Chapter 11
What Matters in Determining Capital Surcharge for Systemically Important Financial Institutions?

Céline Gauthier
Bank of Canada, Canada

Toni Gravelle
Bank of Canada, Canada

Xuezhi Liu
Bank of Canada, Canada

Moez Souissi
Bank of Canada, Canada

ABSTRACT
One way of internalising the externalities each individual bank imposes on the rest of the financial system is to impose capital surcharges (KS) on them in line with their systemic importance. Given the complexity of the financial system and the resulting difficulties in measuring systemic importance, it is sometimes argued to simply apply higher KS to larger banks, abstracting from other factors like interconnectedness. In this chapter, the authors consider different network structures of the banking system that are characterized by two different centrality measures. Their main finding is that size alone is not always a good proxy for systemic importance and must be supplemented with detailed information on interbank exposures. A relatively small bank playing an outsized role in the interbank market might be more systemic, and thus garner a higher capital surcharge, than a less connected bank of somewhat larger size. Alternatively, if the centrality of banks in an interbank network is positively correlated with their size, then proxies of a bank’s systemic importance largely based on size are sufficient indicators.
1. INTRODUCTION

The Basel II capital standards proved to be inadequate during the 2008 global financial meltdown, partly because they were not designed to address systemic risk. In response, the post-crisis debate on regulatory reforms has devoted attention on how to induce individual institutions to internalize the costs associated with the negative externalities that their failure or non-viability may impose on the rest of the financial system. A key policy tool that has been put forward for this purpose is a regulatory capital surcharge based on an institution’s contribution to systemic risk or systemic importance.

Different model-based measures of systemic importance have been proposed in the recent academic literature. While these measures might be appealing for their elegance and sophistication, implementing them can prove very tricky. Not only are they derived from complex and computationally intensive models, but they also often require detailed information at the system-level that is not always publicly available. Therefore, individual institutions may find hard to self-assess their systemic importance based on these measures.

Alternatively, policy makers have considered a simple indicator-based measurement approach that consists in calibrating capital surcharges based on readily available proxies for some key drivers of systemic importance such as size, interconnectedness, lack of substitutability, global (cross-jurisdictional) activity, and complexity. However, the proposed indicators, including those for interconnectedness, tend to be highly correlated with banks’ size, suggesting that under this approach systemic importance will be mainly determined by size.

In this chapter, we contribute to the regulatory debate by examining some conditions under which bank size can be a reliable proxy for more complex measures of systemic importance. In particular, we propose a method to assess under which conditions the structure of the interbank network and the role of its members are aligned with the effect of bank size and under which conditions these are not.

For this purpose, we consider a simple stylized banking system displaying great heterogeneity across the size of banks, and derive systemic risk as well as systemic importance of individual banks for different interbank network structures. We measure system risk with the system-wide or aggregate loss distribution derived using the model introduced in Gauthier, He and Souissi (2010). We then calibrate a bank’s capital surcharge based on its marginal risk contribution to systemic risk using two allocation rules described in Abrecht (2003). An important distinguishing feature of these rules is the full allocation property, which ensures that the sum of the individual risk contributions equals the total system-wide risk.

Our main finding is that proxies of a bank’s systemic importance largely based on size are sufficient indicators if the centrality of banks in an interbank network is positively correlated with their size. However, bank size alone should not be considered as a reliable proxy of systemic importance in interbank network structures where a relatively small bank plays an outsized role in the interbank market, making it more systemic than a less connected bank of somewhat larger size.

The reminder of the chapter is organized as follows. In Section 2, we provide a brief review of the relevant literature. Section 3 succinctly describes the framework used to measure systemic risk as well as the allocation mechanisms applied to derive capital surcharges. We report our simulation results in Section 4. Concluding remarks and possible policy implications are presented in Section 5.

2. LITERATURE REVIEW

Contagion and spillover effects, which are not necessarily appropriately incorporated in market prices ex ante, represent the core amplification