

Financial Risk Assessment: Challenges and Solutions in Developing Markets

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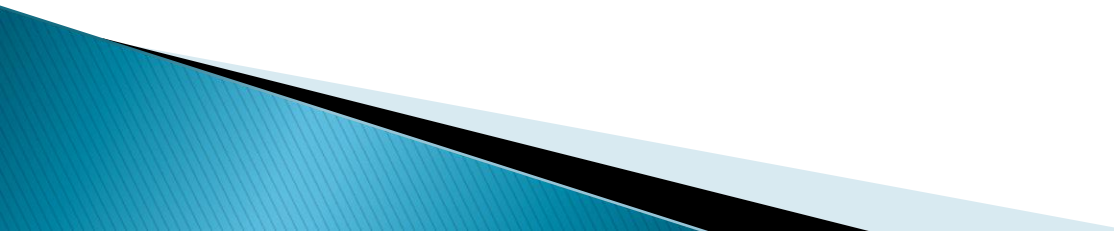
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Financial Risk Assessment: Challenges and Approaches in Developing Markets

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Financial Risk Assessment: The Why, What and How

- ▶ Why? Lessons About Risk from the Crisis
 - ▶ What? Types of Risk Monitoring/Assessment
 - ▶ How? The Institutional Set-Up
 - ▶ *Words of Warning*
- 

I. Why? 5 Lessons About Risk from the Crisis

- ▶ 1. Financial Institutions Cannot Be Relied Upon to Act in Their Self-Interest
 - To Be Sure, Greed and Stupidity Play a Role
 - Huge Principal-Agent Problems =>
 - Compensation Incentives Matter...
 - Asymmetric Incentives – Private Gains, Social Losses
 - ...But Are Difficult to Design

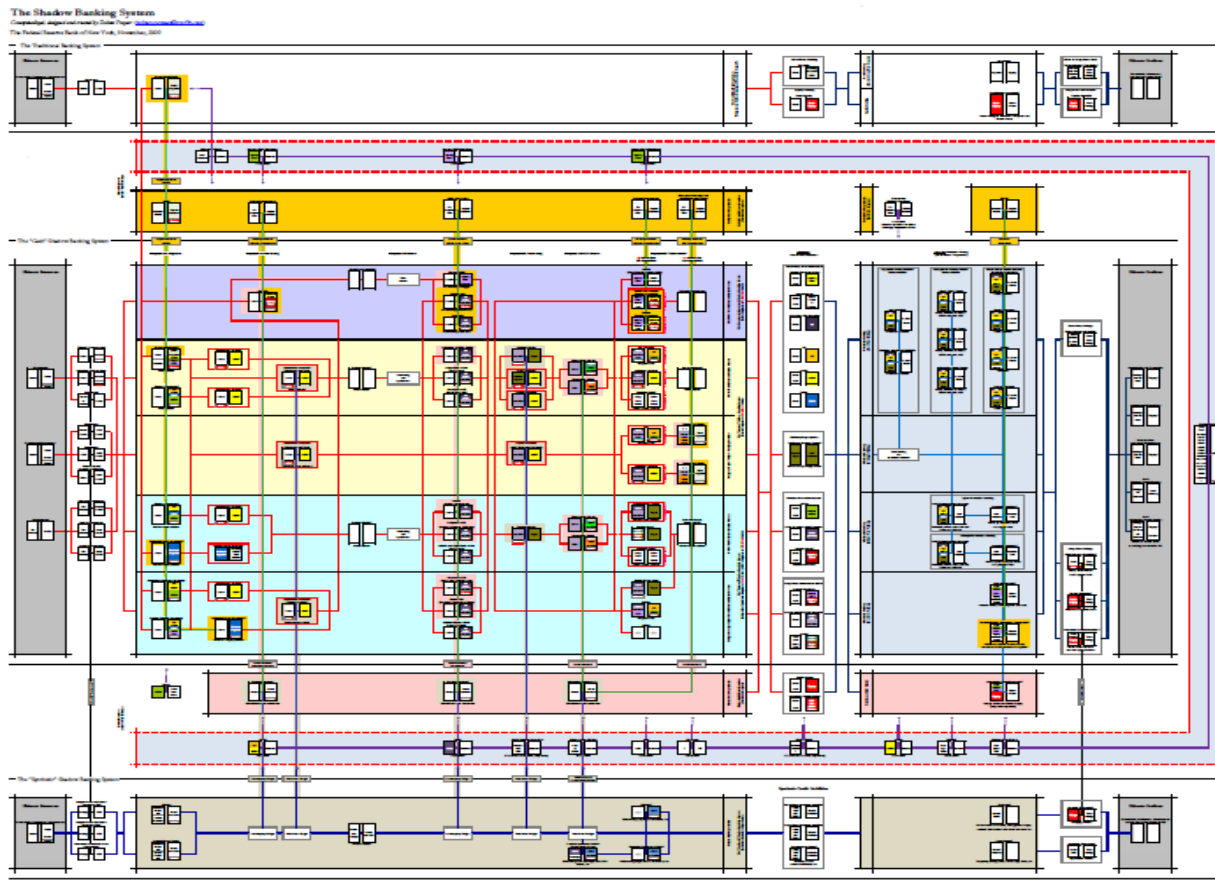
- ▶ *“I made a mistake in presuming that the self-interest of organizations, specifically banks and others, was such that they were best capable of protecting their own shareholders.”*
 - Alan Greenspan, Oct. 23, 2008, testifying to U.S. Congress

