Business Facilitators and Business Correspondents. A roll out of Ultra Small Branches (USBs) in remote locations is one of the steps being taken in this direction.

Direct Cash Transfers and linkages with Aadhaar would be a step forward towards the goal of financial inclusion and may prove beneficial to mutual fund houses in the long run. With below poverty households finally coming to own bank accounts, fund houses could use pre-existing bank channels to offer investment opportunities when these people finally start earning saving.

The advantages of having an active participation by retail investors in mutual fund are not just limited to financial inclusion. It has been shown in past studies that institutional investors (in the form of mutual funds) 'herd' towards small-cap and mid-cap stock which offer growth prospects thereby increasing the depth and breadth of capital markets (Wermers, 1999). Institutional buying and selling of stocks also increases the price-adjustment process in capital markets and under right conditions institutional investors tend to decrease stock price volatility. All these effects are desirables as far as financial markets are concerned.

Financial literacy and investment practices

One of the major reasons behind the under-penetration of mutual funds is the lack of understanding about mutual funds, how they differ from ordinary investments and how they manage to offer superior returns over traditional investments. According to a report on mutual funds investments published by Boston Analytics in 2010, approximately a third of all of respondents from Tier II Indian cities did not know how and where to invest in mutual funds (Boston Analytics, 2010). Most people remain unaware of basic financial concepts such reward (return) to variability (risk) ratio, asset allocation, benefits of diversification, passive-active investment strategies etc.

Most Indian households tend to be extremely risk averse and wary where they invest their hard earned savings. As a result, they are conservative with their savings and tend to invest in 'safe' assets. Investors perceive mutual funds as risky investments (despite the fact that several funds invest in government bonds, thereby being safer than bank deposits) and tend to

invest their savings in tangible assets such as gold, jewelry, real estate or fixed deposits in banks. These choices are a result of a mindset which has generally seen investing in stock markets and other market traded securities as akin to gambling. This is reflected by the proportion of savings of Indian households in the financial markets. The gross domestic savings and investment at current market price by households was 22.3% of GDP 2011-12 (RBI Annual Report, 2012). The household investment in physical and financial assets was 14.3% and 8.0% respectively. The investment in shares and debentures as a percentage of gross financial savings by households was 3.6% during 2011-12. The gross financial savings by household in mutual funds is estimated at 2.5% out of total 3.1% in shares/debentures.

According to a Max New York Life-NCAER India financial protection survey carried out in 2008, Indians prefer keeping 65 percent of their savings in liquid assets like banks, post office deposits or as cash at home, while investing 23 percent in physical investments like real estate and gold. Only 12 percent of the total savings were invested in financial instruments like mutual funds or stocks (NCAER Max New York Life, 2008).

The Mutual fund industry offers something for everyone. A large number of schemes are offered by AMC's and offering are made to suit the investor's risk appetite, desired returns or period of investment. As of March 2013, a total of 1294 different mutual fund schemes were on offer across AMC's (SEBI Annual Report 2012-13). Investors can choose the schemes according to the structure: Open-ended Funds or Close-ended Funds or by the objective of their investment: Growth Funds, Income Funds, Balanced Funds or Money Market Funds.

However, one of the ironies of having a large and established mutual fund industry is that this variation serves to intimidate rather than inform a small investor. To begin with, there exist mutual funds which focus exclusively on one type of asset class and then there are funds which hold securities from different assets. At the same time, several mutual fund schemes have

two to three variations on each fund such as growth, monthly dividend, annual dividend etc. Besides offering different schemes for investment, AMC's also offer several investment plans to their customers. Systematic Investment Plans (SIPs), Systematic Withdrawal Plans (SWPs), Systematic Transfer Plans, Triggers, Insurance Options and many other plans are designed to give a degree of control and flexibility to the investor.

While all this is highly beneficial for a well informed investor, all this is highly intimidating to an investor who is barely financially literate and has little time (or energy) to do his/her research before buying a fund. Boggled by all this complexity, the investor routes his savings to lesser complicated fixed deposits and/or physical assets (Halan, 2013). Lack of standardization in the processes and customer service standards creates unnecessary hassles in investing (Adajania, 2013).

This combination of ignorance, risk-aversion and mutual fund complexity are huge hurdles that AMC's in India will have to overcome if there is to be any increase in retail participation in mutual funds. Investors need to be made to look beyond the traditional avenues of investment through sensitization and education. In addition to this, campaigns should be tailored to increase the visibility of debt funds which generally tend to be safer than equity funds.

Distributional efficiency and number of agents

Another challenge that AMC's in India face is increasing the efficiency of their distributional channels. As we later show in our analysis, distributional efficiency (defined as the AUM earned for one rupee spent on distribution costs) plummets beyond the 4th decile of districts. In other words, attracting new investors in small cities does not come cheaply for the Asset Management Companies beyond the top 200 districts by GDP. More money has to be spent on distribution and marketing for getting investments in poorer districts.

However, AMC's tend to play safe and seem unwilling to focus on their distribution channels outside the

T-15 cities. This can be inferred by observing the geographical spread of their distribution costs. It is seen that 89.75% of all the distribution costs by AMC's are incurred in the T-15 cities and their corresponding districts.

In a recent interview, an AMC reported that in the present distribution model, it takes a typical AMC three years to break even (Kirkire, 2013). This presents a significant challenge to the expansion of AMC's since they are judged on an annual basis. Thus, even if an AMC did want to expand into several towns at once, the paybacks would be so far away in the future that only the least risk-averse managers would go ahead with such expansions.

As of March, 2013, the total number of ARN (AMFI Registration Number) holders registered with AMFI stood at approximately 52,000. Of these, 48,000 are individual ARN holders and 4000 are corporate ARN holders. While these numbers may sound substantial, it should be noted that the number of active distributors are just 18% of the total reported figures. Besides these, approximately 38,000 corporate employees registered with AMFI under corporate ARN holders (Association of Mutual Funds in India, 2013).

Furthermore, considering insurance sector's 2.5 million agents, the number of active mutual fund agents is a big hurdle for penetration and expansion of AMC's outside of T-15 cities. If the reach has to be increased to Tier II and Tier III cities, the distribution network needs to be overhauled and innovative incentive structures need to be adopted.

Over here, it is worth comparing the incentive structures in place for mutual fund agents and those of other commission based products such as insurance. Insurance agents can earn up to 35% commission on the premium for the signing up of a new customer³. Insurance companies with less than ten years of business operations offer up to 40% of the premium

as commission. The corresponding commissions offered to agents bringing in new mutual fund sales ranges from 0.2-0.8% for debt fund to 1-4.5% for ELSS funds. This disparity continues into years subsequent to the sale of the two financial products. For insurance products, the commissions decline to 7.5% for second and third years and 5% to the rest of the life of insurance product. Mutual fund companies on the other hand offer a "trail commission" ranging from 0.5-1.0% on the AUM. This commission is typically taken out from the investors' AUM. This would have two impacts on the sale of mutual funds. Firstly, if the mutual fund purchased by an investor performs poorly (as compared to the index), the investor would not just have a poorly performing investment but also have an additional expenditure to be paid to the mutual fund agent. Secondly, an agent who works in an area characterized with low AUMs will not be able to sustain an income by the trail commission alone. These two factors combined could further depress the sale of mutual fund sales.

However, the biggest question remains unresolved. What causes the AMC's to invest less outside the T-15 cities? Is it because of an inefficient distribution network? Or is it because of lack of demand from areas outside T-15 cities? In the following section, we try to answer this conundrum by looking at the data we have collected through multiple angles. We report on where most growth in AUM is taking place, the distributional efficiencies of AMC's outside T-15 cities and what are the factors which influence growth of AMC's in a particular area.

4. Data Collection, Methodology and Descriptive Statistics

Data Collection Procedure and Survey Details

In conjunction with Securities and Exchange Board of India (SEBI), we asked all the fund houses currently operating in India to provide details about

³ <http://www.basunivesh.com/2013/06/14/life-insurance-vs-mutual-fund-agents-who-earns-more/>

their operations throughout India through a survey. The survey was designed in a manner to gain a better understanding of the operational details of AMC's at both macro and micro levels.

At a macro level, the survey asked the AMC's to provide the total number of folios and assets under management at a country level on the last date of the fiscal year since 2010. The AMC's were also requested to provide a breakup of their folios at a retail and non-retail level. The AMC's were also asked to provide the distribution, commission and advertisement costs and total number of schemes in operation at the end of each fiscal year since 2011.

To gain a better understanding of the geographical reach of the AMC's, we asked the AMC's to provide all the cities/towns in which they had at least one office and the number of years since the AMC's were present in that city/town. However, since a large number of mutual fund sales happen outside dedicated mutual fund offices (through independent financial agents), we asked AMC's to also report on the number of folios and assets under management at a city/town/village level as of the end of fiscal year since 2011.

We classified the distribution and delivery channels of mutual funds in three categories: distributors, banks and independent financial agents. We asked AMC's to provide details of the number of agents they employed at each level and the amount of money spent on marketing and distributions costs at a city/town level as of 31st March 2013.

We then asked AMC's to provide their opinions and views on a range of issues such as financial literacy, availability of fresh talent for recruitment, regulatory framework, distributional efficiencies etc. The AMC's were asked to score each of these questions based on five-point Likert scale in which scores ranged from a "strongly agree" to "strongly disagree". Lastly, we asked AMC's to rank order factors which effect penetration from the "least important" to the "most important" factor.

To the best of our knowledge, this is the first study which takes distribution costs and sales into account at the city/town level. Taken as a whole, the availability

of the data at this level revealed some interesting insights about AMC's operations – especially their operations outside the major cities.

Methodology

Unlike previous studies which have largely used cities as their primary units of analysis, it was decided the best results could be obtained only if the data was aggregated at the district level. The reasons behind this were two-fold.

The main reason was that, the survey data revealed the operations of AMC's extended well beyond Tier I and II cities. While it is true that the scale of AMC's operations in the large cities of India dwarfs their operations in the smaller cities, it is worth noting that taken as a whole AMC's are present all across India. The smallest town to have at least one independent financial agent was the town of Singtam in East Sikkim with a population of just 5431. In our data, we found that through their independent financial agents and bank agents, AMC's have extant operations in well over 1,500 towns and cities.

In this regard, the distribution networks of AMC's are far wider and comprehensive than is often perceived. However, performing an analysis on such a large number of towns becomes unwieldy and is often accompanied with a lot of noise. Many towns which are close to large cities (e.g. towns located in between Indore and Ujjain (which are located just 50 kilometers from each other) benefit from having two large cities thereby having much larger fund representation than they otherwise would have had they not been in between the cities) become outliers which make the results difficult to interpret. By aggregating all the towns and cities into their respective districts, the information becomes far easier to understand.

The second reason was purely statistical. Municipal and city level data in India are hard to come across. While the census results reveal a lot of demographic information at the district level, the same is not true for city level results. Factors such as literacy levels, SEC level classification, GDP levels etc. are not easily available or reliable at a micro level. Often, when the data is available, it is ill-suited to be used

for statistical uses. For these reasons, we decided to take districts as our unit of analysis.

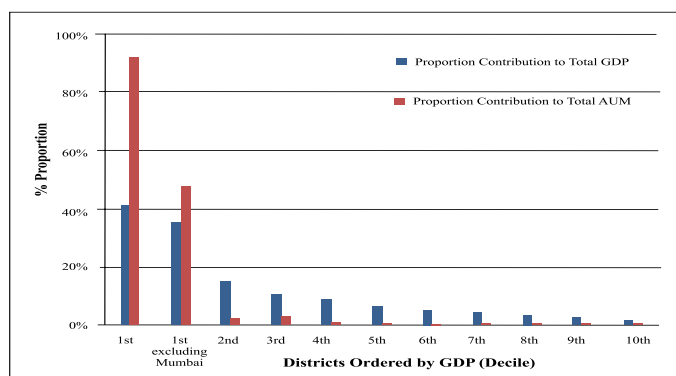
District Domestic Product and AUM/GDP distribution

One of the most common metric to capture the penetration of mutual funds in a given country or area is to find the AUM/GDP ratio. This ratio captures the amount of wealth invested in mutual funds to the earnings of a given region.

It is well known that the geographical distribution of AUMs in India is heavily lopsided in favor of the large cities. The recent report by CII-PWC highlights this by pointing out that 74% of the AUMs originate in the top five cities with another 14% originating from the next ten cities. In other words, the top fifteen cities contribute an astonishing 88% of the entire mutual fund market (PWC, CII, June 2013).

Before calculating the AUM/GDP distribution, all the districts of India were ranked in the descending order of their respective domestic products. This list was then split into ten equal groups (i.e. we took deciles) and then each decile’s contribution to the nation’s gross domestic product was calculated. The resulting distribution is depicted by the vertical blue bars in Chart 4 below.

Chart 4: Contribution to GDP by Decile



Source: Authors’ Survey Data

As shown, the top 60 districts of the nation contribute a net of 41% to the country’s GDP. The last four deciles (i.e. 240 districts) contribute to just 12% to the nation’s economy. We then repeated this process for the same list, only this time – AUMs were taken. The same sixty districts (contributing 41% to the GDP)

contribute over 90% to the total AUMs of the nation. The contribution of the next sixty districts (i.e. the 2nd decile) is just 4% and proceeds to fall off rapidly for the remaining districts.

The AUM/GDP ratio of the districts using the same distribution was then calculated using the same method. While the first decile has an AUM/GDP ratio of 29.53% - this ratio is comparable to developed economics like the UK (40%) and EU member nations (41%). The corresponding AUM/GDP ratio for the second decile is 2.82%. Starting from the fifth decile, AUM comprises less than 1% of the district GDP. The exact measures are given in Table I.

Table 1: AUM/GDP ratio across Indian districts

Region	AUM/GDP
Mumbai	126.10%
1st Decile	29.53%
1st Decile <i>Excluding</i> Mumbai city	12.67%
2nd Decile	2.82%
3rd Decile	3.72%
4th Decile	1.89%
5th to 10th Decile	less than 1.00%

However, one thing to note in the above analysis is that Mumbai is the elephant in the room. Mumbai alone contributes a staggering 58.25% to the entire nation’s AUM. To put it an alternate way: For every 5 rupees invested in a mutual fund, 3 rupees of that investment originates in Mumbai. Mumbai’s AUM/GDP ratio is 126.09% which indicates that money from outside Mumbai is coming to be invested there. So, it should be kept in mind that any category/decile/state etc. which includes Mumbai as one of its components will get a boost in its measure. It should also be kept in mind that approximately 80% of the AUMs invested in Mumbai are institutional or non-retail in nature. Such large non-retail participation is justified considering that almost all large companies’ headquarters and financial operations are conducted out of Mumbai.

