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Economic Analysis of Takeovers and Mergers and the Evaluation of Takeover Bids

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Abstract As some of the most relevant processes of financial and organizational corporate restructuring, takeovers, mergers and acquisitions have been drawing increasing attention among the professional public and researchers alike. The author focuses on the economic analysis of these transactions and the evaluation of takeover bids. First, he sketches out the theoretical framework of takeovers and mergers, which is followed by an economic analysis of mergers. In his study, the author uses the "discounted cash flow analysis" method and the "market multiple analysis" method. The financial evaluation of a specific takeover, comprising a concrete numerical case study, can be considered as the added value of the paper. Net present value is chosen to pinpoint the benefits of a takeover. Determining the bidding price for purchasing the target firm deserves particular attention. With some concrete numerical cases, the author illustrates certain differences in the evaluation of a takeover bid when different funding is taken into account, such as a share offer versus a cash offer. Furthermore, a few calculations regarding the estimation of the economic effects of these realized transactions are demonstrated as well. The author concludes his study by stressing the main findings, and he advocates the thesis that a thorough preliminary economic analysis has to be carried out before the management of firms implements a takeover and/or merger.

Keywords: *evaluation of takeover bids, economic analysis of mergers, funding of takeover, market capitalisation, economic effects of takeovers and mergers*

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1. Introduction

Takeovers and mergers have been an attractive topic of many studies, diplomas and master theses, as well as many scientific and professional papers published in various journals. In the media, we can find plenty of news regarding such business events – how a company took over another company or how a multinational corporation in a particular branch is just about to merge with some other well-known legal entity, for example. These transactions, which in theory belong among financial restructuring, occur very often in the automotive industry, IT, telecommunications, the pharmaceutical industry, in banking, etc. As a matter of fact, there is practically no activity where we do not witness these kinds of organizational and financial transformations. This kind of restructuring also takes place during economic crises, although perhaps to a smaller extent, since commodity producers and their ambitious owners and managers are driven by a strong wish to acquire new markets, to make big profits, to grow fast, and to become a huge business system (empire building) and a very important player in the global market. Last but not least, they are also driven by a wish to suppress the competition. The motives of takeovers and mergers vary, however, and there is no common denominator or recipe for them.

Takeovers and mergers date back to the end of the nineteenth century. They were triggered by technological progress. In order to compete, companies started to join forces. It happens quite often that firms seek innovative assets precisely in mergers. However, it is a challenge to evaluate the technological synergies in mergers. They stem from two sources. According to Shi et al. [1], the first source is technological complementarity. Two firms combine their specific skills to make further innovations in terms of new products and technologies. The second source is the litigation value of the target's patents.[1]

Today, we can affirm that takeovers and mergers of companies have already become a trend in the world economy, and that they are stimulated by globalization. Thus, corporate takeovers represent some of the largest investments that firms undertake. "Corporations have spent $ 5 trillion on deals worldwide in the year 2015 alone, amounting to 6.8% of world GDP", claim Golubov and Xiong [2].

The paper has been conceptualized to touch on mainly economic analysis of takeovers and mergers. In its scope,

[1] As a recent case of an acquisition aiming to obtain litigation value Shi et al. [1] allege Rockstar, the consortium backed by Apple, Microsoft, BlackBerry, Sony and Ericsson that bought the Nortel patents for $ 4.5 billion.

two kinds of analyses, i.e. the discounted cash flow method and the market multiplication method, are presented and explained. Both are applied to a numerical case. We specifically dedicate our attention to the question of how to set and determine a bidding price for purchasing a target firm. The evaluation of a takeover bid is presented thoroughly, once again resorting to concrete numerical cases. In this context, we are mostly interested in the expected profits deriving from takeovers. This question is addressed by studying the economic reasons for takeovers and mergers. Finally, we try to show how to evaluate the effects of takeovers and acquisitions already carried out. In the conclusion of the paper, we summarize the main findings of our study and appeal to the managers of companies planning to carry out takeovers and/or mergers to undertake these kinds of projects extremely seriously and professionally, to perform a deep preliminary economic analysis, and, finally, to confront and to engage with the key challenges that follow the takeovers and mergers already realized.

2. Motives for Takeovers and Mergers from a Theoretical Perspective

In theory, various kinds of motives for takeovers are perceived. There are many of them, and different authors classify them differently. In any case, a takeover deals with a target act, where the expected benefits of this act should be bigger than the expected costs. According to Bertoncelj [3], the reasons for mergers are many and differ considerably. An individual takeover can by no means be explained by a single theory, since each theory considers only one particular motive or a group of motives with common characteristics.

Sudarsanam [4] classifies the motives into two groups. In the first group, there are motives directed at the maximization of the shareholders' benefits. These are the so-called neoclassical motives. In the second group, there are motives related to the personal benefits of the companies' managers, who mainly try to defend themselves against takeovers and maintain their jobs. A syndrome of their predominating influence expansion can be found here as well. Besides that, the other relevant reason is lowering the financial risk and even preventing bankruptcy.

Walters [5] arranges the motives for takeovers in two bigger groups. In the first one, there are motives where the goal is not only to increase effectiveness, but also to gain the power of monopoly and to prevent new competitors from entering the industry. Managers' motives and tax avoidance can also be added. In the second group, there are motives where the goal is to increase effectiveness as shown in synergies deriving from the economy of scale, further, in disciplining the management, and also in financial motives deriving from taking advantage of business opportunities, and, last but not least, in preventing opportunism.

More specific reasons alleged in the practice of carrying out transactions of financial restructuring reflect the expected benefits generated by takeovers and mergers. Pike and Neale [6] define them in the following way: the first reason is to take advantage of the economy of scale, the second is to create synergies, the third is to enter new markets, the fourth is to secure a critical mass, the fifth is to spur and renew growth, the sixth is to increase market power, the seventh is to decrease the dependence on the existing and potentially changeable activities, and the eighth is to get listed on the stock exchange.

3. Economic Analysis of Mergers

The economic analysis of mergers is quite straightforward. A firm that merges with or acquires another firm, i.e. a target firm, carries out the evaluation of this target firm and then makes a decision as to whether it will buy it at this value – of course, it would rather have it at a lower value. We can talk about an acquiring firm, or an acquirer or bidder, and an acquired (target) firm. A target firm will accept the bid if the price is higher than its value, if it keeps on operating independently, or it will accept some other bid.

Bidders compete in an auction to buy a target firm. A bidder's shares can be misvalued. "The bidders and the target may maximize expected profits and be fully rational, but the target cannot perfectly observe the bidders' synergies or the misvaluation of the bidders' shares. Since targets have limited information, bids made by overvalued acquirers can appear more attractive to the target firm than they really are. An overvalued acquirer with low synergy may therefore win the auction, inefficiently crowding out a high-synergy acquirer", say Li et al. [7].

