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THE ANCHORING EFFECT IN MERGERS AND ACQUISITIONS: EVIDENCE FROM AN EMERGING MARKET

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This article examines the presence of the reference price effect in mergers and acquisitions in Russia, which can act as a distortion in investor perception of the influence a deal has on a company. In this study we use the Russian market as a laboratory for the investigation of behavioral effects in a relatively inefficient market. We find a relationship between the acquirer's announcement period return and the proximity of its pre-announcement share price to the 52-week high. The 52-week high serves as a salient anchor even though it is economically irrelevant for valuation purposes. This effect appears to be stronger for deals associated with higher levels of uncertainty. The findings confirm the presence of the anchoring bias in evaluating the effect of a merger or acquisition announcement by Russian investors. We demonstrate a significant anchoring effect even for deals with a blocking (>10%) or a controlling stake (>25%) in an emerging market with a highly concentrated ownership.

Keywords: Mergers; Acquisitions; Anchoring; Reference point; Behavioral corporate finance.

JEL classifications: G34, G41

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1 Introduction

A significant amount of research has been conducted on stock market reactions to merger and acquisition (M&A) announcements. Although classical financial theory predicts that all new relevant information is almost instantaneously incorporated into a company's share price, empirical evidence provides considerably different results. One of the sources of these distortions in price is the subjectivity of investors to a range of behavioral biases. The present paper is devoted to the study of one such biases – the anchoring effect – in Russia in the context of its influence on the acquirer's M&A announcement period return.

The anchoring bias is a process whereby individuals in situations of uncertainty tend to make decisions that are strongly influenced by easily available reference points although they are objectively irrelevant to their current task (**Tversky & Kahneman, 1974)**. The presence of the anchoring effect was found in finance as well, as it is necessary to deal with many numbers and make judgments based on these numbers. Therefore, people rely on salient reference points as a shortcut, instead of finding a proper foundation for their decision, requiring time and cognitive effort. This bias undermines the usually-assumed rationality of investors, especially when it comes to the perception of stock prices and the information they should incorporate. In recent years there have been a number of studies on the significant dependence between investor behavior and the proximity of stock prices to their historic highs. In particular, a growing number of researchers claim that the 52-week high is an important reference point for investors.

The intuition behind this relationship is that investors take a shortcut and attempt to assess whether the information on a firm's qualitative and quantitative characteristics is already incorporated into its stock price – or whether it may increase further. The 52-week high, in a way, represents a reference "maximum" point that is readily available to investors. Even if positive news is released, investors are likely not to bid up the price, since it already reflects the information; negative news does not lead to much bidding-down. The importance of a peak price as an anchor has been confirmed in various fields of study, such as exercising stock options **(Heath et al., 1999**; **Driessen et al., 2012)**, future returns, which influence the return from momentum strategies (**George and Hwang, 2004; Du, 2008)**, determinants of the post earnings announcement drift **(George et.al., 2014)**, contracting **(Hart and Moore, 2008)**, IPO underpricing **(Ljungqvist and Wilhelm, 2005)**, trading volumes **(Odean, 1998; Huddart et al., 2009)** and individual trading decisions **(Grinblatt and Keloharju, 2001)**. Some research shows that investors also anchor on the 52-week high of the Dow Jones Index **(Li and Yu, 2012)**. A

number of studies revealed that the 52-week low also is a significant factor; however, the historic high has always had a stronger influence (**George and Hwang, 2004)**.

This paper focuses on the relationship between the suggested anchor and the stock price reaction to the announcement of M&A deals. The reaction of the market to such announcements has been studied quite extensively. However, the vast majority of the literature on this topic focuses on studying fundamental company variables, since the main determinants of market price change with respect to a deal announcement. These include: the quality of management performance measured by Tobin's Q **(Lang et al., 1989)**, investment opportunities measured by free cash flows **(Lang et al., 1991; Harford, 1999)**, the relatedness of the buyer and the target, based on industry classification **(Matsusaka, 1993)**, overextrapolation of the bidder's past performance **(Rau and Vermaelen, 1998)**, firm size **(Moeller et al., 2004)**, market misevaluation proxied by pre-takeover price ratios, and ratios of residual income model valuation **(Dong et al., 2006)**, corporate governance **(Masulis et al., 2007)**, CEO overconfidence based on their holdings of company options until expiration date **(Malmendier and Tate, 2008)**, target valuation uncertainty measured by the intensity of R&D and idiosyncratic return volatility **(Officer et al., 2009)**, stock market levels **(Bouwman et al., 2009)**, stock overvaluation **(Fu et al., 2012)**, management entrenchment **(Harford et al., 2012)**, periods of high and low merger activity in the market **(Duchin and Schmidt, 2013)**, CEO network centrality measured by CEO personal connections **(El-Khatib et al., 2015)** and the level of similarity in corporate social responsibility characteristics **(Bereskin et al., 2016)**.

Danbolt et al. (2015) presented evidence of a positive dependence between the abnormal returns of acquirers and investor sentiment. This means that the market reaction at the announcement is not fully explained by the rational expectations of investors related to the company's fundamentals and associated changes. In an assessment of the plausible range of the new value of the firm after the deal, a lot of investors use the 52-week high as a reference point for the bidder's offer price and other aspects of merger activity, which was proven in **Baker et al. (2012)**. They studied a sample of 7,498 deals 1984–2007 with public target companies and found that there is a significant relationship between offer premiums paid for target firms and their recent peak prices such as the 52-week high. As this price level is economically irrelevant, the authors suggest it is the applied reference point.

Additional evidence on the anchoring effect in M&A deals was described in **Ma et al. (2016).** They analyzed the connection between the acquirer's announcement return and its 52-week high and found a reference price effect. They studied 19,119 deals 1981–2014, in which the acquirer company was a US publicly traded firm. The main result is that acquirers earn higher

announcement period returns when their share price before the acquisition announcement is significantly below the 52-week high, and a lower return when it is relatively near the 52-week high. The authors explain this phenomenon as a reference price effect: investors perceive the 52-week high as an anchor. Another important result is that this reference price effect was found to be stronger in deals with greater levels of uncertainty, such as deals with private targets, for which it is more difficult to find information and conduct a proper evaluation. The literature presents enough evidence that greater uncertainty may strengthen the anchoring effect (**Tversky and Kahneman, 1974; Jacowitz and Kahneman, 1995; Mussweiler and Strack, 2000).**

Therefore, we develop the idea of **Ma et al. (2016)** and test the anchoring effect on a relatively inefficient market. We used the Russian M&A market for the investigation of behavioral effects in a market that does not correspond to the strong or semi-strong form of market efficiency, i.e. it appears relatively inefficient in comparison to the US market **(Compton et al., 2013)**. The Russian stock market efficiency has been much discussed in literature. **Chong et al. (2010)** compared the stock market efficiency of Brazil, Russia, India and China (BRIC) and found that the Russian market appeared the least efficient, even though it also appeared the most profitable, while the Brazilian market was assigned as the most efficient. **Mobarek and Fiorante (2014)** tested the weak-form efficiency for BRIC equity markets in recent years and compared the results with benchmark countries such as the US, UK and Japan. Their analysis found that the Russian equity market is less *weak-form efficient*, than Brazil, China and such benchmark countries as the US and the UK, although the efficiency level is improving over time. The usual consequences of low level market efficiency include a lower certainty level and potentially significant behavioral biases **(Chen et al., 2007)**.

Based on the these articles we expect to find a more significant anchoring effect in analyzing M&A deals in the Russian market, since it is less efficient than the US market. We test the following hypotheses:

Hypothesis 1. The anchoring bias exists in the Russian market via the reference price effect; the acquirer earns a significantly higher announcement period return if the stock price prior to announcement is well below its 52-week high.

Hypothesis 2. The anchoring effect increases with higher levels of uncertainty associated with the deal.

The results of this study contribute to the literature in three ways. First, they document that Russian investors are subject to such behavioral bias as the anchoring phenomenon, which has been previously proven for developed markets only. Second, it provides evidence for the fact

that uncertainty strengthens the effect of the anchoring bias. Third, it shows that the bias depends neither on size of the acquired stake despite the high concentration of ownership in the market nor on the fact that control over the company is purchased.

The remainder of the paper is organized as follows. Section 2 describes the idea of anchoring bias. Section 3 presents the data, variable description and model specifications. Section 4 reports the empirical results, robustness checks and discussion. Section 5 concludes.

