The instability of financial networks at different frequencies

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Abstract

Financial networks reconstructed from statistical dependencies of market measures such as volatility are paramount in modern finance for forecasting, portfolio optimization, and systemic risk assessment. While extensive literature has been devoted to network reconstruction methodologies, the impact of the underlying data sampling frequency on network topology remains critically underexplored. This paper addresses this gap by systematically investigating how different sampling frequencies alter the structural properties of financial networks. Our results show that the choice of frequency has a profound impact on micro and meso features of the network, while leaves the macro characteristics mostly untouched. This serves as a crucial reminder for practitioners, researchers, and policymakers of the importance of a deliberate and justified selection of sampling frequency. Furthermore, we challenge a statistical stylized fact in the financial network literature by adopting a method -never before applied in this context- to compute the "shadow moments" of the network's degree distribution. This technique enables the calculation of all distribution moments, even in the presence of apparent heavy tails that would typically cause them to diverge, thereby offering a more robust characterization of network properties.