

Introducing Economic Average Invested Capital

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Average invested capital (AIC)

(1/4)

- The average invested capital (AIC) is the basis for the return calculation.
- The AIC of an investment portfolio is the average of the money invested over the total measurement period.
- The AIC depends on the external cash flows (amount and the timing) put into or withdraw from the investment portfolio. Cash inflows increases and cash outflows decreases the AIC.
- In general the AIC is defined by the sum of the beginning market value of the measurement period and the time-adjusted or day-weighted external cash flows where there are various methodologies for calculating the time-adjustment or day-weighting of the external cash flows.
- The implied or economic AIC is that AIC that makes the return to result in the absolute gain and loss.
- The AIC is dependent on the measurement period and the assumptions for reinvestment and compounding.

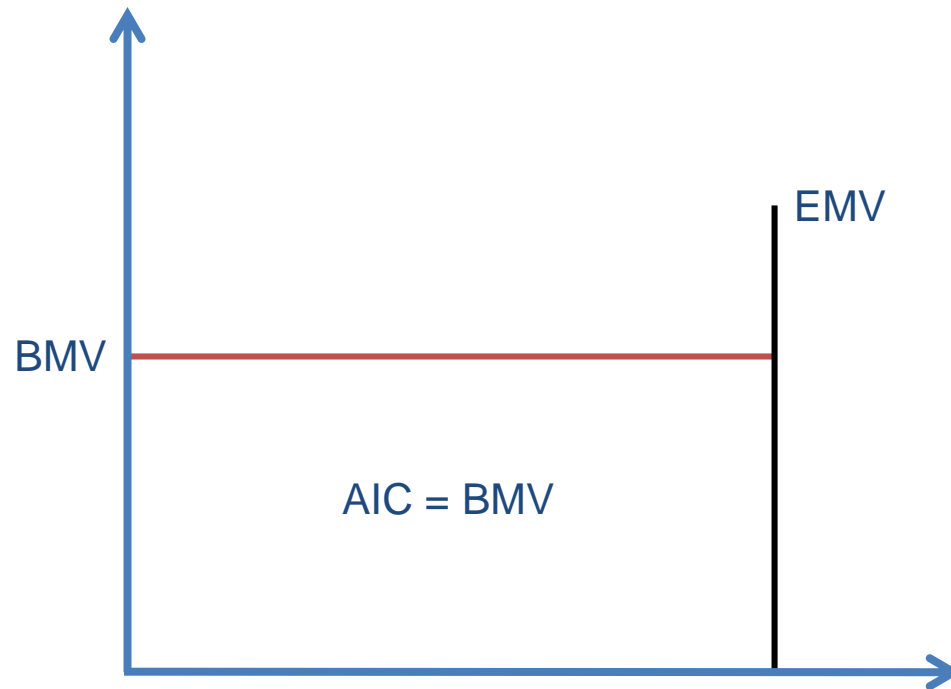
Average invested capital (AIC)

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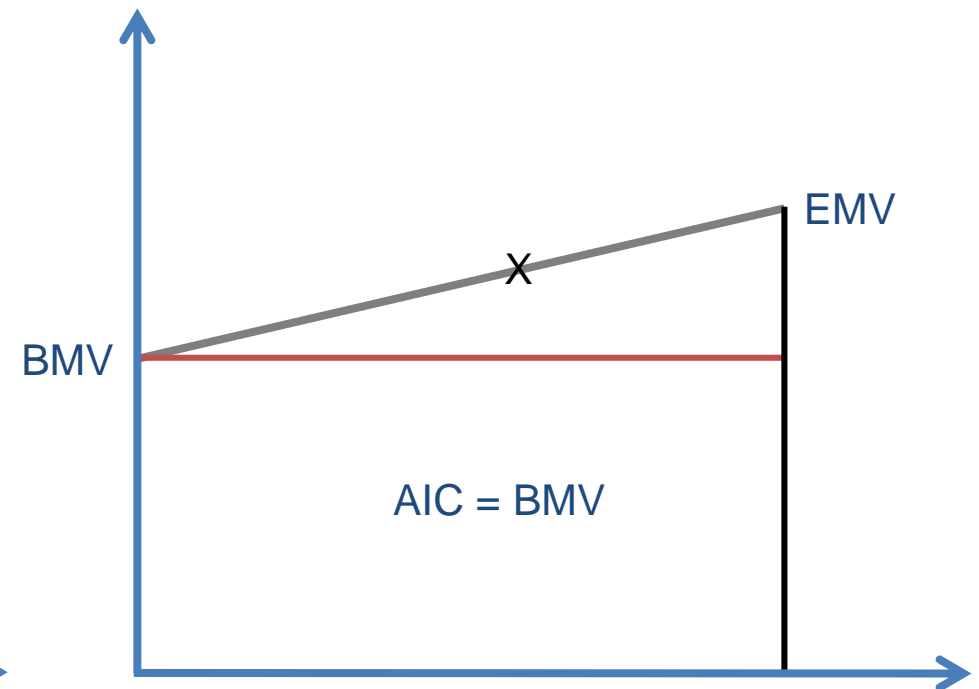
- Approximations of the AIC - for example as the average of the sub-period beginning market values or the day-weighting of the external cash flows - does not equal the economic AIC.
- In practice there are various methods calculating the AIC or for incorporating the external cash flows and therefore returns may vary substantially depending on the chosen methodology.

