A Practical Approach to Determine NPV, IRR, and MIRR Ranking Conflicts With Excel

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DCF methods, except the case of multiple IRRs, identify good projects when analyzed individually. However, all might conflict when ranking projects. MIRR, a method that addresses the multiple IRR problem, is a complex method for analyzing investments as it includes a reinvestment rate. Most finance textbooks do not discuss, even though some mention, the ranking conflict between NPV and MIRR. Along with the known conflict between NPV and IRR, we present an original method to determine if there is a conflict between NPV and MIRR, and the regions of the discount rate where a conflict is present or not. This method, verified by an Excel analysis, is useful to practitioners and educators alike.

Keywords: NPV, IRR, MIRR, WACC, ranking conflict, conflict regions

INTRODUCTION

One of the most critical challenges in creating corporate value is selecting wealth-creating projects. The methods employed for this purpose vary, ranging from sound financial methods to those that may be popular but less rigorous. Methods based on Discount Cash Flow (DCF) models such as Net Present Value (NPV), Internal Rate of Return (IRR), Modified Internal Rate of Return (MIRR), and Profitability Index (PI) are considered sound financial methods. In contrast, methods like Payback, Discounted Payback, Return on Investment, and similar others fall into a different category. The first group is backed by financial theory, while the latter is grounded in accounting concepts. Detailed discussions about the pros and cons of each method are generally textbook fare. (see for example Brigham and Ehrhardt, 2017)

While all the DCF methods except the IRR one in the presence of multiple IRRs, can identify good projects when analyzed individually, conflicts arise when ranking projects becomes necessary. The most well-known ranking conflict is between NPV and IRR. However, less attention is given in textbooks to the conflict between NPV and MIRR. MIRR remains one of the most interesting methods for analyzing investments, with roots going back to the 18th century and the work of Duvillard (see Biondi, 2003)

In this paper, we will discuss the impact of the discount rate, Weighted Average Cost of Capital (WACC) on the conflicts between the principal methods of capital budgeting based on DCF: NPV, IRR, and MIRR. Addressing these conflicts, we will introduce a new method to determine if there is a conflict between NPV and MIRR, and regions of the discount rate where there is a conflict, or not. We will support this method with an Excel application that can easily be used in practice and teaching.

The paper will proceed with Section 2, where we will provide a brief discussion of the issue as presented in a selection of randomly chosen textbooks and extant literature. Section 3 will address the conflict issues between NPV and IRR, and between NPV and MIRR. Section 4 will introduce an Excel template to exemplify the problem, followed by a concluding section.

BRIEF LITERATURE REVIEW

Upon inspecting six textbooks at random, spanning different editions over four decades, several observations emerged. Three of these are well-known textbooks: Brigham and Daves (2017), Brealey et al. (2014), and Ross et al. (2022). We supplemented with a less-known text, Clauss (2010), a popular textbook from the last century now out of publication, Pinches (1994), and the gold standard text for Capital Budgeting, Bierman and Smidt (2007).

All the textbooks discuss the NPV and IRR ranking conflict. However, there is disagreement regarding the reinvestment rate assumption. Brigham and Daves (2017) and Clauss (2010) explicitly state that both NPV and IRR are based on the reinvestment rate assumption: IRR at the IRR rate and NPV at the opportunity cost of capital, WACC. Brealey et al. (2014) and Pinches (1994) do not comment on the issue, while Bierman and Smidt (2007) and Ross et al. (2022) make a very important point: neither IRR nor NPV methods rest on the assumption of reinvestment rate. This discrepancy is concerning, especially considering Dudley's (1972) early observation that the reinvestment rate is not fundamental to NPV and IRR methods.

In the words of Bierman and Smidt (2007):

"It is sometimes stated that the internal rate of return method assumes reinvestment at the internal rate of return rate. At best this claim is inexact. The internal rate of return of an investment can be computed without any assumption about the utilization of the funds generated by the investment. For example, an investment generating cash flow that is consumed will have the same internal rate of return as an investment whose cash flows are invested, if the cash flow of the two investments are equal"

Walker et al. (2011) examined 96 various textbooks across finance, managerial economics, managerial accounting, and engineering economics. They found that 50 textbooks assumed IRR had a reinvestment rate, 9 did not, and 37 were silent on the issue. Our anecdotal investigation aligns closely with these findings. Hatem et al. (2013) address what they termed the "fallacy of implicit reinvestment rate assumptions related to IRR (subsequently YTM) and NPV."

