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Impact of Cross-listing on Local Stock Returns:

Case of Russian ADRs

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Abstract

The paper examines the impact of American Depositary Receipt (ADR) listings on the return of underlying Russian stocks. The contribution of this paper is twofold. First, it looks at a new sample of ADRs issued by Russian companies. Second, the technique used to estimate the market model is different from the previous studies. The returns are modeled to follow a GARCH process, as opposed to the usual OLS procedure, which assumes homoscedasticity in residual returns. Average abnormal returns and cumulative average abnormal returns are calculated for the [–25, +25] event window, with the ADR listing date being the event date. The results indicate a significant negative abnormal local market return on an ADR listing day. Return volatilities after the listing are compared to those before the listing. Eleven out of sixteen companies experienced increased volatility of local returns after cross-listing.

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1 Introduction

Emerging capital markets in transition economies often suffer from low liquidity, insufficient regulation, institutional fragility, and weak minority shareholder protection. All these features apply to the Russian stock market. The objective of this paper is to test the hypothesis of a beneficial cross-listing effect on the companies from a previously closed market. Theory suggests that stock prices from firms that cross-list from segmented markets with investment barriers can be expected to rise, while their subsequent expected returns should fall as an additional built-in risk premium for these barriers disappears (Hargis and Ramanlal, 1998). Factors driving returns may also include investor recognition and liquidity factors. Doidge, Karolyi and Stulz (2003) suggest an alternative explanation based on concentration of ownership. Controlling shareholders of firms listed in the US cannot extract as many private benefits from control compared to controlling shareholders of firms not listed in the US, and cross-listed firms are better able to take advantage of growth opportunities. Consequently, the interests of cross-listed companies could be expected to be better aligned with those of minority shareholders. Protection of minority shareholders is also desirable for companies when entering foreign markets.

This paper examines local market reactions to ADR issues by comparing returns and variances before and after the listing date. The stock price reaction across types of ADRs is also compared, as each ADR program provides various degrees of liquidity and investor recognition with different disclosure requirements.

The paper is divided into three sections: a literature review, a description of the data and empirical methodology used in estimation of abnormal returns, and a presentation of the empirical results and conclusions.

2 Literature review

An extensive body of literature deals with the valuation effects of cross-listing on underlying stocks. When considering the effects of international cross-listing, the degree of integration between local and foreign markets plays an important role. A concern among policymakers in emerging markets is that cross-listing may lower economic growth by diverting order flow from their domestic markets to more developed foreign markets. Moreover, an extensively integrated global economy faces a strong risk of contagion during a downturn. Karolyi (1996) allays these fears to some extent with evidence of positive globalization effects. He documents liquidity improvement, increased total post-listing trading volume on average, as well as higher home trading volume for many issues. Hargis (1997) and Smith and Sofianos (1997) find that cross-listing boosts volume and improves liquidity, even where the foreign market dominates trading. Notably, there is little agreement among authors as to what causes these effects. Domowitz, Glen and Madhavan (1998) argue that liquidity and volume effects depend on prior ownership restrictions across share classes, ownership restrictions across markets, and listing classifications. Karolyi (1996) attributes liquidity improvement to listing location and the scope of foreign ownership restrictions in the home market. Hargis (1997) finds the total and home market volume of cross-listed shares is larger for listings originating in emerging markets and depends on the ability of cross-listing to expand the international shareholder base.

In one of the earliest papers on the volatility effect, Jayaraman, Shastri and Tandon (1993) examine the case of ADR listings in the US. They use the sample of 95 firms registered abroad that had an ADR initially listed on US exchange during the period 1983 to 1988. Their sample consists of ADRs from Japan, United Kingdom, Australia, France, Germany, Italy, and Sweden. The authors find that the listing of ADRs is associated with a positive significant daily excess return of 0.47% on the underlying stock, which is primarily driven by Japanese firms. A possible explanation is that the listing of ADRs provides the company with access to another capital market, thus allowing it to choose the lower-cost source of capital. Comparison of variances of daily returns around the listing dates shows that the listing of ADRs is associated with an average increase of 55% in variance of returns. The result is consistent with the information hypothesis of Freedman (1989), who suggests that cross-listing provides informed traders with additional opportunities to profit from their long-lived information.

