You do not step into the same river twice

- Hiraclitus, circa 550 BC

This time is different – Reinhart and Rogoff (2012)

Motivation

Motivation of this winter school has been to investigate analytically how modern finance (including shadow banking) is related to the real economy through the management of risk in the market economy.

Sources of systemic risk

Exploring different ways of modelling systemic risk

Microeconomic risk management through credit instruments under various assumptions fail at the macroeconomic level due to risk for the entire system.

1. Systemic risk which may arise either within the finance sector itself (interlinkages of banks, financial networks of mutual Insurances without a lender of last resort).

2. It may also fail because of the misalignment between the real and the financial sector of the economy

Modelling possible source of systemic risk

Misalignment between real and financial sectors due to failure of aggregate demand

(a) method of financing of consumption leading to households' over indebtedness to banks and their obligations ending up in financial sector's securitization (e.g. sub-prime lending). Over borrowing by households can also arise from purchase of equities and other financial securities (largely by rich households)

(b) Firms financing investment through equity or credit from banks – when expectations of sales not realized

In all such cases, aggregate demand failure leading to income failure for households and firms leading to default which causes insufficient liquidity in the financial sector

Capital gains expectations may set off this process leading various aggregate demand regimes as explained by Bhaduri, Raghavendra, Guttal (2015) Metroeconomica paper

Possible source 2

Consider the following asset liability matrix of a simple three sector closed economy. Instead of the tradition balance sheet, we propose a cross asset-liability matrix.

Three sectors: 1. the real sector comprise of households and firms
2. the financial core comprise of commercial banks and Monetary authority
3. Financial periphery – investment banks, hedge funds and others

Cross asset-liability matrix

	Financial CORE [C]	Financial Periphery [P]	Real sector [R]	Total
Financial CORE [C]	0	(e_b+M_P)	$eb+M_R$	TL_C
Financial Periphery [P]	$(iL_{CP}+f_c)$	0	f_R	TL_P
Real sector [R]	iL_{CR}	e_f	0	TL_R
Total	TA_C	TA_P	TA_R	$\Sigma(TA-TL)=0$

Its possible analogy with Leontief input-output/SAM

Dividing each row by total liability of each sector, we get a non-negative square matrix.
Further, if we assume one unit increase in liability of sector j as an exogenous variable, the repercussion can be traced by considering the direct and the indirect change in the asset liability sector of each sector in the following way:

$$AL + V = L$$

Where A is non-negative (Net worth/liability) matrix, L is the liability level, V is exogenous variable, e.g.

$$\text{Core} = \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} \quad \text{Or} \quad \text{Per}iphery = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} \quad \text{Or} \quad \text{Real sector} = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$$

Depending on increase in liability of the individual sectors

Does the solution exist (H-S condition)? When solution does not exist, bifurcation may occur due to the direct and indirect implications for other sectors

Open problem: 2

BIS and Basel III regulatory requirements

Problem: Aiming at sufficient reserves can be chaotic

Let R = reserve for settlement of default and L= Loan advanced

Dynamics: Greater the gap (L-R) higher the targeted reserve.

Define $\frac{R}{L} = x, \text{where } 1 > x > 0$ and consider $\frac{R}{L} = 1 = x^*$ to represent the target ratio (or any other arbitrary constant).

$$\frac{x_{t+1}}{x_t} = c(1 - x_t) \qquad 1 > x > 0 \text{ and c arbitrary positive constant}$$

Several logistic curves will coexist in actual regulation because of reserves for different asset categories complicating the system