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Challenging the Status Quo: Steel Producer Case Study on the Enterprise Value for M&A

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Abstract. *The purpose of this paper is to analyze the enterprise value determinants, in order to help the interested parties make correct (investment) decisions by studying industry cases of mergers and acquisitions (M&A). In order to understand and identify value-adding opportunities for the companies, the paper investigates a divestiture within a major international steel group. The research questions refer to the understanding of the relationship between the enterprise value and market capitalization of the selected companies acting in the steelmaking field, including other factors such as the revenue, EBITDA, EPS or ownership structure. In order to understand how the enterprise value is determined, we have analyzed relevant theories, including Tobin's Quotient (Q) for a company/ aggregate corporation, for the study of the relationship between the market value and its replacement value. If used empirically, Tobin's q helps avoid issues of estimating shareholders' risk-adjusted required return by the market prices. However, Q is not (yet) used in practice in the valuations of companies, because of the lack of the necessary input data. Besides using the graphical visualization of the share price, we have used the datasets available for several years on the value of several mature steel producing companies, market capitalization, and other indicators. The methodology also includes Market Comparable method and own spreadsheet calculations. After analyzing the evolution of the share price for the global steelmaking leader (ArcelorMittal), between 2009 and 2018, we have not identified any growth potential; the market value of ArcelorMittal is a proxy for the market value of its assets.*

Keywords: *enterprise value; market value; M&A; book value; EBITDA; Tobin's q; capitalization.*

Introduction

This article is part of the authors' research [i] on the enterprise value (EV) and its determinants, in order to understand the ways to maximize/ increase it, in the context of the accepted theory of value maximization as the single and most important objective of a company (Jensen, 2002). Starting from Professor Jensen's theory (2002), the measure in implementing organizational change should be the increase in the long-term market value of the firm.

In this study, we start with the analysis of the objective of the world's leading steelmaker, ArcelorMittal [ii]. The company's Action 2020 plan (2015) is a strategic roadmap, above the ongoing management gains plan (which targets *cost savings* relating to *reliability*, fuel rate, *yield* and *productivity*) and seeks to deliver operating *results* improvement of \$3 billion, through a combination of *cost* optimization, volume gains and product mix enhancement; for the European market, the objective is to continue successful asset optimization, continued optimization and the clustering of finishing sites to remove substantial overhead, centralize activities (including procurement) and improve logistics and service together with expected *higher added value (HAV)* mix and volume gains, targeting a US\$1 billion improvement in operating income (ArcelorMittal, 2016). Company's vision is a fully digitalized enterprise where everything is connected (ArcelorMittal, 2017).

At present, the mergers and acquisitions make the headlines in bold in the media worldwide, with very large values, showing the very high interest of the large companies to integrate smaller companies in order to create value and growth.

In this paper, the focus is on the activity of a steel producer, ArcelorMittal, a 'Large-Cap' company, which is listed on the major stock exchanges and falls under Basic Materials sector [iii]. On April 13, 2018, this company listed on New York Stock Exchange (ArcelorMittal, symbol MT) announced a *divestment* [iv] package as part of a European Commission review into its *acquisition* of an Italian plant [v]. Romania's biggest steel producer, ArcelorMittal Galați (AMG), with about 5,600 *employees* was the largest of the assets for sale among six other European assets of a combined value of \$752-940 million; on October 12, 2018, ArcelorMittal received a binding offer for the acquisition of four plants, including the Romanian steel producer, according to the agreement with the European Commission during its merger control investigation into the Company's acquisition of Ilva S.p.A and on November 1, 2018, the acquisition completed, ArcelorMittal being the principal partner, with a 94.4 % *equity stake* in the consortium and with Banca Intesa Sanpaolo holding 5.6 percent (ArcelorMittal, 2018). Being under state-supervised special administration since 2015 and charged for corruption and environmental crime, *the target company* (Ilva), was about to be cleaned up or closed in 2018. However, the steel group, a strategic buyer, considers the target company a quality asset, as Europe's single-largest steelmaking site and a unique *opportunity* to expand and strengthen the Group's European presence, offering a compelling value creation opportunity. (ArcelorMittal, 2018)

Since its inception, ArcelorMittal has rapidly grown (ArcelorMittal, 2019). Horizontal mergers and acquisitions of companies facing difficulties are a practice for the Group and so it was the case of the former state-owned Romanian steel mill, Sidex Galați, which was incurring losses and bought for €70 mil., then rebranded into ArcelorMittal Galați

(AMG) [ii]. A company in difficulty should be run to maximize its value to a potential acquirer and avoiding the trap of thinking that the business is just as valuable to anyone else.

The paper is a minor extension to authors' previous research on the factors of enterprise value and the case of a company in difficulty. Instead of making superficial changes with impact for the short term, organizations should make those changes that allow them to increase/ maximize the total long-term market value of the firm (MV), i.e. 'the values of all financial claims on the firm, including equity, debt, preferred stock, and warrants' (Jensen, 2002).

Problem statement

Challenging the status quo is about asking the right questions and finding the obstacles to growth and that is what a company in difficulty is supposed to do in order to make the right changes. Poorly managed firms are taken over and restructured by the new owners, who request the additional value. The current status quo of ArcelorMittal Galați is bad because of market evolution and management. Therefore, how the company market value (stock price) changes when it announced to dispose of assets of \$752-940 million? How the acquisition valuation of the target firm should be done? Which is the best possible estimate of the target's value?