Martell, Rodrigues and Webb (1999) investigate the risk and return of 25 Latin American equity issues following the introduction of their ADRs in US equity markets in 1990 to 1994. Very few of the daily average excess returns are statistically significant, suggesting that the introduction of ADRs in New York had no significant impact on the underlying Latin American stocks. The study also examines the cumulative average abnormal returns. The pattern of price increases in the two-month period prior to ADR introduction peaks about seven trading days before introduction. This is consistent with the literature on domestic listings, whereby price run-ups are observed prior to domestic listing transfers. Moreover, there is a decrease in CAAR after introduction: the CAAR between event days –1 and +25 is – 4.56%, which is highly significant at the 5% level. Such patterns are consistent with the hypothesis of managerial timing, i.e. managers select well-performing stocks with a considerable investor interest for ADR listings. After the ADR introduction, the stocks revert to a lower long-run level of performance. Impact on volatility of stock returns is studied comparing the variances of the stock returns before and after the introduction of ADRs. The authors conclude that ADR introduction has no consistent impact on volatility.

Lau, Diltz and Apilado (1994) examine valuation effects of international stock exchange listings of US companies. Their sample covers 346 listings by US firms involving eight countries from 1962 to 1990. The data include US stock listings on all major European exchanges, as well as the Toronto and Tokyo stock exchanges. The study considers the first trading day, the firm's date of application for listing and date of acceptance of the application. To examine the returns for an eleven-day window surrounding these three event days, the authors use the single-factor market model to generate abnormal returns.

For the eleven days surrounding a firm's date of application for listing, no significant abnormal returns are detected, with the exception of Day –3. Similarly, no significant single-day abnormal returns are detected in the eleven days surrounding the firm's date of acceptance for listing. The authors attribute the absence of significance to the fact that the application and acceptance dates are rarely published in newspapers and known to investors only on a limited basis. Thus, the absence of one-day abnormal returns may not necessarily imply that listings have no valuation consequences. A story is different for the first trading day. A statistically significant negative abnormal return is detected on that day. This suggests that the announcement of foreign stock listings is associated with a temporary negative valuation impact. There is also a significant negative cumulative average abnormal return over the interval [–5, +3] days around the first trading day. This contradicts the results of a positive daily excess return found by Jayaraman et al. (1993) for

foreign companies listing an ADR on US exchange. One possible explanation is that listing on the US market provides access to a lower-cost source of capital, while cross-listing of American companies abroad does not benefit them in the same sense.

The authors compute the cumulative average abnormal returns for the 125-day post-listing period for the full sample and separately for each foreign stock exchange. Overall, the findings reveal negative CAARs of 3.95% over the first 125 trading days. Trading on two of the ten exchanges (Tokyo and Basel) generates the negative returns. The result for Tokyo Stock Exchange may be explained by the extension of trading hours when US stocks are traded, which supports both the private information and noise trading hypotheses.

The study tests for the change in variability of the returns after the cross-listing, a proxy for systematic risk of a company. For each firm in the sample an F-statistic is calculated. F-statistic frequencies appear to be fairly symmetrically distributed, implying there is no clear pattern when comparing estimation period variances with event window variances. In other words, any abnormal returns found in the study were not caused by changes in the firm's systematic risk. Variance did not change significantly.

Miller (1999) tests for the different price response to cross-listings depending on the ADR type. He finds that foreign firms that list on NYSE or NASDAQ experience the largest stock price response. Average abnormal returns are smallest for the firms that dual-list on PORTAL. This is consistent with superior liquidity and investor recognition hypotheses. Using a sample of 181 stocks that announced their first ADR program over the period from 1985 to 1995, Miller also reports a normal post-listing performance. Taken together these effects are consistent with the equilibrium models of asset pricing under barriers to capital flows. Share value increases and cost of capital declines as a result of listing. These results are expected to hold for our sample of Russian stocks.

