

# **Financial Crisis, Systemic Risk and Contagion in Financial Systems**

**Bachelor Thesis in Quantitative Finance**

**at the**

**Department of Banking and Finance**

**University of Zurich**

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## **Executive Summary**

### **Presentation of the problem**

The recent financial crisis has shocked the entire world as an enormous cascade of losses has rushed through the financial system in a very unpredictable fashion. One of the most significant features of this crisis was its speed.

In the last three decades financial systems have experienced a lot of changes. Rapid growing globalization and financial innovations, in the form of structured products, created complex networks of highly interconnected institutions, markets and countries. These new developments brought benefits with them but at the same time have opened the doors for new types of problem. High interconnectedness increases the potential for systemic risk and financial contagion, and made financial systems more vulnerable.

### **Purpose of the Thesis**

The purpose of this thesis is to provide an introduction to systemic risk and to illustrate why modern financial systems can be seen as a complex network of institutions that are highly interconnected with each other. The author will also define financial contagion and describe the channels through which contagion takes place.

A further intension of the author is to discuss characteristics that define financial institutions as systemically important and to introduce a quantitative methodology for analysing contagion and systemic in a network of interlinked institutions.

### **Approach**

Since the methodology for studying a financial system requires a unique data set of all interbank exposures and capital levels which cannot be accessed privately it will be relied on the results of the study for the Brazilian financial system conducted by Cont et al. (2010).

### **Main results**

The recent financial crisis has highlighted the importance of systemic risk. Due to increased complexity modern financial systems became robust but at the same time fragile and vulnerable. The example of the Brazilian financial system shows that financial systems exhibit complex heterogeneous network structure and can be modelled as a directed scale-free network.

Financial contagion is an important factor of systemic risk. Contagion Index, introduced by Cont et al. (2010) allows to measure the systemic importance of a financial institution in the network. Market shocks increase the number of contagious exposure in the network. Balance sheet size together with network structure contributes to the systemic importance of an institution.

Due to the increased interdependence of the financial system targeted capital requirements that are proportional to interconnectedness of the financial institution should be used for protection of the financial system against contagion.