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Weighted average cost of capital in the theory of Modigliani–Miller, modified for a finite lifetime company

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Abstract

The theory of the capital cost and the capital structure by Modigliani and Miller (MM) is based on many assumptions, removal of which significantly alters its conclusions. While the account of corporate and individual taxes, the possibility of bankruptcy and a number of other assumptions have received considerable attention, the MM assumption that all financial flows are perpetuity (the lifetime of the company is infinite) is much less studied. In fact, the lifetime of the company is always, of course, finite and the inclusion of this significantly changes formulae obtained by MM, in particular for the Weighted Average Cost of Capital (WACC). In this article, we consider the WACC of the company in the theory of MM and modify MM's theory for a finite lifetime company. For the first time, we derive the analytical expression for WACC of the company with arbitrary lifetime. In two limited cases – 1 year and perpetuity companies – our

expression gives the well-known results of Myers and MM, correspondingly. We have solved the obtained equation for a 2 year company and compared this result with those of Myers and MM. It shows that WACC values for 2 year company is closer to MM (perpetuity) limit than to Myers (1 year) one at small equity cost (just above the debt cost) while at bigger equity cost, it is closer to Myers limit than to MM one. Algorithm for finding of WACC in the case of arbitrary lifetime of the project has been developed. The use of the obtained equations for the projects of n years, and for companies operating in the market n years significantly alters the assessment of the WACC of the company.