2 What is the anchoring bias?

The anchoring bias is an information-processing bias, first defined by **Tversky and Kahneman (1974)**, the founders of behavioral economics. They conducted several experiments to show that when people need to make estimates or provide judgments, they are frequently biased to some initial value, which can be either given or obtained as a result of a computation. Investors go through a two-stage process –they create an anchor and then adjust their final decision based on this anchor. For a lower anchor, people will end up with a lower result and vice versa. Therefore, different initial points can lead to variations in the final result, although they are irrelevant to the main question.

For example, in one of the original experiments people were asked to answer different numerical questions aimed at estimating values in percentages, such as the share of African countries in the United Nations. Firstly, they were given a number between 0 to 100, and were asked to say, whether, in their opinion, the answer to the basic question is higher or lower than the given number. Then they were asked to give their final answer to the main question. All people were divided into two groups and received two different initial values. They were asked to compare the answers with the initial value: 10% or 65%. People from the group with a lower initial value, ended up with a significantly lower estimate, than people from the other group: who answered 25% and 45% respectively.

Another experiment included two groups of high school students, who were asked to provide an estimation of the product of given numbers from 1 to 8 within 5 seconds. The first group received the equation with numbers listed in increasing order (from 1 to 8), while the second group received the same expression in the opposite order (from 8 to 1). As it is difficult to estimate precisely within the given time limits, people had to make some adjustments. As a result, people from the first group ended up with a significantly lower median estimate (512) in comparison with the second group (2,250). Although both estimates were considerably lower, than the actual answer of 40,320. The difference in the results for the two groups appeared due to

the opposing first values of the sequence (1 compared to 8), which acted as anchors to the final answer.

Similar experiments have examined the presence of the anchoring bias in various environments. **Ariely et al. (2003)** in their experiments found that the anchoring effect influenced people's valuation of products and hedonic experiences. **Switzer and Sniezek (1991)** detected the anchoring effect in judgments about future effort and subsequent performance. Anchoring was shown by **Plous (1989)**, who asked students to evaluate a particular probability (such as the probability of a nuclear war), while **Russo et al. (1989)** and **Epley and Gilovich (2004)** found the evidence of the anchoring bias in people's answers to general knowledge questions.

However, it is of paramount importance to account for people's prior knowledge of the question. **Wilson et al. (1996)** conducted an experiment including 116 students divided into two groups – one receiving an anchor and a control group – and were asked to compare the received number (for the first group) with their answer to the question on how many countries were in the United Nations. After that students had to write down their answer to the question (for both groups) and evaluate their prior knowledge on this question. The results showed a substantial anchoring effect in the first group among students with low levels of knowledge, while for people with high knowledge the difference between the group with an anchor and the control group was insignificant.

This finding provides a rationale for examining the presence of the anchoring bias in finance. This started to attract researchers' attention only relatively recently. Financial agents, such as investors, managers and institutions, frequently act in situations of high uncertainty and with little knowledge of future market performance. Therefore, we can expect them to be subjected to the anchoring bias, which has been shown in empirical studies. For example, **Campbell and Sharpe (2009)** discovered the anchoring effect in expert consensus forecasts of monthly economic releases, which were found to be biased towards the previous months results. **Grinblatt and Keloharju (2001)** showed the presence of the anchoring bias in individual investment decisions. Analyzing Finnish stock holdings, the authors found that less sophisticated investors, such as households or non-profit organizations, tend to base their investment decisions based on whether the stock is at its monthly high or low. Investors are more willing to buy stocks that are at a monthly low and sell stocks that are at a monthly high level. The anchoring bias was also found by **Heath et al. (1999)** in stock option decisions They analyzed a sample of more than 50,000 employees in seven companies listed on NYSE and NASDAQ. The authors discovered that option holders exercised 97% more options than on average when the stock price exceeded its previous year's maximum. The choice of a one-year period for the maximum price is

connected to the availability of this information as the financial press usually reports 52-week highs.

One of the areas in finance in which investors need to make judgments on events having limited knowledge is M&A. **Malhotra et al. (2016)** using a sample of deals from 50 countries found that management, when deciding on the share of equity ownership in an international firm, is biased towards the most recent level of equity purchased by another foreign company in the same country and industry. They pay less attention to other important information, overestimating the influence of the anchor. The authors also showed that the anchoring effect appears to be stronger for transactions associated with higher levels of uncertainty. They approximated deal uncertainty by the relatedness of the buyer and the target in terms of industry and the political stability of the country in which the target company operated.

The present paper is also devoted to the anchoring effect in M&A. As a reaction to M&A announcements, investors start trading the company's shares, based on their perception of the effect of this deal. This changes the share price, which results in a return for the company after the announcement. Nevertheless, as the consequences of the deal and potential synergies for the companies are in most cases extremely difficult to evaluate, the existence of the anchoring bias is hypothesized

3 Data & Methodology

3.1 Data

The sample was constructed based on data from Bureau van Dijk (Zephyr), Mergermarket and Bloomberg and consisted of M&A deals with acquirers which were publicly traded Russian companies 2000–2017. The Bureau van Dijk and Mergermarket databases were used for collecting data about M&A deals and the characteristics of the target (e.g. information about deal financing, target listing status, the country of the target). The deal set was adjusted for deals repeated in both databases. The Bloomberg database was used for collecting market and financial information about the acquirer – its share prices for cumulative abnormal return (CAR) and reference price ratio (RPR), market capitalization, total assets and total equity values and market index data required for calculating CAR. The list of variables used in the analysis can be found in **Table 1** in **Appendix**.

Our initial sample consists of 903 unique deals, which was then restricted to 387 deals after application of several filters. We first excluded observations with deal values of less than US$1 million. Second, we excluded deals in which the acquiring company was unlisted on the announcement date and one year before the announcement (this accounts for the most significant

reduction in the number of observations). Third, deals from the financial sector were excluded because some financial characteristics do not have the same meaning for them as for non-financial firms (for instance, leverage). We also reduced the number of observations by excluding deals with missing data on the structure of deal financing, the ownership before the deal, and the acquired stake.

The distribution of deals throughout the period is presented in **Figure 1** in **Appendix**. The overall dynamics reflect the changes in M&A activity – an increase before 2008, a drop after the crisis, then a recovery until 2015 and another decrease afterwards **(IMF Country Report, 2016)**. However, this does not represent the full picture because of the restrictions imposed for our sample, in particular, the elimination of all the deals in which the acquirer was not listed one year before the announcement. This restriction limits the number of deals in the earlier years of our sample, which is why the presented figures do not capture high levels of growth of the Russian M&A market prior to the crisis of 2008.

Overall, the Russian M&A market differs substantially from the M&A markets of developed countries which makes it more attractive for the present analysis. The market is highly concentrated – a relatively small number of large deals usually represents a major share of the total deal value, and a substantial number of deals during recent years were conducted by companies in the energy and extractive industries. Another important point specific to the Russian M&A market is the role of the government both as a regulator and as an initiator of deals via state-owned companies[4].

Compared to the developed markets, the Russian M&A market is also characterized by having less information available on deals, especially smaller ones, and the information is of lower quality. Moreover, deals usually take a longer period of time for deal completion after the announcement than in developed markets because of, for instance, the longer registration processes[5]. This reduces the investor's ability to accurately predict the outcome of a deal on the company's future value.

3.2 Variables

3.2.1 Dependent variable

In our analysis we use CAR as the dependent variable to measure the return the acquirer receives as a result of the M&A announcement. It shows the market reaction to the announcement and is

[4] See KPMG Report: Russian M&A Review 2016 (2017).
[5] See e.g. KPMG Report: Taxation of Cross-Border Mergers and Acquisitions. Russia (2014).

commonly used to analyze the effect that various firm and deal characteristics have on the market perception of the announcement.

Overall, there are two ways of abnormal return estimation that are most frequently used in empirical studies. The most popular is the market model proposed by **MacKinlay (1997)**, according to which the abnormal return is defined as the difference between the actual return over the event window and the normal return, calculated by the use of a market model over the estimation period.

In our analysis we apply the market model employed by **Grigorieva and Morkovin (2014)**. They studied BRICS acquirers, estimating CAR over the event window of [-20, +20], where 0 is the day of the M&A announcement. For the abnormal return calculation, an estimation period is used [-120, -21] which represents a half year before the announcement. The chosen event window is wider than the one used by **Ma et al. (2016)** of [-5, +1] due to the unique characteristics of emerging markets. Such markets typically take longer to incorporate news into share prices because of their lower efficiency levels. The test for significance of different CAR estimations showed the insignificance of narrow event windows in our sample (see **Table 2** in **Appendix**).