Regarding MIRR, the selected textbooks reveal intriguing results. Brigham and Daves (2017), Pinches (1994), and Clauss (2010) discuss MIRR and provide methods for computation. Brealey et al. (2014) address the issue briefly in a footnote, offering a computation that tends to overestimate the MIRR. Bierman and Smidt (2007) provide a discussion on reinvestment rate and offer a more accepted MIRR computation but do not take a stand on the appropriateness of MIRR as a capital budgeting method. None of the textbooks explicitly discuss the ranking conflict between NPV and MIRR. However, this conflict is occasionally recognized, and Cary and Dunn (1997) provide a method to adjust MIRR to mitigate it. Given the importance of MIRR as a method applied when there are multiple IRRs, it is appropriate to organize these topics and provide practitioners and educators with a clear perspective on these capital budgeting techniques.

RESEARCH METHODOLOGY

The Net Present Value (NPV) formula involves discounting all the cash flows (CF) of the project by an appropriate rate of return called Weighted Average Cost of Capital (WACC). The formula is well-known:

$$NPV = \sum_{i=0}^{N} \frac{CFi}{(1+WACC)^i} \quad (1)$$

Similarly, the fact that the Internal Rate of Return (IRR) is obtained as a solution to the following equation is well-acknowledged:

$$\sum_{i=0}^{N} \frac{CF_i}{(1+IRR)^i} = 0 \quad (2)$$

It is also widely recognized that NPV and IRR can yield conflicting rankings in the case of mutually exclusive projects. This means that projects ranked higher in terms of IRR may not necessarily be superior according to NPV. This conflict can be identified by solving an equation for the difference of the cash flows of two projects, A and B.

$$\sum_{i=0}^{N} \frac{CF_i(A)-CF_i(B)}{(1+IncIRR)^i} = 0 \quad (3)$$

The presence of one or more Internal Rates of Return (IRRs), IncIRR in equation (3), for the incremental cashflows indicates a potentially conflicting ranking. The WACC that is equal to IncIRR is called the crossover rate (for example see, Brigham and Daves, 2022). Project A dominates Project B in terms of NPV but not in terms of IRR for WACC less than the crossover rate. Conversely, if WACC is greater than the crossover rate, Project B dominates Project A in both NPV and IRR.Ben-Horin and Kroll (2017) extensively discuss this conflict and provide conditions for resolving it.

As mentioned, a known issue with IRR is the possibility of more than one IRR when the stream of cashflows has more than one change of sign in the stream of cash flow. In that case, following the Descartes rule, it is well-known that multiple real roots and therefore, more than one IRR could exist. This issue complicates the selection process. To address it, the Modified Internal Rate of Return (MIRR) was developed. While its origins trace back to the 18th century, Lin (1976) was among the early modern proponents. In MIRR, cash flows are reinvested at no less than the cost of capital, usually at the WACC. The commonly used MIRR equation is:

$$(1 + MIRR)^N = \frac{\sum_{i=0}^{N} CF_i^+ (1+WACC)^{N-i}}{\sum_{i=0}^{N} \frac{CF_i}{(1+WACC)^i}} \quad (4)$$

While NPV and MIRR might seem to rank projects similarly due to similar DCF computations, they can yield conflicting rankings. The following derivation, repeating Tuluca (2016), aims to develop a method to predict when NPV and MIRR would give conflicting rankings.

It is helpful to introduce two notations as follows:

PV^+ sum of all positive cash flows discounted at WACC
PV^- absolute value of the sum of all negative cash flows discounted at WACC
With these notations, we can rewrite (4) as:

$$(1 + MIRR)^N = \frac{PV^+(1+WACC)^N}{PV^-} \quad (5)$$

Given that both projects A and B are discounted at the same WACC, a simple inspection of (5) leads to the following inequality when MIRR (A) < MIRR (B):

$$\frac{PV^+(A)}{PV^-(A)} < \frac{PV^+(B)}{PV^-(B)} \quad (6)$$

Subtracting 1 from both sides, we derive the following condition:

$$\frac{PV^{+}(A)-PV^{-}(A)}{PV^{-}(A)} < \frac{PV^{+}(B)-PV^{-}(B)}{PV^{-}(B)} \quad (7)$$

which can be simplified to:

$$\frac{NPV(A)}{PV^{-}(A)} < \frac{NPV(B)}{PV^{-}(B)} \quad (8)$$

And finally to:

$$1 < \frac{NPV(A)}{NPV(B)} < \frac{PV^{-}(A)}{PV^{-}(B)} \quad (9)$$

This derivation offers a simple rule to understand when NPV and MIRR might conflict by examining the compound inequality in (9). When the right side is greater than the ratio of the two NPVs, there will be a conflict between NPV and MIRR. However, the ratio of the two NPVs has to be greater than 1, else there is no conflict since NPV(A) is less than NPV(B). Both NPVs should be greater than 0. It is to be noted that when the NPVs are equal, the WACC will be the crossover rate. Inequality (6) provides a simple method to understand when the MIRR of Project B would be greater than that of Project A without computing the MIRR. In addition, when the two ratios are equal, the WACC at which this occurs will make both MIRRs equal and will represent a crossover rate for MIRR. Let's call this the MIRR crossover rate. Before the MIRR crossover rate, the MIRR(B) will be greater than the MIRR(A), while after the MIRR crossover rate, the MIRR(A) will dominate the MIRR(B). Juxtaposing the NPV-IRR crossover rate with the MIRR crossover rate resulting from inequality (6) will allow us to determine both the NPV and IRR conflict and the NPV and MIRR conflict regions. Understanding the regions of conflict avoids selection mistakes when one uses IRR or MIRR as methods instead of NPV.

To exemplify the above and the influence of WACC on the NPV and MIRR conflict, and to draw a parallel with the NPV and IRR regions of conflict, the following Excel template was constructed.

EXCEL TEMPLATE

Figure 1 displays an Excel template illustrating the method for predicting the conflict in rankings between NPV and IRR and between NPV and MIRR for two mutually exclusive projects. If users for this template enter WACC at B1 and cash flows of two projects at B6:B16 and C6:C16, then present values (PVs), NPVs, IRRs, MIRRs, differences of cash flows, crossover rate, and various ratios of present values (PV+(A)/PV-(A), PV+(B)/PV-(B), and PV-(A)/PV-(B)) and NPV(A)/NPV(B) will be computed by Excel formulas in green-colored cells.

An Excel formula at C30 will decide whether there is a conflict in rankings between NPV and IRR based on the crossover rate at G22 without computing IRRs for Project A and Project B. If the WACC at B1 is less than the crossover rate at G22, there is a conflict in ranking between NPV and IRR. That is, Project A dominates Project B in terms of NPV but not in terms of IRR. If the WACC at B1 is greater than the crossover rate at G22, there is no conflict in ranking between IRR and NPV. That is, Project B dominates Project A both in terms of NPV and in terms of IRR. To verify the results above, IRRs for the two projects are computed at C22 and E 22 and NPVs are computed at C21 and E21 with the Excel functions.

An Excel formula at C32, based on the inequality (9), will decide whether there is a conflict in rankings between NPV and MIRR without computing MIRRs. If NPV(A)>NPV(B)>0, NPV(A)/NPV(B)>1, and NPV(A)/NPV(B) < PV-(A)/PV-(B), there is a conflict in the ranking between NPV and MIRR. If not, there is no conflict in the ranking between NPV and MIRR. To verify that the inequality (9) is correct, MIRRs at C23 and E23 are computed by Excel functions in addition to the NPV computations at C21 and E21.

In this template, there are 10 time periods. For a period that is less than 10, users need to enter cash flows for the set number of periods and leave the other cells blank. If a period is more than 10, it is necessary to modify the template by inserting additional rows and copying the formula at D16 and E16 to newly added

rows to compute present values. Also, cell ranges to compute PV+, PV-, NPV, and various ratios need to be adjusted accordingly.

