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Organizational and economic tools for assessing and improving the efficiency of economic activity in mergers and acquisitions of vertically integrated industrial holdings

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Abstract. The study is aimed at improving the efficiency of economic activity in vertically integrated industrial holdings. Special attention is paid to analyzing socio-economic relationships emerging in the process of evaluating the effectiveness and implementation of mergers and acquisitions (M&A, Mergers & Acquisitions). The attention is focused on the specific behavioral risk – Fear of Missing Out (FoMO) – which deforms the rational business processes of making economic decisions on making inefficient deals during periods of industry transformation. The study uses methods of system analysis and synthesis to identify the relationship between the signs of FoMO and long-term business performance. The approbation was carried out on the basis of 63 mining and metallurgical sector transactions. The assessment of the efficiency of economic activity after the consolidation of assets was carried out using the author’s methodology of “medium-term payback” based on the dynamics of EBITDA indicator within 4 years after the completion of the transaction. The authors have developed a complex risk indicator (RIF, Risk Indicator Factor) that includes monitoring of transaction dynamics, investor sentiment, cross-border activity, and price trends. It has been proved that when the indicator reaches critical values, it signals a decrease in the quality of business processes and an increase in the likelihood of concluding “extra unprofitable” transactions. The authors have suggested an algorithm of modification of corporate risk management procedures which includes creation of independent “opposition to the deal” groups and implementation of alternative scenarios within the discounted cash flow models. Introduction of the proposed economic tool set into the business processes of industrial holdings allows minimizing irrational factors in management. Practical use of the RIF indicator by boards of directors of industrial enterprises ensures improvement of their economic activity in mergers and acquisitions in the long-term perspective by preventing possible destructive integration processes.

Keywords: industrial enterprises, economic activity, business mergers and acquisitions processes, the economics of vertically integrated holdings, risk management, behavioral economics in industry, risk indicator

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Организационно-экономический инструментарий оценки и повышения эффективности хозяйственной деятельности при сделках слияний и поглощений вертикально интегрированных промышленных холдингов

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Аннотация. Исследование направлено на совершенствование бизнес-процессов инвестиционной деятельности в вертикально интегрированных промышленных холдингах. Особое внимание уделяется анализу социально-экономических отношений, возникающих в процессе оценки эффективности и реализации сделок слияний и поглощений (M&A, Mergers & Acquisitions). В центре внимания находится специфический поведенческий риск – «страх упущенной выгоды» (FoMO, Fear of Missing Out), который деформирует рациональные бизнес-процессы принятия экономических решений о заключении неэффективных сделок в периоды отраслевых трансформаций.

В работе применены методы системного анализа и синтеза для выявления взаимосвязи между признаками FoMO и долгосрочной эффективностью бизнеса. Апробация проведена на базе данных 63 сделок горно-металлургического сектора. Оценка эффективности хозяйственной деятельности после объединения активов осуществлялась с использованием авторской методики «среднесрочной окупаемости» на основе динамики показателя EBITDA в течение 4 лет после завершения сделки.

Разработан комплексный индикатор – риск-индикатор (RIF, Risk Indicator Factor), включающий мониторинг динамики сделок, настроений инвесторов, трансграничной активности и ценовых трендов. Доказано, что достижение индикатором критических значений сигнализирует о снижении качества бизнес-процессов и росте вероятности заключения «экстра убыточных» сделок. Авторами предложен алгоритм модификации корпоративных процедур риск-менеджмента, включающий создание независимых групп «оппонирования сделке» и внедрение альтернативных сценариев в модели дисконтированных денежных потоков.

Внедрение предложенного экономического инструментария в бизнес-процессы промышленных холдингов позволяет минимизировать иррациональные факторы в управлении. Практическое использование индикатора RIF советами директоров промышленных предприятий способствует повышению эффективности хозяйственной деятельности при сделках M&A в долгосрочной перспективе за счет предотвращения возможных деструктивных интеграционных процессов.

Ключевые слова: промышленные предприятия, хозяйственная деятельность, бизнес-процессы слияния и поглощения, экономика вертикально интегрированных холдингов, риск-менеджмент, поведенческая экономика в промышленности, риск-индикатор

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在垂直整合工业控股公司的并购交易中评估和提高经济活动效率的组织和经济工具

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摘要: 本研究旨在完善垂直整合工业控股公司投资活动的业务流程。重点评估并购交易 (M&A) 的效果和实施过程中产生的社会经济关系。研究的核心是关注一种特定的行为风

险——错失恐惧症 (FoMO, Fear of Missing Out) , 这种风险在行业转型时期会扭曲经济决策中的理性业务流程, 使企业达成低效交易。

研究中应用了系统分析与综合方法, 以揭示FoMO特征与企业长期绩效之间的关系。研究根据63笔采矿-冶金行业的交易数据进行了验证。并购后的企业绩效评估采用了一种专有的“中期回报率”方法, 该方法基于交易完成后四年内的EBITDA动态变化。

本文开发了一个综合风险指标 (RIF) , 该指标涵盖对交易动态、投资者情绪、跨境活动和价格趋势的监测。研究表明, 当该指标达到临界值时, 预示业务流程质量下降以及签订“超亏损”交易的可能性增加。作者提出了一种改进企业风险管理流程的算法, 包括建立独立的“反对交易”小组, 以及在现金流折现 (DCF) 模型中引入替代情景。

在工业控股公司的业务流程中应用所提出的经济工具, 有助于最大限度地减少管理中的非理性因素。工业企业董事会切实运用风险指标 (RIF) , 有助于通过预防潜在的破坏性整合过程, 在长期内提高并购交易的经营效率。

关键词: 工业企业, 业务活动, 并购业务流程, 垂直整合控股公司的经济, 风险管理, 工业行为经济学, 风险指标

Introduction

Research at the intersection of business performance analysis and behavioral economics has produced an increasingly nuanced understanding of the factors that shape corporate decision-making.

