

RELATION BETWEEN THE MARKET CAP AND ENTERPRISE VALUE: CASE STUDY ON THE VALUE OF LEADING STEELMAKERS

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Abstract. *This article is part of the author's research on the enterprise value and its determinants, in order to understand the ways to increase/ maximize it, in the context of the theory of value maximization as the single objective of a company. The purpose of the paper is to analyze the enterprise value determinants, in order to help the interested parties, make correct (investment) decisions by studying cases of mergers and acquisitions, as it was the case of ArcelorMittal (Galați). The current status quo of the Romanian steel mill, which was in difficulty before the privatization, is a company in the aftermath of a divestment decision. The research questions refer to the understanding of the relation between the enterprise value and market capitalization of the selected companies acting in the steelmaking field, including other factors (such as the ownership structure). In order to understand how the enterprise value is determined, I have analyzed relevant theories, including Tobin's Quotient (q) for a company / aggregate corporation, for the study of the relation 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. Besides using the graphical visualization of the share price, I 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, I have not identified any growth potential; the market value of ArcelorMittal is a proxy for the market value of its assets. 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).*

Keywords: *enterprise value; interested parties; market capitalization; ownership; Tobin's Q Ratio.*

Introduction

On April 13, 2018, a company listed on New York Stock Exchange (ArcelorMittal, symbol MT) announced a divestment package, as part of European Commission review into its new acquisition of a plant in southern Italy. World's biggest steelmaker put up for sale six European assets (of a combined value of \$752-940 million) among which Galați mill (AMG) is the country's biggest steel plant (employing about 5,600 people now) and the largest of those assets. ArcelorMittal falls under 'Large-Cap' category, under Basic Materials sector as part of Steel Works industry.

Being under state-supervised special administration since 2015, the target company from Italy (Ilva) was followed by charges of corruption and environmental crime and is

about to be cleaned up or closed (Reuters, 2018). Such acquisitions are already a practice for many years for the owners of ArcelorMittal, as it was the case of the former state owned Romanian steel mill, Sidex Galați, which was incurring losses and bought for €70 mil. (2001), then rebranded into ArcelorMittal Galați. India's biggest steelmaker may bid for ArcelorMittal Galati plant, according to (Reuters, 2018).

The paper is a minor extension to author's previous research on the factors of enterprise value and the case of a company in difficulty that was and still is incurring losses.

Problem statement

Challenging the status quo is about asking the right questions and finding the primary obstacle to growth. The current status quo of ArcelorMittal Galați is a bad loss because of the market evolution and management; instead of making superficial changes that have an impact only for the short term, the organizations should make the changes that will allow them to increase/ maximize their value.

Stock prices are reliable and realistic for valuations. Therefore, how the company market value (stock price) changes when it announced dispose of assets of \$752-940 million?

Literature review

Investors have to know to value a business, 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).

Asset pricing studies the value of claims to uncertain future payments, based on: the timing and the risk of its payments (corrections for risk are much more important determinants of many assets' values). Financial claims are promises of payments at various points in the future, as for example, a stock, which is a claim on future dividends; at date t , we can define payments $x_{t+\tau}$ for $\tau \geq 1$ and expect the price of these payments to be as below, with some adjustment for time and risk. So, investing p_t today will bring $x_{t+\tau}$, in the future (Brunnermeier, 2015):

$$p_t \approx \mathbb{E}_t \sum_{\tau \geq 1} [x_{t+\tau}]$$

In terms of returns, i.e. investing 1 unit today, will bring R_{t+1} in the future (Brunnermeier, 2015):

$$R_{t+1} = x_{t+1} / p_{t+1}$$

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

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)

Figure 1. Expressing value (Source: author's representation)

Nobel Prize winning economist, Dr. James Tobin offered an alternative measure (q) to the ratios used:

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

Where MV_{assets} = the market value of a firm's assets; RC = the replacement cost of these assets.

In practice, the book value (BV) of debt is used when the market value of debt (MV_{debt}) is unavailable. (Damodaran, n.d.)

However, q is not (yet) used in practice in the valuations of companies, probably because of the lack of the necessary input data. Mihaljevic (2010) acknowledged that the Q estimation method has one major drawback—it is not good at dealing with truly exceptional businesses, i.e., companies that have a large off-balance sheet intangible source of sustainable business value (like Coca-Cola, Microsoft and Walt Disney).

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 book value.

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). Several studies of the effects of managerial equity ownership (Morck, Shleifer & Vishny, 1988; McConnell & Servaes, 1990) have emerged or on the size of a company's board of directors (Yermack, 1996), corporate diversification (Berger & Ofek, 1995; Rajan, Servaes & Zingales, 2000) and dividend changes (Lang & Litzenberger, 1989; Denis, Denis & 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 & 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 and Tower) 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, showing that 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.

Jovanovic and Rousseau (2002) extended Tobin's q theory of investment to merger waves (the q-theory hypothesis) arguing that the technology generating profitability lead to Tobin's q increase and such firms can expand profitably by acquiring other firms. The q-hypothesis permits only horizontal mergers and does not synchronize with the empirical observation of lesser merger frequency in unlisted companies (Bailey & et.al., 2015).

