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Veröffentlichungsversion / Published Version
Zeitschriftenartikel / journal article

Empfohlene Zitierung / Suggested Citation:
Nivorozhkin, E., & Castagneto-Gissey, G. (2016). Russian stock market in the aftermath of the Ukrainian crisis. *Russian Journal of Economics*, *2*(1), 23-40. https://doi.org/10.1016/j.ruje.2016.04.002

Available online at www.sciencedirect.com

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Russian Journal of Economics 2 (2016) 23–40

Russian Journal of Economics

www.rujec.org

Russian stock market in the aftermath of the Ukrainian crisis

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Abstract

This paper studies the dynamic relationship between returns in the Russian stock market and global equity markets in the aftermath of the 2014 Ukrainian crisis. We apply dynamic goodness-of-fit and bootstrapped regression approaches to study the behavior of global equity indices. Our results reveal a significant fall in the degree of synchronicity between the Russian and global equity returns after the crisis outbreak. The Russian stock market clearly decoupled from both developed and emerging markets, as shown by a 30–50% decline in returns correlation. In view of dramatic increase in synchronicity across the Russian sectoral stock indices after the sanctions were introduced, our results suggest that the economic sanctions imposed on Russia during that period have effectively isolated the Russian equity market from the rest of the world and triggered extensive portfolio outflows from the Russian market. As a result of the economic sanctions and the limited choice of investments in Russia, the decreased co-movement between the Russian and global equity returns is unlikely to provide investors with superior diversification opportunities, whilst the returns of the Russian market in the medium-term will likely continue to be predominately driven by idiosyncratic news.

JEL classification: F30, E30, C32, F42.
Keywords: synchronicity, decoupling, equity, stock market, Ukrainian crisis, Russia.

1. Introduction

This paper is concerned with the effect of the ongoing Ukrainian crisis, and the resulting Western sanctions imposed on the Russian Federation, on the Russian

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Peer review under responsibility of Voprosy Ekonomiki.

http://dx.doi.org/10.1016/j.ruje.2016.04.002

stock market. Recently, Castagneto-Gissey and Nivorozhkin (2015) studied the effects of the political and security crisis in Ukraine on the co-movement between the Russian equity market and a large sample of international markets. Contrary to expectations, the results of this study did not reveal any increased co-movement between the Russian stock market return and returns in countries with relatively close economic ties to Russia. In fact, the decrease in returns correlation with the Russian stock market occurred rather uniformly across developed, emerging, and frontier markets, regardless of the strength of economic links with Russia. The degree of co-movement between developed, emerging, and frontier stock markets and the Russian stock market decreased significantly in about 85% of cases, with the decrease in correlation ranging from 46 to 83%. Such overwhelming evidence, obtained using a range of advanced time-series techniques, indicated that the Russian equity market had largely decoupled from global equity markets in the aftermath of the Ukrainian crisis.[1] In relation to the stock market, it appeared that the political and economic sanctions imposed on Russia were successful in generating idiosyncratic shocks for the country whilst yielding limited repercussions on the rest of the world.

This paper provides further insights into the issue of the Russian stock market decoupling from global markets in the aftermath of the Ukrainian crisis by adopting the coefficient of determination (*R*-squared) of the market model as a measure of synchronicity of stock price movements. We further check the robustness of our results by applying a bootstrapped regression approach to the market model.

Earlier results indicate that *R*-squared statistics of the market model tended to be inversely related to the level of financial development of the countries. Morck et al. (2000) show that the average *R*-squared at the firm level tends to be higher in countries with relatively low per-capita GDP and less-developed financial systems. The authors suggest that the leading explanation for the observed phenomenon is the relatively low number of informed traders relative to noise traders in the countries with poor protection of investors' property rights, which could make trades based on firm-specific information less useful. As expected, we observed a higher *R*-squared in models of emerging markets than developed markets, presumably due to "herding" behavior of investors, which makes them more likely to focus on countries rather than individual stocks in trading activities. Jin and Myers (2006) extend the argument of Morck et al. (2000) and assert that some degree of opaqueness, or lack of transparency, at the firm level and imperfect protection for investors are mutually reinforcing as, for example, one would not expect perfect protection of investors in an opaque firm. As expected, the authors find that the *R*-squared statistics were higher in more opaque countries.[2]

Of course, as argued in Jin and Myers (2006), the inverse relationship between financial development and *R*-squared is not necessarily reflective of corporate gov-

[1] The authors also find that the 2014 turmoil period was associated with large transmissions of volatility associated with the Russian stock market, which coincided in many cases with the appearance of asymmetric effects.

[2] Hutton et al. (2009) investigate the relation between the transparency of financial statements and the distribution of stock returns. Using earnings management as a measure of opacity, they find that opacity is associated with higher R^2s, indicating less revelation of firm-specific information. Moreover, opaque firms were found to be more prone to stock price crashes, consistent with the prediction of the Jin and Myers (2006). Chan and Hameed (2006) used the *R*-squared statistics of the market model to examine the relation between the stock price synchronicity and analyst activity in emerging markets. They found that securities covered by a larger number of analysts incorporated greater (lesser) market-wide (firm-specific) information.

ernance factors. Higher macroeconomic risk or lack of diversification across industries could also explain the observed patterns in smaller or less-developed markets.

This paper does not attempt to explain the cross-sectional variation in the degree of synchronicity, focusing instead on explaining the variation of this measure over time in a single country, Russia. Using the equity market indices provided by Morgan Stanley Capital International Inc. (MSCI) and Datastream Global Equity Indices, we show that the influence of the world stock markets on the Russian stock market had considerably decreased in the aftermath of the Ukrainian crisis. The decline in the degree of co-movement of the MSCI Russia Index US dollar returns of the magnitude of 30–40% is observed not only with respect to the MSCI AC World, but also with respect to the MSCI Emerging Markets, and MSCI BRIC, which belong to the same "emerging markets" asset class as the Russian market. Our results are consistent with the hypothesized effect of economic sanctions imposed on Russia, which produced an idiosyncratic shock and effectively isolated the Russian market.

While still being regarded as a major emerging market, the Russian stock market's declining capitalization and free-float led to a dramatic fall in Russia's weight in investable equity indices, such as the MSCI Emerging Markets Index. Despite the attractive valuations in the Russian equity market,[3] the choice of available investments remains limited due to the sanctions imposed on the country, as recently suggested by Mark Mobius, Executive Chairman of Templeton Emerging Markets Group.[4] As a result, the decreasing co-movement of the Russian stock market with the rest of the world is unlikely to provide international investors with superior diversification opportunities. On the other hand, if the sanctions are lifted, a large flow of equity portfolio investments is likely to be observed.

