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# **DO COGNITIVE BIASES IMPACT M&A PERFORMANCE IN EMERGING MARKETS? EVIDENCE FROM RUSSIAN FIRMS**

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## **DO COGNITIVE BIASES IMPACT M&A PERFORMANCE IN EMERGING MARKETS? EVIDENCE FROM RUSSIAN FIRMS**

In this paper we investigate cognitive biases as a potential reason for the varied results of M&A in emerging capital markets. We focus on two cognitive biases, CEO overconfidence and availability bias, which significantly influence CEO behavior, encouraging them to be irrational in M&A deals.

Based on 237 M&A deals closed by Russian firms during the period 2005–2019 we empirically prove that CEO overconfidence destroys value, and availability bias creates value in M&A deals in the Russian market. We show that due to the low level of corporate governance in emerging capital markets, all corporate governance mechanisms can mitigate CEO irrationalities in M&A.

Key words: M&A performance, emerging capital markets, cognitive biases, CEO overconfidence, availability bias.

JEL classification: G34, G41.

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## 1. Introduction

Although mergers and acquisitions (M&A) remain one of the key growth strategies in the contemporary knowledge economy, enabling firms from emerging countries to enter new markets or obtain new customer bases, expand their businesses or buy R&D products and patents, reduce taxes, implement cost synergies, or improve access to capital (see, for example, Renneboog and Vansteenkiste, 2019), the impact of M&A on firm performance tends to be very mixed.

There are several key determinants that may explain the positive (Powell, 2005; Koetter et al., 2007; Lau et al., 2008; Grigorieva and Grinchenko, 2013; Rani et al., 2015) or negative (Bertrand and Betschinger, 2012, Ishii and Xuan, 2014) influence of M&A on firm performance: for instance, size of the acquirer, the CEO's and directors' connections and networks, target acquisitiveness, ownership structure, and cultural fit. However given the high level of risk in M&A transactions, the uncertainty and subjectivity of the acquiring company's behavioral biases may provide us with additional explanations of some of M&A failures or successes especially in emerging markets with their high level of uncertainty.

Empirical evidence on the impact of behavioral biases on M&A performance as one of the potential reasons for the overestimation of synergetic effects of M&A deals (Malmendier et al., 2018; Renneboog and Vansteenkiste, 2019) in general, and in emerging capital markets in particular, tends to be scarce. In this paper, we shed additional light on the impact of two cognitive biases, namely CEO overconfidence and availability bias, which significantly influence CEO behavior encouraging them to be irrational in M&A deals and we determine possible mechanisms for constraining CEO irrationality in M&A deals.

In contrast to prior research, we have chosen for our analysis the Russian market as the least efficient among the major emerging economies (Chong et al., 2010). Its high level of market inefficiency and its high level of uncertainty provides a good foundation to analyze the behavioral biases which tend to influence M&A activities.

Our basic assumption is that CEOs in emerging markets are influenced by the same behavioral biases as CEOs in developed markets (Stepanova et al., 2018). We suppose that the only difference between emerging and developed market firms is in the level of development of corporate governance mechanisms that are able to attenuate CEO irrational behavior in M&A deals.

Our findings contribute to the literature in several ways. First, we review the impact of CEO cognitive biases on M&A performance for emerging capital markets based on Russian firms, which

has not been done before. Secondly, we construct a new empirical model that takes into account the specificities of the Russian market as an emerging market with low efficiency. Thirdly, we introduce a new measure to assess CEO overconfidence that takes into account CEO education as a proxy of his prior professional successes and the current performance of the firm managed by this CEO and engaged in an M&A deal. Fourthly, we propose measures to mitigate CEO irrational behavior in M&A deals in emerging capital markets.

The remainder of the paper is organized as follows. The second section develops the framework for the paper. We discuss the theoretical background behind the impact of cognitive biases on M&A performance, the relationship between corporate governance mechanisms and the impact of CEOs' cognitive errors on M&A performance and formulate the research hypotheses. The third section describes the research sample, methodology and the variables. The results are presented in the fourth section, while the fifth section provides a discussion of the results, conclusions and the contributions of the study. Areas for further research are also addressed.

## **2. Literature review**

### *2.1. CEO overconfidence and its impact on M&A performance*

Overconfidence is a bias in which people believe they are smarter and more informed than they actually are which is why they overestimate their abilities to make reasonable and optimal decisions. The overconfidence hypothesis states that there is a misalignment between the beliefs of the CEO and the market about the firm's value (Renneboog and Vansteenkiste, 2019).

