



MAX-PLANCK-GESELLSCHAFT

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# Systemic Risk, Macro Shocks, and Banking Regulation



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# Innovations after the Crisis



- Systemic Risk Analysis
- Macroprudential regulation and policy
- By now almost routine
- But:  
Do we know what we are doing?

# What is „macroprudential“?



- A well established legal term: Under the Regulation establishing the European Systemic Risk Board, the major field of action for the ESRB – so surely the lawyers know what it means!?
- A Potpourri of measures listed in ESRB surveys?
- NOT microprudential – Crockett 2000
- NOT microprudential – Supervisors since 2012
- ... what Spain did in the years after 2000!?
- ... what we should have been doing in the years before 2007?
- But what precisely was that?

# What is „Systemic Risk“



- A term given to justify the need for banking regulation
- A well established legal term: See the Regulation establishing the European Systemic Risk Board and leave the interpretation to the lawyers and the courts
- Something to measure? Adrian – Brunnermeier, Acharya et al. – What do they actually measure?
- Something to tax? Acharya et al.

# „Systemic Risk“



- Risk from the financial system to the economy? Risk of a credit crunch? Japan 1992 ff, Sweden 1992 ff, Switzerland 1990 ff (?), global economy in 2008
- Risk to the financial system from the economy due to a macro shock? US S&L's 1980, Sweden 1992, US, Germany 1931, US 2006/7?
- Risk to the financial system from problems at individual institutions and contagion?

# Macro shocks and system risk exposure



- Parallel exposures to macro shocks
  - Examples: US S&L's, Sweden, Japan, Thailand,...
- Contagion from hidden exposures to macro shocks
  - Example: Thailand, 2007 – 2009
  - Macro risks hidden in correlated counterparty credit risks: Thailand, AIG
  - ... and in firesale externalities
- Conjecture: Macro shocks are the major source of systemic risk.

# Why macro risks?



- Hellwig EER 1994: From an efficiency point of view banks should provide liquidity transformation but NOT maturity transformation
- Why do we not observe this? Brunnermeier-Oehmke (JF 2013), Admati et al. (JF 2018): lack of commitment – What we see need not be efficient!
- Maturity rat race, leverage ratchet effects
- Excessive risk taking: Why macro? Risk premia from systematic, macro risks?
- Contagion due to „hedges“ – hiding macro risks rather than avoiding them

# A brief overview over the crisis



- Buildup of risks: Subprime lending and securitization
- August 2007 – Downgrades of AAA rated securities by several grades at once
- August 2007 – Breakdown of ABCB funding of conduits and SIVs (Gorton's „panic of 2007“ – except that it wasn't repo and the SIVs were taken into their parents' balance sheets)



# A brief overview over the crisis 2



- August 2007 – Capital squeeze:
  - Taking SIVs into the parent's balance sheets implied a capital squeeze of the parent
  - ... In some cases insolvency from writedowns on the SIVs assets
- August 2007 – September 2008:  
Deleveraging, asset price declines,  
writedowns, further fire sales
  - Not a panic but a slow implosion
- Several breakdowns of interbank markets,  
smoothed by central banks

## A brief overview over the crisis 3



- March 2008, September 2008: Funding breakdowns at Bear Stearns and Lehman Brothers, driven by repo runs on these banks, which had been exposed to the risks of subprime assets that they had been unable to sell.
- September 2008: Post Lehman: Contractual dominos, runs on money market funds, runs by money market funds, enormous asset price declines...

# Why so much systemic risk?



- Base losses from subprime probably were not much larger than base losses in Japan in the nineties.
- The difference was in global interconnectedness, fragility, and contagion
- Interconnectedness through multiple contracts
- Interconnectedness through asset prices and fair value accounting

# Why has systemic risk increased?



- Fair value accounting: Everything is laid open right away – individually beneficial (?) – collectively a source of contagion
- Risk management with a bias towards dealing with „measurable“ risks: Use hedge contracts to get risks of the balance sheets – CDS on MBS
- ... neglecting the correlations
- ... encouraged by regulation
- See UBS (2008)

# Improvements in risk allocation?



- Past experience: System crises arise from common exposure to macro shocks, even without contagion
- Current experience: Contagion plays a major role
- ... Because hedges against macro shocks have shifted the macro risks into the domino effects
- ... Because interconnectedness had increased
- What does this mean for analysis of system risk exposure?

