## Systematic risk

One of the students pointed out to me that the definition of *systematic risk* given in page 9 of the lecture notes from 28 January is not the same as the definition on p. 123 of Danthine and Donaldson. In my notes it is defined as $\beta_j^2\sigma_M^2$, while in the book it is $\beta_j\sigma_M$. I apologize if this has created confusion. (The fact that $\beta_j^2\sigma_M^2 \equiv \beta_j\sigma_{jM}$ adds to the confusion, of course.)

Since one of the definitions is the square of the other, all statements of the type "this depends on the systematic risk" or "this leads to an increase in systematic risk" are true (or false) independently of which definition one uses. It is very uncommon to see statements of the sort "the systematic risk goes up by 20 percent", which would require that we choose one of the definitions.

Two good reasons to use the definition from the lecture notes are: (1) This allows that we write the total risk (the variance) as a sum of unsystematic risk and systematic risk, instead of the sum of unsystematic risk and the square of systematic risk. (2) The definition in the lecture notes is used in other books, like Copeland, Weston, and Shastri, *Financial Theory and Corporate Policy,* 4th ed., 2005, p. 152.

A much more important question is: Can we really say that the variance of an asset's return does not affect the asset's price in the CAPM? I hope I have convinced you that the answer is yes, cf. the second half of p. 8 of the notes for 28 January. Adding noise to next period's price does not affect today's price, when the noise is stochastically independent of the other variables in the model.