Target insiders are often uncertain about a specific bidder's synergy potential and sometimes even lack knowledge of a potential acquisition. According to Suk & Wang [8], "Target insiders have some private information that an acquirer can use to infer the target firm's potential for generating acquisition benefits, whether or not the target insiders are aware of a potential acquisition."

Wang [9] wonders, "Why acquirers pursue takeovers if they do not overtly benefit from the deals. The puzzle seems to contradict both the common assumption that acquirers are value-maximizers and the neoclassical theory of mergers and acquisitions". The same author [9] alleges two possible explanations: "The first, often known as the anticipation effect, argues that part of the market's reaction occurs before the acquisition becomes public. The second, known as the revelation effect, argues that takeover announcements induce the market to reassess the acquirers' stand-alone values". This confounds estimates of merger gains.

Before switching to an economic analysis of mergers, let us also make a distinction between takeover revenue resulting from a target's sale by auction and revenue from the same target's decision to be sold by a negotiated transaction. Some researchers have conducted an analysis, placing auctions and negotiations on an even playing field, arguing how firms should be sold. Gnetrya and Stroupb [10] hypothesized "the possible existence of non-price procedure-specific costs or benefits, for example, a target board's desire to quickly sell the company. Such a sale procedure can be preferred even if it produces lower expected revenue."

The acquirers can be private operating firms and public bidders. Gorbenko [11] classifies bidders for a target company or division as strategic (operating companies)

and financial (private equity funds), domestic and foreign, public and private, and firms in the same industry and outsiders.

An evaluation of the target firm is the first step in the economic analysis of mergers. For the evaluation of the target firm, there are several methodologies available. We focus on two:

1. the discounted cash flow analysis and
2. the market multiple analysis.

Regardless of which analysis or method we choose, two issues have to be considered. First, the target firm will not operate as a separate legal entity. It will become a part of the assets portfolio of the firm that purchases it. Changes in business operations will influence the value of the whole deal, which has to be accounted for in the economic analysis. Second, the aim of the evaluation of the merger is to evaluate the equity of the target firm, since this target firm is acquired from its owners and not from its creditors. Although we speak about the evaluation of a firm, the focus is on equity value rather than total worth.

3.1. Economic Analysis Based on Discounted Cash Flow

This method deals with capital budgeting decisions. It relies on the whole firm and not only on individual investment project.

For this analysis, we need two kinds of entry data: a cash flow forecast (projection) deriving from the merged firms and a discount rate or cost of capital. To forecast an accurate cash flow is, in this analysis, a very demanding task. In the case of a financial merger, where no synergies are expected, the incremental cash flow is simply the cash flow of the target firm. In the case of an operating merger, where the operations of two firms combine, the cash flow forecast is much more difficult. Let us look at a concrete example. In Table 1, the cash flow projection of the target firm for the next five years is presented.

Let us assume that after year t+5 the cash flow of the target firm will grow at a constant annual rate of 8 per cent. If we account for a discount rate of 19.9 per cent (the calculation is presented in the following section of this paper), we can calculate the value of all the cash flows after year t+5 as follows:

$$V_{t+5} = \frac{CF_{t+6}}{k_s - g}$$

$$= \frac{(€29.5 - €15.0)(1.08)}{0.199 - 0.08} = €131.6 \; million$$

€ 131.6 million is the present value (PV) of cash flow at the end of year t+5, generated in year t+6 and afterwards (sum of the infinite geometric series).

Estimate of discount rate

The last row in Table 1 represents the capital of the acquired (target) firm. This capital must be discounted with a discount rate, meaning the cost of capital, and not with a common discount rate, such as WACC. [2] The discount rate used in this calculation must reflect the risk of future cash flows. For this reason, the most suitable discount rate is the cost of capital of the target firm.

[2] WACC denotes a weighted average cost of capital.

Table 1. Cash flow projection in million € for the target firm after the merger

Economic item	Year				
	t+1	t+2	t+3	t+4	t+5
Net sales revenue	135.0	156.0	181.0	204.0	221.0
Cost	110.0	126.0	144.0	162.0	173.0
Depreciation	12.0	12.0	14.0	14.0	16.0
EBIT	13.0	18.0	23.0	28.0	32.0
Interests	7.0	8.0	9.0	10.0	10.0
Taxes	1.7	3.4	5.2	6.8	8.5
Net income	4.3	6.6	8.8	11.2	13.5
Depreciation	12.0	12.0	14.0	14.0	16.0
Cash flow	16.3	18.6	22.8	25.2	29.5
Retained earnings – foreseen for growth	6.0	6.0	9.0	12.0	15.0
End value					131.6
Net cash flow	10.3	12.6	13.8	13.2	146.1

Let us assume that before the merger the market defined beta (β) for the target firm was 1.65. As the merger will not change the capital structure or tax rate of the target firm, this beta (β) will remain the same after the merger, i.e. 1.65.

In order to assess the cost of capital of the target firm after the merger, we use the security market line, SML, as illustrated by the graph in Figure 1.

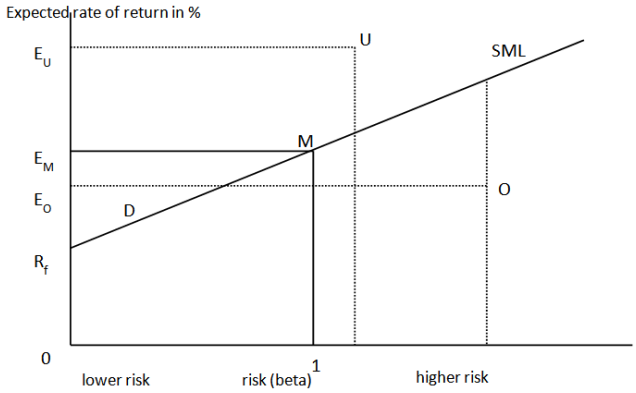

Figure 1. Security market line, SML (Source: Adjusted after Brigham and Houston [12])

If we assume that the risk free rate of return is 10 per cent, with a systematic risk premium of 6 per cent, we get the cost of capital of the target firm, k_s, after the merger with the acquiring firm, which amounts to 19.9 per cent:

$$k_s = k_{RF} + (RP_M)\beta = 10\% + (6\%)1.65 = 19.9\%$$

Evaluation of cash flow

The recent and actual value of capital for the acquiring firm is equal to the present value, PV, of the expected cash flow of the target firm, discounted at a 19.9 per cent discount rate.

$$V_t = \frac{€10.3}{1.199} + \frac{€12.6}{1.199^2} + \frac{€13.8}{1.199^3} + \frac{€13.2}{1.199^4} + \frac{€146.1}{1.199^5}$$

$$= €90.71$$

The value of the target firm is € 90.71 million. The only synergies are the synergies from the operation of the combined firm, and these effects are already accounted for in the projected cash flow.

