

Development of equity capital market for MSMEs in India: an econometrics perspective

Nihar Ranjan Jena, Lina R Thatte

*K.E.T.'s V.G. Vaze College of Arts, Science & Commerce, Mumbai 400081, India
lthatte@gmail.com, nihar1915@gmail.com*

Abstract

Objectives: To assess the state of SME equity capital market in India and to assess the impact of international SME equity markets on Indian SME market

Method/Statistical Analysis: In order to assess the state of SME equity market in India, its performance has been compared with the performance of international SME equity markets. For this purpose information on stock indices of different SME equity stock indices have been sourced for the period October 1, 2012 to March 31, 2017. Moreover, the ratio of number of companies listed on the SME platform and the number of companies listed on the main exchange has been used as a tool for measuring the depth of an SME trading platform. For studying the interaction between the Indian SME stock market and the international SME stock markets, the Autoregressive Conditional Heteroscedasticity Mean (ARCH-M) model has been employed.

Findings: The study reveals that since its inception in the year 2012, the BSE SME market has been able to make a mark for itself. During the reference period, the performance of the market is impressive and much better compared to other international SME equity capital markets. However, international SME equity capital markets are more entrenched than the Indian SME equity capital market as measured by the ratio of number of companies listed on the SME platform and the number of companies listed on the main exchange. Regarding the interaction between the Indian and International SME equity markets, we ascertained that while volatility in Kosdaq and Chinext have negative impacts, volatility in Mothers and TSXV markets have positive impacts on volatility in BSE SME market. Moreover the impact of other two SME equity markets like, AlterNext and FirstNorth on BSE SME are statistically insignificant. We also ascertained that the BSE SME market is a risky market and the findings are statistically significant.

Application/Improvements: Considering the fact that the BSE SME is in its initial years of growth and far from being mature and well entrenched, the policy makers in active coordination with the capital market regulator may take necessary steps in further deepening of the BSE SME trading platform. Further, it would be beneficial for the SMEs in India if the SME trading platform is developed as a multilateral trade facility (MTF) rather than as a regulated market. Sectoral analysis of companies listed on BSE SME can be an area of further research.

Keywords: Stock exchange, SME Equity Capital Market, ARCH-M Model, ARCH Effect, GARCH Model, Volatility Clustering

1. Introduction

India is poised for rapid economic growth in the coming times owing to a very large domestic market, an ever increasing middle class coupled with a huge working force and a progressive self-critic political structure. Very often than not these three virtues of the Indian economy are represented by the famous 3Ds; demand, demography and democracy. In its march towards an inclusive growth model, the micro, small and medium enterprises are poised for a very important role in the Indian economy given their ability to employ large workforce, bridge inequality, creation of employment opportunities and eradication of poverty.

Therefore, it is extremely important that the MSME segment is facilitated to grow and flourish in the country. Further, the MSMEs can also support the present day start-ups which are the next frontiers of growth. MSMEs are aptly described as the growth drivers in an economy and their role can be strengthened further in the wake of important policy initiatives of the government like Make in India, Setting up of National Investment and Manufacturing zones (NIMZs), the proposed coastal economic zones, dedicated freight corridors, etc. The MSMEs should be able to create and nurture a business eco system which is self-sustaining in the country and is able to deliver high value addition through capacity creation. India's go-digital mission augurs well

for the growth of MSMEs through greater usage of information, communication & technology apparatus. For holistic participation, it is a sin-qua-non that the MSMEs grow in all sectors ranging from agriculture, industrial activities to services. It is also because all the sectors of an economy are important and they have their relative relevance. When realised, it is expected that the sector acts as an insinuation for positive social engineering and truly inclusive financial transformation of the masses and the society alike.

1.1. Capital for MSMEs

Capital is one of the most important inputs of production in any production line and that is true in case of MSME sector as well. There are two sources of capital; debt and equity. Debt sources of capital include credit facilities from financial institutions including banks, through issuance of debt instruments like bonds, debentures, etc., loans from friends, relatives, local money lenders etc. One of the important sources of equity capital includes promoter's contribution or simply his owned funds. Joining a public market or stock market is another route through which equity finance can be raised. A stock market listing can help companies' access capital for growth and enable companies to raise finance for further development. It can also raise their public profile and enhance their status among customers and suppliers.

1.1.1. SME Overview

Micro, Small & Medium Enterprises play a very important role in an economy and India can't and has not remained an exception. Like other major economies, the contribution of MSMEs to the Indian economy has been phenomenal. The MSMEs in India contributes 8% to national GDP, 45% to manufacturing output and 40% to total exports. Moreover, it is the single largest employment generating sector after agriculture. The operating length of the Indian MSMEs is wide spread; today they operates in the areas of IT, ITes, retail, education, entertainment, media, etc. The MSMEs play a very pivotal role in the social sector and are known for spawning newer profitable business models.

With the advent of planned model of economic development post-independence, the MSMEs were assigned special role which were further buttressed by subsequent progressive industrial policies. The enactment of Micro, Small, and Medium Enterprises Development (MSMED) Act, 2006 provided for further development of the sector in a holistic manner. Another strategic push for the development of the sector came in 2010 when 'The Prime Minister's Task Force on MSMEs' recommended for setting up of dedicated stock exchange or trading platform for MSMEs. Acting on this recommendation, the capital market regulator Securities and Exchange Board of India (SEBI) laid down framework for setting up a stock exchange or trading platform dedicated to the Small and Medium Enterprises (SMEs).

1.1.2. Definition of an SME exchange

An SME exchange may be defined as a dedicated trading platform for the shares and or securities of the SMEs. The need for a dedicated platform was felt as the SMEs found it difficult to be listed on the main exchange due stricture requirement and inability of the SMEs getting the required visibility and courting healthy trading volumes. Currently, India has two SME dedicated trading platforms namely 'BSE SME' and 'NSE Emerge'. Since inception while BSE SME has emerged as a thick platform for SME listing, the story of NSE Emerge is far from satisfactory.

1.2. Need for dedicated SME exchange

SMEs were not able to access the capital market through the main exchange mainly because of stricter regulations and associated requirements. This led to the policy makers giving a thought to the creation of a dedicated SME trading platform. Finally, the plan got materialised and the SME only trading platforms were launched in the country. Besides, the need for a SME focussed trading platform was felt because of the following:

1. Opportunities for equity financing;
2. Broadening of the investor base and access to secondary market for SMEs;
3. Optimal mix of sources of financing i.e. equity and debt leading to better operating margins and better businesses;
4. Improvement in visibility and credentials of the SMEs;
5. Easy access to venture capital funds;

6. Proper utilisation of remuneration options such as ESOPs to SME employees leading to innovation and boost to entrepreneurial zeal;
7. Efficient distribution of risk;
8. Proper penetration to the financial eco system; banking sector for debt capital and Capital market for equity capital;
9. Option of exploring the debt capital market in the near future.