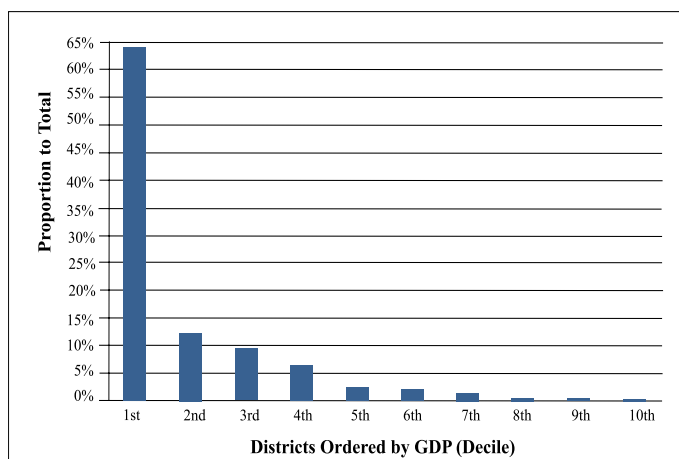
The inclusion of such high aberrational figures would lead to misleading results and interpretations if one

does not exclude them from the analysis. Therefore, going forward we report the first decile of districts two times – once including Mumbai and another time excluding it. If one excludes Mumbai from the first decile of districts, the AUM/GDP ratio drops to 12.67% - a figure comparable to Japan's AUM/GDP ratio (12.4%).

Independent Financial Agent distribution by District GDP

The above results raised the question to why there would be such a skewed distribution of AUM distribution across the country. To shed more light on this, we recalled from the PWC-CII study that Independent Financial Advisors (IFAs) play a crucial role in fund distribution and sales. We therefore wished to find out how agents are geographically distributed across the country. We first sorted the districts into deciles in the same manner described above. The number of agents working in each district was then calculated and aggregated into each decile. The results are presented in Chart 5.

Chart 5: IFA by District GDP



Source: Authors' Survey Data

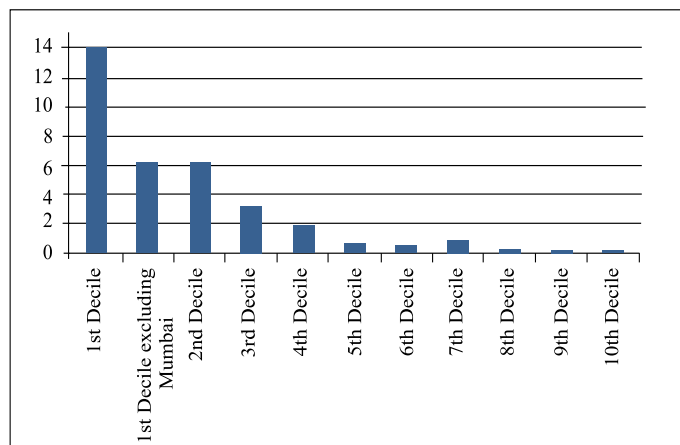
Approximately, 75% of all the agents (independent and bank) are located in 20% of country's districts. While the geographical distribution of IFAs is clearly skewed in favor of the first decile, the level of skew is not to the extent it was in AUM origination where the top 5 cities were contributing to 74% of the total AUMs in the country.

At the same time, it is worth noting that the ratio of the agents is not commensurate with the GDP distribution – the bottom 50% of districts contribute 17% to the nation's GDP but have only 4% of all the agents in the country. Even if people in these districts would like invest their savings into mutual funds, they would be hard pressed to find agents or distributors who would be willing to sell them these investment products.

AUM per Agent

We then decided to see how agents are performing across these districts. To do this, we decided to examine the AUM generated by each agent across all districts. We again ranked and partitioned the districts as mentioned above and computed the average AUM generated by each agent.

Chart 6: AUM/Agent (in Million Rupees)



Source: Authors' Survey Data

As can be seen, the top 50 districts of the nation clearly dominate the rest of India as far AUM generation is concerned. Even if we were to exclude Mumbai from the first decile, the AUM generation potential still dominated the remaining districts of India. However, there is another implication that can be drawn from the above graph. If the average AUM generated is significantly higher in a particular area (as it is here), it is expected that agents would tend to congregate in those areas where they can achieve maximum sales. Thus, the geographical reach of mutual fund agents is more likely to be explained by the potential revenue or AUM generation of each district. So, even if mutual fund houses (or the regulator) push agents

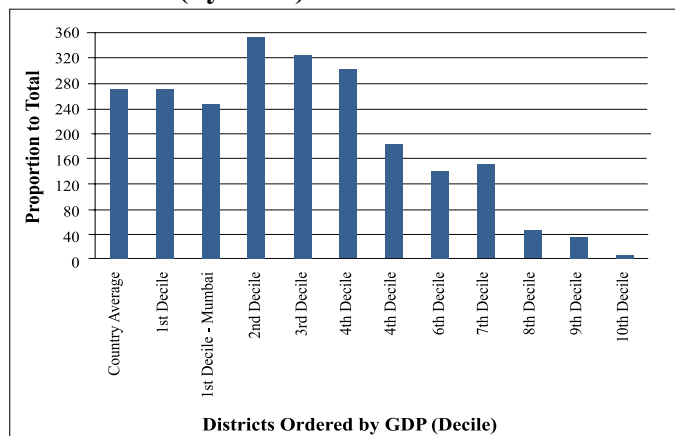
into districts other than the first decile, they are most likely to meet stiff resistance from the agents due to low potential sales in that region.

Looking at the above results, it is clear that the top 50 districts of the country receive a disproportionate amount of attention by AMC's and agents.

Distributional efficiency of Fund Houses

However, such overcrowding could have some other consequences. By having such a large presence in just one location could lead to inefficiencies. We decided to test this out by examining the distribution efficiencies of the fund houses. Specifically, we asked how much does one rupee spent on distribution earn in AUM.

Chart 7: AUM generated per rupee spent on distribution (by IFAs)



Source: Authors' Survey Data

The above graph throws an interesting insight for fund houses: while it may be true that the potential earnings for 90% of the districts are a fraction of the top decile, the 2nd to 4th decile district offer more “bang for the buck” as far as distribution costs are concerned. Spending one rupee in a top decile district would earn a fund house an average of Rs. 270 in AUM. Spending the same amount in the 2nd decile will earn an average of Rs. 355 in AUM. In other words, due to the untapped potential of these districts, distribution networks in this decile are 31.5% more efficient than the top decile. The corresponding figures for the 3rd and 4th deciles are 21.3% and 12.3% respectively.

Growth in AUM since FY2011

We then wanted to examine the growth of assets under management for individual districts and how they have grown over the last two years. Two areas where we had expected growth to occur was Bihar and Gujarat given the high economic growth that these two states have experienced over the past 5-10 years. We calculated the growth of AUMs in these two states along with other states which typically lag the national averages – Rajasthan, Uttar Pradesh, Jharkhand, Madhya Pradesh and Odisha. We computed the CAGR for these states two times – once for the overall state and once after taking out the state capital (this is because capital district would tend to crowd out the AUM growth in the other districts in the state). The results for the states are given below:

Table 2: Growth Rates of AUM of select states

State	Growth Rate
Bihar	5.54%
Bihar <i>excluding</i> Patna district	24.64%
Jharkhand	6.47%
Jharkhand <i>excluding</i> Ranchi district	4.14%
Madhya Pradesh	2.79%
Madhya Pradesh <i>excluding</i> Bhopal & Indore districts	8.11%
Odihsa	11.92%
Odihsa <i>excluding</i> Bhubaneswar (Khurdha) district	3.97%
Rajasthan	6.77%
Rajasthan <i>excluding</i> Jaipur district	4.22%
Uttar Pradesh	7.01%
Uttar Pradesh <i>excluding</i> Lucknow district	7.53%
Gujarat	8.61%
Gujarat <i>excluding</i> Ahmedabad district	1.87%

With the exception of Odihsa, all the states – including Gujarat – lag behind the country average of 9.88%. However, the growth rate for some states – notably Madhya Pradesh and Bihar – improves once the

capital districts are taken out. We remove the capital districts because their AUM levels which are often 10-20 times the AUM levels in smaller districts. If the capital districts are taken out, smaller districts tend to outperform their larger counterparts is because the AUM levels in these districts is so low that even a small addition in AUM leads to a large percentage change in growth. Gujarat and Odisha are standout states where the bulk of the AUM growth is coming from their capital districts. Whether this is due to economic factors or logistical is covered in a separate section of the report.

We then proceeded to map the growth rate of all the districts of India as given in Map 1A. Our findings suggest that the maximum growth is happening in areas with the least AMC presence. Most of the places with the maximum growth (75% and above) is happening in parts of Central India, Haryana, Himachal Pradesh and Bihar. A comprehensive list of the fastest and slowest growing states is given in Table 3.

Table 3: Fastest and Slowest Growing States

Slowest Growth		Fastest Growth	
State Name	Growth Rate	State Name	Growth Rate
Arunachal Pradesh	-18.13%	Sikkim	139.95%
Puducherry	-7.83%	Manipur	94.48%
Madhya Pradesh	2.79%	Himachal Pradesh	36.02%
Andhra Pradesh	3.27%	Haryana	32.82%
Tamil Nadu	3.75%	Nagaland	23.77%
Bihar	5.54%	Tripura	20.31%
Jharkhand	6.47%	Uttarakhand	18.54%

Source: Authors' Survey Data

To further understand the characteristics of the spread of mutual funds, we check the geographical

distribution of folio growth in the country. The number of new folios can be taken to approximate the size of new entrants in the mutual fund market. We map out the growth in the number of folios from 2011 to 2013 in Map 1B. It seems to indicate that growth is strongest in the states of Maharashtra, MP, parts of Karnataka and Andhra Pradesh.

Map 1C presents the number of retail folios for every 1000 households. Here, a clear north-south divide seems to be visible. Large parts of North India have very low presence of mutual funds in the retail space. Exceptions to this are the north Indian states of Punjab and Haryana where the proportion of retail folios is relatively higher.

Map 1D shows the number of retail folios after controlling for bank account penetration. This depicts the ratio of folios to the number of thousand households with bank accounts in 2008 as per the Indicus Analytics database. For example, a ratio of 60 implies that for 6% of bank holders in a given district have invested in mutual funds. The map shows that districts with the lowest measure were in Madhya Pradesh, Uttar Pradesh, Bihar and Jharkhand, as well as some pockets of Rajasthan and Andhra Pradesh.

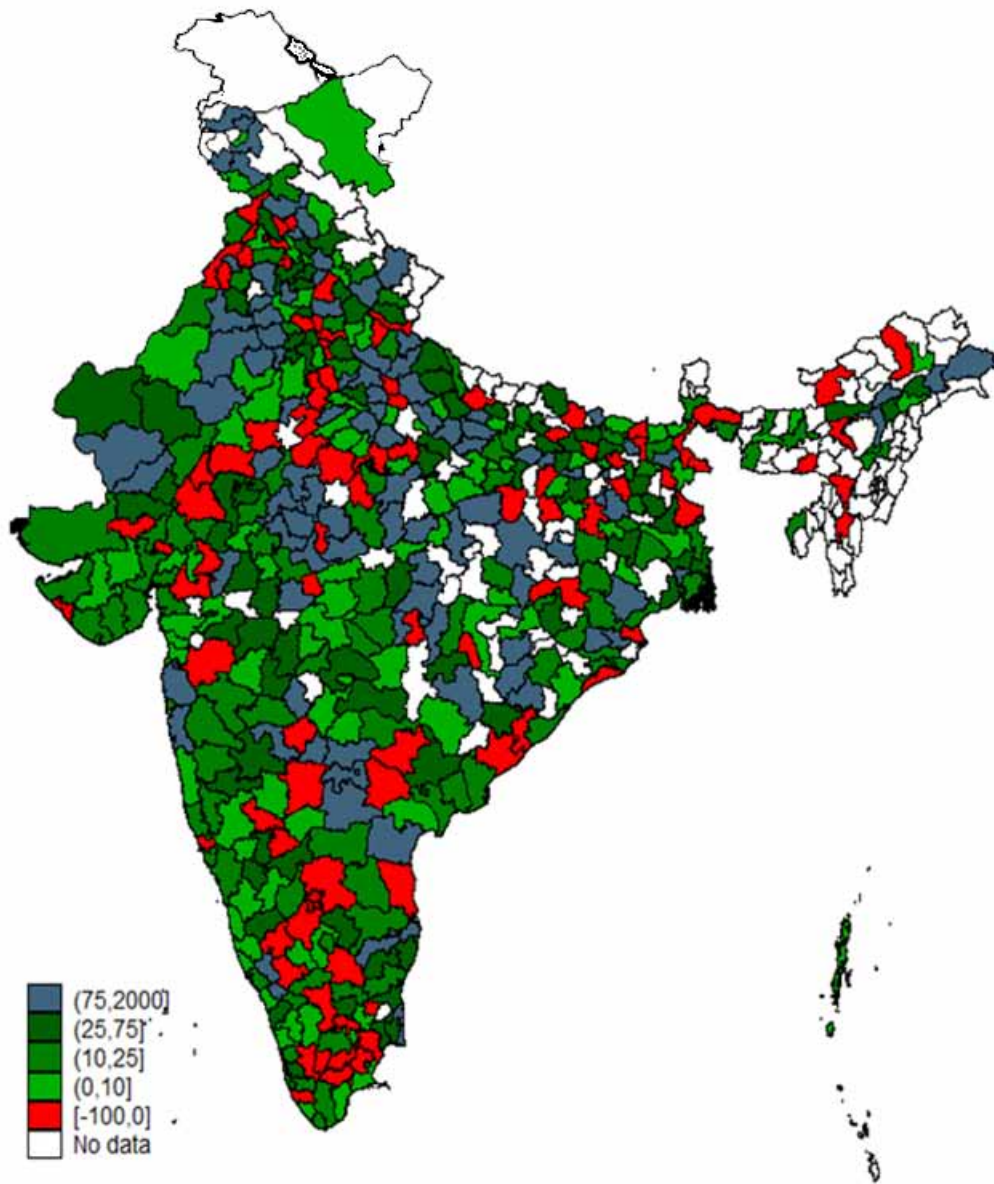
Map 1E which plots the AUM/GDP ratio as of 2013 summarizes the current penetration scenario and corroborates the T-15 bias already mentioned. As can be seen in the map, the penetration of mutual funds in most districts of the country is less than 1%.

In the coming section, we attempt an analysis of the causes of this scenario of geographical distribution of mutual funds

5. Statistical Analysis

After observing the variation in AUM penetration and AUM growth rates across the various districts, it would be worth finding out the factors which cause some areas to receive preferential access to mutual funds, independent financial agents etc. while other states lose out.

