



Contents lists available at ScienceDirect

Research in International Business and Finance

journal homepage: www.elsevier.com/locate/ribaf

Full length Article

Sanctions and the Russian stock market

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ARTICLE INFO

Article history:

Received 7 January 2017

Accepted 26 January 2017

Available online 5 February 2017

Keywords:

Heavy tails
Russia
Structural breaks
Sanctions
Stock market
Volatility

ABSTRACT

The article presents the robust estimates of extreme movements and heavy-tailedness properties for Russian stock indices returns before and after sanctions were introduced. The obtained results show that almost for all sectoral indices there was a statistically significant increase in volatility. At the same time there is not enough evidence of structural breaks in heavy-tailedness, though some indications of heavier both right and left tails in the post-imposition period can be observed for some indices. However, we cannot with complete certainty directly link the increase in heavy-tailedness with the imposed sanctions. The latter to a considerable extent could be caused by higher country-specific risks due to geopolitical tensions as well as oil prices volatility. Whatever is the cause, any increases in heavy-tailedness can have grave consequences for corporate management, economic modeling and financial stability analysis.

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1. Introduction

The Russian stock market as a whole is characterized by a high likelihood of extreme movements and is generally quite volatile even by the standards of emerging markets (see, among others, (Jondeau and Rockinger, 2003; Gaddy and Ickes, 2010; Ibragimov et al., 2015; Castagneto-Gissey and Nivorozhkin, 2016)). The high volatility of emerging financial markets is mostly due to its sensitivity towards a myriad of various internal and external shocks which, in turn, are largely driven by the level of institutional development, geopolitical tensions, structural imbalances, low level of national economy diversification and macroeconomic policy (see, for example, discussion in Åslund et al. (2010), Claessens et al. (2000), Neaime (2010), Lagoarde-Segot and Lucey (2009), Neaime (2012), Lagoarde-Segot (2013), Connolly (2015)). Western sanctions represent one of such shocks, capable of generating large changes in the prices of financial assets as a result of direct restrictions imposed on particular entities as well as of a general increase in the country-specific risk.

The probability of extreme changes in the distribution of a variable can be empirically estimated by the tail index indicator ζ . The more the probability mass in the tails, the smaller are the tail index parameters ζ . Meanwhile, the tail indices estimates are by no means only of academic interest: they can be instrumental in risk-management, serve as an important source of information for policy-makers, financial regulators, financial managers. For example, if $\zeta < 1$, the value of diversification becomes negative which means that adding new assets to the portfolio would increase rather than decrease its overall risk (Ibragimov, 2009a,b). Heavy tails with $\zeta < 2$ may result in the unreliability of standard statistical methods based on analysis

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of variance and correlations, in the ambiguity of time series statistical modeling interpretation (Embrechts et al., 1997; Ibragimov and Walden, 2007; Ibragimov, 2009a; Ibragimov et al., 2015). Tail indices estimates may be of particular value for practitioners involved in financial stability analysis and application of risk-management tools such as value at risk, expected shortfall, etc. For the national stock market they can be employed as rough indicators of expected outliers and general level of market volatility. However, we should admit that the forecast accuracy is by no means assured: in the future we may well encounter even larger outliers.

Currently, several results on empirical analysis of heavy-tailedness of different key financial and economic variables are available in the literature. For instance, the empirical results discussed in Gabaix (2009) (see also Ibragimov and Walden, 2007; Ibragimov et al. 2015, and references therein) point out that the tail indices ζ of financial returns on stocks and stock indices and foreign exchange rates in developed markets typically lie in the interval (2,5). This implies finite variances and possibly infinite fourth moments and kurtosis for these developed markets variables. At the same time, the recent study by Ibragimov et al. (2013) finds that heavy-tailedness tends to be more pronounced for emerging countries' exchange rates, implying, in a number of cases, infinite variances, including the case of the Russian rouble.