1.1.1. Benefits of SME listing

1.1.1.1. Ease of funding

1. SME access to capital funds: Getting listed on the stock exchange provides SMEs with opportunities to access equity capital funds which in turn would fuel their business growth through organic and inorganic expansion. Access to equity capital through stock markets lessens SMEs overtly dependence on debt capital and thus ensures an optimal debt-equity mix. This often leads to better operating margins and happier business.
2. Mergers & Acquisitions: Being a listed company at times provide an opportunity to SME to scout for opportunities in the inorganic space. A listed SME find it easier to bid for an unlisted company using shares as a currency in lieu of cash consideration. Utilizing shares as a currency for mergers & acquisitions can lead to tax efficiency and cost optimization.
3. Optimum Valuation: Valuation of a company depends on a number of factors. One among such factors is whether the concerned entity is listed or otherwise. The phenomenon of value discounting by the potential investors can be avoided if the concerned entity is listed on a recognised national stock exchange or an SME exchange.
4. Optimum risk diversification: The development of capital markets helps in optimum diffusion of risk through the market prices. The market forces ensure that those investors having an appetite for high risks will be rewarded with high returns of investment and viz versa. Since capital is a scarce resource, market forces ensure that there utilization is the optimum.
5. Easier entry and exit platforms for investors: The trading platform driven by market forces ensure that the potential investors have an ease of entering the market. Simultaneously, it also ensures that the existing investors have an easy exit route as well. This helps in increasing the flexibility quotient in the system leading to sustainable investor interest.

1.1.1.2. Ease of taxation

The extant income tax guidelines in the country offers a number of benefits to the companies that are listed on stock exchanges including those listed on an SME stock exchange. It is a matter of fact that tax benefits are one of the major encouragements for listing.

1. Capital Gains Tax: In India while transfer of unlisted shares comes with a long term capital gains tax of 20% and short term capital gains tax of 30%, transfer of listed shares attract zero long term capital gain tax and 15% short term capital gain tax provided the transaction has been subjected to Securities Transaction Tax (STT). This preferential tax treatment is also applicable in case of shares listed on an SME stock exchange. It spells out that listing of shares on an SME exchange can lead to significant tax savings for the promoters of the SMEs.
2. Tax on fresh equity infusion: The Finance Act, 2012 made provision for imposing a tax liability on fresh equity infusion in an unlisted company to investors sans Registered Venture Fund, provided the issuance is made at a value higher than the fair value. This may entail significant tax expenditure on the part of the SMEs, since they frequently raise funds through equity issuance to investors. However, such a tax liability does not arise if the shares of the concerned SME are listed on recognised stock exchanges including SME stock exchanges.
3. Tax on distressed business purchase: The extant income tax guidelines levies a tax on the buyer of shares of an unlisted company, provided the transaction is carried out at a value less than its book value i.e. distressed sale. However, such a tax liability does not arise if the shares of the company, under sale, are listed on recognised stock exchanges including SME stock exchanges.

1.1.1.3. Miscellaneous benefits

1. **Rising Visibility:** Getting listed on a recognised stock exchange including SME stock exchange and going for a public issue is likely to enhance an SME's visibility which also helps in profile building. One of the processes involved before any public issue is widespread advertisement of the same before the launch of the same. This involves using media platforms, doing road shows, meeting with the prospective investors, etc. These activities enhance the SMEs' visibility manifold.
2. **Unlocking investors' value:** The fair value of an unlisted SME cannot be explored in the absence of a market mechanism. When the SMEs are listed on a stock exchange and traded, the market forces tend to take the share price near to the fair value based on the fundamentals of the SME. This leads to unlocking of investors' value.
3. **Integration of Supply chain:** Companies with forward and backward linkages very often try to be integrated for efficiency in operations. Listing of SMEs facilitates integration of value chain.
4. **Corporate Governance:** Listing requirements involve strengthening of internal controls and systems substantially. This in turn ameliorates corporate governance and facilitates sustainable businesses.
5. After knowing the benefits of SME exchanges, now we discuss about the important SME stock exchanges worldwide.

2. Important SME exchanges worldwide

World over, dedicated SME trading platforms or exchanges are prevalent, which are known by different names. Important SME Exchanges in major countries of the world are mentioned here below:

Table 1. Important SME stock exchanges world over

Country	SME Exchange platform	Year of inception	Main Exchange
China	Chi Next	2009	Shenzhen Stock Exchange (SSE)
Canada	TSX Venture Exchange (TSXV)	2001	Toronto Stock Exchange (TSX)
Japan	Market of the high-growth and emerging stocks (Mothers)	2003	Nikkei
Republic of Korea	KOSDAQ	2005	Korea Exchange (KRX)
India	BSE-SME	2012	BSE Sensex
Singapore	Cata List	2006	Singapore Stock Exchange
Europe	Alter Next	2005	Euro Next
United Kingdom	Alternate Investment Market	1995	London Stock Exchange
Nordic countries of Finland, Denmark, Sweden and Iceland	First north	2006	NASDAQ OMX NORDIQ Exchange

In Table 1, we have listed out major SME exchanges across the globe along with their year of inception and the corresponding main exchange board. Let us now deepen our understanding of the performance of important SME stock exchanges worldwide vis-à-vis the performance of the SME stock market in India represented by BSE SME. Though, India has another SME stock market in the form of NSE-Emerge, it is at a very nascent stage of development and no trading information or index value is available for the same. Similarly, it would have been better to include an SME market index from the USA. In the USA, an SME dedicated market operates on New York Stock Exchange (NYSE). However, the relevant information is not available.

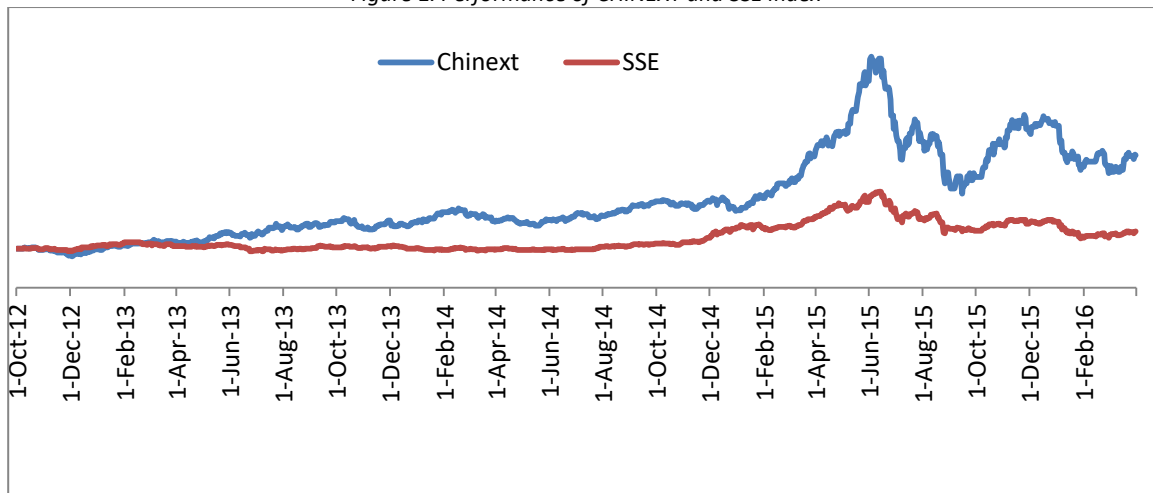
2.1. Performance of important global SME exchanges vis-à-vis the main exchange in that country