In our sample, CAR was estimated over the event window [-20, +20] using the MICEX Index as a market index for the market model. Values ranged from -71.35% to 56.96% with the average of -1.93% and the median of -1.64%.

3.2.2 Main independent variable

The reference price ratio (RPR) is the ratio of a company's share price on a chosen date to its 52-week high. It was proposed by **George and Hwang (2004)**. In our analysis RPR is calculated on the 21st day prior to a M&A announcement to be consistent with CAR calculations. If the company's share price is relatively close to its 52-week high 21 days before the announcement, RPR will be close to 1. For a negative and significant effect of RPR over the acquirer's CAR we will be able to identify the presence of the anchoring bias – the closer the acquirer's share price to its 52-week high, the lower the CAR. This would imply that the market anchors the acquirer's share price to its 52-week high, which does not incorporate any relevant information about the company.

In our sample there is a range of RPRs calculated against each deal on the 21st day prior to the M&A announcement from 0.16 to 1. The average value is 0.87, which means that on average the acquirer's stock price 21 days before the announcement, is 87% of its 52-week high.

3.2.3 Control variables

The set of control variables includes the deal characteristics and market and financial data on the acquirer. The deal-related variables include the relative size of the deal, the type of financing, the relatedness of the target and the buyer in terms of geography and industry, whether the deal was organized as a tender offer, whether the target is a listed company or not, and the share of the target which the acquirer held prior to the deal. Characteristics of the acquirer include its size, leverage and market to book ratio. All these variables can have an influence on the acquirer's return and have been controlled for. We also included yearly dummy variables to control for the time effect.

In our sample, 21% of deals were financed purely by cash and 10% purely by stock. Overall, the average structure of deal financing is similar to the one described by **Ma et al. (2016)**, although in the US market, stock financing is more popular. In most deals, target companies were Russian (81%) and unlisted (86%) companies. The share of deals with unlisted targets for the whole sample in the US market in **Ma et al. (2016)** is 75%, but it has increased in recent years. Deal values in our sample ranges from US$1million to US$27.85billion with the average transaction value of US$535million. The descriptive statistics for each variable we use in the analysis are in **Table 3** in **Appendix.**

3.3 Model specification

The basic specification we use to estimate the linear model constructed based on the methodology of **Ma et al. (2016)** is described by the following equation:

$$\begin{aligned} CAR_i = \beta_0 + \beta_1 RPR_i + \beta_2 Unlisted_i + \beta_3 Shares_i + \beta_4 Cash_i + \beta_5 RelativeSize_i + \\ + \beta_6 Leverage_i + \beta_7 MTB_i + \beta_8 Industry_i + \beta_9 Size_i + \beta_{10} Tender_i \\ + \beta_{11} Toehold_i + \beta_{12} CrossBord_i + \beta_{13} PastReturn_i + \sum \beta_k YearDummy_k + \varepsilon_i \end{aligned} \quad (1)$$

The description of the variables used in the model can be found in **Table 1** in **Appendix**. For the time effect control we group the deals conducted before the global financial crisis in 2008 due to the small number of observations available for every year during this period.

To adapt the model to the features of an emerging market we replaced the market to book ratio with Tobin's Q ratio. This parameter was shown to be significant for M&A deals in emerging markets (**Grigorieva and Grinchenko, 2013).** Then we accounted for state ownership in the acquiring companies which is a traditional measure for emerging markets with significant government participation.

On the basis of the existing results we expect to find an anchoring effect stated in a negative RPR coefficient, which would confirm Hypothesis 1. We also expect a stronger effect for the subsample of unlisted targets which can be explained by the uncertainty associated with such deals.

4 Empirical results

4.1 Basic results

4.1.1 Presence of the anchoring bias

We compared CAR for observations with high and low levels of RPR (above or below the sample median RPR level, respectively). For CAR estimated by the event window of [-20, +20] the difference between average values for low and high RPR values is significant and equal to 4.02% (see **Table 2** in **Appendix**). Higher levels of CAR for low levels of RPR provide evidence for the presence of the anchoring bias in the Russian market.

Then we conducted OLS regression analysis. We estimated several models with various combinations of control variables (see **Table 4** in **Appendix**). Model 2 contains a set of control variables similar to **Ma et al. (2016)**. The replacement of the market to book ratio with Tobin's Q (the result is available upon request) did not change the model, thus the market to book ratio was used further in the analysis. In Models 3, 4 and 5 we added additional variables to account for Russian characteristics. Model 3 is used further in the analysis.

Overall, the effect of RPR over CAR appears to be negative and statistically significant for all model specifications. It is also economically significant as it shows that a one standard deviation increase in RPR leads to around a 3.5% decrease in CAR. Unfortunately, the effect cannot be compared to the one shown in the US market by **Ma et al. (2016)** as different event windows were used. CAR estimated over the event window of [-5, +1] in our sample is not significant in comparison with the CARs estimated in the US market by the authors mentioned above. That is why the effect obtained by modeling these returns over RPR 6 days prior to the announcement is not significant in our sample, and can be observed only for event windows of [-20, +20]. However, in the research on the US market such a long event window was not used. This is due to the higher efficiency of the US market compared to the Russian market, as a result of which, less time is needed for new information about the company, such as an M&A deal announcement, to be incorporated into the stock market.

The dummy variable for the acquisition of control during the deal was insignificant. Therefore the acquisition of control of the target company does not significantly affect CAR. The

interaction term between RPR and the control dummy was also insignificant (see Model 5), while the RPR itself remained significant. This implies that the reference price effect does not depend on whether the deal results in the acquisition of control (the situation when regardless of the initial stake, the final stake of the acquirer would be more than 50%). This means that investors are affected by the same bias while evaluating the effect of the announcement of purchasing both control and minority stakes in the target company.

Nor was the dummy variable for government-owned companies significant. This could show that investors perceive both government-owned and non-government-owned companies in the same way, thus government ownership does not affect the return. On the other hand, the insignificant coefficient for government ownership could indicate that this variable affects the return in both directions. For example, some investors see government-owned companies as riskier due to sanctions and do not expect high returns from them and the weaker economic performance of state-owned enterprises may be driven by non-economic goals of such companies, such as employment or social issues **(Goldeng et al., 2008)**. However, the issue is still debatable. **Jakob (2017)** showed for a wide range of countries there is no significant difference between the performance of state-owned and privately-owned companies. In addition, some investors may view government-owned companies as assets with a low level of uncertainty and a low level of risk, which makes them more attractive for portfolio diversification.

The model was also checked excluding the lowest 10% of RPR values. The effect remained negative and significant. This indicates that the result is not driven by outliers as the RPR distribution is negatively skewed. The result is available upon request.

4.1.2 Valuation

The presence of a negative dependence between CAR and the closeness of the acquirer share price to its 52-week high may be a result of the influence of the company's value. If the share price is close to its 52-week high, then the possibility that the company is overvalued is higher. To control for this effect, we included the variable market-to-book ratio and Tobin's Q ratio in the regression models. Following **Ma et al. (2016)**, we estimated different models for subsamples with high and low levels of market-to-book ratio (above and below the median, respectively). The results are presented in **Table 5** in **Appendix**. Although there is a difference in the coefficients obtained for the two subsamples (and the difference is statistically significant by the Chow test), there is a negative and significant effect for both subsamples.

The same approach was implemented for subsamples with high and low Tobin's Q ratios. Again, negative and significant coefficients appeared for both subsamples, which indicates that the dependence found reflects the anchoring effect.

The model was also tested on a sample of transactions paid purely in cash. Since overvalued companies tend to use stock as a method of payment for acquisitions **(Shleifer and Vishny, 2003)**, companies that pay in cash are not expected to be overvalued. As there are only 82 such transactions in the sample, we were not able to include the full list of control variables. Therefore we modeled the dependence of CAR over RPR only, and still found a negative and significant coefficient. This confirms the anchoring effect. The result is available upon request.

4.1.3 Uncertainty

To test the second hypothesis – that the observed effect increases with uncertainty – we applied different approaches.

First, we assume that the deals in which the target is not a listed company are associated with higher levels of uncertainty among investors as they do not have access to as much financial information about the company as for listed companies. Therefore, we estimated the model separately for subsamples of listed and unlisted targets (see **Table 6** in **Appendix**). The influence of RPR over CAR was insignificant for the subsample of listed targets and the difference between the two models was significant according to the Chow test. Although the small number of observations may be a problem for such a long list of independent variables (there were only 53 deals with listed targets in the sample), the effect remains insignificant if we regress CAR only over the RPR for this subsample.

