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Working Papers on Economics - Modular scale-free architecture of Colombian financial networks: Evidence and challenges with financial stability in view

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Scale-free (inhomogeneous) connective structures with modular (highly clustered) hierarchies are ubiquitous in real–world networks. Evidence from the main Colombian payment and settlement systems verifies that local financial networks have self-organized into a modular scale-free architecture that favors everyday robustness and performance in exchange for rare episodes of fragility but rapid evolution.

Results provide new elements for understanding and modeling the formation and structure of financial networks, and suggest new insights and challenges for authorities contributing to their stability. For instance, (i) the observed architecture suggests that financial systems are complex adaptive systems; (ii) complex adaptive features invalidate traditional reductionist assumptions for modeling financial systems (e.g. homogeneity, normality, static equilibrium, linearity); (iii) the observed modular scale-free architecture tends to limit cascades and isolate feedbacks; and (iv) with financial stability in view, authorities should understand and take advantage of the existing architecture by means of designing and implementing macro-prudential regulation and system-calibrated requirements. Yet, the quest for discovering, explaining and handling the emerging structure of financial systems is an enduring task.

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