2.1.1. **ChiNext:** Chi next, is an important part of China's capital market arrangement. As an independent market, ChiNext offers a new trading platform for the requirements of enterprises engaged in SMEs. ChiNext was launched in the year 2009 which marked an important milestone for the nation's millions enterprises involved in innovative industries. It is also a definitive initiative for improving the level, structure, depth and extent of China's capital market. Chinext is also an important platform for promoting small and medium enterprises (SMEs) and creating sound interactions among prospective innovators, venture capital and capital market. Chinext is favourable for:

1. Financing chain for SMEs engaged in independent innovation industries;
2. Promoting demonstrative and multiplier effects of capital market in driving economic growth,
3. Enhancing development in venture capital investment;

4. Encouraging public interest for entrepreneurship, innovation, and employment;
5. Deepening of capital market for providing investors with a wider choice of financial instruments for wealth management and risk diversification.

Figure 1. Performance of CHINEXT and SSE index



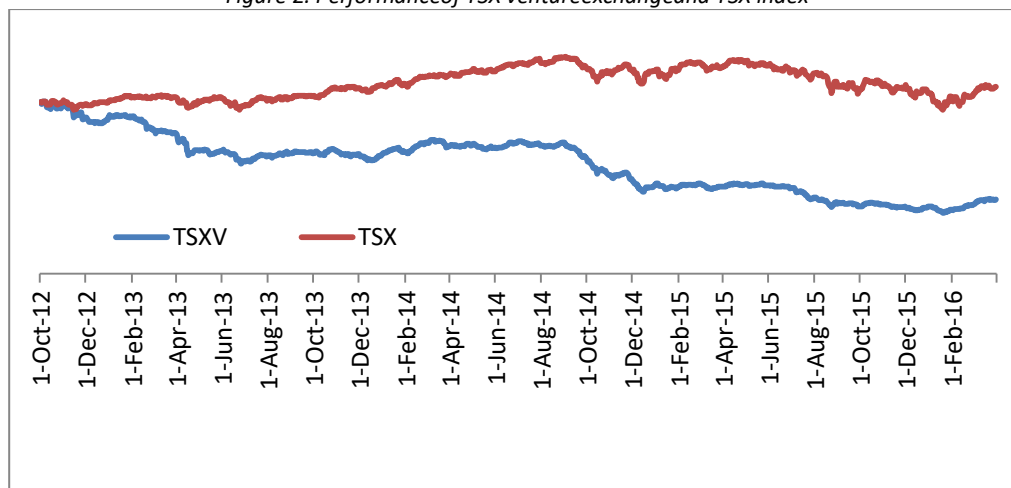
Data source: Website of the Stock Exchange; Self estimation

The performance of the Chi next index vis-à-vis the main Shenzhen Stock Exchange (SSE) index is presented hereunder: We observe in Figure 1 that during the period under consideration, the ChiNext SME index has outperformed the main Senzhen Stock Exchange (SSE) index in China, thus displaying the attractiveness of SME companies in the country.

2.1.1. TSX venture exchange (TSXV) – Canada

The TSX Venture Exchange is a stock exchange, dedicated for the Canadian SMEs in Canada. It is headquartered in Calgary, Alberta; with an additional operation headquarter in Vancouver, British Columbia. Besides, its additional offices are situated in Toronto and Montreal. Its corresponding main exchange is TSX index. It is observed from Figure 2 that the SMEs stock exchange in the Canadian stock market has performed below par the main index of stock market in Canada i.e. Toronto Stock Exchange.

Figure 2. Performance of TSX venture exchange and TSX index

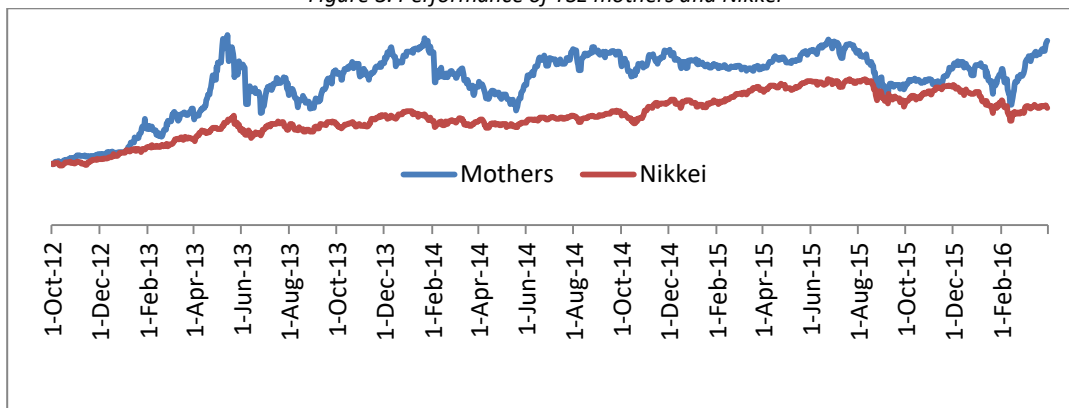


Data source: Website of the stock exchange; self estimation

2.1.2. TSE market of the high-growth and emerging stocks (Mothers) – Japan

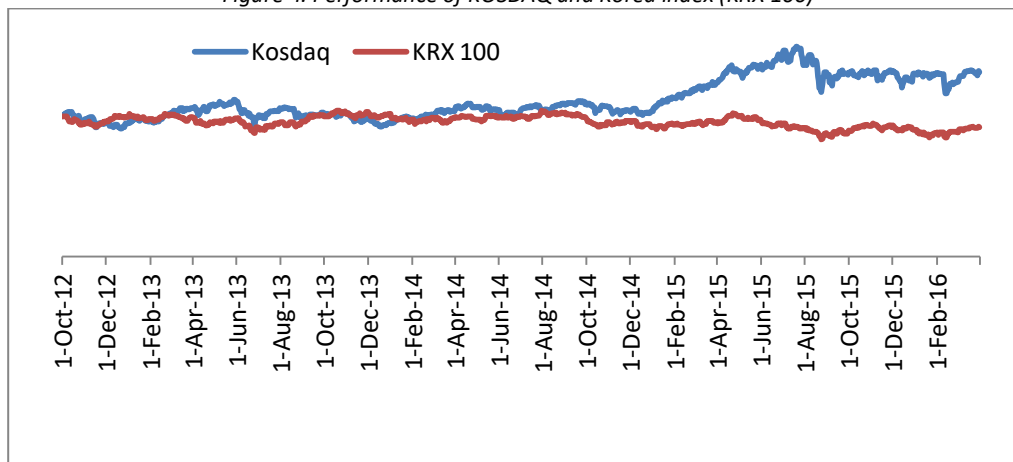
TSE ‘Mothers’ was established in the year as a trading platform aimed at companies at an early stage of their development so that they can access the equity capital markets to fund their expansion. The establishment of TSE Mothers also provided investors with more diversified investment products. Figure 3, we observe that in the Japanese stock market, the SME dedicated trading platform ‘Mothers’ has outperformed the main stock exchange of that country.

