THESIS OF PH.D. DISSERTATION

Kíra Martin

A study of factors influencing the deviation between companies’ market value and book value in Hungary

Research supervisor:

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professor

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1. BACKGROUND AND AIM OF THE RESEARCH

In the last decade – first in international, later also in Hungarian literature – several studies highlighted the difference between the market value and book value of companies and the changes (first increase, then decrease) in the related trends.

Examining the data relating to the period between 1978–1998 of more than 10,000 listed companies in the United States, Boulton, Libert and Samek [2000] found that the book value of the companies represented 95% of their market value at the beginning of the period in question, but this figure decreased to 28% by its end. They cite Microsoft as an outstanding example, with a market value of USD 600 bn and a book value of only USD 31.6 bn as at the end of 1999.

Analysing data of a total of 14,643 listed companies in three European countries – Germany, Norway and the United Kingdom – for the period between 1982–1996, King and Langli [1998] revealed a smaller average deviation between book values and market values. According to data presented in their study, the average value of the book value/share price (BV/P) index was 0.41 in Germany, 0.58 in Norway and 0.63 in the UK.

According to a study by Arce and Mora [2002], examining 22,436 observation units in eight European countries in the period between 1990–1998, the average value of the BV/P index showed major differences in the individual states. The rate was the lowest in Germany at 0.559, but may also be considered low in the Netherlands (0.660) and in the UK (0.670). Increasingly higher index rates were measured in Belgium (0.787), France (0.790), Spain (0.880) and Switzerland (0.892), while Italian listed companies scored highest at 0.995. This latter value indicates that on average no significant deviation was found between the share prices and book values of the companies.

According to data by Gornik, Tomaszewski and Jermakowicz [2001] who examined 77 listed companies in Poland between 1996–1998, the average BV/P index value of 0.61 may be considered rather low compared to other European countries.

A comparative study by Hellström [2006] on Czech and Swedish listed companies brought very interesting results in contrast with former research. Dividing the subject period 1994–2001 in two parts (1994–1997 and 1998–2001), he found that during the two cycles, the market value/book value (MV/BV) ratio decreased from 0.74 to 0.57 in the case of the companies listed on the Prague Stock Exchange, while increased from 2.35 to 2.67 in the case of the companies listed on the Stockholm Stock Exchange. These data have two peculiar
aspects: first, the average book value of the Czech companies (increasingly, but perpetually) exceeded their average market value; and second, the value of the index changed in opposite directions in the two countries in the given period.

According to a study by Brimble and Hodgson [2007] on data relating to Australian listed companies in the period between 1973–2001, the average value of the BV/P rate is 0.80, showing that in line with certain European countries and in contrast with research results respecting the US, in Australia there is no significant discrepancy between the book value of companies and their share prices.

The above cited examples from international literature show that there are substantial differences between individual countries concerning the deviation between the market value and book value of companies, and that this deviation is the strongest in the United States.

Comparable information relating to Hungarian companies was published in a study by Juhász [2004] on data between 1999–2002, revealing that in line with international average trends, the average market value/book value (MV/BV) ratio also decreased in the case of the examined Hungarian companies, with an indicator descending under 1.0 by 2002 (meaning that at that time the book value of the firms exceeded their market value). Since the above mentioned study by Juhász [2002], data concerning the relation between the market values and book values of Hungarian companies have not been published until three years ago, and even then predominantly in stock exchange analysts’ reports.

In September 2008 Korányi [2008a] wrote that companies listed on the Budapest Stock Exchange (BÉT) were actually worth somewhat less than 150% of their book values. Some of them were being traded at 30–40% of their book value, which means that their market values were significantly lower than their book values. Korányi cites OTP shares as an example, having had a market value equalling five times their book value two years earlier, but displaying a share price/book value (P/BV) index of only 216% at the time of the study.

