ISSN 2350-1049

International Journal of Recent Research in Interdisciplinary Sciences (IJRRIS)
Vol. 5, Issue 3, pp: (16-19), Month: July - September 2018, Available at: www.paperpublications.org

Technical Note on the Negative Net Present Value (NPV) One of the Selection Criteria of Investment Projects

Medhat A. Hassanein

Distinguished University Professor of Finance, Management Department, American University in Cairo

Abstract: **The Net Present Value (NPV) technique is considered to be a core criterion for the rejection or acceptance of a capital budgeting project. The definition of NPV is the difference between the discounted Free Cash Flow (FCF) of a project and its initial investment.**

Keywords: **Net Present Value (NPV), Free Cash Flow (FCF), initial investment, Investment Projects.**

1. INTRODUCTION

Investment analysts usually recommend to decision makers to accept only projects which have NPV > 0, If NPV is negative this research paper will explain in details what can be returned from the initial investment but certainly financiers will return no interest as debtholders or a rate of return as shareholders.

The Net Present Value (NPV) technique is considered to be a core criterion for the rejection or acceptance of a capital budgeting project. The definition of NPV is the difference between the discounted Free Cash Flow (FCF) of a project and its initial investment. As a selection criteria if NPV ≥ 0 then the project is accepted and if NPV is negative i.e < 0 the project is rejected.

2. EXPLANATION OF NPV = 0 OR NEGATIVE IS WARRANTED

Investment analysts usually recommend to decision makers, which are usually members of the investment department of a corporation, to accept only projects which have NPV > 0. The strange justification for this selection is sometimes expressed as follows: if NPV= 0 the investment project will only pay back its initial investment but with no return to the shareholders or to the debtholders. If the project is financed by debt and equity and each has its cost/return, this cost/return measure is the weighted Average Cost of Capital (WACC). This justification is a major error of the understanding of the discounting technique of the time value of money theory. If a discounted cash flow at the required rate of return is equal to the initial investment outlay, this implies the return of the initial investment *and* the required rate of return. The other common error in the understanding of the NPV criterion is when the discounted cash flow at the WACC is less than the initial investment i.e. NPV is negative. If so, some analysts conclude that the project has neither returned its WACC nor the total amount of its initial investment.

This technical note shows the fallacy of the conclusions of those analysts.

First, if NPV= 0, the project should be accepted because it has returned back the required rate of return which is shared by stockholders and debtholders i.e. the WACC of the project, in addition to its initial investment,

Second, if the investment project has a negative NPV, this means that the project has returned back its initial investment but the present value of the initial investment is less than its value at the time of launching the project. However if the project is financed by free funds (WACC = 0) then the project will return back its present value of the initial investment. These two propositions will be proven by referring to the following example:

ISSN 2350-1049

International Journal of Recent Research in Interdisciplinary Sciences (IJRRIS)
Vol. 5, Issue 3, pp: (16-19), Month: July - September 2018, Available at: www.paperpublications.org

Otobai Company in Osaka, Japan's [1] staff members prepared the cash-flow forecasts shown in the following table: (figures in ¥ billions)

	Year 0	Annual (From 1-10)
Investment	15	
Revenue		37.5
Variable cost		30.0
Fixed cost		3.0
Depreciation allowance		1.5
Pretax profit		3.0
Tax (Tax rate 50%)		1.5
Net profit		1.5
Operating cash flow		3.0
Weighted average cost of capital		10%

Investment is depreciated over 10 years straight line

Unit sales = 100,000 scooters

Revenue = 100,000 * 375,000

= ¥ 37.5 billion

Proposition one (A): If NPV > 0 accept the project

NPV = -15 + 3 $(PVIFA)_{10,.10}$

= ¥ 3.43 billion

The project is acceptable since its NPV > 0

Proposition one (B): If NPV = 0 accept the project.

Assume that the expected number of unit sales will be 85,093 scooters. Following the same procedure the expected NPV= 0.

Revenue	= 85,093 * 375,000	= 31.91
Variable cost	= 85,093 * 300,000	= 25.53
Fixed cost		= 3.00
Depreciation allowance		= 1.50
Pretax profit		= 1.88
Tax		= .94
Net Profit		= .94
Operating Cash flow		= 2.44

NPV = -15.00 + 2.44 $(PVIFA)_{10,.10}$

[1] R.Brealey, S.C Myers, and F. Allen" Principles of Corporate Finance, Mcgraw/ Hill Education, 11th E, Chp10, PP 248-250.

= -15.00 + 15.00

= .00

Analyzing this result shows that when NPV= 0, the scooter project retuned back its initial investment in addition to the required rate of return (WACC) of 10% according to the theory of the time value of money.