Figure 3. Performance of TSE mothers and Nikkei



Data source: Website of the stock exchange; self estimation

Figure 4. Performance of KOSDAQ and Korea index (KRX 100)



Data source: Website of the stock exchange; self estimation

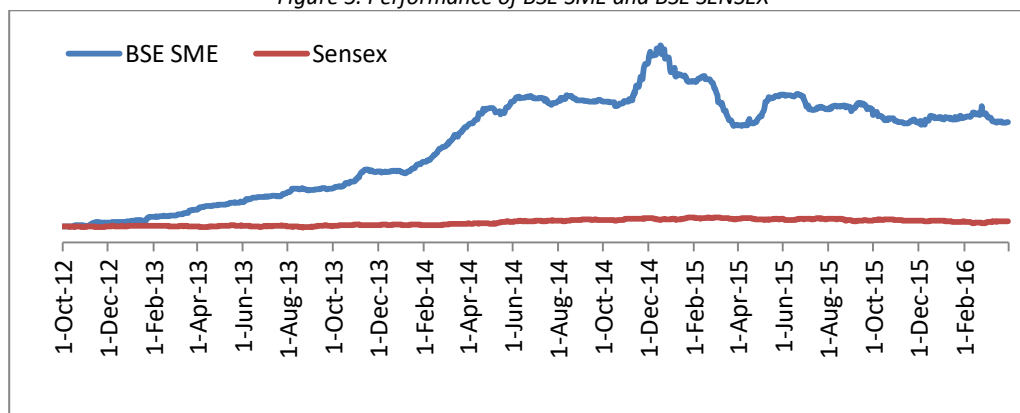
2.1.3. Kosdaq – republic of korea

KOSDAQ (Korean Securities Dealers Automated Quotations) was established in the year 1996. It is a trading board of Korea Exchange (KRX), and operated as its SME Market Division. Different quantitative and qualitative requirements apply to the KOSDAQ markets relating to operating history, capital size, share distribution, business performance, management methods and stability. The fee structure for KOSDAQ market is lower than the KRX’s main board. For the KOSDAQ markets, a track record including but not limited to meeting certain sales amounts over the three (3) most recent fiscal years is required. There are no special working capital requirements. The number of minority shareholders should be at least 500 for the KOSDAQ market. Companies incorporated overseas, including those already listed on an overseas market, are eligible to be listed on KOSDAQ. From Figure 4, we observe that with in the Korean stock market, the SME dedicated trading platform ‘Kosdaq’ has outperformed the main stock exchange of that country.

2.1.4. BSE SME

Following the recommendation of Prime Minister’s task force on MSME, the capital market regulator SEBI came up with a detailed guideline in 2010 and in 2012 the BSE SME trading platform was finally launched. The first company to utilise the platform was a Mumbai-based one named ‘BCB Finance’. The company raised Rs 8.85 crore by issuing 35.40 lakh shares at a face value of Rs 25 each. The novel thing about BSE SME Exchange is that each issue will be 100% underwritten which means that even before formal launch of an issue, the same will be 100% success. Another novel aspect is that there will be support of three years in the secondary market through market making activity. Figure 5 depicts that the Indian SME dedicated trading platform ‘BSE SME’ has outperformed the main stock exchange i.e. BSE Sensex during the reference period.

Figure 5. Performance of BSE SME and BSE SENSEX

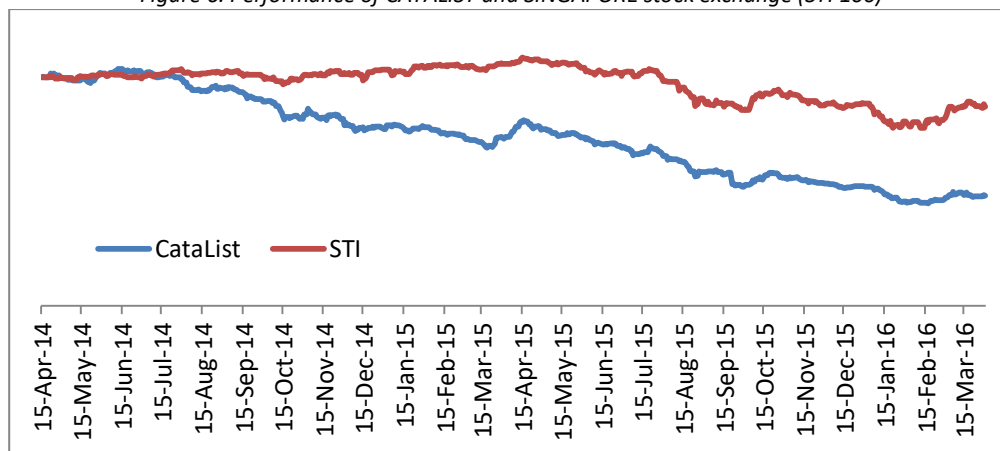


Data source: Website of the stock exchange; self estimation

2.1.5. Catalist – Singapore

The Catalist operated by the Singapore Stock Exchange (SGX) was established in December 2007. The SGX already had a second section called SESDAQ for growth companies, and Catalist was launched as a reformed version of SESDAQ due to the limited success of the later in comparison to other emerging / growth company markets. One of the reasons behind the limited success of SESDAQ was the lack of clear distinction between SESDAQ and the SGX’s main market. The launch of Catalist was therefore accompanied by several important revisions. The most important of these was the shift in overall market operation from an exchange supervised regime to a sponsor supervised one. Catalist listing requirements are much less tight than that of the main board and even recently established companies can be listed on this market. For example companies listed on the main board must fulfil such requirements as having at least three years of business results, with consolidated pretax profits in the most recent year amounting to at least S\$30 million. Companies listed on the Catalist, however, are not subject to any quantitative profit criteria and are eligible to list as long as they have secured enough working capital to cover their need for the first 12 months after listing. Figure 6, we observe that in Singapore, the SME dedicated trading platform ‘Catalist’ has outperformed the main stock exchange of that country.

Figure 6. Performance of CATALIST and SINGAPORE stock exchange (STI 100)

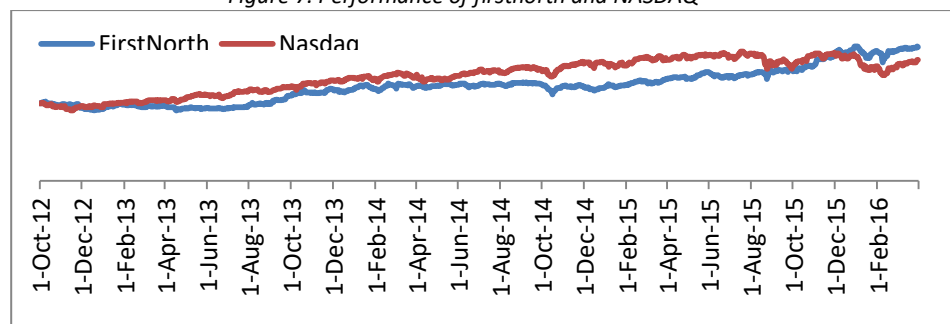


Data source: Website of the Stock Exchange; Self estimation

2.1.6. Alter Next– Europe

The Alter Next market was opened in the year 2005 to provide an opportunity window for small and medium sized firms that were eager to access an equity market for funding their expansion. Alter Next provides for streamlined listing requirements and simplified trading rules to ease the burden on small and mid-sized firms so that can easily enter the equity capital market. The establishment of Alter Next has other unstated goals of better governance, transparency, etc. The Alter Next aims to become a benchmark SME trading platform in the whole of Euro Zone. Figure 7, we observe that in Europe, the SME dedicated trading platform ‘Alter Next’ has underperformed the main stock exchange i.e. Euro Next.