Mergers and acquisitions (M&A) are of particular interest because, despite their apparent rationality and the multilevel review and decision-making procedures involved, they frequently result in a loss of shareholder value. Traditional explanations for such failures focus on conventional financial models, miscalculations of synergies, or agency problems. However, advances in behavioral economics have expanded the analysis to include a range of psychological and social determinants, such as managerial overconfidence (*hubris*), top executives' narcissism, propensity for gambling, and envy [1–3].

Despite considerable progress in the study of behavioral biases, a specific behavioral factor that has gained prominence in the era of digitalization and social media – *Fear of Missing Out* (*FoMO*) – has remained largely unexplored in the context of M&A transactions.

Originally described by psychologist D. Herman as anxiety associated with the possibility of missing out on rewarding experiences enjoyed by others [4], FoMO has been actively investigated in recent years, primarily in relation to consumer behavior, social media activity [5; 6], and individual investment in cryptocurrency and

stock markets [7; 8]. Y. Bonaparte and F.J. Fabozzi, in turn, attempted to develop a FoMO index for analyzing the behavior of retail investors in financial markets [9].

The assumption that experienced executives, board members, and professional advisors responsible for multibillion-dollar corporate decisions may also be influenced by FoMO has not previously been examined systematically. The market environment in which M&A transactions take place contains several triggers recognized in the behavioral literature as central to FoMO: the uniqueness and scarcity of attractive assets, time constraints during bidding or negotiations, and strong social proof during periods of industry transformation and merger waves [5]. When competitors announce strategic acquisitions one after another and analysts revise their forecasts upward, the management of an acquiring company may develop an irrational fear of being left behind as the market enters a new paradigm and of permanently losing ground to competitors. Combined with weaknesses in corporate procedures, a reluctance to jeopardize a deal already approved by senior executives, the herd behavior of industry analysts [10; 11], and the influence of reputable investment intermediaries and major competitors, this fear may lead to inefficient transactions.

The hypothesis that FoMO influences M&A decision-making was first proposed by A.V. Mitenkov and V.F. Klevanskiy [12]. The present study continues this line of research and pro-

vides further support for the hypothesis using the tools developed by the authors. Existing methods for investigating FoMO, such as Przybylski's questionnaires [6] and the Bonaparte–Fabozzi index [9], are insufficient for this purpose because they were developed for other objectives and settings, including social media and retail investment, and do not account for the institutional characteristics or the multistage and complex nature of M&A decision-making.

The study examines investment-active vertically integrated industrial holdings as a distinct type of economic system and focuses on the socio-economic relationships that arise when these companies evaluate and execute M&A transactions.

This study aims to bridge that methodological gap by developing and testing a specialized FoMO indicator (metric) that identifies conditions under which decision-makers are more likely to be influenced by FoMO and helps guide measures to mitigate that risk. This study builds on and extends the authors' previous research on new approaches to assessing the effectiveness of M&A transactions [13] and their criticism of short-term analytical methods [14], focusing on the development of a practical tool for improving the economic efficiency of companies' integration activities.

The objectives of the study are to analyze the theoretical foundations for developing a FoMO risk indicator for M&A transactions; to develop the indicator and a procedure for testing it on a sample of transactions; and to devise a set of appropriate organizational and economic measures aimed at reducing the risk that Fear of Missing Out will affect the efficiency of economic activity in M&A transactions undertaken by vertically integrated industrial holdings.

Research methods

The study draws on relevant research by Russian and international scholars. Analysis and synthesis were used to identify common features, distinctive characteristics, and relationships between the main manifestations of FoMO and M&A performance. Inductive reasoning was used to identify the channels through which FoMO may influence M&A decisions.

Theoretical basis for developing the FoMO risk indicator

A large body of research has examined investor sentiment by measuring deviations of market prices or individual share prices from their fundamental values. Sentiment cannot be measured directly: economists have traditionally treated surveys with a degree of skepticism because of the potential discrepancy between how people respond to survey questions and how they behave in real-world situations. Therefore, most researchers use various proxies to measure investor sentiment, that is, indicators that indirectly reflect deviations in investor behavior from normal, economically rational behavior. In particular, M. Baker and J. Wurgler use six such proxies: trading volume; the dividend premium, defined as the ratio between the stock prices of dividend-paying and non-dividend-paying companies; the closed-end fund discount, defined as the difference between the net asset value of a fund's underlying securities and the fund's market price; the number of initial public offerings (IPOs); first-day IPO returns; and the share of equity in total new issues, including debt financing [15]. With the development of the Internet and search engines, sentiment measurement based on search-query statistics, textual analysis, and media sources has become increasingly widespread. For example, based on more than 1.5 million observations, W. Antweiler and M. Frank concluded that online messages can predict market volatility [16]. P. Tetlock, in turn, convincingly demonstrated that media news content can predict stock market movements. He derived a simple measure of media pessimism – the number of negative words – from the content of the “Abreast of the Market” column in *The Wall Street Journal* (WSJ) and found that high levels of media pessimism have a clearly negative effect on market prices [17]. For further research on sentiment in M&A, the manager sentiment (MS) index developed by F. Jiang et al. may be of particular interest. These authors analyze the aggregate textual content of corporate financial reports, drawing on managers' informational advantage over external investors with respect to their companies. The index measures textual tone as the difference

between the numbers of positive and negative words, multiplied by the total number of words in a company’s communication, thereby providing an aggregate measure of overall managerial sentiment in the market [18].

Of particular relevance here is the FoMO index developed by Y. Bonaparte and F.J. Fabozzi from a set of market-based components [9]. Their proposed FoMO index comprises the following components:

1. Momentum component. This is calculated as the two-month moving value of the S&P 500 Index minus its 12-month moving average.

