Manifestations of a financial crisis at building enterprises of a regional significance

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Abstract: This contribution is intent on the problems of manifestations of a financial crisis at building enterprises of a regional significance and it is a component of the forming dissertation thesis on the theme „The Modelling of The Development of The Middle-Size Building Enterprise Value in the Real Competition of The Czech Republic." The contribution can be divided into theoretical and practical parts. While the theoretical part provides us with a contemporary state of the solved problems, the practical part devotes its attention to a case study which includes basic data about examined building enterprises X1 s.r.o. - X5 s.r.o. as well as their returns' evaluations by the method DCF Entity. The aims of the contribution are to demonstrate manifestations of a financial crisis on a created model of five building enterprises of a regional character with an analogous production and a size of an economic turnover and on the basis of own experience to prove the fact that if an enterprise is indebted, the returns' method DCF Entity becomes inaccurate. Because of achievements of these aims, the examined building enterprises are evaluated in the year 2010 when an impact of the financial crisis on their economic results was the most significant.

Keywords: Method DCF Entity, Prognosis β, Dangerous Premiums of a Country, Secure Interest Rate, Costs on Equity, Costs on Debts, Average Capital Costs, Two-Phase Calculation of Enterprise Value

Abstrakt: Tento příspěvek je zaměřen na problematiku finanční krize u stavebních závodů regionálního významu a je součástí rozpracované dizertační práce na téma "Modelování vývoje hodnoty středního stavebního závodu v reálné konkurenci ČR". Příspěvek lze rozdělit na část teoretickou a praktickou. Zatímco teoretická část nás seznamuje se současným stavem řešené problematiky, praktická část je zaměřena na případovou studii, která zahrnuje jak základní údaje o sledovaných stavebních závodech X1 s.r.o. – X5 s.r.o., tak jejich výnosové ocenění metodou DCF entity. Cílem příspěvku je znázornit projevy finanční krize na vytvořeném modelu pěti stavebních závodů s obdobnou produkcí a velikostí ekonomického obratu, a na základě vlastních zkušeností prokázat, že je-li závod předlužen, výnosová metoda DCF entity se stává nepřesnou. Za účelem dosažení těchto cílů je ocenění sledovaných stavebních závodů zasazeno do roku 2010, v němž byl zaznamenán nejvýraznější dopad finanční lrize na jejich hospodářské výsledky.

1. Introduction

Building industries are one of the most important branches of a national economy and they are sometimes considered to be the most significant indicator of an economic growth and a development of a society. By reason of this, building industries are monitored in all countries. Because a synergistic effect of a building industries' activity on revitalizing national-economic results is proved, in case of an economic efficiency, decline investments are aimed just at building orders.

Recently, there have been talks of an ongoing financial crisis and economic downturns of most developed countries, including the Czech Republic. The truth is, that the first signs of a financial crisis coming into the Czech Republic were already noticed in the year 2009 when there were declines in Gross Domestic Product as well as in a building production. A financial crisis impact on building enterprises in the Czech Republic showed itself up afterwards, however, this delay was caused by one specification of a building production namely by a long productive cycle. Building enterprises in the Czech Republic were then constrained to solve problems connected not with the financial crisis coming but with the already ongoing crisis.

2. Materials and Methods

DCF Entity is used in this contribution as the main calculation method. It belongs to methods based on a returns' analysis and consists in a calculation of Free Cash Flow which is a volume of financial means available to proprietors of an enterprise without a risk of a disturbance of its further development. Prognosis ß is assessed as an arithmetical average of values calculated by means of business and financial risks, historical data, factors for a valuation of a coefficient ß and a risk in the USA for a branch of building industries. Dangerous Premiums of a Country can be assessed either by means of a rating evaluation or according to categories whereupon the first possibility is more accurate because it goes out from real data; the second possibility is quite subjective and therefore it is used only for a comparison. Secure Interest Rate is ascertained from a return of ten-year state bonds according to Czech National Bank. Costs on Equity are calculated by means of Capital Asset Pricing Model which is modified for the Czech Republic by dangerous additional charges for small enterprises, a market capitalization and the other specific risks. Cost on Debts are assessed on the basis of Interest Reimbursement Ratio. Average Capital Costs reprezent a sum of costs on Equity and Debts upon the condition that an income taxation rate as well as shares of Equity and Debts in a total capital are taken into account. Two-Phase Calculation of An Enterprise Value goes out from a calculation of a contemporary value of the first phase which is followed by an ascertainment of a continuing value in a time (a contemporary value of the second phase); a gross operating value reprezents a sum of the first and the second phases and after taking interest-born debts and non-operating assets into consideration, a resultant value of Equity is acquired.

3. Results including Discussion

3.1.Basic Data about the Examined Building Enterprises X_1 s.r.o. - X_5 s.r.o.

3.1.1. Building Enterprise X_1 s.r.o.

- Law form: Limited company
- Object of the activity: Productions of steel constructions of halls
  Complete realizations of structures including complete repairs and reconstructions
  Carpentry, slatery, locksmithery and tinsmithery
  Constructions of family houses, industrial halls and agricultural structures

- Place of business: Svitavy
- Number of employees: 55
- Day of the evaluation: 31.12.2010

3.1.2. Building Enterprise X_2 s.r.o.

- Law form: Limited company
- Object of the activity: Housing constructions, reconstructions of buildings, industrial structures and structures of civil facilities
  Masonic workings, tilery, carpentry, tinsmithery, locksmithery and smithery
  Constructions of family houses, productive and warehousing objects according to requirements of an investor
  Productions of steel constructions of halls
  Smithing production according to individual needs of a customer
- Place of business: Svitavy
- Number of employees: 60
- Day of the evaluation: 31.12.2010

3.1.3. Building Enterprise X_3 s.r.o.

- Law form: Limited company
- Object of the activity: Productions of steel constructions of halls
  Constructions of family houses
  Smithing production
  Housing constructions and reconstructions of buildings
  Industrial structures and structures of civil facilities
- Place of business: Svitavy
- Number of employees: 60
- Day of the evaluation: 31.12.2010