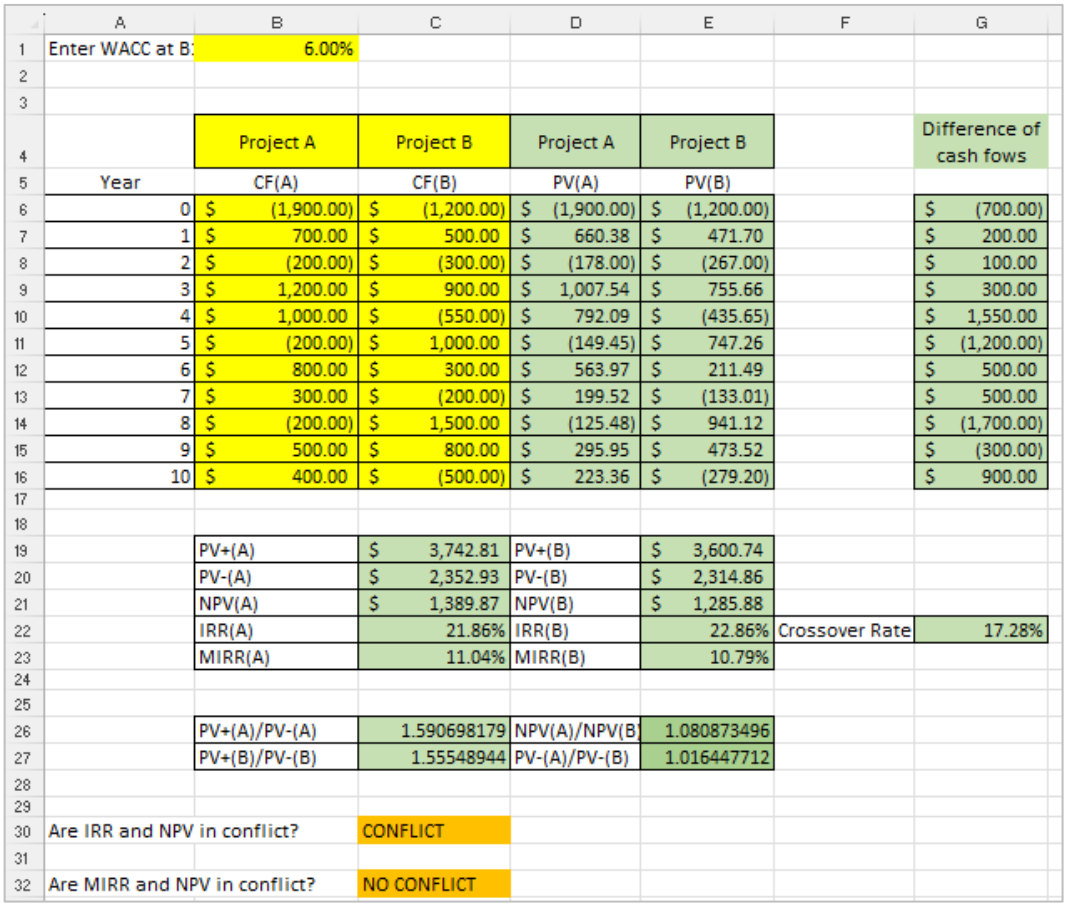
FIGURE 1
A TEMPLATE FOR PREDICTING THE CONFLICT IN RANKINGS BETWEEN IRR AND NPV AND BETWEEN MIRR AND NPV