In November 2008, Mezősi [2008] mentions the fact that the shares of A-class companies are bought for less than the value of the equity per share, which he evaluates as characteristic of the pessimistic climate at BÉT. According to Mezősi [2009a], the situation further deteriorated by March 2009, with share prices at an average of 70% of their book value. In autumn 2009 the trend was reversed: the market value of companies exceeded their book value. Mezősi [2009] makes note of a 129% average P/BV index for A-class shares traded on BÉT.
On the basis of research results published in international literature, information available on Hungarian companies and my own random sampling checks, I consider that a theoretical analysis of the factors influencing the discrepancies between the market values and book values of companies as well as an empirical research of the same subject performed on a sample of Hungarian companies might prove to be an interesting and useful study subject.

The aim of my research is to explore, by way of empirical analysis, the deviations between market values and book values and the factors affecting their development, in order to offer an explanation concerning those deviation trends. Accordingly, my research is prominently of an exploratory and explanatory nature.
2. THEORETICAL FUNDAMENTALS AND APPLIED METHODOLOGY

2.1. Theoretical fundamentals

First I provided adequate theoretical fundamentals to the research: through the review of pertaining academic literature, I first drew up the major theoretical approaches relating to the book value and market value of companies, then enumerated different views on the deviations between market value and book value.

It may be established that according to present accounting rules, the book value of a company (i.e. the value of its equity as indicated in the balance sheet) is mainly determined using a historical cost model founded basically on the realisation principle, presuming the principle of going concern; yet values determined on the basis of the revaluation model based on the time value principle begin to appear in relation to a growing number of items. Accordingly, in the balance sheet compiled in application of IFRS, examined in the framework of the empirical research, the historical cost model based on the realisation principle and the revaluation model based on the time value principle are present in parallel.

We should also stress that the balance sheet may only contain elements which meet the recognition or presentation criteria. Consequently, book value is only constituted by elements owned or controlled by the company, resulting from past events and producing an expected profit in the future, which may be measured reliably, for it is the only way to ensure the assertion of the philosophy that accounting needs to present a true and fair view.

Also the aim of accounting needs to be taken into account when analysing the developments of the book value, as this provides the explanation for the book value being just what it is. Through the intermediary of the balance sheet, accounting provides information to stakeholders about the current financial position of the company. Obviously it is impossible to satisfy the information needs of all coalition members, so priority should be established among the individual interests. As a result, in current accounting practice the aim of determining the result enjoys priority, and the calculation of the values of wealth and equity are subordinated to this objective.
The market value of companies was analysed in Chapter 2.3. According to the statements of that chapter it may be established that the evolution of the market value of a company – i.e. the share price – is influenced by numerous factors.

Assuming an efficient market, the share price reflects the expectations regarding the future performance of the company. In addition to the impacts related to the business environment and other factors, the market players’ expectations are also based on the book value and earnings data of the company. As a result, also research into value relevance has shown that share prices are in significant relationship with book value and earnings, respectively. This also highlights the fact that wealth value and yield together shape the market value of the company.

Examining the issue of market efficiency, we concluded that many economists and researchers confirmed that the operation of the market is not fully efficient. Investors frequently act irrationally and show speculative behaviour. As a result, share prices are also influenced by psychological factors as well as by current supply and demand. Dontoh – Radhakrishnan – Ronen [2004] also shows that a reason for the fact that the strength of the relationship between share price and book value (i.e. value relevance) decreased in the United States may be the expansion of such influencing factors, in other words, of non-information-based business activity.

The facts described above reveal that substantial differences exist between the objective, approach, way of determination and influencing factors of book value and market value. Book value provides information about historical and current evidence; market value substantiates future expectations and the effects of a number of other factors. Book value may be deducted from the value of the wealth of the company; market value is the result of the impact of wealth value, yield value and several other factors. The balance sheet of the company, and consequently book value, seeks to satisfy the information needs of the totality of stakeholders, whereas share price (i.e. market value) examines the value of the company purely from the point of view of the present owners and future investors. The differences in the objective, perspective and influencing factors provide satisfactory explanation for the deviations between market value and book value.
2.2. **Applied methodology**

In the framework of the empirical research, I tested two groups of hypotheses. The first group of hypotheses aimed to analyse the value relevance of accounting data; I intended to observe the strength of the relationship between the book value of equity and the different profit categories on the one hand, and share prices on the other hand. Understanding the existence, direction and strength of these relationships not only provides valuable information for comparison with the results of former international research, but also serves as a starting point for the verification of further hypotheses and for the analysis of the factors influencing the deviation between the market values and book values of companies.

