

Portfolio Construction in the Presence of Codependence Risk

Pierre Laroche (Banque Nationale du Canada)

Since the 1960s, portfolio management has been one of the most important topics of academic and institutional research in finance. The importance of taking into account correlations among returns in portfolio construction has been well understood since the seminal work of Markowitz (1952). It is only later, however, that the instability of correlations was taken into account in portfolio construction models (Connolly *et al.*, 2005 ; Philips *et al.*, 2012).

Some articles (like Buraschi *et al.*, 2010) incorporate a stochastic model for correlations and derive formulas for optimal portfolios in the presence of correlation risk. Although very interesting, such models deal with historical correlations whereas future correlations are really the ones that matter for portfolio managers.

In a parallel line of work, financial economists developed what we could call structural models of correlations (see for instance Rankin and Idil, 2014), which seek to explain what economic and/or market factors drive correlations and could therefore be taken as a basis for correlations forecasting. These models are very interesting but cannot yet be applied readily to portfolio management.

The aim of the proposed research is to build correlation models and forecasting techniques that incorporate macroeconomic explanatory variables like inflation, growth, market volatility, and measures of aggregate risk aversion, in the context of portfolio management, where there are at least two classes of assets composing the portfolio (e.g., equities and bonds). We also seek to go beyond correlations by looking at dependence models (copulas), which provide a more general measure of dependence between the returns of assets.

The other objective of the research project is to apply our findings to the case of a typical Global Macro hedge fund strategy that aims to stabilize the portfolio risk.

References

Buraschi, A., Porchia, P., Trojani, F. (2010). Correlation risk and optimal portfolio choice, *The Journal of Finance*, 65 (1), 393-420.

Connolly, R., Stivers, C., Sun, L. (2005). Stock Market Uncertainty and the Stock-Bond Return Relation, *The Journal of Financial and Quantitative Analysis*, 40 (1), 161-194.

Markowitz, H. (1952). Portfolio selection, *The Journal of Finance*, 7 (1), 77-91.

Philips, C. B., Walker, D. J., Kiniry, F. M. (2012). Dynamic correlations: The implications for portfolio construction, *Vanguard Research Group*, April.

Rankin, E., Idil, M. S. (2014). A century of stock-bond correlations, *Bulletin of the Reserve Bank of Australia*, September Quarter, 67-74.