

1. Introduction to the Role of Structural Uncertainty

The “equity premium puzzle” refers to the striking failure of the standard neoclassical consumption-based representative-agent model of stochastic economic growth to explain the large historical difference between the average return to a representative stock market portfolio and the average return from a representative portfolio of relatively safe stores of value. The neoclassical general-equilibrium paradigm predicts an equity risk premium that is orders of magnitude lower than what is observed. The discrepancy is so large and so pervasive as to suggest strongly that something is fundamentally wrong with the standard formulation of the problem in terms of a non-bizarre, comfortably-familiar coefficient of relative risk aversion, say with values $\theta \approx 2 \pm 1$.

The “risk-free rate puzzle” represents another big disappointment with the standard neoclassical model. The stochastic generalization of the basic Ramsey formula from equilibrium growth theory predicts a risk-free interest rate far higher than what is actually observed, hence the puzzle. To further compound the conundrum, alterations of the model that might lessen the discrepancy in the risk-free rate anomaly tend to increase the discrepancy in the equity premium anomaly. Thus, for example, to eliminate the equity premium puzzle requires an astronomically *high* rate of relative risk aversion, while to eliminate the risk-free rate puzzle calls for a microscopically *low* rate of relative risk aversion.

The third major puzzle for consumption-based neoclassical theory is the “excess volatility puzzle.” In principle, equity returns on a representative stock market index should mirror future growth prospects of the underlying economy. But in the data, observed stock market returns are vastly more volatile than the more-primitive real growth rates that are supposedly driving them.

Taken together, this unholy trinity of puzzles is more than just disturbing. The proper interpretation of these equity macro-puzzles has important ramifications throughout all of economics. At stake is the central issue of whether or not the standard consumption-based representative-agent stochastic-general-equilibrium paradigm is realistic enough to be trusted as a reliable model. The three intuitively-related puzzles are devastating for the credibility of the neoclassical paradigm because they are fairly crying out that something is deeply wrong with our standard formulation for understanding the most basic discounting of time and risk. Some critical