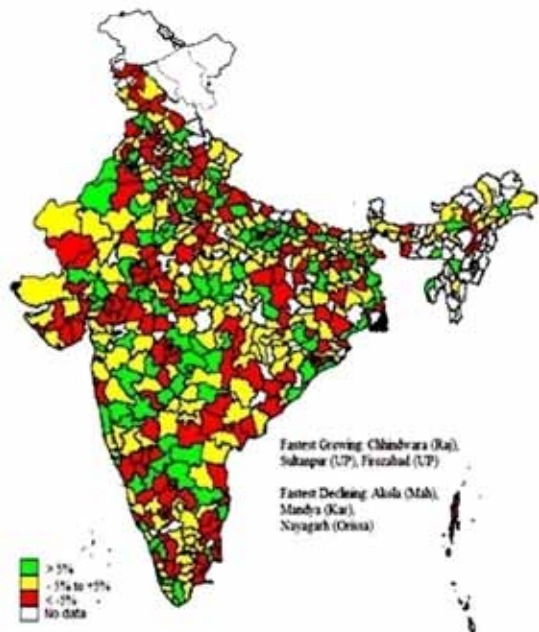
Map 1A: AUM Growth Rates of Districts (%)
AUM CAGR 2011-13



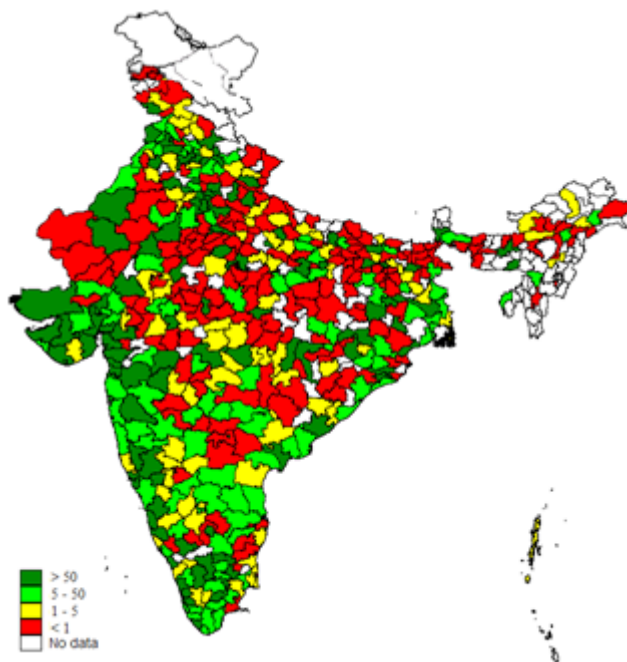
Source: Authors' Survey Data

Other AUM characteristics

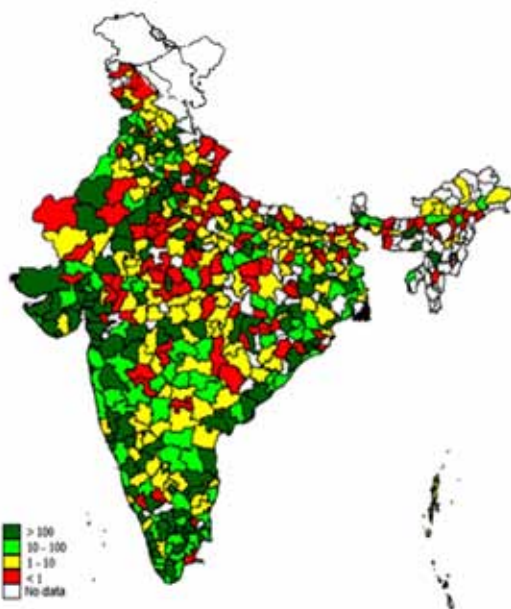
Map 1B: Folio Growth (2011-13, %)



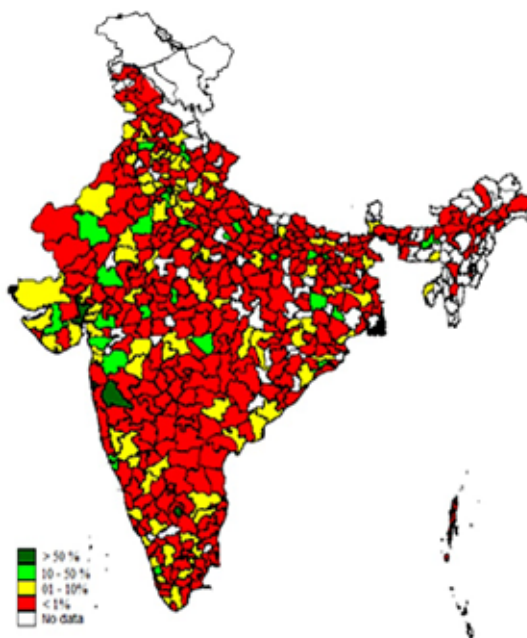
Map 1C: Retail Folio per 1000 households (March 2013)



Map 1D: Retail Folios for 1000 households with Bank Accounts (2013)



Map 1E: AUM/GDP (2013, %)

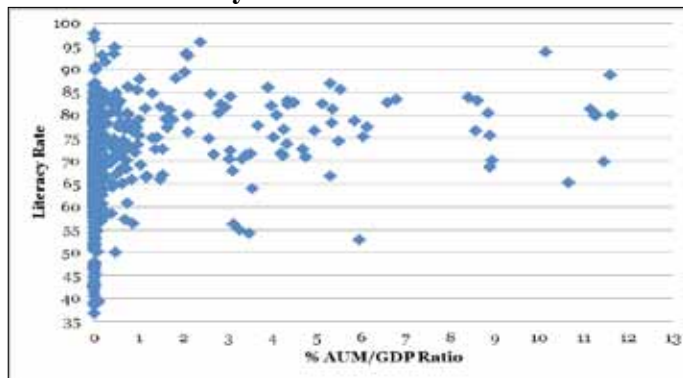


Source: Authors' Survey Data

The most obvious reason that is often quoted in the literature is that financial literacy for the average Indian household – especially in rural areas – is so low that they have difficulty in understanding complex investment vehicles like mutual funds. To test this hypothesis, two variables were chosen to see if there was any such relationship could be established.

The first variable chosen was literacy. It would be reasonable to presume that literate people would have a much better understanding of financial matters and investments. A scatter plot depicting literacy rates on the vertical axis with AUM penetration on the horizontal was plotted. We took out the values for TIER I cities which had high AUM/GDP values since they would tend to distort the graph. The result was as follows:

Chart 8: Literacy vs. AUM Penetration



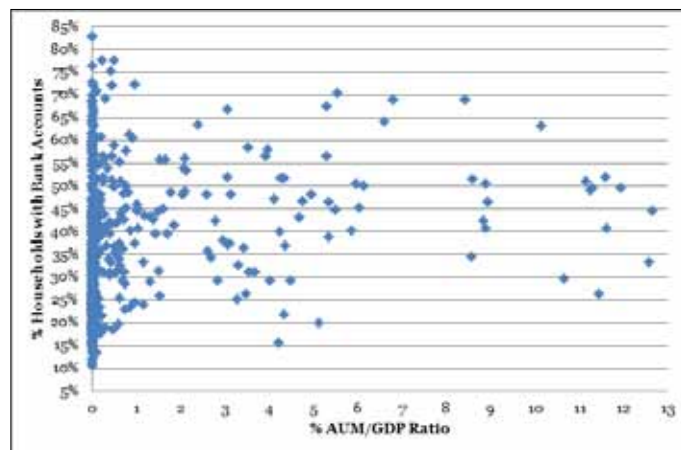
Source: Authors' Survey Data

From the above graph, there doesn't seem to be much correlation in between literacy rate and AUM penetration. In fact, the districts with less than 1% AUM/GDP ratio form a solid vertical line on the graph. While there are several districts with low literacy rates with no mutual fund presence, there are other districts with high literacy rates (e.g. Kasargod in Kerala) have AUM/GDP levels of 0.01% to 0.02% of their GDP.

The correlation coefficient between literacy and AUM/GDP levels is 0.21. Another way to think about this is to square this number and derive the coefficient of determination to determine the strength of the relationship between these two variables. The coefficient of determination measures how much of

the variance in dependent variable (AUM penetration) is captured by the independent variable (literacy). The coefficient of determination in this case is just 0.0441 or 4.41%. This means that literacy rates explain only 4.41% of the total variation in AUM/GDP ratio across the country. All this leads to the conclusion that literacy levels are not a good proxy for mutual fund penetration in that area.

Chart 9: Bank Penetration vs. Mutual Fund Penetration



Source: Authors' Survey Data

One flaw with choosing literacy as a proxy for explaining mutual fund penetration is that it may not necessarily be true that literate people have enough to invest in mutual funds. It is very much a possibility that a farmer practicing subsistence agriculture has completed his primary education and therefore is counted as a literate person. To compensate for this flaw, it was decided to choose a variable which would capture a person's exposure to investment opportunities. The variable chosen to overcome this was the proportion of households in the district having a savings account with a bank. The scatter plot of these two variables is shown in Chart 9 (refer previous page).

A pattern similar to the previous graph emerges. While this time the districts are more scattered about, there is no clear relationship between the two variables. Most damagingly, there are several districts in which over two-thirds of the households have savings accounts but still have little (or no) access to mutual funds. The correlation coefficient is 0.36 which implies a weak

correlation and an inconclusive relationship between the two variables. The coefficient of determination in this case is 0.1296 implying that bank penetration explains only 12.96% of the entire variation in AUM/GDP ratio.

However, this weak relationship can also be interpreted in the following manner: Banks and savings account holders are not being tapped as much as one would imagine for sale of mutual funds. It would be reasonable to suggest that the number of people with surplus money is likely to be higher in those districts where bank penetration is higher (say 65% and above). However, given that there are a large number of districts with high penetration with little to no mutual fund penetration suggest that banks are not being utilized as distribution centers for mutual funds. If one can assume that saving account holders visit their bank branches even once in two months, this would present a good opportunity to inform people about mutual funds and possibly convert them into investors.

Multivariate Analysis

To overcome this, it was decided to run a regression analysis to better eke out the causes for mutual fund penetration across India.

There are two reasons why penetration of mutual funds in some districts is higher than another. The first reason could be that people in the district are extremely rich and are looking for investment opportunities. In other words, the savings propensity for a richer district would be higher than that of a poorer district. The second reason for a high mutual fund penetration could be the presence of agents and distributors. If the number of agents in a particular

district is high, the people in the district are more likely to be aware of mutual fund as an investment asset. This would particularly be true for the districts in the first decile (refer back to Chart 5).

We analyze the effect using two independent variables. The variable chosen to capture the saving propensity in a district was the percentage of households with more than Rs. 300,000 of annual income. Households with these income levels above this can be expected to save at least some percentage of their annual income in some form. This variable is represented by 3Lakhs Per Annum (LPA) and is calculated by taking the number of households earning more than Rs. 300,000 and dividing it by the total number of households. The second variable is the number of financial agents in the district. This variable is represented by Mutual Fund Agents (MFA).

We thus have the following model in mind:

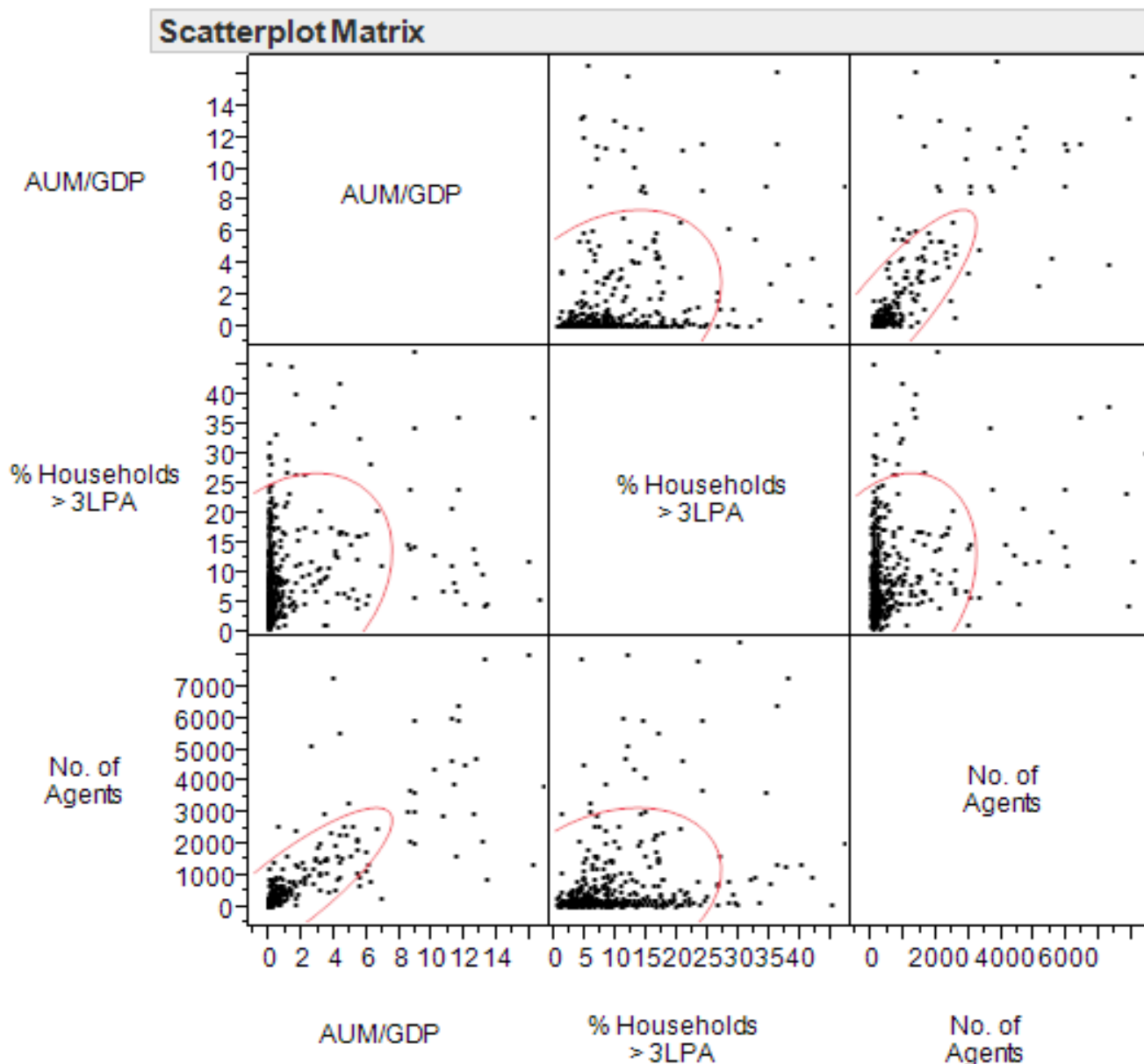
$$\frac{AUM}{GDP} = f(3LPA, MFA)$$

We take took out the outlier categories like Mumbai and other Tier I cities since their AUM penetration levels are over a hundred times larger than the average. The correlation coefficients of these variables are shown in Table 4 followed by the scatter plot of all the three variables on the next page.

Table 4: Multivariate Analysis on Independent Variables

	AUM/GDP	3LPA	MFA
AUM/GDP	1.0000	0.2750	0.8489
3LPA	0.2750	1.0000	0.2549
MFA	0.8489	0.2549	1.0000

Chart 10: Scatter-plot matrix for Independent Variables



The above multivariate plot throws some interesting revelations. Firstly, mutual fund penetration is weakly correlated with the 3LPA variable. This implies the potential market for mutual funds remains largely untapped. There are several districts in India which have households with high savings propensity but have negligible amounts of their savings invested in mutual funds. The second insight is that agents are not necessarily matched well to the households with high savings propensity. An alternative explanation to this

low relationship could be that the two variables could also be that households with high savings potential are unaware of mutual funds as investment opportunities. However, the root cause of this relationship cannot be clearly discerned with the limited data we have. At the same time, the mutual fund penetration is highly correlated with the number of agents in the district which reinforces the notion that agents comprise bulk of the mutual fund sales and remain the dominant channel for delivery.

