Stock Exchange Consolidation: A Comparative Study in the Russian Stock Market

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Abstract: Our paper reviews institutional and structural changes in organized trading within a worldwide trend towards exchange consolidation, chronologically tracing most significant successful and failed exchange mergers, identifying key motivations and objectives. We provide a detailed overview for the case of the Moscow Exchange, the largest exchange in the CIS and Eastern Europe founded in November 2011 upon the MICEX and RTS merger. A comparative study of the Russian stock market performance pre and post consolidation in terms of liquidity is conducted. Liquidity is estimated along three dimensions (trading costs, trading activity, market impact) to capture its multifaceted nature. Liquidity estimates are obtained from limit order book data of tick frequency.

Keywords: Moscow Exchange, exchange consolidation, liquidity dimensions, tick frequency

JEL: F36, G15, G34

INTRODUCTION

From the 1990s institutional and structural developments of exchanges have been particularly intense following a high level of direct competition among exchanges and with electronic communications networks (ECN). Three major directions of these developments are as follows. *Developments in ownership structure* involve a move from mutual societies controlled by their members to for-profit private companies and to publicly listed companies within the demutualization and IPO processes. *Developments in the scope of geographical involvement* are a geographical proliferation of an exchange, often beyond national boundaries, enabled by recent technological advancements. Finally, *developments* in product pipeline involve a move from an exchange specializing in a single type of financial instrument into the one specializing in multiple types of financial instruments within the process of product diversification. Obviously, these

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developments come from the necessity to meet changing economic environment including intensified competition among exchanges. Exchange consolidation is viewed as a strategy to implement these developments (at least the last two mentioned) and to increase exchange competitiveness through *improved quality of exchange functioning and trading*.

In this background the consolidation of the two largest Russian exchanges, MICEX and RTS, into the Moscow Exchange seems to be an interesting field of investigation. Done allegedly with a view to strengthening state control over the Russian financial market during the ongoing financial crisis (Great Recession), the exchange consolidation nevertheless pursued a rational economic objective: to improve the quality of the Russian financial market performance within the activities of the State Project "Moscow – International Financial Center" initiated as far back as 2009 by the Government Decree on the Action Plan on Formation of International Financial Center in the Russian Federation of 11 July 2009.

A quantitative comparative study of the MICEX and RTS merger in terms of market-wide liquidity seeks to identify possible positive changes in stock trading performance. This is essential for the overall assessment of the Russian financial market developments on the way towards market maturity and international involvement. Generally liquidity improvement can be inferred from higher trading activity, lower trading costs and lower volatility. Our quantitative comparative study is based on the procedure of Bacidore (1997) and Barclay et al. (1999) and consists in forming market-wide stock samples pre and post consolidation. These market-wide stock samples are further compared along three liquidity dimensions (trading costs, trading activity, and market impact) to capture its multifaceted nature.

There are a number of contributions of the present paper to the relevant body of research, relating to what is analyzed and the way it is analyzed. First, the present paper analyzes the case of *an exchange consolidation in Russia*. While the Russian stock market has received a sufficient coverage in research papers, the MICEX and RTS merger resulted in emergence of the largest exchange in the CIS and Eastern Europe, the Moscow Exchange, has largely been *left unattended by researchers*. Second, w*e extend our comparative study to multiple samples in the post-consolidation period in 2012 and 2013.* This enables us to trace the dynamics of liquidity performance and consequently the impact of the exchange consolidation over a longer period. That is justified on the basis that the formal consolidation in December 2011 was followed by actual consolidation implemented in a step-by-step way over a longer period. Additionally, we employ *limit order book data of tick frequency* to obtain quantitative proxies for two liquidity dimensions, trading costs and market impact. This is kind of data that offers a deep and accurate insight into the actual market microenvironment.

To our best knowledge there have been no such studies on liquidity of the Russian stock market as yet. The Moscow Exchange does not provide analytical support on liquidity either[1].

The structure of the paper is as follows. Section 1 provides an analytical overview of the relevant exchange developments for the last couple of decades world-wide. Section 2 considers the case of the Moscow Exchange. Section 3 presents the concept of liquidity and the methodology of the comparative study. Section 4 provides results and interpretation of the comparative study. Section 5 concludes.

1. Our Motivation. Evolution of Exchanges and the Objectives of Consolidation

Institutional and structural developments of exchanges world-wide for the last couple of decades are viewed as a response to changing economic environment including a high level of direct competition among exchanges and with electronic communications networks (ECN). There have been three major directions in the evolution of exchanges.

First, exchanges organized as non-profit mutual societies (also, exchanges with state participation) *have been transformed into commercial entities*. Worldwide trend for exchanges is an exchange of a new type, a commercial entity aimed at profit-making. A wave of ownership restructuring into LLC emerges from the 2nd half of the 1990s: the Stockholm Stock Exchange (1993), the Helsinki Stock Exchange (1995), the Copenhagen Exchange (1996), the Amsterdam Exchange (1997), the Borsa Italiana (1997), the Australian Securities Exchange (1996-1998), the Toronto Stock Exchange (2000), the Hong-Kong Stock Exchange (2000)[2]. In 1998 only 38% of the members of the World Federation of Exchanges (WFE) were commercial entities; however, in 2006 the number rose to 75%.