# Contagion mechanisms 1



- Contractual Interconnectedness 1: dominos ex post: Lehman Brothers – Reserve Primary
- Contractual Interconnectedness 2:  
Disappearance of contracting opportunities:  
Lehman Brothers as a market maker, money market fund investors who run, money market funds that no longer provide wholesale short-term lending (repo, ABCP)

# Contagion mechanisms 2



- Information Contagion: Lehman Brothers not TBTF has implications for other investment banks; Reserve Primary breaking the buck means that other mmmf's may not be safe
- Hysteria Contagion? Sunspots and equilibrium multiplicity, „hypersensitivity“ to information
- Information from stock price of Lehman Brothers induced repo financiers to look more carefully at Lehman's balance sheet

# Contagion mechanisms 3



- Asset price contagion: Fire sales depress asset prices, which leads to writedowns at banks with similar positions and possibly further fire sales by these banks...
- Credit crunch contagion: Defensive strategy of one institution leads to a reduction in lending, which forces their borrowers to become defensive as well



# Combinations of Mechanisms



- Suspicions about Lehman losses in warehousing motivate short sales of shares
- Information about losses in warehousing causes repo run
- Repo run forces Lehman into insolvency
- Lehman insolvency causes Reserve Primary to break the buck
- Run on money market funds
- Run by money market funds, breakdown of interbank funding
- Scramble for cash,
- Asset price implosion

# Assessing system risk exposure



- We are talking about a multiplicity of effects
- ... in a highly nonlinear system
- ... which probably has multiple equilibria
- ... in which there is no transparency about the other participants's positions
- ... in which the different participants' positions are changing all the time, and credit risks are endogenous...

# Assessing system risk exposure 2



- Short data series
- For a nonstationary set of phenomena
- In which hidden correlations play a central role
- Where these correlations are changing all the time
- And are endogenous...
- ...and highly contingent

# Fire Sale Effects



The strength of the fire sale effect depends on

- The financial robustness and capacities of potential purchasers
- The information of potential purchasers about the assets (lemons problem)
- Expectations about future asset price developments (bubble problems)

Market illiquidity, i.e., a need for sharp price declines to accommodate sales (if at all), can arise endogenously all of a sudden

# An example



- Research 1992/3: Why are banks so exposed to interest rate risk? (EER 1994: Liquidity provision should not be combined with assumption of interest rate risk!)
- „Interest rate risk“? That is a market risk! Irrelevant for assets in the bank book! (Ten years after S&L Crisis I!) Even today ...
- „But we are not so exposed! We use asset and liability management for maturity matching! ... well, almost.“ ... Using money markets and, later, swaps.

# Continuation of Example



- Example 1: Three banks, A, B, C. Each bank has 1 bn. EUR deposits and 1 bn. EUR 40-year fixed-rate mortgages. In addition, bank A has made a short-term loan  $X$  to bank B, bank B a short-term loan  $X$  to bank C, bank C a short-term loan  $X$  to bank A.
- If  $X$  is large, each bank is almost perfectly maturity-matched. The system as a whole...

## Another example



- Example 2 (Swiss Journal 1995): 480 institutions 1,2,3,...
- Institution  $i$  borrows at maturity  $i-1$  months and lends at maturity  $i$  months.
- Maturity mismatch at any institution: 1 month.
- System maturity mismatch: 40 years.
- System risk is hidden in the correlations of counterparty credit risks and underlying
- Typically neglected in risk assessments
- Also neglected in regulation

# Are the examples surreal?



- Repo borrowing and lending as mechanisms for blowing up short positions
- Transactions chain:
  - Investor – money market fund – structured investment vehicle (sponsored by a bank) – special purpose vehicle 1 (creation of MBS CDO) – special purpose vehicle 2 (creation of MBS) – mortgage bank – mortgage borrower – real estate
  - Delusions about maturity transformation
  - Delusions about liquidity risks – due to neglect of systems effects
  - Delusions about credit risks – perhaps insured with  
AIG



# Delusions about maturity transformation 1



- Sachsen LB, equity < €4bn., liquidity commitments to SIVs > €40bn.
- Supervisor did not apply large-exposure rules because commitments had maturities below 365 days.
- No attention was paid to the fact that assets held by SIVs and therefore the refinancing needs of SIVs had maturities of much more than 365 days.
- (In parentheses: Margin was 10 – 30 bp!!!)