Podpiera (2001) extends the earlier model of Domowitz, Glen and Madhavan (1998) and estimates it using data on stocks from Central Europe (Czech Republic, Hungary and Poland) that are cross-listed on the London Stock Exchange. First, the paper uses the Granger causality framework and a cointegration/error correction to determine whether and to what extent the information flows between local and foreign markets are important. The markets appear to be fragmented as investors watch and react to the differences between the local and the London prices. The two time series of prices are cointegrated and estimation of an error correction model suggests that arbitrage works in all markets to correct any pricing errors. Granger causality is found to run in both directions, although the London market appears slightly more important.

Podpiera next considers on the return volatility of cross-listed stocks. According to the model, return variance of cross-listed securities on a partially fragmented market can be decomposed into three components. First is base line volatility, which is determined by the realization of new information and market frictions unrelated to the second factor, the magnitude and characteristics of order flow (liquidity), and the third, foreign market volatility. by Domowitz et al. (1998) examine the first two factors using data on Mexican equities. The third factor is transferred to the local price of the cross-listed security through pricing errors and utilization of arbitrage opportunities by investors. Podpiera finds that for seven out of ten stocks volatility increased after the GDR listing.

Lowengrub and Melvin (2000) examine volume and volatility before and after international cross-listing using intraday data for the 23 German firms that issued ADRs between 1991 and 1997. The intraday volatility pattern flattens after cross-listing. Podpiera (2001) extends the earlier model of Domowitz et al. (1998) and estimates it using data on stocks from Central Europe (Czech Republic, Hungary, and Poland) that are cross-listed on

the London Stock Exchange. He finds that for seven out of ten stocks volatility increased after the GDR listing.

The results of the studies summarized above, though sometimes conflicting, point to a common finding, i.e. the degree of intermarket transparency matters a great deal in the subsequent price reaction of the underlying stock. Most cross-listings are made to avoid previous market segmentation and provide companies with the improved capital access. Strong information linkages between the two markets are beneficial. Overall, degree of information flows between domestic and foreign markets proves to be very important for the cross-listing effect.

The next section describes the Russian market for ADRs. One would expect a great degree of fragmentation with the US market due to strict restrictions on foreign activities prior to 1989.

3 Stock price response to a depositary program

Sample Description: Russian ADRs

The sample consists of 16 companies domiciled in Russia that announced their first ADR program during the period 1995 to 2001. The sample is constructed from the data compiled by the Bank of New York. The Bank of New York website (www.bankofnewyork.com/adr) provides a complete list of ADRs with the symbol, CUSIP, exchange, country, industry, type of DR, and effective date. There are 91 ADR issues from Russia. First requirement for a company to be included in the sample is the availability of local market price data. I matched the ADR list with the Datastream information on Russian companies. I found local market closing daily prices for 30 firms that issued ADRs. A second requirement for a company to be included in the sample was an identifiable listing date. Following Martell, Rodriguez and Webb (1999), I chose the actual ADR introduction as opposed to an ADR announcement as the event date. The listing date marks the time when effects on the underlying stock can be realized through actual ADR trading. It appears that information revealed in the transactions matters more than the announcement of future trading opportunities. The regular approach to getting announcement dates for cross-listed companies involves searching for the first news release on that matter. I used LEXIS-NEXIS to find announcements dates for the companies in my sample. Unfortunately, the results were conflicting, with some announcement dates occurring after the actual trading dates. Hence, I use the actual listing date as the event date in this paper. Listing dates were obtained from the Bank of New York database on ADRs.

Closing prices for each stock as well as the national market index are compiled from the Datastream International database. Each company is required to have return data at least 175 days before and 175 days after the listing date. This relatively small window is justified by availability of the local stock data. Only 20 firms had a window of this length. Since we are looking at American Depositary Receipts here, I eliminated the four companies that issued off-shore Regulation S depositary receipts.1 Thus, the total sample

[1] The Regulation S program allows raising capital through the placement of depositary receipts off-shore to non-US investors in reliance on Regulation S.

size is 16 companies that issued ADRs in the period from 1995 to 2001. Table 1 provides summary of the sample.

Table 1. Types of ADRs.

