



# The Western Hemisphere Credit & Loan Reporting Initiative (WHCRI)

Public Credit Registries as a Tool for  
Bank Regulation and Supervision

Matías Gutierrez Girault & Jane Hwang

**III Evaluation Workshop**

Mexico City, Mexico. January 27<sup>th</sup> – 28<sup>th</sup>, 2010

# Outline

- What **Public Credit Registries (PCRs)** are
  - Their role in:
    - banking sector regulation
    - banking sector supervision
    - Basel II implementation
    - steering the macroprudential perspective
  - Optimal architecture
  - Final remarks
- ← microprudential perspective

# Public Credit Registries (PCRs) are

- databases of banks borrowers,
- operated by central bank/bank superintendence,
- reporting is mandatory,
- positive & negative data,
- their primary purpose is bank supervision.
- By-products:
  - designing prudential regulation
  - stability analysis and macroprudential policy
  - borrowers' credit information and competition

# PCRs in bank regulation

- regulatory frameworks based on Basel I or SA:
  - are they aligned with the actual underlying credit risk of banks credit portfolios?
- for example:
  1. prudential/regulatory rating systems
    - homogeneous metric + subsidiary role
      - stable+ granular + discriminatory power + calibrated
  2. appropriate calibration of
    - loan loss provisions (to match EL)
    - capital requirements (to match UL)