Figure 7. Performance of firstnorth and NASDAQ



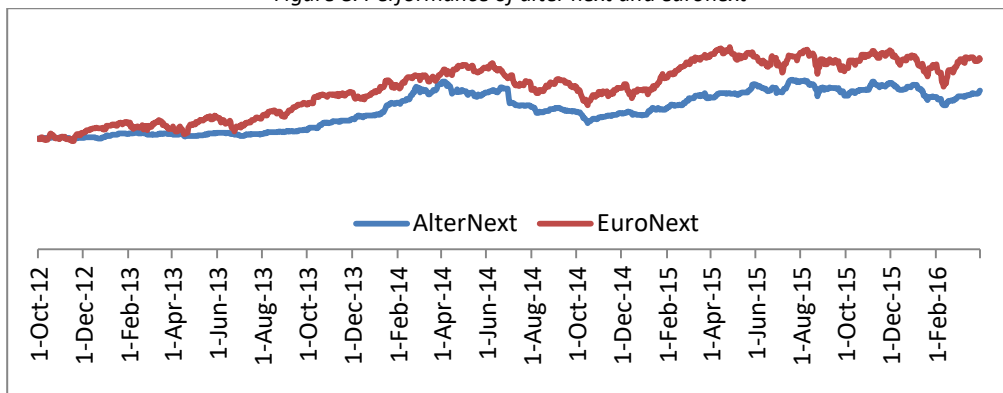
Data source: Website of the stock exchange; self estimation

2.1.7. Alternate investment market (AIM) – United Kingdom

The Alternate Investment Market (AIM) launched in the year 1995 is a sub market of the prolific London Stock Exchange. Famously known as London’s AIM market, it is structured as a multilateral trade facility (MTF) rather than a restricted market like the Alter Next and considered as the gold standard of SME markets. The MTF structure allows the market operator to set the norms, listing requirements and monitors their compliance. Another important element of AIM's model is the composition of its investor’sbase; its investor base is largely composed of institutional investors and wealthy individuals. Any type of company can be listed on AIM provided the relevant AIM Rules have been complied with.

Since its inception, AIM has helped more than 3,000 small-medium-sized companies raise equity to support their growth. Among these are companies from particularly high-growth areas such as technology, clean-tech and biotech. AIM-listed companies usually are only required to adhere to the corporate governance requirements of their home jurisdiction, which vary widely. From Figure 8, it is observed that the performance of the AIM index is at par with the performance of the main index i.e. FTSE 100. However, one aspect of this market is worth noting i.e. the depth of both these markets is at similar level.

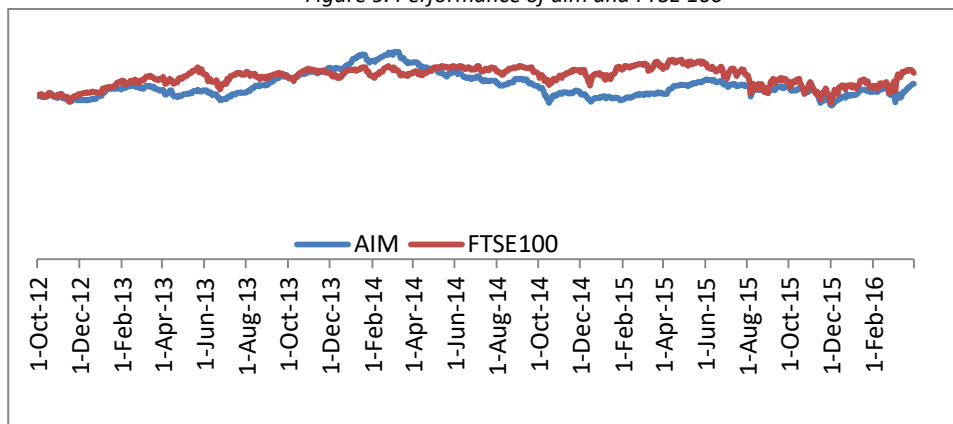
Figure 8. Performance of alter next and euronext



Data source: Website of the stock exchange; self estimation

2.2. A comparative of performance of major world SME exchanges

Figure 9. Performance of aim and FTSE 100



Data source: Website of the stock exchange; self estimation

From Figure 9 we observe that the BSE SME indices have outperformed all the major SME indices worldwide. In order to have a fair comparison between the indices of SME stock exchanges, the base has been taken as 100 as on October 1,2012. From the graph, we observe that the BSE SME index is the best performer among all the indices. Among the other indices, the performance of China's 'Chinext' and Japan's 'Mothers' are noteworthy.

Table 2. Comparative volatility of world's major stock exchanges

Country	Stock Exchanges	Mean	Standard Deviation	Coefficient of variation
China	Chi next	1713	838	0.49
	SSE	2678	746	0.28
India	BSE – SME	639	313	0.49
	BSE	23595	3579	0.15
Singapore*	Catalist	700	169	0.24
	STI	3172	254	0.08
Canada	TSXV	857	226	0.26
	TSX	13713	6475	0.47
UK	AIM	751	51	0.07
	FTSE 100	6494	325	0.05
Europe	Alter Next	903	122	0.13
	Euro Next	4819	796	0.17
South Korea	Kosdaq	584	74	0.13
	KRX 100	4104	177	0.04
Japan	Mothers	800	166	0.21
	Nikkei	15638	3027	0.19

Source: World federation of exchanges report on SME exchanges; websites of stock exchanges of different countries; self estimation