3.2. Market Multiple Analysis

The second method of the evaluation of the target firm is the market multiple analysis, where a market defined multiplier on net income, on earnings per share, on sale, on book value, etc. is used. While the discounted cash flow analysis is more accurate, the market multiple analysis rests more on judgement. Let us illustrate this with an example.

The planned net income for year t+1 is € 4.3 million, and it is projected to grow up to € 13.5 million until year t+5, i.e. € 8.88 million on average in the period of 5 years (see Table 1 above). The average price-to-earning ratio, P/E, for public firms similar to our target firm is 10. In order to assess the value of the target firm while accounting for the P/E multiplier, we simply multiply the average net income of the target firm in the amount of € 8.88 million by the market multiplier 10 and get the value € 88.8 million.

This is the value of the share capital, the worth of the firm. The market P/E multiplier is based on the current income of comparable firms, whereby the current income of the target firm does not reflect the synergies generated from the merger of the firms. In this approach of market multiplication, EBITDA (earnings before interest, taxes and depreciation and amortization) can be used as well. The procedure is similar; however, in this case the market multiplier is equal to the market price of the share divided by EBITDA (instead of earning per share). We would then multiply this multiplier by the EBITDA of the target firm.

3.3. Setting the Bidding Price for the Purchase of the Target Firm

Using the value of the target firm determined by the discounted cash flow analysis, i.e. € 90.71 million (see section 4.1.2 of this paper), we get the highest price the acquiring firm can pay for the target firm. If it paid more, the value of the acquiring firm would decrease. If the acquiring firm paid less than € 90.71 million, it would generate a profit by purchasing the target firm. The acquiring firm is advised to bid a little bit less for the target firm than € 90.71 million.

The graph in Figure 2 demonstrates this price range along with the possible outcomes. Let us now take the target firm and assume that it has 10 million shares selling at € 6.00 apiece, which means that its value as an independent ongoing firm is € 60.0. If the target firm is sold at a value bigger than € 60.0 million, its shareholders will harvest a profit, while they would lose their value at any price lower than € 60 million.

In Figure 2, the graph shows two lines under the angle of 45°; one has a negative slope, the other a positive one. The first shows how much the shareholders of the acquiring firm can gain and how much they can lose, and the second shows how much the price of the merger affects the owners of the target firm.

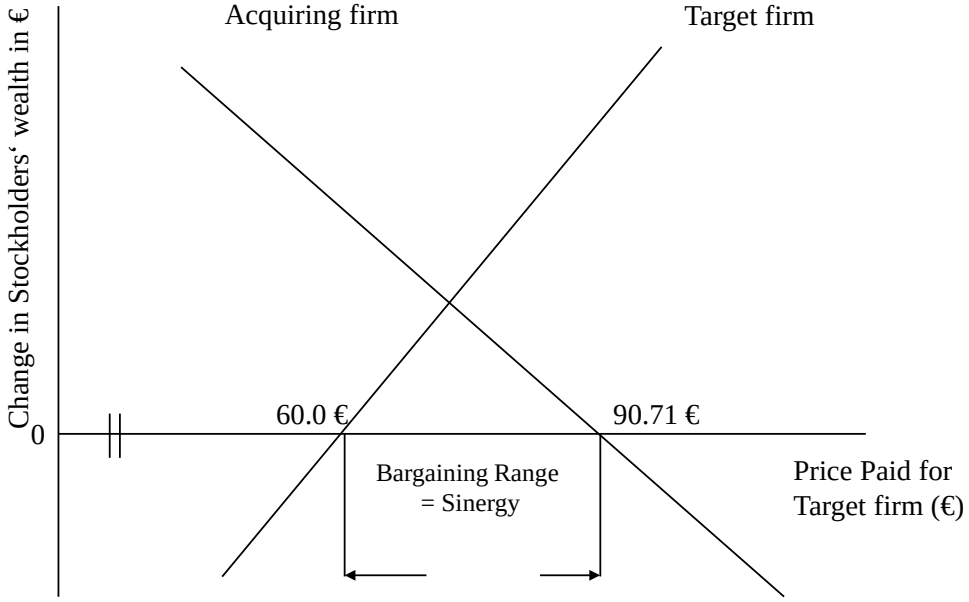

Figure 2. Price frame (range) with possible outcomes (Source: Adjusted after Brigham and Houston [12])

The difference between € 60.0 million and € 90.71 million is equal to € 30.71 million and represents the synergy benefits expected from the merger of the firms. To sum up:

- If there were no synergy benefits, the maximum bid would be equal to the current worth of the target firm. The bigger the synergy profits, the bigger the range between the current price of the target firm and the maximum price the acquiring firm can pay for this purchase.
- The bigger the synergy profits, the bigger the likelihood that the merger will be implemented.
- How to distribute the synergy benefits is a very important question. It is quite obvious that both sides want to gain as much as possible. If the management of the target firm knew the maximum price for its purchase, they would strive for a price very close to € 90.71 million. On the other hand, the management of the acquiring firm would like to implement this purchase of the target firm at a price as close to € 60.0 million as possible.
- How high to set the bidding price? The answer to this question depends on numerous factors, such as

payment terms (either cash or securities), the negotiation ability of both management teams, and the negotiation positions and conditions of both parties.

- The acquiring firm will surely safeguard its maximum bid as a business secret and will plan its bidding strategy carefully and consistently regarding the current circumstances.
- If the management of the acquiring firm expects that some other bidders may appear, or if the management of the target firm resists the sale due to holding and preserving their leading positions, it can create a high "pre-emptive" bid, hoping that it might scare off other bidders and get rid of the resistance of the target firm's management.
- On the other hand, the management of the acquiring firm can also bid at a lower price, hoping that it might "steal" the target firm.

4. Takeover Bid Evaluation – Expected Profits from Takeovers

The evaluation of takeovers differs a little bit from the evaluation of other investments if we assume that the motive for such a takeover is economic rather than managerial, which means that it is in the interest of the acquiring firm to maximize its worth after the takeover has been realized. Pike and Neale [6] assert that it is worth it for firm A to take over firm B if the present value of the cash flow of the combined firm exceeds the present value of both firms as separate entities:

$$V_{A+B} > V_A + V_B$$

By the expression $[V_{A+B} - (V_A + V_B)]$ we measure the increase of value. The net costs of the acquiring firm are equal to the difference between the costs or expenses of the merger and the value of the acquired (target) firm:

$$Net\ cost = \left[Expenses - V_B\right]$$

The net present value, NPV, of the takeover decision is equal to profit reduced by costs or expenses:

$$Net\ cost = \left[Expenses - V_B\right]$$
$$NPV = V_{A+B} - \left(V_A + V_B\right) - \left[Expenses - V_B\right]$$
$$= V_{A+B} - V_A - Expenses$$

Of course, NPV depends on how a takeover is funded and on the conditions of the transaction. The acquiring firm expects to make a good profit out of the takeover, to secure the maximum possible value of savings and synergies for its owners. On the other hand, its bid must be attractive for the owners of the target firm in order to stimulate and motivate them for the sale. Let us look at two cases of takeover bid evaluation.