Second, a *reduction of a geographical gap and an increase in international involvement* were an outcome of the wave of *geographical consolidation of exchanges* initiated at the end of the 1990s: foundation of the Swiss Stock Exchange (SWX) upon merging of stock exchanges of Geneva, Basel, and Zurich in 1995; foundation of the Columbian Stock Exchange upon merging of stock exchanges of Bogota, Medellin, and Cali (Bolsa de Occidente) in 2001; foundation of EURONEXT upon merging of the Belgian, French, and Dutch stock exchanges in 2000 and subsequent joining of the Portuguese stock exchange in 2001; foundation of OMX Exchanges upon merging of 7 exchanges of the Baltic and Scandinavian locations (Stockholm, Copenhagen, Riga, Vilnius, Tallinn, Helsinki, and Iceland) in 2004-2006.

The 2nd half of 2000s was marked by a *geographical consolidation of exchanges on an ever larger scale*: foundation of NYSE-EURONEXT in 2006 and NASDAQ-OMX in 2008; acquisition of control and management powers over the BORSA ITALIANA by LSE in 2011.

Third, the wave of geographical consolidation of exchanges has been accompanied by a process of *exchange consolidation with a view to diversifying product pipeline* with financial instruments of various specifications. That was the case for the Singapore Exchange (SGX) upon merging of the Singapore Stock Exchange and the Singapore Currency and Futures Exchange in 1999; dissolution of the Kyoto Stock Exchange (mainly deals in spot trading) into the Osaka Securities Exchange (mainly deals in futures and other derivatives trading) in 2001 and a subsequent merging of the latter

exchange and the Tokyo Stock Exchange (mainly deals in spot trading) in 2013. Obviously, product diversification as an expansion of an exchange's services can be seen as an additional source of profit making.

Consolidation of exchanges has substantially reshaped the ranking of exchanges worldwide. Nowadays top-12 world exchanges by share turnover (Fig.1) are spread across North America, Europe, and the Asia-Pacific region with NYSE-EURONEXT (US) and NASDAQ OMX occupying the leading positions.

Figure 1: Top 12 world exchanges by monthly share turnover of listed domestic & foreign companies as of February 2013, USD billions *(Source: the WFE statistics)*
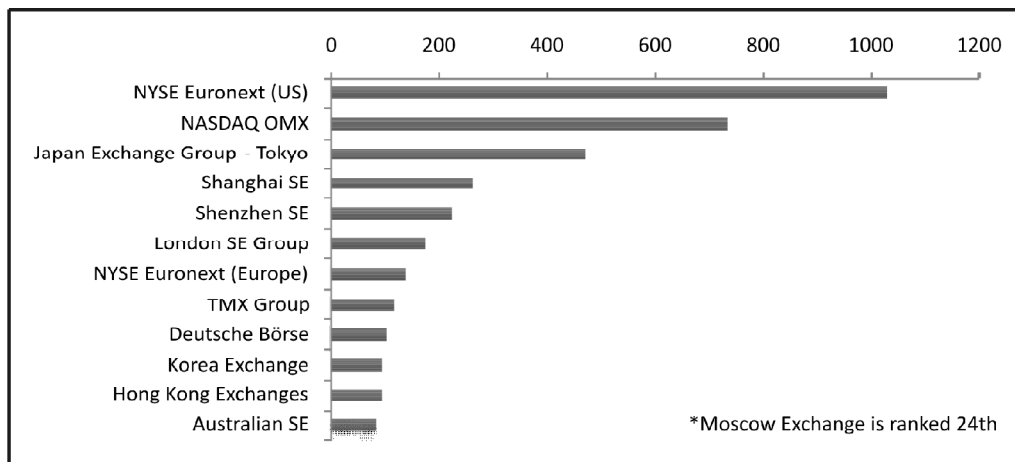

In terms of aggregate market capitalization of listed domestic companies (Fig. 2) NYSE-EURONEXT (US) and NASDAQ OMX still occupy the leading positions.

Figure 2: Top 12 world exchanges by market capitalization of listed domestic companies as of February 12, 2013, USD billions *(Source: the WFE statistics)*
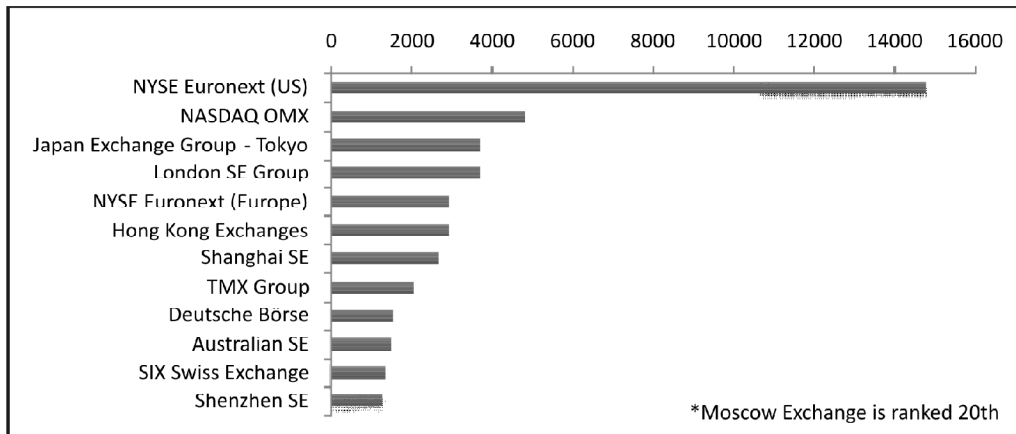
However, in terms of the aggregate number of listed domestic and foreign companies *an exchange of an emerging market*, BSE India, is ranked highest in the top-12 list (Fig. 3).