Another approach is to test the uncertainty hypothesis by including the interaction terms between the RPR and the variables which are usually connected with uncertainty. The first variable represents a stock payment for the deal as for such deals it is more difficult to evaluate the overall effect on the acquirer's fair value. Another variable is the relative size of the deal, as **Ma et al. (2016)** states, larger deals may be more difficult to evaluate. And the last variable we included in the analysis is the annual volatility of the acquirer's weekly returns estimated one month before the announcement.

The results are presented in **Table 6** in **Appendix**. The significant and negative interaction terms between the RPR and stock payment and volatility indicates an increase in the anchoring effect for deals with higher uncertainty. The interaction term between RPR and the relative size of the deal was insignificant. This can be explained by the fact that large deals usually get more media coverage, reducing uncertainty, which overlays the effect of increased deal complexity.

Overall, the results indicate that the anchoring effect increases with uncertainty for the Russian market.

4.1.4 Different levels of acquired control

The model was also estimated for subsamples of different cutoffs for acquired control. Model 1 in **Table 7** in **Appendix** represents the result for the whole sample, Model 2 for the subsample of a more than 10% stake and Model 3 more than 25%. In developed markets with more dispersed equity holdings a stake of 10% can be a blocking stake and a stake of 25% can be a controlling stake, as it can give control over the company with a right to veto in cases where the other 75% of shares is distributed among a large number of investors, and such deals are relatively rare. In our sample almost in 75% of the deals (290 deals out of 387) a stake of more than 25% was acquired.

In all models the coefficient of RPR is negative and significant, illustrating that the effect is present in deals in which large and small stakes were acquired. It could be argued that the dependence of the size of the analyzed effect on the cutoff level should be larger for deals of larger stakes. With a higher level of control, the acquirer is able to influence the target's business to a greater extent and realize more potential synergies. However, it is usually difficult to estimate the exact effect of potential synergies, which increases the uncertainty level. On the other hand, deals in which the control is acquired usually get more media coverage which reduces the level of uncertainty.

Although the coefficient for RPR becomes more negative with increasing cutoffs for the acquired stake (from Model 1 to Model 3), the difference among these coefficients, by Z test (**Clogg et al., 1995)**, remains statistically insignificant. Therefore, the anchoring bias exists regardless of the size of the acquired stake. This means that investors are on average biased in the same way in both estimations of the announcement effect on the acquisitions of small stakes (e.g. Gazprom announced an increase in its stake in Gazprom Neft by 6% in 2015) or controlling stakes (e.g. the announcement of the acquisition of 100% of Delivery Club by Mail.ru in 2016 or the purchasing of 50% in TNK-BP by Rosneft in 2012).

4.2 Robustness check

4.2.1 Alternative measures for CAR

As mentioned in Section 3.2.1, there are several approaches for CAR estimation and to check the robustness of the results we estimated CAR approximating normal returns by a weighted market index return, using the methodology described in **Brown and Warner (1985)**, **Fuller et al. (2002)** and **Officer et al. (2009)**.

In addition to our main approach we used different event windows to estimate CAR. However, only CAR estimated over the event windows [-5, +5], [-10, +10] and [-20, +20] are significant. The results are presented in Panel A of **Table 8** in **Appendix** (Model 1, 2 and 3, respectively).

The effect appeared to be negative and significant for the longest event window and in the basic approach, where the market model was used for the estimation of normal returns. Although the coefficient is smaller in comparison with the basic approach, it is still statistically and economically significant. The result is robust to alternative CAR estimations.

4.2.2 Alternative anchors

To check the robustness of the results we also used different approaches to estimate RPR. First, we estimated the ratio of the acquirer's share price prior to the announcement to its 13-, 26- and 39-week highs (which represents 1, 2 and 3 quarters, respectively). The results are presented in Panel A **Table 9** in **Appendix**. In all specifications the effect remains negative and significant. Almost half of the observations (180 out of 387) of the 52-week high were the same as the price 13-week high (1 quarter), which could be a signal that some investors use different peak prices as anchors.

We then estimated RPR by dividing the acquirer's share price before the announcement into 75%, 90% and 95% percentiles of the share price rather than the 52-week high. The results, which can be found in Panel B of **Table 9** in **Appendix**, show that the anchoring effect is present for all approaches to the RPR estimation.

We also included the ratio of the price to its 52-week high and 52-week low. The coefficient of RPR estimated by the 52-week low was negative and significant, which supports the anchoring hypothesis – if the share price before the announcement is highly above its 52-week low (which means that the price is close to its 52-week high), then the acquirer obtains a lower return. Then, following **Ma et al. (2016)**, we constructed another RPR by dividing the difference between the acquirer's share price before the announcement and its 52-week low by the difference between the 52-week high and the 52-week low. Inserting this ratio into the model instead of the basic RPR also resulted in a negative and significant coefficient. The results are presented in Models 1 and 2 in Panel C of **Table 9** in **Appendix**.

We also calculated RPR with regard to the Russian market index (MICEX), to check whether the effect is driven by the closeness of the whole market to its 52-week high (see Model 3 in Panel C of **Table 9** in **Appendix**). However, the coefficient for the market index RPR was insignificant.

In general, the reference price effect was shown to be robust.

4.3 Discussion

The results demonstrate that Russian investors are prone to behavioral biases, in particular the anchoring bias, in evaluating the effect of an M&A announcement on the acquirer's share price. Generally, investors in emerging markets are influenced by the same behavioral biases as investors in developed markets. However, it was not possible to compare the numerical effects in the US market shown by **Ma et al. (2016)** and the effect obtained on the sample of Russian companies directly. This happens due to the insignificance of CARs calculated on the small event windows of the Russian market because of lower market efficiency. In contrast, in developed markets abnormal returns are usually estimated on rather short event windows. Whether the anchoring bias is stronger in emerging markets in comparison with the developed markets is a subject for further research.

Another area for discussion is the logic behind choosing the 52-week high of the acquirer's share price as the anchor. In this case peak prices such as a 52-week high, represent a salient point, or an anchor. What distinguishes it from other peak prices, such as, for example, peak prices of the latest quarter or half year, is that it is usually available for investors in different electronic resources that aggregate financial information about companies. For instance, Bloomberg presents the 52-week high and low on the overview page for every company in line with its market capitalization, volume traded and other key statistics. However, as we showed in Section 4.2.2, peak prices for periods of different lengths can also serve as relevant anchors.

Another possible price level that is available for investors and can act as the anchor is the average price for the previous year. In Section 4.2.2 we demonstrate that the coefficient obtained for the model for the 75% percentile appeared to be more negative than for the 95% percentile when estimating models for different percentiles of the share price. This may be a signal that investors also anchor the share price to its average level.

The choice of market index used for a normal return calculation has also been debated. In our analysis MICEX index was used. One could claim that in a situation of significant changes in a particular industry, which do not influence the MICEX index much, during the time of an M&A announcement from this industry, the calculated abnormal return could be biased. In this case, it would be more appropriate to use industry indices, such as MSCI, which would reflect industry-specific changes more than a general market index. However, there may be several limitations in using MSCI indices for a sample of Russian companies. First, this index is not calculated for all sectors. For instance, there is no Russian MSCI index for the transportation sector, while there are some deals from this sector in our sample. Second, the overall index is not highly diversified (it includes only 22 companies). Some sectors are represented by a small number of companies,

at one extreme for instance the consumer staples sector is fully presented by Magnit GDR. Therefore, for such industries this index would capture company-specific changes rather than industry-specific ones.

5 Conclusion

This research shows the presence of the anchoring bias through the reference price effect in investor evaluation of M&A deal announcements in Russia. We found a significant and negative relationship between the acquirer's CAR obtained as a result of an M&A announcement and the RPR, which represents the proximity of acquirer's share price before the announcement to its 52-week high. This high serves as an anchor for investors, although this price level is irrelevant for evaluating the effect the deal announcement would have on the company's future performance. The results indicate that in situations where the company's share price prior to the announcement is relatively close to its 52-week high, the acquirer receives a lower CAR in comparison to situations where the pre-announcement share price is well below its 52-week high.

The bias remains significant even after controlling for the valuation level effect, which means that it is not explained by the investor perception that the companies with a relatively low pre-announcement share price are possibly undervalued. Moreover, the reference price effect gets stronger with the increasing level of uncertainty associated with the deal, which generally is in line with behavioral finance theory. The bias also remains significant even after applying different restrictions to the sample regarding the size of the acquired stake and does not strengthen for the deals in which a controlling stake was purchased. The obtained results are robust to various approaches for calculating CAR and the usage of different anchors.