4.1. Case I

Let us first study a case demonstrating the different kinds of takeover funding. Let us take two stock companies listed on the stock exchange, firm A and firm B. The firms are not indebted. The market value of firm A amounts to € 300 million (100 million shares at a nominal value of € 0.50 apiece and a market price per share of € 3), and market value of firm B amounts to € 50 million (10 million shares at a nominal value of € 0.50 apiece and a market price per share of € 5. Firm A expects to take advantage of certain synergies, which should result from the takeover of firm B in benefits amounting to € 15 million. The owners of firm B are offered € 60.0 million in cash. The NPV of the acquiring firm's takeover bid equals:

$$NPV = V_A + B - V_A - Expenses$$
$$= €\ 300\ million + €\ 50\ million + €\ 15\ million$$
$$-€\ 300\ million - €\ 60\ million = €\ 5\ million$$

The profit generated out of the takeover – here we speak about the synergies worth € 15 million – is distributed evenly between the two groups of shareholders. The claim for increasing the bid value submitted by firm A, or even a bid by another firm, would tilt the scale with profit in favour of the shareholders of firm B.

If firm A submitted its takeover bid under the payment terms "share for share" with equal value, the calculation would be different. In this case, firm A would renounce a part of the combined firm after takeover and a part of the profit for the shareholders of firm B. If we assume that the takeover bid of firm A amounts to an equal value, then firm A has to offer 20 million shares (€ 60 million/€ 3). This would result in the issuance of 120 million shares, which means that firm A would surrender (claim) 16.7 % of the combined firm following the takeover to the shareholders of firm B. Consequently, the profit for the shareholders of firm A would be lower. The NPV of the takeover would still equal the difference between the profit and the costs or expenses. However, the latter are now bigger. The proportion of the combined firm reduced by the value of firm B is equal:

$$Cost$$
$$= \left(20million / \begin{pmatrix} 100\ million \\ +20\ million \end{pmatrix} x€365\ million \right) - €50\ million$$
$$= €\ 60.83\ million - €\ 50million = €\ 10.83\ million$$

The NPV of the takeover for firm A is equal:

$$NPV = profit - cost$$
$$= €15\ million - €10.83\ million = €\ 4.17\ million$$

Thus, only € 4.17 million of the net income deriving from the takeover remain to the shareholders of firm A. This is 16.7 per cent less than in the case of firm A offering cash as payment for the purchase of firm B. It is a share (proportion) equal to the share of the combined firm after the takeover, assigned to the shareholders of firm B.

For the owners of the acquiring firm, the exchange of shares of equal value usually means a worse scenario compared to the alternative based on payment in cash, because their share in both firms and profit deriving from the takeover are diluted, i.e. distributed among the big number of shares. The prices of shares after the takeover are in these two cases equal:

Takeover bid based on payment in cash:

$$€365\ million / 100\ million = €\ 3.65$$

Takeover bid based on the exchange of shares:

$$€\ 365\ million / 120\ million = €\ 3.04.$$

However, taking into account that takeovers are very risky projects, as is the case of risk related to the inability to take advantage of the synergies a takeover brings along, a takeover based on the exchange of shares will transfer a part of this risk onto the former owners of the acquired (target) firm, in our case the owners of firm B.

If firm A had to borrow money in order to carry out the takeover of firm B, the increase of its indebtedness would imply that its owners would require a higher return. This would lower the market value of a share. The analysis depends on the existence of efficient capital markets whose estimate of the profits deriving from the takeover corresponds to the estimate from both parties, i.e. from firm A and firm B.

4.2. Case II

Let us study another takeover case. Stock company A, a manufacturing company for mechanical processing of aluminium casts for the automotive industry is completely funded by equity. Its share capital amounts to € 12 million, the nominal value of a common share is 50 cents. The results of its operation for the past year have been recently announced. Its income before taxes for the last year was € 5.4 million. From the address (editorial) of its CEO in the annual report, it can be understood that the profit for the coming year shall increase at an annual growth rate of 4 per cent.

Stock company B, an aluminium foundry, has in its balance sheet a share capital of € 30 million; the nominal value of a common share is 1 €. Its income before taxes for the last year was € 5.4 million. As the company intends to reorganize and rationalize its operation, the growth of the profit is not projected for the current year, but it should grow at a constant annual growth rate of 5 per cent in the following years. In the past years, the growth of profit was not regular; it varied, and therefore the company did not succeed in carrying out its ambitious plans.

Stock company A is planning to take over stock company B. The owners of company B are offered three new shares of stock company A for their four shares. There is also an alternative bid, namely, payment in cash in the amount of 1.25 € per share of stock company B.

When the takeover bid of stock company A was announced, the market price per share of stock company A fell; however, the market price per share of stock company B increased. In Table 2, the data, announced before the submitted takeover bid, are presented for our two stock companies and for two other stock companies in the same industry listed on the stock-exchange.

For both stock companies, A and B, the same tax rate is used, 19 per cent. The cost of capital, WACC, for stock company A is 10 per cent, and 9 per cent for stock company B.

Let us assume the position of a financial analyst employed at the main fund manager, who has invested his/her assets in both stock companies.

Table 2. Data on the market price of a share and the dividend rate for stock companies in the same industry

High market price of a share (€)	Low market price of a share (€)	Company	Dividend rate in %	P/E*
2.10	1.75	A	3.2	14
1.35	1.05	B	3.4	12
1.87	1.22	C	6.0	12
2.30	1.59	D	2.4	17

* price-to-earning per share ratio.

Let us first, on the basis of these data, assess whether the takeover bid of stock company A accounting for the "share for share" principle would be a good decision for the shareholders of stock company A, and whether it would also be an acceptable and reasonable option for the shareholders of company B. Let us also try to answer the question of what investment strategy, based on our calculations, we would recommend to stock company A. While commenting on our proposals and suggestions, let us assume that the above planned profit growth rates are realistic and feasible, and that the new combined company does not plan to issue any further shares.

Before analyzing the effects of the submitted takeover bid of stock company A, let us make the following calculations in order to get the basic information. They are shown in Table 3.