2. Sentiment component. This is calculated as the total number of Google searches containing such keywords as FoMO, short squeeze, and others.

3. FoMO margin component. This reflects investors’ use of borrowed funds. Rising margin levels indicate greater confidence and an increased willingness to borrow in pursuit of higher potential returns.

The approach proposed by Y. Bonaparte and F.J. Fabozzi builds on earlier studies and can be adapted to the M&A context. However, its components must be modified to capture the factors that motivate corporate executives and shareholders in M&A transactions.

In contrast to Bonaparte and Fabozzi and their predecessors, the present study proposes measuring not only the deviations of the components from their previous or fundamental values, but also the duration of these deviations. This approach can be theoretically justified by the nature of FoMO: FoMO typically emerges only after others have already begun to benefit from an opportunity and the decision-maker becomes aware of this with a time lag. In the context of

M&A transactions, this means that the indicator being developed should include a temporal parameter. Given the long-term nature of such transactions and the lengthy periods required for negotiations, documentation, and the execution of binding agreements, this parameter can be measured over extended time intervals, such as years.

When developing the index, it is important to identify components with predictive properties, that is, components capable of warning corporate executives in advance of potential risks and of the need for additional verification of the calculations used to substantiate the expected economic efficiency of the transaction under consideration.

Development of the FoMO risk indicator

Based on the factors theoretically substantiated by the authors as generating the FoMO effect in M&A transactions [12], the index should include components that monitor conditions associated with an increased risk of FoMO (**Table 1**).

Accordingly, the index should incorporate components that capture the following factors:

1. Merger waves: periods of intensified M&A activity that benefit participating companies and reshape the market, while the management of potential acquirers remains outside this process and is exposed to increasing informational and social pressure.

2. Investor optimism: rising share prices among companies involved in M&A transactions. This factor may reflect both shareholder pressure on corporate executives and a growing perception among executives that the transactions under consideration are relatively safe

Table 1

Table 1. Conditions for the occurrence of the “Fear of Missing Out” effect

FoMO components	Factors activating FoMO in M&A transactions
Desire not to miss out on rewarding experiences enjoyed by others	Merger waves
Reliance on the majority’s judgment	Investor optimism
Deference to opinion leaders	Presence of megadeals
Impulsive decision-making and insufficient risk analysis	Changes in market conditions and the emergence of a new paradigm in which previous approaches and forecasts no longer apply

and advantageous. An increase in cross-border transactions may provide an additional indication of optimism in the M&A market. Because such transactions generally involve greater risk and complexity, growth in their number suggests that executives undertaking them perceive the associated risks as less significant. It may also signal the emergence of new market ideas or conditions that encourage further global integration and, in some circumstances, contribute to inflated transaction prices, as discussed in greater detail below.

3. Stock-financed megadeals: both an indication of a tendency to follow influential market participants and an objective sign of an overbought market or an emerging market bubble. The scale of such transactions attracts extensive media coverage and may persuade other market participants that further consolidation is justified, on the assumption that deals of this magnitude must have undergone extensive analysis by investment bankers and consultants. According to L. Renneboog and C. Vansteenkiste, stock-financed megadeals may signal the formation of a market bubble. They are typically undertaken when management believes that the acquiring company's shares are overvalued, making it advantageous to use them as consideration for the acquisition [1]. Such transactions may also reflect caution among financing banks, which may perceive the associated risks as high and therefore be less willing to provide debt financing than to support an equity-financed transaction.

4. Changes in market conditions and the possible emergence of a new market paradigm: developments that alter analysts' consensus forecasts, prompt revisions to financial models, and encourage transactions that would previously have been regarded as unattractive.

These components and the methods used to calculate them are examined in detail below in the context of improving M&A performance

1. Merger-wave component. The number of M&A transactions in the relevant market is proposed as this component. During an upward market wave, the role of the information environment becomes more pronounced: the greater the number of mergers, the more extensively they are covered by specialized and business

media [19]. This component should be defined with reference to the market in which the investor operates or seeks to enter. The relevant information pressure would therefore arise from reports of successful deals and business growth among close partners and direct competitors, or from their expansion into promising adjacent markets.

In addition to completed transactions, the indicator should include all announced transactions, including those subsequently canceled. At the time of announcement, their eventual outcome is not yet known, and their effect in terms of informational pressure does not differ from that of transactions that will subsequently be legally completed.

To account for the time factor, as substantiated above, this component is defined as the number of consecutive years during which the number of announced transactions exceeds the minimum recorded over the preceding four years by more than 30%. When the number of transactions falls below this threshold, the component is reset to zero.

The transaction quantity component Q is calculated as follows:

$$Q_t = \begin{cases} Q_{(t-1)} + 1 & \text{if } x_t > 1.3 \min(x_t - 1, x_t - 2, x_t - 3, x_t - 4), \\ 0 & \text{if } x_t \leq \min(x_t - 1, x_t - 2, x_t - 3, x_t - 4), \end{cases}$$

where t is the measurement year; x_t is the number of announced M&A transactions in the measurement year; $x_t - 1$, $x_t - 2$, $x_t - 3$, and $x_t - 4$ are the numbers of announced M&A transactions in the preceding four years; and Q_t is the transaction quantity component.

2. Investor optimism components

1) CARs component. *Cumulative Abnormal Returns* (CARs) are proposed as this component. A.V. Mitenkov and V.F. Klevanskiy previously discussed the limitations of this indicator for assessing transaction effectiveness [14]. Nevertheless, by its nature, CARs measure investors' responses to particular events. Positive CARs therefore indicate a favorable investor response to announced M&A transactions, whereas negative CARs reflect prevailing pessimism. Following the authors of the present study, researchers examining investor sentiment in the market may reasonably consider this indicator.