The rest of this paper is structured as follows: section 2 introduces the main details related to the Ukrainian crisis, section 3 depicts a preliminary analysis of the data and is followed by a presentation of the empirical methodology used in the paper in section 4. Section 5 presents the main results, thereafter discussed in section 6. Finally, concluding remarks are presented in section 6.

2. The Ukrainian crisis and the Russian stock market

From the perspective of Russia's involvement in Ukrainian affairs and its effect on the Russian economy and capital markets, the Ukrainian crisis can be traced back to 1 March 2014, when the Russian Parliament approved President Putin's request to use armed forces in Ukraine to protect Russian interests. Shortly afterwards, Crimea's secession referendum on joining Russia, widely viewed as illegitimate, was conducted on 16 March and, on 18 March, a bill to absorb

[3] The valuation of Russian equities looks arguably attractive relative to other emerging and developed markets. As of December 31, 2015, MSCI Russia index had a forward price/earnings (P/E) ratio of 5.41x, far below its historical average, and below 11.10x for MSCI Emerging Markets and 15.45x for MSCI AC World; it offered a dividend yield of 4.85% above MSCI Emerging Markets' 2.81% and MSCI AC World's 2.52%; and it was priced on a price-to-book (P/B) basis at 0.62x, comparing to MSCI Emerging Markets' 1.22 and MSCI World's 1.96x.

[4] "Russian stocks are very, very cheap right now. The problem is sanctions. Many of us are not able to go into the companies we would like to go into, simply because of the sanctions. Once they are lifted, then I think you will see a lot of money coming in" — Mark Mobius, Executive Chairman, Templeton Emerging Markets Group (CNBC, 24 Feb. 2015).

Crimea into the Russian Federation was signed. Since then, the economic development of the Russian Federation was heavily affected by the consequences of the political and security crisis in Ukraine. Already in March 2014, the Ukrainian crisis prompted a number of governments to apply sanctions against individuals, businesses and officials from Russia, followed by several rounds of ever tighter sanctions approved by the United States, the European Union as well as other countries and international organizations. In addition to diplomatic actions, the measures included travel bans and asset freezes against Russian officials, including a broad set of measures targeting sectoral cooperation and exchanges with Russia, as well as additional measures concerning general economic cooperation. In particular, Russian state banks were excluded from raising long-term loans, bans were implemented on arms deals, exports of dual-use equipment for military use, and an EU-US ban targeted exports of some oil industry technology and services, to name a few.

Unsurprisingly, the under-diversified and highly concentrated nature of the Russian economy, characterized by pervasive state control, led to a devastating effect of sanctions beyond the targeted sectors. The effect of the sanctions on the Russian economy was exacerbated by reciprocal sanctions and embargos, which the Russian government imposed on most of the agricultural products whose country of origin had either "adopted the decision on introduction of economic sanctions in respect of Russian legal and (or) physical entities, or joined same."[5]

The sanctions against Russian individuals, companies and officials who have been instrumental in the Russian threat to Ukraine's sovereignty can be subdivided into three rounds. The first round of sanctions was imposed in March-April 2014, the second round began on 28 April 2014, while the third round of sanctions dates from July 2014 to the present day.

The sanctions imposed on Russia and the list of countries joining the sanctions kept on increasing in each round. International organizations, such as the European Bank for Reconstruction and Development (EBRD), froze all new projects in Russia, with a number of countries joining this policy. Russia's financial, energy and defense sectors were subjected to increasingly tougher international sanctions and a large number of Russian companies became limited in their ability to access international debt markets and in technology cooperation. By 16 February 2015, the sanction list of the EU covered 151 individuals and 37 entities.

When it comes to the Russian stock market, the MSCI Russia Index had already been down by almost 30% at the beginning of 2014, when the first round of sanctions was introduced and actually recovered some of the losses in the period until the beginning of November 2014 (see Fig. 1). The negative monthly returns of 2.5% in March and 6.6% in April were followed by positive returns of 11.5% in May, and 5.4% in June before turning negative for the rest of the year.[6] This could be interpreted as either evidence of limited effect of sanctions on the Russian stock market or the investors effectively anticipating the consequences of the Ukrainian crisis, thus the effect of sanctions prior to March 2014. The accelerated decline in oil prices and depreciation of exchange

[5] Presidential Decree of August 6, 2014 No. 560 "On the application of certain special economic measures to ensure the security of the Russian Federation." www.garant.ru (in Russian).

[6] The reported returns are in US dollar terms unless mentioned otherwise.

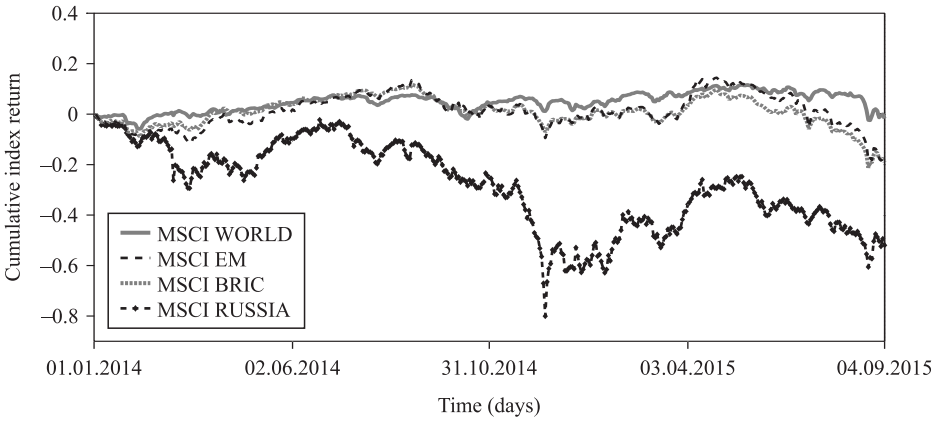

Fig. 1. Cumulative daily index return (total return, in USD terms) of the MSCI AC World Index, MSCI Emerging Market Index, MSCI BRIC Index, and the MSCI Russia Index in the period January 2014–September 2015.

Sources: Thomson Reuters Datastream; Authors' calculations.

rates against the ruble, which started in July 2014 together with the third wave of sanctions introduced in July, consequently led to steadily negative monthly returns of 8.8% in July, 1.5% in August, 6% in September, 2% in October, and 11.4% in November. Nevertheless, the MSCI Russia index remained effectively flat by late November 2014 relative to the beginning of March, revealing once again a lack of any profound effect of sanctions in terms of valuation. In the subsequent period, the stock market fall reached dramatic proportions, returning negative 80% in mid-December from the start of the year and finishing the year 62% down (see Fig. 1).

This casual observation cannot rule out the negative effect of Western sanctions on the Russian stock market but the timing of the stock market decline seems to be more consistent with the negative effect of deteriorating macroeconomic indicators, the oil price decline, and the self-imposed "food embargo".