3.1.4. Building Enterprise X_4 s.r.o.

- Law form: Limited company
- Object of the activity: Industrial structures, structures of civil facilities and housing constructions
  Demolitions of objects
  Structures of engineering conduits
  Installations of objects
  Carpentry, locksmithery, tinsmithery and slatery
  Productions of steel constructions of halls
  Complete constructions of family houses
- Place of business: Svitavy
- Number of employees: 53
- Day of the evaluation: 31.12.2010

3.1.5. Building Enterprise X_5 s.r.o.

- Law form: Limited company
- Object of the activity: Constructions of civil housing and industrial objects including engineering conduits
  Constructions of family houses, reconstructions and repairs of prezent objects

Complete realizations of structures including complete repairs and reconstructions
Masonic workings, tilery and pavery
Productions and assemblies of steel constructions
Carpentry and painting workings
Special industrial floors

- Place of business: Svitavy
- Number of employees: 58
- Day of the evaluation: 31.12.2010

3.2. Returns' Evaluations of the Building Enterprises X_1 s.r.o. - X_5 s.r.o. by the Method DCF Entity

- Prognosis ß

Possibility 1: The assessment on the basis of business and financial risks

Example 1: The assessment of the coefficient ß on the basis of business and financial risks (Source: [1])

ß = 1 + OR + FR,

where:

OR..... a business risk (an additional charge for a systematic business risk)

FR..... a financial risk (an additional charge for a systematic financial risk)

As far as the business risk is concerned, it is possible to define five classes of this risk. The first class reprezents the lowest risk, the third class creates „average" and the fifth class responds to the highest systematic business risk (see Table 1: The business risk).

Table 1. The business risk
(Source: [1])

A class of a systematic business risk	A dangerous modification of the coefficient ß	A risk
1	-0,5	the lowest
2	-0,25	
3	0	average
4	0,25	
5	0,5	the highest

When it comes to the financial risk, it arises owing to an indebtedness of an enterprise (see Table 2: The financial risk).

Table 2. The financial risk
(Source: [1])

The indebtedness of an enterprise	A dangerous modification of the coefficient ß (FR) in comparison with a change at a basic indebtedness
0%	-0,2
20%	-0,1
40%	0
60%	+0,1
80%	+0,2
100%	+0,3
120%	+0,4
140%	+0,5

The building enterprise X1 s.r.o.:

ß = 1 + OR + FR

ß = 1 + 0 + 0,4

ß = 1,4

The building enterprise X1 s.r.o. was included in the third class of the systematic business risk because it belongs to average enterprises which don't fulfil any criterion of the higher business risk (OR = 0). From the financial risk's point of view, it was chosen FR = +0,4 because the indebtedness of the enterprise amounts in the year 2010: CK/VK = 12746/10063 = 1,27x100 = 127%.

The building enterprise X2 s.r.o.:

ß = 1 + OR + FR

ß = 1 + 0 + 0,5

ß = 1,5

The building enterprise X2 s.r.o. was included in the third class of the systematic business risk because it belongs to average enterprises which don't fulfil any criterion of the higher business risk (OR = 0). From the financial risk's point of view, it was chosen FR = +0,5 because the indebtedness of the enterprise amounts in the year 2010: CK/VK = 18208/7314 = 2,49x100 = 249%.

The building enterprise X3 s.r.o.:

ß = 1 + OR + FR

ß = 1 + 0 + 0,5

ß = 1,5

The building enterprise X3 s.r.o. was included in the third class of the systematic business risk because it belongs to average enterprises which don't fulfil any criterion of the higher business risk (OR = 0). From the financial risk's point of view, it was chosen FR = +0,5 because the indebtedness of the enterprise amounts in the year 2010: CK/VK = 11950/6512 = 1,84x100 = 184%.

The building enterprise X4 s.r.o.:

ß = 1 + OR + FR

ß = 1 + 0 + 0,5

ß = 1,5

The building enterprise X4 s.r.o. was included in the third class of the systematic business risk because it belongs to average enterprises which don't fulfil any criterion of the higher business risk (OR = 0). From the financial risk's point of view, it was chosen FR = +0,5 because the indebtedness of the enterprise amounts in the year 2010: CK/VK = 10200/5810 = 1,76x100 = 176%.

The building enterprise X5 s.r.o.:

ß = 1 + OR + FR

ß = 1 + 0 + 0,5

ß = 1,5

The building enterprise X5 s.r.o. was included in the third class of the systematic business risk because it belongs to average enterprises which don't fulfil any criterion of the higher business risk (OR = 0). From the financial risk's point of view, it was chosen FR = +0,5 because the indebtedness of the enterprise amounts in the year 2010: CK/VK = 9870/4820 = 2,05x100 = 205%.

Possibility 2: The assessment on the basis of historical data

Example 2: The assessment of the coefficient ß on the basis of historical data (Source: [1])

$$ß_Z = ß_N \, x\,[1 + (1 - d)\, x\, CK/VK]\,,$$

where:

ßZ..... ß of Equity of an insolvent enterprise (a speculative ß)

ßN..... ß of Equity provided a zero indebtedness (a non-speculative ß)

d ..... an income taxation rate

CK.... Debts

VK.... Equity

If financing by Equity is presumed, the coefficient ßN amounts 0,40 for the branch of building industries.

The building enterprise X1 s.r.o.:

ßZ = ßN x [1 + (1 - d) x CK / VK]

ßZ = 0,40 x [1 + (1 – 0,19) x 12746 / 10063]

ßZ = 0,8104

The building enterprise X2 s.r.o.:

ßZ = ßN x [1 + (1 - d) x CK / VK]

ßZ = 0,40 x [1 + (1 – 0,19) x 18208 / 7314]

ßZ = 1,2066

The building enterprise X3 s.r.o.:

ßZ = ßN x [1 + (1 - d) x CK / VK]

ßZ = 0,40 x [1 + (1 – 0,19) x 11950 / 6512]

ßZ = 0,9946

The building enterprise X4 s.r.o.:

ßZ = ßN x [1 + (1 - d) x CK / VK]

ßZ = 0,40 x [1 + (1 – 0,19) x 10200 / 5810]

ßZ = 0,9688

The building enterprise X5 s.r.o.:

ßZ = ßN x [1 + (1 - d) x CK / VK]

ßZ = 0,40 x [1 + (1 – 0,19) x 9870 / 4820]

ßZ = 1,0635

Possibility 3: The assessment on the basis of factors for a valuation of the coefficient ß

The coefficient ß is influenced by factors which belong to the area of an enterprise, operating and financial levers. The particular factors including the scale for the evaluation of the riskiness and the evaluators' choices are stated in the following table.

