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# THE EMPIRICAL EXAMINATION OF CHANGES RELATED TO VALUE DRIVERS IN THE EFFECTS OF THE 2007-2008 CRISIS

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**Abstract:** The article brings into the focus the corporate value creation and the main value drivers. The first goal of the study is to classify the most relevant value drivers, and their function of the firms' value. Further objective of this paper is to present the effects of the 2007-2008 global financial crisis. This article demonstrates the following. The first part introduces the value chain and illustrates the primary and the support activities of the companies. The second section briefly presents the 2007-2008 global economic crisis, introducing its causes, events and financial aspects. The third empirical part of the paper analyses the database featuring data from 18 European countries, 10 sectors and 1553 firms in the period between 2004 and 2011. At the end, the fourth part contains conclusions. Based on the related literature reviewed and in the conducted empirical research it can be assessed that 2008 can be seen unambiguously as the year of the crisis. In this year, all independent variables had a negative effect on the dependent variable.

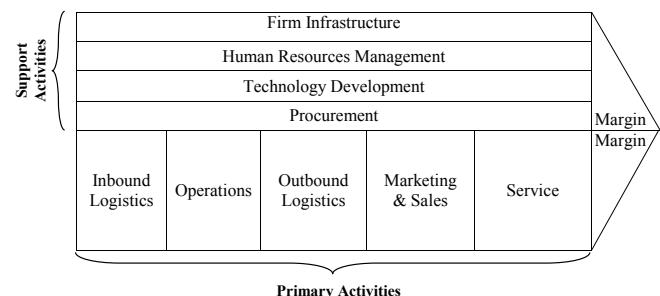
**Keywords:** value chain, firm valuation, value drivers, global financial crisis of 2007-2008 (JEL code: P40)

## LITERATURE REVIEW

### *Value creating by the firm*

„The progress of value creation is the procurement, management and use of resources with the purpose of creating value for the consumer.” (Chikán – Demeter 2006 p.3) This definition approaches the value creating concept and process from the perspective of the literature on management; in other words, it defines the firm as an organisation which creates value during its operation, and which has as the main goal of its operation the satisfaction of consumers' demands.

Porter (1998), in his doctrine of the value chain, concentrates on the value creation. According to his findings all companies work out their activities in order to create value. These activities can be partitioned into two significant classes; primary and support activities. Primary activities are incorporated into the physical creation of the product and its sale and transfer to the customer as well as after-sale assistance. The primary activities are supported by the support activities and also help each other by providing purchased inputs, technology development, and human resources, and different firmwide functions. This generic value chain can be found in the Figure 1. (Porter, 1998, pp.36-43).



**Figure 1. The Generic Value Chain**

Source: Porter (1998) p. 37

In the approach followed by the article, however, this must be achieved in such a way as to increase the shareholder value as well; i.e. that value must be created for the shareholders as well as for consumers. This understanding of value creation is also reflected – among other things - in Chikán's (2003) work on the dual value creation.

The most important value drivers are identified in my previous article Kiss (2015) based on the studies of Copeland and co-authors (1999), Damodaran (2006), Fenyves and co-

authors (2015), Fernandez (2007), Rappaport (1998), Tarnóczki and co-authors (2015 a), Tóth (2014).