The first attempt to find an irrational component in the behavior of company management was the Hubris hypothesis proposed by Roll (1986). Roll suggests that successful acquirers may be optimistic and overconfident in their own valuation of deal synergies and fail to properly account for the winner's curse. Hubris impairs the judgement of the CEO which causes overpayment and such overpayment is the principal mechanism that ultimately damages the performance of the acquisition (Hayward and Hambrick, 1997).

Hubris differentiates CEO narcissism and overconfidence. The main difference is that while narcissistic CEOs attach more importance to corporate social responsibility, hubristic CEOs concentrate solely on their own interests (Tang et al., 2018). Narcissism is a trait related to overconfidence and is described as egocentricity, a permanent search for the spotlight and the

treatment of others with disdain. Overconfidence, being an individual trait, is a small part of the entire leadership personality structure (Renneboog and Vansteenkiste, 2019), so even if overconfidence relates to narcissism, these two phenomena are still distinct.

Overconfidence is highly associated with risk-taking (Li and Tang, 2010; Baker and Wurgler, 2013; Olsen and Stekelberg, 2016) which leads to an increased number of conducted M&A deals and involvement in big deals, especially diversifying ones, often suggested as being of dubious value (Chatterjee and Hambrick, 2007; Malmendier and Tate, 2008; Baker and Wurgler, 2013).

According to Hirshleifer et al. (2012) CEOs, being risk lovers, tend to invest in risky projects, which helps them to innovate and obtain patents. Ham et al. (2018) identify that such overinvestment in M&A and R&D results in the lower profitability of such firms and their reduced operating cash flows.

Overconfidence is positively related to the probability of deal completion and negatively related to the length of the takeover process (Aktas et al., 2016). Overconfident CEOs prefer to use cash as the main payment method which also symbolizes their confidence in the success of the deal (Malmendier and Tate, 2008; Ferris et. al, 2013). Overconfident CEOs often overestimate returns on their investments (Malmendier and Tate, 2005) which results in a higher offer price and lower acquirer announcement returns. Malmendier and Tate (2008) claim that confidence-boosting events for CEOs negatively affect announcement returns around serial acquisitions motivated by this new status. Thus, we hypothesize:

**H<sub>1</sub>:** CEO overconfidence negatively affects M&A performance.

## 2.2. *Availability bias and its impact on M&A performance*

Availability bias describes how people are biased towards judging the likelihood of events based on how they have previously witnessed or taken part in such an event (see, for example, Tversky and Kahneman, 1973).

From an economic perspective, availability bias causes individuals to refuse investment projects even with a reasonable level of risk based on their past failures thereby harming their well-being and, vice versa, to overestimate the potential level of future earnings based on previous successes. This cognitive bias indicates that CEO assessments of the same risks differ depending on whether they have experienced successes or failures before.

Availability bias significantly affects CEO behavior in M&A and forces managers to evaluate the risks of an M&A deal more critically if the previous deal experience was negative. However, it is important to note that this behavior may also be inefficient as the CEO may ignore the most optimal investment projects because they will choose lower gains but with a higher probability of obtaining them (Serfas, 2011; Baker and Ricciardi, 2014). Aktas et al. (2011) proves that the better (worse) the investor reactions to previous announcements, the higher (lower) the bid premium of the subsequent deal, assuming that a high bid premium results in overpayment and inefficient M&A performance. Billet and Qian (2008) find evidence that previous positive M&A performance does not curb the negative wealth effects associated with subsequent M&A deals. Thus, we can conclude that there is an interrelation between a CEO's previous experience and the current market reaction.

In the current research, we consider availability bias as the previous negative experience of a CEO. Consequently, this has a positive impact on transaction performance. Thus, we hypothesize:

**H<sub>2</sub>:** Availability bias positively affects M&A performance.

### 2.3. *Corporate governance systems and the impact of cognitive biases on M&A performance*

Baker and Wurgler (2013), and Campbell et al. (2011) state that corporate governance mechanisms should limit the ability of CEOs to make decisions individually in order to avoid irrationality. Chen et al. (2009) note that a well-developed corporate governance system allows a qualitative reduction in possible losses from various types of fraud. Corporate governance is probably the only effective mechanism that can neutralize the influence of CEOs and their inherent heuristic errors, whether overconfidence or availability bias, on the company's operations and therefore on its operating and financial performance, and on the success of M&A deals.