2. Non-Interventionist Stances Often Not “Time-Consistent”

- ▶ In moments of crisis, there really may be institutions that are too important to fail
- ▶ Policymakers err on the side of saving the system in the short-term, even at expense of adding long-run risk
- ▶ Pre-Emptive Monitoring Approaches are Required for “TITF”
 - => Information Needs to be Shared in Advance of a Crisis

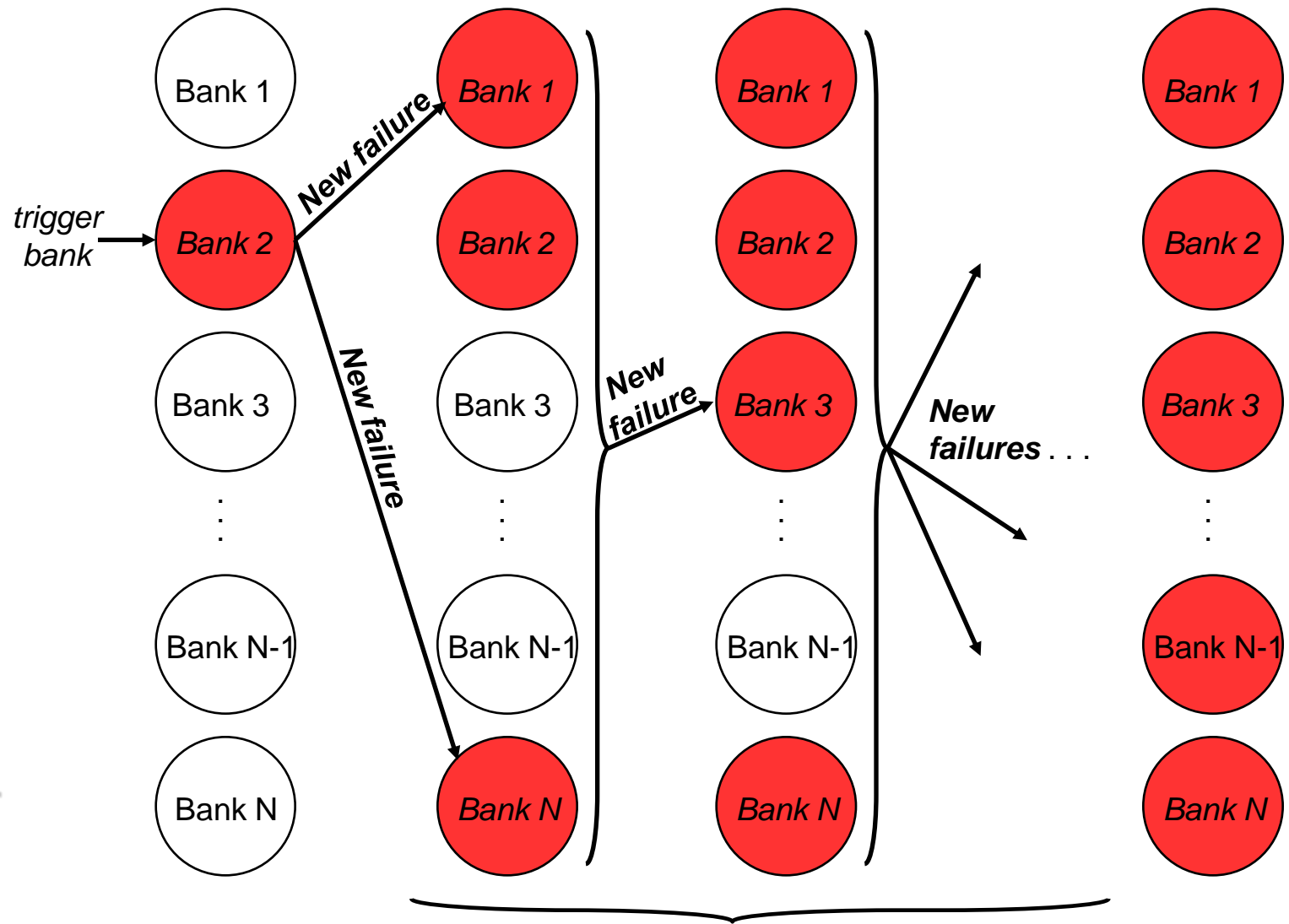
3. Financial Interconnections Can Be Pervasive