	A	B	C	D	E	F	G
1	Enter WACC at B1						
2							
3							
4		Project A	Project B	Project A	Project B		Difference of cash fows
5	Year	CF(A)	CF(B)	PV(A)	PV(B)		
6	0			=B6/(1+$B$1)^A6	=C6/(1+$B$1)^A6		=B6-C6
7	1			=B7/(1+$B$1)^A7	=C7/(1+$B$1)^A7		=B7-C7
8	2			=B8/(1+$B$1)^A8	=C8/(1+$B$1)^A8		=B8-C8
9	3			=B9/(1+$B$1)^A9	=C9/(1+$B$1)^A9		=B9-C9
10	4			=B10/(1+$B$1)^A10	=C10/(1+$B$1)^A10		=B10-C10
11	5			=B11/(1+$B$1)^A11	=C11/(1+$B$1)^A11		=B11-C11
12	6			=B12/(1+$B$1)^A12	=C12/(1+$B$1)^A12		=B12-C12
13	7			=B13/(1+$B$1)^A13	=C13/(1+$B$1)^A13		=B13-C13
14	8			=B14/(1+$B$1)^A14	=C14/(1+$B$1)^A14		=B14-C14
15	9			=B15/(1+$B$1)^A15	=C15/(1+$B$1)^A15		=B15-C15
16	10			=B16/(1+$B$1)^A16	=C16/(1+$B$1)^A16		=B16-C16
17							
18							
19		PV+(A)	=SUMIF(D6:D16,">0")	PV+(B)	=SUMIF(E6:E16,">0")		
20		PV-(A)	=-SUMIF(D6:D16,"<0")	PV-(B)	=-SUMIF(E6:E16,"<0")		
21		NPV(A)	=C19-C20	NPV(B)	=E19-E20		
22		IRR(A)	=IRR(B6:B16,B1)	IRR(B)	=IRR(C6:C16,B1)	Crossover Rate	=IRR(G6:G16,B1)
23		MIRR(A)	=MIRR(B6:B16,B1,B1)	MIRR(B)	=MIRR(C6:C16,B1,B1)		
24							
25							
26		PV+(A)/PV-(A)	=C19/C20	NPV(A)/NPV(B)	=C21/E21		
27		PV+(B)/PV-(B)	=E19/E20	PV-(A)/PV-(B)	=C20/E20		
28							
29							
30	Are IRR and NPV in conflict?		=IF(G22<B1,"NO CONFLICT","CONFLICT")				
31							
32	Are MIRR and NPV in conflic		=IF(AND((E26>1),(E27>E26)),"CONFLICT","NO CONFLICT")				

Figure 2 shows an example of "CONFLICT" in rankings between NPV and IRR, but "NO CONFLICT" in rankings between NPV and MIRR. In this example, WACC is 6% and the crossover rate is 17.28%. Because WACC is less than the crossover rate, there is a conflict in ranking between IRR and NPV. However, because NPV(A)/NPV(B)>1 and NPV(A)/NPV(B) > PV-(A)/PV-(B), there is no conflict in the ranking between MIRR and NPV.

To test whether our approach is effective, IRRs, NPVs, and MIRRs of two projects are computed using Excel functions as previously mentioned. The IRR of Project A, IRR(A), is 21.86%, and the IRR of Project B, IRR(B), is 22.86%. The NPV of Project A, NPV(A), is $1,389.87, and the NPV of Project B, NPV(B), is $1,285.88. Because IRR(A) < IRR(B) and NPV(A) > NPV(B), there is "CONFLICT" in rankings between NPV and IRR. However, MIRR(A) is 11.04% and MIRR(B) is 10.79%. Therefore, there is "NO CONFLICT" in rankings between NPV and MMIRR.

FIGURE 2
EXAMPLE OF A CONFLICT CASE IN RANKINGS BETWEEN IRR AND NPV AND NO CONFLICT CASE IN RANKINGS BETWEEN MIRR AND NPV



	A	B	C	D	E	F	G
1	Enter WACC at B:	6.00%					
2							
3							
4		Project A	Project B	Project A	Project B		Difference of cash fows
5	Year	CF(A)	CF(B)	PV(A)	PV(B)		
6	0	$ (1,900.00)	$ (1,200.00)	$ (1,900.00)	$ (1,200.00)		$ (700.00)
7	1	$ 700.00	$ 500.00	$ 660.38	$ 471.70		$ 200.00
8	2	$ (200.00)	$ (300.00)	$ (178.00)	$ (267.00)		$ 100.00
9	3	$ 1,200.00	$ 900.00	$ 1,007.54	$ 755.66		$ 300.00
10	4	$ 1,000.00	$ (550.00)	$ 792.09	$ (435.65)		$ 1,550.00
11	5	$ (200.00)	$ 1,000.00	$ (149.45)	$ 747.26		$ (1,200.00)
12	6	$ 800.00	$ 300.00	$ 563.97	$ 211.49		$ 500.00
13	7	$ 300.00	$ (200.00)	$ 199.52	$ (133.01)		$ 500.00
14	8	$ (200.00)	$ 1,500.00	$ (125.48)	$ 941.12		$ (1,700.00)
15	9	$ 500.00	$ 800.00	$ 295.95	$ 473.52		$ (300.00)
16	10	$ 400.00	$ (500.00)	$ 223.36	$ (279.20)		$ 900.00
17							
18							
19		PV+(A)	$ 3,742.81	PV+(B)	$ 3,600.74		
20		PV-(A)	$ 2,352.93	PV-(B)	$ 2,314.86		
21		NPV(A)	$ 1,389.87	NPV(B)	$ 1,285.88		
22		IRR(A)	21.86%	IRR(B)	22.86%	Crossover Rate	17.28%
23		MIRR(A)	11.04%	MIRR(B)	10.79%		
24							
25							
26		PV+(A)/PV-(A)	1.590698179	NPV(A)/NPV(B)	1.080873496		
27		PV+(B)/PV-(B)	1.55548944	PV-(A)/PV-(B)	1.016447712		
28							
29							
30	Are IRR and NPV in conflict?		CONFLICT				
31							
32	Are MIRR and NPV in conflict?		NO CONFLICT				