Smithers and Wright (2002) created equity q and made the case that in the late 1990s, the US market was extremely overvalued:

$$Q = E / NW$$

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

Analysts have used a market-level Tobin's q to judge whether an equity market is disvalued, by comparing the current q with 1 or the historical mean value (CFA Institute, 2017). Tobin's q calculated at an overall market level is:

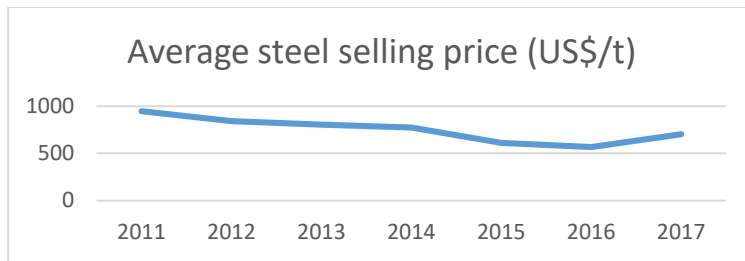
$$Q = (E + D) / RC$$

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

Company-specific Tobin's Q ratios vary to a lesser degree within industries as calculated by (Mihaljevic, 2010).

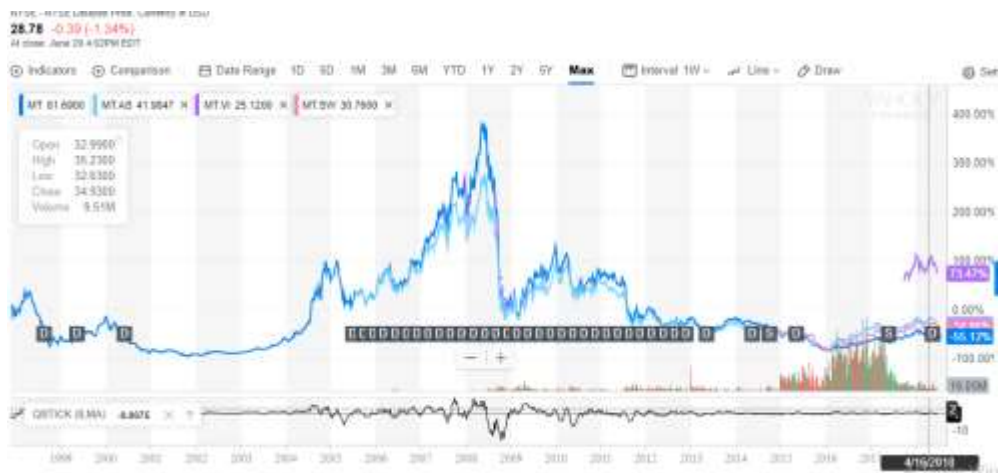
Research method

After the boom between 2002-2007 and after reaching a historical high in July 2008 (see also picture 1), 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). Then, the average steel prices between 2011 and 2017 (figure 1) had decreased.



**Figure 1. Steel prices evolution
(ArcelorMittal, 2018)**

Looking at the company price (picture 1) on the various stock exchanges, we can see a similar trend for the company. After the peak reached in 2008, the company share price followed the steel price evolution.



Picture 1. Company stock price history (1997- June 2018) (Source: Yahoo Finance & Morningstar, 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. At present, the company price is slightly recovering. 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 1).

Table 1. Interpreting Tobin's Q (Source: 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;
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Company's present market value is the effective cost of buying the company or the theoretical price of a target 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 2).

Table 2. Company's Multiples at present (Source: ADVFN, 2018; Yahoo Finance & Morningstar, 2018)

VALUATION RATIOS	In 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 3 are presented quarterly indicators published by the company, including EBITDA.

Table 3. Quarterly indicators (for the year 2017) (Source: 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 4, the EBITDA improved over the last years, overcoming the level registered in 2011.

Table.4 Indicators for the European segment of the group company (2011-2017)
(Source: 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

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, raw price series are converted into 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.

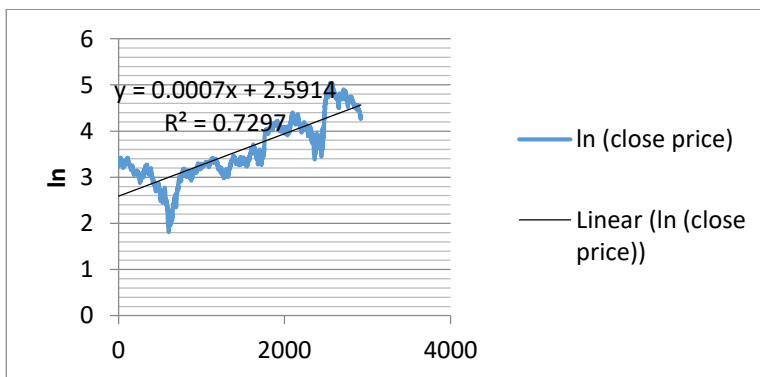


Figure 2. The natural logarithm of the close price of ArcelorMittal
(on Euronext, between 02.01.2007 - 01.07.2018)
Source: author's calculations

Results

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.

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

Conclusion

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.

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