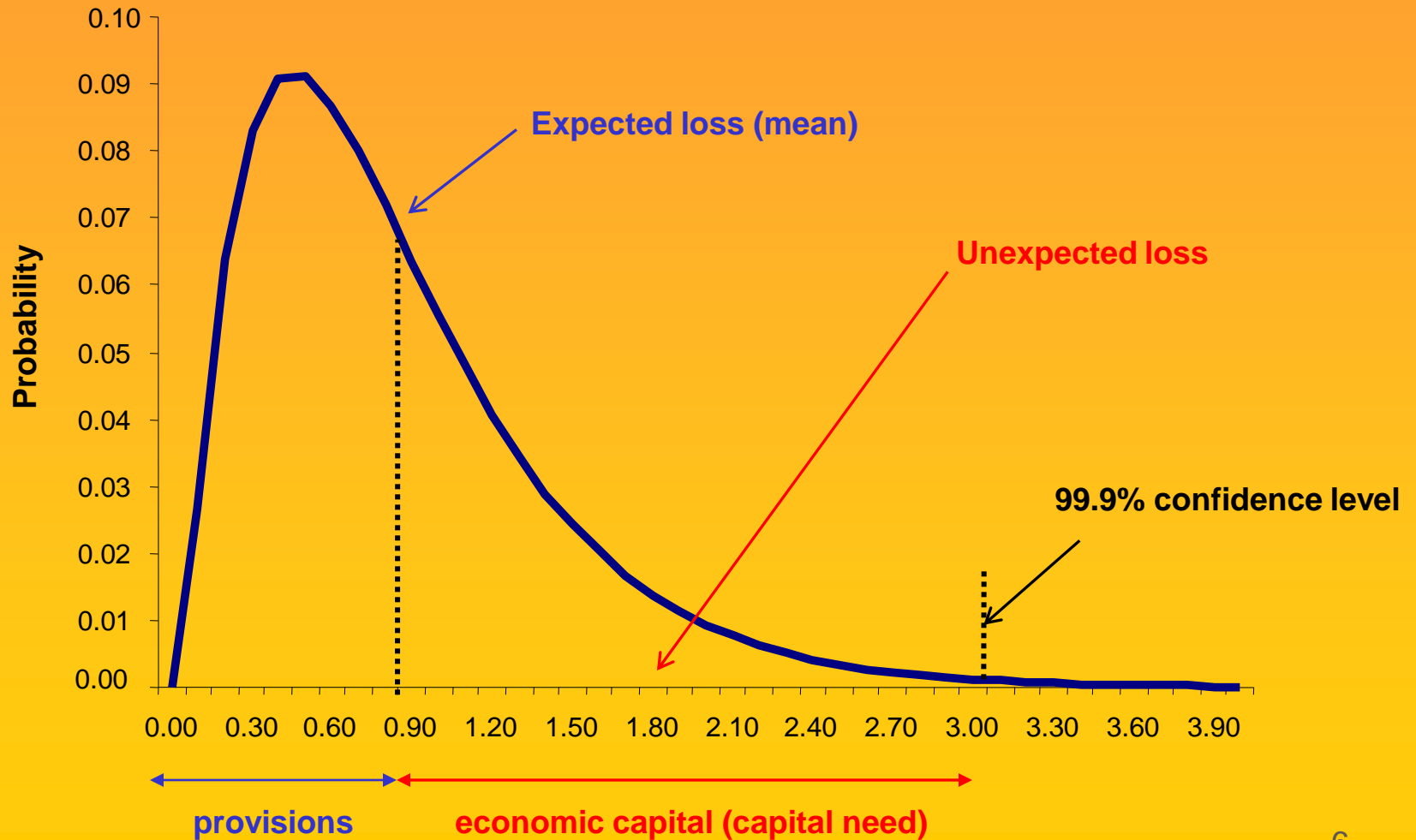
# PCRs in bank regulation

## Meaningful regulatory rating systems

Rating	% borrow.	Provision Rate		EL%	=	PD	x	LGD
1	20%	1%	∥∩	?	=	?	x	?
2	20%	2%	∥∩	?	=	?	x	?
3	15%	5%	∥∩	?	=	?	x	?
4	15%	15%	∥∩	∴	=	∴		∴
5	12.5%	30%						
6	10%	75%						
7	7.5%	100%						

# PCRs in bank regulation

## Calibrated regulatory minimums



# PCRs in bank supervision

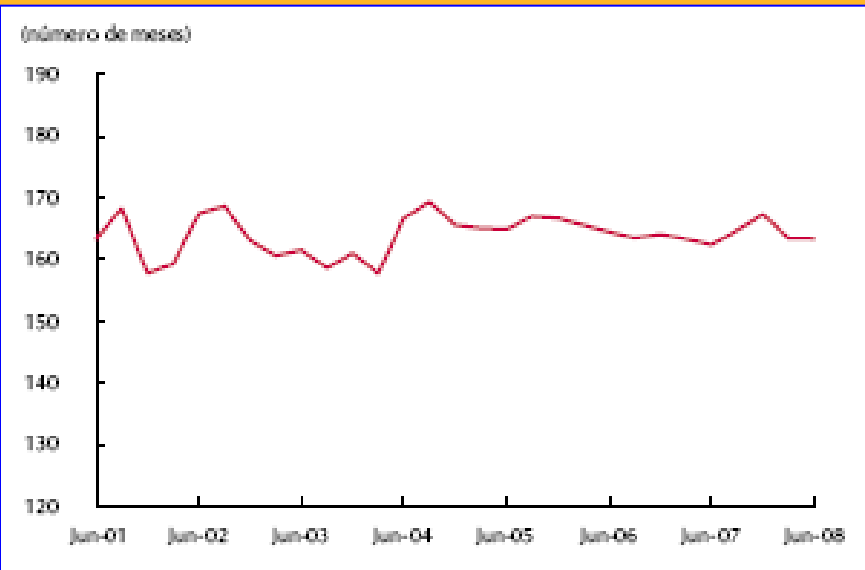
- Facilitates on-site inspections and off-site monitoring
  - **customizing samples** to specific borrowers (e.g. largest, connected, non-performing or restructured) or credits (e.g. sub prime, securitized)
  - **monitoring banks' loan portfolios:**
    - share of non-performing borrowers
    - transition matrices
    - average maturity and spread
    - credit risk concentrations
    - benchmarking credit policies (e.g. **vintage analysis**)
    - largest borrowers
      - often times crystallized in FS Reports