Figure 3: Top 12 world exchanges by the number of listed domestic & foreign companies as of February 12, 2013 *(Source: the WFE statistics)*
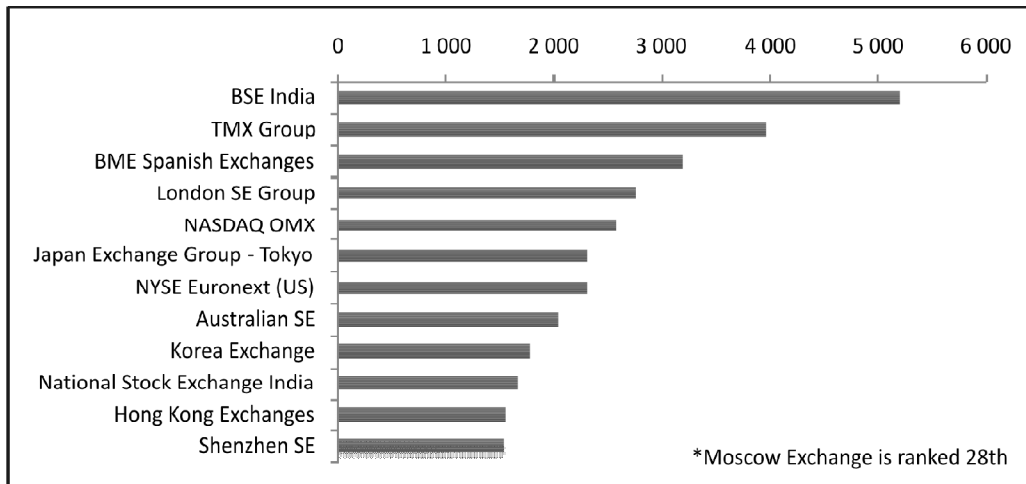
Finally, *more exchanges of emerging market* appear in the top-12 list based on exchanges' own market capitalization (Fig.4). Obviously, for an exchange which is publicly traded increasing its own market capitalization is one of the major tasks.

Figure 4: Top 12 world listed exchanges by market capitalization as of February 11, 2013, USD billions *(Source: the Thomson One statistics)*
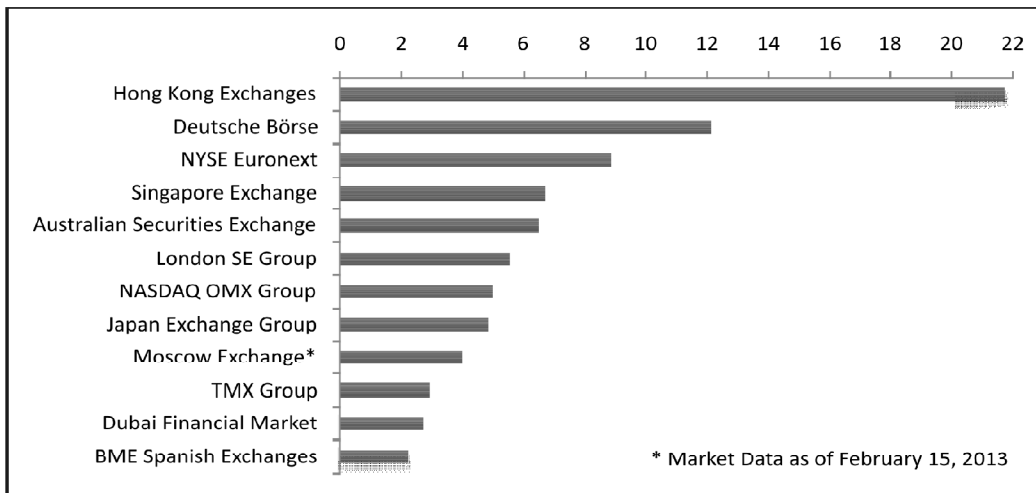
In general terms consolidation of exchanges is beneficial for market participants since it brings in harmonization / unification: organized trading systems and financial instruments' specifications become uniform, regulatory principles grow harmonized as well as the mechanisms to ensure the implementation of these principles. Consolidation, however, is a mixed blessing: NYSE-EURONEXT and NASDAQ-OMX foundation was viewed as an emergence of a transatlantic exchange operator of global significance; however, that raised the question of abuses associated with enjoying monopolistic market power. As a consequence, 2011 was marked by a number of merger failures. The Singapore Exchange (SGX) withdrew its 8 USD billion bid for the Australian Securities Exchange (ASX) after the deal was blocked by the Australian government. NASDAQ OMX Group in partnership with the Intercontinental Exchange (ICE, Atlanta) withdrew its 11,3 USD billion bid to acquire NYSE EURONEXT after the US Department of Justice officially stated it would file an antitrust lawsuit to block the deal. Earlier that year the Deutsche Boerse's proposal to acquire NYSE EURONEXT, valued at 11,3 USD billion, was vetoed by the European Commission. The London Stock Exchange failed to acquire TMX Group for 3,6 US billion due to a higher competing bid from the Maple Group consortium made with a view to preventing a foreign control over the Canadian organized trading systems.
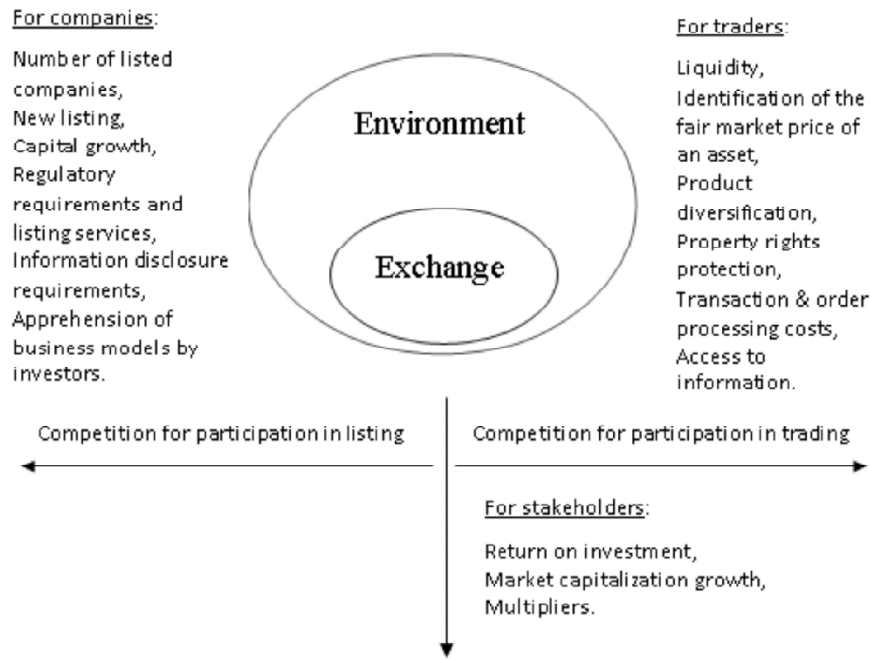
Consolidation of exchanges is a way to face *a stiffening competition in capital markets for more capital / new investors.* A number of advantages of exchange mergers, which improve the quality and diversification of an exchange's services, can be outlined in this regard:

- Reduction in transaction costs;
- Increase in a supply of securities;
- Availability of 24-hour trading (e.g., alliances of American and Asian trading platforms);
- Opportunities of obtaining advanced trading technologies available on other trading platforms (e.g., high-precision terminals which have been reducing the significance of "physically placed" trading platforms);
- Increase in profits due to product pipeline expansion (e.g., inclusion of derivative trading) and synergy effect.

Evaluating the effectiveness of exchange mergers preliminarily requires clarifying upon what makes one exchange more attractive over another. It seems rational to differentiate advantages among three types of marker participants: 1) currently / prospectively listed companies; 2) traders / investors; 3) stakeholders of an exchange. Thus, assessing the effectiveness of exchange mergers is conducted in *three major projections* (Fig. 5).

Benefits *for a company* can be revealed from decision analysis on listing / cross-listing with identification of significant decision factors such as an exchange's size and market share, liquidity, financial reporting and information disclosure

Figure 5: Three projections for assessing the effectiveness of exchange mergers

For companies:

Number of listed companies,
New listing,
Capital growth,
Regulatory requirements and listing services,
Information disclosure requirements,
Apprehension of business models by investors.

Environment

Exchange

For traders:

Liquidity,
Identification of the fair market price of an asset,
Product diversification,
Property rights protection,
Transaction & order processing costs,
Access to information.

Competition for participation in listing ← → Competition for participation in trading

For stakeholders:

Return on investment,
Market capitalization growth,
Multipliers.

requirements, regulatory principles and listing access requirements, and overall cultural compatibility of a prospectively listed company and the participants of that exchange. *From a trader / investor's perspective* key factors include more diversified portfolios, liquidity, the magnitude of transaction costs, quality and variety of post-trade services (clearing and depositary services), additionally financial reporting and information disclosure requirements for listed firms, settlement period (T+N). The increase in liquidity can reduce the price concession and give investors relatively large orders that may be associated with a lower volatility of stocks as stated by Pagano and Padilla (2005). Finally, *benefits for stakeholders of an exchange* refer to investment attractiveness of that exchange evaluated by such factors as return on investment, market capitalization growth, multipliers, etc. However, it is worth mentioning that assessment of the way an exchange functions and the benefits it offers to market participants depends, to a certain extent, on institutional settings of the country that exchange is based in.

2.   Foundation of Moscow Exchange

Motivations for the MICEX and RTS Merger

The Moscow Exchange, the largest Russian exchange by trading volume and by the number of market participants, was founded on 19 December 2011 upon merger[3] of

the then largest Russian exchanges, MICEX[4] and RTS[5]. Although the formal merger took place in 2011 the process of actual consolidation has been still on the way in 2013-2014.

As can be seen from Fig. 1-4, the Moscow Exchange occupies a stable position close to the world's top exchanges on a number of market parameters. Today the Public Joint Stock Company (PJSC) Moscow Exchange is the largest Russian exchange both in terms of trading volume and the extensive client base, that plays a key role in the development of the Russian financial sector, provides a wide range of opportunities to private and institutional investors, professional market participants and their Russian and foreign clients in trading equities, bonds, currencies, commodities (through the National Commodity Exchange), and derivatives (futures and options). It is a center of liquidity provision for Russian securities and a major trading venue for international trading participants willing to invest in Russian companies.