Table 3. Factors of a valuation of the coefficient ß

(Source: [1])

Factors for a valuation of the coefficient ß / A scale for a riskiness evaluation	0,5	1	1,5	„ The evaluators' choices (the building enterprises X_1 s.r.o. - X_5 s.r.o.)“
1. A susceptibility to changes of an economic cycle	a minimal susceptibility	it develops with a cycle	a high susceptibility	it develops with a cycle => 1
2. A negotiating strength rowards suppliers	a prevalence of an enterprise	well-balanced	a prevalence of suppliers	well-balanced => 1
3. A negotiating strength towards customers	a prevalence of an enterprise	well-balanced	a prevalence of customers	well-balanced => 1
4. A share of fixed costs in total costs	low	average	high	average => 1
5. A rate of an indebtedness	less than 40%	40%-80%	80% and more	80% and more => 1,5
6. A size of an enterprise	great	middle	small	middle => 1
7. A diversity of an area	considerable	middle	small	middle => 1
8. A diversity of product	considerable	middle	small	middle => 1

For the valuation of the coefficient ß, it is necessary to take the particular grades of the risk as well as the number of their occurrences into consideration (see Table 4: The valuation of the coefficient ß).

Table 4. The valuation of the coefficient ß
(Source: [1])

A grade of the risk A	A number of occurrences B (X_1 s.r.o. - X_5 s.r.o.)	A x B (X_1 s.r.o. - X_5 s.r.o.)
0,5	0	0
1	7	7
1,5	1	1,5
total	8	8,5

Example 3: The valuation of the coefficient ß (Source: [1])

$$ß = (A \times B) / B$$

where:
A.... a grade of the risk
B.... a number of occurrences
The building enterprises X1 s.r.o. - X5 s.r.o.:

ß = (A x B) / B
ß = 8,5 / 8
ß = 1,0625

Posibility 4: The risk in the USA for a branch of building industries

If a real indebtedness is presumed, the coefficient ß amounts 1,32 for the branch of building industries in the USA.

Example 4: The assessment of the prognosis ß by means of an arithmetical average (Source: [1])

$$ß = \sum_{i=1}^{n} ß_n / n$$

where:
ßn..... possibilities of assessments of the coefficient ß
n..... a number of possibilities of assessments of the coefficient ß

The building enterprise X1 s.r.o.:

Possibility 1: ß = 1,4
Possibility 2: ß = 0,8104
Possibility 3: ß = 1,0625
Possibility 4: ß = 1,32

$$ß = \sum_{i=1}^{n} ß_n / n$$

ß = (1,4 + 0,8104 + 1,0625 + 1,32) / 4
ß = 4,5929 / 4
ß = 1,1482

The building enterprise X2 s.r.o.:

Possibility 1: ß = 1,5
Possibility 2: ß = 1,2066
Possibility 3: ß = 1,0625
Possibility 4: ß = 1,32

$$ß = \sum_{i=1}^{n} ß_n / n$$

ß = (1,5 + 1,2066 + 1,0625 + 1,32) / 4
ß = 5,0891 / 4
ß = 1,2723

The building enterprise X3 s.r.o.:

Possibility 1: ß = 1,5
Possibility 2: ß = 0,9946
Possibility 3: ß = 1,0625
Possibility 4: ß = 1,32

$$ß = \sum_{i=1}^{n} ß_n / n$$

ß = (1,5 + 0,9946 + 1,0625 + 1,32) / 4
ß = 4,8771 / 4
ß = 1,2193

The building enterprise X4 s.r.o.:

Possibility 1: ß = 1,5
Possibility 2: ß = 0,9688
Possibility 3: ß = 1,0625
Possibility 4: ß = 1,32

$$ß = \sum_{i=1}^{n} ß_n / n$$

ß = (1,5 + 0,9688 + 1,0625 + 1,32) / 4
ß = 4,8513 / 4
ß = 1,2128

The building enterprise X5 s.r.o.:

Possibility 1: ß = 1,5
Possibility 2: ß = 1,0635
Possibility 3: ß = 1,0625
Possibility 4: ß = 1,32

$$ß = \sum_{i=1}^{n} ß_n / n$$

ß = (1,5 + 1,0635 + 1,0625 + 1,32) / 4
ß = 4,9460 / 4
ß = 1,2365

- Dangerous Premiums of A Country

Possibility 1: The assessment by means of a rating evaluation

A total dangerous premium which consisted of a basic dangerous premium (5,50%) and an additional dangerous premium (1,70%) amounts 7,20% in the Czech Republic (see Table 5: Dangerous premiums in the Czech Republic).

Table 5. Dangerous premiums in the Czech Republic
(Source: [1])

A country	S&P Rating	A basic dangerous premium	An additional dangerous premium	A total dangerous premium
the Czech Republic	A-	5,50%	1,70%	7,20%

Possibility 2: The assessment according to categories (Business Valuation News)

According to size a of a dangerous premium, enterprises can be divided into five categories (see Table 6: Expert valuations of dangerous premiums).

Table 6. Expert valuations of dangerous premiums
(Source: [1])

A category	A dangerous premium	Characterizations of enterprises
1	6-10%	- established enterprises, strong positions on a market
		- a limited competition
		- financially stable
		- an efficient management
		- a stable previous development
		- a stable development is expected in the future as well
2	11-15%	- estabilished enterprises
		- a relatively strong competition
		- financially stable
		- a good management
		- a stable previous development
		- a further development can be foreseen quite well
3	16-20%	- enterprises in branches with a very strong competition
		- good results in the past
		- a limited capital pretension
		- enterprises don't require an extraordinary know-how
4	21-25%	- estabilished enterprises
		- a cyclic development
		- a dependence on special experience and knowledge of a limited group of people
		- a heavily foreseeable development
5	26-30%	- activities of independent entrepreneurs in the area of services
		- enterprise's returns can be problematically brought forward

The building enterprises X1 s.r.o. - X5 s.r.o. were included in the second category; the dangerous premium amounts 11-15%.