Every company that doesn't simply close its doors will someday be sold. Buyers have to determine how much the company is worth to them and the sellers have to decide how much they will accept for their shares of the company. Then how to assess the company potential from the acquirer's viewpoint?

Literature review

The relation between value maximization and stakeholder theory, called enlightened value maximization theory, accepts maximization of the long-run value of the firm and specifies value seeking as the firm's objective (Jensen, 2002), as it is explained in the table in the Annex.

Investors have to know the business value, not how much a stock has been going up or how sales of a new product are progressing, or "what is this business worth, given all the available facts?" (Mihaljevic, 2014).

Price (1998) specified that his first analysis of an intangible asset was overstated, increased *book value (BV)*, and showed higher earnings than were warranted, in order to keep the stock price higher than it otherwise would have been warranted in 1975. The stock price must relate to its financials and *book value (BV)*, *cash flow*, *interest*, and *ratios* fundamentally value common stock. With this respect, Graham showed the difference between "Book value including intangibles" and "tangible/net book value" (Graham, 1937).

Depending on the perspective used (market or accounting) there are several types of values used in various situations, as shown in Table 1.

Table 1. Expressing the value (authors' representation)

Types of value			
liquidation (floor) value (non-going -concern)	book value (BV) (accounting)	market value (MV) (fair value)	replacement cost of the firm's net assets (Tobin's q)

As shown in the Annex, Tobin's q has become the most widely used measure of a firm's incentive to invest and likely the most commonly used repressor in empirical corporate finance (Erickson & Whited, 2006). Erickson and Whited (2006) adapted the measurement-error consistent estimators, finding that most proxies for Q are poor.

Keynes (1936) and Grunfeld (1960) considered that a firm should invest in additional assets if this increases the stock market's valuation of the firm:

$$q = MV_{\text{assets}}/RC$$

Where MV_{assets} = the market value of a firm's assets, or the book value (BV) of *debt*, in practice (Damodaran, n.d.); RC = the replacement cost of these assets.

The *Market-to-Book* ratio (MB), as a rough proxy for Tobin's q, has been a common measure of *firm value*. In contrast to the M/B (using the book value of the total assets as denominator), the Tobin's Q applies the replacement values of assets; instead of measuring the financial performance of the existing assets, the Tobin's Q measures the financial performance of a new investment, if the existing production capacity is reproduced, being oriented towards the future (Groß, 2007).

When inflation pushed up the replacement cost of the assets or where technology has reduced the cost of the assets, q may provide a more updated measure of the value of the assets than the accounting BV.

Empirical studies using Tobin's Q initially focused on explaining it (Lindenberg & Ross, 1981; Salinger, 1984), then predicted investment spending (Furstenberg, 1977; Summers, 1981; Hayashi, 1982). There are studies of the effects of managerial equity ownership (Morck, Shleifer and Vishny, 1988; McConnell & Servaes, 1990) or on the size of a company's board of directors (Yermack, 1996), corporate diversification (Berger & Ofek, 1995; Rajan, Servaes and Zingales, 2000) and dividend changes (Lang & Litzenberger, 1989; Denis, Denis and Sarin, 1994). Holding investment opportunities constant while investigating the determinants of capital structure (Titman & Wessels, 1988), leveraged buyouts (Opler & Titman, 1993) and takeovers (Lang, Stulz and Walkling, 1989; Servaes, 1991), studies on stock market investments at times when the Q ratio was less than parity have produced above-average long-term returns (Harney & Towervi) despite other contrary opinions; "q beats all variants of the PE ratio for predicting real rates of return". (Mihaljevic, 2010).

Tobin's Q estimates (Chung & Pruitt, 1994) have been calculated using publicly available and easily verifiable company-specific accounting and market pricing data: at least 96.6% of the variability of Tobin's Q, as calculated more elaborately by Lindenberg and Ross (1981), is explained by the "approximate Q" (Mihaljevic, 2010).

$$\text{Tobin's } Q = (MVE + PS + DEBT) / TA$$

Where MVE = market value of the common equity of a firm; PS = liquidating value of the firm's preferred stock; DEBT = current liabilities minus current assets, plus book value of long-term debt; TA = the book value of the total assets of the firm.

Smithers & Wright (2002) created *equity Q*:

$$Q = E / NW$$

Where E=equity market cap; NW=net worth at replacement cost. (CFA Institute, 2017)

Market-level Tobin's Q can be used to judge whether an equity market is disvalued, by comparing the current Q with 1 or the historical mean value (CFA Institute, 2017):

$$Q = (E + D) / RC$$

Where RC = estimate of the replacement cost of aggregate corporate assets; E and D= estimates of aggregate equity and debt market values.

The analysis of the characteristics of companies more likely to be acquired and the relevant indicators summarized by professor Damodaran (2004), in the consideration of an investor's point of view (table 2), show that the increasing interest for poorly managed companies can be explained as there is room for improvement and a chance for acquirers to "make a good company great."