Table 4 demonstrates the takeover analysis.

Based on the general information, the calculations carried out, and the elaborate analysis of the takeover, let us now assess the whole transaction. If we assume that there will be no changes as far as the market prices per share are concerned, and if the rating of the industry to which both stock companies belong does not change, then, after the takeover, the price per share of stock company A would drop down to € 2.13. At this price, the takeover bid proposing the payment principle "3 shares for 4 shares" would attract the owners (shareholders) of stock company B. In this way, they would get shares worth (3x € 2.13), i.e. € 6.39 for the shares whose current value amounts to (4x € 1.50), i.e. € 6.00.

Table 3. The basic information on stock companies before and after the takeover

Calculation	Stock company A	Stock company B	Stock company A after takeover
Income after taxes	0.81x4.8 MM € = 3.888 MM €	0.81x5.4 MM € = 4.374 MM €	8.262 MM €
Market value considering the P/E ratio	14x3.888 € = 54.432 MM €	12x4.374 € = 52.488 MM €	106.920 MM €
Market price per share considering the number of shares outstanding	54.432 MM € / 24 MM = 2.27 €	52.488 MM € / 35 MM = 1.50 €	
Income per share	3.888 MM € / 24 MM = 0.1620 €	4.374 MM € / 35 MM = 0.1250 €	

Table 4. The takeover analysis

Item	Calculation
Number of shares after takeover	24 million + (3/4 x 35 million) = 50.250 million
Expected market price per share after takeover	Total market value / Number of shares = (€ 106.920 million / 50.50 million) = € 2.13
Value of takeover bid at price valid at the issuance of new shares	(3 shares x € 2.13) = € 6.39
Cash value of the takeover bid for 3 offered shares	(€ 1.25 x 4) = € 5.00

The takeover bid based on the payment principle "share for share" is also worth more than the alternative bid based on payment in cash, i.e. € 6.39 instead of € 5.00.

This case can be considered a reverse takeover, where at the end of the day the owners of the acquired (target) company have the majority stake in the combined company. We can ask ourselves: Who gains at all in this case? The original owners of stock company B would hold (26.250 million) / 50.250 million) x € 106.920 million) = € 55.854 million of the value of the combined company, i.e. a profit in the amount of (€ 55.854 million – € 52.488 million of the value of stock company B before the takeover bid) = € 3.366 million.

In this takeover transaction, the shareholders of stock company A would lose € 3.366 million if they funded the takeover through the exchange of shares principle, which would therefore be entirely unattractive to them.

Conversely, a takeover bid based on payment in cash would bring the shareholders of company A a certain property, since they would pay € 5.00 for something that would be worth € 6.00 after the takeover.[3]

Our advice to the fund manager would be to accept the takeover bid for stock company B and sell the shares of stock company A on the market if you achieve for them a selling price higher than € 2.13.

The above advice depends on how the reference price per share of stock company A changes over time. Its price already fell when the takeover bid was announced. The question is by how much. If the capital market is efficient, it could well be too late, for the capital market already absorbed this information.

Ma et al. [14] report that acquirer reference prices affect bid premia and target announcement returns when the uncertainty of an acquirer's valuation is high and when non-cash payment is made for the acquisition. A possible interpretation is that stock market reactions depend on investor perceptions of acquirer and target valuations and that investors have less information than managers.

Let us try to answer some other questions regarding this takeover. First, what benefits can be expected from this takeover or merger? This concerns the cost savings and synergies obtained. If the takeover bid of stock company A is to be reasonable, the present value of these benefits should exceed € 3.366 million in order to achieve a positive net present value (NPV) of the takeover.

Second, how fast do these benefits appear after the takeover? Any delay of the takeover and thereby taking advantage of these benefits would lower the NPV, which is currently 13.75 and thus comparable to the calculated weighted average ratios of both stock companies, i.e. 13.

Third, is it realistic that the capital market could take advantage of the higher P/E ratio for the combined company? Maybe not as high as for stock company A (14), but it could take advantage of something equal to the market average.

Fourth, is it likely that after the takeover stock company A would sell a part of the assets or operation of stock company B to someone else, and to whom? If stock company A has already chosen a buyer, it must count on earning a certain profit out of this deal.

Fifth, is it likely that the managers of the acquired (target) company, i.e. stock company B, will resist the takeover, as they could be scared to lose their leading positions and jobs in the company? If this prevails over everything and causes a problem, then stock company A should increase the value of its takeover bid. Here, we can refer to some very interesting findings of the research carried out by Makeswaran and Pinder [15]. The authors found that resistance against a takeover bid increases the property of the stockholders of the acquiring firm in the period after its announcement, and that the likelihood of hostile takeover increases along with the size of the acquired (target) firm and decreases along with the performance of the acquired (target) firm. However, this is not related to the amount of the premium offered by the acquiring firm. While a hostile takeover bid is not very likely to bear fruit, it will very likely become the subject of an audit. In any case, this would have no effect on the competitive bidders aiming to take over the target firm.

Last but not least, it can also happen that a takeover transaction threatens competitiveness within the industry (due to market concentration), which can imply interference by the regulator judging the justification of such a transaction.

At this point, according to Frattaroli [16] it is worth mentioning that in several countries protectionist anti-takeover laws decreased the affected firms' likelihood of becoming the target of a merger or acquisition and had a negative impact on shareholder value. Protectionism decreases the affected firms' likelihood of receiving a takeover bid but does not necessarily affect the management's bargaining power if a bid is received. Over the last few years, governments worldwide have intervened in a significant number of cross-border mergers and acquisitions, often citing national security concerns.

5. Generating Value through Takeovers and Mergers – the Financial Evaluation of a Takeover

In this section of the paper, the key financial decisions made by global modern corporations will be presented, as

[3] Let us at this point mention an interesting finding of the research carried out by Malmendier et al. [13], who used detailed data on unsuccessful takeover bids between 1980 and 2008. Cash- and stock-financed takeover bids induced strikingly different target revaluations. The targets of cash offers were revalued on average by + 15% after a deal failure, whereas stock targets returned to their pre-announcement levels.

well as the alternative methods used by the corporations to optimize the value of their assets. These financial decisions will be demonstrated with real-world cases.[4]

For a better understanding of the given cases, let us first introduce some symbols:

V_P = present value (PV) of the cash flow of the acquiring firm before the acquisition

V_C = present value (PV) of the cash flow of the acquired (target) firm before the acquisition

V_{PC} = present value (PV) of the cash flow of the combined firm after the acquisition

INCOME = synergistic benefits from the acquisition = $V_{PC} - (V_P - V_C)$

$COSTS_{cash}$ = price x number of shares of the acquired firm

$COSTS_{shares}$ = α x V_{PC}, where α represents a share (a portion) of the combined firm owned by the shareholders of the acquired (target) firm

$$NET\ COSTS_{cash} = COSTS_{cash} - V_C$$

$$NET\ COSTS_{shares} = COSTS_{shares} - V_C$$

$$NPV_P = INCOME - NET\ COSTS$$

Let us assume that firm A is fully prosperous and that its management decides to expand its operation onto other markets. Thus, it recognizes and identifies firm B as a potential target firm to be acquired. The data for both firms are given in Table 5.