## THE GLOBAL FINANCIAL CRISIS OF 2007-2008

Given the great impact and complexity of the 2007-2008 financial/economic crisis, prominent economists have varying ideas regarding its causes and varying suggestions for its solution. In his writings, Stiglitz (2009) refers to the 2007-2008 crisis as the greatest since the great world economic crisis, and also as the first global recession in the age of globalisation. Bokros (2009) also refers to the crisis as a global one, and identifies numerous characteristics in which the interconnectedness of the countries and the national economies of the world can be observed. Lámfalussy (2008), in his book about the 2007-2008 crisis, writes of the deep crisis in the world's financial markets, the globalisation of finance and the vulnerability of the financial system, and further analyses previous financial crises and compares them. Bélyácz (2014), in the introduction to his article notes that many authors mention, but rarely emphasise, the similarities, indeed the common origins, of the great economic crisis and the 2007-2008 global financial crisis. The main cause in both crises was the deregulated financial free market. The study goes on to describe the theoretical background to the crisis, discusses the role of random walk in the financial markets, the ergodic axiom, the efficiency of the market, and true weight of uncertainty. His conclusions indicate that the financial crisis does not invalidate the theory of the efficient market, but illuminates its weak points. The problem does not lie in any ability to predict it, but occurs if we do not take uncertainty into account, or if the actions of the actors in the financial markets accentuate the uncertainty. Mellár's (2010) study analyses the possible directions of the future development of macroeconomics, asking whether in the last 10-20 years – as a result of the approaches of the neo-classical and neo-Keynesian schools – a new neo-classical synthesis has come into being, is continuing, or whether a new direction is emerging. Many believe that macroeconomics has not been able, or has not attempted, to answer the basic questions raised by the crisis, and has not been able to offer a theoretically grounded remedy for the imbalances. The greatest lesson of the crisis is that the belief in the theory of the efficiency of the market seems to be wavering. In relation to the market, a middle way must be found; in other words, a coordinating mechanism which is not perfect but which is indispensable, and which cannot be replaced by any other. Hodgson (2009) also believes that the crisis is the most serious global crisis since the world economic crisis of the 1930s. Just like Keynes at that time, mainstream economists are now pondering whether the crisis will renew the science of economics by expanding the frontiers of current economic theory, and economic policy, or not. In his article he evaluates the prospect of such a renewal. To do this he lists the indicating signs which have not yet received sufficient attention. Krugman (2012) criticises the overemphasis on the self-correcting nature of market mechanisms. He believes the remedy for the crisis is a strengthening the demand, which

must be achieved by the growth of state demand.

The events leading up to the crisis can be mentioned, events which ensured that the 2007-2008 crisis became a worldwide phenomenon.

The financial crisis primarily affected those markets which were in direct contact with structured financial products, and with the American mortgage market, and consequently, the developing countries were less affected. Those countries, however, which proved to be vulnerable, even if they were on the periphery, felt the full force of the crisis through increasingly serious liquidity stresses, volatile sudden increases and price slumps (Király – Nagy 2008).

## MATERIALS AND METHODS

### *Describing of database*

The purpose of this paper is to answer the question of what changes occurred to drivers related to the value creation of firms in the effects of the 2007-2008 global financial crisis.

I conducted an analysis using a database which includes data from 18 European different countries, 10 sectors and 1553 firms. The examination covered the period between 2004 and 2011, which represented a strongly balanced panel, although it contained some missing observations. This database was downloaded from Aswath Damodaran's website, after numerous corrections made the data obtained became available for my research target. (<http://pages.stern.nyu.edu/~adamodar/>, 2014).

The firm value was used as a value category, which is the firm's market capitalization – the best estimate of the market value of equity – and the market value of debt. The factors influencing firm value – as a dependent variable – are those value drivers mentioned above which most determine the value of the firm. Máté et al. (2016) examined the knowledge-intensive business service sectors.

During the examination of firm value, EBIT, reinvestment and invested capital, were used natural logarithms of the variables, while the natural logarithms of the revenue difference was used for the sales growth rate, since in this way the distribution of the variables approached a normal distribution.

### *The applied multivariable panel regression model*

The details of the panel model were specified during the empirical examination. One of the most tried and reliable testing method – combined by using of time series and cross-section data – is the mentioned panel model also referred to as longitudinal data analysis. Thanks to the panel model we can observe the progress over time (time series) of the same company characteristics (cross-sectional data) since we have several time periods and individual entries in the panel database – in tabular forms -, such as: countries, sectors, firms etc. (Ramanathan 2003 pp.498-501).