The enterprises X1 s.r.o. - X5 s.r.o.:

Possibility 1: 7,2%

Possibility 2: 11-15%

Further on, it is calculated with the dangerous premium assessed by means of the rating evaluation (see Possibility 1) because it is more accurate and goes out from real data. The dangerous premium assessed according to categories (see Possibility 2) is quite subjective and therefore it is used only for a comparison.

- Secure Interest Rate

A secure interest rate rf is ascertained from a return of ten-year state bonds according to Czech National Bank; it amounts 4,40% for the year 2010.

- Costs on Equity

Cost on Equity are calculated on the basis of Capital Asset Pricing Model which is modified for the Czech Republic by dangerous additional charges for small enterprises, a market capitalization and the other specific risks.

Example 5: Costs on Equity (Source: [1])

$$r_e = r_f + ß \times ZRP + PMP + PTK + PSR ,$$

where:

re.... costs on Equity

rf..... a secure interest rate

ZRP... a basic dangerous additional charge

PMP..... a dangerous additional charge for small enterprises

PTK.... a dangerous additional charge for a market capitalization (it is mostly omitted)

PSR.... a dangerous additional charge for the other specific risks (PSR = 3-5% for the Czech Republic)

The building enterprise X1 s.r.o.:

re = rf + ß x ZRP + PMP + PTK + PSR
re = 4,40 + (1,1482 x 7,20) + 4 + 0 + 3
re = 19,67%

The building enterprise X2 s.r.o.:

re = rf + ß x ZRP + PMP + PTK + PSR
re = 4,40 + (1,2723 x 7,20) + 4 + 0 + 3
re = 20,56%

The building enterprise X3 s.r.o.:

re = rf + ß x ZRP + PMP + PTK + PSR
re = 4,40 + (1,2193 x 7,20) + 4 + 0 + 3
re = 20,18%

The building enterprise X4 s.r.o.:

re = rf + ß x ZRP + PMP + PTK + PSR
re = 4,40 + (1,2128 x 7,20) + 4 + 0 + 3
re = 20,13%

The building enterprise X5 s.r.o.:

re = rf + ß x ZRP + PMP + PTK + PSR
re = 4,40 + (1,2365 x 7,20) + 4 + 0 + 3
re = 20,30%

- Costs on Debts

Cost on Debts are assessed as a sum of a secure interest rate and a recommended additional charge. The recommended additional charge is valuated by means of a rating grade of a debt of an evaluated enterprise which means that a concrete debt of an enterprise is added to a group of bonds on a market which is weighted by a similarly reduced risk; a basis of this assessment is Interest Reimbursement Ratio.

Example 6: Interest Reimbursement Ratio
(Source: [1])

$$Interest\ Reimbursement\ Ratio = \frac{EBIT}{cost\ 'interest} ,$$

where:

EBIT ….. Earnings before Interest and Taxes

Table 7. Recommended additional charges of costs on Debts
(Source: [1])

Rating grades	Recommended additional charges of costs on Debts
AAA	0,75%
AA	1,00%
A^+	1,50%
A	1,80%
A^-	2,00%
BBB	2,25%
BB	3,50%
B^+	4,75%
B	6,50%
B-	8,00%
CCC	10,00%
CC	11,50%
C	12,70%
D	14,00%

The building enterprise X1 s.r.o:

$$Interest\ Reimbursement\ Ratio = \frac{EBIT}{costs'\ interest} = \frac{2773}{129} = 21{,}50\ percent$$

The building enterprise X1 s.r.o. is included in the rating grade D which means that the recommended additional charge amounts 14,00% (see Table 7: Recommended additional charges of costs on Debts).

The building enterprise X2 s.r.o.:

$$Interest\ Reimbursement\ Ratio = \frac{EBIT}{costs'\ interest} = \frac{2590}{110} = 23{,}55\ percent$$

The building enterprise X2 s.r.o. is included in the rating grade D which means that the recommended additional charge amounts 14,00% (see Table 7: Recommended additional charges of costs on Debts).

The building enterprise X3 s.r.o.:

$$Interest\ Reimbursement\ Ratio = \frac{EBIT}{costs'\ interest} = \frac{1130}{150} = 7{,}53\ percent$$

The building enterprise X3 s.r.o. is included in the rating grade B- which means that the recommended additional charge amounts 8,00% (see Table 7: Recommended additional charges of costs on Debts).

The building enterprise X4 s.r.o.:

$$Interest\ Reimbursement\ Ratio = \frac{EBIT}{costs'\ interest} = \frac{1530}{180} = 8{,}50\ percent$$

The building enterprise X4 s.r.o. is included in the rating grade B- which means that the recommended additional charge amounts 8,00% (see Table 7: Recommended additional charges of costs on Debts).

The building enterprise X5 s.r.o.:

$$Interest\ Reimbursement\ Ratio = \frac{EBIT}{costs'\ interest} = \frac{1850}{510} = 3{,}63\ percent$$

The building enterprise X5 s.r.o. is included in the rating grade BB which means that the recommended additional charge amounts 3,50% (see Table 7: Recommended additional charges of costs on Debts).

The secure interest rate of long-termed state bonds amounts 4,40% for the year 2010.

Example 7: Costs on Debts (Source: [1])

$$r_e = r_f + a\ recommended\ additional\ charge\ ,$$

where:
rd.... costs on Debts
rf..... a secure interest rate

The building enterprise X1 s.r.o.:
rd = rf + a recommended additional charge
rd = 4,40% + 14,00%
rd = 18,40%
The building enterprise X2 s.r.o.:
rd = rf + a recommended additional charge
rd = 4,40% + 14,00%
rd = 18,40%
The building enterprise X3 s.r.o.:
rd = rf + a recommended additional charge
rd = 4,40% + 8,00%
rd = 12,40%
The building enterprise X4 s.r.o.:
rd = rf + a recommended additional charge
rd = 4,40% + 8,00%
rd = 12,40%
The building enterprise X5 s.r.o.:
rd = rf + a recommended additional charge
rd = 4,40% + 3,50%
rd = 7,90%

- Average Capital Costs

Average capital costs represent a sum of costs on Equity and Debts upon the condition that an income taxation rate as well as shares of Equity and Debts in a total capital are taken into consideration.