Further, we present the following three graphs in Figure 3 to show how the inequality (9) could be used to find the ranges where there are or not conflicts in rankings between NPV and IRR and between NPV and MIRR.

Figure 3 <A> shows values of PV+(A)/PV-(B) and PV+(B)/PV-(B) for the numerical example from Figure 2. The value of WACC that makes PV+(A)/PV-(A) = PV+(B)/PV-(B) (or MIRR(A) = MIRR(B)) is 10.26%. This is the MIRR crossover rate and it is represented by point M. This value can be easily obtained with the function Goal Seek in Excel where the cell for the difference of the two ratios is made zero for the found value of WACC. Figure 3 <B> shows the NPV sensitivity with WACC for two projects in the example in Figure 2. NPV values of Project A are greater than those of Project B when WACC is less than the crossover rate of 17.28%, point I on the graph. When the WACC is less than the crossover rate, there is a conflict in rankings between NPV and IRR. Finally, Figure 3 <C> shows NPV(A)/NPV(B) and PV-(A)/PV-(B) for different WACCs. This graph represents the terms from inequality (9). Using the information from Figures <A> and <B> it is clear that there is a conflict in rankings between MIRR and NPV when WACC is between 10.26% (point M1) and 17.28% (point I1). In this range the inequality (9) is satisfied. Note that point M1 corresponds to point M in Figure 3<A> and point I1 corresponds to point I in Figure 3<B>.

The example in Figure 4 for a WACC of 12% which is in the conflict range mentioned above confirms it. There is no conflict in rankings between MIRR and NPV when WACC is less than 10.26% or between 17.28% and 21.86%, since inequality (9) is not satisfied. Note that 21.86% is the IRR for Project A. After

that WACC, NPV(A) is negative and thus the discussion is moot as Project A has to be rejected. Numerical examples for different WACCs in Figures 2 and 5 confirm this. Figure 3<C> also shows that the conflict between NPV and IRR exists until the NPV(A)/NPV(B) crosses the value of one horizontal line which corresponds to the crossover rate in Figure 3<B>, point I, and is indicated as point I1 in Figure 3 <C> as mentioned before. The combination of the three graphs shows how inequality (9) is effective in determining both the conflict between NPV and IRR and NPV and MIRR.

While we presented a very detailed analysis, the analysis can be simplified by using only the graph in Figure 3 <C> and understanding the crossover and MIRR crossover rates. We note that point M1 can be obtained directly from the right side of the compound inequality (9) with the same Goal Seek procedure as applied for inequality (6) to obtain point M. The graphs in Figure 3 were obtained with values generated by a Data Table in Excel.