- ▶ Common Liquidity Providers – Funding Runs
- ▶ Common Exposures – Credit Risk
- ▶ Common Owners – Distressed Asset Sales



Financial Interconnections Can Be Indirect

Why? Lessons About Risk from the Crisis



Financial Interconnections Can Be Surprising

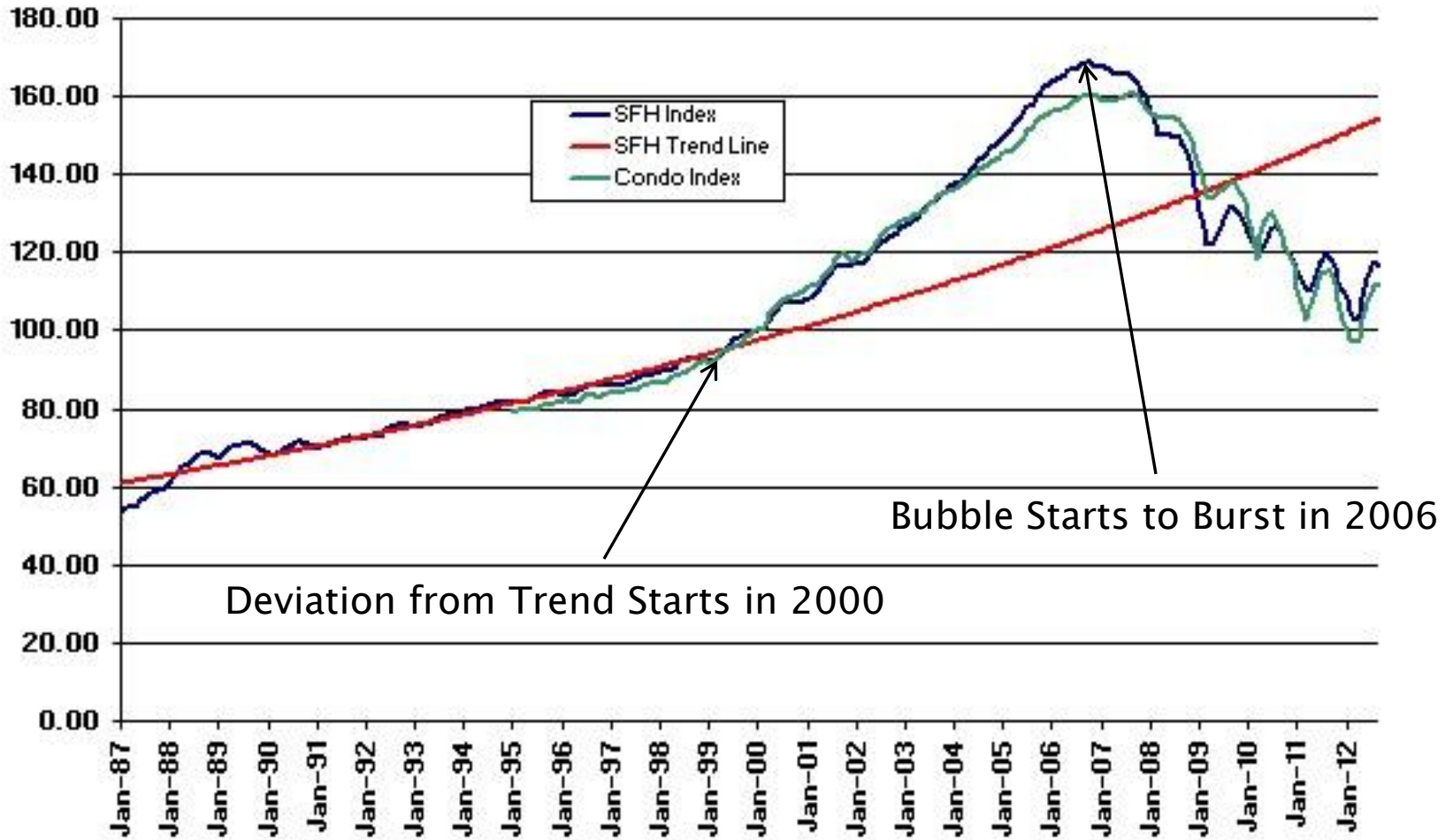
- ▶ **LTCM**
 - Creditor Banks Unaware of Each Other's Funding
- ▶ **AIG**
 - Almost Everyone Was Unaware of AIG-FP's positions
- ▶ **Clico**