Example 8: Average Capital Costs (Source: [1])

$$WACC = r_d\ x\ (1-t)\ x\ D/C + r_e\ x\ E/C\ ,$$

where:
WACC.... average capital costs
rd..... costs on Debts
t..... an income taxation rate
D..... Debts
C..... a total capital
re..... costs on Equity
E..... Equity

The building enterprise X1 s.r.o.:
WACC = rd x (1-t) x D / C + re x E / C
WACC = 18,40 x (1 – 0,19) x 55,9 / 100 + 19,67 x 44,1 / 100
WACC = 17,0%
The building enterprise X2 s.r.o.:
WACC = rd x (1-t) x D / C + re x E / C
WACC = 18,40 x (1 – 0,19) x 71,3 / 100 + 20,56 x 28,7 / 100
WACC = 16,5%
The building enterprise X3 s.r.o.:
WACC = rd x (1-t) x D / C + re x E / C

WACC = 12,40 x (1 – 0,19) x 64,7 / 100 + 20,18 x 35,3 / 100
WACC = 13,6%

The building enterprise X4 s.r.o.:

WACC = rd x (1-t) x D / C + re x E / C
WACC = 12,40 x (1 – 0,19) x 63,7 / 100 + 20,13 x 36,3 / 100
WACC = 13,7%

The building enterprise X5 s.r.o.:

WACC = rd x (1-t) x D / C + re x E / C
WACC = 7,90 x (1 – 0,19) x 67,2 / 100 + 20,30 x 32,8 / 100
WACC = 11,0%

- Two-Phase Calculation of An Enterprise Value

In the following tables the two-phase calculations of the values of the building enterprises X1 s.r.o. - X5 s.r.o. are carried out. These two-phase calculations are based on assessments of contemporary values of the first phase and continuing values in a time (contemporary values of the second phase). As far as the gross operating values of the building enterprises X1 s.r.o. - X5 s.r.o. are concerned, they represent a sum of the first and the second phases. The resulting values of Equity are acquired after taking interest-born debts and non-operating assets into consideration.

The building enterprise X1 s.r.o.:

Table 8. Cumulate DFCF Entity – the contemporary value of the first phase (X1 s.r.o.)
(Source: [1])

Data in thousands Czech crowns	The calculation	2005	2006	2007	2008	2009	2010
Earnings before Interest and Taxes	V30	-256,00	1914,00	1396,00	699,00	1396,00	2773,00
Income taxation rate	a rate	26,00%	24,00%	24,00%	21,00%	20,00%	19,00%
Taxations of Earnings and Interest	ZZ before = V30 x a rate	-68,90	459,36	335,04	146,79	69,40	526,87
Earnings and Interest after Taxes	ZZ after = V30 - ZZ before	-196,10	1454,64	1060,96	552,21	277,60	2246,13
Modifications by non-monerary operations	CF4 = CF5 + CF6 + CF10 + CF12	894,00	1713,00	863,04	760,86	1683,62	1436,00
Depreciations of fixed assets	CF5	687,00	650,00	53,04	626,52	814,35	571,00
Changes in states of items of correction, reserves and transient accounts of assets and	CF6	-600,00	62,00	-73,00	-568,26	242,82	95,00

liabilities							
Accounts of costs' and returns' interest	CF12	177,00	193,00	128,00	86,18	-48,95	129,00
Earnings (Loss) from a sale of fixed assets	CF10	630,00	808,00	755,00	616,42	675,40	641,00
Cash Flow from the operating activity before changes in Working Capital	CF = ZZ after + CF4	697,90	3167,64	1924,00	1313,07	1961,22	3682,13
Changes in Working Capital	CF14 = CF15 + CF16 + CF17	-3486,00	2208,00	826,00	3683,82	-5451,94	-3800,00
Changes in states of claims	CF15	-10262,00	-13239,00	26395,00	-7125,82	-26164,55	-12984,00
Changes in states of short-termed obligations	CF16	6211,00	19066,00	-23954,00	12990,47	20196,68	10353,00
Changes in states of stocks	CF17	565,00	-3619,00	-1615,00	-2180,83	515,93	-1169,00
Cash Flow from the operating activity	CFp = CF + CF14	-2788,10	5375,64	2750,00	4996,89	-3490,72	-117,87
Acquirement of fixed assets	CF24 = CF25 + CF26	-859,00	-1150,00	-1534,00	-1227,73	-1412,26	-1051,00
Receipts from a sale of fixed assets	CF26	-630,00	-808,00	-755,00	-616,42	-675,40	-641,00
Costs connected with the acquirement of fixed assets	CF25	-229,00	-342,00	-779,00	-611,31	-736,86	-410,00
FCF Entity – Free Cash Flow in the enterprise	FCF = CFP + CF24	-3647,10	4225,64	1216,00	3769,16	-4902,98	-1168,87
Interest Payment Off	a rate	0,735	0,681	0,630	0,583	0,583	0,583
DFCF – Discounted Free Cash Flow	DFCF = FCF x a rate	-2680,62	2877,66	766,08	2197,42	-2858,44	-681,45

Cumulate Discounted Free Cash Flow		-2680,62	197,04	963,12	3160,54	302,10	-379,35
Sum of Discounted Free Cash Flow – the contemporary value of the first phase by the method DCF Entity		-379,35					

Example 9: Continuing value in a time (Source: [1])

$$T = \frac{FCF_T + 1}{i_k - g},$$

The building enterprise X1 s.r.o.:

$$T = \frac{FCF_T + 1}{i_k - g}$$

$$T = \frac{-379{,}35}{0{,}08 - 0}$$

$$T = \frac{-379{,}35}{0{,}08}$$

$$T = -4742\,thousands\,Czech\,crowns$$

Table 9. Resulting market value assessed by the method DFCF Entity (X1 s.r.o.)
(Source: [1])

	The calculation	Total in thousands Czech crowns
Evaluation of the first phase		-4742
Discounted rate for the second phase		8%
Pace of the increase for the second phase		0%
Free Cash Flow in the first year of the second phase	-4742 x 1	-4742
Evaluation of the second phase (a continuing value)	-4742 / (0,08 - 0)	-59275
Interest Payment Off for the year 2010		0,583
Contemporary value of the second phase	-59275 x 0,583	-34557
Gross operating value	-4742 + **(**-34557**)**	-39299
Interest-born debts to the taxation date		3500
Net operating value	-39299 - 3500	-42799
Non-operating assets to the taxation date		0
Resulting value of Equity		-42799

The market value of the building enterprise X1 s.r.o. assessed by the method DCF Entity amounts – 42 799 000 Czech crowns to 31.12.2010.