6. Opinions of Fund Houses

In this final section of the report, the opinions of fund Managers on areas on which the regulator ought to focus on, and what are the causes for holding mutual funds back on increasing their presence in rural India.

Investor Awareness

When fund houses were asked whether a typical investor was adequately informed about different mutual fund products, an overwhelming majority (80%) answered in negative. AMC's are of the opinion that investors in metros are significantly better informed as compared to investors in non-metro cities. However, the distinction is not as sharp when awareness levels of investors in T-15 and B-15 cities are compared. Also, within the T-15 cities, awareness levels about different mutual funds were far higher in the five metro areas than the rest of the T-15 cities. 57% of respondents think that lack of customer information is the biggest challenge they face in selling mutual fund products.

Understandably, this lack of awareness on part of investors is one of the single largest factors affecting penetration according to the fund houses. AMC's suggest novel awareness campaigns wherein partnerships with colleges can be established to inculcate financial knowledge at young age. Involving celebrities to spread financial awareness regarding mutual funds at category level is also one of the suggestions. One of the interviewed fund houses suggested opening up of MF 'education centers' in smaller towns could serve as counseling centers and provide fund updates, Net Asset Value (NAV) across AMC's.

Distribution Channels

Of all the fund houses surveyed, 61% of respondents said that finding quality distributors continues to present a formidable challenge. Fund houses are of the opinion that due to the current regulations that impose a limit on the incentives, good quality distributors are hard to find. On the other hand a large majority of respondents says that even if a reasonable commission

is offered, it is difficult to recruit sufficient number of distributors which implies that there is lack of skilled distributors. Finding quality distributors especially in small towns and rural areas is a major hurdle towards increasing mutual fund penetration. This problem is more prevalent in case of AMC's with relatively lower AUM levels.

67% of fund houses opine that distribution, if carried out through post offices could be a positive step towards increasing the penetration of mutual funds. If this could be started, this would be a significant step considering the recent push by India Post of the Post Office Saving Schemes. Since India Post is a loss making enterprise, an introduction of such mutual fund sales through India Post could also help them in reducing their deficit and this could be a highly beneficial move for both parties. Furthermore, India Post through its broad network spread throughout the nation offers a distribution channel that could be leveraged. In January 2001, India Post in association with IDBI-Financial launched a pilot scheme in the Delhi, Mumbai, Kolakata and Patna. From 15th June 2001 onwards, sales of mutual funds by SBI, Principal, Franklin-Templeton and Reliance Mutual Fund were extended to cover post offices in all major capital and other cities all across the country.

Huge costs when entering new areas where there are no existing mutual funds are also a barrier for the fund houses to establish the footprint. AMC's ask for allowing differential incentives for such locations (including, possibly, upfront fees to distributors) to make it mutual fund distribution financially viable and compete with the sale of other financial products. The present regulation provides incentive to the distributors for funds mobilized beyond top 15 cities. However this benefit is effectively cancelled by the claw-back provision which needs to be revisited. AMC's also demand fiscal incentives for opening branches beyond top 15 cities as the infrastructure and set-up need to be incurred by them. At the same time, a large majority of the respondents feel that introducing new channels like transactions through ATMs would not boost AUM levels.

Smaller fund houses and those in private sector count misselling by the distributors as a major factor affecting the penetration of mutual funds. AMC's suggested making the offence of misselling more stringently punishable. An interesting insight obtained from the survey is that the fund houses do not feel that agents have a clash of interest when they sell other financial products along with mutual funds.

AMCs feel the need of using technology as much as possible to increase the reach. Facilities like mobile wallet should be introduced which could help accretions of daily SIPs particularly in small towns and help small investors participate in equity and debt markets.

In order to tackle the shortage of quality distributors, AMC's suggest that the country-wide network of stock brokers can be effectively utilized. They propose that fund houses should be allowed to pay commissions to them and their registration with AMFI should not be made compulsory. AMC's also pointed that restricting the scope of New Cadre Distributors to simple products affects penetration in non metro locations.

Regulatory Framework

Fund houses also consider "Know Your Customer" (KYC) norms, excessive paperwork and the restrictions impose on transactions by cash as roadblocks to penetration by the. Public AMC's consider the regulatory restrictions on advertisements as a reason for under-penetration.

AMCs demand that restrictions on advertisements should be relaxed and the advertising guidelines should be simplified to enable better communication. They should be allowed to compare their track record with other competing products so that the investors can better understand the benefits of investing in mutual funds.

At the time of our survey, fund houses reported that the cumbersome paper work, especially related

to KYC guidelines ought to be further refined and simplified particularly in the case of retail investors. The recent simplification of common KYC norms by SEBI by having i) Common KYC to cover entire financial services sector, ii) fetching KYC related data directly from KYC Registration Agency (KRA) and not from investors and iii) further simplification of rules around disclosure of performance are steps in the right direction. By having this standard format of application form across the industry, uniform procedures and practices like transmission, change of name, and issues with signature mistakes will make the entire investment process easier and simplified for the investor.

By making mutual funds more tax-efficient and friendly, more investors can be attracted and hence, penetration can be increased. Suggestions include introduction of new policies to make investment in mutual fund schemes qualify under Capital Saving Scheme under Income Tax, extension of ELSS Tax benefit for 3 more years in case of rollover and making mutual funds part of pension plans.

From the feedback received from the AMC's, there is a lack of level playing field as compared to other competing products in terms of tax advantages, disclosure levels, after sales support and other regulations. Unless these issues are addressed, it will be very hard for the AMC's to increase the penetration levels.

A summary of the views of fund houses is given below in Table - 5. To arrive at these interpretations, we asked managers at fund houses questions ranging across multiple issues. Fund houses which responded to the questions with "moderately agree" and "strongly agree" were grouped under the category "Agree". Similarly, we grouped "moderately disagree" and "strongly disagree" under the category "Disagree". Questions on which no responses were received were grouped in the third category of neutral.

Table 5: Views/opinions of Fund Houses

No	View/Opinion	Disagree	Neutral	Agree
1	The typical investor is not adequately informed about mutual fund products	8.57%	8.57%	80.00%
2	Investors in metros (tier-I cities) are significantly better informed than investors in non-metros cities	2.86%	17.14%	80.00%
3	Investors in T-15 cities are significantly better informed than investors in B-15 cities	5.71%	34.29%	60.00%
4	Lack of customer information is the biggest hurdle in selling mutual fund products	28.57%	11.43%	57.14%
5	Quality of distributors is a challenge in selling mutual fund products	8.82%	23.53%	61.76%
6	Current limit permissible for incentives / commission is a constraint in recruiting quality distributors / agents	14.29%	20.00%	62.86%
7	Agents selling non mutual fund products along with mutual fund products is a hindrance to mutual fund penetration	51.43%	14.29%	31.43%
8	Regardless of reasonable incentive / commission, it is difficult to recruit sufficient number of qualified distributors	20.00%	28.57%	48.57%
9	Whether certification courses by NISM for distributors requires improvement	20.00%	40.00%	37.14%
10	Penetration would increase if distribution were broadly done through bank branches	25.71%	11.43%	60.00%
11	Penetration would increase if distribution were broadly done through individual financial advisor	14.29%	22.86%	57.14%
12	Facility of investing in mutual funds through ATM machine would boost the investment	40.00%	20.00%	34.29%
13	Distribution through post office would increase penetration	11.76%	17.65%	67.65%

Source: Authors' Survey Data

We also asked fund managers to rank from 1 (not important) to 10 (most important) factors which in their opinion impact the sale of mutual funds. Through their responses, we list the top four factors which the maximum number of fund houses found to be important.

Table 6: Top factors affecting mutual fund penetration

1	Lack of information/financial sophistication of the customers about mutual funds
2	Finding quality distributors / agents in small towns and villages
3	Cost of entering new regions with no existing mutual funds
4	KYC / Paperwork / restrictions on cash transaction

Source: Authors' Survey Data

7. Conclusions and Policy Recommendations

We carry out a preliminary enquiry into the nature of geographical penetration and distribution of mutual funds in India as well as their likely determinants. Using a questionnaire survey we collect qualitative and quantitative evidence from fund managers on the nature and determinants of their geographical presence throughout the country.

We confirm that mutual fund presence in the country is heavily skewed in the favor of the top 60 districts of India. Even within the 60 districts, a lion's share of the mutual fund presence originates from Mumbai. This is primarily due to the fact that Mumbai houses the headquarters (or the financial headquarters) of most of the large companies, thereby getting a bulk of investments through the non-retail or institutional

avenues. If the non-retail customers are taken out, Mumbai starts looking like the other larger metros of the country.

We confirm that independent financial agents are associated with the bulk of the sales of mutual funds in the country. We then report that the geographical distribution of the financial agents is similarly skewed (but not as much) in the favor of the top 60 districts. Agents in these top districts can expect to manage to have AUM in the range of three to seven times the amount they can expect to manage in the next 60 districts.

At the same time, the distribution costs as a function of AUM generated in the top 60 districts are far higher than the costs in the lower districts. This suggests that distribution networks have a larger throughput in the 2nd and 3rd decile of the district distribution and fund houses ought to focus on these districts *ceteris-paribus* if they did like to see the maximum amount of AUM generated for each rupee spent in distribution costs.

We report that demographic and social development factors such as adult literacy or bank penetration (savings account) do not show any strong correlation with mutual fund penetration. This lack of strong correlation is a strong indicator that banks are not being utilized as effective delivery channels.

Commissions offered to mutual fund agents appear to be significantly less attractive than those for other financial products (particularly insurance). Mutual fund agents outside T-15 cities cannot rely exclusively on the sale of mutual funds as an income source and the products compete for the “push” given to them by the agents. Low commissions could also be a reason for the difficulty in finding talent.

At the same time, the number of agents together with number of households with more than Rs. 300,000 of annual income does show a high correlation with mutual fund penetration, thereby suggesting that fund houses ought to seek out those districts where such households are present.

We finally present a brief summary on the opinions of fund house managers on what is holding mutual

funds from increasing their presence outside T-15 cities. The main concern raised by fund houses was lack of good talent for training and hiring mutual fund agents. Another major concern was about investor awareness and the lack of financial sophistication of investors outside T-15 cities.

The growth in the mutual fund industry is by and large governed by the macroeconomic factors affecting the country. Given the recent high inflation rates with a slowdown in the economic output of the nation, it is not surprising to see a slowdown in the rate of growth in the mutual fund industry as well.

However, there remains a large untapped market waiting to be explored and serviced. Some of these areas, such as Himachal Pradesh, Haryana and Manipur are already experiencing high growth rates (albeit from a smaller base). However, this growth can be sped up substantially if the proper areas are targeted.

While there is universal acknowledgement that there good talent is hard to find and AMCs face difficulty in recruiting the right distributors and agents in small towns and villages, they should take note of the large pool of Business Correspondents which number 195,000 as on March 31, 2013. This could be a talent pool waiting to be tapped to address the shortage of mutual fund agents in the nation. (Dept. of Financial Services, Ministry of Finance, 2013).

We also feel that bank channels are currently being underutilized. With several districts having high banking penetration among households, such districts ought to be a prime target for further growth. With the RBI scheduled to roll out new banking licenses by 2014, financial inclusion is set to receive a huge push, thereby signaling a possible strengthening of banks’ distribution networks. AMCs should therefore start to focus on their bank distribution channels and build robust information systems in order to take advantage of these upcoming opportunities.

The deduction of “trail commission” from investors makes mutual funds less attractive. A possibility may be explored about the sharing of the “trail

commission” between fund houses and investors – this would increase the attractiveness of mutual funds vis-a-vis other products. However, the exact mechanics of such a change should take into account the elasticity of investors to mutual fund returns.

This report is but a preliminary investigation into the delivery mechanism of mutual funds in India and offers several avenues for further research and exploration.

An area we have not looked into is the impact of advertisement and marketing costs on distribution. While fund houses did report these figures, with the exception of a few fund houses, marketing and advertisement costs were only available at the central level for the fund as a whole. It is generally held that “*You can't manage what you don't measure*”. By not having these costs allocated or measured at a micro level, fund houses would not know which areas to increase their marketing and advertising efforts, which could lead to inefficient marketing.

It may be helpful to explore the challenges faced by India Post's 2001 pilot programme for the sale of mutual funds through post offices in major cities. Such a study could investigate whether such a rollout across villages would be economically feasible and meaningful.

Finally, we have treated mutual fund sales as homogenous sales by the independent financial agents. Analysis of sales data of agents would allow future research to be much more precise in determining the impact of agents on retail sales.

References

- Adajania, K. E. (2013). MF industry needs to look at standardization in a new light. *HT Mint*, September 04 .
- Anagol, S., & Kim, H. H. (2012). The Impact of Shrouded Fees: Evidence from a Natural Experiment in the Indian Mutual Fund Market. *American Economic Review* , 576 - 593.
- Anagol, S., Marisetty, V. B., Sane, R., & Venugopal, B. G. (2013). On the Impact of Regulating Commissions: Evidence from the Indian Mutual Funds Market.
- Association of Mutual Funds in India. (2013). *AMFI Quarterly Updates*. Retrieved October 14, 2013, from amfiindia.com: <http://portal.amfiindia.com/spages/aqu-vol12-issueIV.pdf>
- Barber, B., Zheng, L., & Odean, T. (2005). Out of Sight, Out of Mind: The Effects of Expenses on Mutual Fund Flows. *Journal of Business* , 2095-2120.
- Barth, J., Gerard, C. J., & Ross, L. (2001). The Regulation and Supervision of Banks Around the World: A New Database. *Brookings Institution Press* .
- Boston Analytics. (2010). *Mutual Funds Investments*. Retrieved October 3, 2013, from Boston Analytics: http://www.bostonanalytics.net/india_watch/BA_SMD_Press_release_June_Final_3.pdf
- Chiyachantana, C., Jain, P., Jiang, C., & Wood, R. (2004). International evidence on institutional trading behavior and price impact. *The Journal of Finance* , 869-898.
- Demirguc-Kunt, A., & Klapper, L. (2012). *Measuring Financial Inclusion: The Global Findex Database*. World Bank.
- Dept. of Financial Services, Ministry of Finance. (2013). *An Overview on Financial Inclusion*. Report (Accessed from <http://financialservices.gov.in/banking/Overviewofefforts.pdf>).
- Halan, M. (2013). Why do Indians buy so much gold jewelry? *HT Mint*, June 11.
- Indicus Analytics. District GDP of India, 2005-09
- Investment Company Institute. (2013). *2013 Investment Company Fact Book*.
- Keswani, A., & Stolin, D. (2012). Investor Reaction To Mutual Fund Performance: Evidence From UK Distribution Channels. *Journal of Financial Research* , 425-450.
- Khorana, A., Servaes, H., & Tufano, P. (2005). Explaining the Size of the Mutual Fund Industry Around the World. *Journal of Financial Economics* , 50.
- Kirkire, S. (2013). It is about time in the market and not timing the market. (L. P. Barбора, Interviewer)

HT Mint, August 09.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and Finance. *Journal of Political Economy* , 106.