Following Kolasinski and Li (2013), within the current research we study the interactive effect of how corporate governance mechanisms attenuate the effect of CEO overconfidence as an example of CEO cognitive biases on M&A performance. We also treat the corporate governance system as exogenous when assessing its influence on board activities (Paul, 2007; Cornett et al., 2008; Kolasinski and Li, 2013).

If managers hold only a part of the company's shares, their efforts to increase the company's value will not fully affect their personal well-being. In other words, managers have no incentive to put in a lot of effort if those efforts do not have a significant impact on their income. Under these conditions a manager focuses on increasing his own well-being by increasing the firm's expenses

which negatively affects the firm performance. If the manager's income is directly related to the company's performance, they will make every effort to increase the market value of the company without additional non-monetary benefits. Behavioral Agency Theory argues that managers are primarily loss averse and only secondarily risk averse (Wiseman and Gomez-Mejia, 1998), and that they discount their future prospective rewards according to a hyperbolic discount function (Ainslie, 1991; Ainslie and Haslam, 1992).

To make managers interested in the growth of the company's value, it is necessary to transfer shares into their hands (Feito-Ruiz and Renneboog, 2017). The larger the volume of shares held by the manager, the more interested they are in the growth of the company's value, which means that the interests of managers and owners coincide, constraining the agency conflict between them.

The same is supposed to be true with regards to M&A deals. CEOs will be more accurate when accessing the potential results of a deal, being aware that this deal will directly affect their welfare. So, we formulate our third research hypothesis in the following way:

**H3:** The effect of CEO overconfidence on M&A performance is attenuated by CEO ownership.

The degree of information transparency in the firm is an important part of its corporate governance system. This is extremely important for the stakeholders of the company in M&A deals as it allows them to make correct decisions, reduce possible losses from management expropriation, and helps limit the CEO's ability to make their own decisions resulting in higher M&A performance. Thus, our fourth hypothesis is as follows:

**H4:** The effect of CEO overconfidence on M&A performance is attenuated by information transparency.

According to Kolasinski and Li (2010), small boards dominated by independent directors reduce the impact of CEO overconfidence on M&A performance. The size of the board positively affects the probability of M&A failure due to the fact that the enlargement of the board takes place through the addition of people close to CEO who are more likely to support their initiatives and ideas. Strategic decisions are formally taken collectively but in fact it is the CEO who is fully responsible for them. The same logic may be applied with regards to the number of independent directors as inside managing directors are more beholden to the CEO for their positions and, thus, are more likely to endorse the CEO's initiatives (Hayward and Hambrick, 1997). Thus, we hypothesize that:

**H5:** The effect of CEO overconfidence on M&A performance is attenuated by a higher number of board members.

**H6:** The effect of CEO overconfidence on M&A performance is attenuated by a higher number of independent directors.

According to Huang and Kisgen (2013), male CEOs tend to suffer more from overconfidence and their behavior is more likely to be subject to empire-building desires. That is why deals conducted by female CEOs gain higher announcement returns. In our sample, there are no female CEOs therefore we empirically test this relationship for female board members. We hypothesize that:

**H7:** The effect of CEO overconfidence on M&A performance is attenuated by a higher number of female board members.

Hayward and Hambrick (1997) claim that board vigilance is weak when the CEO is also a board member because such managers cannot assess their own performance, which is why the board lacks objectivity. Therefore, we hypothesize that:

**H8:** The effect of CEO overconfidence on M&A performance is attenuated by the CEO also being a board member.

### **3. Data and methodology**

#### *3.1. Data sample*

To form the research database and to find data on company stock prices, the S&P Capital IQ database is used. Data on CEO names, their education and board structure are collected manually.

The period of the study is from 2005 when the volume of M&A deals in Russia exceeded a threshold of 20 billion USD in monetary terms and when the M&A market in Russia began a wave of active growth (Ivashkovskaya et al., 2020).

To be included in the sample, transactions must also meet the criteria in Table 1.