Consolidation of MICEX and RTS was initiated with a view to:

- Founding a multi-functional[6] trading platform to operate various types of Russian assets; optimizing the structure of market segments; simplifying trading procedure and access to trading; searching for new products and services to improve the quality of organization and maintenance of interaction between market participants and to position the consolidated exchange as a center for price-setting for Russian assets.

- Reducing trading costs, increasing transparency of the risk management system (mitigating risks of technical failures, arranging the central securities depositary), and increasing liquidity. The merger's "founding fathers" believed that an increase in liquidity would result in an increase in traders / investors and that, in turn, would attract new issuers searching for capital (financial resources).

- Converting the exchange into a private entity, issuing IPO, replacing, in the consolidated exchange ownership, its major shareholder, the Central Bank of Russia (whose share was estimated to be 21-24% at the time of consolidation) with a large foreign player (e.g., Deutsche Boerse).

- Transforming the exchange in the future into an international financial center among the world's top exchanges.

On 19 December 2011 the consolidated exchange held its first trades on a single trading platform. That put an end to a years-long competition between the then largest Russian exchanges, MICEX and RTS.

As a step in implementation of these objectives the Moscow Exchange went public in February 2013, though there is still direct (30%) and indirect (15-17%) state participation in ME ownership.

Comparability of Trading venues pre and Post Consolidation

A comparative study of the exchange performance in the pre- and post-consolidation period can only be valid when conducted for comparable structural units. We confine our quantitative investigation exclusively to the stock market leaving out bond and derivative markets for further research. Stock trading facilities were provided by both exchanges, MICEX and RTS, prior to the consolidation. The CLASSICA sector was the principal stock trading facility on the RTS exchange. It was the oldest regulated Russian stock market founded as far back as 1995 as a non-anonymous stock trading venue with full advance asset depositing and dollar quoting and settlement. Throughout years the CLASSICA sector was modified with a view to improving its attractiveness among traders, decreasing transaction costs and increasing trading efficiency. In particular, the non-anonymous trading (address deals) was complemented by anonymous trading in 2007; full advance asset depositing was abandoned in 2008.

The MICEX Main Market was an alternative stock trading venue. It was featured by full advance asset depositing and by ruble quoting and settlement. In contrast to the CLASSICA sector the Main Market was organized as an order-driven market with orders being placed and matched electronically. Stock trades were settled on a Delivery Versus Payment (DVP) basis in T+0 settlement cycle. The Main Market was by far the most developed trading venue for stocks in Russia. Stock trading on the Main Market constituted up to 80-90% of the overall exchange stock trading in Russia. That can be traced partially from comparing the Main Market trading activity to that on the CLASSICA sector (Fig. 6).

Figure 6: MICEX and RTS monthly stock trading volume of domestic shares (electronic order book), USD billion *(Source: the WFE statistics)*
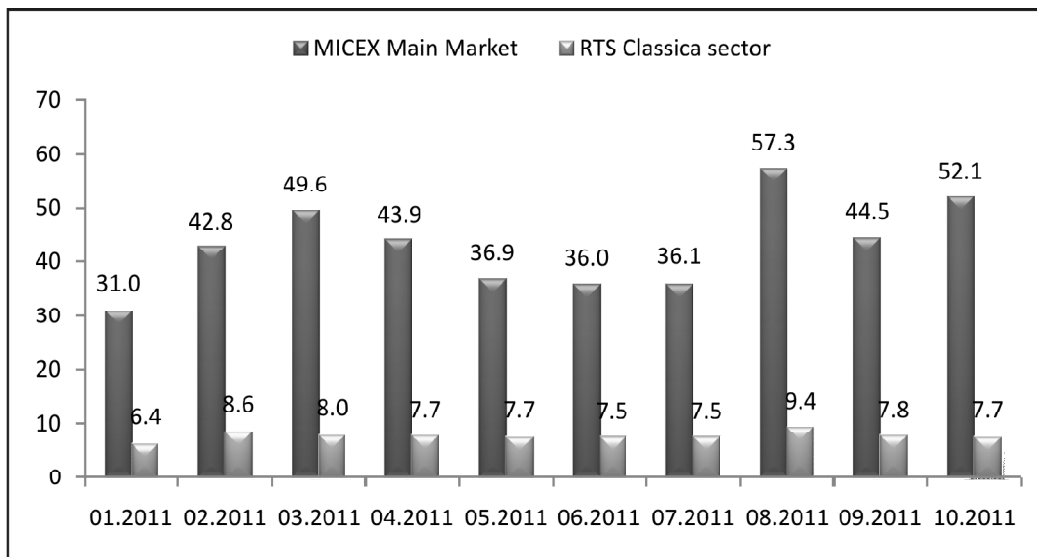
The exchange consolidation did not change structural organization of stock trading in a drastic manner. There are two principal stock trading venues on the Moscow Exchange, the Main Market with a number of trading modes (anonymous deals, negotiated deals, odd lots trading, REPO) and the CLASSICA sector. In the post-consolidation period both trading venues underwent some organizational changes. For instance, since March 2013 stock trades in the Main Market have been implemented in a deferred settlement cycle (T+2). That has been done with a view to improving trading efficiency and enhancing accessibility to Russian stocks for foreign investors. Overall, the Main Market's domination in stock trading has strengthened while the CLASSICA sector has performed rather poorly. Its anonymous trading has been nearly inactive for a long period of time; that can easily be traced from an accessible daily statistics published by the Moscow Exchange.