Massa, M., Goetzmann, W. N., & Rouwenhorst, G. K. (1999). Behavioral Factors in Mutual Fund Flows. *Yale ICF Working Paper No. 00-14* , 42.

Müller, S., & Weber, M. (2010). Financial Literacy and Mutual Fund Investments: Who Buys Actively Managed Funds? *Schmalenbach Business Review* , 126-153.

NCAER Max New York Life. (2008). *India Financial Protection Survey*.

Nicola, C., & Michele, G. (2001). Banking market structure, financial dependence, and growth:

International evidence from industry data. *Journal of Finance* , 617-648.

PWC, CII. (2013). *Indian Mutual Fund Industry: Unearthing the growth potential in untapped markets*. Mumbai: CII.

Reserve Bank of India, Annual Report (2012)

Thompson, J., & Choi, S.-M. (2001). *Governance systems for collective investment schemes in OECD countries*. Paris: OECD.

Wermers, R. (1999). Mutual Fund Herding and the Impact on Stock Prices. *Journal of Finance* .

World Bank. (2012). World Development Indicators.

Zechner, J., Neal, S., & Youchang, W. (2011). Intermediated Investment Management. *Journal of Finance* , 947-980.

TABLES:

Impact of Increased Derivatives Trading on the Price Discovery Process

Table-1: Indian Stock and Index Futures and Option Segment (Rs Crore)

Year	No of Trading Days	Index Futures	Stock Futures	Index Options	Stock Options	Total	Daily Average
2001-02	247	22,758	51,967	3,849	25,276	1,03,851	420
2002-03	251	45,762	2,87,176	9,249	1,00,156	4,42,344	1,762
2003-04	254	5,61,034	13,11,120	52,823	2,17,544	21,42,521	8,435
2004-05	253	7,85,773	14,84,280	1,24,251	1,68,861	25,63,165	10,131
2005-06	251	15,13,796	27,91,722	3,38,472	1,80,270	48,24,260	19,220
2006-07	249	25,95,066	38,34,487	7,91,912	1,93,811	74,15,276	29,780
2007-08	251	40,55,327	75,56,172	13,62,150	3,59,137	1,33,32,786	53,119
2008-09	243	35,81,868	34,79,651	37,31,511	2,29,227	1,10,22,257	45,359
2009-10	244	39,34,485	51,95,247	80,28,102	5,06,065	1,76,63,899	72,393
2010-11	254	43,56,909	54,95,757	1,83,65,366	10,30,344	2,92,48,375	1,15,151
2011-12	249	37,56,447	40,84,886	2,33,38,374	9,78,500	3,21,58,208	1,29,149
2012-13	249	26,49,504	42,27,290	2,98,09,055	20,10,673	3,86,96,523	1,55,408

Table 2: Descriptive Statistics

In of Land Value	NIFTY		ACC		BHEL		BICL		CIPLA		HDFC		ITC		RAMBAXY		RELIANCE		SHIN		TATAPOWER	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Observations	2877	2795	2877	2296	2877	2795	2060	2795	2877	2795	2877	2795	2877	2795	2877	2795	2877	2795	2877	2795	2877	2795
Mean	7.98	8.01	7.95	6.30	6.18	6.71	6.76	6.55	6.00	6.01	5.81	6.93	5.83	5.48	5.83	6.22	6.26	6.72	6.69	6.88	6.91	5.99
Median	8.20	8.23	8.16	6.60	6.42	7.16	7.21	6.61	5.94	5.95	5.75	6.65	6.59	6.44	6.32	6.22	6.22	6.72	6.72	7.03	7.07	6.14
Maximum	8.75	8.78	8.74	7.31	7.32	7.96	7.97	7.95	6.69	6.69	7.24	7.25	7.23	7.24	7.15	7.14	7.14	8.08	8.08	8.16	8.15	7.40
Minimum	6.75	6.83	6.75	4.86	4.86	4.59	4.68	4.91	4.78	4.78	5.11	5.70	5.74	4.90	4.90	4.90	4.90	5.32	5.40	5.32	4.95	4.40
Std. Dev.	0.62	0.60	0.61	0.76	0.74	0.82	1.03	0.99	1.06	1.02	0.61	0.61	0.61	0.76	0.70	0.43	0.42	0.66	0.65	0.66	0.79	0.97
Skewness	-0.55	-0.61	-0.54	-0.55	-0.60	-0.40	-0.43	-0.47	-0.12	-0.05	-0.06	-0.09	-0.83	0.92	1.51	-0.39	0.34	-0.06	-0.08	-0.05	-0.52	-0.26
Kurtosis	1.84	1.94	1.86	1.96	1.51	1.58	1.63	1.33	2.61	2.59	2.04	2.33	2.58	5.39	1.92	1.88	1.70	1.89	1.98	2.48	2.06	1.64
ADF (P Value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PP (P Value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	2876	2794	2876	2794	2177	2876	2794	1812	2794	1935	2876	2794	1935	2876	2794	2876	2794	2876	2794	2876	2794	2876
Median	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Maximum	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116	3116
Minimum	-0.13	-0.16	-0.16	-0.16	-0.13	-1.65	-1.64	-1.63	-0.71	-0.69	-0.69	-1.59	-0.94	-1.59	-0.94	-1.58	-1.58	-2.62	-2.62	-2.62	-2.62	-2.33
Std. Dev.	0.02	0.02	0.03	0.02	0.02	0.04	0.04	0.05	0.03	0.04	0.04	0.04	0.04	0.05	0.05	0.02	0.02	0.03	0.03	0.02	0.02	0.05
Skewness	0.29	0.41	0.09	0.26	0.33	-0.26	-0.28	-0.28	-0.14	-0.29	-0.88	-2.28	-2.28	-2.28	-2.28	-2.28	-2.28	-2.28	-2.28	-2.28	-2.28	-2.28
Kurtosis	12.00	12.84	8.60	6.98	7.39	8.19	8.75	8.60	7.52	7.00	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
ADF (P Value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PP (P Value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	0.90	0.90	0.89	0.86	0.80	0.94	0.91	1.00	0.52	0.51	0.58	0.67	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Median	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Maximum	1.11	1.14	1.11	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
Minimum	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Std. Dev.	0.23	0.23	0.23	0.26	0.26	0.37	0.39	0.29	0.66	0.11	0.14	0.21	-1.77	-1.62	-1.63	-1.07	-0.95	-0.01	0.71	0.59	1.34	-0.41
Skewness	0.61	0.49	0.62	0.38	0.35	0.37	0.39	0.29	0.66	0.11	0.14	0.21	-1.77	-1.62	-1.63	-1.07	-0.95	-0.01	0.71	0.59	1.34	-0.41
Kurtosis	1.88	1.71	1.91	1.83	1.58	1.82	1.57	1.44	1.92	2.33	2.35	2.35	4.87	4.30	4.32	2.75	2.45	2.45	2.13	1.92	3.75	1.98
ADF (P Value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PP (P Value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mean	796	714	796	714	796	714	796	714	796	714	796	714	796	714	796	714	796	714	796	714	796	714
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	0.08	0.10	0.07	0.10	0.07	0.08	0.13	0.14	0.11	0.13	0.23	0.24	0.10	0.10	0.06	0.16	0.19	0.12	0.09	0.08	0.08	0.10
Minimum	-0.13	-0.16	-0.16	-0.11	-0.12	-0.23	-0.28	-0.15	-0.23	-0.22	-0.22	-1.59	-1.59	-0.07	-0.70	-0.70	-0.06	-0.10	-0.10	-0.10	-0.49	-0.48
Std. Dev.	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.06	0.06	0.03	0.06	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Skewness	-1.25	-1.71	-1.39	0.13	-0.07	-0.08	-0.77	-1.41	0.00	-0.59	-0.16	0.09	-23.65	-22.96	0.15	-12.62	-13.74	0.45	-0.21	-0.25	-0.42	-9.15
Kurtosis	14.20	25.47	17.86	4.74	4.59	4.97	13.05	24.31	6.63	10.46	14.67	16.83	620.92	302.92	1.73	7.05	8.40	6.61	182.75	203.04	163.45	10.87
ADF (P Value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PP (P Value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table-3: Annual Standard-Deviation (in %)*

Index/Company	Pre-Derivative	Annual Standard-Deviation (in %)*											Subperiods			Full Period				
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	SP-1	SP-2		SP-3			
						Spot														
NIFTY	8.95	6.45	19.66	9.15	11.36	10.33	15.04	22.84	22.96	7.64	6.63	6.01	23.14	35.10	20.70	62.14				
ACC	20.57	7.17	19.81	7.94	14.10	20.50	14.37	22.74	18.51	8.50	6.89	7.80	25.69	43.55	31.40	76.47				
BHEL	17.39	7.03	31.88	11.39	20.73	14.38	20.90	19.06	21.37	3.86	83.21	9.68	53.61	45.23	96.71	102.67				
BPCL**	23.20	19.47	21.40	15.55	7.59	12.76	10.47	17.73	17.59	14.15	8.71	33.06	26.97	12.10	29.84	32.22				
CIPLA	16.12	8.20	20.55	75.99	16.96	38.33	12.56	8.67	18.49	4.89	6.50	10.64	50.36	30.36	20.93	59.31				
HDFC	11.18	13.38	19.43	10.15	15.49	11.57	20.85	21.76	25.79	66.84	4.25	8.95	22.52	44.19	60.85	60.63				
ITC	6.67	5.96	13.34	10.36	109.54	8.88	8.54	9.68	15.03	23.90	8.31	12.79	19.48	93.92	19.00	76.31				
RANBAXY	15.83	9.70	20.22	8.15	43.92	9.26	8.71	33.65	35.84	11.80	9.58	7.83	21.41	41.65	33.49	43.09				
RELIANCE	8.71	10.59	22.63	10.05	17.77	19.34	26.82	28.77	25.72	4.18	10.65	6.28	27.80	55.39	36.31	66.45				
SBIN	12.17	7.02	21.52	14.79	15.08	15.69	28.20	22.81	28.85	17.05	16.91	8.26	39.38	42.34	27.92	82.41				
TATAPOWER	26.37	9.63	31.40	17.96	9.13	9.12	31.37	25.40	24.76	4.29	112.69	6.00	45.66	42.72	112.46	97.07				
						Futures														
Nifty	2.62	6.42	19.73	9.53	11.46	10.59	15.24	22.78	23.15	7.81	6.65	6.15	23.11	35.20	20.84	60.30				
ACC	6.82	7.21	20.01	8.16	14.14	20.65	14.48	22.79	19.03	8.71	7.24	7.87	24.62	43.64	31.75	73.75				
BHEL	3.60	7.04	32.03	11.60	20.93	14.57	21.12	19.14	21.66	3.88	82.82	9.63	51.67	45.41	96.67	99.41				
BPCL	19.47	19.47	21.38	16.11	7.75	12.81	10.62	17.68	17.55	14.15	8.62	33.01	26.83	12.10	29.89	32.28				
CIPLA	1.10	8.48	20.60	76.13	16.89	38.69	12.42	8.71	18.55	4.92	6.53	10.67	52.29	30.47	21.02	57.29				
HDFC	1.50	13.46	19.45	10.41	15.67	11.68	20.93	21.70	25.80	66.72	4.05	9.13	22.71	44.33	60.50	61.06				
ITC	2.66	5.86	13.42	10.77	109.33	9.05	8.76	9.71	15.09	23.68	8.26	12.82	19.78	93.85	18.88	76.36				
RANBAXY	4.22	20.15	21.15	8.33	43.83	9.32	8.78	33.17	35.87	11.88	9.58	7.86	20.84	41.63	33.50	43.57				
RELIANCE	2.03	9.65	22.93	10.22	17.86	19.27	27.01	28.79	25.79	4.16	10.44	6.48	28.28	55.35	36.08	64.93				
SBIN	5.73	7.12	21.64	14.92	15.14	15.91	28.30	23.00	28.93	17.07	16.81	8.42	36.93	42.36	28.20	78.62				
TATAPOWER	6.12	9.59	31.54	18.15	9.32	9.68	31.76	25.27	24.70	4.38	112.65	6.18	46.36	42.71	112.32	95.83				
						Option														
Nifty	7.13	6.44	19.68	9.67	11.17	10.89	15.34	23.85	23.89	8.77	8.75	6.67	23.11	34.25	22.28	60.58				
ACC	13.24	7.21	20.01	8.14	14.18	21.03	15.26	21.21	7.10	8.68	7.22	7.80	25.69	45.13	19.43	82.42				
BHEL	7.38	6.46	30.57	9.22	17.03	11.94	19.54	15.72	22.39	3.94	83.20	9.63	49.84	52.47	98.57	106.39				
BPCL	19.55	19.55	21.36	16.08	7.39	8.82	10.63	9.62	16.65	10.81	8.63	33.08	27.13	9.18	27.36	38.47				
CIPLA	6.17	7.39	19.17	53.52	15.19	43.63	10.47	7.56	14.90	4.94	6.57	10.64	51.26	32.78	13.46	42.10				
HDFC			3.91	3.14	4.61	4.33		21.02	25.89	67.63	4.25	9.15	32.75	25.10	60.78	61.04				
ITC	6.22	5.86	13.48	8.06	117.91	9.00	9.08	9.78	15.25	23.75	8.07	12.68	17.25	85.59	19.21	70.32				
RANBAXY	7.92	20.46	21.24	8.48	45.58	9.44	8.75	34.24	36.12	11.84	9.71	7.82	21.31	40.78	33.08	42.35				
RELIANCE	10.72	9.63	22.92	10.20	17.85	19.27	27.05	28.83	25.82	4.14	10.68	6.46	27.99	55.32	36.29	66.50				
SBIN	5.78	6.93	21.67	14.94	15.12	15.91	28.03	22.20	29.06	17.02	17.09	8.42	37.40	41.29	28.02	79.37				
TATAPOWER	7.89	10.00	31.62	18.20	9.69	9.25	32.15	15.67	23.62	4.60	117.45	6.14	46.57	28.00	124.52	96.45				

*Of In (price)

**BPCL & started in 2002. So, for this company, pre-option period is Jan-Dec 2001. For all others, it is July 2000 to June 2001.