ADR type /Trading location	Number of firms
Rule 144 / PORTAL	1
OTC pink sheets (Level 1)	13
NYSE (Level 2)	2
Total sample size	*16*

Two Russian ADRs are traded on NYSE; thirteen are traded over the counter (Level 1), and one is rule 144A (privately placed). All of the depositary receipts in the sample are sponsored, i.e. issued with a formal agreement with a company. Level 1 ADR Program is the simplest way for companies to access the US capital markets. Level 1 ADRs are traded in the US over-the-counter (OTC) market with prices published in the "pink sheets." The issue of a Level 1 ADR does not require full SEC registration and the company does not have to report its accounts under US Generally Accepted Accounting Principles (GAAP) or provide full SEC disclosure. Level 1 ADR program allows companies to enjoy the benefits of a publicly traded security without changing its current reporting process since it uses existing shares, and hence does not raise new capital. A cost of issue to the company is estimated to be less than $25,000 (as reported by Miller, 1999, p.107). Generally, the majority of ADR issues are of Level 1 type. This holds for our sample (see table 2). Thirteen companies have issued Level 1 ADRs.

Sponsored Level 2 Depositary Receipts are exchange-listed securities, but they do not raise new equity capital for a company. These ADRs require SEC registration and adherence to applicable requirements for US GAAP. The issue costs to a company vary from $200,000 to $700,000. Tatneft and Rostelecom are the only two companies in the sample that have listed their ADRs on the NYSE.

Privately placed (SEC Rule 144a) Depositary receipts do not require SEC registration. Rule 144a programs provide for raising capital through the private placement of DRs with large institutional investors. Level 1 program can be established along side a Rule 144a program. These programs are rather costly: $250,00-500,000 per issue. One company (Aeroflot) issued a Rule 144a ADR.

Table 2. Basic Characteristics of Cross-Listed Stocks.

	Company name	Type of issue	**Industry**	Market Cap, US$	Effective date
1	Aeroflot	144a	Airlines	388,175,845	Dec-22-2000
2	AO Mosenergo	Level 1	Utility – Gas and Electric	1,201,378,963	July-17-1997
3	AO Surgutneftegas	Level 1	Oil and Gas – Service	11,546,646,965	Dec-30-1996
4	Bank Vozrozhdeniye	Level 1	Banking	41,000,705	July-03-1996
5	Chernogorneft	Level 1	Oil and Gas – Service	66,927,505	Mar-01-1996
6	Irkutskenergo	Level 1	Utility – Gas and Electric	383,251,379	Jan-23-1997
7	Samaraenergo	Level 1	Utility – Gas and Electric	119,233,240	Feb-09-1998
8	Lukoil	Level 1	Oil and Gas – Service	12,183,889,751	Dec-01-1995
9	Moscow City Telephone Network	Level 1	Telecom – Data Networking	578,760,241	June-21-1999
10	Norilsk Nickel	Level 1	Mining and Minerals	3,162,888,660	June-15-2001
11	Rostelecom	Level 2	Telecom-Data Networking	847,716,344	Feb-12-1998
12	Seversky Tube Works	Level 1	Steel	33,690,300	Feb-01-2001
13	Sibneft	Level 1	Oil and Gas – Service	4,443,071,293	Apr-20-1999
14	Tatneft	Level 2	Oil and Gas – Service	1,105,685,429	Mar-25-1998
15	TSUM	Level 1	Household Products and Appliances	30,483,380	July-03-1997
16	GUM	Level 1	Retailing	93,000,006	June-07-1996

The following section describes the methodology of this study.

Empirical Method

An event study procedure is used to measure changes in share value around the listing date. Local returns are computed as follows:

$$R_t = ln\,(P_t\ ) - ln\,(P_{t-1}), \quad (1)$$

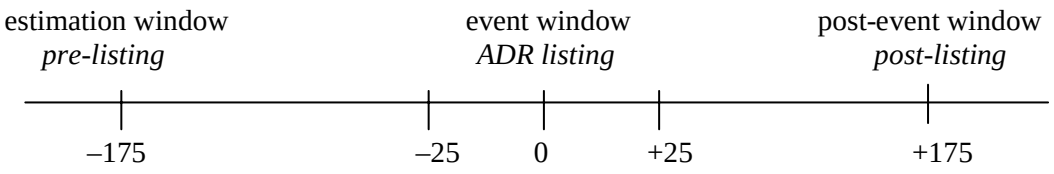
where P_t is daily closing price.