4. Markets Can Generate Their Own Connections: Contagion Without Balance Sheet Links

- ▶ Common Membership in Benchmark Indices
- ▶ Hidden Risk Transfers
 - Explicit (but off balance sheet), e.g. CDS
 - Implicit, e.g. via Reputational Risk
 - Bear Stearns' Hedge Funds
 - Citi's SIVs
- ▶ Liquidity Runs – “Business Model Contagion”
 - Gary Gorton's Tainted Beef Analogy
 - Transparency Matters – But Is Hard to Achieve

5. Vulnerabilities Can Build For a Long Time

Chicago Case Shiller Index



II. Types of Risk Monitoring/Assessment : Watching All Fronts

- ▶ 1. Financial Institutions Can't Be Relied Upon to Act in Self-Interest
 - ▶ 2. Non-Interventionist Stances Often Not "Time-Consistent"
 - ▶ 3. Financial Interconnections Can Be Pervasive
 - ▶ 4. Markets Can Generate Their Own Connections
 - ▶ 5. Vulnerabilities Can Build For a Long Time
- ▶ 1. Monitor Individual Institutions
 - ▶ 2. Enhanced Monitoring and Regulating of SIFIs
 - ▶ 3. Monitor the System
 - No "Natural" Systemic Monitor
 - ▶ 4. Market Intelligence
 - ▶ 5. So Don't Rely Excessively on Market for Signals

