FINANCIAL EVALUATION OF PROPERTY DEVELOPMENT PROJECTS. CASH FLOW METHOD

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Abstract

Property development is a constant process, and therefore the developer must not just conduct a one-off appraisal in the research and evaluation phase, but rather needs to constantly reappraise the profitability of the scheme throughout the development process. Financial evaluation of property development projects uses several conventional techniques or methods. In the cash flow method costs and revenues are allocated over the time of their occurrence in the development period. In this way the calculation of funding fees over time, which are often due for a longer period than the development period, as well as of other costs and revenues, is much more accurate than the residual valuation.

Key words: *financial evaluation, cash flow, dcf, cf, property development, property finance*

Property development is a constant process, and therefore the developer must not just conduct a one-off appraisal in the research and evaluation phase, but rather needs to constantly reappraise the profitability of the scheme throughout the development process. Risk is an inherent part of any investment and production process, which is why it must be clearly defined and assessed. In fact, property development is a process, which is under the effect of myriad influencing factors, and the analyst or appraiser, together with the developer, have the task to evaluate the degree of impact of each of these risks on the specific project.

Financial evaluation of property development projects uses several conventional techniques or methods, namely:

- Residual valuation;
- Cash flow method together with the discounted cash flow method (DCF);
- Uncertainty analysis and risk assessment;
- Sensitivity analysis.

In the **cash flow method** costs and revenues are allocated over the time of their occurrence in the development period. In this way the calculation of funding fees over time, which are often due for a longer period than the development period, as well as of other costs and revenues, is much more accurate than the residual valuation.

An example for reallocation of the cost cash flows in a single project is illustrated in Table 2, under the following assumptions:

- Annual interest rate on bank financing again 7% per annum – accrued each month on the cumulative amount of the costs, increased with the interest from the preceding month;
- Allocation of the weight of occurring building costs over time - Table 1;
- Development period 36 months;
- The project is for an office building, which is not generating revenues over the development period, as tenants have a grace period for payment of the rent for the first 6 months of the full lease.

Table 1		
Month	**Finishing**	**Value BGN**
1	2.00%	132 000
2	9.00%	594 000
3	13.00%	858 000
4	17.00%	1 122 000
5	20.00%	1 320 000
6	22.00%	1 452 000
7	33.00%	2 178 000
8	45.00%	2 970 000
9	60.00%	3 960 000
10	65.00%	4 290 000
11	70.00%	4 620 000
12	75.00%	4 950 000
13	80.00%	5 280 000
14	85.00%	5 610 000
15	90.00%	5 940 000
16	92.00%	6 072 000
17	94.00%	6 204 000
18	96.00%	6 336 000
TOTAL BC		**6 600 000**
Guarantee	**4.00%**	**264 000**

Building costs (**BC**) arise as agreed with the builder, usually complying with the following principle: a small percentage of advance payment upon signing the contract, and immediately after that payment at certain stage of construction. The other building costs are paid in the course of construction following the principle of progress billing (taking-over) of completed work. Of course strict allocation of the amounts over the construction period is also possible, but in any event it is better if the developer can control the performance of construction works (also known as "construction and assembly works" or CAW), as well as the agreed terms with the builder before making the next payment. Building costs arise according to the specifics of the respective building, but mostly over time they form a curve similar to sinusoid (Fig. 1). Furthermore, usually in the middle of the construction process about half of building costs have already occurred, due to the specifics of rough construction, roof structures and facades. These are processes that take less time than finishing (fitting-out) works, while they quickly create volume in the building. The "per unit" cost of materials in rough construction, however, is lower than the one in finishing works. 4% of the cost of CAW are retained as a performance guarantee, which is also standard practice. Their payment is set for 6 months after the completion of construction.

