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Robust portfolio choice with derivative trading under stochastic volatility

We determine the optimal portfolio for an ambiguity averse investor who has access to stock and derivatives markets. The stock price follows a stochastic volatility jump-diffusion process and the investor can have different levels of uncertainty about the diffusion parts of the stock and its volatility. We find strong evidence that the optimal exposures to stock and volatility risks are significantly affected by the ambiguity aversion to the corresponding risk factor only. We also show that volatility ambiguity has a smaller impact in incomplete markets. Investors who ignore jump risk/model uncertainty/derivatives always incur welfare losses. In our numerical example, the loss from neglecting model uncertainty can be almost as much as the loss from not trading the derivatives.