To measure abnormal return I estimate a market model for each firm using local stock returns denominated in US dollars. With the listing date defined as Day 0, the market coefficients are estimated in the pre-listing period: Day –175 to Day –26. The next section describes the market model in detail.

Following the technique used by Jayaraman, Shastri and Tandon (1993), 51 days around listing are excluded to allow for a permanent effect. It is typical for the estimation and the event windows not to overlap, as noted by Campbell et al. (1997, p. 158). This design provides the estimators for the parameters of the normal return model that are not influenced by the event-related returns. Including the event window in the estimation of the parameters of the market model could lead to the event returns having a large influence on normal return measure. In this situation, both the normal and abnormal returns would reflect the impact of the cross-listing. This is problematic since the methodology implicitly

assumes that the event is exogenous with respect to the change in market value of the security. Figure 1 shows the non-overlapping windows.

Figure 1. Time Line for the Cross-listing Study



Abnormal returns in the event window are determined by the prediction errors from the market model. Coefficients from the pre-listing model are used to calculate abnormal returns from Day –25 to Day +25. Abnormal returns are then averaged across firms (average abnormal returns) and across time (cumulative abnormal returns).

Market Model Specification

Stock returns are modeled using the GARCH and ARCH-in-mean specification. Finance theory suggests that an asset with a higher perceived risk would on average pay a higher return. If we decompose the difference of ex-post return and the risk-free rate into the unanticipated mean component and unanticipated error component, then theory suggests that mean return is a function of variance and the residual return can be modeled as an ARCH-in-mean process.

The presence of heteroscedasticity in residual returns, if not properly explicitly accounted for, leads to inefficient parameter estimates and biased, inconsistent test statistics in many estimated asset-pricing models. Moreover, as noted by Giacotto and Ali (1982), standard event studies testing for the effects of firm-specific events on security prices must be modified if heteroscedasticity is present. Finally, Diebold, Lim and Lee (1992) state that because excess unconditional kurtosis may be unrelated to conditional heteroscedasticity, examining time-varying volatility may shed light on the non-normality of stock returns, as well as on convergence to normality under temporal aggregation.

In a GARCH model the conditional variance of market model residual returns is permitted to move in autoregressive fashion. The model follows the one introduced by Diebold et al. (1992). A market model with *p*th and *q*th order GARCH disturbances for a particular firm *i* is written as:

$$R_t^{\,i} = X_t^{\,i}\ \beta^{\,i} + \varepsilon_{\,t}^{\,i}, \qquad (2)$$

$$\varepsilon_t^{\,i} \mid \Omega_{t-1}^{\,i} \sim N\,(0,\, h_t^{\,i}),$$

where $h_t^{\,i} = \alpha_0^{\,i} + \Sigma_j \alpha_j^{\,i} (\varepsilon_{t-j}^{\,i})^2 + \Sigma_k \gamma_k^{\,i} (h_{t-k})$ is conditional variance of the error term, and
$\alpha_0^{\,i} > 0, \quad \alpha_t^{\,i} >= 0, \qquad j=1, \ldots, q; \quad k=1, \ldots, p.$
$R_t^{\,i}$ is the return on the stock of firm *i* at time *t* (in US dollars);
$\Omega_{t-1}^{\,i}$ is the information set that contains $\varepsilon_{t-1}^{\,i}, \varepsilon_{t-2}^{\,i}, \ldots, \varepsilon_{t-p}^{\,i}$; and t= 1, …, T indexes time.

The row vector $X_t^{\ i}$ contains an intercept, the local market index return and the US market index return.[2]

The Russian market index closing prices are taken from Datastream International, which quotes the prices in US dollars. The S&P 500 composite index return is used as a proxy for US market return. The US return data are obtained from the CRSP database.

First, I implement Lagrange multiplier (LM) and Portmanteau Q tests to check for heteroscedasticity in the returns. The results indicate that the returns exhibit heteroscedasticity.