# PCRs in bank supervision

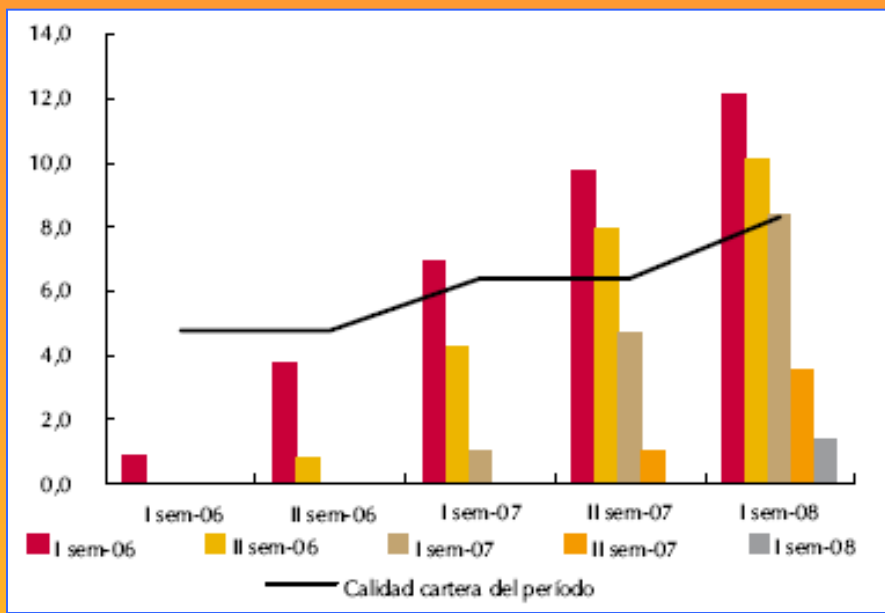
**Transition matrix for commercial borrowers (June 2002 – June 2008)**

	A	B	C	D	E
A	95,61	3,33	0,74	0,16	0,16
B	35,60	42,16	18,21	3,36	0,67
C	14,02	7,85	29,16	45,75	3,22
D	6,97	2,22	1,88	61,63	27,30
E	3,79	1,04	0,63	3,15	91,39

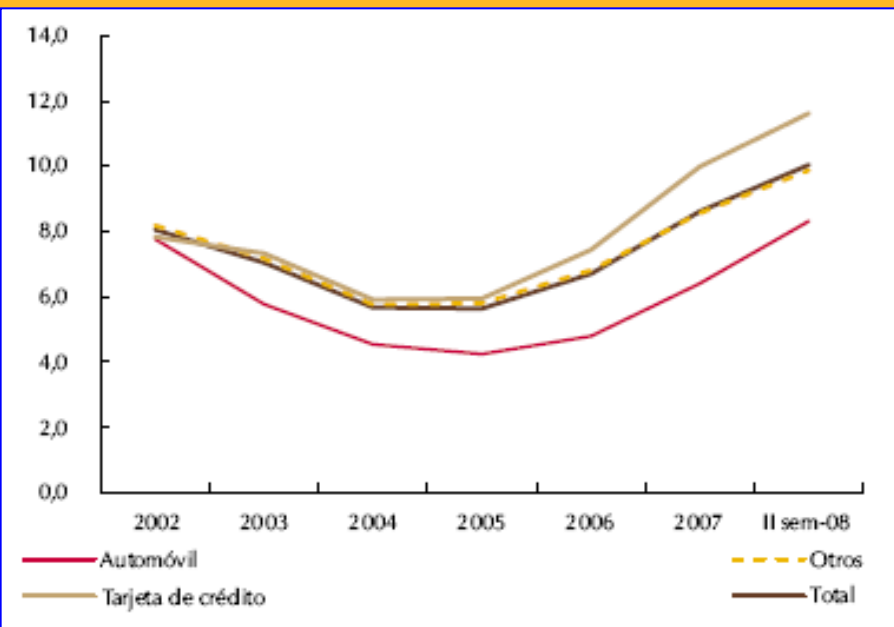
**Average residual maturity of residential mortgages (months)**