Lessons about Risk

Lessons for Risk-
Monitoring

Monitoring Individual Institutions: Stress Testing

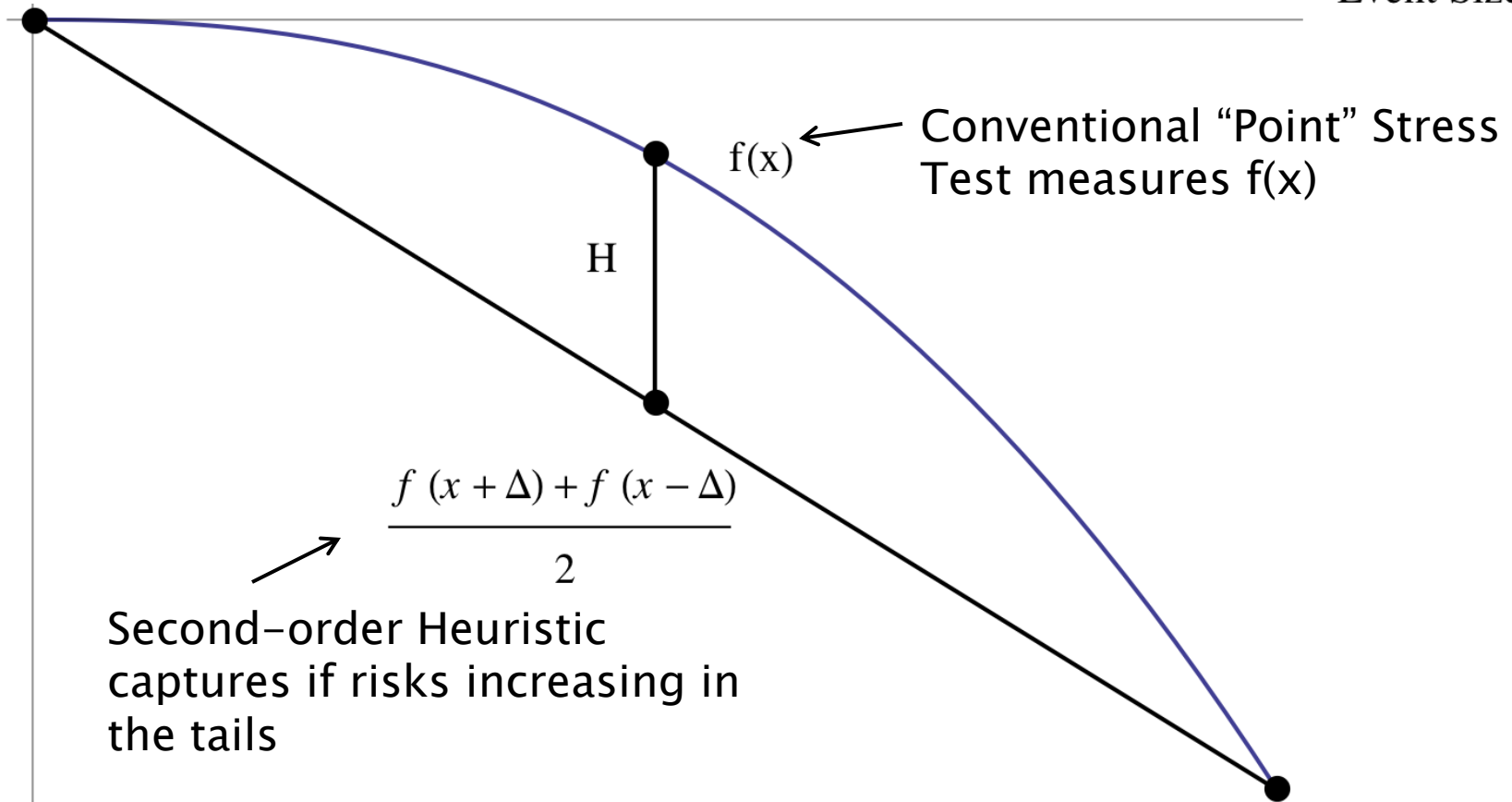
- ▶ Impact of specific risks
 - Credit Risk
 - Concentration Risk
 - Market Risk
 - Interest Rate Risk
 - Exchange Rate Risk
 - Liquidity Risk
- ▶ Macroeconomic Scenarios
 - Via Impact on NPLs
- ▶ Measures Impact on CAR or Funding Liquidity

Second-Order Stress Testing* (Beyond Pass/Fail)

Types of Risk Monitoring/Assessment

Harm

Event Size



* See Taleb, Canetti, et. al., “A New Heuristic Measure of Fragility and Tail Risks”, IMF WP 12/216

Enhanced Monitoring/Regulating SIFIs

- ▶ SIFI Identification Critical*:
 - Size
 - Interconnectedness
 - Lack of Substitutability
- ▶ Information Sharing May Be Needed to Assess “SIFIness”
- ▶ Enhanced Regulation (e.g. systemic risk capital and liquidity charges)

* See IMF/FSB/BIS, “Guidance to Assess the Systemic Importance of Financial Institutions, Markets and Instruments: Initial Considerations”, October 2009

