



# The financial-economic crisis and value of equity capital: A case study of Slovenian public limited companies 2006–2011



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## ABSTRACT

The purpose of this paper is to discuss the effect of financial-economic crisis on the equity value of companies, as well as present the importance of fair and honest company valuations. The fundamental value of equity capital of a company is important for both management and external shareholders. The wide disparity between market and fundamental values can lead to high value adjustments, which reduces investors confidence in the capital market. This has had a negative impact on the operations of financial institutions, and individual as well as company investment; especially on developing financial markets during a financial-economic crisis. This research was designed to assess the equity value of Slovenian public limited companies based on the discounted free cash flows to equity and comparing it with market value of equity capital of companies before and during the financial-economic crisis. The fundamental value of equity capital of the selected companies (sample of 25) is calculated using a two-tiered model. The paired-sample *t*-tests method rejected the hypothesis that the fundamental value of equity capital of Slovenian public limited companies better reflects the market value of equity capital in today's times of financial-economic crisis (2011) than before the crisis (2006). However, we found that the market value of equity capital in relation to the fundamental value of equity capital of the selected companies was lower in 2011 than in 2006. Various models of the basic calculations are used in the model evaluation. This study shows the problem of company valuation on small and emerging capital markets which have a short history of data.

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## 1. The financial-economic crisis and equity value of companies

In recent years a number of companies have closed down (see Janeš & Dolinšek, 2010), the level of unemployment has drastically risen (see Laporšek & Dolenc, 2012), equity indices have been overthrown and some countries are on the verge of bankruptcy due to incorrect monetary policies of central banks. The consequences of this financial crisis could paralyse the global economic system (Norberg, 2009). The market value of equity capital of the majority of Slovenian public limited companies on the stock exchange has therefore decreased. In times of economic boom the market value of companies was incredibly high. The large difference between the market value and fundamental value of equity capital was proven by Stubelj (2010) who in his research stated that market values can be higher due to: (a) investors who have “insider” information about the company increasing share prices; (b) expected high acquisition value of the company; (c) purchasing of shares for too high prices (for speculative reasons) in order to sell the company for a higher price; (d) lack of investment opportunities for

the investor on the Slovenian capital market. These factors have contributed to a dramatic decrease in value during times of financial-economic crisis (from 2008 onwards). The effects of the financial-economic crisis which have severely shook and swung the global financial markets causing share prices on the stock market to fall, have also been felt in Slovenia. The share prices of Slovenian companies have decreased a lot more than on some more developed financial markets. This can be seen on the stock market index; the Slovenian stock market index decreased by 60% between 2007 and 2012 (LJSE, 2012), whereas on the developed financial markets like Dow Jones, NYSE, S&P, the stock market index decreased by only 15%. On the financial market NASDAQ the stock market index even increased by 8% in 2007 (MWatch, 2012).

Market price of shares shows how much investors are willing to pay for shares on the basis of expected benefits of ownership. The benefits are expected cash flows belonging to the owners of equity (shareholders). Due to market imperfections and perceived expectations of investors, there is a discrepancy between the market price of the company and its internal (fundamental) value. The internal value is a value based on a comprehensive analysis and assessment of a company. It is expressed as the current value of all the company's expected cash flow from doing business,

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discounted to the current value by using the appropriate discount rate. For Fama (1995) the analyst should in principle be able to determine if the actual market price of the security is above or below its intrinsic value. If actual prices tend to move toward intrinsic values, then attempting to determine the intrinsic value is the same as predicting the future market price. This is the essence of the predictive procedure implicit in fundamental analysis (Fama, 1995). In addition to fundamental value there are many factors that can affect the market price of shares. An important factor is supply and demand for shares, which depends on economic factors, government policy, the expected performance of companies and industries and potential growth.

Significant impact on the supply and demand of shares can have irrational behaviour of investors, which can lead to excessive investment optimism or pessimism. In our opinion most of the market price growth of Slovenian listed company's shares to autumn 2007 is due to excessive investment optimism, which led to excessive demand for shares of Slovenian public companies. Increased inflows of capital investments (mainly in shares and mutual funds) pushed up share prices.

The level of stock market prices is important for the economy. This was highlighted by James Tobin (1969) who with his model made a great contribution to financial theory. Tobin's  $q$  shows the relationship between its market value and replacement value of assets. The fundamental value is the present value of expected discounted cash flows that belong to investors and we can express Tobin's  $q$  as the present value of cash flows discounted by the cost of capital divided by the replacement value of assets. The basic idea is that if the ratio is bigger than one ( $q > 1$ ) the company is willing to invest. In this case, the investment adds value. The difference between the market value of investments and the cost of investment is positive. If  $q < 1$ , the market value is lower than the replacement cost, which means that the desired volume of capital is lower than the current volume, and companies are not willing to invest. Tobin's  $q$  connects the capital market with the real sector of the economy. This is explained by the impact of capital market investment activity of enterprises. High stock prices are an incentive for owners to increase the volume of investment and in the case of low stock prices owners are not willing to invest a lot. This connection can also be deceptive because the market price of shares may deviate from fundamental values, which can lead to erroneous investment decisions. Excessive growth in share prices which deviate market prices of shares from fundamental values can lead to large negative corrections of market share prices, which can drastically reduce investment activity. However, Blanchard, Rhee, and Summers (1993) found that this relationship is not so strong. They found that in the United States from 1920 to 1990, the fundamental value of a company was a better predictor of investment than stock prices. Decisions on companies investment is based not only on changes in share prices but rather on the basis of the expected added value of investment. Summers (1986) suggest caution in treating stock prices or their changes as rational reflections of fundamental values. For Summers this point is very important for macroeconomic theories such as  $q$  investment theory which presume that asset prices can be used to reflect the present value of the rents an asset will generate.