Table 1. Description of criteria to form the research sample

Criteria	Description
Information about the announcement date	The exact date of the transaction announcement is known
Deal Announcement Date	Information about the deal is announced between 2005 and 2019
Transaction status	Completed
Minimum purchase size	Minimal size of the purchase: 50% + 1 share
Characteristics of the acquirer	<ol style="list-style-type: none"> <li>1. Public company listed on the stock exchange</li> <li>2. Operates in the Russian market</li> </ol>
Characteristics of the target company	<ol style="list-style-type: none"> <li>1. Public or private company</li> <li>2. May operate in any market</li> </ol>

Our final sample consists of 237 deals with the total value of 122 billion USD with almost half of deals initiated by companies in the energy (21%) and telecommunications (21%) industries.

### 3.2. Variables

#### **CEO overconfidence**

- Current performance of the firm (OVER1)

Following Kolasinski and Li (2013), and in order to measure the current performance of the firm, we calculate the excess returns of a company's shares over the MICEX industry exchange indices for the past calendar year (if there are no data on the industry index, the Moscow Exchange broad market index is used as a proxy). The logic behind this is that if the company shows growth above the industry average for the reporting year, the CEO believes that the results of his current operating activities are successful and exceed the expectations of the market and investors, and as a result, his confidence becomes higher.

- CEO prior professional successes (OVER2)

Following Malmendier and Tate (2005), we measure CEO overconfidence by a proxy which includes an analysis of the level of education of the CEO, the ranking of the university from where the CEO graduated, assuming that it does not change significantly during the observed period, and the relatedness of the education to the industry where the firm managed by the CEO operates.

- New CEO overconfidence index (OVER\_I)

We build a new index to measure CEO overconfidence based on these two proxies: the company's current performance (OVER1) and CEO prior professional experience (OVER2) in order to be able to capture the past achievements of the CEO (education) and current ones (current performance of the firm managed by the CEO) are weighted equally.

#### **Availability bias**

Following Aktas et al. (2011) and in order to assess the existence of the availability bias of the CEO, we compare the result of the previous M&A deal conducted by the CEO with the market average for that period. If the result is below the market average, the dummy variable takes the value of 1.

We also assume that the absence of previous M&A experience means that CEO comprehensively and thoroughly assesses the potential risks of the deal which results in rational behavior which is similar to the behavior of the CEO with previous negative experience (Billet and Qian, 2008; Hamori and Koyucu, 2015; Field and Mkrtchyan, 2017).

#### **Information transparency index**

In order to evaluate the firm's information transparency we apply the methodology developed by Durnev and Guriev (2007) who find a correlation between the company's share yield and the return of the market index. If there is a statistically significant relationship between these indicators, we may conclude that the company's shares move in line with the current market trends and therefore prices do not reflect specific information about the company's operating activities. If there is a weak correlation, prices obviously reflect specific information about the firm. Thus, the information transparency of the market is measured based on the following regression:

$$r_t = \alpha + \beta_1 r_{mt} + \beta_2 r_{ust} + \varepsilon_t,$$

where  $r_t$  is the return on the company's shares,

$r_{mt}$  is the return on the market index of the country to which the company belongs,

$r_u$  is the yield of the US market index (S&P).

The higher the explanatory power of the regression, the lower the information transparency of the company ( $INFO_t$ ). The latter is measured as the unexplained fraction of the yield variance:  $INFO_t = 1 - R^2$ .

## Other variables

Table 3. Description of control variables included in Regression equation 1

Variable	Description	Expected sign between the variable and M&A performance	Examples of previous research papers
DEALSIZE	The relative size of the transaction. The ratio of the M&A transaction value in US dollars to the acquirer's market capitalization	Negative sign	Moeller et al., 2004
ROA	Return on assets. The ratio of net profit to the book value of the acquirer's assets	Positive sign	Kolasinski and Li, 2013
QTobin	Tobin's Q Coefficient. Calculated as (total assets of the company – book value of equity + market capitalization)/total assets of the company)	Positive sign	Rhodes-Kropf et al., 2005

To control for the influence of the Russian economic crisis of 2014, we include a dummy variable, CRISIS, that takes the value of 1 if the transaction was announced during the period of economic crisis.