For calculation purposes, the component is defined as the number of years during which at least half of the announced M&A transactions have positive cumulative abnormal returns and fewer than half have negative cumulative abnormal returns. The component is reset to zero when more than half of the announced M&A transactions have negative cumulative abnormal returns.

The component reflecting the prevalence of positive CARs in the relevant market is calculated as follows:

$$C_t = \begin{cases} C_{(t-1)} + 1 & \text{if } N_{\text{Positive CARs}_{0-7}(t)} \geq N_{\text{Negative CARs}_{0-7}(t)}, \\ 0 & \text{if } N_{\text{Positive CARs}_{0-7}(t)} < N_{\text{Negative CARs}_{0-7}(t)}, \\ 0 & \text{if } N_{\text{Positive CARs}_{0-7}(t)} + N_{\text{Negative CARs}_{0-7}(t)} < 2, \end{cases}$$

where C_t is the component reflecting the prevalence of positive CARs; t is the measurement year; and $N_{\text{Positive CARs}_t}$ and $N_{\text{Negative CARs}_t}$ are the numbers of transactions with positive and negative CARs in the measurement year. CARs are calculated for all transactions announced during year t in the industry and geographical market under consideration, for acquiring companies listed on stock exchanges, over a 0–7-day event window following the transaction announcement, relative to the stock market index over the same period:

$$\text{CARs}_{0-7} = \frac{P_7 - P_0}{P_0} - \frac{\text{S\&P500}_7 - \text{S\&P500}_0}{\text{S\&P500}_0},$$

where P_7 and P_0 are the acquiring company's share price seven days after the transaction announcement and on the announcement date, respectively; and $\text{S\&P500}_7 - \text{S\&P500}_0$ are the values of the S&P500 Index seven days after the transaction announcement and on the announcement date, respectively.

2) Cross-border transaction growth component. Cross-border M&A transactions are the most complex and risky in terms of integrating the combined assets. An increase in their number above the levels recorded in previous years may indicate growing optimism among M&A market participants. Combined with the FoMO effect, this optimism may cause decision-makers to disregard existing doubts and accumulated negative experience and to assume additional risks.

Growth in the number of cross-border transactions may also reflect industry transformation

associated with the emergence of new players seeking to increase their market shares through asset consolidation. This, in turn, may lead to overpayment for acquired assets and, where the phenomenon becomes widespread, to accelerated price growth and an increased risk of concluding unprofitable transactions.

This component is defined as the number of years during which the number of cross-border transactions remains above its average for the preceding years. A prolonged deviation is assumed to intensify the FoMO effect, prompting corporate executives to pay greater attention to M&A news and, despite the additional risks involved, to consider expansion into new markets.

The cross-border transaction quantity component T is calculated as follows:

$$T_t = \begin{cases} T_{(t-1)} + 1 & \text{if } x_t > \mu(x_t - 1, x_t - 2, x_t - 3, x_t - 4), \\ 0 & \text{if } x_t \leq \mu(x_t - 1, x_t - 2, x_t - 3, x_t - 4), \end{cases}$$

where t is the measurement year; x_t is the number of cross-border M&A transactions in the measurement year; $x_t - 1$, $x_t - 2$, $x_t - 3$, and $x_t - 4$ are the numbers of cross-border M&A transactions in the preceding four years; and $\mu(x_t - 1, x_t - 2, x_t - 3, x_t - 4)$ is the average number of cross-border M&A transactions over the preceding four years.

3) Megadeal indicator. This component is based on the presence of stock-financed megadeals, that is, transactions that are exceptionally large relative to the normal transaction size. Only legally completed transactions are used to calculate this indicator because the cancellation of such exceptionally large transactions, potentially accompanied by criticism, may reduce or eliminate the FoMO effect on market participants.

4) Market conditions component. This component may be represented by an indicator of substantial changes in the conditions determining profitability in the relevant market. A sustained change in the price of finished products may not only prompt revisions to previous financial forecasts but also alter attitudes toward the M&A transactions under consideration.

In addition to reinforcing FoMO, rising prices generate surplus resources for potential acquirers, thereby increasing their appetite for mergers. A prolonged decline in prices may also

trigger merger waves, whether to combine financial capacity, reduce costs, or strengthen competitiveness in the market.

The component is defined as the number of years during which the market price of the relevant product remains above or below its average value for the preceding years. A prolonged deviation is assumed to cause market participants to expect the existing trend to continue. This subsequently leads to changes in analysts' consensus forecasts used in discounted cash flow models when planning M&A transactions. It also changes the resource potential and the balance of power among industry participants, which may, in turn, give rise to integration and disintegration processes.

The indicator is reset to zero when prices fall below or rise above their average values for the preceding four years, thereby indicating a reversal of the trend. It is assigned a value of 1 again if the trend continues and subsequently increases by 1 for each year during which the upward or downward price trend remains unchanged.

The price component reflecting changes in market conditions M is calculated as follows:

$$M_t = \begin{cases} M_{(t-1)} + 1 & \text{if } (P_t - \bar{P}_{t-4,t-1}) \cdot (P_{t-1} - \bar{P}_{t-5,t-2}) > 0, \\ 0 & \text{if } (P_t - \bar{P}_{t-4,t-1}) \cdot (P_{t-1} - \bar{P}_{t-5,t-2}) \leq 0, \end{cases}$$

where t is the measurement year; P_t is the product price in the measurement year; $\bar{P}_{t-4,t-1}$ is the average product price over the four years preceding the measurement year; and M_t is the price component.

Development of the integrated FoMO risk indicator for M&A transactions

The proposed components, which characterize informational pressure in the market, investor sentiment, the influence of opinion leaders, and changes in price conditions, meet the previously established criteria for proxies used to assess the influence of Fear of Missing Out in the M&A market. However, given the complex nature of the FoMO effect, these components need to be combined into a single integrated indicator that accounts for all relevant factors across the diverse set of FoMO risk assessment areas.