Levine and Zervos (1998) found that various measures of stock market activity are positively correlated with measures of real economic growth across countries. They found that the association is particularly strong for developing countries.

According to Mishkin (2007) the share price may affect the economy and GDP: (a) through Tobin  $q$  on investment, (b) on consumer wealth and hence consumption, and (c) through moral hazard and adverse selection problems on lending activities for the scope of investment. Therefore, the level of share prices is of utmost importance for the economy. Since Slovenian companies

finance investments mostly by internal sources (retained earnings) and loans, lower stock prices lower firms' creditworthiness and reduce investment possibilities. Reduction in share prices through increases in financial leverage causes refinancing problems and rise debt costs. Also other factors as for example the effectiveness of the legal system is important for the financing of companies which was demonstrated by Demircuc-Kunt and Maksimovic (1998). They showed that firms in countries with high ratings of legal system effectiveness are able to grow faster by relying more on external finance. For Mishkin (2001) financial liberalization promotes transparency and accountability, reducing adverse selection and moral hazard.

This paper deals with the problem of the disparity between the market and fundamental value of equity capital of Slovenian public limited companies. This topic is very relevant today when the financial-economic crisis has uncovered overvaluation of companies in the past. Knowing the fundamental value is important for making the right decisions on different levels (policymakers, investors, employees, country, buyers, suppliers, banks,...) (Koller & Goedhart, 2005). Huge imbalance between the market prices of the shares and their fundamental values should concern providers of economic policy. Providers of economic policy should work towards large deviations of market values from fundamental values, which can cause extreme reductions in share prices and the negative impact on economic growth.

This article is divided into five parts; the second section presents the theoretical foundations of company valuation, the third section the methodology and the fourth section shows the analysis and findings of the research. The fifth section provides a conclusion and recommendations for regulators, providers of economic policy, management and the public.

## 2. Company valuation

Company valuation or estimated value of a company consists of forming an expert and impartial opinion on the value of the whole company, its individual organisational units, resources, capital equity and debts. The need for expert and impartial company valuation comes from the undeniable fact that the amounts shown in accounting records which are influenced by accounting guidelines, generally differ significantly from the actual market value of the company assets (Glen, 2005, see also Odar, Kavcic, & Jerman, 2012; Huang, Tsaih, & Lin, 2012; Ong & Chen, 2013). The main aim of valuating a company is, by using appropriate valuation methods and techniques, to uncover what the actual value of the company is (Fires, 2009).

The most frequent reasons for company valuation are: (a) the purchase or sale of all or part of the company's equity value or ownership share, (b) the execution of acquisition procedures, (c) withdrawal and payment of a shareholder, (d) mergers or acquisitions, (e) buyout of the management, (f) increase or decrease of (share) capital, (g) rehabilitation, liquidation or bankruptcy value of the company's estate which is in bankruptcy proceedings and (h) internal audit of assets and financial position of the company to support the adoption of strategic financial decisions (Fiducari, 2009). NLB (2012) also states various purposes for evaluation of fundamental values of companies: (a) acquisitions, mergers, sale and purchase of the company or part of the company, recapitalisation, separation and spin-off, withdrawal of shareholders, management buyouts and leveraged buyouts, (b) investment decisions, (c) accounting reports, (d) tax purposes, (e) legal disputes.

We often wonder how much a company is worth, or if the market value of the company is overestimated or underestimated. In order to answer this question, it is necessary to calculate the fundamental value of the company, which reflects the current value

of the expected benefits to investors (Domodaran, 2006). We use different valuation models when assessing the fundamental value of companies (e.g., a discounted cash flow model, a model of comparable companies listed on the stock exchange, the net asset value model, etc.), depending on the individual valuation factors (Brigham & Ehrhardt, 2005).

Stubelj (2010) indicates that valuating companies is a utilitarian activity. The assessment should bring benefits to the users of that service. Due to the great benefits that can arise from a good valuation estimate, analysts and experts in the field of valuation designed a large number of models based on different assumptions. The starting point and the determinants of each valuation model vary. However, the essential element of all models is the future benefits to investors. There are models based on profits, dividends, investment opportunities, free cash flow, as well as models based on comparative analysis.

In order to value a company, a number of different valuating models can be used, varying from simple to highly sophisticated. The model chosen is dependent on the purpose of the valuation, the data available to us and other factors (Brealey & Myers, 2001).

Static and dynamic valuation models are recognized. Static valuation models are based on the comparison of various indicators (indicators which are calculated on the basis of profit, book value or income). When using dynamic valuation models it is necessary to predict future input parameters, which are required to calculate the value of the company. Valuating companies using a dynamic model highly depends on the analyst's evaluation of the input parameters. By taking the correct data into account we can very accurately define the fundamental value of the company (Brigham & Ehrhardt, 2005).

One of the great limitations in the valuation of companies in the Slovenian capital market is the small size of the market and the consequent small number of companies. The Slovenian capital market is not mature. Many changes in the Slovenian financial environment in times of transition mean a shorter history of useful data for analysis. Data from the balance sheets and profit-loss accounts are highly unreliable and do not follow the long-term fiscal and development policies of companies, thus making the valuation process more difficult. The instability of the financial statements and balance sheets is not always down to the operations of the company, but is rather more often due to the adaptation to changes in legislation and conditions on the Slovenian market. The partially formed ownership structure of companies (incomplete privatisation) and the influence of politics on business have had and will continue to have an impact on Slovenian public limited companies (Stubelj, 2010).