Table 4. Description of variables included in Regression equation 2

Variable	Description	Examples of previous research papers
OWN	% of shares owned by CEO	Feito-Ruiz and Renneboog, 2017
BOARD	Number of Board members	Kolasinski and Li, 2010; Hayward and Hambrick, 1997
BOARD.FEM	% of female members on the Board	Huang and Kisgen, 2013
BOARD.IND	% of independent directors on the Board	Kolasinski and Li, 2010
CEO.DUAL	CEO duality: dummy-variable equals 1 if CEO is also a Board member	Hayward and Hambrick, 1997

### 3.3. Method

#### 3.3.1. Cumulative abnormal return

To assess M&A performance we calculate the cumulative abnormal return using the event studies method. We calculate the return of shares with the following formula:

$$R_{it} = \ln\left(\frac{p_{i,t}}{p_{i,t-1}}\right),$$

where  $R_{i,t}$  is the daily return on share  $i$  on day  $t$ ;

$p_{i,t}$  is the closing price of company  $i$  on day  $t$ .

The profitability of the market index in each of the studied days is calculated using a similar formula:

$$R_{mt} = \ln\left(\frac{p_{m,t}}{p_{m,t-1}}\right),$$

where  $R_{m,t}$  is the daily market yield on day  $t$ ;

$p_{m,t}$  is the market index at close on day  $t$ .

To calculate normal returns we refer to the market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},$$

where  $R_{mt}$  is the market return on day  $t$ ;

$\beta_i$  shows the sensitivity of company  $i$  to the market;

$\alpha_i$  is the average return for the period not explained by the market;

$\varepsilon_{it}$  is a statistical error ( $\sum \varepsilon_{it} = 0$ ).

Normal return  $\hat{R}_{it}$  is calculated per day of the analyzed period in which the announcement of the transaction had not yet been received, and therefore it is possible to study the normal movement of quotations. In this research, following Ivashkovskaya et al. (2009) and Grigorieva and Morkovin (2014) the evaluation period is (-100, -21) from the date of the announcement of the deal.

In order to find  $\hat{R}_{it}$ , we construct a regression for the selected interval, from where we take estimates of the coefficients  $\alpha$  and  $\beta$ :

$$\hat{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i R_{mt}.$$

Next, we calculate the residuals of  $r_{it}$  per day in the window and per company. The residual is the difference between the actual yield of the stock on that day and its expected yield predicted by the market model:  $r_{it} = (R_{it} - \hat{R}_{it})$ . This difference is the excess yield, which is generated because of the market reaction to the announcement about the deal.

Residual values per day in the observed period are summed for a company and then averaged, so the average residual on the day  $t$  equals  $AR_t$ , where:

$$AR_t = \frac{\sum_{i=1}^N r_{it}}{N} \text{ (where } N \text{ is the number of firms in the sample).}$$

The last step is to summarize the average balances for each day across the study window to obtain the cumulative abnormal return:

$$CAR = \sum_{t=-5}^5 AR_t.$$

The cumulative abnormal return is the average return for all the firms in the sample in the selected event window. Following Kolasinski and Li (2013), we consider an event window to be 11 days.

### 3.3.2. Regression models

To empirically test the impact of cognitive biases on M&A performance for Russian acquirers, we estimate the first regression equation for models 1–3 based on the regular Ordinary Least Squares method:

$$100 \cdot \ln(1 + CAR_i) = \alpha_i + \beta_1(OVER) + \beta_2(AV) + \beta_3(DEALSIZE) + \beta_4(ROA) + \beta_5(CRISIS) + \beta_6(QTobin) + \varepsilon_i \quad (1)$$

Models 1–3 differ only in how CEO overconfidence is measured.

In order to analyze factors that may attenuate the effect of CEO overconfidence on M&A performance, we apply the interaction variables methodology proposed by Kolasinski and Li (2013). Our second regression equation for Model 4 is:

$$P(\text{Acquisition} = 1) = F(\alpha_i + \beta_1(\text{OWN} * \text{OVER}) + \beta_2(\text{INFO} * \text{OVER}) + \beta_3(\text{BOARD} * \text{OVER}) + \beta_4(\text{BOARD.FEM} * \text{OVER}) + \beta_5(\text{BOARD.IND} * \text{OVER}) + \beta_6(\text{CEO.DUAL} * \text{OVER}) + \varepsilon_i) \quad (2)$$

In Model 4, we measure the extent to which various corporate governance mechanisms may attenuate the effect of CEO overconfidence on M&A performance, not how corporate governance mechanisms affect M&A performance directly. In other words, we estimate how corporate governance mechanisms influence the probability of inefficient M&A deals assuming that CEO overconfidence influences M&A performance.