Table 2. Criteria for stocks likely to be targeted in M&A (Damodaran, Investment Philosophies and Investment Fables, 2004)

Indicator	Benchmark
Return on equity (ROE)	> 4% below the peer group ROE
Stock returns over last year lag peer group returns	by > 5%
Annualized standard deviation in stock prices	> 80%
Insider holdings	< 10%
debt to capital ratios (D/C)	< 50%

In a study of the period 2007 – 2017, the market cap of the companies operating in the oil & gas and materials sectors were the least influenced by the economic cycles. A median excess return of up to 12% of the indices over the risk-free rate was estimated for the period 2012-2017, compensating investors for taking on the relatively higher risk of equity investment. Financial multiples tend to decrease when the economy contracts, thus financial multiples are a relatively good proxy for investors' expectations (PwC Romania, 2017).

Communication with stakeholders does not support the processes of knowledge management and innovation processes. Not treating communication with stakeholders as a basis for creating enterprise value suggests depreciation of communication in managing surveyed entities, especially that the basis of their functioning (external funding) is communication with stakeholders, e.g. clients or co-developers of innovative basic processes. Improving/modernizing methods/tools of communication with stakeholders is usually a cost for the surveyed enterprises than the source of development, e.g. in the long run (Wereda & Woźniak, 2018).

Research method

The market approach

After the boom between 2002 and 2007 and after reaching a historical high in July 2008, the average global price of steel has declined each month since then, and in May 2009 reached a level that was 55% lower than July's peak (OECD Steel Committee, 2009).

In order to understand the steel market and how the company share price evolved, we look at the steel price evolution shown in Figure 1.

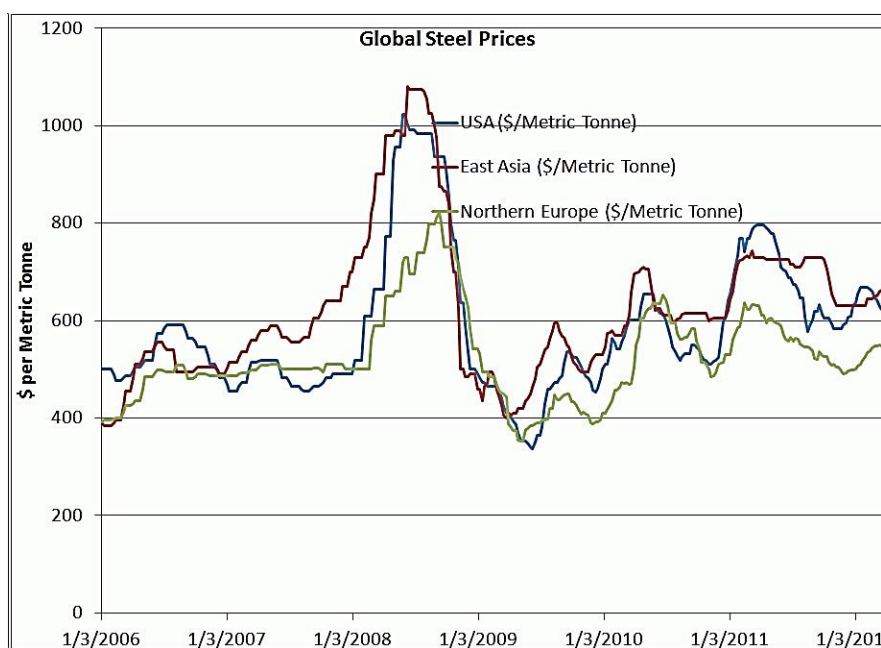


Figure 1. Steel prices evolution (Bloomberg, 2012)

The peak of the price of steel was reached in 2008. Looking at the company price (Figure 2), we can see a similar trend, making us understand the importance and the great influence of the market on the company value. After the peak reached in 2008, the company share price followed the steel price evolution, which means that the correlation should be tested.



Figure 2. Company stock price history (Bloomberg, 2017)

Steel prices and producers' shares are being lifted as per the strong global demand. Nations have strengthened trade defenses after China's so-called steel dumping became a political flashpoint (Bloomberg, 2017).

Financial data are often considered very 'noisy', being difficult to separate underlying trends or patterns from random and uninteresting features and not being normally distributed; high-frequency data often contain additional 'patterns' (as a result of the way that the market works, or the way that prices are recorded) and these features need to be considered in the model-building process (Brooks, 2014). For statistical reasons, the raw price series are converted into a series of returns, which are unit-free (figure 3). The log-return formulation (or log-price relatives, since they are the log of the ratio of this period's price to the previous period's price) have the property that they can be interpreted as continuously compounded returns – so that the frequency of compounding of the return does not matter and thus returns across assets can more easily be compared, and are time-additive. However, the disadvantage of using the log-returns is the continuously compounded returns are not additive across a portfolio; the log of a sum is not the same as the sum of a log since the operation of taking a log constitutes a non-linear transformation.

