

# Measuring and allocating systemic risk

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## Abstract

This paper develops a framework for measuring, allocating and managing systemic risk. SystRisk, our measure of total systemic risk captures the a priori cost to society for providing tail-risk insurance to the financial system. Our allocation principle distributes the total systemic risk among individual institutions according to their size-shifted marginal contributions. To describe economic shocks and systemic feedback effects we propose a reduced form stochastic model that can be calibrated to historical data. We also discuss systemic risk limits, systemic risk charges and a cap and trade system for systemic risk.

**Keywords:** Systemic risk measure, systemic risk allocation, feedback effects, shadow prices, systemic risk limits, systemic risk charges, cap and trade.

## 1 Introduction

The purpose of this paper is to develop a framework for measuring, allocating and managing systemic risk. Financial services play an important role in modern free market economies. Therefore, governments often do not have a choice but to provide support to failing financial institutions to protect the broader economy. We address this issue by studying the following two questions: (i) how to measure the total systemic risk generated by the financial sector and (ii) how to allocate the total systemic risk to individual financial institutions?

We view possible government support of financial institutions as an externality and measure total systemic risk by determining its a priori cost to society. To allocate the total systemic risk among individual institutions we propose to use their marginal contributions. To describe economic shocks, spillover, amplification and adverse feedback effects we develop a reduced form stochastic model that can be calibrated to historical data.

The most important features of our approach are:

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