The results of checking for the significance of the dependent variable for the first regression equation (1) are given in Appendix 2. All the model specifications have been checked for multicollinearity, heteroskedasticity, and model specification error. The results are in Appendix 3 and 4.

#### *3.4. Descriptive statistics and correlation analysis*

Table 2 reports the descriptive statistics which characterize the Russian M&A market and the specificities of the national corporate governance system.

Table 2. Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
CAR	237	-0.0027	0.0788	-0.24	0.26
OVER1	237	1.9114	0.8108	0	3
OVER2	237	0.4720	0.4983	0	1
OVER_I	237	1.3175	0.4092	0.5	2
AV	237	0.5781	0.4949	0	1
DEALSIZE	237	0.1802	0.9860	0	11.98
OWN	237	1.5004	8.6131	0	72.90
INFO	237	0.5286	0.2102	0.14	1
BOARD	237	8.4557	1.9645	5	10
BOARDFEM	234	0.1297	0.1343	0	0.67
BOARDIND	237	0.3832	0.1726	0	0.86
CEODual	237	0.4515	0.4987	0	1
ROA	237	0.0736	0.1831	-2.45	0.37
Qtobin	237	1.2544	0.7819	0.18	4.53

On average, M&A deals initiated by Russian acquirers during the period of 2005–2019 do not bring any value as their CAR is negative. The mean of the availability bias variable indicates that 57.8% of the deals conducted during the observed period were not successful. The average relative size of the deal performed by Russian acquirers is 18% which is relatively low in comparison with US deals where this indicator was 35% (Aktas et al., 2010). A Russian CEO owns only 1.5% of the company's shares while the information transparency index is 53%. The average board of a Russian company consists of 8 members, only 13% are women and 38.3% are independent members. Almost half of the CEOs (45%) are also members of the board. All these indicators prove that the level of development of corporate governance mechanisms in the Russian market is low.

The correlation matrix (Appendix 1) indicates that there will be no problems with multicollinearity due to the low correlations among variables.

## 4. Empirical results

Table 5 summarizes the empirical results of regression equation (1) to analyze the effect of CEO overconfidence and availability bias on M&A performance.

Table 5. Regression results (Model 1–3)<sup>3</sup>

Variables	Model 1	Model 2	Model 3
OVER1	<b>-1.686*** (0.571)</b>		
OVER2		<b>-1.140* (0.605)</b>	
OVER_I			<b>-2.248** (0.987)</b>
AV	<b>1.601** (0.826)</b>	<b>1.690** (0.835)</b>	<b>1.685** (0.832)</b>
DEALSIZE	<b>1.229** (0.655)</b>	<b>1.220** (0.662)</b>	<b>1.220** (0.660)</b>
SIZE	0.328 (0.268)	0.397 (0.269)	0.375 (0.269)
Qtobin	0.075 (0.476)	0.059 (0.480)	0.062 (0.479)
CRISIS	-0.169 (1.001)	-0.259 (1.019)	-0.242 (1.016)
ROA	0.050 (0.072)	0.038 (0.073)	0.044 (0.073)
Intercept	-1.527 (3.284)	<b>-5.787** (2.943)</b>	<b>-2.662* (3.280)</b>
Observations	237	237	237
R <sup>2</sup>	0.07	0.05	0.05

### 4.1. CEO overconfidence

All three indicators of CEO overconfidence negatively affect M&A performance in the Russian capital market. Our results coincide with the results of the previous research based on data from other developed and emerging markets (see, for example, Malmendier and Tate, 2005; Kolasinski and Li, 2013; Renneboog and Vansteenkiste, 2019). This negative effect is caused by the fact that overconfident CEOs tend to improperly evaluate risks connected with M&A deals. They exaggerate the attractiveness of the deal and the potential synergetic effects which results in a higher offer price and lower acquirer announcement returns. This finding proves that cognitive biases do not depend on the market where the firm operates.

<sup>3</sup> The t-statistics is reported between parentheses below each parameter estimate. Coefficients that are significantly different from zero at the 1%, 5% and 10% are indicated with \*\*\*, \*\* and \* respectively.



The coefficient value itself shows that with the increase of CEO overconfidence by one unit of measurement, CAR will decrease from 1.1–2.2% which is a bit higher than the results obtained by Liu (2009) for the US market which showed a range from -1.5% to -0.9% depending on how CEO overconfidence is measured. Thus, we may conclude that the negative impact of CEO overconfidence in the Russian capital market is higher than in the US capital market, which could be primarily explained by the level of corporate governance mechanisms that may attenuate CEO irrationalities.