### 3. Research methodology

This research is quantitative in nature. Its purpose is to research and present the equity values of Slovenian public limited companies before and during the financial-economic crisis. This value is based on the discounted free cash flows, which belong to equity capital. It will then be compared to the market value of the company. Due to the abnormal reduction in the market value of shares during the financial-economic crisis we are interested in the difference between the fundamental and market values of companies before the crisis and now, during the crisis.

We used secondary data from the Ljubljana stock exchange website (number of shares and price) as well as data found in the annual reports of the selected companies, which was also taken from their respective company websites. There are a total of 67 public limited companies on the Slovenian stock exchange; we evaluated all the Slovenian companies in the prime market (9 companies) and all the companies in the standard market (16 compa-

nies) in the period between 2006 and 2011, quoted on the stock exchange on the 31st December 2006 and 31st December 2011. Sampling has its flaws, which we already encounter when we gather data or prepare the sample – and of course this influences our results and their appropriateness for generalization to the entire population (see Nastav, Bojan, & Štefan Bojnec, 2008). The sample is small but the selected companies represent almost 90% of the total market capitalisation of all shares listed on Ljubljana stock exchange in the studied time period. Therefore we can consider our sample representative of the Slovenian share market.

The market value of equity capital of Slovenian public limited companies has fallen sharply during the crisis. In light of these facts we can assume that the market values of the Slovenian public limited companies before the crisis were exaggerated and did not reflect the fundamental value of equity capital of the company. Our basic theory is that the fundamental value of equity capital better reflects the market value of equity capital in today's times of crisis than before the crisis. We tested the validity of our theory with the hypothesis that the fundamental values of Slovenian public limited companies are closer to their market values now (2011) than before the crisis (2006).

Each selected company's fundamental value is evaluated by using a two-tiered model of discounted free cash flow, which is a part of the equity capital. The fundamental value of equity capital of the company is calculated as the current value of the company's expected free cash flow from doing business, discounted to today's value using the estimated cost of equity capital (Brigham & Ehrhardt, 2005). We chose the two-tiered model as it allows for the use of valuating cash flow to a time horizon from which we can assume a stable level of growth. In accordance with this, we estimated the companies' cash flow for the next three years using data history. In the following years we took into account the steady growth of cash flows.

Table 1 presents the selected companies and their book value of equity capital on 31st December 2006 (Equity 06), book value of debt on 31st December 2006 (Debt 06), the debt-equity ratio on 31st December 2006 (D/E 06), free cash flow average 2006 (calculated as the average of the years 2004, 2005 and 2006) (FCFA 06), book value of equity capital on 31st December 2011 (Equity 11), book value of debt on 31st December 2011 (Debt 11), the debt-equity ratio on 31st December 2011 (D/E 11) and free cash flow average 2011 (calculated as an average of the years 2009, 2010 and 2011) (FCFA 11).

In Section 4.4 we illustrated the frequency distribution of the sample by using the SPSS programme to examine the characteristics of the different variables which we included in the research. We also showed the descriptive statistics (mean, standard deviation) and used a bivariate method of analysis as well as the paired *t*-test method to assist in checking the difference between the market and fundamental values in 2006 and 2011.

Our hypothesis was checked by comparing the market and estimated fundamental value of the selected companies in the years 2006 and 2011. The ratio between the fundamental and market values of the companies were calculated and by using the paired *t*-test we were able to determine whether there is a statistically significant difference in the calculated ratio in 2006 and 2011. Moreover, we wanted to know which average was higher.

### 4. Analysis and findings

In this study the cost of equity capital of the selected companies was estimated. Using this information the current value of estimated future free cash flows which is a part of equity capital of the selected companies was estimated/calculated. We calculated the market value of equity capital on the basis of the number of

**Table 1**

The selected companies (sample). Source: Annual company report.

	Company	Equity 06 in 000 €	Debt 06 in 000 €	D/E 06	FCFA 06 in 000 €	Equity 11 in 000 €	Debt 11 in 000 €	D/E 11	FCFA 11 in 000 €
Prime market	F1	254	650	2.56	12.101	398	854	2.15	15.280
	F2	181	108	0.60	8.804	141	266	1.89	2.823
	F3	571	308	0.54	21.154	1.140	394	0.35	52.127
	F4	295	72	0.24	7.748	241	237	0.99	–2.276
	F5	648	1.213	1.87	9.141	789	1.859	2.36	19.028
	F6	321	3.937	12.26	143.844	436	5.381	12.35	–25.731
	F7	397	446	1.13	13.884	442	1.095	2.48	28.864
	F8	989	482	0.49	46.123	815	760	0.93	41.072
	F9	375	1.706	4.54	3.946	489	2.473	5.05	854
Standard market	S1	215	2.682	12.47	73.038	231	4.027	17.41	–18.378
	S2	97	12	0.12	4.170	123	6	0.05	1.905
	S3	23	11	0.47	620	12	27	2.22	–185
	S4	61	15	0.24	1.189	23	24	1.04	544
	S5	43	126	2.96	2.086	43	133	3.12	5
	S6	402	647	1.61	3.511	13	364	27.13	–3.479
	S7	49	6	0.12	672	50	7	0.15	2.903
	S8	25	16	0.64	589	29	29	0.97	49
	S9	4	2	0.51	36	2	1	0.64	–4
	S10	303	382	1.26	1.826	125	444	3.54	6.844
	S11	102	255	2.49	2.463	148	434	2.93	–3.135
	S12	43	27	0.62	2.239	53	34	0.65	4.690
	S13	433	242	0.56	2.086	166	445	2.69	6.881
	S14	92	36	0.39	2.208	99	100	1.01	2.914
	S15	119	207	1.74	2.045	122	198	1.63	–44
	S16	72	47	0.66	1.959	69	52	0.76	–963