In 2015, the recovery of the Russian equity market, which lasted until mid-May, made it one of the best performing stock markets in the world but the gains effectively disappeared by the end of summer 2015, with the market remaining about 52% down relative to the start of 2014. Nevertheless, from a historical perspective, the Russian market still performed better than the MSCI AC World, the MSCI Emerging Markets, and the MSCI BRIC, returning in excess of 142% in dollar terms since the beginning of 2001 (see Fig. 2).

3. Data and descriptive statistics

We employ the equity market indices provided by Morgan Stanley Capital International Inc. (MSCI).[7] Thousands of organizations worldwide currently use the MSCI international equity benchmarks for investing trillions of dollars, thus the choice of indices can be viewed as appropriate for the aims of this paper.

[7] MSCI is a leading provider of equity, fixed income, and hedge fund indices. The design and implementation of the index construction is based on a broad and fair market representation.

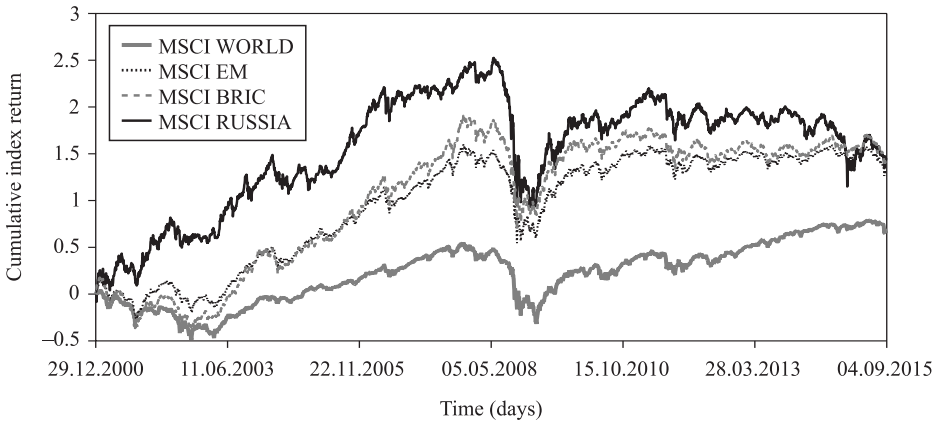

Fig. 2. Cumulative daily index return (total return, in USD terms) of the MSCI AC World Index, the MSCI Emerging Market Index, the MSCI BRIC Index, and MSCI Russia Index in the period January 2000–September 2015.

Sources: Thomson Reuters Datastream; Authors' calculations.

The indices used in this paper are the MSCI ACWI (an all-country world index), MSCI Russia Index, MSCI Emerging Markets Index, and the MSCI BRIC Index.

The MSCI World Index (MSCI ACWI) captures large and mid-cap firms across 23 developed and 23 emerging market countries. With 2,477 constituents, the index covers approximately 85% of the global investable equity opportunity set.

The MSCI Russia Index is designed to measure the performance of the large and mid-cap segments of the Russian market. With 21 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in Russia.

The MSCI Emerging Markets Index captures a large and mid-cap representation across 23 Emerging Market (EM) countries. With 834 constituents, the index similarly covers approximately 85% of the free float-adjusted market capitalization in each country.

The MSCI BRIC Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance across the 4 Emerging Markets country indices: Brazil, Russia, India and China. With 302 constituents, the index covers approximately the same proportion of free float-adjusted market capitalization in each country.

The data on the sectoral indices is from the Datastream Global Equity Indices. This family of indices forms a comprehensive, independent standard for equity research and benchmarking. For each market, a representative sample of stocks covering a minimum 75–80% of total market capitalisation enables market indices to be calculated. Within each market, stocks are allocated to industrial sectors using the Industry Classification Benchmark (ICB) jointly created by FTSE and Dow Jones. Sector indices are then calculated.

We construct daily continuously compounded return series based on the total return indices, which account for reinvested dividends (see Fig. 1 and Fig. 2). The observation period starts at the beginning of 2001 when the daily returns for the MSCI Russia Index became available.

Table 1 reports the descriptive statistics and the unit root test results for the MSCI index returns used in this study. The Augmented Dickey-Fuller (ADF)

Table 1
Descriptive statistics for daily index returns.

	Mean	Std. dev.	ADF
Pre-crisis Period			
MSCI AC World	0.000673	0.00611	$P < 0.001$
MSCI EM	0.000027	0.00778	$P < 0.001$
MSCI BRIC	–0.000044	0.00886	$P < 0.001$
MSCI RUS	–0.000223	0.01135	$P < 0.001$
Crisis Period			
MSCI AC World	–0.0000619	0.00670	$P < 0.001$
MSCI EM	–0.0003949	0.00829	$P < 0.001$
MSCI BRIC	–0.0003401	0.01120	$P < 0.001$
MSCI RUS	–0.0009649	0.02400	$P < 0.001$

Sources: Thomson Reuters Datastream; Authors' calculations.

test statistic confirms the absence of unit roots in the employed time-series data. The comparison of the mean daily returns and their volatility between the "pre-crisis" period (27 August 2012 to 28 February 2014) and "the crisis period" (3 March 2014 to 4 September 2015) reveals a decrease in the former and an increase in the latter for all indices.

The next section examines the empirical methodologies employed in this paper to disentangle the dynamic relation between returns in the Russian market and the global equity markets considered.

4. Empirical methodology

In order to understand the impact of world stock market returns on Russian stock market returns we employ two distinct empirical procedures, described in the following sections. Section 4.1 describes the market model and the methodology used to analyze the dynamic profile of the goodness of fit (R-squared) for the market model. Section 4.2 describes the bootstrapped model employed to further investigate the change in co-movement between the Russian stock market and global equity markets in the aftermath of the Ukrainian crisis.

4.1. Dynamic goodness of fit analysis

Our measure of stock price synchronicity follows Morck et al. (2000). We estimate the linear regression equation (1)

$$R_t = \beta_0 + \beta_1 R_{m,t} + \varepsilon_t \tag{1}$$

where R_t is the return of the MSCI Russian stock index on day t and $R_{m,t}$ is the global market return, m, at day t.

As in Morck et al. (2000), synchronicity can be defined by equation (2), as:

$$SYNCH_t = \log\left(\frac{R^2}{1-R^2}\right) \tag{2}$$

where R^2 is the coefficient of determination from the estimation of (1) for MSCI Russia on day t. $SYNCH_t$ is measured for a market based on the daily return ob-

servations of the year. A high $SYNCH_t$ indicates that the Russian market is highly correlated with global markets.