#### *4.2. Availability bias*

The coefficient of the availability bias variable has a positive sign and it is significant in models (1–3), which is in line with previous papers stating that this cognitive bias affects CEO behavior while participating in M&A. The previous negative experience of the CEO forces him to behave more risk-aversely and be more accurate while accessing possible outcomes of the deal. This finding again supports the idea that there is no country specificity in availability bias as the result obtained for Russia does not differ from the results obtained in developed capital markets. In general, availability bias increases M&A performance in developed capital markets by 1.7% (Aktas et al., 2011).

As far as the relative size of the deal, which is statistically significant in every model, is concerned, the results obtained contradict the results of the previous research papers: a larger deal tends to result in a higher premium paid. Due to the fact that the development of the market economy in Russia began only in the middle of the 1990s (significantly later than in other developed countries), the consolidation of state and private firms happened mainly by means of such deals. This is the reason why large M&A deals in Russia are associated with an indicator of future economic growth.

#### *4.3. The impact of corporate governance mechanisms on CEO overconfidence in M&A deals*

While building the probability regression model (our regression equation (2)) we take into account the empirical results of the first regression equation (1) which proves that overconfidence negatively affects M&A performance. Thus, we include CEO overconfidence into our second regression equation (2) as an interaction variable to analyze the probability of constraining the negative effects of CEO overconfidence on M&A performance.

The model with the lowest levels of penalty criteria is the probit model which we use for our empirical analysis (for details see Appendix 5). To assess the predictive power of the model, we build the ROC-curve, estimate sensitivity and specificity of the model (Appendix 6).

Table 6 reports the empirical results of regression equation (2).

Table 6. Regression results (Model 4)<sup>4</sup>

Variables	Sign at the corresponding variable
OWN	-.***
INFO	-.*
BOARD	+**
BOARDFEM	-
BOARDIND	-.**
CEODual	+**
Observations	234

*CEO ownership* (OWN) attenuates the effect of CEO overconfidence on M&A performance. This relationship derives from the nature of the agency conflict between managers and company owners. Managers, receiving a fixed salary, are less interested in maximizing the value of the company than owners, unless the CEO has a stake in the company, meaning that their income is directly related to the firm's performance. Such dependency of income on firm performance forces them to be more accurate while assessing the possible outcomes of a deal, which reduces the possibility of M&A failure.

*The level of the firm's information transparency* (INFO) attenuates the effect of CEO overconfidence on M&A performance. Proper disclosure of information gives the firm's stakeholders opportunities to provide better control over managers' behavior thus attenuating the irrational behavior of CEOs (such as taking part in M&A deals with a dubious value).

*The size of the board* (BOARD) attenuates the effect of CEO overconfidence on M&A performance. This could be explained by the fact that board expansion in the Russian capital market happens mainly through people subordinated to the CEO and thus fully accepting his position, which leads to the fact that strategic decisions from a naive point of view are made collectively but in fact individually by the CEO.

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<sup>4</sup> \* - p-value < 0.1, \*\* - p-value < 0.05, \*\*\* - p-value < 0.01

*The number of female board members* (BOARDFEM) does not statistically significantly impact the mitigation effect of CEO overconfidence on M&A performance although the sign of the coefficient demonstrates the predicted negative character of relationship. Females tend to be less overconfident, thus, decrease the probability of an inefficient M&A deal.

*The percentage of independent directors* (BOARDIND) attenuates the effect of CEO overconfidence on M&A performance. This result could be explained by the fact that independent directors are less likely to automatically endorse the CEO's initiatives and tend to vote for more optimal decisions. According to Malmendier and Tate (2008) independent directors more actively participate in board meetings especially when they comprise the majority of the board.

*CEO duality* (CEODual) attenuates the effect of CEO overconfidence on M&A performance. This may be due to the fact that the board lacks objectivity when CEO is also a board member because such managers cannot assess their own performance and may behave irrationally. In such cases the CEO has more power to pursue a deal that seems valuable to him because of his overestimation of potential gains caused by his overconfidence.

## **5. Discussion and conclusions**

In the current paper, we focus on CEO overconfidence and availability bias as examples of cognitive errors which significantly influence the behavior of CEOs in M&A deals in emerging capital markets, causing them to be irrational.