The building enterprise X2 s.r.o.:

Table 9. Cumulate DFCF Entity – the contemporary value of the first phase (X2 s.r.o.)
(Source: [1])

Data in thousands Czech crowns	The calculation	2005	2006	2007	2008	2009	2010

Earnings before Interest and Taxes	V30	3580,00	3333,00	3680,00	3250,00	2680,00	2590,00
Income taxation rate	a rate	26,00%	24,00%	24,00%	21,00%	20,00%	19,00%
Taxations of Earnings and Interest	ZZ before = V30 x a rate	930,80	799,20	883,20	682,50	536,00	492,10
Earnings and Interest after Taxes	ZZ after = V30 - ZZ before	2649,20	2530,80	2796,80	2567,50	2144,00	2097,90
Modifications by non-monerary operations	CF4 = CF5 + CF6 + CF10 + CF12	1237,00	1910,00	1750,00	1420,00	1050,00	970,00
Depreciations of fixed assets	CF5	618,00	623,00	550,00	570,00	420,00	410,00
Changes in states of items of correction, reserves and transient accounts of assets and liabilities	CF6	210,00	330,00	248,00	274,00	180,00	175,00
Accounts of costs' and returns' interest	CF12	174,00	150,00	125,00	130,00	118,00	110,00
Earnings (Loss) from a sale of fixed assets	CF10	235,00	807,00	827,00	446,00	332,00	275,00
Cash Flow from the operating activity before changes in Working Capital	CF = ZZ after + CF4	3886,20	4440,80	4546,80	3987,50	3194,00	3067,90
Changes in Working Capital	CF14 = CF15 + CF16 + CF17	-3434,28	-3923,21	-4054,30	-3468,42	-2726,23	-2623,95
Changes	CF15	-1055,60	-1218,78	-1375,62	-1522,60	-1478,32	-1620,00

in states of claims							
Changes in states of short-termed obligations	CF16	-998,78	-898,62	-902,10	-930,90	-558,99	-477,88
Changes in states of stocks	CF17	-1379,90	-1805,81	-1776,58	-1014,92	-688,92	-526,07
Cash Flow from the operating activity	CFp = CF + CF14	451,92	517,59	492,50	519,08	467,77	443,95
Acquirement of fixed assets	CF24 = CF25 + CF26	-387,00	-440,00	-408,00	-420,00	-419,00	-404,00
Receipts from a sale of fixed assets	CF26	-259,00	-268,00	-263,00	-248,00	-230,00	-212,00
Costs connected with the acquirement of fixed assets	CF25	-128,00	-172,00	-145,00	-172,00	-189,00	-192,00
FCF Entity – Free Cash Flow in the enterprise	FCF = CFP + CF24	64,92	77,59	84,50	99,08	48,77	39,95
Interest Payment Off	a rate	0,735	0,681	0,630	0,583	0,583	0,583
DFCF – Discounted Free Cash Flow	DFCF = FCF x a rate	47,72	52,84	53,24	57,76	28,43	23,29
Cumulate Discounted Free Cash Flow		47,72	100,56	153,80	211,56	239,99	263,28
Sum of Discounted Free Cash Flow – the contemporary value of the first phase by the method		263,28					

DCF Entity							

The building enterprise X2 s.r.o.:

$$T = \frac{FCF_T + 1}{i_k - g}$$

$$T = \frac{263{,}28}{0{,}08 - 0}$$

$$T = \frac{263{,}28}{0{,}08}$$

$$T = 3291\ thousands\ Czech\ crowns$$

Table 11. Resulting market value assessed by the method DFCF Entity (X2 s.r.o.)
(Source: [1])

	The calculation	Total in thousands Czech crowns
Evaluation of the first phase		3291
Discounted rate for the second phase		8%
Pace of the increase for the second phase		0%
Free Cash Flow in the first year of the second phase	3291 x 1	3291
Evaluation of the second phase (a continuing value)	3291 / (0,08 - 0)	41137,5
Interest Payment Off for the year 2010		0,583
Contemporary value of the second phase	41137,50 x 0,583	23983,16
Gross operating value	3291 + 23983,16	27274,16
Interest-born debts to the taxation date		15820
Net operating value	27274,16 – 15820,00	11457,16
Non-operating assets to the taxation date		0
Resulting value of Equity		11454,16

The market value of the building enterprise X2 s.r.o. assessed by the method DCF Entity amounts 11 454 160 Czech crowns to 31.12.2010.

The building enterprise X3 s.r.o.:

Table 12. Cumulate DFCF Entity – the contemporary value of the first phase (X3 s.r.o.)
(Source: [1])

Data in thousands Czech crowns	The calculation	2005	2006	2007	2008	2009	2010
Earnings before Interest and Taxes	V30	1580,00	1420,00	1430,00	1500,00	1210,00	1130,00
Income taxation rate	a rate	26,00%	24,00%	24,00%	21,00%	20,00%	19,00%
Taxations of Earnings and Interest	ZZ before = V30 x a rate	410,80	340,80	343,20	315,00	242,00	214,70
Earnings and Interest after Taxes	ZZ after = V30 - ZZ before	1169,20	1079,20	1086,80	1185,00	968,00	915,30
Modifications by	CF4 = CF5 + CF6 + CF10 +	1115,00	1155,00	1235,00	1100,00	983,00	920,00