The remaining hypotheses aim to examine the factors influencing the deviation between market value and book value. When formulating these hypotheses, I intended to highlight that these two values serve different purposes, and as a consequence also their methods of determination and the scope of the factors directly influencing their development need to be different. This necessarily leads to a deviation between the two values. The innovative nature of these hypotheses primarily lies in the fact that they set up a cause and effect relationship between the above described characteristics and the deviation between market value and book value.

I verified the established hypotheses on the set of the companies having issued shares listed at the Budapest Stock Exchange in the period between 2005–2009. Resulting from the low number of listed companies, I was able to avoid sampling and conduct a full research. It was a requirement towards each element of the population under review that all through the examined period, their shares must be listed on the stock exchange, and they should prepare their financial reports in accordance with the International Financial Reporting Standards so as to ensure that the population is homogeneous concerning the system of applied accounting rules. Due to their accounting specificities, no financial enterprises were admitted into the population under review. As a result, the total number of observation units was 26. This fact might challenge statistical stability if not taken into proper consideration during the evaluation of the study results.

During verification of the hypotheses related to the value relevance of accounting data, I tested the existence as well as the direction, stability, strength and nature of the relationship
between book value and earnings\(^1\) on the one hand, and market value on the other hand. I used correlation and regression analysis as a method to examine the relations between the above mentioned metric values. I performed the same calculations not only for the totality of the companies involved in the research, but also for two subgroups into which I had divided the companies according to their sizes, so as to observe if any differences arise on this basis.

For the purpose of the other hypotheses, I analysed time series and performed trend estimations. I used cross correlation analysis to reveal any covariance of the market value and the book value with the wealth value. To find the factors influencing the deviations between market value and book value, I examined the changes in the market value over time for each company, then identified for each of them the periods when a substantial deviation could be observed in the changes of the two values, and reviewed public information in order to establish whether they offered adequate explanation for these differences in value changes.

I also examined, through additional trend estimation, the covariance of certain indicators with market value and book value and their eventual forecasting potential, identifying the indicators influencing only one or both of the values. For these calculations I also used the method of cross correlation analysis.

\(^1\) I examined several categories of earnings: the values included in the calculations were EBIT, EBT, and comprehensive earnings.
3. RESULTS OF THE DISSERTATION

3.1. Results of the verification of hypothesis 1

Hypothesis 1: A positive relationship exists between a company’s book value and market value.

During the verification of hypothesis 1, I calculated the Pearson’s correlation coefficient and the partial correlation coefficient in order to examine the existence, direction and strength of the relationship between the book value and market value of individual companies. I calculated both types of the correlation coefficient for the five balance sheet dates of the period under review, both for the entire population and separately for the two groups composed of companies with higher and lower capitalisation. In calculating the partial correlation coefficient, data associated with the individual profit categories represented the controlled variables both together and separately.

In respect of the entire population and the group of companies with lower and higher capitalisation alike, based on the research results we may conclude that there was a significant, at least medium strong positive relationship between book value and market value throughout the period under review. This at least medium strong positive relationship was maintained even when profit categories were included in the calculation as controlled variables; however, the thus computed partial correlation coefficient values did not prove to be significant in certain cases. This problem arose in the case of groups composed of a small number of elements; the results of the calculations for the entire population proved to be significant.

In the group of companies with higher capitalisation the partial correlation coefficient values evolved similarly to those computed for the entire population; however, when all profit categories were controlled simultaneously, they indicated a stronger relationship than the coefficient values computed for the entire population. The relationship between book value and market value appeared to be less strong in the group of companies with lower capitalisation; however, the profit categories did not have such a clear, partial explanatory power than in the case of companies with higher capitalisation. In the case of companies with lower capitalisation, in addition to the sharp decline in market values in 2008, the economic crisis set off the downturn observed in 2009 as well, which led to a further erosion of the
strength of the relationship between book value and market value. Among the companies with higher capitalisation, however, this effect dissipated by 31/12/2009.

