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Portfolio Diversification and Systemic Risk in Interbank Networks ex  
“Diversification and Financial Stability”

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# Portfolio Diversification and Systemic Risk in Interbank Networks *ex* “Diversification and Financial Stability”

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## Abstract

This paper contributes to a growing literature on the ambiguous effects of risk diversification. In our model, banks hold claims on each other's liabilities that are marked-to-market on the individual financial leverage of the obligor. The probability of systemic default is determined using a passage-problem approach in a network context and banks are able to internalize the network externalities of contagion through their holdings. Banks do not internalize the social costs to the real economy of a systemic default of the banking system. We investigate the optimal diversification strategy of banks in the face of opposite and persistent economic trends that are ex-ante unknown to banks. We find that the optimal level of risk diversification may be interior or extremal depending on banks exposure the external assets and that a tension arises whereby individual incentives favor a banking system that is over-diversified with respect to the level of diversification that is desirable [in the social optimum](#).

*Keywords:* Naive Diversification, Leverage, Default Probability, Financial Networks, Contagion, Systemic Risk

*JEL classification:* G20, G28

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## 1. Introduction

The folk wisdom of “not putting all of your eggs in one basket” has been a dominant paradigm in the financial community in recent decades. Pioneered by the works of Markowitz (1952), Tobin (1958) and Samuelson (1967), analytic tools have been developed to quantify the benefits derived from increased risk diversification. However, recent theoretical studies have begun to challenge this view by investigating the conditions under which diversification may have undesired effects (see, e.g., Battiston et al., 2012b; Ibragimov et al., 2011; Wagner, 2011; Stiglitz, 2010; Brock et al., 2009; Wagner, 2010; Goldstein and Pauzner, 2004). These works have found various types of mechanisms leading to the result that full diversification may not be

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