To equalize the weights of the components, their maximum values should be capped. Almost all of the indicators used reflect the number of years during which conditions that activate the

FoMO factor persist in the market. Given the time required to prepare M&A transactions and publish their initial results, which demonstrate the benefits of ongoing mergers, it can be assumed that FoMO factors begin to operate approximately two years after they first emerge. This period of combined exposure to the relevant conditions – an increase in the number of M&A transactions, investor optimism, and high prices for the products of industry companies – is sufficient to signal an increased risk of FoMO influencing decision-making. The megadeal indicator, which is measured in monetary units, is considered separately as a component with an immediate predictive effect.

The integrated FoMO risk indicator (RIF) can be expressed as the following sum of components:

$$\text{RIF}_t = Q_t + C_t + T_t + M_t,$$

where Q_t is the transaction quantity component; C_t is the component reflecting the prevalence of positive cumulative abnormal returns (CARs); T_t is the cross-border transaction quantity component; M_t is the price component; and t is the measurement year. For all t , Q_t , C_t , T_t , and $M_t \leq 2$. All components have equal weights and the same dimension.

Empirical testing the FoMO risk indicator

The empirical basis for testing the indicator comprised anonymized datasets from the internal reporting records of mining and metallurgical enterprises in Russia and other countries. Access to the primary data was restricted under a non-disclosure agreement, which necessitated the aggregation of information and the removal of any details that could directly identify the sources. The use of proprietary data enabled the hypotheses to be tested against operational metrics that are rarely available from public statistical sources, thereby strengthening the relevance and originality of the findings.

The final sample comprised 63 M&A transactions involving companies in ferrous metallurgy and related mining and metallurgical industries. Under the proposed approach, an M&A transaction is classified as unsuccessful when its N -year payback falls substantially below the industry average and the outcomes of comparable transactions. The study period was limited to 1985–2018

because the assessment of completed transaction effectiveness required the financial statements of the acquiring companies for several years following each transaction. For the purposes of statistical analysis, given the availability of a large volume of data and to avoid errors arising from the use of different reporting currencies, the sample was limited to acquiring companies registered in the United States, listed on the New York Stock Exchange (NYSE) or NASDAQ¹, and involved in cash-financed M&A transactions.

For the selected companies, EBITDA data – operating profit before income tax, interest, depreciation, and amortization – were collected for the year preceding the M&A transaction and for the subsequent four years. The economic indicators were calculated using the medium-term return formula first proposed by A. Mitenkov and V. Klevanskiy [13]. The percentage return on the investment made in a merger or acquisition over the specified period was calculated as follows:

$$\text{Long-term payback} = \sum \frac{\text{EBITDA}(t_N, \dots, t) - \text{EBITDA}(t)}{\text{M\&A transaction price}},$$

where t_0 is the date of the acquiring company's annual financial statements preceding the M&A transaction; $t_N, \dots, t_1$ are the dates of the financial statements 1, 2, ..., N years after completion of the M&A transaction; and EBITDA is operating profit before income tax, interest, depreciation, and amortization.

Under the proposed approach, unsuccessful M&A transactions are those for which the payback over the calculated N -year period deviates critically in a negative direction from the average for the industry and comparable transactions. For the purposes of the present study, a transaction was considered ineffective when the indicator calculated using the above payback formula was negative or equal to zero over the four-year period following completion of the transaction. In other words, a transaction was classified as unsuccessful when the acquirer's profit not only failed to rise after the acquisition but fell below its pre-transaction level. In such cases, profit growth during individual post-transaction periods was

insufficient to offset declines during the remaining years. Furthermore, because executives of acquiring companies generally expect synergies to materialize within one or two years after completion of a transaction [13], transactions showing zero or negative profit growth not only over four years but also over the first two post-transaction years were excluded from the resulting sample. The acquirers' discounted cash flow models presumably anticipated neither the absence of synergies nor a prolonged post-transaction decline in profit. These transactions were therefore unlikely to have met management expectations or to have been regarded as successful or timely over the period examined. This approach to identifying ineffective M&A transactions is illustrated in **Fig. 1**.

The calculated FoMO risk indicator values and the analysis of the corresponding sample of acquiring companies are presented in **Table 2** and suggest that the indicator has predictive value. The table shows that, once the sum of the indicators reflecting the duration of the relevant factors – each capped at two years – reaches a certain level, it can provide an early warning of exposure to FoMO-related risks that may subsequently lead to unprofitable transactions. In the present case, a value of 7 indicates the combined effect of all FoMO factors, three of which had persisted for more than two years. In addition to these indicators, the presence of stock-financed megadeals provides a separate signal. These signals are enclosed in frames in Table 2. For the purposes of the calculation, megadeals were defined as transactions exceeding USD 10 billion in value.

Analytical basis for practical recommendations on the use of FoMO risk indicators

The combination of the maximum levels of the various indicator components makes it possible to identify in advance the ranges of values corresponding to a high risk of exposure to FoMO factors for eight of the nine transactions considered (shown in dark gray; see Table 2). Given the lengthy preparation periods for M&A transactions, it can be assumed that preliminary agreements concerning the ninth transaction were reached during the high-risk period predicted by the FoMO indicator. Under this interpretation, the indicator would have flagged all extra-loss transactions.

¹ NASDAQ (National Association of Securities Dealers Automated Quotations) is a U.S. stock exchange specializing in the shares of high-technology companies, including electronics and software manufacturers.