Systemic Risk (Macroprudential) Monitoring

▶ Time Dimension

- Total Credit Growth (credit/GDP or trend deviations)
- Macro Imbalances
- Leverage Ratios
- Balance Sheet “Stretch” (e.g. debt service ratios)
- Increased exposure to interest rate and currency risk
- Asset Prices
- Changes in Lending Standards

▶ Structural Dimension

- Financial Linkages (Interconnectedness)
 - Financial to Financial
 - Financial to Real
 - Cross-Border

III. Financial Risk Assessment: The Institutional Setup

The IMF Approach

- ▶ Multilateral
 - Global Financial Stability Report
 - Early Warning Exercise
 - Vulnerability Exercises
 - Spillover Reports
- ▶ Bilateral
 - Financial Sector Assessments (FSAPs)
 - Article IV Follow Ups

Early Warning Systems versus Exercises

The Institutional Setup

- ▶ **Early Warning Systems – Quantitative Approaches**
 - Risk Dashboard – Monitor a Range of Indicators
 - Threshold (Kaminsky and Reinhart) Approach
 - Use Historical Data to Find Threshold Triggers of Crisis
 - Poor History of Predicting Actual Crises
 - Near-Coincident Indicators – Market Based
- ▶ **IMF/FSB Early Warning Exercise – A Holistic Approach**
 - Aims to “Connect the Dots”
 - Integrates multilateral economic and financial surveillance
 - Combine economic (IMF) and supervisory (FSB) knowledge
 - Draws on IMF’s model-driven vulnerability exercises
 - Draws on wide-ranging discussions with markets, academics and officials
 - Ultimate Outputs Based on Judgment

Sample Output: VEA Ratings

Country Flags Raised by the VEA¹

The Institutional Setup

| | Country 1 | Country 2 | Country 3 | Country 4 | Country 5 | Country 6 | Country 7 | Country 8 | Country 9 | Country 10 | Country 11 | Country 12 | Country 13 | Country 14 | Country 15 | Country 16 | Country 17 | Country 18 | Country 19 | Country 20 | Country 21 | Country 22 | Country 23 | Country 24 | Country 25 | Country 26 | Country 27 | Country 28 | Country 29 | Country 30 | Country 31 | Country 32 | |
|----------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--|
| Overall VEA rating | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| External | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| External imbalances (empirical crisis model, thresholds for 3 external sector indicators) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Overvalued exchange rate (CGER) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| International Balance sheet analysis | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Macro | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Growth risks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Growth risks (empirical crisis model) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GDP at risk | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Growth above potential (general equilibrium macro model) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inflation risks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Loose monetary policy (Taylor rule) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Loose monetary conditions (general equilibrium macro model) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deflation risks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tight monetary policy (Taylor rule) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tight monetary conditions (general equilibrium macro model) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fiscal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fiscal risks, overall indicator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Gross funding risk (sovereign financing risks analysis) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Market perception of sovereign default risk (CDS and RAS spreads, models for government bond yields and term risk premium) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Medium-term fiscal adjustment need | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Long-term fiscal adjustment need | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fiscal vulnerability to an adverse growth shock | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contagion risk (distress dependence from other sovereigns) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fiscal crisis risks (empirical crisis model) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Asset prices | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Real estate overall vulnerability | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Residential real estate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| House price misalignment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Household debt burden | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Potential impact on GDP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mortgage market characteristics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Commercial real estate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Equity prices | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Model based misalignments | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Valuation multiples misalignments | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Corporate sector vulnerability | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Financial sector and systemic models | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Financial crisis (empirical crisis model) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Financial stability at risk | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Expected deterioration of asset quality (NPL model) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Interbank spreads | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Distress from Large Complex Financial Institutions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Duration of crisis (duration model) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contagion | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cross-border financial sector exposure (contagion through bank channels) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Financial sector exposure to vulnerable advanced economies | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Financial sector exposure to vulnerable emerging economies | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contagion through trade channels | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

¹The table summarizes the main results of the VEA exercise. The colors indicate countries that were flagged as relatively vulnerable in each sector, with red, orange and green for high, medium and low vulnerabilities respectively. When "n.a.", the number of red and orange flags needed to rank a country with H or M drops accordingly.

