



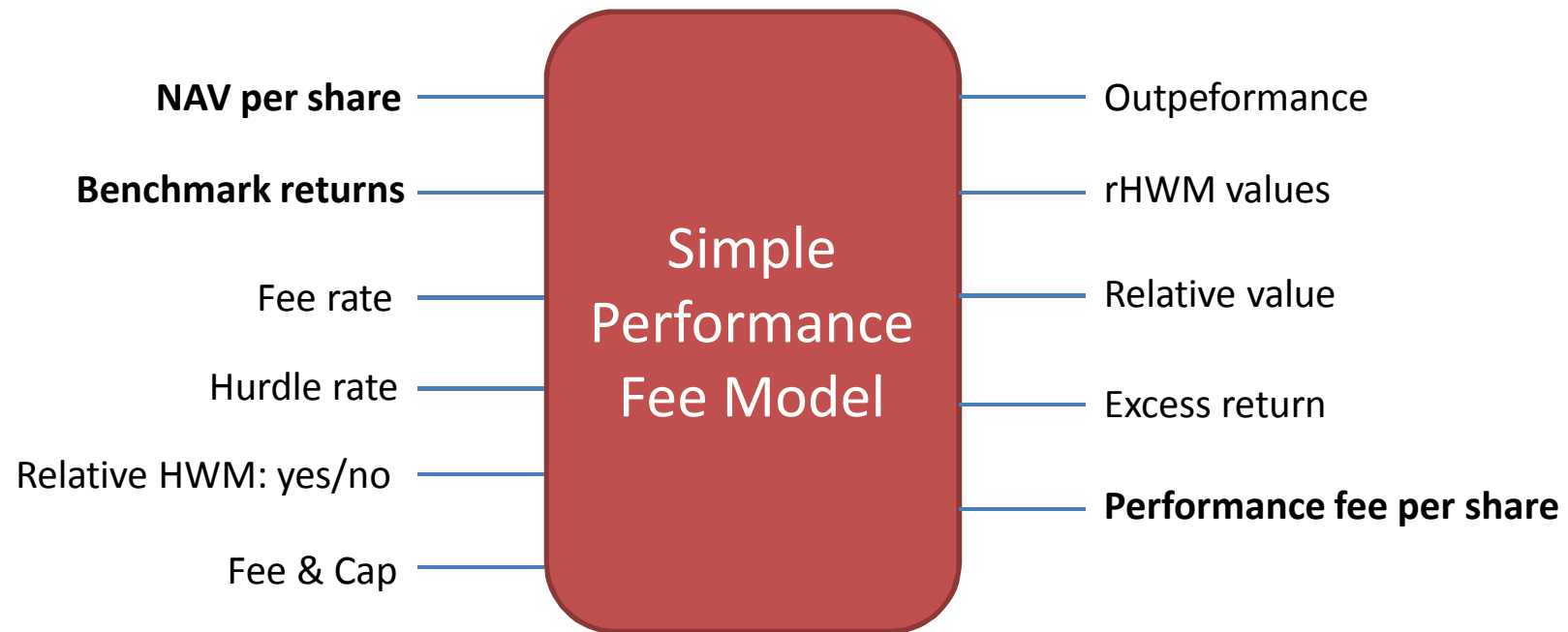
Simple Performance Fee Calculation

Tunç Ali Kütükçüoğlu

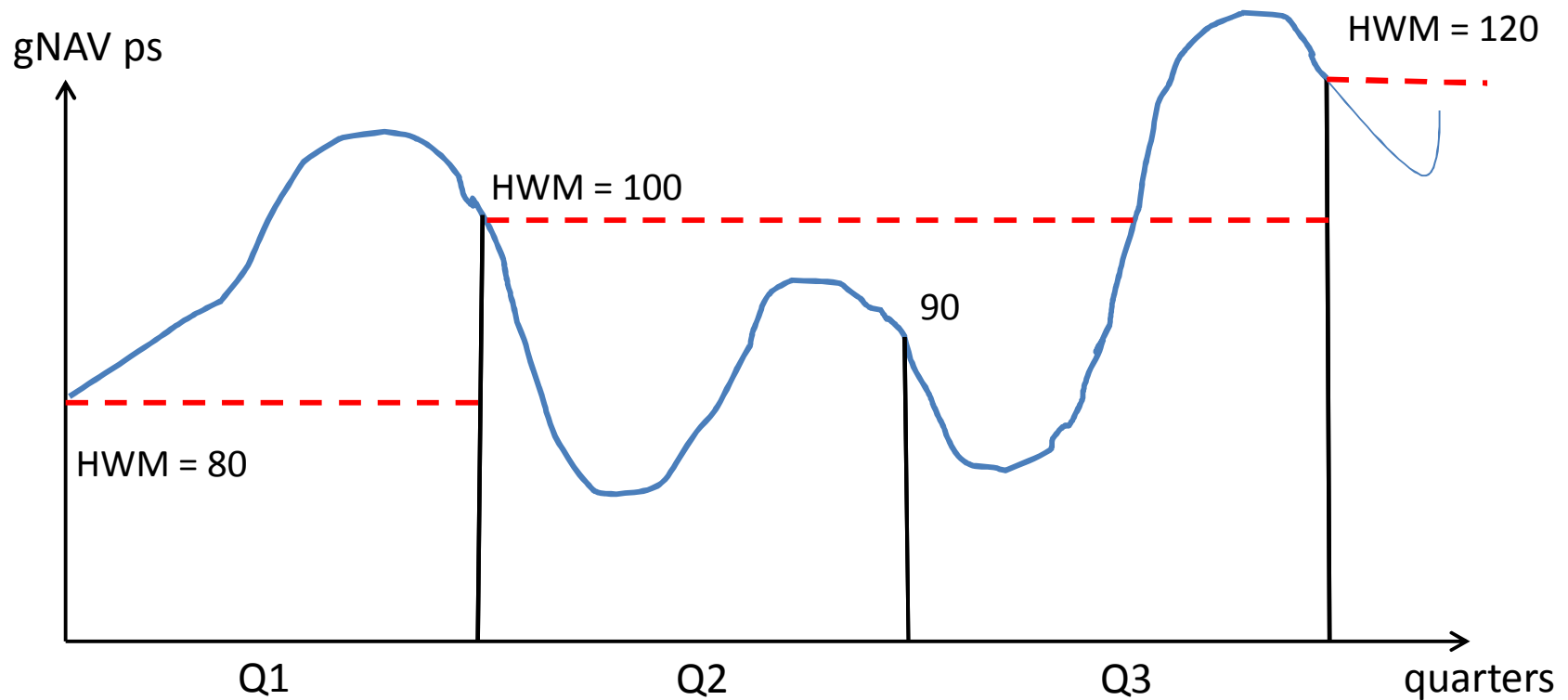
CFA, Dipl. Ing. ETH

Email: tuncalik@finaquant.com

Simple Performance Fee

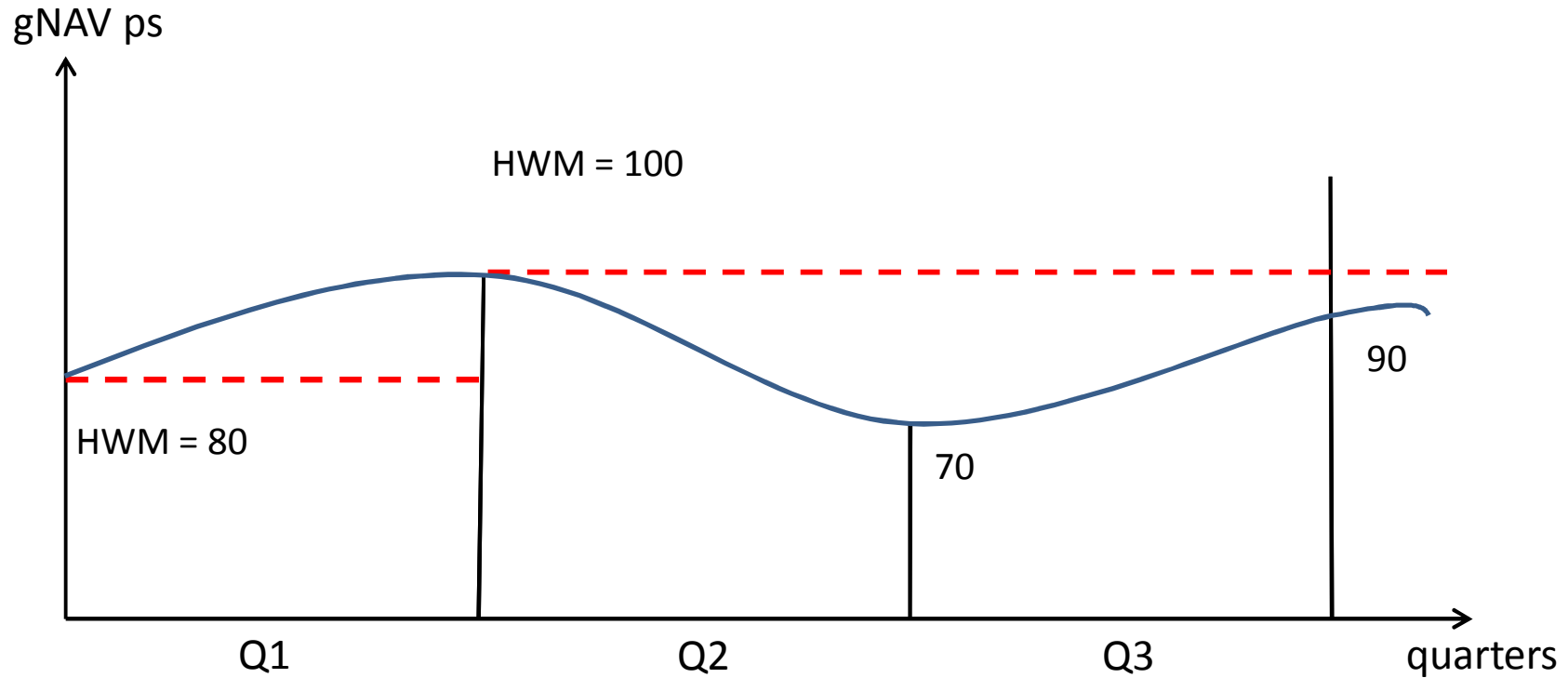


NAV per share development in three quarters



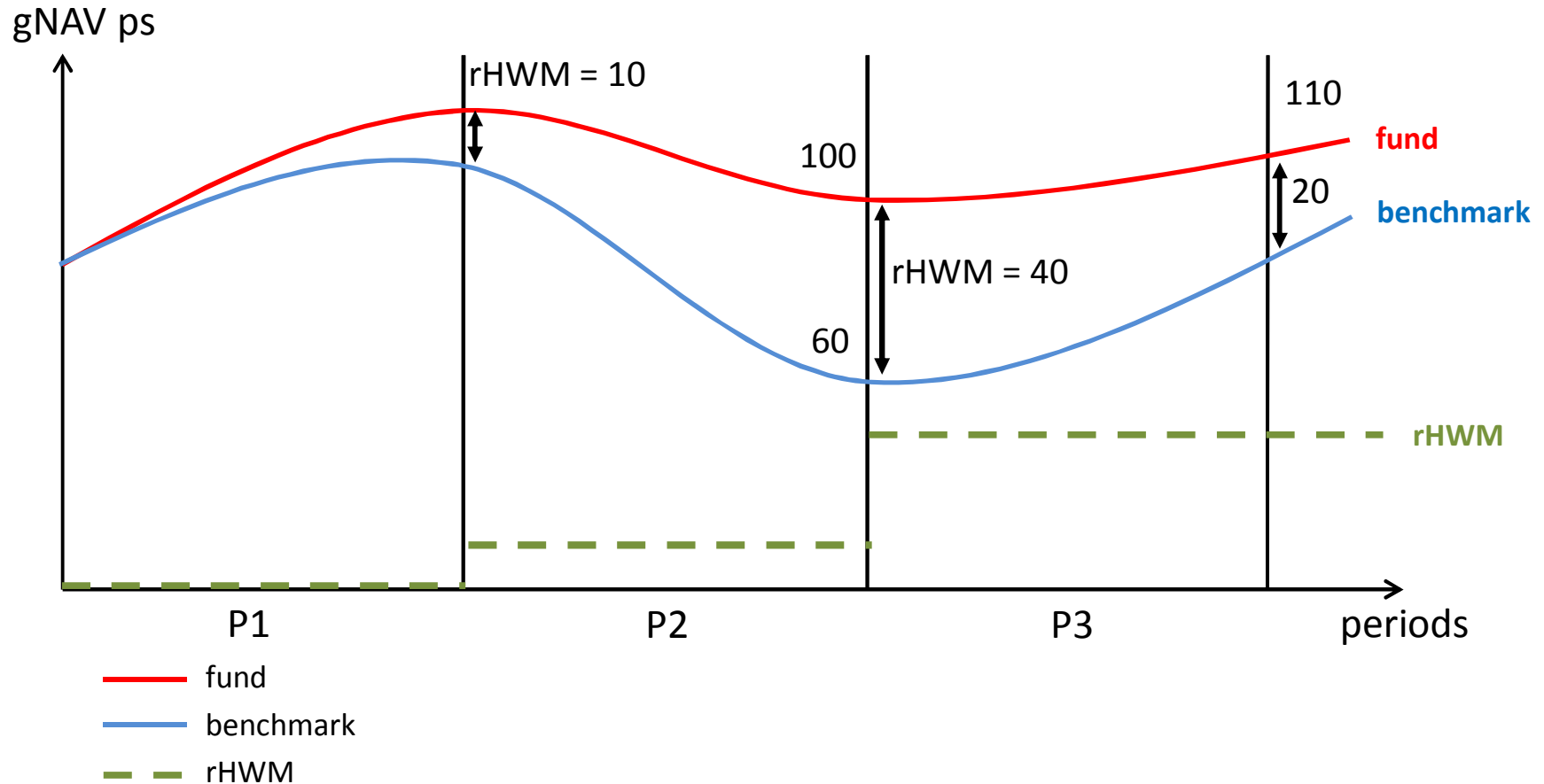
NAV per share values are \$80, \$100, \$90 and \$120 at the beginning of 1st, 2nd, 3rd and 4th quarters respectively.

High Watermark (HWM)



No positive performance fee for the third quarter Q3 due to HWM; the current HWM value 100 is larger than the period-end NAVps value 90.

Relative High Watermark (rHWM)



No positive performance fee for the third period P3 due to relative HWM; the current rHWM value 40 is larger than the period-end value excess 20 w.r.t. Benchmark.

Calculation Model: Assumptions

- “ There are no inter-period share purchases (subscriptions) or sales (redemptions). All purchase or sale transactions occur at the beginning or end of the measurement periods.
- “ Measurement period is also the payment period; performance fee payments are done at the end of each measurement period.
- “ Measurement period can be a month, quarter, half-year or year.
- “ Benchmark returns are calculated elsewhere and delivered to the calculation model as input; the calculation model doesn't need to calculate benchmark returns itself.
- “ The input parameter *performance fee rate* is stated with respect to the measurement period. For example if the measurement period is a month, the given fee rate is a monthly rate; not an annual fee rate.