FIGURE 3
NPVs AND PVs FOR DIFFERENT WACCs IN THE EXAMPLE IN FIGURE 2

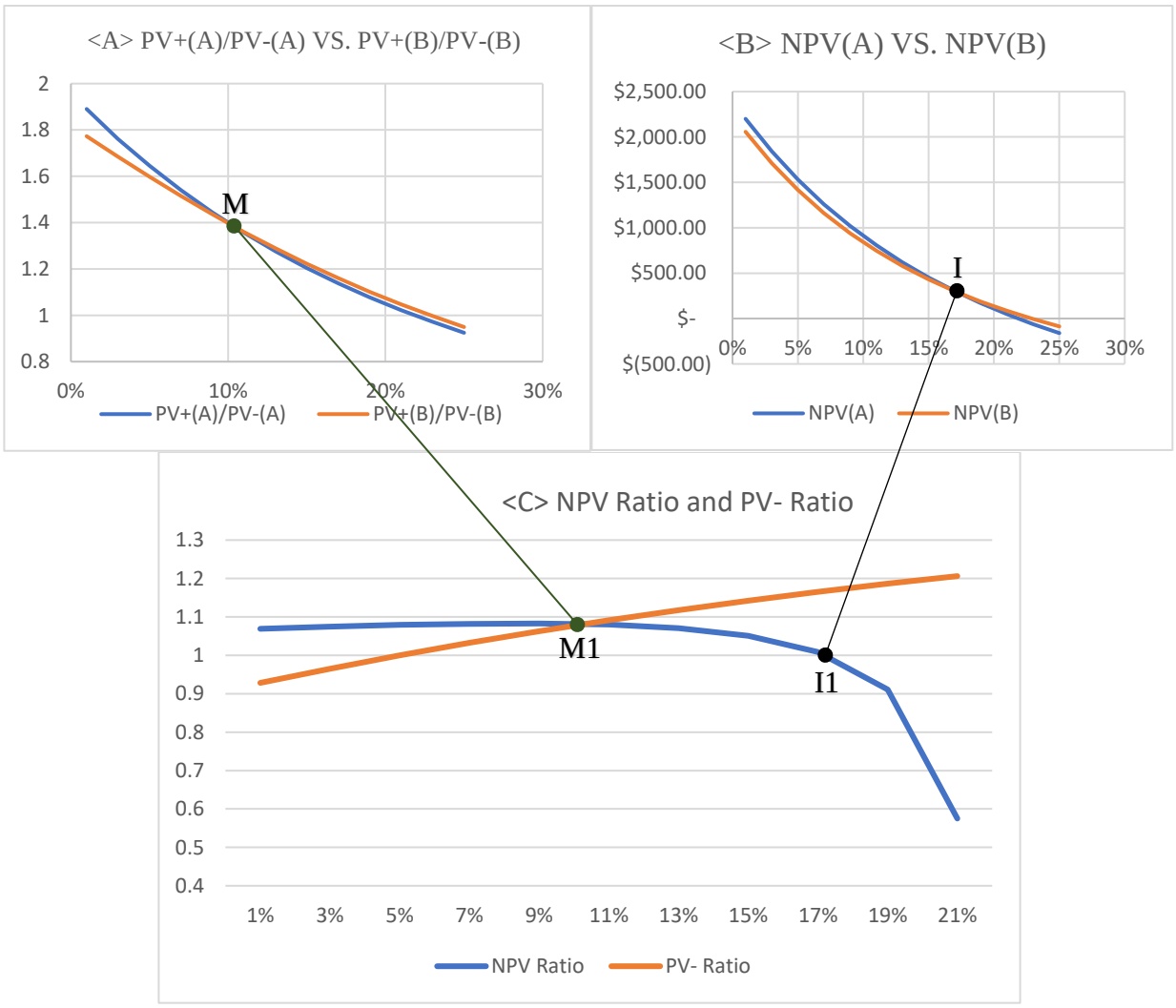


Table 1 summarizes the different interest rate ranges for conflict/no conflict in rankings between NPV and IRR and between NPV and MIRR, and the selected WACCs for the examples in Figures 2, 4, and 5 confirm the results. The regions of conflict or no conflict are different between the two methods, MIRR and IRR. Up to point M1 (the MIRR crossover rate), MIRR would recommend the same project as NPV while

IRR would not. The region where both IRR and MIRR would make the incorrect recommendation is only between points M1 and I1. After point 11 both MIRR and IRR would make the correct decision with respect to NPV. It is clear that MIRR and IRR recommend differently depending on interest rate ranges, and thus along with NPV and IRR and NPV and MIRR, there is a MIRR and IRR conflict in rankings.

It is well known that most people relate to rates of return or interest rates. Whenever possible, it is easier to communicate the relevance of a project based on its rate of return rather than on NPV, especially to professionals not familiar with NPV. Thus, knowing the regions of conflict makes it easier for managers to recommend projects with superior NPV, not based on NPV, but based on IRR or MIRR, without making costly mistakes. Therefore, this paper provides managers with a useful method to discover the conflict region for both IRR and MIRR. It also provides educators with a detailed Excel template with which they can teach from a novel perspective the two conflicts.