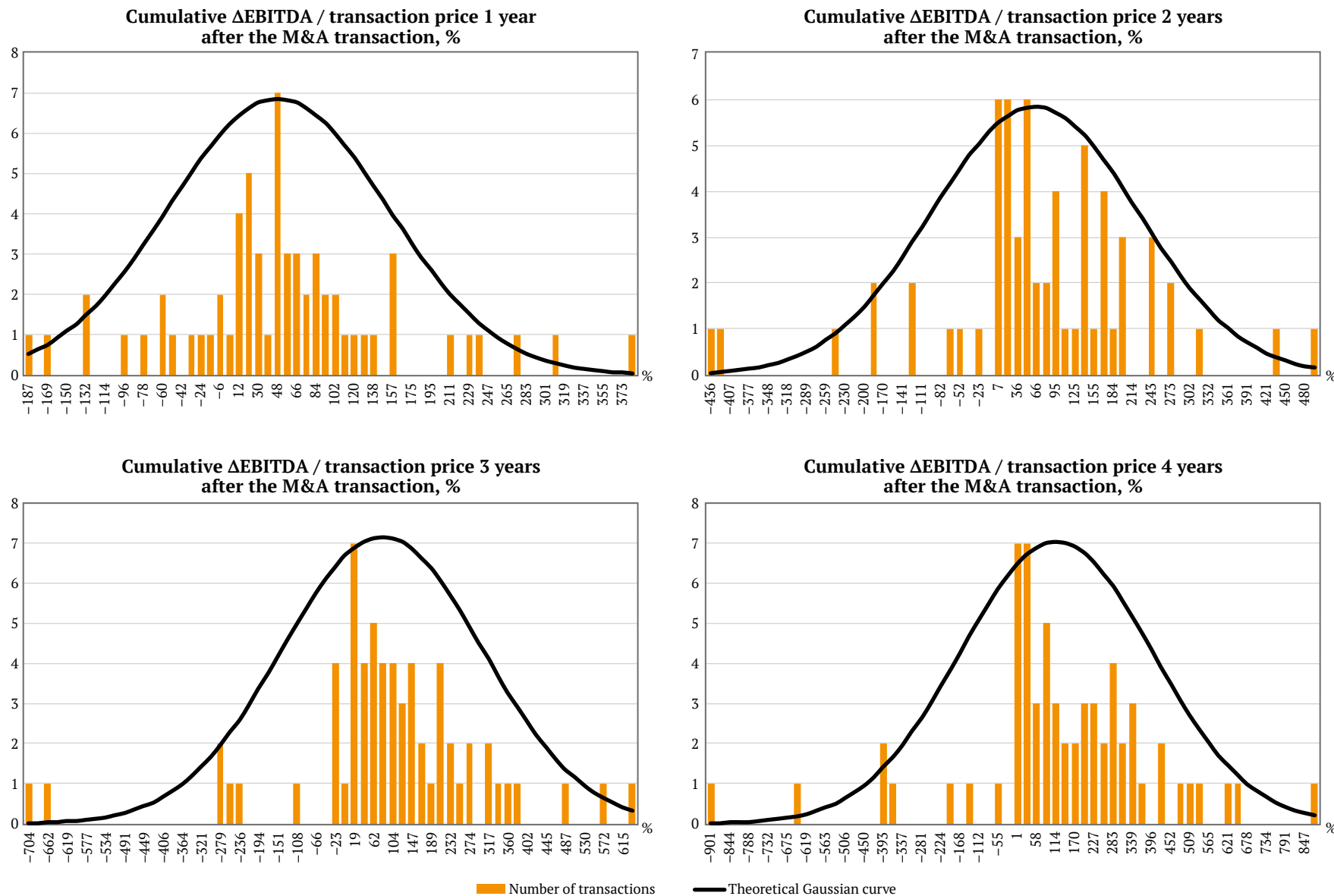


Fig. 1. Distribution of the results of mergers and acquisitions transaction by their payback indicator and the approach to determining the sample of ineffective transactions (hereinafter referred to as “extra-loss transactions”, highlighted in a frame)

Table 2

Comparison of the FoMO risk indicator and the distribution of extra-loss trades

Year	Transaction quantity component (Q)	Price component (M)	CARs component (C)	Cross-border transaction quantity component (T)	Integrated FoMO risk indicator (RIF)	Total value of transactions exceeding USD 1 billion and paid for with shares	Extra-loss transactions	Other transactions in the sample
1985	0	0	0	0	0	0	0	1
1986	0	0	0	0	0	0	0	2
1987	0	0	0	0	0	0	0	1
1988	1	0	1	0	2	0	0	1
1989	2	0	2	1	5	0	0	1
1990	2	1	2	2	7	0	0	1
1991	2	2	0	2	6	1 600	1	0
1992	0	2	0	0	2	0	0	1
1993	0	0	0	0	0	0	0	0
1994	1	1	1	0	3	0	0	1
1995	2	2	2	1	7	0	0	1
1996	2	0	2	2	6	0	0	4
1997	2	1	2	2	7	4 762	0	3
1998	2	2	0	2	6	0	2	5
1999	0	2	0	2	4	3 804	1	1
2000	0	2	0	0	2	5 899	0	2
2001	0	2	1	0	3	17 888	0	2
2002	0	0	2	0	2	0	0	0
2003	0	1	2	0	3	0	0	1
2004	1	2	2	1	6	4 060	0	2
2005	2	2	2	2	8	0	0	2
2006	2	2	2	2	8	45 081	0	1
2007	2	2	2	2	8	2 149	2	1
2008	2	2	2	2	8	4 537	1	0
2009	0	0	0	0	0	0	0	1
2010	0	1	0	0	1	4 931	0	1
2011	1	0	1	0	2	25 629	0	3
2012	0	0	2	0	2	5 273	1	5
2013	0	0	2	0	2	1 409	1	1
2014	0	1	2	0	3	2 488	0	3
2015	0	0	2	0	2	0	0	5
2016	0	1	2	0	3	0	0	0
2017	0	0	0	0	0	0	0	0
2018	1	1	1	1	4	0	0	1

Legend:

2	Indicator components reaching their maximum level
8	Warning signal indicating FoMO-related risks in M&A transactions in subsequent years
2	Correct triggering of the warning signal
1	No signal or a premature signal

However, the proposed indicators cannot serve as the sole basis for M&A decision-making, and their activation should not completely block M&A activity. This is due to the occurrence of false early signals and the presence, alongside extra-loss transactions, of transactions with positive payback in the sample during the same FoMO-risk periods. These two circumstances should be considered separately.