Table 5. Basic data for the acquiring firm A and the potentially acquired firm B

Data	Firm	
	A (acquiring firm)	B (acquired or target firm)
Price of a share	€ 60	€ 15
Number of shares	80,000	30,000
Market capitalization	€ 4,800,000	€ 450,000

Based on the economic analysis, we see that through this takeover synergistic benefits in the amount of € 200,000 can be generated, derived mainly from the bigger and more cost-effective combined firm.

Further, let us assume that the management of firm A is willing to offer the shareholders of firm B payment in cash in the amount of € 18 per share. Let us make an economic assessment:

1. The net costs of the acquisition are:

$$NET\ COSTS_{cash} = COSTS_{cash} - V_C$$
$$= (€\ 18x30,000) - €\ 450,000 = €\ 90,000$$

2. The NPV for firm A, if its bid is accepted, amounts to:

$$NPV_A = INCOME - NET\ COSTS$$
$$= €\ 200,000 - €\ 90,000 = €\ 110,000$$

3. The maximum price the management of firm A is still willing to pay, i.e. the price when $NPV_A = 0$.

We raise the question: At what price will the NET COSTS equal the INCOME, i.e. € 200,000?

$$(Price_{Max} x 30,000) - €\ 450,000 = €\ 200,000$$

Thus, when $Price_{Max}$ equals € 21.67.

The alternative bid is based on the exchange of shares of both firms. The management of firm A now offers 2 shares for 7 shares of firm B. The bid, based on the data shown in Table 6, is very tempting.

However, this result can be a bit confusing considering what the management of firm A has offered the owners (shareholders) of firm B. They will become the shareholders of the combined firm (A_{POST}) and not the shareholders of firm A, which existed before the acquisition (A_{PRE}). Why would the price per share change from A_{PRE} to A_{POST}?

Let us conduct the economic analysis again accounting for the same terms and conditions, i.e. 2 shares of firm A for 7 shares of firm B. We get an answer to the above question by performing the calculation presented in Table 7.

Table 6. Calculation of costs based on the bid considering the exchange of shares between firm A and firm B

Data	Calculation	Total
Firm A offers:	2 shares at € 60 each	€ 120
for:	7 shares at € 15 each	€ 105
Net cost (for 7 shares of firm B)		€ 15
Net cost (per share)		€ 2.14
Net cost total	30,000 x € 2.14 per share	€ 64,200

Table 7. Economic analysis – calculation of the costs of the takeover and the price per share

Data	Calculation	Result
VPC = VP + VC + Income	€ 4.8 million + € 0.45 million+ € 0.2 million	€ 5.45 million
Number of shares	80,000 + (2/7 x 30,000)	88,571
Price per share	€ 5.45 million / 88,571	€ 61.53

$$COSTS_{shares} = \alpha\ x\ V_{PC}$$
$$= (8,571\ /\ 88,571)\ x\ €\ 5.45\ million$$
$$= 0.0968\ x\ €\ 5.45\ million = €\ 527,560\ €$$

$$NET\ COSTS = COSTS_{shares} - V_C$$
$$= €\ 527,560 - €\ 450,000 = €\ 77,560$$

$$NPV_P = INCOME - NET\ COSTS$$
$$= €\ 200,000 - €\ 77,560 = €\ 122,440$$

If this NPV is distributed among 80,000 shares in firm A, the income equals € 1.53 per share.

The advice to the management of firm A would be:

$$NPV_P = INCOME - NET\ COSTS$$

$$NPV_P = INCOME - (COSTS - V_C)$$

6. Definition of the Economic Reasons for a Takeover and/or Merger

Let us sum up what the sense of takeover from the perspective of the acquiring firm actually is. The answer is provided by the following formula:

[4] In doing so, we lean on the abundant experiences of two institutions in this particular field, i.e. the Faculty of Business and Economics, University of Melbourne, and the Bank of New York Mellon.

$$NPV_P = INCOME - NET\ COSTS$$

While this is already true, what are the factors of this income? From the perspective of the shareholders of the acquiring firm, it must be ensured that the takeover is not motivated by the private personal interest of the management.

Pinder [17] argues that the economic rationality of the takeover is clarified and the benefits of the transaction are justified by several factors. These might be synergies, inefficient leadership of the acquired firm, strengthening the acquiring firm, and fiscal aspects. Frattaroli [16] has found out that corporate governance literature has long described takeovers as a way through which a shareholder or a third party can remove unproductive management to create value.

There are also a few dubious reasons for takeovers. In this paper, we focus only on two issues, i.e. on the "earnings per share" ratio and on the "business diversification of the acquiring firm".

a. Increase of earnings per share, EPS

A planned increase of earnings per share, EPS, does not mean that synergies exist *per se*, nor does it imply the creation of value for the shareholders of the acquiring firm. Let us look the following example, shown in Table 8.

Table 8. General data of the acquiring firm and the acquired (target) firm before the takeover

Data	Acquiring firm	Acquired firm	Steps*
Earnings per share (EPS)	€ 12	€ 4	(3)
P/E ratio	7.5	3.75	(4)
Price per share	€ 90	€ 15	(5)
Number of shares	100,000	70,000	(2)
Income	€ 1,200,000	€ 280,000	(1)
Market capitalization	€ 9,000,000	€ 1,050,000	(6)

*In this column, the sequence of steps in the calculation of individual categories is shown.

Let us assume that:

- there are no profits from the takeover, and that
- the terms and conditions of the takeover are set in a way that one (1) share of the acquiring firm is exchanged for five (5) shares of the acquired (target) firm – the premium is not paid.

In Table 9, the calculation of new values of the individual categories of the combined firm after the takeover is shown. The exchange ratio is 1:6.