4.2. Bootstrapped analysis

In order to provide a more accurate measure of the impact of global equity markets on the Russian market, we complement the previous analysis with a bootstrapped regression procedure. Bootstrapping is a simulation method, used for frequentist inference and is based on random sampling with replacement, which enables the estimation of the properties of an estimator when sampling from an approximate distribution (Efron and Tibshirani, 1994), which may be optimal in this case given the relatively short sample period in our case. It is convenient to employ this technique because it does not require distributional assumptions, including normally distributed errors. Furthermore, the bootstrap is able to deliver more accurate results when the data are not well behaved, as in our case, or when the sample size is small. Although the post-crisis period used in this paper is longer than the one used by Castagneto-Gissey and Nivorozhkin (2015), the sample may still not be considered large, thus indicating our method as a justified approach to overcome this issue. The adopted approach allows us to avoid a number of assumptions of parametric models made in Castagneto-Gissey and Nivorozhkin (2015), who used different types of GARCH models. We use the percentile method to yield the confidence intervals of the estimator as:

$$[\theta^*_{\alpha/2}, \theta^*_{1-\alpha/2}] \tag{3}$$

where θ^*_p is the p^{th} quantile of the bootstrap distribution $(\hat{\theta}_1, ..., \hat{\theta}_k)$. We specified z_0 as

$$z_0 = \phi^{-1}\left\{\frac{\left[\sum_{n_1(i)}^{n_N(i)}(\hat{\theta}_i \le \hat{\theta})\right]}{k}\right\} \tag{4}$$

where n is the number of elements of i, $\sum_{n_1(i)}^{n_N(i)}(\hat{\theta}_i \le \hat{\theta})$ represents the number of elements in the bootstrap distribution which are less than or equal to the observed statistic, ϕ stands for the standard cumulative normal and z_0 is the median bias of $\hat{\theta}$. Moreover, let

$$a = \frac{\sum_{i=1}^{n}(\bar{\theta}_{(\cdot)} - \hat{\theta}_{(i)})^3}{6[\sum_{i=1}^{n}(\bar{\theta}_{(\cdot)} - \hat{\theta}_{(i)})^2]^{3/2}} \tag{5}$$

where a is the jack-knife acceleration estimate for $\hat{\theta}$, $\hat{\theta}_{(i)}$ are the leave-one-out, or jackknife, estimates of $\bar{\theta}_{(\cdot)}$, and $\hat{\theta}_{(i)}$ represents the estimates' mean value. In addition,

$$p_1 = \phi\left\{z_0 + \frac{z_0 - z_{1-\alpha/2}}{1-\alpha(z_0 - z_{1-\alpha/2})}\right\} \tag{6}$$

$$p_2 = \phi\left\{z_0 + \frac{z_0 + z_{1-\alpha/2}}{1-\alpha(z_0 - z_{1-\alpha/2})}\right\} \tag{6}$$

where $z_{1-\alpha/2}$ represents the $(1-\alpha/2)^{\text{th}}$ quantile of the normal distribution.

We use the bootstrapped regression in which the MSCI Russia Index return is a function of the global index return series. The regression is estimated with data from the pre-crisis period (27 August 2012 to 28 February 2014) and the crisis period (3 March 2014 to 4 September 2015). Our aim is to derive the relative coefficients of variation to provide inferences regarding the changing impact of global equity markets returns on Russian stock returns over the two periods.

5. Results

This section provides the results of our investigation. The dynamic goodness of fit profile of the Russian equity index return as explained by global equity indices returns is presented hereafter (section 5.1), and is complemented by our bootstrapped regression analysis (section 5.2).

5.1. Dynamic goodness of fit analysis

The coefficient of determination (R^2) of the market model specified in (1) is estimated using a simple linear regression framework. Similarly to other studies (e.g., De Nicolo and Kwast, 2002), the dynamic R^2 series were calculated using a rolling 262-day, or one year,[8] window starting on 31 December 2001 to calculate the daily R^2.[9]

The R^2 and our measure of synchronization, SYNCH_t, defined in (2), relative to the world, emerging and BRIC markets, are reported in the figures below (Figs. 3–6).

The degree of synchronization of the Russian stock market with the rest of the world reveals a dramatic decline in the level of co-movement between the MSCI Russia Index and the MSCI AC World, the MSCI Emerging Markets, and even the MSCI BRIC indices, since the beginning of the Ukrainian crisis (see Figs. 3–6). The average monthly R^2 of the MSCI Russia and the MSCI AC World indices daily returns declined by almost 50% from the peak of 39% in February 2014 to the throw of 19% in December 2014. The average monthly R^2 remained in the range of 19–22% since July 2014 until the end of the sample period.

The falls in the degrees of synchronicity of the Russian market with the MSCI Emerging Markets and the MSCI BRIC were also very significant. The average monthly R^2 of the MSCI Russia and the MSCI Emerging Markets dollar returns declined by 40% from the peak of 50% in January and February 2009 to the throw of 30% in December, remaining in the range of 30–36% until the end of the sample period.

The average monthly R^2 of the MSCI Russia and the MSCI BRIC dollar returns declined by over 40% from the peak of 47% in January and February 2009 to the throw of 28% in December, remaining in the range of 28–34% until the end of the sample period.

The decline in all of the R^2 statistics in the crisis period is strongly statistically significant relative to the mean value in 2013. The decline was also significant in the period before July 2014, when the oil price began declining and the Russian macroeconomic indicators began deteriorating.

[8] Note that weekends are not included in the MSCI data.

[9] The results of the paper remain qualitatively similar when alternative rolling windows were used.

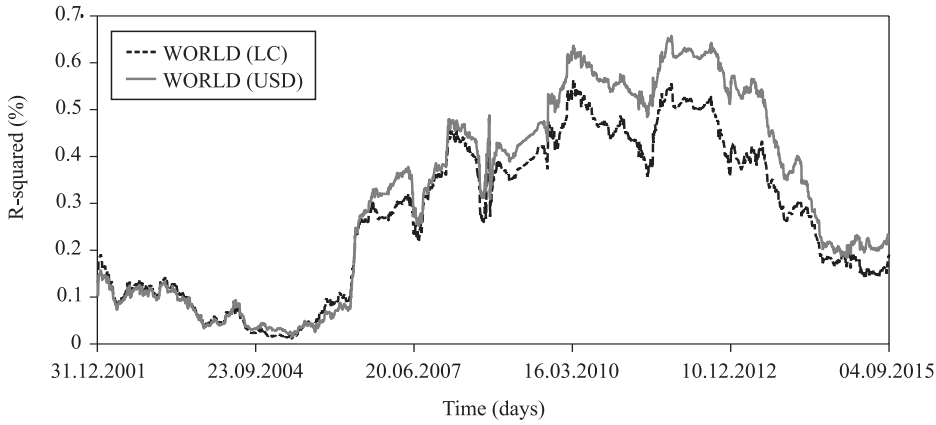

Fig. 3. Rolling 262-day window estimates of coefficients of determination (*R*-squared) of the market model for the MSCI AC World Index and MSCI Russia Index in the period January 2002–September 2015.