non-monerary operations	CF12						
Depreciations of fixed assets	CF5	310,00	310,00	350,00	350,00	270,00	250,00
Changes in states of items of correction, reserves and transient accounts of assets and liabilities	CF6	105,00	105,00	120,00	120,00	95,00	80,00
Accounts of costs' and returns' interest	CF12	180,00	190,00	175,00	180,00	158,00	150,00
Earnings (Loss) from a sale of fixed assets	CF10	520,00	550,00	590,00	450,00	460,00	440,00
Cash Flow from the operating activity before changes in Working Capital	CF = ZZ after + CF4	2284,20	2234,20	2321,80	2285,00	1951,00	4835,30
Changes in Working Capital	CF14 = CF15 + CF16 + CF17	-1765,00	-1716,00	-1670,00	-1800,00	-1820,00	1830,00
Changes in states of claims	CF15	-995,00	-980,00	-910,00	-980,00	-1020,00	-1050,00
Changes in states of short-termed obligations	CF16	-580,00	-506,00	-540,00	-550,00	-620,00	-630,00
Changes in states of stocks	CF17	-250,00	-230,00	-220,00	-270,00	-180,00	-150,00
Cash Flow from the operating activity	CFp = CF + CF14	519,20	518,20	651,80	485,00	131,00	5,30
Acquirem	CF24 =						

ent of fixed assets	CF25 + CF26	-460,00	-480,00	520,00	-480,00	-304,21	-87,26
Receipts from a sale of fixed assets	CF26	-310,00	-350,00	-380,00	-330,00	-149,21	-49,26
Costs connected with the acquirement of fixed assets	CF25	-150,00	-130,00	-140,00	-150,00	-155,00	-38,00
FCF Entity – Free Cash Flow in the enterprise	FCF = CFP + CF24	59,20	38,20	131,80	5,00	173,21	-81,96
Interest Payment Off	a rate	0,735	0,681	0,630	0,583	0,583	0,583
DFCF – Discounted Free Cash Flow	DFCF = FCF x a rate	43,51	26,01	83,03	2,92	-100,98	-47,78
Cumulate Discounted Free Cash Flow		43,51	69,52	152,55	155,47	54,49	6,71
Sum of Discounted Free Cash Flow – the contemporary value of the first phase by the method DCF Entity		6,71					

The building enterprise X3 s.r.o.:

$$T = \frac{FCF_T + 1}{i_k - g}$$

$$T = \frac{6,71}{0,08 - 0}$$

$$T = \frac{6,71}{0,08}$$

$$T = 84\,thousands\,Czech\,crowns$$

Table 13. Resulting market value assessed by the method DFCF Entity (X3 s.r.o.)
(Source: [1])

	The calculation	Total in thousands Czech crowns
Evaluation of the first phase		84
Discounted rate for the second phase		8%
Pace of the increase for the second phase		0%
Free Cash Flow in the first year of the second phase	84 x 1	84
Evaluation of the second phase (a continuing value)	84 / (0,08 - 0)	1050
Interest Payment Off for the year 2010		0,583
Contemporary value of the second phase	1050 x 0,583	612,15
Gross operating value	84 + 612,15	696,15
Interest-born debts to the taxation date		105
Net operating value	696,15 – 105,00	591,15
Non-operating assets to the taxation date		0
Resulting value of Equity		591,15

The market value of the building enterprise X3 s.r.o. assessed by the method DCF Entity amounts 591 150 Czech crowns to 31.12.2010.

The building enterprise X4 s.r.o.:

Table 14. Cumulate DFCF Entity – the contemporary value of the first phase (X4 s.r.o.)
(Source: [1])

Data in thousands Czech crowns	The calculation	2005	2006	2007	2008	2009	2010
Earnings before Interest and Taxes	V30	1920,00	1970,00	1950,00	1820,00	1650,00	1530,00
Income taxation rate	a rate	26,00%	24,00%	24,00%	21,00%	20,00%	19,00%
Taxations of Earnings and Interest	ZZ before = V30 x a rate	499,20	472,80	468,00	382,20	330,00	290,70
Earnings and Interest after Taxes	ZZ after = V30 - ZZ before	1420,80	1497,20	1482,00	1437,80	1320,00	1239,30
Modifications by non-monerary operations	CF4 = CF5 + CF6 + CF10 + CF12	1285,00	1450,00	1290,00	1160,00	1170,00	1150,00
Depreciations of fixed assets	CF5	450,00	460,00	470,00	420,00	410,00	410,00
Changes in states of items of correction, reserves and transient	CF6	150,00	150,00	160,00	140,00	130,00	120,00

accounts of assets and liabilities							
Accounts of costs' and returns' interest	CF12	205,00	210,00	190,00	180,00	180,00	180,00
Earnings (Loss) from a sale of fixed assets	CF10	480,00	630,00	470,00	420,00	450,00	440,00
Cash Flow from the operating activity before changes in Working Capital	CF = ZZ after + CF4	2705,80	2947,20	2772,00	2597,80	2490,00	2389,30
Changes in Working Capital	CF14 = CF15 + CF16 + CF17	-1825,00	-1930,00	1840,00	-1950,00	-1920,00	-1935,00
Changes in states of claims	CF15	-1050,00	-1030,00	-1020,00	-1060,00	-1070,00	-1080,00
Changes in states of short-termed obligations	CF16	-485,00	-620,00	-550,00	-610,00	-590,00	-605,00
Changes in states of stocks	CF17	-290,00	-280,00	-270,00	-280,00	-260,00	-250,00
Cash Flow from the operating activity	CFp = CF + CF14	880,00	1017,20	932,00	647,80	570,00	454,30
Acquirement of fixed assets	CF24 = CF25 + CF26	-750,90	-768,00	-1143,00	-785,60	-620,00	-480,87
Receipts from a sale of fixed assets	CF26	-490,10	-468,50	-558,50	-590,00	-520,00	-450,00
Costs connected with the acquirement of fixed assets	CF25	-260,80	-299,50	-575,50	-195,60	-100,00	-30,87

FCF Entity – Free Cash Flow in the enterprise	FCF = CFP + CF24	129,90	249,20	-202,00	-137,80	-50,00	-26,57
Interest Payment Off	a rate	0,735	0,681	0,630	0,583	0,583	0,583
DFCF – Discounted Free Cash Flow	DFCF = FCF x a rate	95,48	169,71	-127,26	-80,34	-29,15	-15,49
Cumulate Discounted Free Cash Flow		95,48	265,19	137,93	57,59	28,44	12,95
Sum of Discounted Free Cash Flow – the contemporary value of the first phase by the method DCF Entity		12,95					

The building enterprise X4 s.r.o.:

$$T = \frac{FCF_T + 1}{i_k - g}$$

$$T = \frac{12,95}{0,08 - 0}$$

$$T = \frac{12,95}{0,08}$$

$$T = 162\, thousands\, Czech\, crowns$$

Table 15. Resulting market value assessed by the method DFCF Entity (X4 s.r.o.)