Key: **prime market:** Gorenje, plc. (F1), Intereuropa, plc. (F2), Krka, plc. (F3), Luka Koper, plc. (F4), Mercator, plc. (F5), NKBM, plc. (F6), Petrol, plc. (F7), Telekom Slovenije, plc. (F8), Zavarovalnica Triglav, plc. (F9), **Standard market:** Abanka Vipra, plc. (S1), Aerodrom Ljubljana, plc. (S2), Delo Prodaja, plc. (S3), Etol, plc. (S4), Iskra Avtoelektrika, plc. (S5), Istrabenz, plc. (S6), Kompas MTS, plc. (S7), Mlinotest, plc. (S8), Nika, plc. (S9), Pivovarna Laško, plc. (S10), Pozavarovalnica Sava, plc. (S11), Salus, plc. (S12), Sava, plc. (S13), Terme Čatež, plc. (S14), Unior, plc. (S15) in Žito, plc. (S16).

shares issued and the market value of shares in the aforementioned period. We concluded our study with a comparison of the estimated fundamental value of equity capital with the market value of equity capital of the companies before and during the financial-economic crisis.

#### 4.1. The cost of equity capital of the selected companies

The cost of equity capital and the required return on equity was estimated using CAPM (Capital Asset Pricing Model). Based on this model, we estimated the required return on equity as the sum of the risk-free rate of return and the market risk premium multiplied by factor  $\beta$  (Damodaran, 2006). CAPM is the most frequently used model for estimating the cost of equity capital (Brigham & Ehrhardt, 2005).

The Slovenian financial market is seen as a small and developing financial market with a short history. For this reason the CAPM model was applied in order to estimate the cost of equity capital, where certain information from developed financial markets was used to assist us. Three variables are needed to estimate the cost of equity capital using the CAPM model:

$$r_s = r_{rf} + \beta * RP_m,$$

where  $r_s$  represents the cost of equity capital,  $r_{rf}$  risk-free rate of return, measure of specific risk  $\beta$  (relative risks for the company dependent on the market) and  $RP_m$  market risk premium.

In this case a developed market can be defined as one which has a sufficient data history of price fluctuations and risk-free bonds for at least 50 years. We can count the United States of America as one such market, where we can receive data on fluctuations of shares prices, bonds, inflation and other databases from 1926 onwards.

For the risk-free rate of return, the real risk-free rate of return from the American market was used, where we took the yield-to-maturity of inflation indexed bonds of the last thirty years

(WTP30A29) and noted the monthly average return on 31st December 2006 and 31st December 2011 to which we added the Slovenian inflation forecast.

The measure of specific risk beta was determined on the basis of the American market. The history of American companies' sector beta was used. Companies which work in the same sector have similar operative risks (operating leverage). We must also take into account the different financial structures of the company and consequently different financial risks (financial leverage). Sector beta for the American market was received online from Damodaran (Damodaran, 2007a in 2012a).

The market risk premium was calculated using data history. The market risk premium on the American market was calculated using data history from more than 90 years ago, with which we can decrease standard errors. Problems arise with countries like Slovenia which do not have as long a history as the USA. For that reason we have calculated the market risk premium for Slovenia as follows:

$$RP_m = RP_{ZDA} + RP_{dSLO}$$

where  $RP_m$  represents market risk premium on the Slovenian financial market,  $RP_{ZDA}$  market risk premium on the American financial market and  $RP_{dSLO}$  additional risk premium on the Slovenian financial market (immature financial market). The market risk premium on the American market in 2006 was 4.91% (Damodaran, 2007b), in 2011 6% (Damodaran, 2012b).

#### 4.2. Estimating the fundamental value of equity capital of the selected companies

When valuating a company using a two-tiered model of discounted free cash flow which is a part of equity capital, you must also predict free cash flow which is a part of equity capital. We recorded previous free cash flows which are a part of equity capital



**Table 2**

Fundamental and market value of equity capital 2006–2011 in 000 €.

Company		On 31.12.2006		On 31.12.2011	
		Fundamental value	Market value	Fundamental value	Market value
Prime market	F1	58.567	323.300	85.155	79.534
	F2	142.358	202.776	18.144	3.398
	F3	179.567	2.768.162	549.872	1.874.042
	F4	143.346	660.380	–20.290	99.400
	F5	82.138	809.214	59.184	553.508
	F6	625.389	216.061	–96.441	123.629
	F7	216.287	1.031.196	111.283	323.585
	F8	500.980	1.988.942	409.926	411.604
	F9	19.720	214.336	2.134	227.351
Standard market	S1	313.007	260.513	–50.454	115.200
	S2	57.067	218.262	23.483	39.104
	S3	10.424	11.981	–691	16.019
	S4	21.994	52.063	5.301	18.333
	S5	12.580	28.869	15	24.286
	S6	48.079	92.981	–1.793	16.006
	S7	10.723	2.717	31.639	3.568
	S8	9.393	17.943	488	6.425
	S9	826	2.933	–30	3.419
	S10	23.308	348.681	33.180	96.399
	S11	20.104	222.572	–16.524	54.396
	S12	27.677	85.065	42.094	29.160
	S13	27.206	463.554	27.068	24.084
	S14	39.269	112.277	17.992	88.470
	S15	21.313	19.516	–187	34.061
	S16	31.023	59.684	–10.643	30.242

from the companies' annual reports. Table 2 shows the estimated values in Euros on 31st December 2006.