It is thus justified to compare only the MICEX Main Market and its successor, the Moscow Exchange Main Market, since these are two stock trading venues largely concurring in the way they are organized and function. A common way to conduct a comparative study of stock trading performance pre- and post-consolidation would be to resort to the World Federation of Exchange statistics for the MICEX and the Moscow Exchange. There is however a point about it. The WWE statistics confines to a number of measures of *trading activity*, i.e. monthly trading volume for domestic and foreign issuers, monthly number of trades for domestic and foreign issuers etc. The Main Market is a center of liquidity provision in the Russian stock market. Liquidity is of a broader concept than trading activity (actually liquidity incorporates trading activity) and thus suggests more ways to compare stock trading performance pre and post consolidation. We therefore estimate market-wide liquidity in the Main Market through a number of liquidity proxies specifically computed for the present paper.

3. Concept of Liquidity and Methodology of the Comparative Study

In broad terms high liquidity in a market amounts to saying that there is a high likelihood of buying or selling an asset with *no delay*, at *no extra cost*, with *no major influence on subsequent price dynamics*. Trading in many assets does not meet these conditions; that points out to low liquidity. Thus, a trader / investor willing to buy or sell an asset immediately will possibly face a delay of the trade due to unavailability of an appropriate counterpart to the trade. Even if the counterpart to the trade is available, the trader / investor will possibly have to buy / sell at a higher / lower price than expected due to a wide bid-ask spread for the asset. Finally, if the trade involves dealing with a large amount of the asset, there will possibly be an impact on its price dynamics upwards (in case of buying) or downwards (in case of selling) which will result in inability to complete the trade at the price initially prevailing.

Undoubtedly *time uncertainty* and *unexpected contemporaneous and ensuing price changes* are no mere inconveniences associated with low liquidity in a day-to-day trading on an exchange. These are major hindrances for executing successful trading

strategies. Trading strategies are a set of thoroughly considered trading actions performed at the moment when the actual price prevailing on the exchange reaches a certain predetermined price (a condition to act). Therefore executing a trading strategy at a price which deviates from the predetermined price or at a time which deviates from the time when the condition was met (that, obviously, transfers the trade to a different market microenvironment which may not be any more favorable) *alters the outcome of the trading strategy*.

These considerations refer to the 2nd type of market participants – traders / investors (described in Section 2). However, the 1st type of market participants, listed companies, is also involved. High liquidity facilitates the identification of the fair price of a stock. Low liquidity implies the hazard of a stock mispricing. If a stock tends to be overpriced traders / investors will be willing to sell it. That will bring the price down. If the stock tends to be underpriced traders / investors will be willing to buy it. That will bring the price up. Thus, frequent trading ensures the prevalence of prices which approximate the fair price of the stock with a good degree of precision. Low liquidity is associated with infrequent trading which implies the hazard that the *company may be undervalued / overvalued, sometimes persistently* since there is no trading mechanism to correct the mispricing error as stated by Loderer and Roth (2005).

Buying or selling an asset with *no delay*, at *no extra cost*, with *no major influence on subsequent price dynamics* correspond to three liquidity dimensions – *trading activity*, *trading costs*, and *price impact* respectively. Let us assign quantitative proxies for them as follows. Trading activity is approximated by trading volume and number of trades following Chordia, Roll & Subrahmanyam (2001), trading costs are approximated by a spread between best bid and best ask quotes following Amihud, Mendelson (1986), price impact is approximated by variance ratio following Patnaik, Thomas (2002).

Our quantitative comparative study is based on the procedure of Bacidore (1997) and Barclay *et al.* (1999) and consists in forming market-wide stock samples pre and post consolidation. Two sample periods pre and post consolidation are chosen on the ground that each sample period is sufficiently close to the date of consolidation to reflect the prevailing market microenvironment on one hand but is enough far-off to avoid market disturbances of the near-consolidation period on the other hand. Provided that MICEX and RTS merged into the Moscow Exchange on 19 November 2011 the sample periods are total trading days of September 2011 and total trading days of March 2012. However, *we extend our comparative study further and include yet two more sample periods, total trading days of September 2012 and March 2013*. That is justified on the ground that 19 November 2011 marked the formal rather than the actual merger and merging activities took place gradually rather than immediately. Therefore, we are interested in tracing the merger further.

Numerical values for the quantitative proxies of trading activity are obtained from the MICEX and Moscow Exchange daily statistics. Numerical values for the quantitative proxies of trading costs and market impact are based on BLOOMBERG tick bid and

ask quotes. It is worth mentioning that limit order book data of tick frequency is employed to compute quantitative proxies of trading costs and market impact (bid-ask spread and variance ratio). Best bid and best ask quotes of tick frequency are infrequently employed in research due to their unavailability for researchers or difficulty of their processing otherwise. However, it is this type of data that offers a deep and accurate insight into the actual market microenvironment.

Variance ratio can be obtained from returns calculated from best bid and best ask quotes. Preference for such approach towards calculating returns is justified as follows. First, employing limit order book data we obtain variance ratio with a unique combination of *intraday short periods* (45 minutes) and *daily long periods* (1 day). There are not enough stocks in the Russian stock market which have at least two trades over every 45-minute period (to calculate returns). Calculating returns from best bid and best ask quotes enables us to obtain variance ratio for the full range of the pre- and post-consolidation sample stocks and to estimate the market impact projection of market-wide liquidity. Second, employing best bid and best ask quotes refines statistics mitigating any possible distortions associated with deviation of prices of actually realized trades (buy or sell prices) from the fair price. As stated by Corwin (1999) variances obtained from quote-midpoint returns *are refined from noise arising from bid-ask bounce*.