Table 9. The calculation of new values of the individual categories of the combined firm

Data	Acquiring firm	Acquired firm	Joint firm
Earnings per share (EPS)	€ 12	4 €	€ 13,254
P/E ratio	7.5	3.75	7.5
Price per share	€ 90	€ 15	€ 97.37
Number of shares	100,000	70,000	111,667
Income	€ 1,200,000	€ 80,000	€ 1,480,000
Market capitalization	€ 9,000,000 €	€ 1,050,000	€ 10,873,016

Perfect! Practically out of nothing, the acquiring firm has generated a difference in the amount of € 823,016. At any rate, we have to assess the P/E ratio of the combined firm one more time.

$$P/E_{P+C} = (P/E_P \ x \ \frac{Income_P}{Income_{P+C}}) \ x \ (P/E_C \ x \ \frac{Income_C}{Income_{P+C}})$$

$$P/E_Z = (7.5 \ x \ \frac{€1,200,000}{€1,480,000}) + (3.75 \ x \ \frac{€280,000}{€1,480,000}) = 6.7905$$

We repeat the calculation of the individual categories for the combined (joint) firm, taking into account the new P/E ratio. This is shown in Table 10.

Table 10. The calculation of new values of the individual categories of the combined firm, taking into account the new P/E ratio

Data	Acquiring firm	Acquired firm	Joint firm	Steps*
Earnings per share (EPS)	€ 12	€ 4	€ 13.254	(3)
P/E ratio	7.5	3.75	6.7905	(4)
Price per share	€ 90	€ 15	€ 90	(5)
Number of shares	100,000	70,000	111,667	(2)
Income	€ 1,200,000	€ 280,000	€ 1,480,000	(1)
Market capitalization	€ 9,000,000	€ 1,050,000	€ 10,050,000	(6)

*In this column, the sequence of steps in the calculation of the individual categories is shown.

The primary illustration, given in Table 8, is known as EPS bootstrapping.[5] This can occur when a fast growing firm, i.e. a firm with a high P/E ratio, takes over a firm with a bad outlook as far as its future growth is concerned. It is not likely that the firm will increase its earnings per share (EPS) either. In addition, the management of such a firm even asserts that the firm generates value.

EPS bootstrapping is a phenomenon in real-world corporate finance. By means of it, earnings per share (EPS) increase, and thus also the price per share. Bootstrapping is a common practice used in takeovers and mergers. Investors should be aware of it, since the "boostrap" does not bring any economic benefits to a firm. A merger brings higher earnings per share, but the combined value is still equal to the sum of both separate parts. Bootstrapping does occur in takeovers and mergers. In this case, an acquiring firm purchases a firm with a low P/E ratio on the basis of a stock swap. Bootstrapping occurs automatically when the P/E ratio of the acquiring firm exceeds the P/E ratio of the acquired (target) firm. Of course, the total approach is only an accounting "fraud" (deception?). In principle, the market will confirm and recognize what is really going, and the price of the acquiring firm will adjust in such a way that a certain effect will be taken into account. In such a case, the P/E ratio of the firm will remain unchanged.

[5]Bootstrapping is an expression describing an entrepreneur who founds a company with a small amount of capital deriving mainly from his/her personal savings, and from the sales revenue of the newly founded company. In general, Horwath [18] says this expression relates to the self-starting process which shall go on without external investments.

Let us illustrate this case with the following example. Let us assume that there are two firms and that one takes over the other. The data and the calculation are provided in Table 11. Let the acquiring firm issue 25,000 new shares.

Table 11. EPS bootstrapping – phenomenon in real-world corporate finance

Data	Acquiring firm	Acquired firm	Joint firm
Earnings per share (EPS)	€ 3	€ 2	
P/E ratio	20	15	
Price per share	€ 60	€ 30	€ 60
Number of shares	100,000	50,000	125,000
Income	€ 300,000	€ 100,000	€ 400,000
Market capitalization	€ 6,000,000	€ 1,500,000	€ 7,500,000

EPS after the merger is equal to 3.2; as a matter of fact, it is only slightly higher than the EPS of the acquiring firm before the merger with the acquired firm.

While bootstrapping can show a temporary increase of the price of a share, if the investors do not identify a fraud, the effect will disappear over time. The only way to keep the P/E ratio artificially high is to purchase other firms constantly. This is not a realistic scenario, though, so the P/E ratio will adjust over time and the price per share will decrease.

b. Diversification

A recurrent and powerful argument accompanying takeovers and acquisitions is the diversification of the operation of the acquiring firm.

Pinder [17] mentions the following example. In March 2001, Kellogg's announced its takeover bid for purchasing Keebler Foods, a cake producer, for $ 3.9 billion. Following the arguments communicated at a press conference, the future growth of Kellogg's would actually get a fresh impetus with the help of a takeover emphasizing a more diversified product portfolio, i.e. with the products being ranked first or second in the USA according to their sale in seven main food categories. At the time, Keebler was USA's number two producer of cakes and crackers. Both productions evidenced faster growth than the majority of other food categories in the USA.

According to Pinder [17], the shareholders of the acquiring firm should ask themselves: *Why is it reasonable that the firm should diversify its activities on their account (on behalf of them), and why shouldn't they rather do it themselves?*

The following must be taken into account:

Costs: Kellogg's had to pay a control premium for the shares of Keebler – it offered $ 42, while only a couple of weeks before the takeover the shares were selling at $ 38.

Opportunity: Do the shareholders have an opportunity to invest into the acquired firm by themselves?

To sum up, the cogent reasons for takeovers and acquisitions are generating synergies, inefficient leadership and management of the acquired firm, strengthening the position on the market, and fiscal reasons. Among the doubtful reasons for such transactions, two are frequently mentioned: an increase of earnings per share and diversification of the operation of the acquiring firm.

7. Evaluation of the Economic Effects of the Implemented Takeovers and Mergers

Takeover and acquisition announcements have a certain impact on the value of the direct competitor of the combined entity. Some researchers, such as Mataigne et al. [19] argue that the ownership structure of the target drives competitor wealth effects. An intra-industry acquisition strongly impacts a firm's direct competitors, but the implications vary widely depending on the nature of the deal and company characteristics.[6]

As already mentioned, many takeovers and mergers fail, meaning that the decision makers do not achieve their planned goals. What are the key reasons for such failure? According to Riley (2020) [20], the key reasons are the following: (1) high financial costs related to the funding of takeovers, (2) firms could not integrate their different technologies, (3) the need to increase fresh capital could have a negative impact on the price per share, (4) conflict of different corporate cultures, (5) loss of human capital (professional staff and customers), (6) excessive payments, i.e. the firm overpays for the transaction in order to take over control of an operation, (7) loss of jobs, and (8) inappropriate time, especially if takeovers take place toward the end of an economic boom and they end up with loss and damage for both firms.

According to Pike and Neale [6], the effects of the implemented takeovers and acquisitions can be assessed at various levels. If takeovers are supposed to suppress (to annul) the inefficiency of the leadership and management of the acquired firms, then, at the macro level, we can expect a good performance of such combined (joint) firms.