The following step was to specify the multivariable regression model:

$$\begin{aligned} \ln FV_{i,t} = & \alpha + \beta_{lnEBIT} \ln EBIT_{i,t} + \beta_{tax} tax_{i,t} + \beta_{lnReinv} \ln Reinv_{i,t} + \beta_{lnInvC} \ln InvC_{i,t} \\ & + \beta_{ROIC} ROIC_{i,t} + \beta_{NetM} NetM_{i,t} + \beta_{MROA} MROA_{i,t} + \beta_{dlnRev} dlnRev_{i,t} + u_{i,t} + \varepsilon_i \end{aligned}$$

### The empirical analysis and its results

The STATA 11 statistical program helped the analysis to be done. This program can produce statistical and econometric calculations and graphic presentations of data.

The results of the analysis are made in synthesised form, covering the entire period (2004-2011) and all the industrial sectors (10 sectors).

In my current research I examine how the 2007-2008 financial crisis affected the relationship between firm value and value drivers. To do this I used a random effect panel regression model, in such a form that alongside the predictors, I introduced the effect of the years as a "time dummy" variables into the model, and also inserted the one-year delayed dependent variable into the independent variables, which assisted me in analysing of impacts. The results of the panel regression are contained the Table 1.

**Table 1. Random effect panel regression results regarding the effects of the years**

	lnFirm_V		
	Coef.	z	P> z
lnFirm_V L1.	0.5638	17.59	0.000***
lnEBIT	0.3790	17.42	0.000***
Tax_r	-0.2425	-3.82	0.000***
lnReinv	0.0513	8.44	0.000***
lnInv_C	0.1784	12.07	0.000***
ROIC	0.0241	5.08	0.000***
Net_M	0.3400	2.32	0.021**
MROA	-2.2981	-6.84	0.000***
dlnRev	0.3055	14.57	0.000***
Dummy of 2005	0.3830	18.53	0.000***
Dummy of 2006	0.4268	21.04	0.000***
Dummy of 2007	0.1968	10.00	0.000***
Dummy of 2008	-0.2094	-10.56	0.000***
Dummy of 2009	0.3080	15.48	0.000***
Dummy of 2010	0.2080	7.82	0.000***
Dummy of 2011	omitted because of collinearity		
cons.	1.4769	19.96	0.000***
R <sup>2</sup> overall	0.9551		
R <sup>2</sup> within	0.7439		
R <sup>2</sup> between	0.9693		
Wald (chi <sup>2</sup> )	63 206.18***		
Number of observations	5 504		

Source: own calculation

Note: At the levels of significances \*\*\* 1 %, \*\* 5 %, \* a 10%  
respectively

The panel regression model describes the variances of firm value, taking into account the effects of individual years. It can be considered reliable on the basis of the Wald-test, and explains the dependent variable under 5% according to the Wald-test. Moreover, the overall R<sup>2</sup> is being equivalent to 95.51%, and the regression coefficients of the 16 independent variables are significant at levels of 1% and 5%.

On the basis of the estimated values of the model parameters, it can be stated that no change occurred in the direction of the correlation between the business value and the independent variables. Its correlation with EBIT, Reinvestment, Invested Capital, Return on Invested Capital, Profit Margin, and the Growth in Revenue was positive. There was a negative correlation between the Tax Rate and the Firm Value, and the relationship between the MROA used as a proxy and the dependent variable was still strongly negative. The effect of the year 2004 is built in to the constant member, and functions as a positive co-factor in the model. The years 2005, 2006 and 2007 correlate positively with firm value. In 2008 the effects of the crisis become visible, and this year had a negative effect on firm value. The years 2009 and 2010 also produced changes on the same direction in firm value. 2011 was left out as a result of collinearity.

In the results obtained, the length of the half-life - i.e. the period which corresponds to the time needed to eliminate half of the divergence from the counter-weight of the given variable - was also decisive. This is the speed of adjustment, it is most often measured by the half-life, the time needed in order to eliminate 50% of the deviation (Földvári 2012):

$$t_{half-life} = \frac{\ln 2}{variable}$$

This is calculated as follows:

$$t_{half-life} = \frac{\ln 2}{0.5638} = 1.2294$$

In this case the impact of the crisis eliminates in little more than one year.