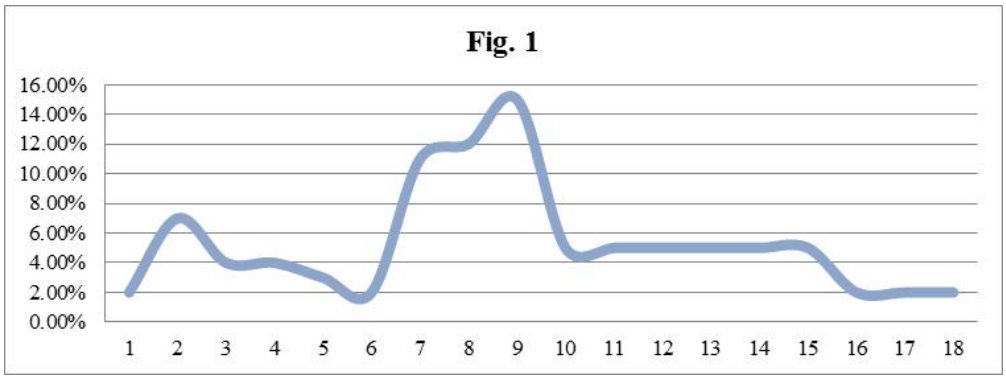

Table 2. Reallocation of the cost cash flows in a single project

Costs/Months	Общо	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2.1. Lend costs	***315 700***	315 700															
2.2. Building costs	***6 600 000***						132 000	462 000	264 000	264 000	198 000	132 000	726 000	792 000	990 000	330 000	330 000
2.3. Professional teem costs 12.5%@building costs	***825 000***			132 000		198 000	385	385	385	385	385	385	385	385	385	385	385
2.4. Costs for design visa	***3 000***		3 000														
2.5. Costs for permits end surveillance	***50 000***					25 000			1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000	1 000
2.6. Cost for financing	***54 000***					54 000											
2.8. Renting agents' commissions 10%@annual rent	***108 000***																
2.9. Promoting costs	***50 000***																
2.10. Sale costs	***407 400***																
2.12. Other costs	***100 000***																
2.13 VAT paid@20%	***1 702 620***	63 140	600	26 400	0	55 400	26 477	92 477	53 077	53 077	39 877	26 677	145 477	158 677	198 277	66 277	66 277
2.14. VAT reimbursed	***-1 617 140***			-63 140		-600	-26 400	0	-55 400	-26 477	-92 477	-53 077	-53 077	-39 877	-26 677	-145 477	-158 677
2.15. Total monthly costs	***8 598 580***	378 840	3 600	95 260	0	331 800	132 462	554 862	263 062	291 985	146 785	106 985	819 785	912 185	1 162 985	252 185	238 985
2.17. Previous month CF	***9 773 394***	0	381 050	386 894	484 966	487 795	824 376	962 420	1 526 133	1 799 632	2 103 818	2 263 731	2 384 545	3 223 022	4 159 329	5 353 361	5 638 245
2.16. Cumulative costs		378 840	384 650	482 154	484 966	819 595	956 838	1 517 282	1 789 195	2 091 617	2 250 603	2 370 716	3 204 330	4 135 207	5 322 314	5 605 546	5 877 230
2.17. Monthly interest @0.58%	***1 174 814***	2 210	2 244	2 813	2 829	4 781	5 582	8 851	10 437	12 201	13 129	13 829	18 692	24 122	31 047	32 699	34 284
2.18. CF		**381 050**	**386 894**	**484 966**	**487 795**	**824 376**	**962 420**	**1 526 133**	**1 799 632**	**2 103 818**	**2 263 731**	**2 384 545**	**3 223 022**	**4 159 329**	**5 353 361**	**5 638 245**	**5 911 514**