The findings add to existing literature in several ways. First, we showed that investors in Russia are subjected to the same behavioral bias, in our case the anchoring bias, as investors in developed markets. Second, we provided additional evidence that the anchoring effect strengthens with increasing levels of uncertainty. Third, we demonstrated that on average the anchoring bias exists in all deals regardless of the size of the acquired stake and whether the resultant stake is controlling.

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Appendix

Table 1 Variables description

Variable	Description
CAR	Cumulative abnormal return estimated by the market model for different event windows with estimation period [-120, -21]
RPR	Reference price ratio, the ratio of the acquirer's share price 6 / 11 / 21 days before the announcement to its 52-week high level
Unlisted	Dummy variable, which equals 1 for unlisted targets
Shares	Dummy variable, which equals 1 for the deals fully paid in stock
Cash	Dummy variable, which equals 1 for the deals fully paid in cash
Rel.size	Relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to the announcement
Leverage	Leverage ratio for the acquirer on the previous year end prior to the announcement
MTB	Market-to-book ratio for the acquirer on the previous year end prior to announcement
Industry	Dummy variable, which equals 1 if the acquirer and the target are from the same industry
Size	Natural logarithm of acquirer's market capitalization on the previous year end prior to announcement
Tender	Dummy variable, which equals 1 for the deals organized as a tender offer
Toehold	Dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement
Crossbord	Dummy variable, which equals 1 for the deals with a non-Russian target
Past return	Acquirer's return over a year prior to the announcement month
Tobin's Q	Tobin's Q ratio for the acquirer on the previous year end prior to announcement
Government	Dummy variable, which equals 1 for the acquirer's owned by the government
Control	Dummy variable, which equals 1 for the deals, in which the control over the target was acquired
Sigma	Standard deviation of the acquirer's weekly returns over a year one month prior to announcement

Source: authors' calculations

Table 2 Cumulative abnormal return

Panel A

Event window	Mean CAR	t statistics
[-5, +1]	-0.40%	-1.57
[-5, +3]	-0.55%	-1.82
[-5, +5]	-0.71%	-2.17
[-10, +10]	-1.54%	-2.86
[-20, +20]	-1.93%	-2.71

Source: author's calculations

Note: This table shows mean levels of cumulative abnormal returns estimated for different event windows for the estimation period of [-120, -21]. t statistics is used to check the significance of CAR.

Panel B

	All sample	Low RPR	High RPR	t statistics for the difference
[-5, +1]	-0.40%	-0.55	-0.25	0.72
[-5, +3]	-0.55%	-0.36	-0.74	-0.80
[-5, +5]	-0.71%	-0.33	-1.11	-1.50
[-10, +10]	-1.54%	-0.71	-2.37	-1.95
[-20, +20]	-1.93%	0.09	-3.93	-3.62

Source: authors' calculations

Note: This table shows mean levels of cumulative abnormal returns estimated for different event windows for the estimation period of [-120, -21] for the whole sample and subsamples of low and high RPR levels. t statistics is used to check the significance of the difference between CAR levels for two subsamples.

Table 3 Descriptive statistics

	Mean	Median	Standard deviation	Min	Max
CAR	-2%	-2%	14%	-71%	57%
RPR	0.87	0.90	0.12	0.16	1
Deal value (US$mn)	535	98	1,777	1	27,854
MarketCap (US$mn)	26,504	10,061	45,899	16	335,572
Leverage	0.50	0.46	0.18	0.06	0.99
MTB	1.90	1.19	1.90	1.10	15.82
Tobin's Q	1.33	1.09	0.72	0.43	4.56
Past return	6%	4%	47%	-222%	257%

Source: authors' calculations

Table 4 Regression model results

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	0.2123***	0.1668*	0.1681*	0.1856*	0.1183
	(4.252)	(2.087)	(0.038)	(0.023)	(0.314)
RPR	-0.2664***	-0.2956***	-0.2959***	-0.2969***	-0.2207°
	(-4.683)	(-4.291)	(0)	(0)	(0.062)
Unlisted		0.0092	0.0095	0.0092	0.0088
		(0.420)	(0.668)	(0.68)	(0.694)
Shares		-0.0859***	-0.087**	-0.0859**	-0.0863**
		(-3.451)	(0.001)	(0.001)	(0.001)
Cash		0.0217	0.0218	0.024	0.0239
		(1.227)	(0.22)	(0.178)	(0.181)
Rel.size		0.0740*	0.0737*	0.071*	0.0706*
		(2.393)	(0.018)	(0.023)	(0.024)
Leverage		-0.0474	-0.0474	-0.0491	-0.0485
		(-1.107)	(0.269)	(0.254)	(0.261)
MTB		0.0020	0.0022	0.0021	0.002
		(0.491)	(0.618)	(0.645)	(0.654)
Industry		-0.0249°	-0.0252°	-0.0244°	-0.0236
		(-1.725)	(0.086)	(0.096)	(0.109)
Size		0.0102*	0.0099°	0.0098°	0.0097°
		(2.145)	(0.055)	(0.059)	(0.062)
Tender		-0.0139	-0.0137	-0.009	-0.0101
		(-0.387)	(0.704)	(0.803)	(0.779)
Toehold		0.0206	0.0206	-0.0325°	-0.0344°
		(1.355)	(0.176)	(0.076)	(0.062)
Crossbord		-0.0310°	-0.0311°	-0.0124	-0.0104
		(-1.705)	(0.089)	(0.526)	(0.6)
Past return		-0.0140	-0.0137	0.0013	0.0023
		(-0.719)	(0.483)	(0.941)	(0.898)
Government			0.0021	-0.0108	0.1183
			(0.907)	(0.484)	(0.314)
Control				0.1856*	0.0826
				(0.023)	(0.484)
RPR*Control					-0.1062
					(0.425)
N	**387**	**387**	**387**	**387**	**387**
Adj. R2	**0.0514**	**0.1023**	**0.0999**	**0.0966**	**0.0957**

Source: authors' calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR) estimated by the market model for the event window [-20, +20] on the reference price ratio (RPR), that represents the ratio of the acquirer's share price 21 days before the announcement to its 52-week high level, and different sets of control variables. *Unlisted* – dummy variable, which equals 1 for unlisted targets. *Shares* – dummy variable, which equals 1 for the deals fully paid in stock. *Cash* – dummy variable, which equals 1 for the deals fully paid in cash. *Rel.size* – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. *Leverage* – leverage ratio for the acquirer on the previous year end prior to announcement. *MTB* – market-to-book ratio for the acquirer on the previous year end prior to announcement. *Industry* – dummy variable, which equals 1 if the acquirer and the target are from the same industry. *Size* – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. *Tender* – dummy variable, which equals 1 for the deals organized as tender offer. *Toehold* – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. *Crossbord* – dummy variable, which equals 1 for the deals with non-Russian target. *Past return* – acquirer's return over a year prior to the announcement month. *Government* – dummy variable, which equals 1 for the acquirer's owned by the government. *Control* – dummy variable, which equals 1 for the deals, in which the control over target was acquired. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

Table 5 Check for valuation levels effect

	Model 1 (high MTB)	Model 2 (low MTB)	Model 3 (high Tobin's Q)	Model 4 (low Tobin's Q)
Intercept	0.275*	0.2068°	0.2582°	0.247*
	(0.044)	(0.054)	(0.051)	(0.02)
RPR	-0.3927***	-0.2181*	-0.3911***	-0.2652**
	(0)	(0.026)	(0)	(0.004)
Unlisted	0.0119	0.0174	0.0071	0.0175
	(0.774)	(0.51)	(0.864)	(0.505)
Shares	-0.0635	-0.1023**	-0.0608	-0.1055**
	(0.175)	(0.003)	(0.192)	(0.002)
Cash	0.0195	0.043°	0.0213	0.0405°
	(0.471)	(0.065)	(0.432)	(0.079)
Rel.size	0.1273°	0.0415	0.129°	0.0402
	(0.078)	(0.202)	(0.073)	(0.216)
Leverage	-0.0304	-0.0659	-0.0167	-0.0984°
	(0.694)	(0.199)	(0.828)	(0.065)
MTB	0.002	-0.0118	0.0023	0.0178
	(0.763)	(0.772)	(0.731)	(0.663)
Industry	-0.0319	-0.0003	-0.0321	0.0018
	(0.142)	(0.987)	(0.137)	(0.928)
Size	0.0074	0.0069	0.009	0.0055
	(0.453)	(0.292)	(0.349)	(0.405)
Tender	-0.0514	-0.0199	-0.0487	-0.0216
	(0.427)	(0.642)	(0.452)	(0.612)
Toehold	0.0114	0.0091	0.0086	0.0068
	(0.648)	(0.643)	(0.73)	(0.726)
Crossbord	-0.0577*	0.0209	-0.0554°	0.0177
	(0.044)	(0.419)	(0.052)	(0.485)
Past return	-0.0567	0.0099	-0.0607°	0.0163
	(0.101)	(0.678)	(0.071)	(0.504)
Government	-0.0128	-0.0108	-0.0188	-0.014
	(0.708)	(0.63)	(0.572)	(0.537)
N	**191**	**189**	**192**	**188**
Adj. R2	**0.1463**	**0.1812**	**0.1370**	**0.1961**