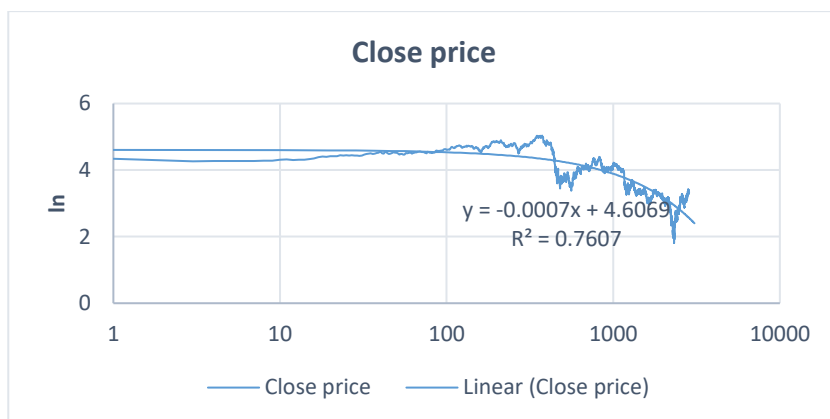


Figure 3. The natural logarithm of the close price of ArcelorMittal (on Euronext, between 02.01.2007 – 01.07.2018) (author's calculations)

In Figure 4, the average steel prices decreased (2011 - 2017). But even during the downturn, the company kept making deals (like ThyssenKrupp AG's plant in Alabama, Europe's biggest steel plant in Italy - Ilva) or looking at a joint venture in India (Bloomberg, 2017).

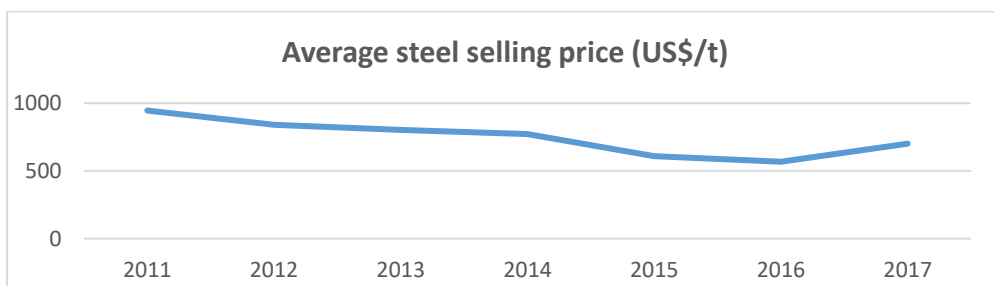


Figure 4. Steel prices evolution (ArcelorMittal, 2018)

In Table 3 below, we can see the current situation of the market and MT share price [vii] and the company is performing below the market.

Table 3. The market and MT share price

	7-day Return (%)	1 Year Total Return (%)	Share Price (end of 2018)	PE Ratio
United States Market	-	4.8	-	16.8x
Netherlands Metals and Mining	-2.9	-1.7	-	8.5x
ArcelorMittal [MT]	-7.9	-26.6	19.2	4.14

PER (or P/E) is based on the market capitalization of companies on profit and expresses the number of years the investment in one share could be recovered from the issuing company; P/E or PBV reflect the company's profitability and signals over/undervalued

enterprise and it represents an alternative to the traditional assessment methods (assets, financial performance) based on the financial statements (which show historical data), which should reflect the image of the company but does not register the brand's reputation, or goodwill (Ion, 2016). A small PER may indicate the stock is undervalued (Pasol, 2004). However, some firms have no interest to report a big profit, in order to optimize costs: there are Romanian companies relying on bank financing and banks look for companies with a solid financial situation – assets, equity, dues (Pasol, 2004).

With their scale and scope, ArcelorMittal (2017) wants to remain ahead and lead the industry in the future of steelmaking. The company ambitious plans include a digitalization phase of the manufacturing sector driven by four disruptions:

- The rise in data volumes, computational power, and connectivity, especially new low-power wide-area networks;
- The emergence of analytics and business intelligence capabilities;
- New forms of human-machine interaction such as touch interfaces and augmented-reality systems;
- Improvements in transferring digital instructions to the physical world, such as advanced robotics and 3-D printing.

In order to understand the interest for the Energy, Mining & Utilities sector, in table 4 below, we see several relevant transactions in Europe, at the end of 2018, totaling 74 US\$ bn., which comes second to the most attractive sector.

Table 4. M&A targeting Europe in Q4 2018 (Acuris, 2018)

Value (US\$ bn.)	Bidder company	Target company	Target sector
79.7	Takeda Pharmaceutical Company Limited	Shire Plc.	Pharma, Medical & Biotech
51.5	Comcast Corporation	Sky Plc.	Media
46.6	E.ON SE	Innogy SE	Energy,
27.4	China Three Gorges Corporation	Energias de Portugal SA (76.73% Stake)	Mining & Utilities
39.6	Consortium	Abertis Infraestructuras SA	Construction

In a Romanian top by value (Figure 5), the transactions that targeted production companies (for 100% stake) totaled 490,8 mil. Euro, including industry assets.

Nr.	Obiectul tranzacției	Sector	Tipul acordului	Participație (%)	Cumpărător (Țară)	Valoare (mil. euro)
1.	Enel Distribuție Muntenia, Enel Energie Muntenia	energie și utilități	minoritar	13,6%	Enel (Italia)	401,2
2.	A & D Pharma Holdings	distribuție și retail	total	100%	Penta Investment (Cehia)	350*
3.	Bancpost	finanțe și asigurări	majoritar	99,2%	Banca Transilvania (România)	240*
4.	EcoPack și EcoPaper	producție	total	100%	DS Smith (Marea Britanie)	208
5.	Hotelul Radisson Blu din București	real estate și construcții	total	100%	Revetas Capital (Marea Britanie)	169,2
6.	companii din grupul Electrica**	energie și utilități	minoritar	22%	Electrica (România)	165,7
7.	operațiunile din România ale Takata Corp.	producție	total	100%	Key Safety Systems (SUA)	153,9***
8.	Bitdefender	telecom & IT	majorare de capital	30%	Vitruvian Partners (Marea Britanie)	151,3***
9.	Premium Porc Group	agricultură	total	100%	Polaris Private Equity (Danemarca)	134*
10.	active ale Oltchim	producție	total	100%	Dynamic Selling Group, Chimcomplex (România)	128,9
-	Top 10	-	-	-	-	2.102,2