Free cash flow is expected inflow (almost the same as income), minus the outflow for operations (expenses and costs) (Kupnik, 2011), therefore quite accurately defining a calculation of success and loss. This does not take into consideration depreciation, which is an accounting category. It is replaced by the estimate of cash flow for necessary investments (replacing equipment). This, of course, reduces the cash flow (Kadunc, 2008). Free cash flow, which is included in equity, is calculated as follows (Domodaran, 2006):

$$FCF = NP + DEP + ND - (IBS + CWC + RD),$$

where FCF represents free-cash flow, NP net profit, DEP depreciation, ND new debt, IBS investment in basic resources, CWC change in working capital and RD repaid debt.

Our growth forecast for free cash flow which is a part of equity capital is based on the assumption that in the long run no company can grow faster than the economy it operates in. A stable growth rate is an important factor when calculating value using a discounted cash flow model as it strongly influences the result. Thus, our growth forecast was defined as the sum of predicted economic growth and inflation. From the fourth year on, we assumed that the economy growth rate was 0%. Despite this, the companies must still maintain a level of growth which at least matches the rate of inflation if they want to retain value. By using this method we minimised free cash flow which will be a part of equity capital. On the basis of this we calculated the fundamental value of equity capital of each company.

For the assessment of future growth we used the Autumn Forecast of Economic Trends (*Jesenske napovedi gospodarskih gibanj*), which is prepared and published every year by the Institute of Macroeconomic Analysis and Development (UMAR). Using the Autumn Forecast of Economic Trends we recorded the forecast of real economic growth (changing gross domestic product) and inflation forecast for the next three years. For the year 2006 we used the Autumn Forecast of Economic Trends 2007 (UMAR, 2007) as well

as for the year 2011 using the Autumn Forecast of Economic Trends for 2012 (UMAR, 2012). From the fourth year onwards we assumed that each company who wants to maintain their fundamental value must have a growth rate that matches that of inflation. We used the recommended rate of inflation of the European Union after the fourth year. The rate of inflation was just below 2%, and therefore low enough that the economy could take full advantage of price stability. The goal of the European Central Bank is to basically keep the level of inflation stable which is just below 2% (European Commission, 2012). For this reason we decided the rate of inflation from the fourth year onwards was 2%.

We evaluated the equity of twenty-five Slovenian public limited companies which together represent almost 90% of the total market capitalisation on 31st December 2006 and on 31st December 2011.

The equity value of the chosen Slovenian public limited companies was estimated using a two-tiered discounted free cash flow to equity capital model.

$$P_0 = \sum_{t=1}^{t=n} \frac{FCFE_t}{(1+r_{sh})^t} + \frac{P_n}{(1+r_{sh})^n},$$

$$P_n = \frac{FCFE_{n+1}}{(r_{ss} - g)},$$

where  $P_0$  represents the current equity value,  $t$  period of fast growth,  $FCFE_t$  free cash flow which is a part of equity capital in the year  $t$ ,  $r_{sh}$  cost of equity capital in a period of fast growth,  $P_n$  final value at the end of year  $n$ ,  $r_{ss}$  cost of equity capital in a period of stable growth and  $g$  constant level of growth after year  $n$ .

On the 31st December 2006, the equity capital of all the twenty-five selected companies using the two-tiered discounted free cash flow model which is a part of equity capital were evaluated. The highest estimate of equity capital was company F6 (625,389,209.89 EUR), the lowest S9 (826,123.21 EUR). We did the same on 31st December 2011, however nine out of the twenty-five companies had a negative equity value due to negative free cash flow, which is a part of equity capital. The results of these nine companies were meaningless as companies with worse

business results and companies that cannot get new loans to refinance old loans have negative free cash flow. The highest value estimate was company F3 (549,871,933.66 EUR), the lowest positive value estimate was S5 (15,413.86 EUR).

#### 4.3. The companies' market value of equity capital

The market value of equity capital for each of the selected companies was also calculated. Each item, including a company, is only worth what someone is willing to pay for it. For this reason we calculated the market value as follows:

$$MV = S_n * S_p,$$

where MV represents market value,  $S_n$  number of shares and  $S_p$  market price of a share.

When calculating the value we took into account all shares the company had and did not differentiate between preference and ordinary shares. We used the share prices as valued at the close of market on 31st December 2006 and 31st December 2011. Table 2 shows the calculation/estimate of the fundamental and market value of equity capital on 31st December 2006 and 31st December 2011.

#### 4.4. Comparison of the companies' market value of equity capital with the estimated fundamental value of equity capital

The purpose is to research and present the values of equity capital of Slovenian public limited companies based on the discounted free cash flow which is a part of equity capital and then to compare with the companies' market value of equity capital. Considering the abnormal reduction in the market value of shares during the financial-economic crisis, we were primarily interested in the difference between the fundamental and market value of equity capital of the companies before the crisis and now, during the crisis. For this purpose, we calculated the ratio between the fundamental and market value of equity capital on 31st December 2006 and 31st December 2011. The closer the ratio is to 1, the smaller the difference between the fundamental value and market value estimate. Our basic theory is that the fundamental value of equity capital better reflects the market value of equity capital in today's times of crisis than before the crisis. Therefore, if the ratio average between the estimated fundamental value and calculated market value of equity capital on 31st December 2011 is closer to 1 than on 31st December 2006. In the case that the ratio is equal to 1 the fundamental value exactly reflects the company's market value of equity capital:

$$K = \frac{\text{Fundamental value}}{\text{Market value}},$$

where  $K$  represents the ratio between the company's estimated fundamental value and calculated market value of equity capital, *Fundamental value* is the company's estimated fundamental value of equity capital and *Market value* is the calculated market value of equity capital of the company.

