**Quiz For Lecture # 6**

You are a sales person at Putnam. Your client is currently invested in an active managed product. Your client wants to move his assets to Vanguard. Your client ponders whether to switch 70% that is invested in Putnam's "Top"-fund into Vanguard's "Star"-fund, which is a passive fund reflecting the S&P 500 index.

Putnam's active product produces an expected return of 18% and has a standard deviation of 28%.

Vanguard's passive product , that mimics the S&P 500 stock index, yields an expected rate of return of 13% with a standard deviation of 25%.

Assume that $r_f = 8\%$

a) Explain to your client the disadvantage of the switch.

b) Show him the maximum fee you could charge (as a percentage of the investment in your fund, deducted at the end of the year) that would leave him at least as well off as investing in your fund as in the passive one.

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$\sigma_r = 0.30 \times 0 + 0.7 \times 25 = 19.6\ \%$

$E_r = 0.30 \times 0.08 + 0.7 \times 18 = 15\%$

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$E(r_c) = r_f + 0.7\,[E(r_M) - r_f]$ $\quad r_f = 8\%,\ E(r_M) = 13\%$

$E(r_c) = 8\% + 0.7 \times (13-8) = 11.5\%$

$\sigma_c = 0.7 \times \sigma_M = 0.7 \times 25\% = 17.5\%$

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$E(r_c) = 8 + y\,(18-8) = 8 + 10\,y$ $\quad E(r_c) = 11.5\%$

$11.5 = 8 + 10\,y$
$y = (11.5 - 8) / 10 = 0.35$

$\sigma_c = y \times 28\ \% = 0.35 \times 28\% = 9.8\ \%$

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