* estimare a pieței oferită de EMIS pe baza datelor disponibile. ** SDEE Distribuție Muntenia Nord, SDEE Distribuție Transilvania Nord, SDEE Distribuție Transilvania Sud, Electrica Furnizare. *** estimare EMIS. SURSE: CMS și EMIS

Figure 5. Top 10 transactions in Romania by value (CMS)

In a top 5 of the Romanian companies from the Materials group by market cap, there are Alro S.A, TMK-Artrom S.A., Teraplast S.A., Vrancart S.A., and Oltchim S.A. with net profit margin of 4% to 9% (quartiles), with a median of 6% and PER multiple ranges between 7.9x and 13.4x, with a median of 9.8x. Most active sectors in M&A were Industrial and Consumer (with 15 and 12 deals closed during 2007 – 2017), according to PwC Romania (2017). In table 5, the PER ratio is presented for the industrial and other similar sectors, which recorded figures mainly above the other sectors.

Table 5. PER ratio for the interval 2007-2017 (PwC Romania, 2017)

Industry	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Volatility of P/E ratio (%)	Last 5 yr max	Last 5 yr min
Industrial	30.6	7.2	7.6	10.1	15.3	8.1	12.1	11.0	8.6	9.4	12.0	25	12.1	8.6
Materials	27.5	6.4	11.8	14.0	6.8	10.2	13.1	7.3	5.7	10.7	9.8	30	13.1	5.7
Electricity	46.6	9.1	2.7	25	9.3	19.4	5.6	13	11.4	12.5	15.9	53	15.9	5.6
All sectors	24.8	7	8.4	12.5	9.5	7.8	11.3	9.5	9.3	10.9	11.7	18	11.7	9.3
GDP growth (%)	6.9	8.3	-5.9	-2.8	2	1.3	3.5	3.1	4	4.8	7	169.5	7.0	3.1
Industrial (%)	10.1	1.9	-5	4.9	7.9	2.6	7.4	6.3	3	1.7	8.2	103.3	8.2	1.7

Companies with differing risk profiles compared to the valuation target are used to estimate value. The strategic reasons for acquiring a particular company in a specific market led to prices that are out of line with typical values of most frequently used multiples - price to sales ratio, price earnings ratio (PER) and price/book value of equity ratio (P/BV).

The PwC Romania (2017) analysis of the local M&A market activity on 50 transactions completed (the period 2007-2017) shows that the historical average EV/EBITDA

multiple for transactions closed over the period 2007-2017 is 8.3x. (Table 5). Otherwise, when a company Z is similar to a company X, the enterprise value (of company X) is:

$$EV_x = EV/EBIT_z \times EBIT_x$$

The multiples selection considers the robustness of the data information available within the data set while focusing on the multiple that best represents the sector/sub-industries (Table 6). The selection of the best indicator amongst the median and the mean considers the dispersion test. Outliers, defined by PwC Romania (2017) as multiples exceeding 50, were excluded.

Table 6. The historical average EV/EBITDA for the transactions closed (2007-2017) (adapted from PwC Romania, 2017)

	2008	2010	2017	Average
EV/EBITDA	11.2x	2.6x		
Avg. EV/EBITDA			7.5x	8.3

Buyers and sellers usually know the *EBITDA multiple* to be used, depending on the projected growth rate of the business, its history and reputation, and market conditions or rely on a *weighted average of EBITDA* over the previous 3-5 years (Knight, 2016). EBITDA [viii] is considered to have several limitations that become more crucial as risk tolerance among high-yield investors increases and underwriting standards and financial covenants loosen (i.e. investor demand remains strong for bonds issued by companies with weak balance sheets, so companies negotiate aggressive adjustments to EBITDA to depict lower leverage and a seemingly better credit profile) (Moody's, 2014).

According to professor Damodaran, acquisition valuations are complex, involving issues like synergy and control, which go beyond just valuing a target firm. M&A analysis requires the application of valuation tools for the decision, such as bid and takeover premium, distribution of gains between acquiring firm and target firm shareholders (Table 7).

Table 7. Motives behind acquisitions and firm value (adapted from Damodaran)

Acquisition motive	Value target firm as	Examples
Undervaluation by the financial markets	Status Quo Valuation: no extra premium	Ilva S.p.A
Diversification, for stabilizing earnings and reducing risk		
Operating Synergy -Cost Savings: in the same business to create economies of scale; -Higher growth	Target Firm Value = Independent Value + Synergy Synergy = value of the bidding firm (pre-acquisition) - value of the target firm (with control premium)	
Financial Synergy, from:	Tax Benefits: Value of Target Firm + PV of Tax Benefits	

	Increased Debt Capacity: Value of Target Firm + Increase in Value from Debt Cash Slack: Value of Target Firm + NPV of Projects/ Target	
Control (of poorly managed firms)	Value of Target Firm run optimally (industry averages) Value of Control = Value of firm, with restructuring - Value of firm, without restructuring	As in the case of Sidex Galați (mentioned previously);
Manager's Interest	Value of Target Firm: No additional premium	