Notes: WORLD (LC) are the local currency estimates, whereas WORLD (USD) are the estimates in US dollars. The MSCI AC World Index and MSCI Russia Index are total return indices in USD terms and local currencies.
Sources: Thomson Reuters Datastream; Authors' calculations.

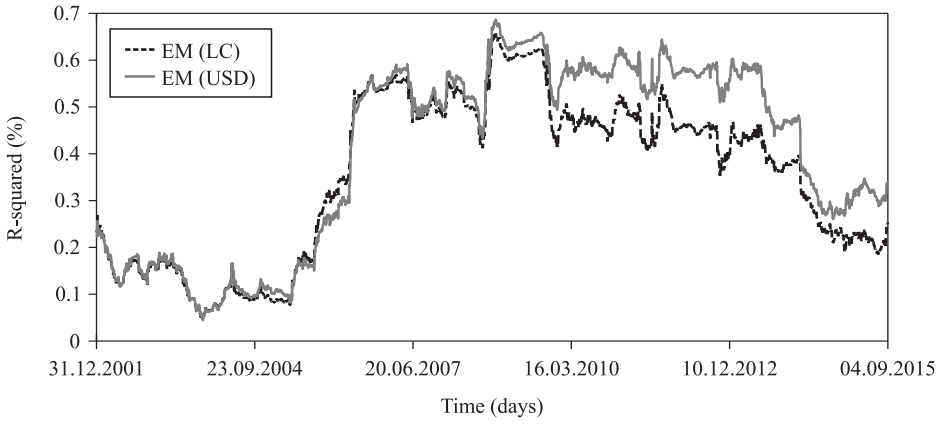

Fig. 4. Rolling 262-day window estimates of coefficients of determination (*R*-squared) of the market model for the MSCI Emerging Markets Index and MSCI Russia Index in the period January 2002–September 2015.

Notes: EM (LC) are the local currency estimates, whereas EM (USD) are the estimates in US dollars. The MSCI Emerging Markets Index and MSCI Russia Index are total return indices in USD terms and local currencies.
Sources: Thomson Reuters Datastream; Authors' calculations.

The low level of synchronicity of the Russian stock market with the rest of the world is striking and had not been observed for an extended period of time. The R^2 of the dollar returns of the MSCI Russia and the MSCI AC World has not been below 40% since 2008. The R^2 of the dollar returns of the MSCI Russia and the MSCI EM and the MSCI BRIC has not been below 40% since 2006, that is before Yukos's bankruptcy.

Importantly, however, the decline in synchronicity of the MSCI Russia began long prior to the Ukrainian crisis. For example, the R^2 with MSCI AC World was on a declining trend since December 2011 when it reached its maximum value of 66%.

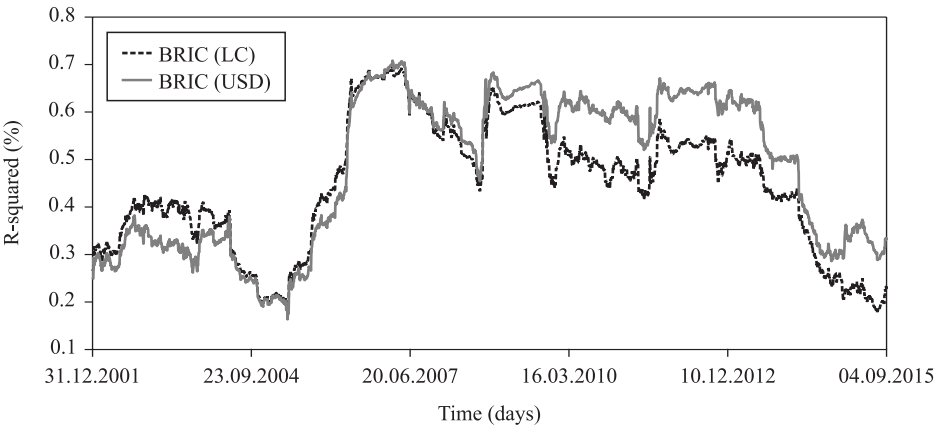

Fig. 5. Rolling 262-day window estimates of coefficients of determination (*R*-squared) of the market model for the MSCI BRIC Index and MSCI Russia Index in the period January 2002–September 2015.

Notes: BRIC (LC) are the local currency estimates, whereas BRIC (USD) are the estimates in US dollars. The MSCI BRIC Index and MSCI Russia Index are total return indices in USD terms and local currencies.
Sources: Thomson Reuters Datastream; Authors' calculations.

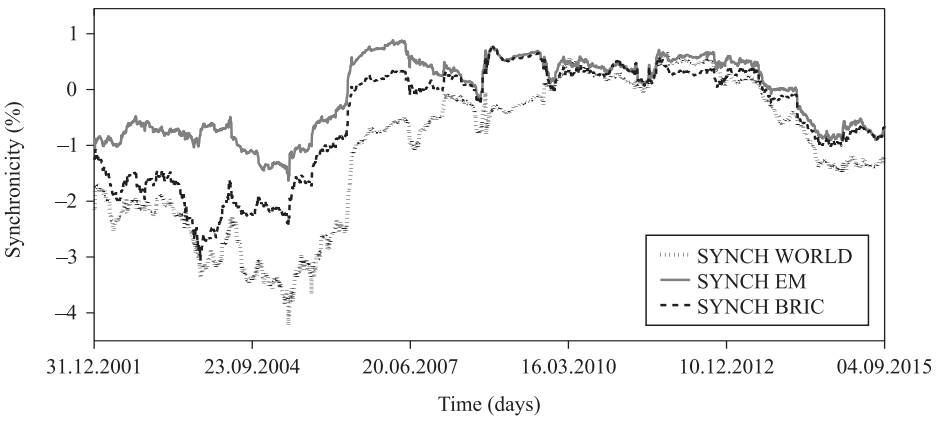

Fig. 6. Rolling 262-days window estimates of synchronicity ($SYNCH_t$) between the MSCI AC World Index, the MSCI Emerging Market Index, the MSCI BRIC Index, and MSCI Russia Index in the period January 2002–September 2015.

Notes: SYNCH WORLD, SYNCH EM, and SYNCH BRIC are the estimates in US dollar. All indices are total return indices in USD terms.
Sources: Thomson Reuters Datastream; Authors' calculations.

Overall, it appears that, although the Ukrainian crisis cannot be ruled out as a contributing factor affecting the synchronicity of the Russian stock market, there are clearly other factors at play.