False signals. Baker and Wurgler [15] observe that market crashes generally occur during periods of high investor sentiment, although their timing is notoriously difficult to predict. This is widely recognized even among ordinary retail investors: the duration and strength of behavioral factors are difficult to predict, and betting against the market may result in losses even when investor behavior clearly deviates from rational fundamental values.

Positive-payback transactions during FoMO-risk periods. The presence of transactions with positive payback during such periods supports two conclusions:

1. The investment payback formula proposed above, which relates the change in the acquiring company's profit, measured by EBITDA, before and after the transaction to the transaction price, identifies as extra-loss transactions not only those concluded during pre-crisis periods. It identifies companies that experienced problems after completing a transaction while also demonstrating that, during the same periods, some acquiring companies remained in a more favorable position despite the general decline in prices and other external factors affecting all market participants. This confirms that the proposed method for the preliminary selection of transactions for subsequent individual examination has considerable potential for practical application.

2. Despite the presence of FoMO factors, effective transactions can still be concluded during the corresponding high-risk periods. Thus, the indicator can identify periods characterized by an increased risk of exposure to FoMO factors without requiring all M&A activity to be suspended during such periods. At the same time, the higher concentration of extra-loss transactions specifically during FoMO-risk pe-

riods suggests that the RIF indicator can be used to identify these periods and initiate additional risk management procedures to reduce the risk of concluding extra-loss transactions.

Practical recommendations for using the FoMO risk indicator

Unlike other behavioral theories, the hypothesis that FoMO affects managerial decisions during the preparation of M&A transactions provides a basis for developing practical risk management tools. The use of the FoMO risk indicator in M&A transactions makes it possible to identify specific external circumstances affecting the choices made by top management. These circumstances can consequently be taken into account in economic modeling, the selection of forecasts for valuation purposes, and the assessment of transaction attractiveness and risk.

Once implemented in practice, the FoMO risk indicator can identify periods associated with a high risk of concluding transactions amid prolonged changes in market conditions and heightened investor optimism regarding ongoing integration processes. Provided that transaction databases and baseline price data for the industry's key products are available, obtaining the source data and calculating the indicator components should, once the indicator has been calibrated, be a relatively straightforward process. It can readily be organized as part of the preparation of a transaction for approval by the board of directors or another corporate governing body. When one or more indicator components reach their maximum levels, this will clearly signal to the highest governing bodies of acquiring companies that additional risk management and self-control procedures are required.

Risk management algorithm for reducing the risk of FoMO-driven extra-loss transactions

The proposed algorithm, presented in Fig. 2, is based on minimizing the FoMO factors associated with:

- high RIF values during merger waves;
- transactions that are large relative to the acquiring company, particularly those agreed upon at the level of the companies' shareholders or top executives (this aspect of FoMO is examined in greater detail in [12]).