With their scale and scope, ArcelorMittal (2017) wants to remain ahead and lead the industry in the future of steelmaking. The company ambitious plans include a digitalization phase of the manufacturing sector driven by four disruptions:

- The rise in data volumes, computational power, and connectivity, especially new low-power wide-area networks;
- The emergence of analytics and business intelligence capabilities;
- New forms of human-machine interaction such as touch interfaces and augmented-reality systems;
- Improvements in transferring digital instructions to the physical world, such as advanced robotics and 3-D printing, driven by four disruptions:

In a regional top (table 8), the steel producer from Galați, benefiting from globalization and group synergy, accessed new markets, dominating by its turnover the other local retailers and producers.

Table 8. Local (Galați) top firms by turnover (TopFirme, 2018)

Name	turnover (mil. Lei)	turnover (mil. euro)	Activity
ARCELORMITTAL GALAȚI SA	4700	1100	steel production
ARABESQUE SRL	1700	387,1	retail
MAIRON GALATI SA	1000	231,6	retail
PRUTUL SA	649,4	147,6	production
SANTIERUL NAVAL DAMEN GALATI SA	531,8	120,9	shipbuilding
BELOR ROMANIA SOCIETATE PE ACȚIUNI	514,4	116,9	retail
COMPANIA DE NAVIGATIE FLUVIALA ROMANA NAVROM SA	222,9	50,7	transportation
NEXT ENERGY PARTNERS SRL	212,1	48,2	energy
BAUROM CONSTRUCT SRL	198,3	45,1	retail
MAIRON TUBES S.R.L.	186,2	42,3	production
ARCADA COMPANY SA	184,9	42	constructions

Company's present market value is the effective cost of buying the company or the theoretical price of a ``1target company before a takeover premium is considered; rather

than the equity value, EV include all ownership interests and asset claims from both debt and equity (see Table 9).

**Table 9. Company's Multiples for 2018 (ADVFN, 2018)
(Yahoo Finance & Morningstar, Inc., 2018)**

Valuation ratios	USD
Enterprise Value (EV)	42 B
Market cap	35.3 B
Current P/E Ratio – LTM	6.5
Enterprise Value (EV)/EBITDA	8.15

EV = Market Capitalization + Market Value of Debt – Cash and Equivalents

Or

EV = Common Shares + Preferred Shares + Market Value of Debt + Minority Interest – Cash and Equivalents

Assets or the application of funds are financed through liabilities and shareholder's equity as the sources of funds used.

When we say value, we mean the current or market value of the company, the market value of liabilities and the market value of equity.

Next, in Table 10, quarterly indicators published by the company, including EBITDA, are presented.

Table 10. Quarterly indicators (for the year 2017) (ArcelorMittal, 2018)

Indicators (USDm)	1Q 17	2Q 17	3Q 17	4Q 17
Sales	8,222	9,180	9,196	9,610
Operating income / (loss)	636	652	546	525
Depreciation	273	290	302	336
EBITDA	909	942	848	861
Average steel selling price (US\$/t)	649	698	723	736

In Table 11, the EBITDA improved over the last years, overcoming the level registered in 2011.

**Table 11. Indicators for the European segment of the group company (2011-2017)
(ArcelorMittal, 2018)**

(USDm) unless otherwise shown	2011	2012	2013	2014	2015	2016	2017
Operating income / (loss)	(369)	(5,725)	(985)	737	171	1,270	2,359
Depreciation	2,153	1,944	2,003	1,510	1,192	1,184	1,201
Impairments	301	5,032	86	57	398	49	0
Restructuring / Exceptional charges	219	587	517	(0)	632	0	(0)
EBITDA	2,304	1,838	1,621	2,304	2,393	2,503	3,560

Results

Applicative relevance of the paper: In order to avoid making value-destroying transactions the younger firms can learn from the more mature firms and use the integrative perspective when are valued for sale. Similarly, the mature firms should use an integrated perspective and value the similarity, or complementarity factors of the target companies and vice versa. For the companies presented, such factors may refer to the production capacity, labor costs, incentives, diversification, for stabilizing earnings and reducing risk, operating synergy - cost savings (in the same business to create economies of scale) or control.

However, the financial indicators such as the cash-flow are paramount (as per the agency theory). Dividing the market cap (at the end of the fiscal year) by the weighted average EBITDA, the result is company's EBITDA multiple (12.17), which is used as a good benchmark for other businesses in the same industry. A publicly traded company often trades at a higher multiple than private businesses, because its stock is more liquid.

Table 12. Weighted EBITDA valuation methodology

<i>in US\$ millions</i>						Total
Weighting	5	4	3	2	1	15
Fiscal year	2017	2016	2015	2014	2013	
EBITDA (\$)	3,560,000	2,503,000	2,393,000	2,304,000	1,621,000	
Weighted EBITDA	16,230,000	11,284,000	10,596,000	3,854,000	1,617,000	43,581,000
Multiple: 4.0					Average EBITDA	2,905,400
					Business Value	11,621,600

Any model for the EV should consider the market conditions, i.e. the steel price, as a factor and the future research will analyze this correlation. For the company (MT), higher [x] EV was correlated with a higher market cap, Pearson's r is .62 [x], which is normally considered a large effect. In table 12 below, some statistics are included.