Given our use of daily equity returns, it is not feasible to test the effect of macroeconomic and institutional indicators on the behavior of the Russian stock market. Therefore, we look at the behavior of the sectoral stock indices. Global equity indices from Thomson Reuters are available for nine Russian industries, namely: Basic Materials (denoted BMAT in Figs. 7a and 7b), Consumer Goods (CNSMG), Consumer Services (CNSM), Health Care (HLTH), Financials

(FINAN), Industries (INDUS), Oil and Gas (OILG), Telecom (TELC) and Utilities (UTIL). All indices are daily total returns denominated in US dollars. Our hypothesis is that the effect of the Ukrainian crisis and the Western sanctions on the synchronicity of the Russian stock market would be indirectly revealed through the increase in co-movement of the sectoral index returns. This would also be consistent with a "flight-to-quality" phenomenon occurring when investors sell what they perceive to be higher-risk investments and turn to safer investments (see e.g., Eichengreen et al., 2001).

The results in Fig. 7 and Table 2 reveal a dramatic change in the behavior of the sectoral stock indices. The wildly varying and often negative correlation across stock indices in 2013 (Fig. 7b and Table 2b) changed to uniformly positive correlation in excess of 80% across virtually all sectoral indices in the crisis

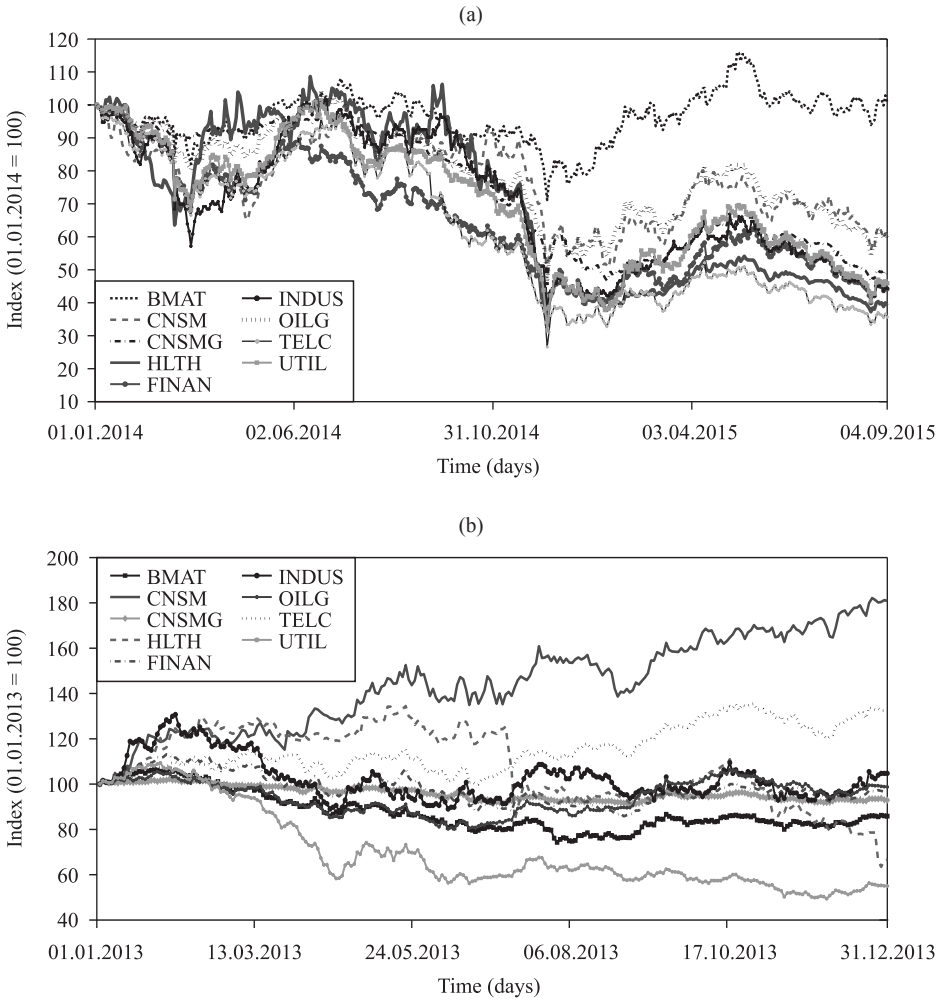

Fig. 7. The Thomson Reuters sectoral indices for the Russian stock market in the period (a) January 2014–September 2015 and (b) January 2013–December 2013.

Notes: The sectoral stock indices are Basic Materials (BMAT), Consumer Goods (CNSMG), Consumer Services (CNSM), Health Care (HLTH), Financials (FINAN), Industries (INDUS), Oil and Gas (OILG), Telecom (TELC) and Utilities (UTIL).

Sources: Thomson Reuters Datastream; Authors' calculations.

Table 2
Correlation coefficients of the sectoral indices for the Russian Stock Market
(obtained from the Thomson Reuters Datastream global equity indices)
in the period (a) January 2014–September 2015 and (b) January 2013–December 2013.

(a)

Index	BMAT	CNSM	CNSMG	HLTH	FINAN	INDUS	OILG	TELC	UTIL
BMAT	1.00	0.37	0.13	0.12	0.25	0.28	0.39	0.21	0.31
CNSM		1.00	0.83	0.84	0.81	0.93	0.89	0.85	0.90
CNSMG			1.00	0.96	0.95	0.92	0.94	0.97	0.96
HLTH				1.00	0.89	0.94	0.90	0.94	0.93
FINAN					1.00	0.89	0.96	0.97	0.97
INDUS						1.00	0.94	0.94	0.97
OILG							1.00	0.96	0.99
TELC								1.00	0.97
UTIL									1.00

(b)

Index	BMAT	CNSM	CNSMG	HLTH	FINAN	INDUS	OILG	TELC	UTIL
BMAT	1.00	–0.71	0.95	0.46	0.93	0.73	0.51	–0.37	0.92
CNSM		1.00	–0.75	–0.67	–0.53	–0.42	0.07	0.83	–0.82
CNSMG			1.00	0.63	0.92	0.66	0.38	–0.44	0.90
HLTH				1.00	0.50	0.21	–0.28	–0.64	0.50
FINAN					1.00	0.74	0.54	–0.21	0.83
INDUS						1.00	0.55	–0.13	0.80
OILG							1.00	0.52	0.37
TELC								1.00	–0.53
UTIL									1.00

Notes: The sectoral stock indices are Basic Materials (BMAT), Consumer Goods (CNSM), Consumer Services (CNSMG), Health Care (HLTH), Financials (FINAN), Industries (INDUS), Oil and Gas (OILG), Telecom (TELC) and Utilities (UTIL).
Sources: Thomson Reuters Datastream; Authors' calculations.

period (Fig. 7a and Table 2a). Importantly, the increase in the index co-movement was particularly consistent, with strong positive correlation persisting in the period before July 2014, when the oil price started to decline and ruble exchange rates began to weaken.