We empirically prove that in the Russian capital market overconfident CEOs improperly evaluate the risks of M&As and exaggerate the attractiveness and the potential synergetic effects of potential deals, thus, they may conduct deals that result in negative M&A performance destroying value.

Availability bias which we measure as the CEO's negative experience in their previous M&A deal, makes the CEO more accurate while assessing possible M&A outcomes and think critically before conducting the deal, which positively influences M&A performance of Russian acquirers.

Furthermore, based on our previous results that CEO overconfidence negatively affects M&A performance, we construct a binary choice model to find the factors that mitigate the effect of CEO overconfidence on M&A performance. We empirically prove that for Russian acquirers every corporate governance mechanism (except for female board members) has a statistically significant attenuation impact on the effect of CEO overconfidence on M&A performance which could be

explained by the fact that the low level of corporate governance in Russia means any mechanism that may restrict CEO irrational behavior helps to improve M&A performance.

We also prove that such variables as the size of the board and the CEO being a member of the board positively affect the probability of an inefficient M&A deal, while CEO ownership, company's information transparency and the number of independent directors reduce the likelihood of taking part in such deals. This proves that corporate governance mechanisms are able to prevent CEOs not only from opportunistic behavior but also from cognitive errors.

To further develop this topic it is possible to enhance the scope of cognitive biases and include other biases (for example, familiarity bias, home bias or crowd effect), and to perform a comparative analysis of the impact of cognitive biases on M&A performance of Russian firms with other emerging and developed market firms. Given the challenges of direct estimations of the psychological aspects of CEO behavior, we also find it reasonable to compare the results of the current study with CEO overconfidence estimation through principal component analysis for our idea to proxy CEO overconfidence as a combination of the current performance of the company and the prior professional successes of its CEO.

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## Appendices

### Appendix 1. Correlation matrix

	CAR	OVER1	OVER2	OVER_I	AV	DEALSIZE	Qtobin	Crisis	ROA
CAR	1								
OVER1	-0.181	1							
OVER2	-0.148	0.680	1						
OVER_I	-0.137	0.796	0.701	1					
AV	0.109	0.028	0.110	0.062	1				
DEALSIZE	0.113	0.017	-0.021	0.006	0.085	1			
Qtobin	0.043	0.083	0.097	0.083	0.027	-0.056	1		
Crisis	-0.008	0.035	0.026	0.012	-0.010	-0.070	0.003	1	
ROA	0.010	0.128	0.064	0.144	0.008	-0.091	0.303	-0.008	1

## Appendix 2. Test for significance of CAR

	CAR
Mean	-0.003
St error	0.001
P-value	0.016

## Appendix 3. Multicollinearity Test Results

Variables	VIF
OVER_I	1.04
AV	1.06
DEALSIZE	1.07
SIZE	1.31
Qtobin	1.29
CRISIS	1.01
ROA	1.21
Mean VIF	1.14

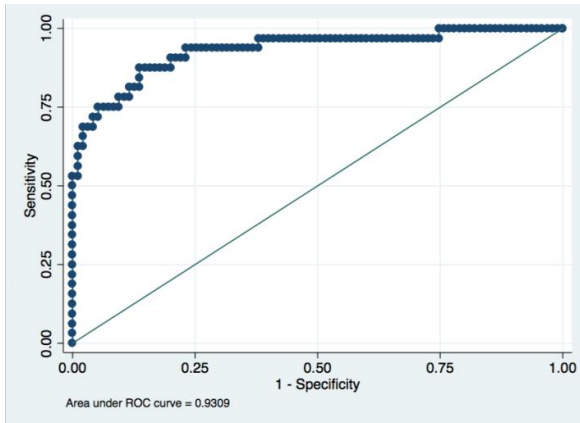
## Appendix 4. Ramsey, Heteroskedasticity Test Results

Test	P-value	Result
Ramsey Test	0.65	Correct specification
Breusch-Pagan	0.69	Constant variance
White's test	0.32	Homoskedasticity

## Appendix 5. Choice of Right Specification of Probability Model

	Logit	Probit
AIC	248.50	248.37
BIC	270.81	270.69
Observations	179	179

## Appendix 6. Probit Model: ROC Curve and Specification Metrics



Sensitivity	71.88%
Specificity	95.79%
Correctly classified	89.70%

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