The AUTOREG procedure in SAS is used to test, first, for the number of lagged error terms (*q*) in the variance of error term, and second, whether unconditional variance depends on the previous variances (*p* order). Most of the companies' returns exhibit GARCH (1,1) process.

The daily abnormal return for security *i* for day *t*, AR_{it}, is calculated as:

$$AR_{it} = R_{it} - (X_t^{\ i} \ \beta^{i}), \quad (3)$$

where β^{i} is the vector of the estimated intercept and the coefficients for local market and US market proxies from the market model (equation 2).

The daily abnormal returns are then averaged across N securities, weighted by companies' size, on Day t to compute the average abnormal return:

$$AR_t = \Sigma_i (AR_{it} \ w_i), \quad (4)$$

where $w_i = MarketCap_i \ / \ \Sigma_i (MarketCap_i)$ is the weight of each company, based on its market capitalization in US dollars.

To judge the statistical significance of the abnormal returns, the Dodd and Warner (1983) methodology was then used to compute standardized abnormal returns and their test statistics. For each security *i*, the daily abnormal return AR_{it} is standardized by the square root of its estimated forecast variance to determine its standardized abnormal return:

$$SAR_{it} = AR_{it} / s_{it} \quad (5)$$

where: $s_{it} = \{ s_i^2 [1+1/L+(R_{mt}-R`_m)(R_{ust}-R`_{us}) / \Sigma_{k=1}^{L} (R_{mk}-R`_m)(R_{usk}-R`_{us})]\}^{1/2}$

where s_i^2 is the estimated residual variance from the market model regression for security *i*, R_{mt} is the local market return on day t, R_{ust} is the US market return on day t, $R`_m$ is the mean local market return over the L days used to estimate the regression, $R`_{us}$ is the mean return on the US market index over the L days used to estimate the regression. For each day *t* of the event period, a test statistic Z_t is calculated:

$$Z_t = \Sigma_{i=1}^{N} SAR_{it} (1/N)^{1/2} \quad (6)$$

[2] If the markets are not completely segmented, the firm's shares may be priced with respect to its home market, as well as the market where it dual-lists [Stapleton and Subrahmanyam (1977), Miller (1999)]. Predicted returns are determined from the multivariate regression of the domestic market proxy and the S&P500 index.

Cumulative average abnormal returns were calculated as follows:

$$CAR_{t,T} = \Sigma_{t=1}^{T} AR_{t,} \quad (7)$$

where T is the number of days in the accumulation period. Cumulative test statistics are calculated as follows:

$$CZ_t = \Sigma_{i=1}^{T} Z_t \ (1/T)^{1/2}. \quad (8)$$

The event window extends from 25 days prior to the event day to 25 days after the event day. Number of days in the market regression is 150 (L=150).

4 Results

On the listing day, Day 0, the local market exhibits negative statistically significant average abnormal return of 1.045%. Table 3 presents the daily average abnormal returns (AR_{it}), and the cumulative abnormal returns for Day –25 through Day +25 around the listing date. This result conforms with the findings of Lau, Diltz and Apilado (1994), who found temporary negative valuation impact on the first trading date for the sample of US companies listing abroad. The authors also found a significant negative cumulative average abnormal return over the interval [–5, +3] days around the first trading day. This contradicts the results of a positive daily excess return found by Jayaraman et al. (1993) for foreign companies listing an ADR on US exchange.