In the following analysis we have excluded the companies with a negative fundamental value of equity capital estimate for the year 2011. Comparing negative fundamental values of equity is meaningless. The following companies were excluded: F4, F6, S1, S3, S6, S9, S11, S15 and S16. We continued the analysis with sixteen companies.

Fig. 1 illustrates the calculated ratio between the estimated fundamental value and calculated market value of equity capital for the companies on 31st December 2006 (K06) and 31st December 2011 (K11).

#### 4.4.1. Is the market value of the company reflective of the fundamental value of the company?

We can see from Table 2 that nine ratios were closer to 1 in the year 2011 (F1, F3, F5, F7, F8, S2, S10, S12 in S13), whilst in the remaining seven the ratio was closer to 1 in the year 2006. In our sample, nine of the selected companies confirmed our theory that the fundamental value of equity capital better reflects the market value of equity capital in today's times of crisis (2011) than before the crisis (2006). We tested the validity of our theory with the hypothesis that the fundamental values of Slovenian public limited companies are closer to their market values now, during the crisis (2011) than before the crisis (2006). We were interested to see whether we could come to a conclusion about the general population of public limited companies on the basis of our sample analysis.

In the following analysis we took away 1 from every ratio and calculated the absolute worth as follows:

$$|K - 1| = |V|,$$

where  $K$  represents the ratio between the estimated fundamental value and the calculated market value of equity capital for the companies on 31st December 2006 and 31st December 2011 and  $|V|$  distance of the ratio from 1.

$|V|$ , the distance of the ratio from 1, tells us how strongly the fundamental value of equity capital reflects the company's market value of equity capital. The smaller  $|V|$  is, the better the fundamental value of equity capital reflects the market value of equity capital of the company and vice versa. In the case that  $|V| = 0$ , the fundamental value of equity capital exactly reflects the market value of equity capital.

In order to confirm or reject our hypothesis we checked if the  $|V|$  11 average differentiates from the  $|V|$  06 average and whether the difference is statistically significant. In our case we were dealing with the same units, but in different circumstances (before the crisis and during the crisis). For that reason we used the SPSS programme to conduct a paired  $t$ -test to check our hypothesis of arithmetic mean for dependent samples. We wanted to prove the  $|V|$  11 average to be smaller than the  $|V|$  06 average, meaning that the difference between them would be negative. This would show that the fundamental value of equity capital of Slovenian public limited companies better reflects the market value of equity capital of the company now in times of crisis (2011) than before the crisis (2006). On this basis we developed the null hypothesis (the difference between the  $|V|$  11 average and the  $|V|$  06 average is equal to 0 or positive) and the alternative hypothesis (the difference between the  $|V|$  11 average and  $|V|$  06 average is negative):

$$H_0 : \mu_d \geq 0,$$

$$H_1 : \mu_d < 0,$$

where  $\mu_d$  represents the arithmetic mean difference in value for each pair before/during.

We used the paired  $t$ -test to check our hypothesis. The SPSS programme gave us three tables. Table 3 shows the descriptive statistics variables  $|V|$  11 and  $|V|$  06 (average estimates, size of sample, estimate of standard deviation and estimate of standard error mean). Table 4 shows the correlation between variables  $|V|$  11 and  $|V|$  06. Table 5 shows the value of the  $t$ -test which is calculated as follows:

$$T = \frac{\text{Mean}}{\text{Standard error mean}} = \frac{0.417}{0.409} = 1.019.$$

We were interested to see whether the test showed a statistically significant difference. Table 5 calculates the accurate level of characteristics for a two-tailed test, which was 0.324. Due to how we designed our hypotheses we had a one-tailed test, which is why it

was necessary to carry out certain calculations. It was also necessary to check if the critical region and  $t$ -test values were on the same side. Our critical region was on the left, while the  $t$ -test value was on the right, because:

$$\text{Sig.}_{(1\text{-tailed})} = 1 - \frac{\text{Sig.}_{(2\text{-tailed})}}{2} = 0.838.$$

Due to the statistical characteristics results (one-tailed), which was 0.838 (which is more than 0.05), we came to the appropriate conclusion: with the level of characteristics being 0.05 we could not reject the null hypothesis. We could not confirm that the average of variable  $|V|$  11 was smaller than the  $|V|$  06 average. Based on these results we could reject the hypothesis, as we could not confirm that the fundamental value of equity capital of Slovenian public limited companies better reflects the market value of equity capital of the company now in times of crisis (2011) than before the crisis (2006).

Due to the smaller number of units (16 companies), we could not definitively confirm if the assumption of normal distribution was fulfilled. Therefore, we also checked the hypothesis using a non-parametric Wilcoxon signed-rank test, where we came to the same conclusion as with the paired  $t$ -test for dependent samples.

#### 4.4.2. Is the market value of the company in comparison with the fundamental value of the company smaller in times of crisis or before crisis?