In what follows I have arranged my panel model to enable cross-effects to be taken into account during the analysis. The marginal effect of one independent variable can sometimes also depend on other variables. To show this, Ramanathan (2003 pp.264-265) suggests that the mutual effects between the variables should also be understood, in order to show the cross-effects. (Tarnóczi et al. 2015 b)

When examining cross-effects, in cases in which all variables are listed with the time dummy variable for 2008, it is clear that the cross-effect in 2008 of Invested Capital and Return on Invested Capital is positive, while the product of the 2008 time dummy variable for Reinvestment has a negative effect on firm value, while the product of the 2008 time dummy variable with the other variables is not significant. (See Table 2.)

**Table 2. Results of cross-effects analysis between 2004 and 2011 for all sectors**

	InFirm_V		
	Coef.	z	P> z
InFirm_V L1.	0.3646	17.41	0.000***
InEBIT	0.3760	17.11	0.000***
Tax_r	-0.2601	-4.00	0.000***
InReinv	0.0587	8.71	0.000***
InInv_C	0.1698	11.56	0.000***
ROIC	0.0230	4.99	0.000***
Net_M	0.3216	2.23	0.026**
MROA	-2.1419	-6.02	0.000***
dlnRev	0.3043	14.11	0.000***
Dummy of 2005	0.3918	18.47	0.000***
Dummy of 2006	0.4365	20.84	0.000***
Dummy of 2007	0.2040	10.14	0.000***
Dummy of 2008	-0.7039	-4.99	0.000***
Dummy of 2009	0.3091	15.53	0.000***
Dummy of 2010	0.2127	7.97	0.000***
Dummy of 2011	omitted because of collinearity		
InEBIT*2008 dummy	-0.0388	-1.24	0.214 nsz.
Tax_r*2008 dummy	0.0646	0.50	0.619 nsz.
InReinv*2008 dummy	-0.0676	-6.08	0.000***
InInv_C*2008 dummy	0.1431	4.45	0.000***
ROIC*2008 dummy	0.0450	2.30	0.021**
Net_M*2008 dummy	0.1847	1.24	0.214 nsz.
MROA*2008 dummy	-0.4706	-0.74	0.461 nsz.
dlnRev*2008 dummy	0.0143	0.68	0.495 nsz.
cons.	1.5054	20.24	0.000***
R <sup>2</sup> overall	0.9556		
R <sup>2</sup> within	0.7494		
R <sup>2</sup> between	0.9694		
Wald (chi <sup>2</sup> )	71099.30***		
Number of observations	5504		

*Source: own calculation*

*Note: At the levels of significances \*\*\* 1 %, \*\* 5 %, \* a 10% respectively*

## CONCLUSIONS

The aim of this article is to present the value creation, the value chain and the value drivers. Beyond this the other purpose of this article is to answer the question of what changes occurred to drivers related to the value creation of firms in the effects of the 2007-2008 global financial crisis. The article demonstrates the following. The first part briefly introduces the value chain, the primary and the support activities. The second section briefly presents the 2007-2008 global economic crisis, introducing its causes, events and financial aspects. The third empirical part of the paper analyses the database comprising data from 18 European countries, 10 sectors and 1553 firms in the period between 2004 and 2011. At the end, the fourth part concludes what might be learned from this study, summarising the results of the examination above, I formulated the conclusions. An examination of the changes following the 2007-2008 financial crisis and their relationship with the value drivers allows us to conclude, that 2008 can be treated unambiguously as the year of the crisis. The other main finding of this work is that, in the year of 2008, all independent variables had a negative effect on the dependent variable.

This study also concludes that the dependent variable was effected negatively by all independent variables, such as: EBIT, Reinvestment, Invested Capital, Return on Invested Capital, Net Margin, Sales Growth Rate, Tax Rate and Market Value of Return on Asset (MROA).

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