

## Review of What We've Learned (Big Picture)

### Models

- We've used (broadly) three approaches for developing and testing asset pricing models
  - Consumption-based Model with Specific Utility Functions
  - Linear Factor Models, where Factors are Excess Returns
  - Cross-Sectional Factor Models, where Factors are Macro or Financial Variables
- How are utility functions and factors selected?
  - Size of Pricing Errors
  - Connection to Economic Theory

### Estimation

- How do we estimate our models?
  - For Factor Models: OLS plus GMM to correct standard errors
  - Explicit Discount Factor Models: Nonlinear Model-GMM
- What do we learn from the parameters?

### Testing our Models

- Always the same question: Are pricing errors large?
  - Step 1: Find model parameters that minimize pricing errors
  - Step 2: Are the resulting pricing errors statistically significant?
  - Issues of in-sample v. out-of-sample fit

### Interpreting Model Rejections

- Statistical
  - Did we correctly model the time-series process for the residuals / pricing errors?
  - What are the small-sample properties of our test?
- Economic
  - Did we omit relevant factors?
  - Can we theorize a new view of consumer utility?
- Rationalizing a Failure
  - Does the model at least do well for most portfolios?
  - Does our model respect at least some limitations of theory?

**Sample Exam Question**

- Suppose you think up a new factor that you believe should help price stocks (in the context of a linear time series factor pricing model). We'll call this new factor Momentum, where momentum is the difference in return on last periods high return portfolio minus the return on last periods low return portfolio. Describe the empirical tests you would run to convince yourself (and me) that this factor is in fact a factor that is priced in portfolios of stock returns.

**Wrap-Up: That's all folks!**