IMF FSAP Main Goals

- ▶ Evaluate Financial System Stability
 - Stress Tests
 - Interconnectedness Tests
 - Risk Assessment Matrix – Likelihood and Impact
- ▶ Standards Assessments
 - Banking
 - Insurance
 - Securities
- ▶ Safety Nets and Crisis Management
 - Deposit Insurance, etc.
 - Crisis Management Arrangements

Macroprudential Institutional Arrangements: IMF Survey*

The Institutional Setup

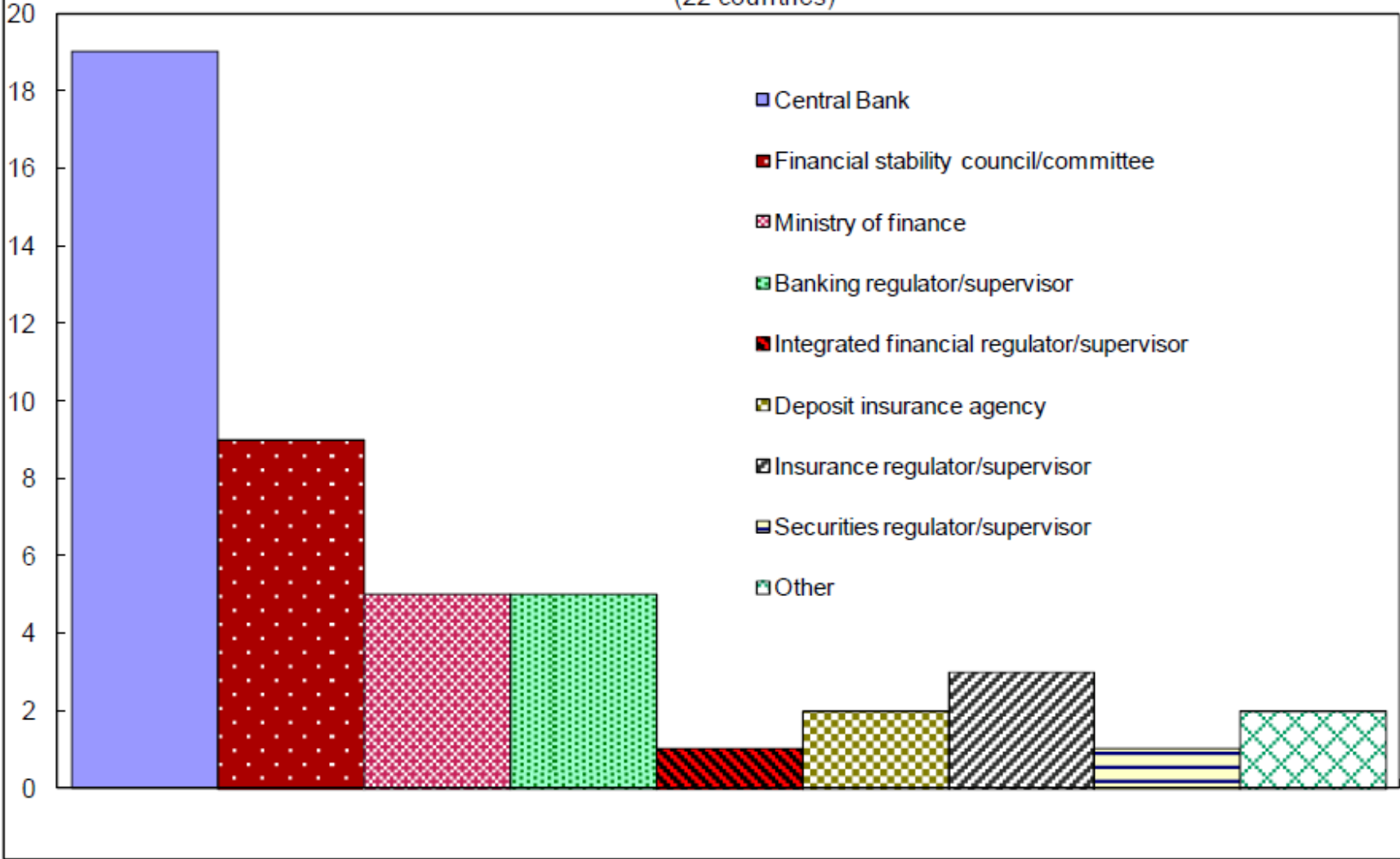
- ▶ IMF Survey of 50 countries plus ECB in 2010¹
- ▶ Macropru becoming an overarching goal
- ▶ A multi-agency, consensus process
- ▶ Central Bank Plays Key Role in Vast Majority ...but Usually Shared with Other Agencies (up to 5)
- ▶ Financial Stability Committees Coordinate, but Are Usually Advisory in Nature
- ▶ Fewer than Half of Jurisdictions Had Formal Macropru Mandate... but Many Were Developing It
- ▶ Macropru Policy Defined to Limit, Mitigate or Reduce Systemic Risk ... but Crisis Management Not Seen as Macroprudential