**Table 13. Descriptive statistics for the enterprise value and market cap
(author's calculations)**

EV		market cap	
Mean	49782895036	Mean	42057366926
Standard Error	5553908764	Standard Error	9618244999
Median	49614716642	Median	28393036755
Standard Deviation	20024902829	Standard Deviation	34679075524
Kurtosis	0.47965804	Kurtosis	0.505953475
Skewness	0.728659731	Skewness	1.242409931
Minimum	22808955176	Minimum	7027955176
Count	13	Count	13

The ArcelorMittal group was \$33,3 B, enterprise value for the stock listed on NYSE (MT), end of 2018.

After the drop in 2009, the company did not manage to recover and reach or beat those results, following the evolution of the price of steel.

In the issue of 'Equities and Tobin's q ', September 2010, for the ArcelorMittal (MT) price of \$32.83 (-20% low and 51% high), MV of \$49,587mn and EV of \$70,012mn, price/book was 0.9, q was 0.5, similarly to the year and quarter before (see table 14).

**Table 14. Interpreting Tobin's q
(adapted from CFA Institute, 2017; Mihaljevic, 2010; Damodaran, 2012)**

q for the company (MT)	q value	Explanation
	$q > 1$	It is profitable to invest in the capacity reproduction; if a company has a Q ratio meaningfully in excess of parity, the market may be pricing in sustainable long-term outperformance and investors may want to verify their assumptions about the true sustainability of a company's high returns on capital.
0.5; 0.34	$q < 1$	negative excess returns; firms do not utilize efficiently their assets; further capital investment is unprofitable; firms likely to be taken over for restructuring;

However, Q is not (yet) used in practice in the valuations of companies, because of the lack of the necessary input data. When investing in/ managing assets, the key is not only to know their value but also to understand the sources of value and the ways to increase it, or at least prevent its decrease. Tobin's q and other multiples prove to be useful tools in making investments. For the target price of ArcelorMittal, the calculated odds of ArcelorMittal to move above current price is about 31.89%, based on normal probability

distribution (the probability density function to fall within a particular range of prices over 60 days).

Tobin's q may still support improvements and developments in the theory and practice; for example, its significance can be further developed, for smaller intervals, such as q of 0.5 to indicate investment for the short term, while for the long term investment, $q < 0.5$.

Companies need to permanently consider the changes in their value and manage this process at their best. Enterprise Value is a firm valuation proxy that approximates the current market value of a company, to determine takeover or merger price of a firm, unlike market capitalization, which is smaller; EV takes into account the entire liquid asset, outstanding debt, and exotic equity instruments that company has on its balance sheet.

When the takeover occurs, the parent company will have to assume the target company's liabilities but will take possession of all cash and cash equivalents.

Conclusions and implications

Challenging the status quo is an exercise that every manager and company owner should practice often, as the competition surely does it. Asking the right questions and finding the obstacles to growth is what a company in difficulty is supposed to do in order to make the right changes. The company in difficulty should be run to maximize its value to a potential acquirer, by looking closely at the financials and other factors, avoiding the trap of thinking that the business is just as valuable to anyone else. Poorly managed firms are taken over and restructured by the new owners, who request the additional value.

According to (OECD Steel Committee, 2009), the global economic crisis has pushed the world steel industry into recession and steelmaking capacity continues to increase despite the market downturn. The Romanian steel company has to understand the changes undergoing in the field and challenge its status quo of a company in difficulties: instead of making superficial changes with impact for the short term, should prepare a long-term strategy of value maximization that will allow it to thrive as it happened in the past in the communist era.

The interest in production companies from the materials sector generates important transactions. Sidex Galați, the biggest Romanian steel mill was privatized in 2000 [ii] and in almost 19 years has become part of the world's largest steel producer. At present, the company is being sold together with other steel mills in a divestiture procedure required by the E.C. and will go again through a change management process required by the change of ownership, management objectives and strategy.

The Group ArcelorMittal (2019) has rapidly grown through a consolidation strategy with a number of significant acquisitions of steel mills in management and financial difficulties. The two European plants from Romania and Italy, taken over by the world largest steel group, were undervalued as they were heavily indebted, while the buyer could increase and diversify the products offered. The issue of control is equally

important, which means that the target firms' value should be considered as run optimally.

Digitalization, with the right focus, brings competitive advantage, which is vital in today's highly competitive environment and ArcelorMittal (2017) is making the necessary steps to take advantage of the rise in data volumes, computational power, and connectivity, the emergence of analytics and business intelligence capabilities and the new forms of human-machine interaction.