The behavior of the basic materials sector represents an important exception and sheds further light on the impact of sanctions. The basic materials sector represents the stocks of companies involved in the discovery, development and processing of raw materials. The sector includes the mining and refining of metals, chemical producers and forestry products. According to a number of experts, the probability of any sanctions directly impacting the Russian metals and mining sector is very low.[10] Even if further sanctions are introduced, Russian companies are likely to be able to diversify their exports to other markets and may even benefit because market prices could rise significantly in such situation. Moreover, despite the restriction on access to the European and American equity markets, Russian mining and metallurgical companies are likely to be able to successfully raise finances via international banking syndicate loans and, potentially, in Asian

[10] Interfax. Russia & CIS Business and Financial Newswire, 2014, July 21.

stock markets.[11] Unlike other sectoral indices, the basic materials sectoral index remained effectively flat during the crisis period, and its correlation with other sectoral indices was in the range of 12–37%.

Overall, the increased synchronicity in 8 out of 9 Russian sectoral stock indices is consistent with the negative impact of sanctions, which triggered widespread portfolio outflows from the market, or a "flight-to-quality" phenomenon mentioned earlier and frequently observed during the emerging markets crisis (Rösch and Kaserer, 2013).

According to Fig. 8, the volatility of daily returns in the Russian stock market has been steadily increasing from the beginning of the Ukrainian crisis but remained rather moderate from a historical perspective, despite increasing at the end of the observation period, particularly in dollar terms. Using the standard approach (e.g. Derrabi and Leseure, 2005), Fig. 9 decomposes the total variance of daily returns into systematic and residual (unsystematic) components. The systematic risk component is a proportion of the total variance of daily stock returns of the MSCI Russia explained by the market model with respect to the MSCI AC World Index, and unsystematic risk refers to the unexplained part of the variance (the residual variance). Strikingly, the level of unsystematic risk overtook that of systematic risk in July 2014 and the wedge between the two risk components kept on increasing during the observation period. With the exception of the global financial crisis period, such high magnitude of unsystematic risk was only observed in 2001–2002 when the Russian stock market was hardly on the radars of international portfolio managers. The timing of the relative increase in the idiosyncratic risk component is also considerably similar to the changes in synchron-

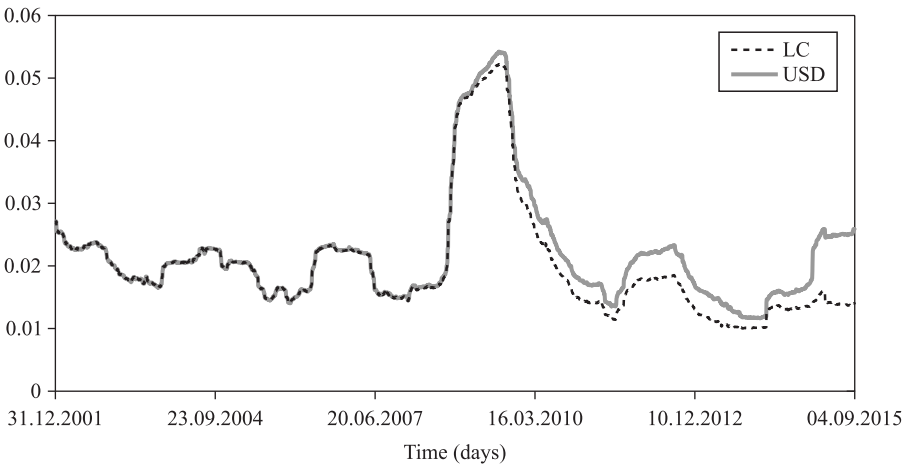

Fig. 8. Rolling 262-days window estimates of daily returns volatility of the MSCI Russia Index in the period January 2002–September 2015.

Note: The index is the total return index in USD terms and local currency.
Sources: Thomson Reuters Datastream; Authors' calculations.

[11] Recent successful refinancing of EVRAZ for USD 425 million carried out by international syndicate of Deutsche Bank AG, Raiffeisen Bank International AG, ING Bank N.V., Nordea Bank, Société Générale and Rosbank can be interpreted as a proof that sanctions against mining and metals industry as a whole and individual companies in Russia seem to be ineffective.

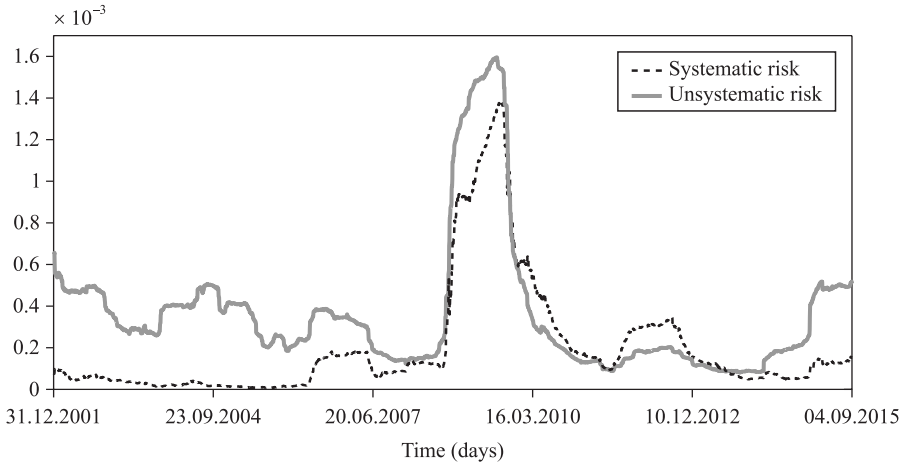

Fig. 9. Rolling 262-days window estimates of the proportions of systematic and unsystematic risk of the MSCI Russia Index with respect to the MSCI AC World Index in the period January 2002–September 2015.

Note: The index is the total return index in USD terms.
Sources: Thomson Reuters Datastream; Authors' calculations.

icity of the Russian market with the rest of the world. Consistent with the cross-sectional evidence from the previous studies (Morck et al., 2000), the low degree of synchronicity tends to be associated with the larger amount of unverifiable (idiosyncratic) risk. In fact, if we delete from the sample two years of the global financial crisis (2008–2009), the correlation between the amount of idiosyncratic risk of the MSCI Russia and synchronicity (SYNCH) between the MSCI Russia and the MSCI AC World is –58%.[12]

As synchronicity is likely to capture the extent of the Russian stock market's integration with the rest of the world, it seems that the current "decoupling" of the Russian market had been associated with the appearance of trends similar to the ones observed in the "pre-integration" period.

According to Hsin and Tseng (2011), stock price synchronicity may vary asymmetrically depending on market conditions. The authors find that price synchronicities tend to be stronger in bearish markets and interpret this as being consistent with the hypothesis that investors have increased loss aversion in bear markets, which further limits informed arbitrage. The results for the 2008 global financial crisis period seem to be consistent with that finding. On the other hand, the decreased synchronicity of the Russian market during the Ukrainian crisis accompanied by large negative returns highlights the importance of controlling for exogenous factors, in our case represented by the economic sanctions imposed on Russia.

