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Average Internal Rate of Return and Investment Decisions: A New Perspective

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Abstract

The internal rate of return (IRR) is often used by managers and practitioners for investment decisions. Unfortunately, it has serious flaws: (1) multiple real-valued IRRs may arise; (2) complex-valued IRRs may arise; (3) the IRR is, in general, incompatible with the net present value (NPV) in accept/reject decisions; (4) the IRR ranking is, in general, different from the NPV ranking; (5) the IRR criterion is not applicable with variable
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which we call average internal rate of return, complex-valued numbers disappear and all the above-mentioned problems are wiped out. The economic meaning is compelling: it is the project return rate implicitly determined by the market. The traditional IRR notion may be found as a particular case.

Notes

For example, the cash flow stream (−4,12,−9) has a unique IRR equal to 50%. According to the IRR criterion, the project must be accepted if the market rate is smaller than 50%, but the NPV is negative for any rate different from 50%, so the project is not worth undertaking. (Note that this example implicitly introduces a further class of problems: if a project is not unambiguously individuated as either an investment or a borrowing, the IRR profitability rule is ambiguous.)

The approach is compatible with a bounded-rationality perspective: in this case r is a subjective threshold (Magni, 2009b).

The IRR rule is semantically not satisfactory because it is not associated with a univocal definition of investment/borrowing, so that in some situations one does not know whether the IRR acts as a rate of return or a rate of cost (see footnote 1).

Note that the theorem includes those cases where $x_0 = 0$ (i.e., the project starts at time $t > 0$).

The real options approach is but a sophisticated version of the traditional NPV model, where the set of alternatives is inclusive of the options implicit in the project: ‘‘one can always redefine NPV by subtracting from the conventional calculation the opportunity cost of e NPV is positive’ 4, p. 7).

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