At the same time investigations considering the Russian capital market are generally included in large comparative studies of stock market returns' distribution properties in developed and developing countries (see, for example, Rockinger and Urga, 2001; Jondeau and Rockinger, 2003; Fernandes and Ferreira, 2008; Li and Rose, 2009; Mensi et al., 2014; Castagneto-Gissey and Nivorozhkin, 2016). It is important to note that in those studies Russia is usually represented by the lowest number of observations compared to other countries which results in relatively wide confidence intervals of the obtained estimates. Generally, empirical studies demonstrate a higher likelihood of outliers in the Russian stock market as well as a higher degree of volatility even in comparison with emerging economies.

To our knowledge, at present, there are no empirical results on the degree of heavy-tailedness and empirical estimates of tail indices for Russian financial markets. The main goals of this study are two-fold. First, to fill this gap in the literature by providing an analysis of heavy-tailedness properties of the Russian stock market. The problem is particularly important because the evidently high sensitivity of the Russian market towards global economic trends is compounded by geopolitical factors contributing to its increased volatility. The analysis is based on applications of robust log-log rank-size regression tail index estimation approaches with optimal bias-correction shifts and correct standard errors dealt with in Gabaix and Ibragimov (2011).

The use of correct standard errors of the tail index estimates and the implied correct confidence intervals allows us to achieve its second main purpose, that is, to present robust inference on structural breaks in the Russian stock market heavy-tailedness before and after the imposition of Western sanctions (hereafter referred to as pre-imposition and post-imposition periods). This problem is of high interest both in Russia and the West and is naturally related to the analysis of the sanctions' efficiency and their effects on Russian economic and financial markets. In the course of sectoral stock indices analysis we investigate, among others, the possible effect of sectoral sanctions. The problem of tail indices ζ invariability in time is also quite important within the framework of financial stability analysis and application of risk-management tools. If the probability mass in the tail changes during structural shocks then it can result in the corresponding estimates for the whole sample not accurately representing the magnitude of expected extreme changes.

The rest of the paper is organized as follows: Section 2 reviews the imposed anti-Russian sanctions and the relevant literature empirically assessing the effect the sanctions have had on the Russian economy. In Section 3 we discuss the robust log-log rank-size regressions approach that we use to estimate the degree of heavy-tailedness. In Section 4 we review the data under consideration and present the results of descriptive analysis of stock returns outliers; within the framework of the analysis we compare bootstrap confidence intervals of the obtained estimates. Section 5 summarizes the results of empirical estimation of changes in heavy-tailedness in the post-imposition period together with their robustness check. Section 6 describes implications of such changes, discusses to what extent those changes can be attributed to the imposed sanctions or the fall in oil prices. The concluding Section 7 summarizes our main findings and provides some suggestions for further research.

2. Sanctions and the Russian economy

According to Hufbauer et al. (2009) a sanction campaign can be divided into several stages reflecting the strength of their potential effect: diplomatic actions (such as suspending joint projects, expulsion from international organizations, etc.), measures taken against particular individuals and companies (bans on entry into certain countries, assets freezes, restriction of credits), sectoral sanctions (trade and financial restrictions, technology export bans). All the above-mentioned steps were taken by the Western powers against Russia after the Crimean crisis of 2014. The sequence of events in the process of imposing sanctions upon Russia was generally as follows: in March 2014 the United States enact the first restrictive list of high-ranking Russian officials and political figures, the European Union and a number of other countries (Canada, Australia, Japan, Albania, Iceland, Montenegro, the Ukraine and some others) follow soon afterwards. In April the United States introduce sanctions against a number of Crimea-based companies while in May Canada imposes economic sanctions on several Russian banks and real sector companies. In June the same year the United States impose massive sectoral sanctions on companies representing defense industry, raw materials and financial sectors with the EU and some other countries following suit. Subsequently the sanctions lists were gradually expanded with a certain tightening of access towards capital markets in the US and EU

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