Costs/Months	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
2.1. Lend costs																		
2.2. Building costs	330 000	330 000	132 000	132 000	132 000							264 000						
2.3. Professional teem costs 12.5%@building costs	385	385	385	385	385	488 070												
2.4. Costs for design visa																		
2.5. Costs for permits end surveillance	1 000	1 000	1 000	1 000	1 000	9 000												
2.6. Cost for financing																		
2.8. Renting agents' commissions 10%@annual rent												108 000						
2.9. Promoting costs		5 000	5 000	5 000	5 000	5 000	5 000	5 000	5 000	5 000	5 000							
2.10. Sale costs																		407 400
2.12. Other costs						80 000											20 000	
2.13 VAT paid@20%	66 277	67 277	27 677	27 677	27 677	116 414	1 000	1 000	1 000	1 000	1 000	74 400	0	0	0	0	4 000	81 480
2.14. VAT reimbursed	-66 277	-66 277	-66 277	-66 277	-67 277	-27 677	-27 677	-27 677	-116 414	-1 000	-1 000	-1 000	-1 000	-1 000	-37 200	-37 200	0	0
2.15. Total monthly costs	331 385	337 385	99 785	99 785	98 785	670 807	-21 677	-21 677	-110 414	5 000	5 000	445 400	-1 000	-1 000	-37 200	-37 200	24 000	488 880
2.17. Previous month CF	6 515 719	6 887 045	7 266 573	7 409 328	7 552 916	7 696 336	8 415 952	8 443 241	8 470 690	8 409 044	8 463 126	8 517 524	9 015 207	9 066 790	9 118 674	9 134 449	9 150 317	9 227 833
2.16. Cumulative costs	6 847 104	7 224 430	7 366 358	7 509 113	7 651 701	8 367 143	8 394 275	8 421 564	8 360 276	8 414 044	8 468 126	8 962 924	9 014 207	9 065 790	9 081 474	9 097 249	9 174 317	9 716 713
2.17. Monthly interest @0.58%	39 941	42 143	42 970	43 803	44 635	48 808	48 967	49 126	48 768	49 082	49 397	52 284	52 583	52 884	52 975	53 067	53 517	56 681
2.18. CF	**6 887 045**	**7 266 573**	**7 409 328**	**7 552 916**	**7 696 336**	**8 415 952**	**8 443 241**	**8 470 690**	**8 409 044**	**8 463 126**	**8 517 524**	**9 015 207**	**9 066 790**	**9 118 674**	**9 134 449**	**9 150 317**	**9 227 833**	**9 773 394**

The remaining costs are presented by the months of their occurrence directly in Table 2. It is noted that land costs and funding fees usually occur before the construction, and professional fees are spread before, during and shortly after the completion of construction.

The cash flow method allows the developer to get a more realistic idea of the cost burden of the project, allocated over time. This is extremely important for property developments, since cash flows there are unevenly spread. As with the residual value method, with the cash flow method it is particularly important to adequately assess estimated costs. The cash flow method, however, is also affected by another important factor, namely the proper allocation of these costs over time.

The cash flow model, presented in Table 2, can be significantly complicated if the project is developed in stages, and after its completion each stage begins to generate income from rents or sales, and in the meantime construction continues into the next stage. Similar more complex models exist in the construction of large-scale multifunctional developments (e.g.: shopping center with an office building, which is constructed in stage two). Projects with sales during the construction stage are often seen in housing developments especially in the case of large-scale residential complexes. There income streams are further complicated by the payment of apartments at stages within 3-12 months.

Estimating the cash flows is in fact mandatory requirement of the financing institutions before they agree to provide a credit or another form of loan to the developer. Securing the ability to recover the invested funds is the main prerequisite for every financial investor before making the decision to invest in a specific project, whether in capital or in debt.

Evaluation based on cash flows has the advantage of reflecting actual changes in the interest rates, in case there are such in the course of the development period. The latter is almost certain considering the duration of the period – very rarely under 2 years, and in the specific example – 3 years.

Discounted Cash Flow Method

Once estimated, the cash flows are discounted back using a present value formula. The present value calculated using the **Discounted Cash Flow (DCF)** method is very important for assessing the financial viability of property development projects. This valuation represents another, more accurate than NDV, method for establishing the potential sales price and the profit of the project after its completion.

In the residual valuation, or the so-called "conventional approach", the interest is calculated month by month with accumulation in the course of the development period. In this way compound interest is actually accrued on cumulative costs over time until the end of the cycle.

The evaluation of discounted cash flows uses mechanisms for discounting costs that increase in time, so that we can get their present value at the time of the evaluation. Two cash flow techniques can be used, namely:

- **Net Terminal Approach (NTA)**; and
- **Discounted Cash Flow (DCF)**.