Table 4: Cointegration Between Futures, Option, and Spot: Using JJ (Including Linear Trend)

Index/Company	Periods	Unrestricted Cointegration Rank Test (Trace)				Unrestricted Cointegration Rank Test (Maximum Eigenvalue)			No of Co integrating equations
		No. of CE(s)	None	At most 1	At most 2	None	At most 1	At most 2	
Nifty	SP1	Eigenvalue	0.169	0.036	0.000	0.169	0.036	0.000	2
		Prob.**	0.000	0.001	0.666	0.000	0.001	0.666	
	SP2	Eigenvalue	0.042	0.006	0.001	0.042	0.006	0.001	1
		Prob.**	0.000	0.614	0.243	0.000	0.700	0.243	
	SP3	Eigenvalue	0.040	0.027	0.002	0.040	0.027	0.002	2
		Prob.**	0.000	0.000	0.124	0.000	0.000	0.124	
Whole Period	Eigenvalue	0.034	0.015	0.001	0.034	0.015	0.001	2	
	Prob.**	0.000	0.000	0.236	0.000	0.000	0.236		
ACC	SP1	Eigenvalue	0.148	0.050	0.001	0.148	0.050	0.001	2
		Prob.**	0.000	0.000	0.547	0.000	0.000	0.547	
	SP2	Eigenvalue	0.229	0.059	0.003	0.229	0.059	0.003	2
		Prob.**	0.000	0.000	0.171	0.000	0.000	0.171	
	SP3	Eigenvalue	0.146	0.031	0.003	0.146	0.031	0.003	2
		Prob.**	0.000	0.010	0.194	0.000	0.012	0.194	
Whole Period	Eigenvalue	0.096	0.037	0.000	0.096	0.037	0.000	2	
	Prob.**	0.000	0.000	0.591	0.000	0.000	0.591		
BHEL	SP1	Eigenvalue	0.163	0.088	0.002	0.163	0.088	0.002	2
		Prob.**	0.000	0.000	0.368	0.000	0.000	0.368	
	SP2	Eigenvalue	0.343	0.034	0.001	0.343	0.034	0.001	0
		Prob.**	0.177	0.996	0.833	0.030	0.993	0.833	
	SP3	Eigenvalue	0.134	0.029	0.000	0.134	0.029	0.000	2
		Prob.**	0.000	0.000	0.516	0.000	0.000	0.516	
Whole Period	Eigenvalue	0.118	0.044	0.002	0.118	0.044	0.002	2	
	Prob.**	0.000	0.000	0.132	0.000	0.000	0.132		
BPCL	SP1	Eigenvalue	0.178	0.068	0.002	0.178	0.068	0.002	2
		Prob.**	0.000	0.000	0.247	0.000	0.000	0.247	
	SP2	Eigenvalue	0.281	0.039	0.022	0.281	0.039	0.022	1
		Prob.**	0.026	0.796	0.177	0.006	0.926	0.177	
	SP3	Eigenvalue	0.186	0.112	0.003	0.186	0.112	0.003	2
		Prob.**	0.000	0.000	0.222	0.000	0.000	0.222	
Whole Period	Eigenvalue	0.168	0.074	0.002	0.168	0.074	0.002	2	
	Prob.**	0.000	0.000	0.092	0.000	0.000	0.092		
CIPLA	SP1	Eigenvalue	0.950	0.382	0.111	0.950	0.382	0.111	1
		Prob.**	0.000	0.190	0.135	0.000	0.275	0.135	
	SP2	Eigenvalue	0.178	0.072	0.007	0.178	0.072	0.007	2
		Prob.**	0.000	0.001	0.127	0.000	0.001	0.127	
	SP3	Eigenvalue	0.165	0.097	0.003	0.165	0.097	0.003	2
		Prob.**	0.000	0.000	0.123	0.000	0.000	0.123	
Whole Period	Eigenvalue	0.153	0.082	0.000	0.153	0.082	0.000	2	
	Prob.**	0.000	0.000	0.731	0.000	0.000	0.731		
HDFC	SP3	Eigenvalue	0.116	0.034	0.004	0.116	0.034	0.004	2
		Prob.**	0.000	0.000	0.080	0.000	0.000	0.080	
Whole Period	Eigenvalue	0.116	0.034	0.004	0.116	0.034	0.004	2	
	Prob.**	0.000	0.000	0.080	0.000	0.000	0.080		
ITC	SP1	Eigenvalue	0.163	0.057	0.007	0.163	0.057	0.007	0
		Prob.**	0.768	0.894	0.495	0.641	0.894	0.495	
	SP2	Eigenvalue	0.043	0.014	0.001	0.043	0.014	0.001	0
		Prob.**	0.995	0.993	0.742	0.975	0.991	0.742	
	SP3	Eigenvalue	0.120	0.029	0.001	0.120	0.029	0.001	1
		Prob.**	0.000	0.194	0.651	0.000	0.150	0.651	
Whole Period	Eigenvalue	0.058	0.023	0.002	0.058	0.023	0.002	1	
	Prob.**	0.000	0.065	0.324	0.000	0.060	0.324		

Ranbaxy	SP1	Eigenvalue	0.175	0.064	0.003	0.175	0.064	0.003	2
		Prob.**	0.000	0.000	0.226	0.000	0.000	0.226	
	SP2	Eigenvalue	0.125	0.045	0.003	0.125	0.045	0.003	2
		Prob.**	0.000	0.006	0.270	0.000	0.005	0.270	
	SP3	Eigenvalue	0.097	0.024	0.000	0.097	0.024	0.000	2
		Prob.**	0.000	0.001	0.525	0.000	0.001	0.525	
Whole Period	Eigenvalue	0.096	0.025	0.000	0.096	0.025	0.000	2	
	Prob.**	0.000	0.000	0.476	0.000	0.000	0.476		
Reliance	SP1	Eigenvalue	0.120	0.035	0.000	0.120	0.035	0.000	2
		Prob.**	0.000	0.001	0.629	0.000	0.001	0.629	
	SP2	Eigenvalue	0.132	0.061	0.000	0.132	0.061	0.000	2
		Prob.**	0.000	0.000	0.686	0.000	0.000	0.686	
	SP3	Eigenvalue	0.079	0.021	0.004	0.079	0.021	0.004	3
		Prob.**	0.000	0.000	0.024	0.000	0.001	0.024	
Whole Period	Eigenvalue	0.055	0.022	0.001	0.055	0.022	0.001	2	
	Prob.**	0.000	0.000	0.113	0.000	0.000	0.113		
SBI	SP1	Eigenvalue	0.142	0.060	0.000	0.142	0.060	0.000	2
		Prob.**	0.000	0.000	0.605	0.000	0.000	0.605	
	SP2	Eigenvalue	0.132	0.036	0.003	0.132	0.036	0.003	2
		Prob.**	0.000	0.000	0.117	0.000	0.000	0.117	
	SP3	Eigenvalue	0.102	0.027	0.003	0.102	0.027	0.003	2
		Prob.**	0.000	0.000	0.078	0.000	0.000	0.078	
Whole Period	Eigenvalue	0.060	0.034	0.001	0.060	0.034	0.001	2	
	Prob.**	0.000	0.000	0.223	0.000	0.000	0.223		
Tata Power	SP1	Eigenvalue	0.109	0.080	0.000	0.109	0.080	0.000	2
		Prob.**	0.000	0.000	0.591	0.000	0.000	0.591	
	SP2	Eigenvalue	0.110	0.016	0.006	0.110	0.016	0.006	0
		Prob.**	0.216	0.918	0.312	0.075	0.960	0.312	
	SP3	Eigenvalue	0.122	0.061	0.002	0.122	0.061	0.002	2
		Prob.**	0.000	0.000	0.337	0.000	0.000	0.337	
Whole Period	Eigenvalue	0.069	0.057	0.002	0.069	0.057	0.002	2	
	Prob.**	0.000	0.000	0.127	0.000	0.000	0.127		

**MacKinnon-Haug-Michelis (1999) p-values

Table-5: Causality Analysis: Sub-Periods*

Index/Company	SP-1					SP-2					SP-3						
	Obs	F-Statistic	Prob.	Causality	Obs	F-Statistic	Prob.	Causality	Obs	F-Statistic	Prob.	Causality	Obs	F-Statistic	Prob.	Causality	
NIFTY	O → F	3.960	0.020	O → F	O → F	3.116	0.045	O → F	F → O	1163	0.300	O → F	F → O	635	6.909	0.001	O → F
	F → O	124.622	0.000	S → F	F → O	74.818	0.000	S → F	F → O	1163	88.886	0.000	O → F	F → O	5.281	0.005	O → F
	S → F	7.138	0.001	S → F	F → O	1.389	0.250	S → F	F → O	1163	0.241	0.786	S → F	F → O	7.923	0.000	S → F
	F → S	1.856	0.157	S → O	F → O	0.217	0.805	S → O	F → O	635	0.614	0.541	S → O	F → O	0.614	0.541	S → O
	O → S	144.608	0.000	S → O	F → O	71.514	0.000	S → O	F → O	635	18.464	0.000	S → O	F → O	0.857	0.425	S → O
ACC	O → F	4.819	0.008	S → O	F → O	2.591	0.076	S → O	F → O	1163	89.987	0.000	S → O	F → O	0.144	0.866	S → O
	F → O	0.158	0.854	O → F	F → O	0.327	0.721	O → F	F → O	635	6.909	0.001	O → F	F → O	5.281	0.005	O → F
	S → F	3.242	0.006	S → F	F → O	19.541	0.000	S → F	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	6.352	0.002	S → F	F → O	1.323	0.267	S → F	F → O	635	0.614	0.541	S → F	F → O	0.614	0.541	S → F
	O → S	13.237	0.000	S → O	F → O	0.570	0.566	S → O	F → O	635	18.464	0.000	S → O	F → O	0.857	0.425	S → O
BHEL	O → F	7.974	0.000	S → O	F → O	0.537	0.585	S → O	F → O	1163	89.987	0.000	S → O	F → O	0.144	0.866	S → O
	F → O	0.752	0.472	O → F	F → O	0.340	0.713	O → F	F → O	635	6.909	0.001	O → F	F → O	5.281	0.005	O → F
	S → F	17.535	0.000	S → F	F → O	1.819	0.001	S → F	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	3.865	0.021	S → F	F → O	0.810	0.445	S → F	F → O	635	0.614	0.541	S → F	F → O	0.614	0.541	S → F
	O → S	3.745	0.024	S → O	F → O	1.463	0.232	S → O	F → O	635	18.464	0.000	S → O	F → O	0.857	0.425	S → O
BPCL	O → F	31.045	0.000	S → O	F → O	8.129	0.001	S → O	F → O	1163	89.987	0.000	S → O	F → O	0.144	0.866	S → O
	F → O	0.117	0.890	O → F	F → O	0.215	0.807	O → F	F → O	635	6.909	0.001	O → F	F → O	5.281	0.005	O → F
	S → F	5.846	0.003	O → F	F → O	0.328	0.721	O → F	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	33.447	0.000	S → F	F → O	3.706	0.028	S → F	F → O	635	0.614	0.541	S → F	F → O	0.614	0.541	S → F
	O → S	1.289	0.276	S → O	F → O	0.859	0.424	S → O	F → O	635	18.464	0.000	S → O	F → O	0.857	0.425	S → O
CIPLA	O → F	17.446	0.000	S → O	F → O	1.328	0.265	S → O	F → O	1163	89.987	0.000	S → O	F → O	0.144	0.866	S → O
	F → O	10.808	0.000	S → O	F → O	1.744	0.180	S → O	F → O	635	6.909	0.001	F → O	F → O	5.281	0.005	F → O
	S → F	3.330	0.037	S → F	F → O	0.624	0.538	S → F	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	0.087	0.917	O → F	F → O	0.070	0.933	O → F	F → O	635	0.614	0.541	F → S	F → O	0.614	0.541	F → S
	O → S	0.423	0.660	O → F	F → O	3.887	0.021	O → F	F → O	635	18.464	0.000	O → S	F → O	0.857	0.425	O → S
HDRC	O → F	0.539	0.583	S → F	F → O	0.218	0.804	S → F	F → O	1163	89.987	0.000	S → F	F → O	0.144	0.866	S → F
	F → O	0.015	0.985	S → F	F → O	2.502	0.083	S → F	F → O	635	0.614	0.541	F → O	F → O	5.281	0.005	F → O
	S → F	0.714	0.490	S → O	F → O	4.364	0.014	S → O	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	18.610	0.000	S → O	F → O	0.042	0.959	S → O	F → O	635	0.614	0.541	F → S	F → O	0.614	0.541	F → S
	O → S	0.250	0.482	S → O	F → O	2.873	0.058	S → O	F → O	635	18.464	0.000	O → S	F → O	0.857	0.425	O → S
ITC	O → F	1.383	0.267	S → O	F → O	0.150	0.878	S → O	F → O	1163	89.987	0.000	S → O	F → O	0.144	0.866	S → O
	F → O	3.573	0.031	O → F	F → O	0.155	0.856	O → F	F → O	635	6.909	0.001	F → O	F → O	5.281	0.005	F → O
	S → F	1.256	0.289	S → F	F → O	8.463	0.000	S → F	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	1.005	0.366	S → F	F → O	0.221	0.801	S → F	F → O	635	0.614	0.541	F → S	F → O	0.614	0.541	F → S
	O → S	0.525	0.592	S → O	F → O	0.008	0.992	S → O	F → O	635	18.464	0.000	O → S	F → O	0.857	0.425	O → S
RANBAXY	O → F	0.901	0.409	S → O	F → O	4.364	0.014	S → O	F → O	1163	89.987	0.000	S → O	F → O	0.144	0.866	S → O
	F → O	0.680	0.507	O → F	F → O	0.476	0.622	O → F	F → O	635	6.909	0.001	F → O	F → O	5.281	0.005	F → O
	S → F	22.091	0.000	S → F	F → O	14.246	0.000	S → F	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	0.516	0.597	S → F	F → O	0.706	0.494	S → F	F → O	635	0.614	0.541	F → S	F → O	0.614	0.541	F → S
	O → S	0.714	0.490	S → O	F → O	0.145	0.865	S → O	F → O	635	18.464	0.000	O → S	F → O	0.857	0.425	O → S
RELIANCE	O → F	18.610	0.000	S → O	F → O	11.122	0.000	S → O	F → O	1163	89.987	0.000	S → O	F → O	0.144	0.866	S → O
	F → O	0.282	0.755	O → F	F → O	0.794	0.453	O → F	F → O	635	6.909	0.001	F → O	F → O	5.281	0.005	F → O
	S → F	1.800	0.166	O → F	F → O	0.419	0.658	O → F	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	5.706	0.004	S → F	F → O	4.069	0.017	S → F	F → O	635	0.614	0.541	F → S	F → O	0.614	0.541	F → S
	O → S	0.909	0.404	S → O	F → O	0.762	0.467	S → O	F → O	635	18.464	0.000	O → S	F → O	0.857	0.425	O → S
SBI	O → F	2.584	0.076	S → F	F → O	0.364	0.695	S → F	F → O	1163	89.987	0.000	S → F	F → O	0.144	0.866	S → F
	F → O	3.377	0.035	S → F	F → O	4.238	0.015	S → F	F → O	635	6.909	0.001	F → O	F → O	5.281	0.005	F → O
	S → F	3.377	0.035	S → O	F → O	4.238	0.015	S → O	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	0.436	0.647	S → O	F → O	0.557	0.573	S → O	F → O	635	0.614	0.541	F → S	F → O	0.614	0.541	F → S
	O → S	1.920	0.147	O → F	F → O	1.808	0.165	O → F	F → O	635	18.464	0.000	O → S	F → O	0.857	0.425	O → S
TATAPOWER	O → F	3.930	0.020	O → F	F → O	11.275	0.000	O → F	F → O	1163	89.987	0.000	O → F	F → O	0.144	0.866	O → F
	F → O	2.317	0.099	S → F	F → O	1.627	0.197	S → F	F → O	635	6.909	0.001	F → O	F → O	5.281	0.005	F → O
	S → F	3.922	0.020	S → F	F → O	0.836	0.434	S → F	F → O	1163	88.886	0.000	S → F	F → O	7.923	0.000	S → F
	F → S	3.607	0.028	S → O	F → O	12.599	0.000	S → O	F → O	635	0.614	0.541	F → S	F → O	0.614	0.541	F → S
	O → S	1.631	0.196	S → O	F → O	1.958	0.142	S → O	F → O	635	18.464	0.000	O → S	F → O	0.857	0.425	O → S