From Table 2, it is observed that among the stock exchanges dedicated mainly for the Small & Medium Enterprises, the Alternate Investment Market (AIM) of UK has the least volatility followed by South Korea's Kosdaq. SME stock exchanges of India and China i.e. BSE SME and Chinext are observed to be the most volatile among others. In case of all the countries, it is observed that the SME dedicated exchange is more volatile than the correspondence main index in that country. However, there are two exceptions to this i.e. Canada and Europe where in the main index is more volatile compared to the SME dedicated stock exchange in terms of coefficient of variation. After analysing the performance of BSE SME vis-à-vis other world SME stock exchanges, we now want to study the relationship between important world SME exchanges and BSE SME. For this purpose we use the Autoregressive Conditional Heteroscedasticity-Mean (ARCH-M) Model. Let us now discuss the available literature in this area. In [1] have shown how 'BSE SME' and 'NSE Emerge' have been better arrangements than 'BSE Indonext' and 'OTCEI' for raising of equity capital by the SMEs in India. The success of new platforms compared to the older ones has been attributed to the well thought out policy of the government, hundred per cent compulsory underwriting, etc. along with increased awareness among the investor class. In [2] as part of policy research working paper of world bank group have indicated that before working to develop an SME Exchange, countries need to determine if they have the appropriate and supportive context, most critically a supply of growing SMEs that are willing to use public equity markets to raise financing, interested investors, and a supportive macro political, legal and regulatory environment. In [3] have ascertained that growth potential is the main driver of prospective investors which shows that SME investment is not viewed for short term gain, but rather for long term appreciation. In [4] with reference to the Spanish Economy have shown that various incentives in the form of public aid, fiscal incentives etc. are required to support and promote the SME trading platforms. In [5] ascertains through certain case studies that with regard to establishment of SME trading platforms across emerging and developed markets, there may not be any singlediagnosis. Nevertheless, the report highlights certain factors such as tailored listing, disclosure requirements etc. as methods for enhancing secondary market listing. The report acknowledges the fact that trading platform for SMEs should be treated only as a part of the larger ecosystem to promote the growth of SMEs. In [6] proposed that given the existing financial constraints before the SMEs, the provision of a well-entrenched SME trading platform may go a long way in ensuring sustainable growth of SMEs. In the existing literature, no studies exist that throws a light on the interaction between BSE SME and other international SME dedicated trading platforms. On this backdrop, the current study is a novel attempt which tries to ascertain the interaction between major international SME trading platforms and BSE SME.

3. Data for the study

The study uses the financial time series data for the period October 1, 2012 and March 31, 2016 which has been sourced from website of different stock exchanges, yahoo finance and Google finance.

4. Econometrics model and analysis

The Study uses an Autoregressive Conditional Heteroscedasticity (ARCH) Mean model. Let us now discuss the model and its applicability in the current context in details.

4.1. Autoregressive conditional Heteroscedasticity (ARCH-M) model

For many financial time series there is a tendency to volatility clustering e.g. periods of high and low market uncertainty. ARCH and GARCH models are ways of modelling this feature i.e. specifying equations for the conditional mean and the conditional variance. ARCH models assume that the variance of current term is related to the size of the previous periods' error terms, giving rise to volatility clustering. This phenomenon is widely observed in financial markets. Generally speaking, an ARCH-M model is applicable when two conditions are satisfied. They are the presence of volatility clustering and the presence of ARCH effect.

4.1.1. Volatility clustering

Volatility clustering is a situation wherein periods of low volatility is followed by period low volatility and period of high volatility is followed by period of high volatility. In our study we have referred to the following market indices: BSE SME, AIM, AlterNext, ChiNext, FirstNorth, Kosdaq, Mothers, and TSXV. Since the AIM (U.K.) is considered as the gold standard for SME exchanges world over, we analyse how AIM index has affected the BSE SME index. Here, we are dealing with financial time series data. Therefore, we will first ascertain whether ARCH-M model is applicable or not. For ARCH-M model to be applicable the presence of two conditions need to be ascertained. Since, applicability of ARCH-M model requires the underlying data to be stationary; we first need to check the same with our data. Using Augmented Dickey Fuller (ADF) and Philips Perron (PP) unit root tests, we came to know that the financial time series data at hand is non-stationary at level. However, we also ascertained that they are first difference stationary. Using OLS with first difference of BSE SME as dependent variable and first difference of aim as the regressor, the graph of corresponding residuals is given Figure 11.

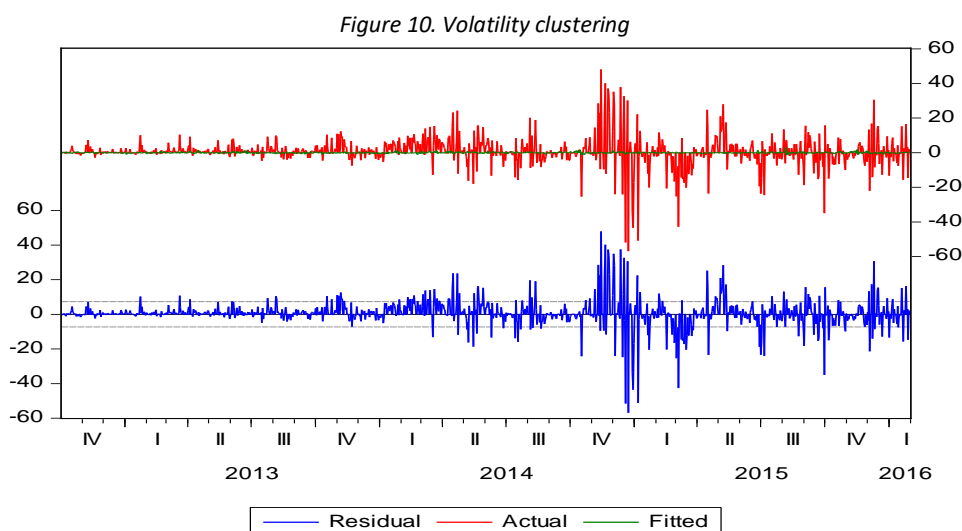
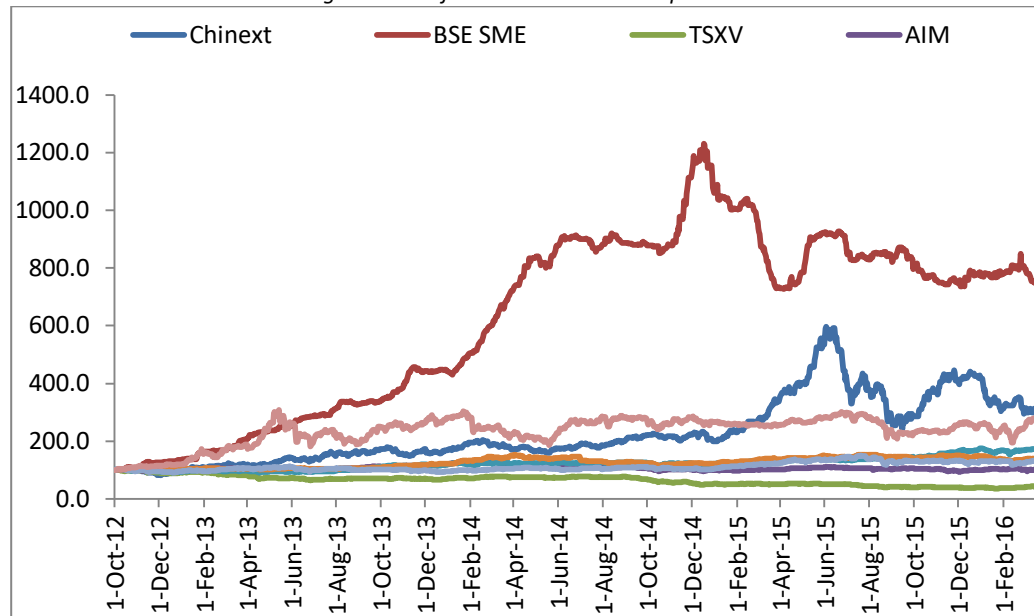


Figure 11. Major world SMES – a comparative



Data source: Website of the stock exchanges; self estimation

From Figure 10 we observe that the residuals follow the pattern of Volatility clustering; i.e. periods of low volatility is followed by period of low volatility and periods of high volatility is followed by periods of high volatility. The next step is to find out whether there exists ARCH Effect or not.

