Multi-Asset Market Making

Ioanid Roşu, Andriy Shkilko, Elvira Sojli, and Wing Wah Tham*

July 18, 2026

Abstract

We model a risk-averse dealer who manages inventory by setting quotes in multiple correlated assets. In closed form, each midquote equals the fundamental value minus a linear combination of the dealer's inventories in all assets, with coefficients that form a pricing matrix; its off-diagonal entries capture cross-hedging: a long dealer quotes to sell correlated assets. Cross-hedging increases with fundamental correlation, while own-quote shading weakens, a substitution effect. It declines with risk aversion, as she mean-reverts each position too quickly for portfolio rebalancing to matter, and is diluted across many assets. The resulting transitory price pressure lowers return correlations at high frequencies, a pattern known as the Epps effect. Ignoring cross-hedging would bias risk-aversion estimates downward: with N perfectly correlated assets the estimate recovers only a fraction $1/N$ of the true coefficient. In message-level Toronto Stock Exchange data, market makers' quotes display cross-hedging that is directionally sharp and increases with correlation, yet quantitatively modest, consistent with relatively high dealer risk aversion in the model.

KEYWORDS: Market making, inventory management, pricing matrix, cross-hedging, Epps effect.

*Roşu (corresponding author), rosu@hec.fr, HEC Paris; Shkilko, ashkilko@uga.edu, University of Georgia; Sojli, e.sojli@unsw.edu.au and Tham, w.tham@unsw.edu.au, both at UNSW Sydney. We thank Bruno Biais, Dion Bongaerts, Tarun Chordia, Davide Cianciaruso, Hans Degryse, Thierry Foucault, Denis Gromb, Terrence Hendershott, Stefano Lovo, Sophie Moinas, Andreas Park, Paolo Pasquariello, Gideon Saar, Daniel Schmidt, and Clara Vega for their suggestions. We are also grateful to finance seminar participants at Norwegian School of Economics, HEC Paris, Peking University, and Bucharest University of Economic Studies, as well as conference participants at the NBER Summer Institute 2026 Financial Market Structure conference, 10th Erasmus Liquidity Conference, the 10th Women in Market Microstructure Conference, and the 10th Annual Conference of Romanian Academic Economists from Abroad (ERMAS), for valuable comments.