In addition, we tested if the ratio averages (companies' fundamental/market value of equity capital) was higher in 2011, with the aim to check if the ratio averages (companies' fundamental/market value of equity capital) are higher now, in times of crisis (2011) than before the crisis (2006). Again, we were dealing with the same units but in different circumstances (before crisis and during crisis). For that reason we used the SPSS programme to conduct a paired  $t$ -test to check our hypothesis of arithmetic mean for dependent samples. We wanted to prove the K11 average (Ratio 11) to be bigger than the K06 average (Ratio 06), meaning that the difference between them would be positive. This would show that the market value of equity capital in comparison with the fundamental value of equity capital is lower in times of crisis (2011) than before the crisis (2006). On this basis we developed the null hypothesis (the difference between the K11 average and the K06 average is equal to 0 or negative) and the alternative hypothesis (the difference between the K11 average and K06 average is positive):

$$H_0 : \mu_d \leq 0,$$

$$H_1 : \mu_d > 0,$$

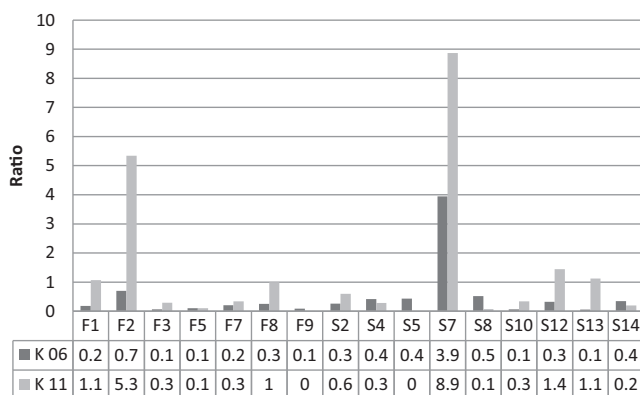


Fig. 1. Relationship between the fundamental and market values (ratio) 2006–2011.

Table 3

Descriptive statistics variables ( $|V|$  11 and  $|V|$  06).

		Mean	N	Standard deviation	Standard error mean
Pair 1	$ V $ 11	1.286	16	2.013	0.503
	$ V $ 06	0.869	16	0.584	0.146

Table 4

Correlation between variables ( $|V|$  11 and  $|V|$  06).

		N	Correlation	Sig.
Pair 1	$ V $ 11 and $ V $ 06	16	0.726	0.001

Table 5

Paired  $t$ -test ( $|V|$  11 and  $|V|$  06).

		Paired differences			T	Sig. (2-tailed)
		Mean	Standard deviation	Standard error mean		
Pair 1	$ V $ 11– $ V $ 06	0.417	1.639	0.409	1.019	0.324

Table 6

Descriptive statistics variables (K11 and K06).

		Mean	N	Standard deviation	Standard error mean
Pair 1	K11	1.319	16	2.389	0.597
	K06	0.500	16	0.937	0.234

Table 7

Correlation between variable (K11 and K06).

		N	Correlation	Sig.
Pair 1	K11 and K06	16	0.884	0.000

where  $\mu_d$  represents the arithmetic mean difference in value for each pair before/during.

Again we inserted data into the SPSS programme, this time from Picture 1 and used the paired  $t$ -test to check our hypotheses. Table 6 shows the descriptive statistics variables K11 and K06. Table 7 shows the correlation between variables K11 and K06. Table 8 shows the value of the  $t$ -test which is calculated as follows:

$$T = \frac{\text{Mean}}{\text{Standard error mean}} = \frac{0.820}{0.405} = 2.023$$

We were interested to see whether the test showed a statistically significant difference. Table 8 calculates the accurate level of characteristics for a two-tailed test, which is 0.061. Due to how we designed our hypotheses we had a one-tailed test, which was why it was necessary to carry out certain calculations. It was also necessary to check if the critical region and  $t$ -test values were on the same side. Our critical region was on the right, as was the  $t$ -test value, because:

$$\text{Sig.}_{(1\text{-tailed})} = \frac{\text{Sig.}_{(2\text{-tailed})}}{2} = 0.031$$

Due to the statistical characteristic result (one-tailed), which is 0.031 (which is less than 0.05), we came to the appropriate conclusion: with the level of characteristics being 0.05 we could reject the null hypothesis and confirm the alternative hypothesis that the K11 average was bigger than the K06 average. We could confirm that the market value of equity capital of the company in comparison with

**Table 8**  
Paired *t*-test (K11 and K06).

		Paired differences			<i>T</i>	Sig. (2-tailed)
		Mean	Standard deviation	Standard error mean		
Pair 1	K11–K06	0.820	1.621	0.405	2.023	0.061

the fundamental value of equity capital was smaller in times of crisis (2011) than before the crisis (2006), meaning that the equity capital of the company before the crisis was overvalued or in times of crisis undervalued.

Due to the smaller number of units (16 companies), we could not definitively confirm if the assumption of normal distribution was fulfilled. Therefore, we also checked the hypothesis using a non-parametric Wilcoxon signed-rank test, where we came to the same conclusion as with the paired *t*-test for dependent samples.

## 5. Conclusion

The market value of equity capital of Slovenian public limited companies has fallen sharply since the financial-economic crisis began. We assumed that the market values of the Slovenian public limited companies before the crisis were exaggerated and did not reflect the company's fundamental value of equity capital. We wanted to confirm our basic theory that the fundamental value of equity capital better reflects the market value of equity capital in today's times of crisis than before the crisis. We tested the validity of our theory with the hypothesis that the fundamental values of Slovenian public limited companies are closer to their market values now (2011) than before the crisis (2006).