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ANNEX

Theory	References	firms' life cycle and examples of companies analyzed	Acquisitions (including examples discussed in the paper)	Indicators (with examples)
Value maximization	(Jensen, 2002)	i.e. ArcelorMittal group has rapidly grown through a successful consolidation strategy with a number of significant acquisitions (ArcelorMittal 2019)	Sidex Galați; Ilva;	MV=market value = the sum of the values of all financial claims on the firm, including equity, debt, preferred stock, and warrants; Losses; For example, ArcelorMittal invests in <i>growth</i> projects to leverage the operating expertise to grow EBITDA and <i>free cash flow (FCF)</i> over the long-term.
The Q theory of investment and its extension to merger waves (the Q-theory hypothesis)	Brainard and Tobin (1968), Tobin (1969), Mihaljevic (2010), (Jovanovic & Rousseau, 2002); Jovanovic and Rousseau (2002) (Bailey and et.al. 2015)	the Q estimation method is not good at dealing with truly exceptional businesses	Not for companies that have a large off-balance sheet intangible source of sustainable business value (like Coca-Cola, Microsoft and Walt Disney). Firms can expand profitably by acquiring other firms (horizontal mergers)	Tobin's q - firm's incentive to invest; the technology generating profitability lead to Tobin's Q increase; does not synchronize with the empirical observation of lesser merger frequency in unlisted companies).
Agency theories	Mueller (1972) and Jensen (1986, 1993); Chatterjee, 1992; D. K. Datta, Pinches, & Narayanan, 1992; King, Dalton, Daily, & Covin, 2004; Moeller,	older firms	make value-destroying acquisitions; acquisitions did not enhance acquiring firm value	cash flow; q; firm value - performance measures; the performance of bidding firms; returns; premiums

Theory	References	firms' life cycle and examples of companies analyzed	Acquisitions (including examples discussed in the paper)	Indicators (with examples)
	Schlingemann, & Stulz, 2003; Seth, Song, & Pettit, 2002; (Haleblian, et al. 2009)			
Neoclassical theories	Maksimovic and Phillips (2013)	older firms, (i.e. the company analyzed, the ArcelorMittal group, the successor to Mittal Steel, a business originally set up in 1976)	wealth-increasing acquisitions to exploit underutilized assets	Tobin's q= the ratio of the market value of firm assets to book value, as our proxy for growth opportunities ($Q=MV/BV$), i.e. $Q=0.5$, similarly to the year and quarter before. (Mihaljevic, EQUITIES AND TOBIN'S Q, 2010)
the financial economic school	Cartwright and Cooper, 2001; Stahl and Voigt, 2008; Bauer, F., & Matzler, K. (2014); Dixon Wilcox, Chang and Grover, 2001; Haspeslagh and Jemison, 1991	around the announcement day; however, the MT share price (on the 13 April 2018) did not change as such (see below [vi])	Wealth effects for shareholders;	stock market-based measures (e.g., CAPM, CAR); the share prices of buyer and bidder companies
strategic management school	Cartwright, 2006; Chatterjee, 2009; Haspeslagh and Jemison, 1991; Larsson and Finkelstein, 1999; Bauer, F., & Matzler, K. (2014)		i.e. Ilva is considered a complementary fit for the existing business, providing significant scale and being strategically well located (ArcelorMittal, 2018).	premerger relatedness, perceived similarity, or complementarity and performance
the organization behavior school	Birkinshaw et al., 2000; Haspeslagh and Jemison, 1991; Bauer, F., & Matzler, K. (2014)			premerger issues (e.g., cultural fit or compatibility), and degree of integration (post-merger)

Theory	References	firms' life cycle and examples of companies analyzed	Acquisitions (including examples discussed in the paper)	Indicators (with examples)
the process school (or perspective)	Haspeslagh and Jemison, 1991; Angwin (2004), Ellis, Reus and Lamont (2009), Homburg and Bucerius (2006) and Jemison and Sitkin (1986); Bauer, F., & Matzler, K. (2014)	An effective and efficient integration process is decisive	i.e. Sidex Galați privatization	
integrative perspective	(Bauer & Matzler, 2014) (Buono and Bowditch, 2003; Cartwright and Cooper, 2001); (Arikan & Stulz, 2016)	young firms (SMEs for the Central European economy)	more related and diversifying acquisitions than mature firms	strategic complementarity, cultural fit, speed of integration, degree of integration, and M&A success; the acquisition rate follows a U-shape over the firms' life cycle;

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ⁱ<http://www.ectap.ro/supliment/international-finance-and-banking-conference-fi-ba-2017-xvth-edition/27/>

ⁱⁱ See also Ion, M. (2018). Factors of enterprise value - the privatization of 'Sidex Galati' Romania (case study), Proceedings of the International Conference on Business Excellence, 12(1), 466-475. doi: <https://doi.org/10.2478/picbe-2018-0042>

ⁱⁱⁱ See also Value Adding Through Corporate Divestiture: Case Study From The Steel Industry, VM ION - Proceedings of the INTERNATIONAL MANAGEMENT Conference, 2018, https://scholar.google.ro/citations?user=78td_ZQAAAAJ&hl=ro

^{iv} Divestment operations consist of two stages: (i) a division of enterprise' secondary activities by outsourcing them (as independent enterprises); (ii) the offer of the unincorporated enterprises for sale and the recovery of their capital in order to develop the main activities (Toma 2011).

^v MT Open price (USD) on NYSE was 32.99, with a high of 33.05, and a close of 32.67 (Yahoo Finance, 2019).

^{vi} <http://public.econ.duke.edu/Papers/Other/Tower/Pessimism.pdf>

^{vii} On 1 May 2019, ArcelorMittal (MT) at NYSE - Nasdaq USD Price is 21.76, -0.08 (-0.37%) according to (Yahoo Finance, 2019)

^{viii} earnings before interest, taxes, depreciation and amortization

^{ix} $r > 0$

^x Or correlation coefficient