Table-6: Overall Causality Directions: Sub-Periods*

	<u>SP-1</u>	<u>SP-2</u>	<u>SP-3</u>
Panel-A			
O	2	0	4
F	7	9	5
F	9	9	11
S	4	0	6
F	5	3	3
F	11	17	11
S	6	8	9
O	2	0	1
O	10	10	10
Missing Data	4	4	0
TOTAL	60	60	60
Panel-B			
O → F	1	0	2
O ← F	6	9	3
O ↔ F	1	0	2
O ↑ F	1	0	3
S → F	1	0	6
S ← F	2	3	3
S ↔ F	3	0	0
S ↑ F	4	7	1
S → O	5	8	8
S ← O	1	0	0
S ↔ O	1	0	1
S ↑ O	2	1	1
Missing Contracts	2	2	0
TOTAL	30	30	30
Panel-C			
S causes F or O	10	8	15
F causes S or O	12	12	8
O causes S or F	4	0	5
No causality	30	36	32
Missing Data	4	4	0
TOTAL	60	60	60
Panel-D			
Only S causes F or O	6	8	14
Only F causes S or O	8	12	6
Only O causes S or F	2	0	2
S bidirectional with F & O	4	4	1
F bidirectional with S & O	4	0	2
O bidirectional with S & F	2	0	3
F, S, and O are Independent	7	8	5
SUBTOTAL	28	28	30
Missing No of Contracts	2	2	0
TOTAL No of Contracts	30	30	30

* Symbol Meaning

- Causes
- ← Is caused by
- ↔ Bidirectional Causality
- ↑ Are independent

Table-7: Causality Analysis, Directions, and Dominance: Full-Period*

Panel-A	SPI+SP2+SP3			Whole Period							
	Index/Company	Relative Relationship	Overall Observation	Dominance	Causes(\rightarrow)	Obs	F-Statistic	Prob.	Causality	Dominance	
NIFTY		F shows increasing dominance over O over time	PD stopped in O but continued in S & F, but they became independent	Dominance of S and F increased	O	F	2788	0.011	0.989	O \leftarrow F	S dominates F & O, and F dominates O
					F	O	2788	250.267	0.000	S \rightarrow F	
					S	F	2788	6.109	0.002	S \rightarrow F	
					F	S		0.298	0.742		
					S	O	2870	263.602	0.000	S \rightarrow O	
					O	S		0.138	0.871		
ACC		F shows decreasing dominance over O over time	S started feeding O instead of the reverse, O started feeding F, but F stopped feeding S	Dominance of S increased	O	F	1959	2.827	0.059	O \leftrightarrow F	All bidirectional causality
					F	O	2788	24.183	0.000	S \leftrightarrow F	
					S	F	2788	3.215	0.040	S \leftrightarrow F	
					F	S		5.117	0.006		
					S	O	2041	23.257	0.000	S \leftrightarrow O	
					O	S		5.245	0.005		
BHEL		F shows decreasing dominance over O over time	O started feeding S, S continued feeding F, and O started feeding F	Dominance of O increased	O	F	1543	3.665	0.026	O \leftrightarrow F	All bidirectional causality
					F	O	2788	4.331	0.013	S \rightarrow F	
					S	F	2788	13.535	0.000	S \rightarrow F	
					F	S		0.508	0.602		
					S	O	1560	16.452	0.000	S \leftrightarrow O	
					O	S		2.951	0.053		
BPCL		F shows increasing dominance over O over time	O stopped feeding S and F	Dominance of O decreased	O	F	1293	0.719	0.488	O \leftarrow F	All bidirectional causality
					F	O		32.585	0.000		

CIPLA	F shows increasing dominance over S over time	S	F	2746	1.051	0.350	S ← F	
	S shows increasing dominance over O over time	F	S	17.141	0.000			
	F shows increasing dominance over O over time	S	O	1293	13.480	0.000	S ↔ O	
	F and S started feeding O, and F started feeding S	O	S	3.969	0.019			S & F are independent but dominate O
HDFC	F shows increasing dominance over S over time	O	F	1175	0.051	0.951	O ← F	
	S shows increasing dominance over O over time	F	O	18.767	0.000			
	O and F became more independent over time	S	F	2788	0.474	0.623	S ↓ F	
	S shows increasing dominance over O over time	F	S	1.835	0.160			
ITC	F shows increasing dominance over S over time	S	O	1180	14.653	0.000	S → O	
	S shows increasing dominance over O over time	O	S	0.313	0.731			
	S shows increasing dominance over F over time	O	F	881	0.614	0.541	O ↑ F	O & F are independent but dominated by S
	S shows increasing dominance over O over time	F	O	0.821	0.440			
ITC	F shows decreasing dominance over O over time	S	F	2788	7.117	0.001	S → F	
	S started feeding F, and O continued feeding F	F	S	0.046	0.955			
	S shows increasing dominance over F over time	S	O	881	4.243	0.015	S → O	
	F shows decreasing dominance over O over time	O	S	0.250	0.779			S dominates O but is independent of F; F & O affect each other
ITC	F shows decreasing dominance over O over time	O	F	914	4.335	0.013	O ↔ F	
	S shows increasing dominance over F over time	F	O	5.645	0.004			
	S shows increasing dominance over F over time	S	F	2788	2.249	0.106	S ↓ F	
	S shows increasing dominance over O over time	F	S	0.017	0.984			
ITC	S shows increasing dominance over O over time	S	O	936	15.293	0.000	S → O	
		O	S	1.007	0.366			

RANBAXY	F shows decreasing dominance over O over time	PD Continued in S & F, but they remained independent	Dominance of S and F continued	O	→	F	2181	2.236	0.107	O ← F	S & F are independent but dominate O
	S and F became more independent over time			F	→	O		57.166	0.000		
				S		F	2788	0.728	0.483	S ↑ F	
	S shows increasing dominance over O over time			F		S		0.285	0.752		
				S	→	O	2250	87.594	0.000	S → O	
				O		S		1.166	0.312		
RELIANCE	O and F became more independent over time	PD Continued in S, but stopped in F	Dominance of S increased but F decreased	O		F	2775	0.403	0.668	O ← F	S dominates F & O, and F dominates O
	S shows increasing dominance over F over time			F	→	O		5.916	0.003		
				S	→	F	2788	12.216	0.000	S → F	
	S shows increasing dominance over O over time			F		S		2.138	0.118		
				S	→	O	2857	22.787	0.000	S → O	
				O		S		1.048	0.351		
SBI	F shows decreasing dominance over O over time	PD Continued in S, and started in O	Dominance of S and O increased but F decreased	O	→	F	2693	5.146	0.006	O ↔ F	S dominates F & O, and F and O cause each other
	S shows increasing dominance over F over time			F	→	O		12.282	0.000		
				S	→	F	2788	36.410	0.000	S → F	
	S shows increasing dominance over O over time			F		S		1.770	0.170		
				S	→	O	2698	51.913	0.000	S → O	
				O		S		0.879	0.415		
TATAPOWER	O and F became more independent over time	Dominance of S and F over O reduced, but F started dominating S	Dominance of S reduced	O		F	1316	1.905	0.149	O ← F	F dominates S & O, and S dominates O
	F shows increasing dominance over S over time			F	→	O		4.846	0.008		
				S		F	2788	0.334	0.716	S ← F	
	S and O became more independent over time			F	→	S		2.786	0.062		
				S	→	O	1325	2.730	0.066	S → O	
				O		S					

TOTAL	30	Independence	4
		TOTAL	30

Panel-F

- Dominance of Option Continued
- Dominance of Option Increased
- Dominance of Option Decreased
- Dominance of Futures Continued
- Dominance of Futures Increased
- Dominance of Futures Decreased
- Dominance of Spot Continued
- Dominance of Spot Increased**
- Dominance of Spot Decreased

0
2
1
1
1
2
1
5
1

* Symbols Used

-
- ←
- ↔
- ↕

TABLE-8: VAR Analysis

Index/Company	Full Period						SP-1			SP-2			SP-3				
	Futures		Option		Spot	Futures	Option		Spot	Futures	Option		Spot	Futures	Option		Spot
Nifty	F(-1)	-0.381578*	0.252578	0.031908	-0.40049*	0.170985	-0.082881	-0.339652*	0.647417*	0.115687	-0.130056	0.054314	0.322049	-0.130056	0.054314	0.322049	
	F(-2)	-0.238365*	0.027891	-0.059677	-0.431827*	-0.201677	-0.212799	-0.125147	0.136513	0.038878	-0.126046	0.227405	0.044581	-0.126046	0.227405	0.044581	
	O(-1)	-0.000687	-0.604498*	-0.000205	-0.196455*	-0.79754*	-0.169732*	0.066025*	-0.498555*	0.058120*	-0.015601	-0.632274*	-0.012825	-0.015601	-0.632274*	-0.012825	
	O(-2)	-0.002151	-0.289498*	-0.005071	-0.05305	-0.292087*	-0.079815	0.008678	-0.211815*	0.004274	-0.001753	-0.32781*	-0.00202	-0.001753	-0.32781*	-0.00202	
	S(-1)	0.427240*	0.466578*	0.032684	0.631231*	0.808943*	0.317877*	0.306368	0.021667	-0.120209	0.179989	0.607981	-0.263249	0.179989	0.607981	-0.263249	
	S(-2)	0.199751*	0.303339*	0.024109	0.388080*	0.470584*	0.182163	0.106396	0.150954	-0.051276	0.100993	0.153032	-0.065896	0.100993	0.153032	-0.065896	
	C	0.000603	0.000515	0.000587	0.000682	0.000528	0.000673	0.001072*	0.000516	0.001046*	0.000206	0.000473	0.000188	0.000206	0.000473	0.000188	
ACC	F(-1)	-0.2389*	0.253069*	0.217640*	0.622284*	1.126477*	1.000626*	-0.140843	0.577811*	0.170729	-0.554621*	-0.112107	-0.039613	-0.554621*	-0.112107	-0.039613	
	F(-2)	-0.178861*	0.161837	0.037890	-0.050793	0.147419	0.119828	-0.337012	0.186804	-0.185197	-0.096233	0.190510	0.181508	-0.096233	0.190510	0.181508	
	O(-1)	0.126336*	-0.417154*	0.078436	0.131088	-0.470432*	0.072781	0.075588	-0.513639*	0.067670	0.124811	-0.343544*	0.065451	0.124811	-0.343544*	0.065451	
	O(-2)	0.019431	-0.380201*	-0.002144	0.026768	-0.245268	0.013981	0.012237	-0.465197*	0.066520	-0.046348	-0.414941*	-0.175034*	-0.046348	-0.414941*	-0.175034*	
	S(-1)	0.152594*	0.198427*	-0.267461*	-0.754049*	-0.656033*	-1.071636*	0.120547	-0.05196	-0.188509	0.482251*	0.546037*	-0.011584	0.482251*	0.546037*	-0.011584	
	S(-2)	0.117305	0.185479*	-0.087192	-0.07168	0.016935	-0.22357	0.317967	0.295649	0.108143	0.201974*	0.255145*	0.005619	0.201974*	0.255145*	0.005619	
	C	0.001004	0.001016	0.001090	0.000683	0.000680	0.000682	0.001873*	0.001985*	0.001966*	0.000395	0.000370	0.000583	0.000395	0.000370	0.000583	
BHCL	F(-1)	-0.703088*	-0.179744	-0.147156	-0.320581*	0.154797	-0.022303	0.075935	0.374397	0.791367*	-0.754778*	-0.25962	-0.139193	-0.754778*	-0.25962	-0.139193	
	F(-2)	-0.295929*	0.006021	-0.05618	-0.229101	-0.266363	-0.360921*	-0.997644*	-0.82311	-0.601484	-0.489894*	-0.110088	-0.157429	-0.489894*	-0.110088	-0.157429	
	O(-1)	0.019146	-0.536192*	0.049967	0.015967	-0.630858*	0.068039	-0.063808	-0.717248*	-0.067885	-0.027344	-0.454768*	0.002072	-0.027344	-0.454768*	0.002072	
	O(-2)	0.299343*	-0.071468	0.291570*	0.073139	-0.264544*	0.121541	0.055431	-0.410793*	-0.013446	0.641553*	0.258106	0.585516*	0.641553*	0.258106	0.585516*	
	S(-1)	0.690892*	0.726370*	0.106017	0.297385	0.490226*	-0.038587	0.166992	0.430561	-0.511697	0.788188*	0.724738*	0.144399	0.788188*	0.724738*	0.144399	
	S(-2)	0.004747	0.078079	-0.223519	0.164235	0.539435*	0.213405	0.729671*	1.016363*	0.407649	-0.14222	-0.135239	-0.413288*	-0.14222	-0.135239	-0.413288*	
	C	-0.001101	-0.000914	-0.001064	0.001634	0.002211*	0.001759*	0.002946	0.004441*	0.002993	-0.00275	-0.002803	-0.00273	-0.00275	-0.002803	-0.00273	
BPCL	F(-1)	0.149265	0.925342*	0.636667*	0.295266*	1.065860*	0.742043*	0.442032	1.468363*	0.687135	0.448128	1.002644*	0.794098	0.448128	1.002644*	0.794098	
	F(-2)	-0.178198	0.178487	0.070927	-0.415812*	0.069539	-0.135514	0.312715	0.657786	0.323045	0.733030	0.729809	0.798855	0.733030	0.729809	0.798855	
	O(-1)	-0.083922	-0.706475*	-0.014765	-0.299454*	-0.926694*	-0.149654	0.139866	-0.45756*	0.147543	0.083534	-0.529998*	0.069034	0.083534	-0.529998*	0.069034	
	O(-2)	0.008899	-0.317902*	0.027921	0.143380	-0.296217*	0.161362	0.048600	-0.252678	0.045731	-0.126456	-0.309371*	-0.118122	-0.126456	-0.309371*	-0.118122	
	S(-1)	-0.065637	-0.191222	-0.615684*	0.045057	-0.074621	-0.555046*	-0.642165	-0.983832*	-0.894679	-0.527687	-0.449626	-0.857394*	-0.527687	-0.449626	-0.857394*	
	S(-2)	0.150868	0.145628	-0.104819	0.230576*	0.233416*	-0.038186	-0.385248	-0.387894	-0.421523	-0.596955	-0.403465	-0.670244	-0.596955	-0.403465	-0.670244	
	C	-0.00051	-0.000458	-0.00033	-0.000498	-0.00049	-0.000275	0.001211	0.001517	0.001638	-0.000648	-0.000687	-0.0006	-0.000648	-0.000687	-0.0006	
CIPLA	F(-1)	0.401087	0.990498*	0.852341*	0.480509	0.090400	0.051760	0.773485	1.242223	1.285905	0.053525	0.784918*	0.485089*	0.053525	0.784918*	0.485089*	
	F(-2)	0.176692	0.334746	0.311227	2.608630	1.784877	2.035807	0.237306	0.293206	0.360816	0.187137	0.439222*	0.329632	0.187137	0.439222*	0.329632	
	O(-1)	-0.030462	-0.718356*	-0.046023	-0.222943	-0.578287	-0.227722	-0.057291	-0.727983*	-0.08618	-0.055463	-0.751798*	-0.050321	-0.055463	-0.751798*	-0.050321	
	O(-2)	0.003780	-0.274591*	0.001372	0.794522	0.878231	0.717835	0.033327	-0.245931	0.029321	-0.073572	-0.337907*	-0.073772	-0.073572	-0.337907*	-0.073772	
	S(-1)	-0.323996	-0.232602	-0.756266*	-0.214181	0.561242	0.252407	-0.660782	-0.470174	-1.143655	-0.035837	-0.048386	-0.45969*	-0.035837	-0.048386	-0.45969*	
	S(-2)	-0.207506	-0.071566	-0.344991	-2.872082	-2.134495	-2.211025	-0.303455	-0.063688	-0.425937	-0.138296	-0.10538	-0.296928	-0.138296	-0.10538	-0.296928	
	C	0.000112	4.02E-05	7.88E-05	0.005565	0.004407	0.004499	-0.001303	-0.001267	-0.00123	0.000603	0.000476	0.000531	0.000603	0.000476	0.000531	

