Thesis Chapters and Abstracts (Carlos Castro)

1. Confidence Sets for Asset Correlation (joint work with D. Cassart, R. Langendries and T. Alderweireld).

This paper addresses the estimation of asset correlations' confidence sets for credit risk portfolio modeling using rating transition data. Estimation of asset correlation with rating transition data has focused on the point estimation of the correlation without giving any consideration to the uncertainty around these point estimates. Specific bounds for these parameters are important for stress testing credit portfolio models. We obtain for two approaches, Standard Transition Matrix and Directional Transition Matrix, confidence intervals from bootstrapped distributions for the pairwise asset correlations. In most cases, intra and inter correlations are strictly positive, but vary substantially across economic sectors, world regions and structured products. The majority of the asset correlations estimate for economic sectors and world region fall in between the Basel II recommended bounds. The same cannot be said with respect to the asset correlations estimates for structured products, where the Basel II bounds underestimate the correlations.

2. Uncertainty in asset correlation for portfolio credit risk: the shortcomings of the Basel II.

Moody's databases of corporate issuers of long term bonds and structured products are used to estimate asset correlations across a group of sectors, world regions and products. The estimation of a dynamic factor model for default risk is performed using Bayesian methods. Results indicate: i) a two factor model rather than the one factor model, as proposed by the Basel II framework, better represents the historical default data. ii) Importance of unobserved factors in this type of models is reinforced and point out that the levels of the implied asset correlations critically depend on the latent state variable used to capture the dynamics of default, as well as other assumptions on the statistical model. iii) The posterior distributions of the asset correlations show that the Basel recommended bounds, for this parameter, undermine the level of systemic risk. iv) Uncertainty regarding asset correlation in credit portfolio models leads to a large and significant variation on the economic capital.

3. Portfolio choice under local industry and country factors.

This article extends the parametric portfolio policy approach to optimize portfolios with large numbers of assets, derived by Brandt, Santa-Clara, and Valkanov (2007). The proposed approach incorporates unobserved effects into the portfolio policy function. These effects measure the importance of unobserved heterogeneity for exploiting the difference between groups of assets. The source of the heterogeneity is local priced factors, such as industry or country. The statistical model derived allows testing the importance of such local factors in portfolio optimization. The results suggest that local effects or return heterogeneity associated to economic sectors or
geographic factors is not as straightforward to exploit financially or relevant as suggested by the extensive multivariate factor literature on the subject. Furthermore, trying to exploit industry effects rarely provided gains over simple benchmarks. On the other hand, trying to exploit country effects does provide gains over the benchmarks. However, these gains may be offset by the increasing cost and risk inherent to such strategies. Finally, exploiting size, momentum, and liquidity anomalies in the cross-section of stocks provides strictly greater returns than the industry and country effects.