(Source: [1])

	The calculation	Total in thousands Czech crowns
Evaluation of the first phase		162
Discounted rate for the second phase		8%
Pace of the increase for the second phase		0%
Free Cash Flow in the first year of the second phase	162 x 1	162
Evaluation of the second phase (a continuing value)	162 / (0,08 - 0)	2025
Interest Payment Off for the year 2010		0,583
Contemporary value of the second phase	2025,00 x 0,583	1180,58
Gross operating value	162 + 1180,58	1342,58
Interest-born debts to the taxation date		350
Net operating value	1342,58 – 350	992,58
Non-operating assets to the taxation date		0
Resulting value of Equity		992,58

The market value of the building enterprise X4 s.r.o. assessed by the method DCF Entity amounts 992 580 Czech crowns to 31.12.2010.

The building enterprise X5 s.r.o.:

Table 16. Cumulate DFCF Entity – the contemporary value of the first phase (X5 s.r.o.)
(Source: [1])

Data in thousands Czech crowns	The calculation	2005	2006	2007	2008	2009	2010
Earnings before Interest and Taxes	V30	2180,00	2370,00	2460,00	2250,00	1920,00	1850,00
Income taxation rate	a rate	26,00%	24,00%	24,00%	21,00%	20,00%	19,00%
Taxations of Earnings and Interest	ZZ before = V30 x a rate	566,80	568,80	590,40	472,50	384,00	351,50
Earnings and Interest after Taxes	ZZ after = V30 - ZZ before	1613,20	1801,20	1869,60	1777,50	1536,00	1498,50
Modifications by non-monerary operations	CF4 = CF5 + CF6 + CF10 + CF12	1350,00	1410,00	1390,00	1315,00	1230,00	1180,00
Depreciations of fixed assets	CF5	430,00	440,00	450,00	420,00	410,00	405,00
Changes in states of items of correction, reserves and transient accounts of assets and liabilities	CF6	170,00	180,00	190,00	175,00	150,00	135,00
Accounts of costs' and returns' interest	CF12	520,00	570,00	550,00	530,00	520,00	510,00
Earnings (Loss) from a sale of fixed assets	CF10	230,00	220,00	200,00	190,00	150,00	130,00
Cash Flow from the operating activity before changes in	CF = ZZ after + CF4	2963,20	3211,20	3259,60	3092,50	2766,00	2678,50

Working Capital							
Changes in Working Capital	CF14 = CF15 + CF16 + CF17	-1960,00	-1940,00	-1940,00	-2000,00	-2080,00	-2080,00
Changes in states of claims	CF15	-1020,00	-1010,00	-1030,00	-1050,00	-1100,00	-1100,00
Changes in states of short-termed obligations	CF16	-620,00	-580,00	-600,00	-590,00	-610,00	-630,00
Changes in states of stocks	CF17	-320,00	-350,00	-310,00	-360,00	-370,00	-350,00
Cash Flow from the operating activity	CFp = CF + CF14	1003,20	1271,20	1319,60	1092,50	686,00	598,50
Acquirement of fixed assets	CF24 = CF25 + CF26	-630,00	-580,00	-2049,20	-1575,00	-600,00	-590,00
Receipts from a sale of fixed assets	CF26	-420,00	-390,00	-1090,20	-905,00	-370,00	-330,00
Costs connected with the acquirement of fixed assets	CF25	-210,00	-190,00	-959,00	-670,00	-230,00	-260,00
FCF Entity – Free Cash Flow in the enterprise	FCF = CFP + CF24	373,20	691,20	-729,60	-482,50	86,00	8,50
Interest Payment Off	a rate	0,735	0,681	0,630	0,583	0,583	0,583
DFCF – Discounted Free Cash Flow	DFCF = FCF x a rate	274,30	470,71	-459,65	-281,30	50,14	4,96
Cumulate Discounted Free Cash Flow		274,30	745,01	285,36	4,06	54,20	59,16
Sum of							

Discounted Free Cash Flow – the contemporary value of the first phase by the method DCF Entity		59,16					

The building enterprise X5 s.r.o.:

$$T = \frac{FCF_T + 1}{i_k - g}$$

$$T = \frac{59,16}{0,08 - 0}$$

$$T = \frac{59,16}{0,08}$$

$$T = 739,50\ thousands\ Czech\ crowns$$

Table 17. Resulting market value assessed by the method DFCF Entity (X5 s.r.o.)
(Source: [1])

	The calculation	Total in thousands Czech crowns
Evaluation of the first phase		739,5
Discounted rate for the second phase		8%
Pace of the increase for the second phase		0%
Free Cash Flow in the first year of the second phase	739,50 x 1	739,5
Evaluation of the second phase (a continuing value)	739,50 / (0,08 - 0)	9243,75
Interest Payment Off for the year 2010		0,583
Contemporary value of the second phase	9243,75 x 0,583	5389,11
Gross operating value	739,50 + 5389,11	6128,61
Interest-born debts to the taxation date		1050
Net operating value	6128,61 – 1050,00	5078,61
Non-operating assets to the taxation date		0
Resulting value of Equity		5078,61

The market value of the building enterprise X5 s.r.o. assessed by the method DCF Entity amounts 5 078 610 Czech crowns to 31.12.2010.

4. Conclusions

In the theoretical part of the contribution, the contemporary state of the solved problems was presented, the contents of the subsequent practical part are basic data about the examined building enterprises X1 s.r.o. - X5 s.r.o. and their returns' evaluations by the method DCF Entity.

From the ascertained results of returns' evaluations of the examined building enterprises by the method DCF Entity it stands to reason, that if the enterprise is insolvent, this method becomes inaccurate. Furthermore, manifestations of the financial crisis were demonstrated successfully on the created model of five middle-size building enterprises of a regional significance. On the basis of these results it is possible to state, that the building enterprise disposing of a sufficient capital reserve is always better prepared for contingent sways of an economic situation. According to the reactions of the examined building enterprises it is possible to consider the building enterprise X2 s.r.o. to be the leader among these companies because it managed the best the critical situation on a market.

References

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