Calculation Model: Input parameters

- “ **NAV per share** (NAVps) values of the fund for each period
- “ **Performance fee rate**; a percentage like 20%
- “ **Benchmark returns** for each period; benchmark return is zero if there is no benchmark for the calculation.
- “ (relative) **hurdle rate**; a percentage like 3%
- “ **Relative High Watermark** (rHWM): Yes or No; if yes, apply rHWM condition for calculating performance fees.
- “ Fee **floor** and **cap**, indicated as per share dollar amounts.

Calculation Model: Intermediate Results - 1

At the initial start, or at an rHWM reset period:

$$(1a) \text{ rHWM}(p) = 0 \qquad (1b) \text{ benchmark value}(p) = \text{NAVps}(p)$$

Calculate fund's return; NAVps(p) is NAV per share at the end of period p:

$$(2) \text{ fund return}(p) = [\text{NAVps}(p) - \text{NAVps}(p - 1)] \div \text{NAVps}(p - 1)$$

Benchmark return is always zero if there is no benchmark:

$$(3) \text{ outperformance}(p) = \text{fund return}(p) - \text{benchmark return}(p)$$

$$(4) \text{ benchmark value}(p) = \text{benchmark value}(p - 1) \times (1 + \text{benchmark return}(p))$$

$$(5) \text{ relative value}(p) = \text{NAVps}(p) - \text{benchmark value}(p)$$

Calculation Model: Intermediate Results - 2

Case A) Apply rHWM = yes, relative value(p) > rHWM(p-1):

- Performance fee depends on excess return and cap & floor (c&f)
- Update rHWM(p)

$$(6) \text{ rHWM}(p) = \text{relative value}(p)$$

$$(7) \text{ excess return}(p) = \text{outperformance}(p) - \text{hurdle rate}$$

$$(8) \text{ outperform rHWM}(p) = \text{outperform}(p) \times (\text{RelativeValue}(p) - \text{rHWM}(p - 1)) \\ \div (\text{RelativeValue}(p) - \text{RelativeValue}(p - 1))$$

$$(9) \text{ fee before c\&f}(p) \\ = (\text{outperform rHWM}(p) - \text{hurdle rate}) \times \text{NAVps}(p - 1) \times \text{Fee Rate}$$

$$(10) \text{ performance fee per share}(p) = \max(\min(\text{fee before c\&f}(p), \text{cap}), \text{floor})$$

Calculation Model: Intermediate Results - 3

Case B) Apply rHWM = yes, relative value(p) <= rHWM(p-1):

- rHWM test is not passed; performance fee is max(0, floor)

$$(6) \text{ rHWM}(p) = \text{rHWM}(p - 1)$$

$$(7) \text{ excess return}(p) = \text{outperformance}(p) - \text{hurdle rate}$$

$$(8) \text{ fee before c\&f}(p) = -\text{hurdle rate} \times \text{NAVps}(p - 1) \times \text{Fee Rate}$$

$$(9) \text{ performance fee per share}(p) = \max(\min(\text{fee before c\&f}(p), \text{cap}), \text{floor})$$

Calculation Model: Intermediate Results - 4

Case C) Apply rHWM = no:

- No rHWM test; performance fee depends on excess return and cap & floor:

$$(6) \text{ } rHWM(p) = \max(\text{relative value}(p), rHWM(p - 1))$$

$$(7) \text{ } excess\ return(p) = outperformance(p) - hurdle\ rate$$

$$(8) \text{ } fee\ before\ c\&f(p) = excess\ return(p) \times NAVps(p - 1) \times Fee\ Rate$$

$$(9) \text{ } performance\ fee\ per\ share(p) = \max(\min(fee\ before\ c\&f(p), cap), floor)$$

Download matlab and R files

Matlab (*.m) and R (*.r) files for the calculation of Simple Performance Fee can be downloaded at finaquant.com/download

How to run the calculation?

1) Make sure that all files are in the current (working) directory of matlab/R

1) Enter command:

```
matlab> script_SimplePerformanceFee
```

```
R > source('script_SimplePerformanceFee.R')
```