We may conclude, overall, that there is a positive relationship between a company’s book value and its market value; hypothesis 1, therefore, should be accepted as thesis.

3.2. Results of the verification of hypothesis 2

Hypothesis 2: A positive relationship exists between a company’s earnings and market value.

During the verification of hypothesis 2, I calculated both Pearson’s and partial correlation in order to examine the existence, direction and strength of the relationship between the earnings and the market value of individual companies. The values of the three profit categories reviewed at testing hypothesis 1 were separately included in the calculations performed to determine their relationship with market value. I calculated both types of the correlation coefficient for the 5 financial years and balance sheet dates of the period under review, both for the entire population and separately for the two groups of companies with higher and lower capitalisation. In determining the partial correlation coefficient, the controlled variable applied was the book value.

In respect of the entire population and the group of companies with lower and higher capitalisation alike, based on the research results we may conclude that there was a significant, at least medium strong positive relationship between the values of the individual profit categories and the market value throughout the period under review. This association weakened and, especially in the group of companies with higher capitalisation, even lost its significance in most cases, once book value was included as a controlled variable in the research.

The results of the calculations performed for the group of less capitalised companies did not always indicate an acceptable significance level in respect of the Pearson’s correlation coefficient either, and involving the controlled variable increased the number of these cases further. Consequently, in the case of this group we may not conclude that there was a significant relationship between the individual profit categories and market value throughout the entire review period.
It should not be overlooked, however, that the number of elements included in the population under review was rather low, which may have contributed to the deterioration of the significance level.

Based on the results received we may not conclude, overall, that there is a positive relationship between a company’s earnings and its market value; hypothesis 2, therefore, must be rejected, so it weren’t a thesis.

3.3. **Results of the verification of hypothesis 3**

**Hypothesis 3:** The value relevance of book value is higher than the value relevance of earnings.

Upon testing hypothesis 3, I examined whether it was the book value or the profit figure that had a stronger relationship with the market value in the course of the review period.

In the case of the entire population and the group of companies with higher capitalisation there was a significant, strong positive relationship between the examined explanatory variables, the book value and the values of the individual profit categories throughout the entire period under review. Since the existence of multicollinearity did not allow for the performance of a linear regression calculation, in the case of these two groups I drew conclusions from the comparison of the results of the calculations performed during the testing of the first two hypotheses.

In reviewing the Pearson’s correlation coefficients I concluded that, without exception, it was the book value that proved to have a closer relationship with the market value. This is reconfirmed by the fact that, in the case of the individual profit categories, the partial correlation coefficients computed with book value as the controlled variable either proved to be not significant, or their value was lower than the corresponding values of the partial correlation coefficient computed for the relationship between book value and market value.

As the multicollinearity problem did not arise in relation to companies with lower capitalisation, regression calculation was feasible; the t-test of the constant term, however, did not indicate an acceptable significance level. In the case of this group, neither was the significant relationship between the individual profit category values and market value
maintained at all dates under review. This leads to the conclusion that it was the book value that had a stronger relationship with market value.

Once again however, it should not be overlooked that the number of elements included in the population under review was rather low, which may have contributed to the deterioration of the significance level.

Based on the results received we may conclude, overall, that the value relevance of book value was greater than that of earnings; hypothesis 3, therefore, should be accepted as thesis.

3.4. Results of the verification of hypothesis 4

Hypothesis 4: A deviation exists between market value and book value because market value is not determined on the basis of wealth value.

To verify hypothesis 4, I used cross correlation to analyse the relationship of market value and book value with wealth value and their mutual forecasting ability. On the basis of the results of the performed analyses, we may conclude that a relationship exists between book value and wealth value; nevertheless certain property elements – typically the variations in liabilities – may modify or even screen this relationship. The cross correlation analysis showed that there is no basic relationship between the market value and the wealth value; their eventual relationship was mainly due to certain events in the companies’ histories. The events having an impact on the registered capital or, through the earnings, on the equity of the company, also affected the wealth value. The change in the market value was either due to a change in the registered capital or to other events in the company history; as a consequence, the observed relationship between market value and wealth value was due to a third factor.