4.1.2. Presence of ARCH effect

Null Hypothesis (H₀): There is no ARCH Effect.

Alternative Hypothesis (H₁): There is ARCH Effect. From Table 3 we observe that, the p-value is zero percent for the null hypothesis is no ARCH effect. Since the p-value is less than 5%. We can reject the null hypothesis of no ARCH effect and accept the alternative hypothesis that there is ARCH effect.

Having confirmed the presence of volatility clustering and ARCH effect, we can now proceed with the ARCH-M model.

Table 3. Test for presence of arch effect

Heteroskedasticity Test: ARCH

F-statistic	50.86823	Prob. F(1,1214)	0.0000
Obs*R-squared	48.90294	Prob. Chi-Square(1)	0.0000

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 07/25/17 Time: 21:45

Sample (adjusted): 10/03/2012 1/31/2016

Included observations: 1216 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	42.66739	6.390489	6.676702	0.0000
RESID^2(-1)	0.200540	0.028118	7.132197	0.0000

R-squared	0.040216	Mean dependent var	53.37026
Adjusted R-squared	0.039426	S.D. dependent var	221.0134
S.E. of regression	216.6128	Akaike info criterion	13.59574
Sum squared resid	56962199	Schwarz criterion	13.60414
Log likelihood	-8264.212	Hannan-Quinn criter.	13.59890
F-statistic	50.86823	Durbin-Watson stat	2.026423
Prob(F-statistic)	0.000000		

4.2. ARCH-M model

Table 4. ARCH-M model

Dependent Variable: D(BSE_SME)
 Method: ML ARCH - Student's t distribution (BFGS / Marquardt steps)
 Date: 07/26/17 Time: 21:25
 Sample (adjusted): 10/02/2012 3/31/2016
 Included observations: 1277 after adjustments
 Failure to improve likelihood (non-zero gradients) after 141 iterations
 Coefficient covariance computed using outer product of gradients
 Presample variance: backcast (parameter = 0.7)
 t-distribution degree of freedom parameter fixed at 10
 GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1) + C(6)
 *D(ALTER_NEXT) + C(7)*D(CHINEXT) + C(8)*D(FIRST_NORTH)
 + C(9)*D(KOSDAQ) + C(10)*D(MOTHERS) + C(11)*D(TSXV)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
@SQRT(GARCH)	0.140871	0.025316	5.564429	0.0000
D(AIM)	-0.414742	0.120668	-3.437035	0.0006
Variance Equation				
C	0.967229	0.097464	9.923931	0.0000
RESID(-1)^2	0.431259	0.037067	11.63463	0.0000
GARCH(-1)	0.593988	0.015961	37.21440	0.0000
D(ALTER_NEXT)	0.118454	0.176926	0.669510	0.5032
D(CHINEXT)	-0.045096	0.022770	-1.980537	0.0476
D(FIRST_NORTH)	-0.020596	0.105477	-0.195266	0.8452
D(KOSDAQ)	-0.671028	0.120112	-5.586664	0.0000
D(MOTHERS)	0.047531	0.015870	2.995109	0.0027
D(TSXV)	0.503988	0.138690	3.633912	0.0003
R-squared	-0.020410	Mean dependent var		0.509760
Adjusted R-squared	-0.021210	S.D. dependent var		7.373591
S.E. of regression	7.451378	Akaike info criterion		5.870250
Sum squared resid	70791.87	Schwarz criterion		5.914631
Log likelihood	-3737.154	Hannan-Quinn criter.		5.886917
Durbin-Watson stat	1.765692			

From Table 4, we observe that our model gives us two equations, one for Mean and Variance. From the mean equation we observe that @SQRT(GARCH) has a positive value and a p-value of zero. This indicates that the BSE SME market is a risky market and the findings are statistically significant. This also indicates that higher the value of standard deviation higher the risk volatility and vice-versa. We also observe that the volatility in AIM (U.K.) market is negatively affecting the volatility BSE SME market.

From variance equation, we observe that the ARCH effect i.e. the effect on account of availability of previous day's information, as measured by RESID(-1)², is significantly impacting BSE SME market. We also observe that previous day's volatility in the BSE SME market, as measured by GARCH(-1), is also significantly impacting the current day's volatility in the BSE SME market. These two are internal causes of volatility in the BSE SME market. Among the external causes depicted by D(ALTER_NEXT), D(CHINEXT), D(FIRST_NORTH), D(KOSDAQ), D(MOTHERS) and D(TSXV) in the variance equation, we observe that while the impact of volatility in SME equity markets like Chinext, Kosdaq, Mothers and TSXV on BSE SME equity market are statistically significant, impact of other two SME equity markets like, AlterNext and FirstNorth on BSE SME are statistically insignificant. While volatility in Kosdaq and Chinext have negative impacts on BSE SME, volatility in Mothers and TSXV markets have positive impacts on BSE SME market.

4.2.1. Existence of ARCH effect after fitting the ARCH model

After fitting the model, as a diagnostic checking, we check again whether there exists the ARCH effect or not. **Null Hypothesis (H₀):** There is no ARCH Effect. **Alternative Hypothesis (H₁):** There is ARCH Effect. From Table 5, we observe that for the null hypothesis of 'no ARCH effect' we have a 'p' value of more than 32 per cent which implies that we cannot reject the null hypothesis.

Table 5. Test for arch effect

Heteroskedasticity Test: ARCH				
F-statistic	0.965917	Prob. F(1,1274)	0.3259	
Obs*R-squared	0.966700	Prob. Chi-Square(1)	0.3255	
Test Equation:				
Dependent Variable: WGT_RESID^2				
Method: Least Squares				
Date: 07/26/17 Time: 22:23				
Sample (adjusted): 10/03/2012 3/31/2016				
Included observations: 1276 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.852487	0.238206	7.776818	0.0000
WGT_RESID^2(-1)	-0.027524	0.028006	-0.982811	0.3259
R-squared	0.000758	Mean dependent var	1.802871	
Adjusted R-squared	-0.000027	S.D. dependent var	8.315602	
S.E. of regression	8.315713	Akaike info criterion	7.075737	
Sum squared resid	88098.48	Schwarz criterion	7.083811	
Log likelihood	-4512.320	Hannan-Quinn criter.	7.078769	
F-statistic	0.965917	Durbin-Watson stat	2.001225	
Prob(F-statistic)	0.325887			

4.2.2. Test of autocorrelation

The next step is to ascertain whether the model suffers from any serial correlation or not.

Null Hypothesis (H₀): There is no serial correlation in the model.

Alternative Hypothesis (H₁): There is serial correlation in the model.

