

Pitfalls in the use of systemic risk measures*

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Abstract

We examine pitfalls in the use of return-based measures of systemic risk contributions (SRCs). For both linear and non-linear return frameworks, assuming normal and heavy-tailed distributions, we identify non-exotic cases in which a change in a bank’s systematic risk, idiosyncratic risk, size or contagiousness increases the risk of the system but lowers the measured SRC of the bank. Assessments based on estimated SRCs could thus produce false interpretations and incentives. We also identify potentially adverse side effects: A change in a bank’s risk structure can make the measured SRC of its competitors increase more strongly than its own one.

Keywords: Systemic Risk; CoVaR; Marginal Expected Shortfall; Tail Risk

JEL classification: G21, G28.

1 Introduction

A measure of systemic risk aims to quantify how much an entity – be it a bank or hedge fund or sovereign – contributes to the vulnerability of the financial system. Recent years have seen a strong interest in refining such measures. Judging from the citation frequency, the two most influential concepts seem to be the CoVaR family of measures proposed by [Adrian and Brunnermeier \(2011\)](#) and the marginal expected shortfall of [Acharya, Pedersen, Philippon, and Richardson \(2012\)](#).¹ Originally intended for use in bank regulation, the literature now discusses these measures not only in conjunction with regulation but employs them for a variety of purposes: to examine whether systemic risk is priced ([Meine, Supper, and Weiß \(2015\)](#), [Nucera, Schwaab, Koopman, and Lucas \(2015\)](#)); to measure whether banks benefit from their too-big-to-fail status ([Barth and Schnabel, 2013](#)); to examine which funding channels or instruments are most important for systemic risk ([López-Espinosa, Moreno, Rubia, and Valderrama \(2012\)](#), [Battaglia and Gallo \(2013\)](#)); or to measure the contagion potential of sovereigns ([Fong and Wong \(2012\)](#)).

The literature on value at risk (VaR) has shown that the properties of risk measures and the consequences of choosing a specific measure for a particular purpose are not immediately obvious (cf. [Artzner, Delbaen, Eber, and Heath \(1999\)](#), [Basak and Shapiro \(2001\)](#)). With this

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¹On 05/21/2015, Google Scholar showed 1051 citations for [Adrian and Brunnermeier \(2011\)](#) and 807 for [Acharya et al. \(2012\)](#).