We need to note that the above analysis is project specific and thus for any other case the interest rate ranges of decision would be different.

TABLE 1
SUMMARY TABLE OF CONFLICT/NO CONFLICT FOR IRR, MIRR, AND NPV

Interest Rates	IRR and NPV	MIRR and NPV
Less than 10.26%	conflict	no conflict
between 10.26% and 17.28%	conflict	conflict
between 17.28% and 21.86%	no conflict	no conflict

FIGURE 4
BOTH IRR AND NPV AND MIRR AND NPV ARE IN CONFLICT WHEN WACC=12%

	A	B	C	D	E	F	G
18							
19		PV+(A)	$ 2,964.76	PV+(B)	$ 2,700.76		
20		PV-(A)	$ 2,253.70	PV-(B)	$ 2,040.15		
21		NPV(A)	$ 711.06	NPV(B)	$ 660.61		
22		IRR(A)	21.86%	IRR(B)	22.86%	Crossover Rate	17.28%
23		MIRR(A)	15.11%	MIRR(B)	15.19%		
24							
25							
26		PV+(A)/PV-(A)	1.315506635	NPV(A)/NPV(B)	1.076364648		
27		PV+(B)/PV-(B)	1.323804828	PV-(A)/PV-(B)	1.104674298		
28							
29							
30	Are IRR and NPV in conflict?		CONFLICT				
31							
32	Are MIRR and NPV in conflict?		CONFLICT				

FIGURE 5
BOTH IRR AND NPV AND MIRR AND NPV ARE IN NO CONFLICT WHEN WACC=18%

	A	B	C	D	E	F	G
18							
19		PV+(A)	$ 2,419.04	PV+(B)	$ 2,099.16		
20		PV-(A)	$ 2,184.27	PV-(B)	$ 1,857.46		
21		NPV(A)	$ 234.78	NPV(B)	$ 241.70		
22		IRR(A)	21.86%	IRR(B)	22.86%	Crossover Rate	17.28%
23		MIRR(A)	19.21%	MIRR(B)	19.45%		
24							
25							
26		PV+(A)/PV-(A)	1.107485272	NPV(A)/NPV(B)	0.971351099		
27		PV+(B)/PV-(B)	1.130124681	PV-(A)/PV-(B)	1.175944858		
28							
29							
30	Are IRR and NPV in conflict?		NO CONFLICT				
31							
32	Are MIRR and NPV in conflict?		NO CONFLICT				

CONCLUSION

The paper discusses two conflicts in Capital Budgeting, one between NPV and IRR and the other between NPV and MIRR, and uncovers a third one, between MIRR and IRR, while clarifying once more the reinvestment rate issue. It is inexact to assume that IRR and NPV need any reinvestment rate assumption. On the other hand, MIRR is based on the reinvestment rate assumption. Considering the cost of capital, WACC, as the reinvestment rate makes practical sense, therefore MIRR remains an interesting method of determining the suitability of a project. However, it is known that NPV and MIRR could lead to conflicting selections in the case of mutually exclusive projects. The paper extends a method developed by Tuluca (2016) to determine when this is the case by adding an Excel template to exemplify the issue. More importantly, the paper finds that, as in the case of NPV and IRR conflict, it is possible to find the regions of conflict or no conflict between NPV and MIRR.

A detailed Excel template model is presented that can be easily reproduced and used to predict if and when there will be a conflict between NPV and MIRR as a parallel with the procedure of determining the same for NPV and IRR.

In conclusion, this paper provides a method to predict if NPV and MIRR would conflict. At the same time, it shows how the ranges of conflict and no conflict for both NPV and MIRR and NPV and IRR can be found with only one graph which also determines when MIRR and IRR are in conflict. The discussion in the paper is useful to anyone studying capital budgeting topics as it clarifies a number of issues that are not dealt with conclusively in finance textbooks or extant literature. It also has important practical applications, as it provides a method to determine the regions for WACC where conflict between NPV and MIRR exists or not. As a byproduct, the method also provides a comparison of the interest rate ranges of NPV-MIRR, NPV-IRR, and MIRR-IRR conflicts. In addition, while the paper used Excel as a tool to operationalize the theoretical discussion, the method is scalable and can be implemented in any package capable of computations and data visualization or in any proprietary systems of capital budgeting employed by corporations.

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