Source: authors' calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR) estimated by the market model for the event window [-20, +20] on the reference price ratio (RPR), that represents the ratio of the acquirer's share price 21 days before the announcement to its 52-week high level, and a set of control variables. Models are estimated for subsamples of high and low levels of MTB (Model 1 and Model 2, respectively) and for high and low levels of Tobin's Q (Model 3 and Model 4, respectively). *Unlisted* – dummy variable, which equals 1 for unlisted targets. *Shares* – dummy variable, which equals 1 for the deals fully paid in stock. *Cash* – dummy variable, which equals 1 for the deals fully paid in cash. *Rel.size* – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. *Leverage* – leverage ratio for the acquirer on the previous year end prior to announcement. *MTB* – market-to-book ratio for the acquirer on the previous year end prior to announcement. *Industry* – dummy variable, which equals 1 if the acquirer and the target are from the same industry. *Size* – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. *Tender* – dummy variable, which equals 1 for the deals organized as tender offer. *Toehold* – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. *Crossbord* – dummy variable, which equals 1 for the deals with non-Russian target. *Past return* – acquirer's return over a year prior to the announcement month. *Tobin's Q* – Tobin's Q ratio for the acquirer on the previous year end prior to announcement. *Government* – dummy variable, which equals 1 for the acquirer's owned by the government. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

Table 6 Check for uncertainty effect

Panel A

	Model 1 (unlisted)	Model 2 (listed)
Intercept	0.2291**	-0.5549
	(0.003)	(0.22)
RPR	-0.3286***	0.0515
	(0)	(0.907)
Shares	-0.0894**	-0.0063
	(0.001)	(0.96)
Cash	-0.0056	0.1436*
	(0.765)	(0.027)
Rel.size	0.0761*	-0.1258
	(0.012)	(0.699)
Leverage	-0.0131	-0.1199
	(0.767)	(0.502)
MTB	-0.0036	0.028
	(0.435)	(0.107)
Industry	-0.0295*	0.0619
	(0.046)	(0.414)
Size	0.0097°	0.0138
	(0.069)	(0.534)
Tender	0.0031	-0.0868
	(0.954)	(0.27)
Toehold	0.022	0.0848
	(0.158)	(0.256)
Crossbord	-0.0353°	-0.0965
	(0.053)	(0.454)
Past return	-0.0082	-0.0512
	(0.684)	(0.594)
Government	-0.0072	0.0495
	(0.699)	(0.474)
N	**344**	**53**
Adj. R2	**0.1221**	**0.0881**

Source: authors' calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR) estimated by the market model for the event window [-20, +20] on the reference price ratio (RPR), that represents the ratio of the acquirer's share price 21 days before the announcement to its 52-week high level, and a set of control variables. Models are estimated for subsamples of unlisted and listed targets (Model 1 and Model 2, respectively). *Shares* – dummy variable, which equals 1 for the deals fully paid in stock. *Cash* – dummy variable, which equals 1 for the deals fully paid in cash. *Rel.size* – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. *Leverage* – leverage ratio for the acquirer on the previous year end prior to announcement. *MTB* – market-to-book ratio for the acquirer on the previous year end prior to announcement. *Industry* – dummy variable, which equals 1 if the acquirer and the target are from the same industry. *Size* – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. *Tender* – dummy variable, which equals 1 for the deals organized as tender offer. *Toehold* – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. *Crossbord* – dummy variable, which equals 1 for the deals with non-Russian target. *Past return* – acquirer's return over a year prior to the announcement month. *Government* – dummy variable, which equals 1 for the acquirer's owned by the government. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

Panel B

	Model 1 (Shares)	Model 2 (Rel.size)	Model 3 (Sigma)
Intercept	0.1653*	0.1624*	0.1661
	(0.042)	(0.049)	(0.152)
RPR	-0.2923***	-0.2882***	-0.1014
	(0)	(0)	(0.362)
RPR*Sigma			-4.685***
			(0)
RPR*Rel.size		-0.1068	
		(0.675)	
RPR*Shares	-0.0954**		
	(0.002)		
Sigma			1.8746°
			(0.083)
Unlisted	0.0094	0.0096	0.0026
	(0.671)	(0.666)	(0.902)
Shares		-0.0876**	-0.082**
		(0.001)	(0.002)
Cash	0.0222	0.0214	0.0208
	(0.212)	(0.229)	(0.228)
Rel.size	0.0719*	0.1647	0.0649*
	(0.021)	(0.453)	(0.033)
Leverage	-0.0475	-0.0472	-0.061
	(0.27)	(0.272)	(0.147)
MTB	0.002	0.0018	0.0017
	(0.658)	(0.692)	(0.692)
Industry	-0.0252°	-0.0243	-0.0306*
	(0.086)	(0.1)	(0.033)
Size	0.01°	0.0099°	0.0039
	(0.055)	(0.056)	(0.452)
Tender	-0.0126	-0.013	-0.0177
	(0.728)	(0.721)	(0.614)
Toehold	0.0203	0.0204	0.0225
	(0.184)	(0.181)	(0.129)
Crossbord	-0.0307°	-0.0313°	-0.0319°
	(0.094)	(0.087)	(0.074)
Past return	-0.0125	-0.0127	0.0095
	(0.521)	(0.519)	(0.628)
Government	0.0008	0.0017	0.0042
	(0.963)	(0.927)	(0.815)
N	**387**	**387**	**387**
Adj. R2	**0.0973**	**0.0979**	**0.1502**

Source: authors' calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR) estimated by the market model for the event window [-20, +20] on the reference price ratio (RPR), that represents the ratio of the acquirer's share price 21 days before the announcement to its 52-week high level, the interaction terms between RPR and Shares, Rel.size and Sigma (Model 1, Model 2 and Model 3, respectively), and a set of control variables. *Unlisted* – dummy variable, which equals 1 for unlisted targets. *Shares* – dummy variable, which equals 1 for the deals fully paid in stock. *Cash* – dummy variable, which equals 1 for the deals fully paid in cash. *Rel.size* – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. *Leverage* – leverage ratio for the acquirer on the previous year end prior to announcement. *MTB* – market-to-book ratio for the acquirer on the previous year end prior to announcement. *Industry* – dummy variable, which equals 1 if the acquirer and the target are from the same industry. *Size* – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. *Tender* – dummy variable, which equals 1 for the deals organized as tender offer. *Toehold* – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. *Crossbord* – dummy variable, which equals 1 for the deals with non-Russian target. *Past return* – acquirer's return over a year prior to the announcement month. *Government* – dummy variable, which equals 1 for the acquirer's owned by the government. *Sigma* – standard deviation of the acquirer's weekly returns over a year one month prior to announcement. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

Table 7 Different levels of acquired control

	Model 1 (all sample)	Model 2 (more than 10%)	Model 3 (more than 25%)
Intercept	0.1681*	0.1687*	0.2551**
	(0.038)	(0.036)	(0.005)
RPR	-0.2959***	-0.3323***	-0.3751***
	(0)	(0)	(0)
Unlisted	0.0095	0.0278	-0.0159
	(0.668)	(0.245)	(0.634)
Shares	-0.087**	-0.073**	-0.0983***
	(0.001)	(0.005)	(0.001)
Cash	0.0218	0.0063	-0.0081
	(0.22)	(0.731)	(0.7)
Rel.size	0.0737*	0.0778**	0.0925**
	(0.018)	(0.009)	(0.003)
Leverage	-0.0474	-0.0526	-0.0546
	(0.269)	(0.21)	(0.239)
MTB	0.0022	0.001	0.001
	(0.618)	(0.822)	(0.841)
Industry	-0.0252°	-0.0164	-0.037*
	(0.086)	(0.261)	(0.022)
Size	0.0099°	0.0133**	0.0147**
	(0.055)	(0.009)	(0.009)
Tender	-0.0137	-0.0156	-0.0472
	(0.704)	(0.676)	(0.363)
Toehold	0.0206	0.0263°	0.0281
	(0.176)	(0.091)	(0.145)
Crossbord	-0.0311°	-0.0483**	-0.0614**
	(0.089)	(0.008)	(0.003)
Past return	-0.0137	0.0048	0.0035
	(0.483)	(0.802)	(0.866)
Government	0.0021	-0.0149	-0.0096
	(0.907)	(0.405)	(0.626)
N	**387**	**350**	**290**
Adj. R2	**0.0999**	**0.1305**	**0.1829**