HDFC	F(-1)	-0.677057*	-0.165406	-0.677057*	-0.165406	-0.100467	-0.100467
	F(-2)	-0.423512	-0.153491	-0.423512	-0.153491	-0.213972	-0.213972
	O(-1)	-0.032592	-0.620933*	-0.032592	-0.620933*	-0.045099	-0.045099
	O(-2)	0.215066	-0.113493	0.215066	-0.113493	0.199063	0.199063
	S(-1)	0.686201*	0.762133*	0.686201*	0.762133*	0.115192	0.115192
	S(-2)	0.215705	0.270228	0.215705	0.270228	0.015399	0.015399
	C	-0.0008	-0.000875	-0.0008	-0.000875	-0.00084	-0.00084
	F(-1)	-0.765137*	-0.127765	-0.226866*	-0.226866*	-0.326303	-0.326303
	F(-2)	-0.320092*	0.069514	-0.212299	-0.936809*	-0.840052*	-0.564879
	O(-1)	0.166107*	-0.430392*	0.107203	0.475539*	0.519853*	0.241219
O(-2)	0.038440	-0.305576*	-0.01927	0.253723*	0.109147	0.228667	
S(-1)	0.588519*	0.575746*	0.087986	0.184119	0.178166	-0.152828	
S(-2)	0.211389*	0.202381*	0.140815	0.401609	0.314196	0.475007	
C	0.000558	0.000216	0.000871	7.15E-07	-0.000468	1.86E-05	
ITC	F(-1)	-0.765137*	-0.127765	-0.226866*	-0.226866*	-0.326303	-0.326303
	F(-2)	-0.320092*	0.069514	-0.212299	-0.936809*	-0.840052*	-0.564879
	O(-1)	0.166107*	-0.430392*	0.107203	0.475539*	0.519853*	0.241219
	O(-2)	0.038440	-0.305576*	-0.01927	0.253723*	0.109147	0.228667
	S(-1)	0.588519*	0.575746*	0.087986	0.184119	0.178166	-0.152828
	S(-2)	0.211389*	0.202381*	0.140815	0.401609	0.314196	0.475007
	C	0.000558	0.000216	0.000871	7.15E-07	-0.000468	1.86E-05
	F(-1)	0.083740	0.131517*	0.127353	0.459695	1.040209*	0.741698*
	F(-2)	0.058062	0.053861	0.015018	-0.314106	0.025843	-0.173824
	O(-1)	-0.1198*	-0.736479*	-0.095539	-0.150736	-0.913803*	-0.192415
O(-2)	-0.133565*	-0.347643*	-0.093113	-0.037965	-0.522086*	-0.095833	
S(-1)	0.082130	0.659268*	0.025022	-0.254674	-0.078521	-0.483221	
S(-2)	0.094359	0.342600*	0.095200	0.356477	0.511055	0.270512	
C	-0.0000313	5.24E-05	-0.00000498	0.000338	0.000368	0.000363	
Rabnaxy	F(-1)	0.083740	0.131517*	0.127353	0.459695	1.040209*	0.741698*
	F(-2)	0.058062	0.053861	0.015018	-0.314106	0.025843	-0.173824
	O(-1)	-0.1198*	-0.736479*	-0.095539	-0.150736	-0.913803*	-0.192415
	O(-2)	-0.133565*	-0.347643*	-0.093113	-0.037965	-0.522086*	-0.095833
	S(-1)	0.082130	0.659268*	0.025022	-0.254674	-0.078521	-0.483221
	S(-2)	0.094359	0.342600*	0.095200	0.356477	0.511055	0.270512
	C	-0.0000313	5.24E-05	-0.00000498	0.000338	0.000368	0.000363
	F(-1)	-0.327364*	0.189372	0.246759*	0.280127	0.783627*	0.587703*
	F(-2)	-0.24833*	-0.039171	-0.044394	-0.504127*	-0.214285	-0.297747
	O(-1)	-0.193974	-0.761733*	-0.221959	-0.171007	-0.682426*	-0.190934
O(-2)	-0.05325	-0.304119*	-0.120098	0.293621	-0.007072	0.226923	
S(-1)	0.548192*	0.600479*	0.003470	-0.108455	-0.099935	-0.390337*	
S(-2)	0.287550*	0.333655*	0.137700	0.145029	0.162228	-0.004514	
C	0.000349	0.000342	0.000342	0.000747	0.000749	0.000760	
Reliance	F(-1)	-0.327364*	0.189372	0.246759*	0.280127	0.783627*	0.587703*
	F(-2)	-0.24833*	-0.039171	-0.044394	-0.504127*	-0.214285	-0.297747
	O(-1)	-0.193974	-0.761733*	-0.221959	-0.171007	-0.682426*	-0.190934
	O(-2)	-0.05325	-0.304119*	-0.120098	0.293621	-0.007072	0.226923
	S(-1)	0.548192*	0.600479*	0.003470	-0.108455	-0.099935	-0.390337*
	S(-2)	0.287550*	0.333655*	0.137700	0.145029	0.162228	-0.004514
	C	0.000349	0.000342	0.000342	0.000747	0.000749	0.000760
	F(-1)	-0.625943*	-0.082506	-0.154421	-0.283613	0.288007	0.056720
	F(-2)	-0.328907*	-0.104483	-0.163293*	-0.883507*	-0.72308*	-0.685981*
	O(-1)	0.046068	-0.546543*	0.048865	0.301675*	-0.348485*	0.252719
O(-2)	0.033878	-0.268607*	-0.005844	0.203155	-0.130241	0.163980	
S(-1)	0.666414*	0.721016*	0.188124*	0.055641	0.129395	-0.246883	
S(-2)	0.269950*	0.378672*	0.130045	0.570969*	0.792953*	0.412961*	
C	0.000760	0.000700	0.000797	0.000975	0.000952	0.001015	
SBI	F(-1)	-0.625943*	-0.082506	-0.154421	-0.283613	0.288007	0.056720
	F(-2)	-0.328907*	-0.104483	-0.163293*	-0.883507*	-0.72308*	-0.685981*
	O(-1)	0.046068	-0.546543*	0.048865	0.301675*	-0.348485*	0.252719
	O(-2)	0.033878	-0.268607*	-0.005844	0.203155	-0.130241	0.163980
	S(-1)	0.666414*	0.721016*	0.188124*	0.055641	0.129395	-0.246883
	S(-2)	0.269950*	0.378672*	0.130045	0.570969*	0.792953*	0.412961*
	C	0.000760	0.000700	0.000797	0.000975	0.000952	0.001015
	F(-1)	0.049144	0.602822	0.264646	0.187040	0.675316*	0.314254
	F(-2)	0.923037*	1.224639*	0.942082*	-0.001048	0.290788	0.050336
	O(-1)	0.142091	-0.59059*	0.136012	-0.01861	-0.621725*	-0.040306
O(-2)	-0.229412	-0.502642*	-0.236564	0.049998	-0.191884	0.010356	
S(-1)	-0.206091	-0.014545	-0.415592	-0.07005	0.093726	-0.153574	
S(-2)	-0.695355	-0.717667	-0.708273	-0.131703	-0.174117	-0.160131	
C	-0.000573	-0.000384	-0.000607	0.001598*	0.001518	0.001610*	
Tata Power	F(-1)	0.049144	0.602822	0.264646	0.187040	0.675316*	0.314254
	F(-2)	0.923037*	1.224639*	0.942082*	-0.001048	0.290788	0.050336
	O(-1)	0.142091	-0.59059*	0.136012	-0.01861	-0.621725*	-0.040306
	O(-2)	-0.229412	-0.502642*	-0.236564	0.049998	-0.191884	0.010356
	S(-1)	-0.206091	-0.014545	-0.415592	-0.07005	0.093726	-0.153574
	S(-2)	-0.695355	-0.717667	-0.708273	-0.131703	-0.174117	-0.160131
	C	-0.000573	-0.000384	-0.000607	0.001598*	0.001518	0.001610*
	F(-1)	0.632587	1.247388	0.632587	-0.649888*	-0.09197	-0.507019
	F(-2)	3.194609*	3.349441*	3.194609*	-0.341836	0.156666	-0.444016
	O(-1)	0.354709	-0.415788	0.354709	0.194891	-0.619379*	0.224020
O(-2)	-0.541348	-0.881565*	-0.541348	0.214215	0.009375	0.272628*	
S(-1)	-1.004152	-0.839559	-1.004152	0.377673	0.732541*	0.190139	
S(-2)	-2.661725*	-2.469928*	-2.661725*	0.189961	-0.16048	0.220520	
C	-0.003962	-0.003757	-0.003962	0.000567	0.001198	0.000438	

TABLE-9: VAR Analysis Summary

	<u>Full Period</u>	<u>SP-1</u>	<u>SP-2</u>	<u>SP-3</u>
Past Futures Affects Current Futures	7	6	2	6
Past Futures Affects Current Option	5	6	4	4
Past Futures Affects Current Spot	7	7	1	4
Past Option Affects Current Futures	4	3	0	2
Past Option Affects Current Option	10	7	9	10
Past Option Affects Current Spot	1	1	1	3
Past Spot Affects Current Futures	6	3	1	8
Past Spot Affects Current Option	7	4	4	8
Past Spot Affects Current Spot	4	4	1	6
Past Does Not Affect Current	39	49	67	39
TOTAL	90	90	90	90

Table 10: Trade Value (Rupees Crore)

Stocks -->	NIFTY	ACC	BHEL	BPCL	CIPLA	HDFC	ITC	RANBAXY	RELIANCE	SBIN	TATAPOWER
Spot											
2001	2866.73	27.38	6.23		7.04	2.55	28.28	33.49	61.54	5.95	2.28
2002	2487.35	12.88	9.56	37.86	4.05	3.63	20.32	27.58	91.55	19.55	3.29
2003	3574.34	40.28	21.49	39.61	9.65	9.09	25.19	55.51	198.16	136.55	20.54
2004	4626.61	61.69	39.98	37.04	12.90	19.91	36.08	50.35	349.29	223.19	64.25
2005	5530.37	40.09	26.95	17.64	20.14	34.51	75.61	57.77	377.14	193.37	22.48
2006	7664.91	108.48	84.68	16.97	49.49	61.52	105.40	57.96	519.16	147.71	19.00
2007	12425.63	80.34	173.93	18.54	32.18	121.12	95.95	44.86	584.03	224.29	59.91
2008	12961.42	30.89	257.04	24.38	25.13	242.91	111.80	112.59	869.07	269.71	82.75
2009	15687.37	42.69	201.39	34.39	42.42	229.63	110.47	60.60	751.73	422.04	57.76
2010	14513.97	39.06	128.86	71.50	44.81	185.34	105.17	57.06	493.09	454.36	44.64
2011	11187.36	29.03	130.07	33.34	38.97	173.17	138.96	38.62	392.34	545.55	33.91
2012	11193.03	44.31	121.32	34.58	53.57	254.72	155.54	39.31	271.76	557.25	36.71
Futures											
2001	41.04	8.01	1.38		0.35	0.07	2.94	5.49	8.35	1.13	0.89
2002	45.82	6.67	5.02	20.43	0.78	0.19	5.62	10.84	28.39	10.07	2.82
2003	384.83	43.03	24.48	28.33	6.59	2.17	13.98	60.68	107.16	126.04	33.49
2004	1063.10	89.00	35.67	25.58	12.33	7.37	24.13	46.37	245.49	191.97	75.95
2005	1625.24	76.49	35.58	15.70	24.81	14.37	49.82	43.46	348.51	268.11	31.63
2006	3085.34	190.48	118.16	18.12	65.83	27.27	79.85	45.77	538.65	285.18	33.98
2007	4468.63	117.94	128.35	22.44	31.95	42.90	61.20	53.25	599.98	388.04	53.10
2008	5178.75	22.38	94.67	16.11	17.38	67.50	59.18	84.61	506.18	244.54	43.63
2009	4574.59	39.41	119.02	25.73	30.92	99.66	62.16	41.70	431.34	262.37	35.98
2010	4620.88	43.34	92.17	68.47	43.12	96.84	64.97	49.62	284.36	305.01	31.39
2011	4420.70	26.40	76.10	0.00	0.00	88.68	75.14	0.00	204.62	337.01	0.00
2012	2830.23	34.12	83.91	28.16	37.80	97.68	72.95	36.74	135.37	378.13	22.61
Option											
2001	1.83	0.63	0.15		0.07	0.02	0.17	0.52	0.61	0.12	0.13
2002	2.42	0.50	0.30	1.11	0.07	0.03	0.28	0.49	1.46	0.71	0.24
2003	7.35	1.06	0.57	0.92	0.10	0.16	0.38	1.18	2.80	3.96	0.83
2004	14.62	1.52	0.35	0.28	0.38	0.57	0.37	0.69	3.33	2.06	0.93
2005	35.74	1.60	0.17	0.14	0.37	0.20	0.69	0.29	5.79	3.44	0.31
2006	80.99	1.10	0.37	0.22	0.57	0.63	1.11	0.43	8.13	3.47	0.37
2007	138.21	0.47	0.24	0.17	0.41	0.19	1.16	0.51	8.64	3.69	0.14
2008	204.48	0.09	0.69	0.11	0.14	1.05	0.59	2.20	5.23	1.15	0.60
2009	351.83	0.20	0.88	0.19	0.38	0.58	0.90	0.58	8.36	2.45	0.48
2010	792.59	0.30	1.14	1.44	0.95	0.86	1.59	1.08	11.40	9.00	0.21
2011	996.55	0.26	1.45	0.50	0.56	1.65	3.21	0.82	8.21	12.43	0.16
2012	932.42	1.21	3.36	0.76	1.99	3.58	3.99	1.67	11.52	28.86	0.62



SECURITIES AND EXCHANGE BOARD OF INDIA

Head Office

SEBI Bhavan, Plot No. C4-A, "G" Block, Bandra Kurla Complex, Bandra (E), Mumbai - 400 051.

Website : <http://www.sebi.gov.in>