4. Results and Interpretation of the Comparative Study

The pre- and post-consolidation data for the comparative study is given in Table 1. Trading volume and number of trades are daily estimates averaged over the corresponding month. Trading volume estimate is expressed relative to daily market capitalization. Bid-ask spread is a daily average further averaged over the corresponding month. Bid-ask spread is expressed relative to bid-ask midpoint. Variance ratio includes variances of daily returns (long period) and 45-minute returns (short period) over the corresponding months. The quantitative proxies of liquidity dimensions are given in a form of location parameter – both mean and median. The use of median is justified on the ground that median pays less attention to outliers. It is mentioned in Section 3 that the comparative study of liquidity performance pre and post consolidation is conducted across market-wide samples. The market-wide samples include full range of stocks which were continuously traded during the sample periods and had sufficient trading and EOB data to obtain numerical values for quantitative proxies of liquidity dimensions. There are 164 stocks like that. These stocks are obviously quite diverse in market parameters – blue chips and outsiders, trading in thin and thick markets, having market capitalization from RUR 63.64 million to RUR 3.67 trillion, more and less volatile. It is therefore quite likely that calculated numerical values could be from a heavy-tailed distribution; in this case median is a better statistical indicator of central tendency than mean.

It is reasonable to conduct the comparative study of liquidity performance pre and post consolidation along three liquidity dimensions in the sort-run period (March

Table 1
Data for the Comparative Study of the Pre- and Post-consolidation Samples

		09.2011	*03.2012*	*09.2012*	*03.2013*
Spread, %*	Mean	3.45	2.71	3.16	NA
	Median	1.88	1.26	1.66	NA
	Min	0.02	0.02	0.02	NA
	Max	27.23	17.51	22.32	NA
Variance ratio*	Mean	1.66	1.61	1.70	NA
	Median	1.34	1.30	1.41	NA
	Min	0.31	0.45	0.43	NA
	Max	24.39	6.89	4.91	NA
Trading volume, %**	Mean	0.0903	0.1135	0.0753	0.0819
	Median	0.0217	0.0160	0.0138	0.0126
	Min	0.00006	0.00009	0.00004	0.00001
	Max	1.6136	4.3569	1.0915	3.1591
Number of trades, units**	Mean	3002.76	2373.97	2042.54	1665.43
	Median	69.61	54.40	53.98	40.78
	Min	0.32	0.29	0.25	0.15
	Max	116877.05	89702.29	64435.10	53928.70
Average trade size, %	Mean	0.000696	0.000825	0.007004	0.005198
	Median	0.000215	0.000233	0.000219	0.000174
	Min	0.000005	0.000004	0.000001	0.000001
	Max	0.012488	0.034653	0.212253	0.709911
Sample size, stocks		164	164	164	164
Number of listed companies***		253	323	296	285

* MICEX and Moscow Exchange daily statistics
** Computed numerical values based on Bloomberg limit order book data of tick frequency
*** World Federation of Exchanges statistics

2012), middle-run period (September 2012) and long-run period (March 2013). The data in Table 1 reveals the following.

In the sort-run, trading costs significantly decrease both in mean and median (3.45% versus 2.71% and 1.88% versus 1.26% respectively). This indicates liquidity improvement in its trading costs dimension. Mean variance ratio decreases from 1.66 to 1.61; median variance ratio decreases from 1.34 to 1.30. Provided that the benchmark numerical value for variance ratio is 1, both mean and median values for the March 2012 sample indicate better liquidity in its market impact dimension. Trading volume increases in mean (0.0903% versus 0.1135%) while decreases in median (0.0217 versus 0.0160). The mean and median of trading volume provide conflicting results. It is thus reasonable to resort to alternative indicators of trading activity to bring in a unanimous interpretation of liquidity performance in its trading activity dimension. Mean and median number of trades decreases in March 2012 in comparison to September 2011. However, number of trades as such seems to be a rather poor indicator for the market-wide sample with no further sub-division into subsamples due to its extreme diversity. Thus, a positive / negative change of 1000 trades for *one* highly liquid stock (GAZP,

GMKN, ROSN or SBER) can easily outweigh negative / positive changes in number of trades for *many* less liquid stocks. We therefore calculate additional indicator of trading activity, average trading size, which involves both trading volume and number of trades. The mean and median of average trading size do not provide conflicting results. Average trading size increases in both mean and median (0.000696% versus 0.000825% and 0.000215% versus 0.000233% respectively). An increase in average trading size points out to liquidity improvement in its trading activity dimension. Traders / investors possibly increased trade sizes they dealt in due to lower trading costs (lower bid-ask spread). Overall, liquidity estimates along three liquidity dimensions unanimously points out positive changes. In the short-run the MICEX and RTS merger produced a favorable effect upon liquidity performance in the Russian stock market.

In the middle-run and in the long-run the pattern of liquidity performance mostly coincides along its three dimensions pointing to a trend towards deterioration. Trading costs increase to 3.16% (mean) and to 1.66% (median) in September 2012 approaching their pre-consolidation numerical values. Variance ratio further deviates from the benchmark value of 1; numerical values of September 2012 actually exceed those of September 2011. Finally, trading volume fluctuates between a decrease (September 2012) and an increase (March 2012) when assessed in mean but gradually deteriorates when assessed in median. We apply here the same kind of reasoning that was applied for assessing trading activity in the short-run. Average trade size gradually decreases from March 2012 to March 2013 in both mean and median and this observation evidences in favor deterioration trend in trading activity. Overall, in the middle-run and in long-run there have been negative changes in liquidity performance post consolidation.