From the results of our first *t*-test (sub-heading 3.8.1) we rejected our hypothesis. In the second paired *t*-test (sub-heading 3.8.2) we found that the ratios (companies' fundamental/market value of equity capital) on average are higher now, in times of crisis (2011) than before (2006). That means that the equity capital of the company before the crisis was overvalued or in times of crisis undervalued.

We evaluated the fundamental value of equity capital of Slovenian public limited companies (25 plc.) on the basis of discounted free cash flow, which is a part of equity. Knowing the fundamental value of equity capital of a company is key for: (a) acquisitions, mergers, sale and purchase of the company or part of the company, recapitalisation, separation and spin-off, withdrawal of shareholders, management buyouts and leveraged buyouts, (b) investment decisions, (c) accounting reports, (d) tax purposes, (e) legal disputes, (f) for making the right decisions on different levels (investors, employees, country, buyers, suppliers, banks, ...). It should be noted that the estimated fundamental value of the company is based on many assumptions which could influence the bias of the assessor, especially in the case of a small financial market with a short history where only recent data is available. Our analysis was based on a small sample but the selected companies represent almost 90% of the total market capitalisation of all shares listed on Ljubljana stock exchange in the studied time period. Therefore we can consider our sample representative of the Slovenian share market.

We have not detected any similar research in Slovenia. The scientific contribution of our study is the proposed methodology for equity valuation on a developing and small capital market with a short history of available data in times of an economic downturn. Our study is a clear demonstration of valuating the equity capital of Slovenian public limited companies. The research shows that

valuating equity capital is a challenging task which has to deal with an unpredictable future. The problems of valuating are also the assumptions and decisions of the assessor introducing subjectivity into the estimated value. Due to the aforementioned the estimated value can deviate from the fundamental value which has an effect on the behaviour of all company shareholders. It is important that the assessor takes in to account all the relevant information which is necessary for estimating value and on the basis of this information carry out the best possible valuation of variables which are included in the valuating model. All their decisions must have grounds. The users of this estimate must interpret the value, taking into account all assumptions and limitations. According to Norman (2008), this also opens an ethical question. This study also faced the problem of valuating in a small and developing capital market, with a short data history. In the valuation we used data from developed capital markets to help us, which requires additional assumptions.

This study is an important contribution to science and professions as it draws attention to the irrational behaviour of investors, who with a herd-like instinct and wish for profit, can influence the share price and thus supports the theory of an inefficient capital market. It also raises the question of ethical conduct of company shareholders, who with their unethical behaviour reduce the efficiency of the capital market. Reasons for high share prices before the financial-economic crises in the Slovenian capital market and large discrepancies in the market value of shares from the fundamental value of shares can also be factors and anomalies on a Slovenian capital market which are presumptions and difficult to prove their impact: (a) investors' inexperience and lack of knowledge of financial investments and risks, (b) low perceived risk by investors, as the Slovenian stock market since the creation to year 2008 predominantly recorded growth; (c) investors who have "insider" information about the company increasing share prices; (d) expected high acquisition value of the company. The reason can be a big share of state property in the public companies which could lead in a bad management (see Peslak, 2012; Trunk, Babnik, & Breznik, 2013) and performance below the companies potential; (e) purchasing of shares for too high prices (for speculative reasons) in order to sell the company for a higher price; and (f) lack of investment opportunities for the investor on the Slovenian capital market; (g) increased demand of shares to invest amounts that individuals was investing in mutual funds.

Future research can be conducted trying to find an impact the above reasons could have on large discrepancies in the market and fundamental values of shares.

Abnormally large corrections of share prices which occurred because of external factors like the financial-economic crisis have been very damaging to the Slovenian capital market as well as financial institutions on the Slovenian market. A large decline in trust in particular has threatened the operations of financial institutions and individual as well as company investment. Due to the abnormal importance of the operations of the financial system and the influence on the economy which was highlighted in the theoretical part of the paper, regulators should be able to detect and prevent large differences between the fundamental and market value of companies (Stubelj, 2009). The question is how to prevent the excessive growth of market stock prices. The solution may be



controlling the main factors that determine the internal values of stocks that are expected growth, risk and cash flow characteristics. The cash flow characteristics depend upon the business companies undertake. The risk which influences the cost of capital and the rate of growth may be influenced with monetary policy. Interest rates growth increases the cost of capital and decreases the economic growth perspectives and the expected growth rate of stocks. Both reduce the internal value of stocks. Countries part of the monetary union as Slovenia does not have an autonomous monetary policy, but they implement fiscal policy. Tax burden on profits and individual taxes on capital gains could affect the growth of stocks market value. However, market interventions needs caution because the effects are difficult to predict and may harm the economic activity. We must be aware that public companies represent just a part of the economy. Also small and the medium-sized enterprises (SMEs) are socially and economically very important since they represent more than 96% of all enterprises in Slovenia and 99% of all enterprises in the EU (Florjančič & Lesjak, 2010, see also Tavčar, Mitja, & Valerij Dermol, 2012). Regulators must monitor the capital market and enforce regulation to prevent anomalies that could lead to big discrepancies in the market values and fundamental values of shares.

The timely detection of inflated market share prices and the application of efficient mechanisms would also be sensible to explore, as it would prevent the market share prices from being inflated. It would also be sensible to design a qualitative research in order to investigate the relationships of all major shareholders (e.g. owners, managers, investors, employees, banks, suppliers, ...) to the problem of company valuation and examine the reasons which influence a distorted or unfair company value. It will be interesting to expand the study on other countries to compare the impact of the crisis on the market and fundamental values of listed stocks. The research of the effect of stock prices corrections on investment could be of great value to discuss the theories on the field.

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