The difference between DCF and NTA is that in establishing the terminal value the approach is from a moment in time, when the development is let or sold, and respectively the debt is fully repaid. Compound interest is calculated on each month's total expenditure with the formula of compound interest factor: $(1 + i)^n$ until the end of the development period. NTA is demonstrated through an example in Table 3.

As shown in the examples in Tables 2 and 3, the project value estimated with CF does not differ from that with NTA. Both methods are actually two different approaches for solving the same problem, and the difference in them being the moment, when the calculation is made. In CF this is the start of the investment, and forward in time. While with NTA this is the end of the development period and back to present day – the start of the investment.

It should be taken into account that, when calculating estimates of projects based on cash flows in time, it is very important to consider the implications of VAT (Value Added Tax) on the value of the project. The specifics of this tax are expressed in the following:

- On the one hand, its substantial rate – 20% on the amount of each payment between contracting entity and supplier of a product or service (the rate is up to date as at the beginning of 2014). This artificially increases the monthly cash flows of the developer;
- On the other hand, VAT is an indirect tax, whose actual payment is net for the reporting period – month. VAT is paid to the person providing services or products, which has the obligation to pay it for the benefit of the state budget, but only the difference between VAT to paid it and VAT, paid by it to other suppliers within the month;
- On the third hand, the developer usually makes substantial investment payments each month when developing a new project. If the developer is not selling another completed project by parts during the development period of the new one, its cash flow will be burdened with the amount of VAT due. Since the net VAT due will be the difference between the acquisition price and the sales price of the project, the legislation has provided for the recovery of the temporarily overpaid tax. Thus the developer will start to recover VAT paid to suppliers of goods and services in the course of the development period. Recovery is delayed in time depending on various factors, but typically rarely exceeds 2-3 months.

The effect of outgoing and incoming VAT cash flows is an essential element for the accurate estimation of CF when developing investment projects.

Table 3. Net Terminal Approach

Months	**Costs BGN**	**Monthly interest** i	**Compound interest factor** $(1+i)^n$	**Costs+interest**
1	378 840	0.005833	1.232926	467 082
2	3 600	0.005833	1.225775	4 413
3	95 260	0.005833	1.218666	116 090
4	0	0.005833	1.211599	0
5	331 800	0.005833	1.204572	399 677
6	132 462	0.005833	1.197586	158 635
7	554 862	0.005833	1.190641	660 641
8	263 062	0.005833	1.183736	311 396
9	291 985	0.005833	1.176870	343 629
10	146 785	0.005833	1.170045	171 745
11	106 985	0.005833	1.163260	124 451
12	819 785	0.005833	1.156513	948 092
13	912 185	0.005833	1.149806	1 048 836
14	1 162 985	0.005833	1.143138	1 329 452
15	252 185	0.005833	1.136508	286 610

Months	**Costs BGN**	**Monthly interest** i	**Compound interest factor** $(1+i)^n$	**Costs+interest**
16	238 985	0.005833	1.129917	270 033
17	199 385	0.005833	1.123364	223 982
18	331 385	0.005833	1.116849	370 107
19	331 385	0.005833	1.110372	367 961
20	337 385	0.005833	1.103932	372 450
21	99 785	0.005833	1.097530	109 517
22	99 785	0.005833	1.091165	108 882
23	98 785	0.005833	1.084837	107 166
24	670 807	0.005833	1.078545	723 496
25	-21 677	0.005833	1.072290	-23 244
26	-21 677	0.005833	1.066071	-23 109
27	-110 414	0.005833	1.059889	-117 027
28	5 000	0.005833	1.053742	5 269
29	5 000	0.005833	1.047631	5 238
30	445 400	0.005833	1.041555	463 909
31	-1 000	0.005833	1.035514	-1 036
32	-1 000	0.005833	1.029509	-1 030
33	-37 200	0.005833	1.023538	-38 076
34	-37 200	0.005833	1.017602	-37 855
35	24 000	0.005833	1.011701	24 281
36	488 880	0.005833	1.005833	491 732
			Total Development Cost - NTA	**9 773 394**
			Net Development Value - NDV	**11 640 000**
			Profit	**1 866 606**

Unlike other methods, the basis of discounted cash flow (**DCF**) method is that it calculates the present value of each month's net cash flows, as well as the profit, after completion of the development period. Thus we actually establish the present value of the project as a whole, which is very often used as one of the methods for establishing its market price. The calculation uses the discount rate based on a compound interest, namely: $\frac{1}{(1+i)^n}$. An example for the calculation of DCF is shown in Table 4.