We avoid the expression "effect of the MICEX and RTS merger" when interpreting the results in the middle-run and in the long-run. Whether the deterioration of liquidity performance observed in its three dimensions in September 2012 and March 2013 implies that the MICEX and RTS merger has turned out to be ineffective over its implementation with two years or it points out to a certain negative market-wide trend in the Russian stock market is an issue for further research. It is worth mentioning that in March 2013 stock trading in the Moscow Exchange Main Market changed from the T+0 to the T+2 settlement cycle. That has been done with a view to improving trading efficiency and enhancing accessibility to Russian stocks for foreign investors. Continuing deterioration of the market-wide liquidity from September 2012 to March 2013 indicates that the change did not have a favorable effect (at least immediately). A decrease in the number of listed companies (the bottom row of Table 1) can be interpreted as an additional indicator of liquidity performance deterioration. However, a reduction in listed companies due to the exchange merger issues is a mere conjecture. To sum up, there are good reasons to believe that in the short-run the improvement in liquidity performance confirms favorable effect of the MICEX and RTS merger. In the long-run the deterioration in liquidity performance can not be interpreted straightforward as a negative effect of the exchange merger (more precisely, as

ineffective implementation activities upon an extended period of time). Both could be consequences of certain negative market-wide trends.

CONCLUSION

The present paper provides a detailed overview of the exchange consolidation in the Russian financial market. The Moscow Exchange, the largest exchange in the CIS and Eastern Europe was founded in November 2011 upon the MICEX and RTS merger. Identification and description of motivations and objectives for the exchange consolidation is followed by a comparative study of liquidity performance in the Russian stock market pre and post consolidation. We study whether liquidity performance changed upon the exchange merger in a similar manner to research papers which study the gains and effectiveness of institutional / structural changes in organized trading in developed economies.

Nowadays, consolidation of exchanges is a world-wide trend. Specifically in relation to the Moscow Exchange, the consolidation is seen as a way to organize a multi-functional trading platform with a supply of securities of various specifications; to reduce transaction costs; to facilitate the conversion of the exchange into a private company with ensuing issue of IPO; to facilitate transformation of the exchange into an international financial center. The merger is seen as a way to improve the performance of the Russian financial market by organizing a trading platform whose functioning principles and scope would meet international standards. As a step in implementation of these targets the Moscow Exchange went public in February 2013. It is rational to suggest that market-wide liquidity would improve upon implementing the merger. That is essential for overall assessment of the Russian financial market developments on the way towards market maturity and international involvement.

To capture the multifaceted nature of liquidity we assess three liquidity dimensions (trading costs, trading activity, market impact) through four liquidity proxies (bid-ask spread, variance ratio, trading volume, and number of trades). To capture a step-by-step implementation of the merger over an extended period of time the liquidity performance of three post-consolidation samples, March 2012, September 2012, March 2013, is studied in comparison to liquidity performance of one pre-consolidation sample, September 2011. To sum up, the comparative study reveals an improvement in liquidity performance in the short-run performance interpreted as a favorable effect of the MICEX and RTS merger. In the long-run the deterioration in liquidity performance can not be interpreted straightforward as a negative effect of the exchange merger (more precisely, as ineffective implementation activities upon an extended period of time). Both could be consequences of certain negative market-wide trends.

Notes

1.   It can be mentioned that since 2006 MICEX and further the Moscow Exchange have been issuing a list of 50 most liquid securities (stocks and bonds) on a quarterly updated basis

(available at *http://rts.micex.ru/a179*). Liquidity is evaluated from the trading activity point of view (number of trades, number of market participants, trading volume). That is done for a merely technical purpose to identify securities which are eligible as collateral securities for marginal trading on the Moscow Exchange. This requirement is outlined by the Directive "On the Adoption of the Guidance on Liquidity Criteria for Securities" of 7 March 2006 issued by the Federal Agency on Financial Markets (FAFM).

2. An example of an exchange which remains fully state-owned is that of the Tehran Stock Exchange (Iran).

3. MICEX obtained controlling interest in RTS by purchasing shares of 5 private shareholders – Renaissance Capital, Aton, Alpha-Bank, Troika Dialog, Da Vinci Capital. RTS shareholders' stakes were paid out partly by cash (35%) and partly by an exchange for shares of the merged exchange in the 1 to 3 proportion.

4. Founded in 1992, MICEX had 16 shareholders prior to the merger, the major ones being the Central Bank of Russia (28%), Unicredit Bank (12.7%), Vnesheconombank (11.8%), VTB (7.6%), Sberbank (7.5%).

5. RTS was founded in 1995. 20 shareholders had an ownership stake in excess of 94.5% prior to the merger, the major ones being Da Vinci Capital (14.9%), Troika Dialog (10%), KIT Finance (11%), Aton (9.8%), Alpha-Bank (9.6%), Renaissance Broker (9.2%).

6. Privately owned RTS featured trading of small and middle caps and derivatives. It was seen by market participants as a customer-centric exchange, which duly met its customers' demand. MICEX, an entity with a state stake, featured trading in currency and money instruments along with bonds and blue-chips.

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