UCLA **Fall 2016**
MGMT 239C **Prof. Mikhail Chernov**

Empirical Asset Pricing
Problem Set 1
due 12 hours before the class

1 Introduction

The problems are open-ended to simulate real research environment. You are expected to figure out how to focus the questions, which resources you need to figure out how to implement the required tasks. If in trouble, please feel free to contact me by e-mail or during office hours (by appointment).

The solutions must be typed up (preferably in LaTeX) and submitted as a pdf via an e-mail to me. If you are uncomfortable with LaTeX, you may consider using LyX. This is a free user-friendly interface, that is similar to Scientific Workplace.

The solutions must be presented as mini research papers. That is, do not dump all the output on me. Clearly explain what you are doing and why, discuss the results and present only the ones that are relevant for your discussion. Organize the relevant results neatly in tables and/or figures.

You will be using the same dataset over and over again. For bonds, you will use nominal T-bills with 3 months to maturity at monthly frequency from 1954 to 2015, available at FRED II. Some exercises will require the full yield curve. The data can be found here. For equities, you will use S&P 500 returns at daily frequency from 1954 to 2015, available at Yahoo!Finance, ticker ^GSPC.

2 Problems

1. Estimate the Vasicek interest-rate model via Maximum Likelihood. Use five different samples: the full one; 1954-1975; 1976-1981; 1982-2005; 2006-2015. Comment on the differences in parameter estimates. Please provide all the derivations and code. Tricks: i. Treat conditional variance, rather than volatility, as a parameter; volatility has an indeterminate sign; although I am hearing that sticking with vol works "bettter"; ii. Convert the data into decimal form; iii. Divide interest rates by 12 to have monthly interest rates observed at monthly frequency – this simplifies the interpretation of parameters.

2. Calibrate the Merton "jump-diffusion" model – a normal shock + Poisson mixture of normals – to equity returns by matching the moments in the data to the theoretical moments. This is MM, rather than GMM. Simply find parameters by minimizing the squared distance between the theoretical and empirical moments. Please justify your selection of moments. Can you tell if the model is well-specified? Please provide all the derivations and code.