Source: authors' calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR) estimated by the market model for the event window [-20, +20] on the reference price ratio (RPR), that represents the ratio of the acquirer's share price 21 days before the announcement to its 52-week high level, and a set of control variables. Models are estimated for the whole sample (Model 1), for the subsamples of deals in which stakes of more than 10% and more than 25% were acquired (Model 2 and Model 3, respectively). *Unlisted* – dummy variable, which equals 1 for unlisted targets. *Shares* – dummy variable, which equals 1 for the deals fully paid in stock. *Cash* – dummy variable, which equals 1 for the deals fully paid in cash. *Rel.size* – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. *Leverage* – leverage ratio for the acquirer on the previous year end prior to announcement. *MTB* – market-to-book ratio for the acquirer on the previous year end prior to announcement. *Industry* – dummy variable, which equals 1 if the acquirer and the target are from the same industry. *Size* – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. *Tender* – dummy variable, which equals 1 for the deals organized as tender offer. *Toehold* – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. *Crossbord* – dummy variable, which equals 1 for the deals with non-Russian target. *Past return* – acquirer's return over a year prior to the announcement month. *Government* – dummy variable, which equals 1 for the acquirer's owned by the government. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

Table 8 Robustness check: alternative measures for CAR

	Model 1 ([-5, +5])	Model 2 ([-10, +10])	Model 3 ([-20, +20])
Intercept	0.038	-0.0177	0.071
	(0.258)	(0.745)	(0.356)
RPR	-0.0291	-0.0458	-0.1394*
	(0.309)	(0.34)	(0.034)
Unlisted	-0.0073	-0.0009	0.0041
	(0.486)	(0.957)	(0.847)
Shares	-0.0336**	-0.0603**	-0.0693**
	(0.008)	(0.003)	(0.006)
Cash	-0.018*	-0.0048	0.0207
	(0.033)	(0.723)	(0.22)
Rel.size	0.025°	0.0448°	0.0546°
	(0.092)	(0.057)	(0.065)
Leverage	-0.0153	-0.0137	-0.0537
	(0.451)	(0.672)	(0.188)
MTB	0.0003	-0.0008	0.0035
	(0.907)	(0.803)	(0.405)
Industry	-0.0107	-0.0106	-0.0314*
	(0.124)	(0.337)	(0.024)
Size	0.0003	0.0073°	0.0066
	(0.898)	(0.063)	(0.18)
Tender	-0.0042	-0.0019	-0.0165
	(0.804)	(0.945)	(0.631)
Toehold	0.0078	-0.0016	0.0128
	(0.284)	(0.886)	(0.378)
Crossbord	-0.0178*	-0.032*	-0.0285
	(0.04)	(0.021)	(0.101)
Past return	0.0295**	0.031°	0.0544**
	(0.005)	(0.076)	(0.004)
Government	-0.0009	-0.0154	0.0045
	(0.92)	(0.259)	(0.794)
N	**387**	**387**	**387**
Adj. R2	**0.0567**	**0.0506**	**0.0737**

Source: authors' calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR), for which the normal return is approximated by MICEX index, estimated for different event windows – [-5, +5], [-10, +10] and [-20, +20] (Model 1, Model 2 and Model 3, respectively) on the reference price ratio (RPR), that represents the ratio of the acquirer's share price 6, 11 or 21 days before the announcement (depending on the chosen event window) to its 52-week high level, and a set of control variables. Unlisted – dummy variable, which equals 1 for unlisted targets. Shares – dummy variable, which equals 1 for the deals fully paid in stock. Cash – dummy variable, which equals 1 for the deals fully paid in cash. Rel.size – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. Leverage – leverage ratio for the acquirer on the previous year end prior to announcement. MTB – market-to-book ratio for the acquirer on the previous year end prior to announcement. Industry – dummy variable, which equals 1 if the acquirer and the target are from the same industry. Size – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. Tender – dummy variable, which equals 1 for the deals organized as tender offer. Toehold – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. Crossbord – dummy variable, which equals 1 for the deals with non-Russian target. Past return – acquirer's return over a year prior to the announcement month. Government – dummy variable, which equals 1 for the acquirer's owned by the government. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

Table 9 Robustness check: alternative anchors

Panel A

	Model 1 (1Q)	Model 2 (2Q)	Model 3 (3Q)
Intercept	0.2554**	0.1655*	0.1487°
	(0.008)	(0.041)	(0.058)
RPR	-0.3669***	-0.2946***	-0.2859***
	(0)	(0)	(0)
Unlisted	0.0116	0.0097	0.0132
	(0.6)	(0.66)	(0.553)
Shares	-0.0925***	-0.0864**	-0.0855**
	(0.001)	(0.001)	(0.001)
Cash	0.0238	0.0216	0.0205
	(0.179)	(0.224)	(0.249)
Rel.size	0.0699*	0.0728*	0.0682*
	(0.025)	(0.02)	(0.029)
Leverage	-0.0355	-0.0474	-0.0437
	(0.406)	(0.27)	(0.308)
MTB	0.0003	0.0023	0.0028
	(0.946)	(0.612)	(0.531)
Industry	-0.0224	-0.0252°	-0.0263°
	(0.126)	(0.086)	(0.073)
Size	0.0086°	0.0101°	0.0101°
	(0.094)	(0.052)	(0.051)
Tender	-0.0144	-0.0129	-0.0124
	(0.69)	(0.721)	(0.732)
Toehold	0.0195	0.0205	0.019
	(0.2)	(0.18)	(0.213)
Crossbord	-0.031°	-0.0312°	-0.0304°
	(0.09)	(0.088)	(0.096)
Past return	-0.0393*	-0.0132	-0.0068
	(0.021)	(0.5)	(0.742)
Government	0.0017	0.0018	0.0021
	(0.926)	(0.921)	(0.908)
N	**387**	**387**	**387**
Adj. R2	**0.0999**	**0.0995**	**0.0993**

Source: author's calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR) estimated by the market model for the event window [-20, +20] on different reference price ratios (RPR), that represents the ratio of the acquirer's share price 21 days before the announcement to its 13-, 26- and 39-week high levels (Model 1, Model 2 and Model 3, respectively), and a set of control variables. *Unlisted* – dummy variable, which equals 1 for unlisted targets. *Shares* – dummy variable, which equals 1 for the deals fully paid in stock. *Cash* – dummy variable, which equals 1 for the deals fully paid in cash. *Rel.size* – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. *Leverage* – leverage ratio for the acquirer on the previous year end prior to announcement. *MTB* – market-to-book ratio for the acquirer on the previous year end prior to announcement. *Industry* – dummy variable, which equals 1 if the acquirer and the target are from the same industry. *Size* – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. *Tender* – dummy variable, which equals 1 for the deals organized as tender offer. *Toehold* – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. *Crossbord* – dummy variable, which equals 1 for the deals with non-Russian target. *Past return* – acquirer's return over a year prior to the announcement month. *Government* – dummy variable, which equals 1 for the acquirer's owned by the government. *Control* – dummy variable, which equals 1 for the deals, in which the control over target was acquired. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