1 / Excludes 13 Non-Respondents

*See “Macroprudential Policy: An Organizing Framework: Background Paper”, IMF, 3/14/11

Figure 1.2: Institutions with a Mandate for Macroprudential Policy
(22 countries)

The Institutional Setup



Key Aspects of Macroprudential Policy: Institutional Arrangements*

- ▶ Ability and Willingness to Act
 - Framework Should Counter Bias to Inaction
 - Quantitative Proof May Be Hard
 - Counter Lobbying/Political Pressures
- ▶ Macroprudential Powers
 - “Hard” – policymaker has direct control over calibration of specific macropru tools
 - “Semi-Hard” – policymaker makes formal recommendations and can require “comply or explain”
 - “Soft” – Policymaker can make recommendations
 - Information Collection Powers
 - Fill Information Gaps
 - May Require Changes to Legal Impediments
 - Since Risks Migrate, Broad Back-Up Powers of Collection Needed

* “Key Aspects of Macroprudential Policy”, IMF, 6/10/13

Key Aspects of Macroprudential Policy: Assignment of the Mandate*

- ▶ Identify a Macroprudential Authority
 - Else, Agencies Will “Free-Ride” and Underinvest in Systemic Risk Identification and Mitigation
- ▶ Central Bank Should Have Prominent Role
- ▶ 3 Common Models
 - Assign to Central Bank
 - Natural Where CB Already Concentrates Regulatory and Supervisory Powers
 - Assign to Dedicated Committee Within CB
 - Counter Risk of Dual Mandates (Monetary vs. Macropru)
 - Assign to Outside Committee, but CB Participates
 - Useful when MoF Needs Strong Role, but MoF Should Not Dominate (risks delaying action)
- ▶ Governance of Decision-Making Committee
 - Avoid requirements for unanimity

Words of Warning

- ▶ Monitoring Can Push Risks Off the Radar Screen
- ▶ Complexity Can Generate Conflicting Messages
 - There is some evidence that simple heuristics are best
- ▶ Beware of Giving False Comfort to Markets for Fear of Triggering Problems
- ▶ Beware of Giving False Comfort to Yourself Just Because You Are Monitoring Risks
 - Remember there are always unknown unknowns
- ▶ OTOH – “Disaster Myopia”
 - ▶ Those With a Mandate Only to Warn About Risks Will Always be Pessimists

Looking for Risk in All the Wrong Places The Dangers of Modeling

Words of Warning

- ▶ Models Deepen, Not Widen, Understanding of Risks
Statistical Tools May Prepare You to Fight the Last War
- ▶ Social Phenomena \neq Physical Phenomena
"I can calculate the motion of heavenly bodies but not the madness of people" – Isaac Newton
- ▶ Quantifying Risk Can "Anchor" Expectations in the Wrong Place
"Some may use the argument [that] predicting risks [is] equal or better than nothing;...any prediction has side effects of increasing risk-taking, even by those who know that [it is]not reliable. Information, even when it is known to be sterile, increases overconfidence. – Nassim Taleb

Last Word to Yogi Berra

Words of Warning



It's tough to make predictions, especially about
the future.

(Yogi Berra)