THE DEUTSCHE BANK PRIZE
IN FINANCIAL ECONOMICS

CFS Lecture by Prof. Robert C. Merton

On January 21st, Robert C. Merton, Nobel Laureate and Distinguished Professor of Finance at the MIT Sloan School of Management, gave a lecture at Goethe University Frankfurt entitled "On a New Approach for Analyzing and Managing Macrofinancial Risks." The guest lecture, organized under the auspices of the Deutsche Bank Prize in Financial Economics, attracted more than 600 participants.

Merton explained how credit risk can be built up from the micro to the macro level, and proceeded to use this framework to present the evidence of the interconnection and the feedback loops of credit risk between sovereigns and financial institutions.

In order to understand the development of the recent financial crisis it is crucial to have a clear grasp of the building up of credit risk. To do so, he started by explaining the similarities between purchasing risky debt (or loans/mortgages) and issuing a put option. In fact, the buyer of risky debt can be thought of as being engaged in two different financial activities: risk-free lending and writing (aka shorting) a guarantee of the promised payment on the risky debt, which is insurance writing. The holder of a guarantee, in case of a default, receives the full promised payment on the debt instead of whatever value of assets is recovered from the defaulting entity. Therefore, the value of the guarantee is equal to a put option on the assets of the borrower. It follows that whenever the value of the underlying corporate or housing asset drops due, for example, to market fluctuation, the value of the guarantee increases, ~~but~~ the value of the debt decreases and the risk profile increases in a non-linear fashion. The same effect on debt value occurs if the volatility of the underlying assets increases, even if the value of those underlying assets remains unchanged.

The next step is to use this equivalence to analyze the effect of risk on banks and to understand how the building up of risk has been underestimated before the recent financial crisis.

In fact, banks issue loans and the value of their debt is subject to the fluctuations of the underlying assets. After a negative shock, the value of the loan book decreases and its risk profile increases even in the absence of arrears. However, this feature has not been taken sufficiently into consideration and had led to the overlooking of the building up of credit risk.

Moreover, all governments guarantee their banks implicitly or explicitly. This means they write a guarantee on the banks' assets and, while their exposure to risk is very low during normal times, it might increase steeply during crisis. The situation becomes worse since most sovereigns encourage their banks to buy government debt. In fact, this is equivalent to a guarantor writing a guarantee on its own guarantor. When there are multiple sovereign and multiple banks that hold each others assets, feedback loops of risks between sovereigns and banks can develop.

However, it is possible to map the interconnection and the feedback loops between the institutions involved. Merton, with various coauthors, analyze the connectivity between banks, insurance companies and sovereigns (due to limited data availability), quantifying the credit risk of each institutions and sovereigns and how they affect each other. They propose to use the expected loss

ratio to measure how the change in the credit of one entity affects the other. Having computed the credit risk of an institution or a sovereign, they compute how much it influences other institutions and sovereigns and build the connectivity between the institutions in the sample.

They show how the degree of connectedness changes over time and how it increased dramatically from before the crisis to the peak of the crisis.
It is important to monitor these relationships because they vary over time depending on underlying conditions. Even though they are not are structural and it might not be possible to envisage policies to prevent them from occurring, it is worthwhile to measure and monitor their developments in order to be prepared for them.

Merton argued that the main limitation of current models is that they do not embed structural uncertainty that has proved relevant in the analysis of credit risk and feedback loops. Merton proposed to look at fiscal policy, monetary policy and financial stability as an integrated system. In particular, monetary policy actions should take into considerations also the impacts on financial stability.

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