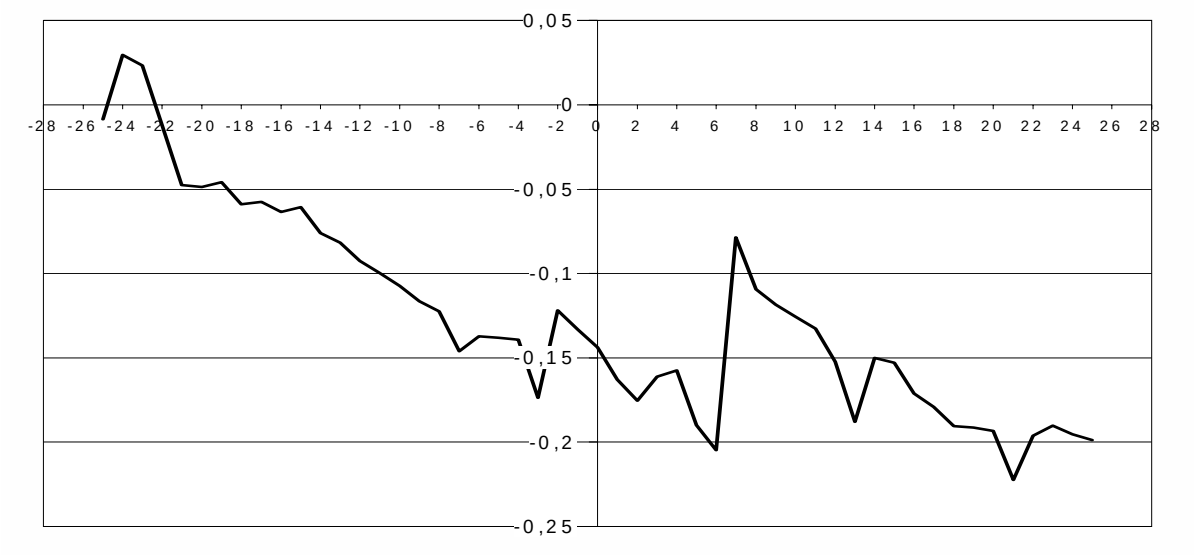
Table 3. Average Abnormal Returns ($AAR_{t,T}$) , Cumulative Abnormal Returns ($CAR_{t,T}$) and the percentage of firms with nonnegative abnormal returns.

$AAR_{t,T}$	$CAR_{t,T}$	Days
-0.0084369**	-0.00844	-25
-0.0010037	-0.04869	-20
0.0029113	-0.06068	-15
-0.0076629	-0.10726	-10
-0.0011306	-0.13826	-5
0.0518202	-0.12195	-2
-0.011274**	-0.13322	-1
-0.0104517**	-0.14368	0
-0.0193449**	-0.16302	1
-0.012365**	-0.17539	2
-0.0327492**	-0.19012	5
-0.0072274	-0.12569	10
-0.0027633	-0.15288	15
-0.0019355	-0.19347	20
-0.0035263	-0.19878	25

** indicates significance at 5%; * indicates significance at 10%.

Most of the cumulative abnormal returns are negative, but statistically insignificant. This is consistent with a normal post-listing performance documented by Miller (1999). Figure 2 presents cumulative abnormal returns in the event window.

Figure 2. Cumulative abnormal returns from Day –25 before the listing to Day +25 after the listing of an American Depositary Receipt program.



Note: The daily abnormal returns are averaged across firms and then cumulated.
The sample includes 16 companies.

This finding contradicts the hypothesis of beneficial cross-listing effect for the stocks from developing markets. Once the data become available, it would be interesting to check the long-run performance of dual-listed Russian stocks after listing.

Table 4 presents average abnormal returns around the listing by the ADR type. Russian companies that list their ADRs over the counter as pink sheets experience the least negative stock response in the local market. Consistent with Miller's (1999) findings, NYSE cross-listing provides the favorable significant response from the local investors.

Table 4. Average abnormal returns around the listing of ADR by equity offering type.

ADR type	t=-25 to -2	t=-1 to +1	t=+2 to+25
Rule 144 / PORTAL	-0.00799	-0.05371	-0.14718
OTC pink sheets (Level 1)	0.04758	-0.00937	0.04996
NYSE (Level 2)	0.00578**	-0.05726	-0.05053
Total sample	0.04546	-0.12028	-0.14775

** significant at 5%.

These results are most likely related to the costs of ADR issue. The least costly pink sheets Level 1 ADRs provided the most favorable local market response. This is a puzzling result, since liquidity and investor recognition hypothesis would predict that firms that list on

PORTAL as Level 1 ADRs would get low investor awareness and the smallest price response (Miller, 1999). The result might be attributed to the fact that local investors are seeking for the cheapest ways to access overseas markets, trying to keep issuing costs down.

Next I compare the volatilities of stock returns before and after the ADR listing. The window used for the before period is [–175, –26] days, and [+26, +175] days for the after period. Variance ratios are computed as:

$$\text{Ratio} = (\text{VAR after}) / (\text{VAR before}). \quad (9)$$

Thus, if the ratio is greater than one, the variability of stock returns increased after the ADR introduction, and vice versa.