**Vintage analysis for car loans**



**Non-performing retail loans**



**Source:** Reporte de Estabilidad Financiera, Banco de la República – Colombia, 2008.

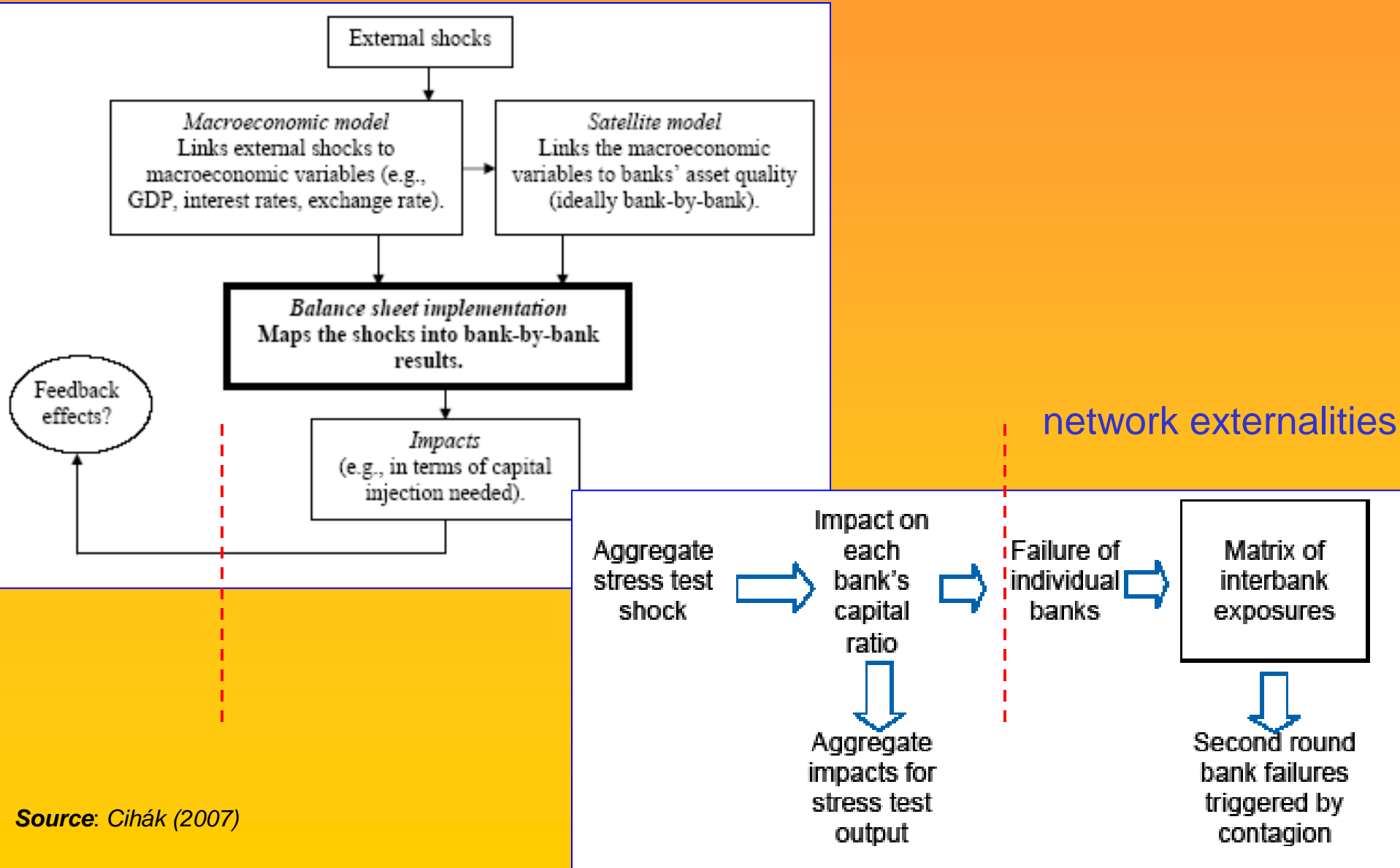


# PCRs in bank supervision

- monitoring ... (cont.):
  - correct application of classification rules:
    - benchmarking ratings & detection of outliers
  - reliability of banks rating systems:
    - benchmarking ratings & detection of outliers
    - checking:
      - discriminatory power + calibration
      - granularity + stability
  - adequacy of provisions and capital:
    - quantitative tools (e.g. transition matrices, credit portfolio models)
    - stress tests

# PCRs in bank supervision

## Supervisory Stress Tests



# PCRs in bank supervision

## Role in Stress Tests

*“A few years ago, ahead of the present crisis, the Bank of England and the FSA commenced a series of seminars with financial firms, exploring their stress -testing practices ... We had asked firms to us the sorts of stress which they routinely used for their stress-test. **quick survey suggested these were very modest stresses.** We as why ... There was a much simpler explanation according to on.*

# PCRs in bank supervision

## Supervisory Stress Tests

- detailed PCR data enables
  - bottom-up approaches, e.g. by
    - type of borrower
    - credit type
    - systemic obligors
  - top-down approaches
    - information for each and every bank
- guarantees homogeneous approach

# PCRs & BII implementation

- PCR data can be harnessed to:
  - simulations
  - re-calibration
  - validate banks' rating systems
  - auxiliary rating systems
  - Pillar 2 responsibilities:
    - adequacy of Pillar 1 results & assumptions
      - e.g. Herfindahl-Hirschman Index
    - stress tests