Average invested capital (AIC)

(3/4)



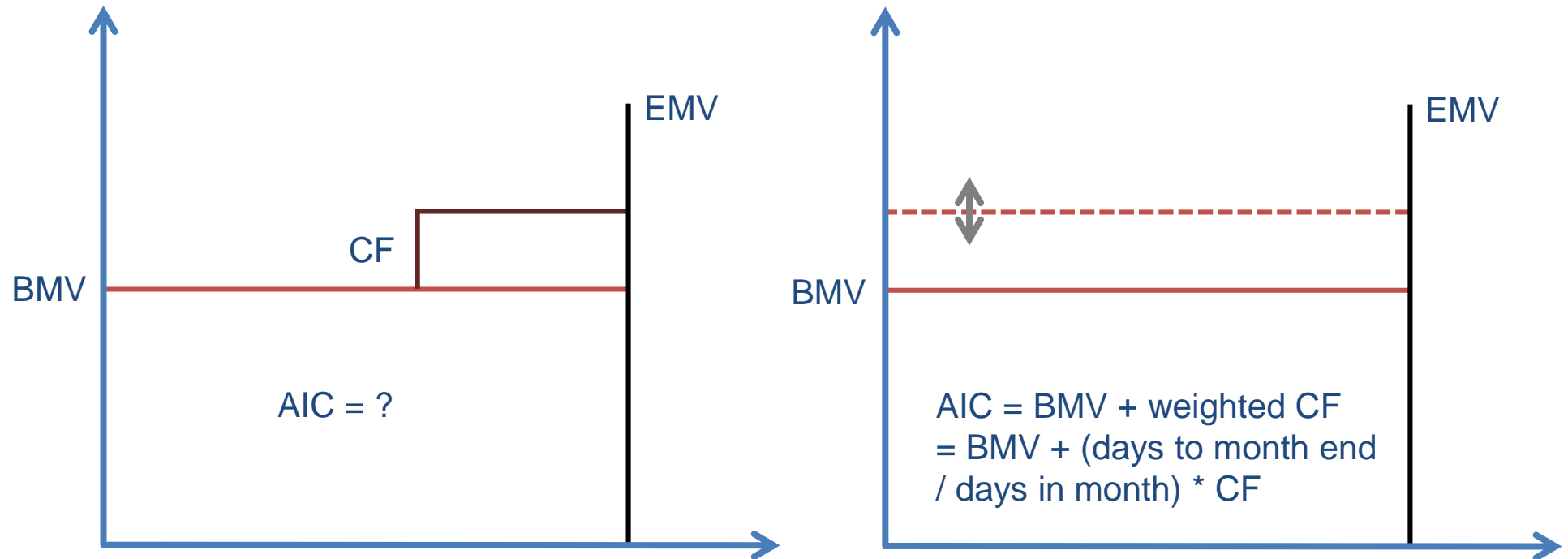
=> AIC is depending on the measurement period
=> $AIC = P\&L / \text{return}$



=> Income or expenses have no impact on the AIC.
=> Only external cash flows influence the AIC.

Average invested capital (AIC)

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=> There are various ways to approximate the AIC - normally through day-weighting. Additionally different compounding assumptions lead to different AIC - for example Modified Dietz assumes linear compounding and IRR assumes continuous compounding.

Economic average invested capital (EAIC)

(1/3)

- The implied or **economic average invested capital (EAIC)** is that AIC that makes the return to result in the absolute gain and loss.

- Impact of the cash flow on the AIC:

$$\begin{aligned} \Rightarrow \text{AIC} &= \text{BMV} + \text{delta AIC} \\ &= \text{BMV} + (\text{delta P\&L due to cash flow}) / \text{return} \\ &= \text{BMV} + (\text{P\&L} - \text{implied P\&L on BMV}) / \text{return}. \end{aligned}$$

$$\Rightarrow \text{EAIC} = \text{P\&L} / \text{return} \quad \text{with P\&L} = \text{EAIC} * \text{return}.$$

- The EAIC depends on the underlying assumptions regarding the compounding of external cash flows.
- Important: EAIC has to be consistent with the underlying financing and reinvestment assumptions.

Economic average invested capital (EAIC)

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Example:

- Equity portfolio
- 31.12.2014: BMV = 100.00 EUR.
- 30.09.2015: Cash outflow = - 30.00 EUR
- 31.12.2015: EMV = 96.00 EUR.

=> IRR = 27.92%.

=> MWR using Modified Dietz Method = 28.13%.

=> EAIC(IRR) = $100.00 + (26.00 - 100.00 * IRR) / IRR = 93.12$.

=> P&L(IRR) = $93.12 * 27.92\% = 26.00$.

=> EAIC(MWR) = $100.00 + (26.00 - 100.00 * MWR) / MWR = 92.44$.

=> P&L (MWR) = $92.44 * 28.13\% = 26.00$.

What is the impact on the initial capital at risk ?

=>

How much initial capital at risk is needed to generate the actual P&L assuming a return equal to the calculated one and no cash flows?

Economic average invested capital (EAIC)

(3/3)

Proof that EAIC(MWR) equals AIC(MWR):

$$\text{EAIC(MWR)} = 100.00 + (26.00 - 100.00 * \text{MWR}) / \text{MWR} = 92.44.$$

equals:

$$\text{AIC(MWR)} = 100 + (-30) * (365 - 272) / 365 = 92.44.$$

Contact details and disclaimer

Contact details



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