From Table 6, we observe that for the null hypothesis of no serial correlation or no auto-correlation, we have 'p' values in excess of 5 per cent implying that we can't reject the null hypothesis. This means we do not have the problem of autocorrelation in our model.

Table 6. Test for autocorrelation

Date: 07/26/17 Time: 22:23						
Sample: 10/01/2012 3/31/2016						
Included observations: 1277						
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*	
		1 -0.028	-0.028	0.9697	0.325	
		2 -0.021	-0.022	1.5503	0.461	
		3 -0.024	-0.025	2.2731	0.518	
		4 -0.018	-0.020	2.6710	0.614	
		5 -0.012	-0.015	2.8669	0.720	
		6 -0.009	-0.011	2.9708	0.813	
		7 0.008	0.006	3.0534	0.880	
		8 0.007	0.006	3.1193	0.927	
		9 -0.010	-0.010	3.2383	0.954	
		10 -0.019	-0.020	3.7074	0.960	
		11 -0.002	-0.003	3.7111	0.978	
		12 0.015	0.014	3.9982	0.983	
		13 -0.016	-0.016	4.3136	0.987	
		14 0.005	0.004	4.3446	0.993	
		15 -0.012	-0.013	4.5417	0.995	
		16 -0.017	-0.018	4.9112	0.996	
		17 0.012	0.011	5.1047	0.997	
		18 -0.006	-0.006	5.1499	0.999	
■	■	19 0.071	0.069	11.663	0.900	
■	■	20 -0.013	-0.010	11.878	0.920	
■	■	21 0.089	0.093	22.255	0.385	
		22 -0.003	0.006	22.264	0.444	
		23 -0.011	-0.004	22.423	0.495	
		24 0.066	0.072	28.090	0.256	
		25 -0.011	-0.004	28.253	0.296	
		26 -0.010	-0.006	28.393	0.339	
		27 -0.008	-0.004	28.484	0.386	
		28 0.018	0.020	28.900	0.418	
		29 0.013	0.015	29.115	0.459	
		30 -0.009	-0.005	29.233	0.505	
		31 -0.027	-0.026	30.193	0.507	
		32 -0.001	0.000	30.194	0.558	
		33 -0.021	-0.024	30.769	0.579	
		34 0.005	0.010	30.799	0.625	
		35 0.005	0.004	30.829	0.670	
		36 -0.011	-0.016	30.992	0.706	

*Probabilities may not be valid for this equation specification.

4.3. Depth of Indian SME exchange vis-à-vis other world SME exchange

Table 7. Depth of INDIA SME exchange vis-à-vis other world SME exchanges

Country	Name of the SME stock exchange	No of Companies listed on the SME stock exchange	Name of the corresponding main stock exchange	No of Companies listed on the stock exchange	Ratio of companies listed on the SME exchange to companies listed on the main exchange (%)*
China	Chi Next	570	Senzhen Stock Exchange (SSE)	1870	30.5
Canada	TSE Venture Exchange	2033	Toronto Stock Exchange (TSE)	3419	59.5
Japan	Mothers	757	Nikkei	3502	21.6
India	BSE-SME	151	BSE Sensex	5821	2.6
Singapore	CataList	185	Singapore Stock Exchange (SGX)	757	24.4
United States*	NYSE Market	239	NYSE Group	2307	10.4
Europe	AlterNext	197	EuroNext	1051	18.7
UK	AIM	1000	London Stock Exchange	2292	43.6

Source: World federation of exchanges report on SME exchanges; websites of stock exchanges of different countries; self estimation

As we have mentioned above, every SME exchange in the world has a corresponding main exchange. The main exchanges comprise of all the companies listed on the bourse including the ones listed on the SME exchange as well. In other words, the main exchange is a broader platform than the SME exchange. In a particular equity stock market, more the number of SME companies listed, more is the evident that the SME fraternity in the country is aware of the effectiveness of raising equity through stock market. It also signifies the openness of the SME equity market. In order to measure the depth of the Indian SME equity stock market vis-à-vis other SME equity stock markets in the world, we will analyse the ratio of total number of SME companies listed on the SME equity stock exchange to the total number of companies listed on the corresponding main stock exchange. For example in case of India, the ratio of number of companies listed on BSE SME platform to the total number of companies listed on BSE sensex. Higher the ratio, higher the depth of the SME equity stock market in that country. Let us now estimate this ratio for major SME equity stock exchanges across the world.

From Table 7, we observe that the ratio of the number of SME companies listed on the SME equity platform to the total number of companies listed on the corresponding main exchange is the highest for Canada at 59.5 per cent. Canada's SME equity stock market TSXV has 2033 SMEs and growth companies listed on it where as the main equity stock market of Canada, Toronto Stock Exchange, has a total of 3419 companies listed on it. By contrast, the ratio is the lowest for India at only 2.6 per cent with only 151 SME companies listed on BSE-SME as against a total of 5821 companies listed on the BSE Sensex. It implies that the equity market for the Indian SMEs is not as developed as those in the developed countries like UK (AIM), USA (NYSE MKT), Japan (Mothers), Singapore (CataList), Canada (TSXV), etc.

5. Conclusion

Among the SME dedicated stock exchanges under consideration, the performance measured in terms of growth has been the most impressive for the BSE SME during the reference period. Further, we found out that there exists statistically significant relationship between growth of BSE SME and Chinext, Kosdaq, Mothers & TSXV. While Chinext&Kosdaq have negative influence on BSE SME, Mothers & TSXV have positive influence. We found out that the risk quotient of BSE SME as a trading platform from investors' point of view is very high. We also observed that the BSE SME market as a trading platform for the SMEs is yet to develop fully compared to other important SME stock exchanges world over. Keeping this in mind, the policy makers need to take steps aimed at further liberalising the listing process for BSE SME. Improved investors' education and deepening the SME ecosystem in the country would go a long way in broadening the SME stock market in India.

6. References

1. S. Shroff, S. Sengupta. SME exchange: transformation opportunities of SMEs. *IOSR Journal of Business and Management*. 2016, 1-5.
2. Harwood, T. Konidaris. SME exchanges in emerging market economies: a stocktaking of development practices. *Finance and Markets Global Practice Group of World Bank Group*. 2015.
3. Rai, Sunita. Issues and challenges in promoting SME exchanges amongst MSMES in MAHARASHTRA. 2015.
4. O. Arce, E. Lopez, L. Sanjuan. Access of SMEs with growth potential to the capital markets. Comission National Del Mercado De Valores (CNMV) Research Statistics and Publication Department. 2011, 1-52.
5. World federation of exchanges releases research paper on SME markets. *The World Federation of Exchanges*. 2016.
6. MCX-SX and Small and Medium Business Development Chamber of India.Meeting Financial and Risk Management Challenges of Small and Medium Enterprises.

The Publication fee is defrayed by Indian Society for Education and Environment (www.iseeadyar.org)

Cite this article as:

Nihar Ranjan Jena, Lina R Thatte. Development of equity capital market for MSMES in India: an econometrics perspective. *Indian Journal of Economics and Development*. Vol 5 (8), August 2017.