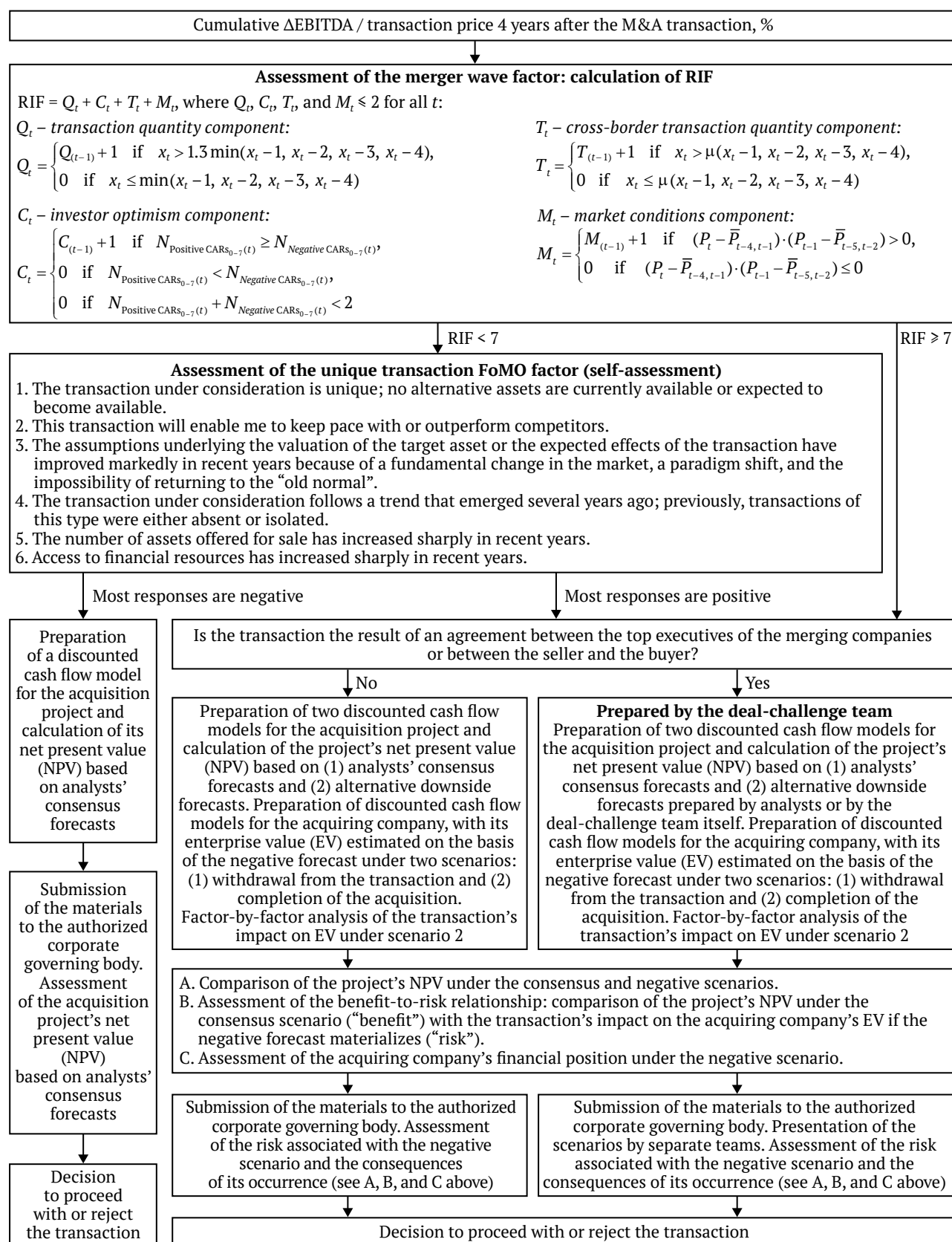


Fig. 2. Algorithm of procedures designed to reduce the risks of concluding extra-loss transactions under the influence of FoMO factors

When the risk of FoMO is identified, the algorithm provides for the following mechanisms to minimize its influence:

1. Establishment of an independent deal-challenge team (the “opposition to the deal” group). As previously noted in [12], the risk of concluding unprofitable transactions may arise from the absence of internal opposition to a deal already agreed upon by the top executives or shareholders of the companies involved. The corporate culture of these companies may discourage disagreement with the position expressed by management, particularly when a potential withdrawal from the transaction would have financial consequences, such as payment of a termination fee, or reputational consequences, including damage to the company’s standing with its business partners.

An additional risk factor in such situations is the involvement of investment advisers or bankers whose fees depend on the transaction being completed and whose professional authority may influence both corporate executives and employees.

In such circumstances, the acquiring company should establish a separate internal working group or, where this could create a conflict of interest, engage an external consultant. The group or consultant would perform an additional critical review of the parameters and financial models of the proposed transaction and present counterarguments to the company’s management and supervisory board. The financial incentives of such a consultant or working group could even be linked to a decision not to proceed with the transaction.

This formalized independent challenge mechanism is clearly appropriate only for particularly large transactions that not only intensify the FoMO effect but also make employees reluctant to voice criticism that contradicts the views and agreements of the executives of the companies involved.

2. Use of alternative forecasts and supporting analysis. When high FoMO risk indicator values are corroborated by affirmative responses to the self-assessment questions, particular attention should be paid to the sustainability of current trends. The arguments advanced by analysts who, contrary to the prevailing consensus, fore-

cast a downturn in a rising market should also be examined impartially. When preparing discounted cash flow models to support a transaction, this approach allows the consensus forecasts of investment banks – which, as discussed above, are susceptible to herd behavior – to be assessed more critically. It also enables an additional assessment of the probability of adverse scenarios and their potential negative consequences.

Conclusion

This study developed and tested a specialized indicator of FoMO-related risk in industrial M&A, addressing a major methodological gap in research on behavioral influences on strategic corporate decision-making. It addresses a substantial methodological gap in research on behavioral factors affecting the effectiveness of high-level corporate decisions. Unlike previous studies focusing on individual psychological traits or general market sentiment, the proposed integrated FoMO risk indicator (RIF) specifically identifies a set of external conditions that may cause top executives and board members to experience an irrational fear of being left out of merger waves or missing a unique transaction, thereby increasing the risk of concluding unprofitable transactions.

The indicator is theoretically grounded in a synthesis of behavioral economics and conventional financial analysis. Four key components reflecting the channels through which FoMO influences M&A were identified and incorporated into the indicator: (1) transaction dynamics (merger waves); (2) prevailing investor optimism (CARs); (3) cross-border transaction activity; and (4) sustained changes in market price conditions. The presence of stock-financed megadeals, in which the acquiring company’s shares serve as consideration, was used as an additional indicator. A distinctive feature of the methodology is that it accounts not only for deviations of these parameters from their normal levels but also for the duration of such deviations. This reflects the nature of FoMO as a behavioral response that builds over time under sustained social and informational pressure.

Empirical testing of RIF using historical data on mining and metallurgical companies for 1985–2018 confirmed its predictive potential.

High RIF values – particularly a value of 7 on the proposed scale – and the occurrence of stock-financed megadeals were associated with periods in which extra-loss M&A transactions were concentrated. These transactions were defined as those with negative medium- and long-term payback, calculated using EBITDA. The findings suggest that RIF can serve as an effective early-warning tool for identifying periods of heightened behavioral risk.

The indicator is not intended to serve as an automatic bar to M&A activity. Rather, it is designed to trigger a warning within corporate risk management systems and prompt additional review safeguards. The study proposes a specific algorithm for such situations, including the establishment of an independent working group to critically challenge the transaction and the man-

datory modeling of alternative, more conservative scenarios within discounted cash flow models, incorporating the views of analysts whose forecasts differ from the market consensus.

This study contributes both to the theoretical understanding of the behavioral determinants of M&A decisions and to the development of practical tools for improving the economic efficiency of companies' M&A activities. The proposed FoMO risk indicator represents a step toward more rational and informed strategic decision-making, enabling companies to resist an irrational fear of missed opportunities and focus on creating long-term shareholder value. Further research may refine the indicator components for different industries and examine its interaction with other behavioral biases in M&A processes.

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Klevansky V.F. – writing the source text; collection and analysis of the material, preparation, analysis and development of proposed approaches and hypotheses, revision of the text; new scientific results; final conclusions

Mitenkov A.V. – scientific guidance; development of methodology; quality control

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