The method of discounted cash flow allows the subsequent calculation of the **Internal Rate of Return** on investment (**IRR**). Unlike the simple calculation of the profit's NDV on the cost of the project without consideration to the timing of costs and interest, DCF is used mostly by investors who prefer to retain project as an investment property and to analyze its return. The main reason is that NDV does not take into account actually invested funds, nor the uncertainty in time.

Internal Rate of Return (IRR) is the profitability of the project calculated using the DCF method, where the present value of its sales price will be equal to the present value of development costs (present value of the project). IRR is an indicator frequently used to assess the profitability of projects.

The example in Table 4 can be used to calculate that its Internal Rate of Return is 12.78 %.

DCF and IRR are used by the developer to compare the profitability of projects for the purpose of making decision on the most appropriate alternative. Projects can have a different development period, as well as different types of properties. For example: comparing the investment in a residential development with the investment in the development of an office building. Both projects have very different cash flows. While residential complex is being developed gradually, block by block, the office building is one, but it is usually much larger than a residential building. The residential development is sold even before its full completion, i.e. it begins to generate positive cash flows from sales in the course of the development period. The office building usually starts to generate positive cash flows from 6 months to 1 year from its completion and that is in the form of rents, and not sales of areas.

Table 4. DCF Method

Month	Cost BGN	Montly interest (i)	Discount rate (1/(1+i)^n)	Discounted cost
1	378 840	0.005833	0.994200	376 643
2	3 600	0.005833	0.988435	3 558
3	95 260	0.005833	0.982702	93 612
4	0	0.005833	0.977003	0
5	331 800	0.005833	0.971337	322 290
6	132 462	0.005833	0.965704	127 919
7	554 862	0.005833	0.960103	532 725
8	263 062	0.005833	0.954535	251 102
9	291 985	0.005833	0.948999	277 093
10	146 785	0.005833	0.943495	138 491
11	106 985	0.005833	0.938024	100 354
12	819 785	0.005833	0.932583	764 518
13	912 185	0.005833	0.927175	845 755
14	1 162 985	0.005833	0.921798	1 072 037
15	252 185	0.005833	0.916452	231 115
16	238 985	0.005833	0.911137	217 748
17	199 385	0.005833	0.905853	180 613
18	331 385	0.005833	0.900599	298 445
19	331 385	0.005833	0.895376	296 714
20	337 385	0.005833	0.890183	300 335
21	99 785	0.005833	0.885021	88 312
22	99 785	0.005833	0.879888	87 800

Month	**Cost BGN**	**Montly interest (i)**	**Discount rate (1/(1+i)^n)**	**Discounted cost**
23	98 785	0.005833	0.874785	86 416
24	670 807	0.005833	0.869712	583 409
25	-21 677	0.005833	0.864668	-18 743
26	-21 677	0.005833	0.859653	-18 635
27	-110 414	0.005833	0.854668	-94 367
28	5 000	0.005833	0.849711	4 249
29	5 000	0.005833	0.844783	4 224
30	445 400	0.005833	0.839884	374 084
31	-1 000	0.005833	0.835013	-835
32	-1 000	0.005833	0.830170	-830
33	-37 200	0.005833	0.825356	-30 703
34	-37 200	0.005833	0.820569	-30 525
35	24 000	0.005833	0.815810	19 579
36	488 880	0.005833	0.811079	396 520
Project DCF				**7 881 022**
NDV – Net development value:				
37	**11 640 000**	**0.005833**	**0.806375**	**9 386 206**
			NPV - Net Present Value (Profit)	**1 505 184**
			NPV (Profit) %	**19.10%**
			Future profit value with interest @ 37 months	**1 866 606**
			IRR	**12.72%**

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