

Let  $f$  be the price of a derivative contingent on the stock price process

$$dS = \mu S dt + \sigma S dz.$$

Portfolio  $\Pi = h(f, S)$  satisfies

$$d\Pi = h_f df + h_S dS,$$

where

$$df = (\mu f_S S + f_t + \frac{1}{2} \sigma^2 f_{SS} S^2) dt + \sigma f_S S dz.$$

The multiplier of  $dz$  in  $d\Pi$  is zero only if

$$h_f f_S + h_S = 0.$$

Thus  $h(f, S) = \text{const}$ , showing the nonexistence of risk-neutral measures.

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