Although it is not necessary that there is a causal connection. Pike and Neale [6] argue, it is very likely that there is a cause-effect relationship between the impact of horizontal mergers on decreasing competition and the goal to achieve short-term performance. Peacock and Bannock [21] conclude that so far, mergers and takeovers have not generated property, they have rather transferred the assets' ownership. According to Porter [22], it is not that easy to explain why those economies where takeovers and acquisitions are frequent do not perform so well, since there is reciprocal interaction among economic, social and political factors.

The second level at which the effects of takeovers and mergers can be assessed according to Pike and Neale [6], is the performance of individual firms, i.e. the micro level. Whether a takeover was successful and useful for the firms which carried out such a transaction (see section 3 of this paper), can be evaluated based on an analysis of the performance of the combined (joint) firm in the period after the implemented takeover. Today, many researchers in the field of corporate finance study these kinds of effects.

There are several approaches to study these effects. The first is *the financial characteristic approach*. It tries to

[6] Frattaroli [16] reminds us that the negative stock price reactions of the internet companies Apple, IBM, and Yahoo in 2013 (a significant drop of their share prices) reflected Microsoft's announcement that it would acquire the Devices and Services business of its competitor Nokia in a deal worth $ 7 billion.

study the key financial characteristics of both firms, i.e. the acquiring firm and the acquired (target) firm, before and after the takeover. In this way, we can find out if the combined (joint) firm is more profitable after the takeover than both firms were before the takeover.

The second approach, the so-called *capital market approach*, is based on studying the effects of a takeover on the price of shares of both firms, i.e. the acquiring firm and the acquired (target) firm, in order to assess how much and to what extent the expected benefits from the takeover or acquisition are embraced in the prices of shares, and how the latter are distributed between both groups of shareholders, i.e. the shareholders of the acquiring firm and the shareholders of the acquired (target) firm.

The evaluation of takeover performance and their economic effects has been the subject of some other studies, such as Sudarsanam et al. [23], Franks and Mayer [24,25], Gregory [26], Gregory and McCorriston [27], Dion et al. [28] and Sris et al. [29].

8. Concluding Remarks, Limitations and Guidelines for Future Research

Takeovers and mergers have become almost a constant in the field of financial and organizational restructuring, given that the ambitious managers of acquiring firms incessantly try to conquer new markets, increase the volume of sales and profits, and strengthen their competitivity on the market. Takeovers and mergers can be considered as rather demanding and complicated procedures which can last for longer periods of time. They have to be planned carefully. The managers have to prepare themselves well before they make the final decision. They have to perform an economic analysis of the expected effects. They have to make a good takeover bid and account for the various kinds of factors that can influence a takeover or merger, and, last but not least, they have to get ready for long-lasting and harsh negotiations. The management of the acquiring firms has to have a clear vision as to why they should take over the target firm and what they want to achieve with it. Numerous cases in this contribution show that the takeover by itself does not constitute the final act of the project. Nowhere can it be taken for granted that the combined (joint) firm will harvest benefits, generate the planned synergies and achieve positive effects. The post-takeover stage is crucial. It can be considered as a phase of integration of the acquired firm into the newly expanded combined (joint) firm.

The paper focuses on the economic analysis of takeovers and mergers, presenting how it comes to this kind of financial and organizational restructuring on concrete numerical cases. We have presented two methodologies for the evaluation of the target firm, i.e. the discounted cash flow analysis, which is much more accurate and also more demanding, since it is based on a qualitative projection of the future cash flow of the acquired firm and on the choice of the appropriate discount rate as the cost of capital, and the market multiple analysis. We have dedicated quite some time and space to the question of how to determine the bidding price for purchasing the acquired firm, and we have defined and also graphically shown the price frame or range with the possible outcomes. Special attention has been paid to the question of the evaluation of the takeover bid, i.e. to the estimate of the expected profits related to takeovers. From the analyzed numerical cases, we can draw the conclusion that the exchange of shares of equal value for payment in cash usually constitutes a worse scenario for the owners of the acquiring firm compared to the alternative based on payment in cash. Let us put ourselves in the shoes of an investment fund manager who possesses shares of the acquiring firm. Let us accept the takeover bid for purchasing the acquired (target) firm and sell the shares of the acquiring firm on the market if we manage to reach such a price for them that we get a positive difference. Such a decision would depend on the price trend of the shares of the acquiring firm. We should not forget that its price on the stock market already fell at the time of the takeover announcement. In this case, several questions arise, and we have tried to find reasonable answers.

The added value of this contribution is also the attempt to financially evaluate a takeover on a concrete numerical case. We have chosen net present value as the most appropriate investment decision criterion, and by means of it, we have shown the benefits of the acquiring firm which merges with a target firm. If the difference between income and net costs (costs reduced by the value of the target firm) is positive, we are on the right track and the takeover is economically justified, at least in the phase of making decisions about it.

The economic rationality of a takeover can be explained by several factors, such as synergies, inefficient management of the acquired firm, strengthening of the market share of the acquiring firm, and fiscal reasons. All these factors are thoroughly presented in this contribution. Besides them, there are also doubtful reasons for a takeover. We have exposed only two, i.e. earnings per share, EPS, and business diversification of the acquiring firm.

At the end of the paper, we also touched on the assessment of the economic effects of the implemented takeovers and mergers.

Let us conclude with the thought that if a takeover process, which has to be well planned and prepared, is implemented successfully, then the management of the resulting combined (joint) firm must inevitably confront some challenges. Among them, the following three are the biggest: first, to wholly integrate two kinds of operations, i.e. the operation of the acquiring firm and the operation of the acquired firm, with different organizational cultures; second, to integrate IT; and third, to understand the finances of the acquired firm and restore a qualitative reporting system in the new combined (joint) firm.

Some important limitations of the present study should be noted. First, relatively little attention has been given to the market multiple analysis, although this analysis is less accurate than the discounted cash flow analysis. It has not been studied either how often it is used for decision making in this area. This issue could be an interesting topic for future research.

Second, the author has presented and explained various methods for the economic analysis of takeovers and mergers, using several numerical cases mainly as textbook

examples. It would be interesting to conduct such an economic analysis on some real-world cases, which is also the author's suggestion for future research. In this context, it would be worth considering takeovers and mergers in the same line of business, and along a certain supply chain. Congeneric and conglomerate mergers could also be an interesting topic of economic analysis. As a matter of fact, it would be quite reasonable to take under consideration the failures of takeovers and mergers carried out. The research question would be, what are the key deficiencies of these failed transactions?

Third, while analyzing the economic effects of takeovers and mergers, this paper focuses on big firms only, i.e. large corporations. A study and an economic analysis of takeovers and mergers of SMEs, in order to find out if there are any specific issues, mainly relating to the synergies achieved, would deserve special interest.

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