On the basis of the obtained results we may conclude, overall, that a deviation exists between market value and book value because market value is not determined on the basis of wealth value: consequently, hypothesis 4 should be accepted as thesis.

3.5. Results of the verification of hypotheses 5 and 6

Hypothesis 5: A deviation exists between market value and book value because market value depends on factors such as expectations concerning the ability of the company to earn profits in the future; the characteristics of the given country and region; global and macroeconomic trends; industrial cycles; and other influences of a psychological nature.
Hypothesis 6: A deviation exists between market value and book value because there is a difference between the factors influencing book value and those determining market value.

Hypothesis 5 and 6 are strongly interlinked, as they seek to analyse whether certain factors are related to market value (hypothesis 5) and book value (hypothesis 6) respectively; therefore I performed the verification of the two hypotheses jointly.

As formulated in hypothesis 5, variations in the market value are influenced by expectations concerning the ability of the company to earn profits in future. It is however difficult to illustrate and quantify the expectations (a process indispensable for empirical research), because it is a rather intangible phenomenon interpreted differently by the individual investors. At all events, it may be established that the evolution of expectations concerning the ability of the company to earn profits in future is influenced by information made public in relation to the given company. Such information includes data displayed in the annual, mid-year and quarterly financial reports as well as any published information concerning the future plans and major transactions of the company.

Accordingly, I examined the impact of expectations concerning the ability of the company to earn profits in future on the evolution of market value by individually mapping out all the events made public. For each company, I represented in a diagram the variation of market value and book value over time to identify the periods with substantial differences between market value and book value. For all periods with such outliers, I reviewed the major (published) events in the company’s history in order to find the factors which might explain the substantial changes in the values through shaping expectations concerning the ability of the company to earn profits in future.

On the basis of the individual analyses performed we may conclude, overall, that numerous events and published pieces of information which affected expectations concerning the ability of the companies to earn profits in future also had a resulting impact on the evolution of their market values. In the analysed cases, the changes in market value substantially differed from the variations of the book value, which suggests that published information and events are incorporated into expectations and, depending on the nature of the event, either only influence the evolution of the market value but leave the book value intact, or cause major changes in the market value which also appear as an immediate impact in the book value.
Further influencing factors identified in hypothesis 5 include national macroeconomy, regional economy, global economic trends, industrial specificities and other psychological influences. I used cross correlation analysis to test the influence of the characteristics of the country, region, global economy and industry on the evolution of market value. To be able to perform these tests, to the determined influencing factors I assigned indicators which appropriately illustrate the variations in the factor under observation.

I first used the cross correlation analyses to test whether changes in the indicators illustrating the individual factors were related to variations in the market value, and whether a forecast relationship existed between the two in either of the directions. Subsequently I repeated the above procedure regarding the changes in the observed indicators and the book value.

We may establish, overall, that the cross correlation analyses proved to be very useful in revealing certain interrelations in the variations of the market values and the examined indicators; yet if we seek to perform a more precise analysis of the factors influencing market value, we need to involve more indicators to be able to illustrate the individual influencing factors under review. The timeframe of the present research did not make it possible to involve further indicators in the study.

On the basis of the results of the cross correlation analyses performed, we may conclude that the evolution of the book value did not reveal any relationship with the variations in the indicators under review. In the light of the fact that for a more precise analysis of the relationships, more indicators should be involved to illustrate the individual factors influencing changes in the market value, it shall also be necessary to further examine the relationship of these influencing factors with the book value.

On the basis of the results of the analyses, we may establish that we do not need to reject either hypothesis 5 or, consequently, hypothesis 6; however, further research is necessary in order to be able to fully establish their validity and to accept them as theses.

### 3.6. Possible direction of subsequent research

In continuation of the research, I deem it necessary to involve further indicators reflecting the individual factors having an impact on the development of market value, in order to be able to perform a deeper analysis of hypothesis 5 and 6.

A possible direction for subsequent research may be the extension of the length of the period under review, and of the set of companies involved in the research.
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