Proposition Two: If NPV is negative the expected rate of return will be less than the estimated weighted Average of Cost of Capital (WACC) which is the 10% of this example and the initial investment will also be returned but with a loss in value; unless funds are provided at no cost or return.

The following example shows these results.

Number of units sold = 60,000 units

Initial investment = $15,000,000

The life of the project = 10 years

Depreciation allowance = $1,500,000 (Straight line)

If annual EBIT = 0, when units sold = 60,000 units. This means that there will be no interest to debt holders nor return to shareholders

Weighted Average cost of capital = 10%

Then OCF = (EBIT)(1-t) + Dep allow

= 0 + $1,500,000

DCF of OCF = 1,500,000 $(PVIFA)_{10,10\%}$

= $9,216,851

This means that annual depreciation of $1,500,000 which will be the OCF of the project for 10 years is worth now $9,216,851, if the expected WACC = 10%

From the example, the cost of the machine is $15,000,000 which is the initial investment of this project.

This means a loss of value of ($15,000,000) + 9,216,851

($5,783,149) = NPV

If the (WACC) were 5% then:

DCF of 1,500,000 for 10 years at 5%

= 1,500,000 $[PVIFA]_{10,5\%}$ = $11,582,602

Loss of value =15,00,000 – 11,582,602

= ($ 3,417,398) = NPV

If the (WACC) = 1%

The DCF at 1% for 10 years will be:

DCF = 1,500,000 $(PVIFA)_{10,.01}$

= $14,206,957

Loss of value = (15,000,000) + 14,206,957

= ($793,043) = NPV

If WACC = 0, No cost of equity, No cost of debt

ISSN 2350-1049

International Journal of Recent Research in Interdisciplinary Sciences (IJRRIS)
Vol. 5, Issue 3, pp: (16-19), Month: July - September 2018, Available at: www.paperpublications.org

Therefore

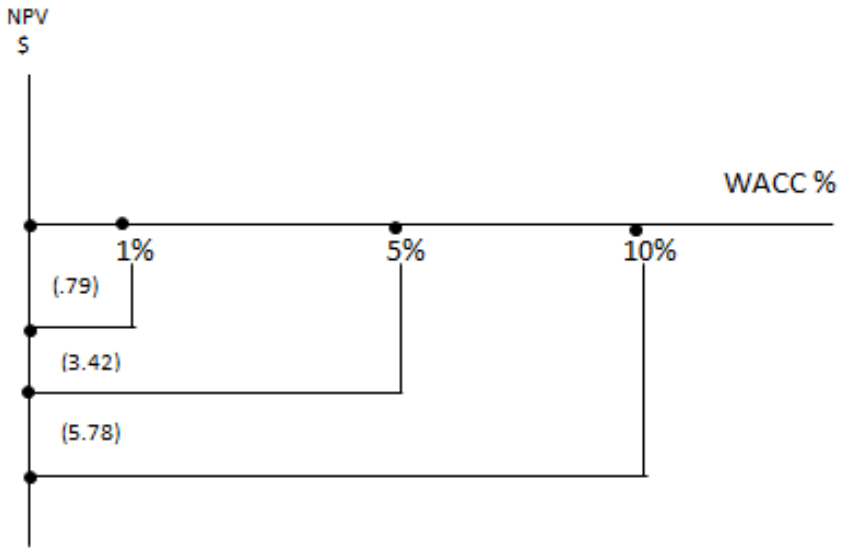
DCF = 1,500,000 $(PVIFA)_{10,zero\%}$

= $1,500,000

Loss of value = 0 = NPV

The investors and the debt holders recovered their principal amounts of the investment in this project, but the financing provided from debt and equity was at no cost/return. This is similar to crude payback period method used in project evaluation.

To rephrase proposition two, shareholders and debtholders will always get back their initial investment if NPV is negative and the operating cash flow (OCF) covers the annual depreciation allowance. But in a negative NPV they will always get a rate of return less than the WACC. We should realize that debtholders have priority over shareholders. Yet if operating cash flow (OCF) will have a zero annual Net Profit After Tax (NOPAT), therefore there will be a zero return to both financiers. They will certainly get back their initial investment if their opportunity cost/return of their funds are zero, and loss of value of their initial investment which equals the negative NPV, if they have WACC > 0.



3. CONCLUSION

Shareholders and debtholders will always get back their initial investment if NPV is negative and the operating cash flow (OCF) covers the annual depreciation allowance. But in a negative NPV they will always get a rate of return less than the WACC. We should realize that debtholders have priority over shareholders. Yet if operating cash flow (OCF) will have a zero annual Net Profit after Tax (NOPAT), therefore there will be a zero return to both financiers.