LIDAM Discussion Papers LFIN

LIST OF ABSTRACTS . 2024

2024 / 01

Calendar Effects on Returns, Volatility and Higher Moments: Evidence from Crypto Markets

Bernardina Algieri, Kokulo Lawuobahsumo, Arturo Leccadito

This study aims to investigate calendar effects in the cryptocurrency market. We consider the day-of-the-week, the month-of-the-year, quarter-of-the-year, the US Holidays, and Weekend calendar anomalies for the leading cryptocurrencies: Bitcoin, Dash, Dogecoin, Litecoin, Ripple, and Stellar. Our study employs the Autoregressive Conditional Density model with dummy variables to scrutinize these calendar effects. We find anomalies in the mean, variance, skewness, and kurtosis for these cryptocurrencies' returns. Our result suggests that the cryptocurrency market in some periods tends to violate the Efficient Market Hypothesis.

2024 / 02

The role of CDS spreads in explaining bond recovery rates

Matteo Barbagli, Pascal François, Geneviève Gauthier, Frédéric Vrins

Identifying the drivers of bond's recovery rates is an important and topical field of research. In spite of its obvious connections with recovery rates, credit default swap (CDS) spreads received little attention for this purpose. In this paper, we introduce two novel recovery rates determinants built from CDS market data. These dynamic indices capture the level and uncertainty information embedded in CDS spreads aggregated by industry sectors, thereby forming a new family of determinants sitting in between the idiosyncratic and systematic factors identified so far. Analyzing 613 defaulted U.S. corporate bond issues from 2006 to 2019 and using a beta regression model, we find the cross-sectional mean and approximate entropy of aggregated CDS spreads to be significant to explain the mean and dispersion parameters of the beta distribution underlying recovery rates. These findings offer valuable insights for improving credit risk assessment methodologies and identifying key risk drivers of recovery rates prior to running prediction models.

2024 / 03

The Economic Value of Mean Squared Error: Evidence from Portfolio Selection

Zhaokun Cai, Zhenyu Cui, Nathan Lassance, Majeed Simaan

When designing and evaluating estimators, the mean squared error (MSE) is the most commonly used generic statistical loss function because it captures the bias-variance tradeoff and allows easy analytical and numerical treatment. However, MSE estimators are often applied to decision problems for which the loss function is different, raising questions about how much value there is in using a generic statistical loss function like the MSE rather than a decision loss function. We elucidate this question through the lens of the portfolio selection problem by showing that for several important portfolio rules, there is a positive linear relation between the MSE and a portfolio-decision loss function. Moreover, shrinkage portfolio estimators derived under these two loss functions are typically close to each other. Our findings highlight the economic value of MSE to serve as a general-purpose statistical loss function in portfolio selection.

LIST OF ABSTRACTS . 2024

2024 / 04

Optimal Portfolio Size under Parameter Uncertainty

Rodolphe Vanderveken, Nathan Lassance, Frédéric Vrins

Estimation risk in portfolio selection can be mitigated with sparse approaches such as lasso that penalizes for the norm of the portfolio weights and excludes assets from the investment universe. The latter are revealed a posteriori, by identifying which assets receive an optimal weight of zero. We show instead that in the presence of parameter uncertainty, it is desirable to remove assets before computing the portfolio weights. In particular, we show that the optimal portfolio size strikes a tradeoff between accessing additional investment opportunities and limiting estimation risk. Our approach disentangles the determination of the optimal portfolio size from the asset selection rule, making it more easily implementable and robust to estimation risk than alternative sparse methods. Empirically, our restricted portfolios substantially outperform their counterparts applied to all available assets. Our methodology renders portfolio theory valuable even when the full dataset dimension is comparable to the sample size.

2024 / 05

European option pricing with model constrained Gaussian process regressions

Donatien Hainaut, Frédéric Vrins

We propose a method for pricing European options based on Gaussian processes. We convert the problem of solving the Feynman-Kac (FK) partial differential equation (PDE) into a model-constrained regression. We form two training sets by sampling state variables from the PDEs inner domain and terminal boundary. The regression function is then estimated to fit the option payoffs on the boundary sample while satisfying the FK PDE on the inner sample. We adopt a Bayesian framework in which payoffs and the value of the FK PDE in the boundary and inner samples are noised. Assuming the regression function is a Gaussian process, we find a closed- form approximation for the option prices. We demonstrate the performance of the procedure on call options in the Heston model and basket call options in a Black- Scholes market.

2024 / 06

Credit selection in Collateralized Loan Obligation: efficient approximation through linearization and clustering

Arnaud Germain, Frédéric Vrins

Despite its role in the global financial crisis, collateralized loan obligation (CLO) remains a powerful tool to direct funds towards the real economy. In particular, it enables development banks to increase credit supply to SMEs. Public financial institutions thus face the challenge of identifying a subset of credits to be pooled in a CLO for the sake of reaching a specific financial target. This is a mixed-integer nonlinear program, known to be NP-hard. In this paper, we provide an efficient method to tackle this problem by relying on the large pool approximation combined with clustering and linearization of ancillary variables. As illustration, we consider two objective functions. We rely on the celebrated one-factor Gaussian copula in the main examples, but make clear that this assumption is not a restriction and can be relaxed. Our results contribute to reduce the funding cost of SMEs and are of direct interest for securitization stakeholders such as public financial institutions, commercial banks and pension funds.