General Equilibrium Models in Continuous Time

Adam Speight

February 4, 2003

Abstract

Many stochastic processes traditionally used in mathematical finance to model the evolution of asset prices were first derived in a general equilibrium context. These models have been extended to account for market incompleteness and other frictions. Often, the price processes resulting from these models exhibit interesting features consistent with empirical regularities. When available, these theoretically grounded models of asset prices are a desirable alternative to theoretic statistical models that merely provide good in-sample fit to historical data. In addition to generating specifications for price processes, general equilibrium models present a significant mathematical challenge in terms of analysis and computation.

This talk presents one prominent model by Basak and Cuoco [1], which provides a striking example of an equilibrium price system that admits a unique state price density process but does not admit an equivalent martingale measure. In particular, this implies that there is arbitrage in the class of "generally admissible" trading strategies but no agent can exploit this. This talk also presents some new work joint with P. Collin-Dufresne and J. Hugonnier that settles questions left open in [1] and interprets the properties of this model in light of the results of [4], [3], and [2].

References

[1] S. Basak and D. Cuoco. An equilibrium model with restricted stock market participation. *The Review of Financial Studies*, 11:309–341, 1998.

[2] F. Delbaen and W. Schachermayer. Non-arbitrage and the fundamental theorem of asset pricing: Summary of main results. 1997.

[3] D. O. Kramkov and J. Hugonnier. Optimal investment with random endowments in incomplete markets. 2003. Working Paper.

[4] D. O. Kramkov and W. Schachermayer. The asymptotic elasticity of utility functions and optimal investment in incomplete markets. *Annals of Applied Probability*, 9:904–950, 1999.