Table 5 shows the variance ratios for the sample companies. Eleven of the ratios are greater than one, and ten of them are statistically significant based on an F-ratio test of whether the variance ratio is equal to one. This means that most of the companies in the sample experienced a greater volatility of returns after the ADR listing. Five firms have variance ratios less than one. Four of these ratios are statistically significant at the 5% level of confidence, implying that return variance for the four companies in the sample reduced after the listing.

The return volatilities did not change consistently for the whole sample, with most companies experiencing an increase in volatility of local stock returns. The result can be attributed to low degree of information transparency between the local and the US markets.

Table 5. Variance Ratios.

	Company Name	Type of issue	Variance ratio
1.	Aeroflot	144a	1.141994
2	AO Mosenergo	Level 1	1.823032**
3	AO Surgutneftegas	Level 1	0.063245**
4	Bank Vozrozhdeniye	Level 1	5.77629**
5	Chernogorneft	Level 1	16.306834**
6	Irkutskenergo	Level 1	0.226385**
7	Samaraenergo	Level 1	8.685847**
8	Lukoil	Level 1	0.074944**
9	Moscow City Telephone Network	Level 1	0.838374
10	Norilsk Nickel	Level 1	4.106529**
11	Rostelecom	Level 2	2.008565**
12	Seversky Tube Works	Level 1	2.096824**
13	Sibneft	Level 1	0.085432**
14	Tatneft	Level 2	4.939007**
15	TSUM	Level 1	1.963676**
16	GUM	Level 1	5.598065**

** indicates significance at 5%; * indicates significance at 10%.

Note: Ratios compare variance after the listing to variance before the listing. Before period includes [–175, –26] days before the listing. After period includes [+26, +175] days after the listing.

Number of ratios greater than one: 11
Number of ratios less than one: 5

5 Conclusions

This paper investigated the local market response to listing abroad. Empirical evidence on the effects of international cross-listing on the underlying stocks is mixed. The findings presented here indicate that conditions under which ADR introductions from emerging markets affect the underlying stock still require further clarification.

Using a traditional event study methodology with a modified covariance structure of returns, the paper tested the hypothesis of beneficial cross listing effect on companies from Russia. Available data relating to stock prices in developing countries and transition economies, in particular, are subject to shortcomings. The paper used the most recent sources that can be taken as generally comparable. Nevertheless, the results here need to be interpreted cautiously. In general, empirical evidence provides no support to the hypothesis of favorable market reaction to a listing of ADR. Significant negative abnormal return was found on the day of the ADR listing. This finding is consistent with Lau et al (1994), who used a sample of US companies listing abroad. Overall, the results of this study do not support investor recognition and liquidity hypothesis. ADR issues by Russian companies did not earn positive abnormal returns on the listing date. A possible explanation may be the choice of event window. Since the data on announcement day of ADR listing was unreliable, this paper used listing day with 175 days around it. The market beta may be overestimated, because local stock returns might have increased after the announcement day and the abnormal return could be underestimated (see equation 3).

When considering variance of returns after the cross-listing, the results indicate increased variance of returns for most companies in the sample. ADR listing provides greater transparency and awareness of the company abroad, with more trades being executed in both markets. The result of increased variance is consistent with Freedman's (1989) private information hypothesis, whereby an increase in variance is connected to more private information acquired by informed traders after the cross-listing.[3]

Since this paper merely intended as a first look at an issue of interest, many valuable aspects were beyond the scope of the research. Further investigation of the cross-listing effects will be possible when comparable and complete data sources are provided by companies and statistical offices of transition countries.

[3] Freedman (1989) examines the impact of allowing informed traders to allocate their trading of a cross-listed stock optimally between foreign and domestic markets. The model allows for long-lived private information by assuming a two-period structure. Cross-listing provides informed traders with additional opportunities to profit from their long-lived information, as well as increases the variance of returns in the domestic exchange, regardless of the number of informed traders or liquidity traders. Ultimately, additional information is revealed.

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