Panel B

	Model 1 (75%)	Model 2 (90%)	Model 3 (95%)
Intercept	0.2211**	0.1041	0.0576
	(0.007)	(0.194)	(0.461)
RPR	-0.321***	-0.214**	-0.1705*
	(0)	(0.001)	(0.014)
Unlisted	0.0172	0.0152	0.0152
	(0.435)	(0.498)	(0.502)
Shares	-0.0858**	-0.0872**	-0.09***
	(0.001)	(0.001)	(0.001)
Cash	0.0176	0.0191	0.0219
	(0.318)	(0.289)	(0.225)
Rel.size	0.0684*	0.0705*	0.0698*
	(0.027)	(0.025)	(0.028)
Leverage	-0.0327	-0.0353	-0.0349
	(0.439)	(0.414)	(0.423)
MTB	0.0021	0.0025	0.0028
	(0.63)	(0.583)	(0.537)
Industry	-0.0243°	-0.0245°	-0.0252°
	(0.094)	(0.097)	(0.091)
Size	0.008	0.0089°	0.0093°
	(0.115)	(0.089)	(0.079)
Tender	-0.0067	-0.015	-0.0181
	(0.853)	(0.681)	(0.623)
Toehold	0.0208	0.0214	0.0217
	(0.168)	(0.165)	(0.162)
Crossbord	-0.0254	-0.0273	-0.0289
	(0.159)	(0.139)	(0.12)
Past return	0.0547*	0.0069	-0.0096
	(0.048)	(0.795)	(0.716)
Government	0.004	0.0005	-0.0017
	(0.824)	(0.98)	(0.925)
N	**387**	**387**	**387**
Adj. R2	**0.1185**	**0.0805**	**0.0700**

Source: author's calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR) estimated by the market model for the event window [-20, +20] on different reference price ratios (RPR), that represents the ratio of the acquirer's share price 21 days before the announcement to its 75%, 90% and 95% percentiles over 52 weeks (Model 1, Model 2 and Model 3, respectively), and a set of control variables. *Unlisted* – dummy variable, which equals 1 for unlisted targets. *Shares* – dummy variable, which equals 1 for the deals fully paid in stock. *Cash* – dummy variable, which equals 1 for the deals fully paid in cash. *Rel.size* – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. *Leverage* – leverage ratio for the acquirer on the previous year end prior to announcement. *MTB* – market-to-book ratio for the acquirer on the previous year end prior to announcement. *Industry* – dummy variable, which equals 1 if the acquirer and the target are from the same industry. *Size* – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. *Tender* – dummy variable, which equals 1 for the deals organized as tender offer. *Toehold* – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. *Crossbord* – dummy variable, which equals 1 for the deals with non-Russian target. *Past return* – acquirer's return over a year prior to the announcement month. *Government* – dummy variable, which equals 1 for the acquirer's owned by the government. *Control* – dummy variable, which equals 1 for the deals, in which the control over target was acquired. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

Panel C

	Model 1	Model 2	Model 3
Intercept	0.2867**	-0.0295	-0.157
	(0.001)	(0.636)	(0.261)
RPR	-0.3518***		
	(0)		
RPR for 52-week low	-0.0362**		
	(0.001)		
(P-H)/(H-L)		-0.0894**	
		(0.003)	
RPR for market index			0.1014
			(0.443)
Unlisted	0.0082	0.0123	0.0118
	(0.708)	(0.583)	(0.604)
Shares	-0.0847**	-0.0889**	-0.0902**
	(0.001)	(0.001)	(0.001)
Cash	0.0186	0.0224	0.0236
	(0.29)	(0.212)	(0.194)
Rel.size	0.069*	0.0706*	0.063*
	(0.025)	(0.026)	(0.049)
Leverage	-0.0397	-0.0275	-0.0274
	(0.35)	(0.525)	(0.53)
MTB	0.0011	0.0018	0.0025
	(0.808)	(0.691)	(0.591)
Industry	-0.028°	-0.0251°	-0.0235
	(0.053)	(0.09)	(0.118)
Size	0.0076	0.0091°	0.0068
	(0.142)	(0.083)	(0.199)
Tender	-0.0103	-0.0162	-0.024
	(0.773)	(0.658)	(0.517)
Toehold	0.0183	0.0223	0.0213
	(0.224)	(0.148)	(0.173)
Crossbord	-0.0272	-0.0267	-0.0237
	(0.132)	(0.148)	(0.207)
Past return	0.0445°	-0.0224	-0.0612***
	(0.092)	(0.283)	(0)
Government	0.0015	-0.0041	-0.0003
	(0.934)	(0.822)	(0.989)
N	**387**	**387**	**387**
Adj. R2	**0.1228**	**0.0770**	**0.0559**

Source: author's calculations

Note: The Table presents regression results of the cumulative abnormal return (CAR) estimated by the market model for the event window [-20, +20] on reference price ratio (RPR), that represents the ratio of the acquirer's share price 6, 11 or 21 days before the announcement (depending on the chosen event window) to its 52-week high level, and a similar ratio estimated by the use of 52-week low level (Model 1), the normalized RPR ratio (the difference between the acquirer's share price before the announcement and it's 52-week low level by the different between 52-week high and 52-week low levels) (Model 2), RPR ratio for MICEX index (Model 3), and a set of control variables. *Unlisted* – dummy variable, which equals 1 for unlisted targets. *Shares* – dummy variable, which equals 1 for the deals fully paid in stock. *Cash* – dummy variable, which equals 1 for the deals fully paid in cash. *Rel.size* – relative size of the deal, the ratio of the deal value to acquirer's market capitalization on the previous year end prior to announcement. *Leverage* – leverage ratio for the acquirer on the previous year end prior to announcement. *MTB* – market-to-book ratio for the acquirer on the previous year end prior to announcement. *Industry* – dummy variable, which equals 1 if the acquirer and the target are from the same industry. *Size* – natural logarithm of acquirer's market capitalization on the previous year end prior to announcement. *Tender* – dummy variable, which equals 1 for the deals organized as tender offer. *Toehold* – dummy variable, which equals 1 for the deals in which the acquirer owned more than 5% of the target before the announcement. *Crossbord* – dummy variable, which equals 1 for the deals with non-Russian target. *Past return* – acquirer's return over a year prior to the announcement month. *Government* – dummy variable, which equals 1 for the acquirer's owned by the government. *Control* – dummy variable, which equals 1 for the deals, in which the control over target was acquired. P-values are in the parenthesis.

*** - significant at the 0.1% level
** - significant at the 1% level
* - significant at the 5% level
° - significant at the 10% level

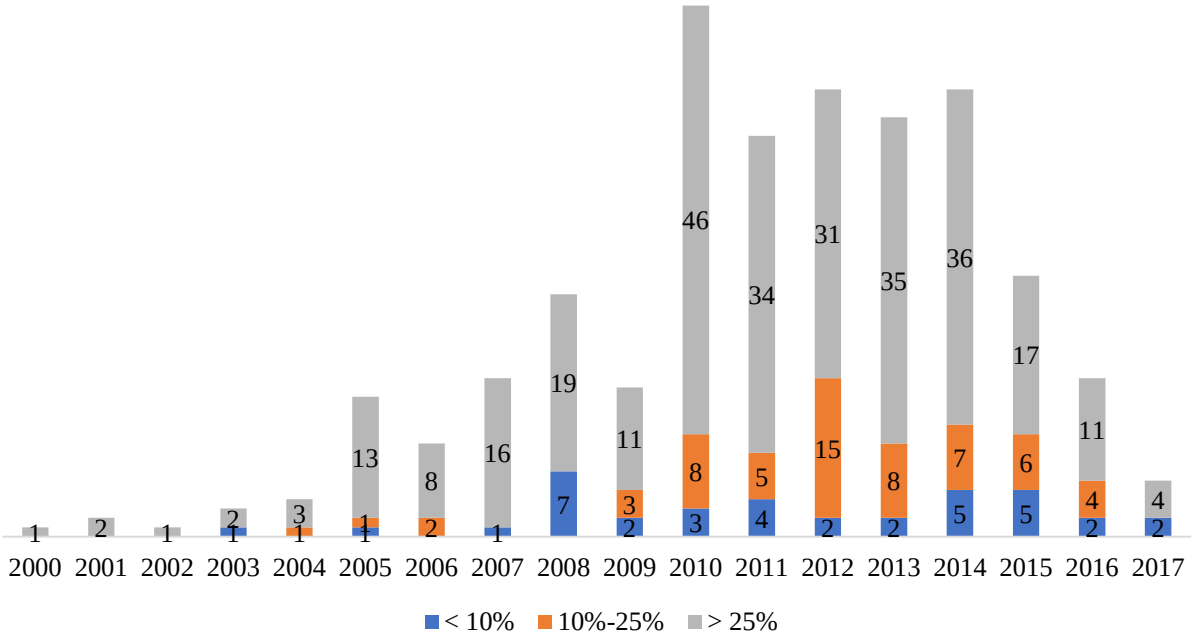

Figure 1 Number of announced M&A deals by year

Note: The Figure presents the distribution of the number of announced M&A deals included in analyzed sample by year. The deals are divided into 3 subcategories – deals in which a stake of less than 10% was acquired, deals, in which a stake between 10% and 25% was acquired, and deals in which a stake of more than 25% was acquired.

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