The synchronicity of the MSCI Russia return tends to be highly correlated with the cumulative return of the index. In fact, the correlation was in excess of 50% for the period since 2001, as well as for the more recent period since the beginning of 2014, associated with the Ukrainian crisis. The volatile portfolio capital flows to the Russian stock market, and the emerging markets in

[12] Otherwise, the correlation for the whole sample is –5%.

general, are likely to be responsible for the finding. In the time of booms, favorable valuation, due to a potentially diversifiable component of unsystematic risk of the market, drives returns up, leading to an increased integration of the Russian market with the rest of the world, thereby increasing the synchronicity of the stock returns as the marginal investor is likely to become represented by a foreign entity holding an internationally diversified portfolio. In the time of bust, as in the current period, the opposite situation emerges, with the Russian market effectively decoupling from the rest of the world and returns predominately being driven by idiosyncratic news.

This evidence is consistent with literature on the implications of partial segmentation, which is defined as the situation in which "there are some equity flows that take place either in or out of a country, although these flows are limited because of explicit constraints on, or because of barriers to, international investment" (Karolyi and Stulz, 2003). The conclusive empirical evidence on the difference between global pricing of assets to local pricing exists for a number of countries where some of the barriers to international investment are known explicitly (e.g., Errunza and Losq, 1985; Hietala, 1989; Bailey and Jagtiani, 1994). The common results of the papers are that market segmentation significantly affects valuation of equities and that the premium of shares available to foreign investors varies over time.

5.2. Bootstrapped analysis

The bootstrapped analysis unveils the impact of world stock market returns on Russian stock returns before and after the Ukrainian crisis. Table 3 depicts the results of our bootstrapped regression analysis. The results in Table 3 once more confirm a substantial decline in the degree of synchronicity between the Russian stock market and a representative set of global equity markets. The results are robust to specifications in local currencies and to alternative time period specifications. A decline of the MSCI Russia synchronicity with the MSCI BRIC and the MSCI Emerging Markets, which belong to the same "emerging markets" asset class as the Russian market, appear to credibly indicate the idiosyncratic effect of the Ukrainian crisis and a broad decoupling of the Russian market from the rest of the world.

Table 3
Pseudo R^2 of the bootstrapped regressions of the MSCI Russia on the MSCI AC World, the MSCI Emerging Markets, and the MSCI BRIC.

		Pseudo R^2	t	ΔPseudo R^2 (%)
MSCI AC World	Pre-crisis	0.2228***	14.27	–44.84
	Crisis	0.1229***	14.41	
MSCI BRIC	Pre-crisis	0.2456***	9.01	–32.45
	Crisis	0.1659***	8.19	
MSCI EM	Pre-Crisis	0.2432***	10.89	–27.67
	Crisis	0.1759***	8.23	

Notes: All indices are total return indices in USD terms. The pre-crisis period is 27 September 2012–28 February 2014, the crisis period is 3 March 2014–4 September 2015. The level of significance: * 10%, ** 5%, *** 1%.
Sources: Thomson Reuters Datastream; Authors' calculations.

6. Conclusions

This paper studies the dynamic relationship between the Russian stock market and a representative sample of global markets in the aftermath of the 2014 Ukrainian crisis. By applying dynamic goodness-of-fit and bootstrapped regression approaches, we show that the influence of the world stock markets on the Russian stock market considerably decreased in the aftermath of the Ukrainian crisis. The decrease in co-movement of Russian equity market returns in the magnitude of 30–50% is observed not only with respect to global equity returns, but also with respect to emerging and BRIC markets, which belong to the same "emerging markets" asset class as the Russian market. In view of dramatic increase in synchronicity across the Russian sectoral stock indices after the sanctions were introduced, our results are consistent with the effect of economic sanctions imposed on Russia, which have apparently isolated the Russian equity market from the rest of the world and triggered widespread portfolio outflows from the market, or a "flight-to-quality" phenomenon frequently observed during emerging markets crises.

Our results are in line with the evidence presented in Castagneto-Gissey and Nivorozhkin (2015), who look at the "decoupling" of the Russian equity market in the aftermath of the Ukrainian crisis on a country-by-country basis. Similarly to our results, the study finds a strong decrease in interdependence between the Russian equity market and 85% of major developed, frontier and emerging markets.[13] Using a longer sample period, our results show that the correlation with the BRIC and Emerging Markets groups as a whole decreased significantly, providing further support to the evidence of tangible effects of Western sanctions on the Russian equity market.

Our results also reveal a strong positive correlation between the cumulative return of the Russian equity index and the synchronicity of the Russian market with the World Index. The synchronicity of the MSCI Russia is also negatively correlated with the level of the idiosyncratic risk derived from the market model. Our results also seem to indicate a significant variation in the degree of the Russian stock market's integration with the rest of the world, as the current decoupling of the Russian market had been associated with the appearance of trends similar to those observed in the "pre-integration" period in the early part of the previous decade. This evidence is consistent with literature on the implications of partial segmentation, supporting the stylized facts that market segmentation significantly affects valuation of equities and that the premium of shares available to foreign investors is time-varying.

While still being regarded as a major emerging market, the Russian stock market's declining capitalization and free-float led to a dramatic fall in Russia's weight in investable equity indices, such as the MSCI Emerging Markets Index. For example, the weight of Russian stocks in iShares MSCI Emerging Markets ETF,[14] which tracks the MSCI Emerging Markets Index, dropped to 3.76%,

[13] Some evidence of increased interdependence was exclusively found in the Brazilian market. However, Brazil and Russia were notably among the ten worst performing markets in 2014, thus the increase in correlation between these markets' returns in the crisis period could be explained by the idiosyncratic downside risk factors occurring simultaneously across both markets as well as by similar exposure of both countries to the declining oil price.

[14] https://www.ishares.com/us/products/239637/ishares-msci-emerging-markets-etf.

lagging behind markets such as Mexico, South Africa, and Brazil. Albeit the attractive valuations in the Russian equity market, the choice of available investments remains limited due to the economic sanctions imposed on the country. As a result, the decrease in co-movement of the Russian stock market with the rest of the world is unlikely to provide international investors with superior diversification opportunities. On the other hand, the lifting of sanctions is likely to result in a large portfolio investments inflow towards Russia.

As it is hard to forecast when the sanctions will be lifted, the returns of the Russian market in the medium-term could continue to be predominately driven by idiosyncratic news and the effective decoupling of the Russian market from the rest of the world is likely to persist.

Acknowledgements

We would like to thank Andrei Simonov, Raphael Espinoza, participants of the University College London's 2015 SSEES Centennial Conference, and the two anonymous referees, for valuable suggestions and comments.

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