# Delusions about maturity transformation 2



- Gorton: Subprime mortgage lending funded by MBS held by SPVs and banks financed by asset backed commercial paper and repo involved no maturity transformation because the subprime mortgage was effectively a short-term security.
- Contract designed in such a way that the mortgage is bound to be renegotiated after two years.
- Delusions about credit risk and its correlation with the underlying

# Delusions: Adjustable rates and the problem of interest rate risk



- UK experience of late 1980s: Rate adjustments in response to high market rates of interest induce defaults and foreclosures
- High rates of interest also go along with low collateral values
- Building societies had insured credit risk with insurance companies – delusions about credit risk
- Problem: The „final“ asset is long term and its service provision is fixed

# Delusions: Securitization and the Problem of Interest Rate Risk



- Problem: Risk transfer involved micro risks as well as macro risks
- Pure interest rate risk transfer: maturity matching, e.g. by issuing covered bonds, with liability of the issuer
- MBS also transfer debtor specific risk
- Needed in the US because of prepayment option in mortgage contracts, which links micro and macro risks

# A note on methodology



- Models are not Theories
- Partial versus general equilibrium
- Need to look at the entire system of transactions and positions
- Need to take account of the multiplicity of contractual relations and possible correlations – highly contingent and changing from episode to episode
- Need to take account of lack of data

# Experience from Competition Policy



- There is no one model that is adequate in all situations.
- Need for improvisation with respect to the combination of models that are applied in a given situation
- Interplay between trying out models and collecting and assessing data.
- No robustness in moving from one case to the next; contingency of effects
- What is the STORY?

# Macro-prudential analysis



- Tied to „cycle“ .... „macro“?
- What is the STORY?
- Real economy, financial, or real assets?
- What is the role of quantitative models and indicators?
- Macro risks must be somewhere? Where are they hidden?
- Example: Interest rate risk: Early 1980s, late 1980s/early 1990s, mid 2000s
- Exchange rate risks? Business cycle risks?

# Macro-prudential analysis ctd.



- What is the role of asset markets?
- Deleveraging: Slow and fast
- Different time scales for different processes?
- Corrective measures at the level of stock variables?
- General equilibrium question: Who can be the counterparty to deleveraging?
- The failure of macroeconomic models – even now!!!
- Dynamics of corrections: Priorities?



# An institutional proposal



- Entrust analysis to an independent institution (like the Monopolkommission, IMF, BIS)
- Task: independent analysis: What is the story? No ticking of boxes in a long list. Unencumbered by prejudices of micro-prudential supervisors or central bankers or by the interests of finance ministers and central bankers
- Separate policy choices from analysis
- Policy choices must involve those who carry them out – central bankers, supervisors, finance ministers – with some coordination in a „macro-prudential“ framework

# Macroprudential policies: what are they



- Capital surcharges, LTV ratios, etc.
- Macro?
- ... How do they relate to monetary and fiscal policy?
- Problem: Macro-Pru is not really a policy of its own but a dimension of other policies
- On the upswing? What about the downswing?
- Use macroprudential policy to get the banks to lend and jumpstart the economy?
- What if excess leverage is the problem and we have a balance sheet recession?

# Macro-prudential regulation: Objectives and tradeoffs



- Financial stability or macro stability?
- Coincide on the upswing, in conflict in a crisis
- If banks are weak and the economy is weak, what should be done?
- Prioritize financial stability and get the banks in shape again? (Greenspan 1990)
- Use forbearance to reduce procyclicality of current regulation!?
- Or beware of excessive forbearance, which may cause undue delay in cleaning the mess up?

# Financial stability versus macro stability



- No conflict (!?): If the macroeconomy does not improve, banks will not get back into shape
- No conflict (!?): If banks do not get back into shape, the macro recovery will not be sustainable