# PCRs & BII implementation

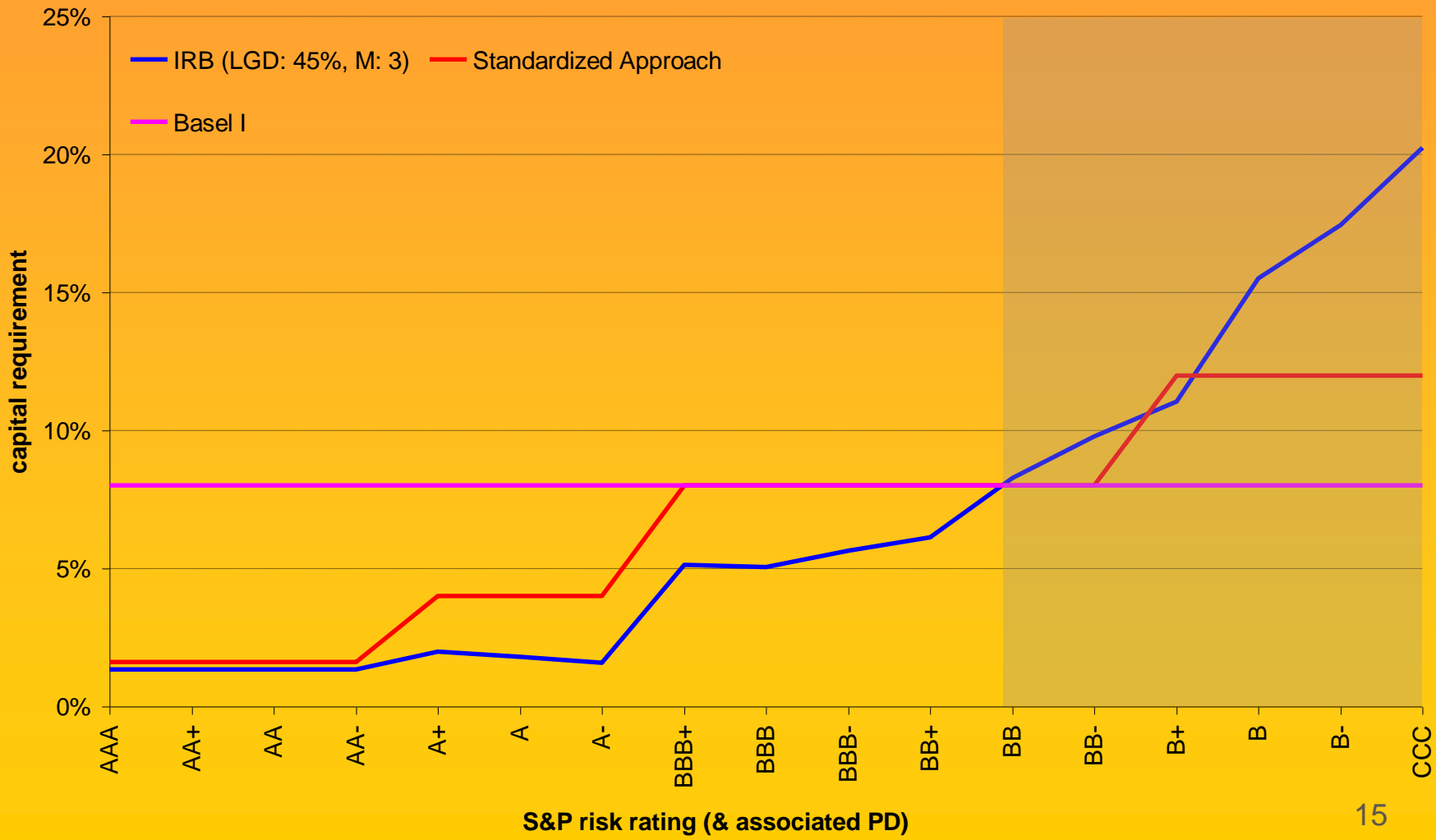
## Simulating BII IRB

- Partition banks' portfolios
- Measure risk dimensions
  - **EAD**: particularly for off-balance
  - **LGD**: information on recoveries
  - **M**: structure of contractually payable cash flows
  - **PD**: compute observed long run default rate

# PCRs & BII implementation

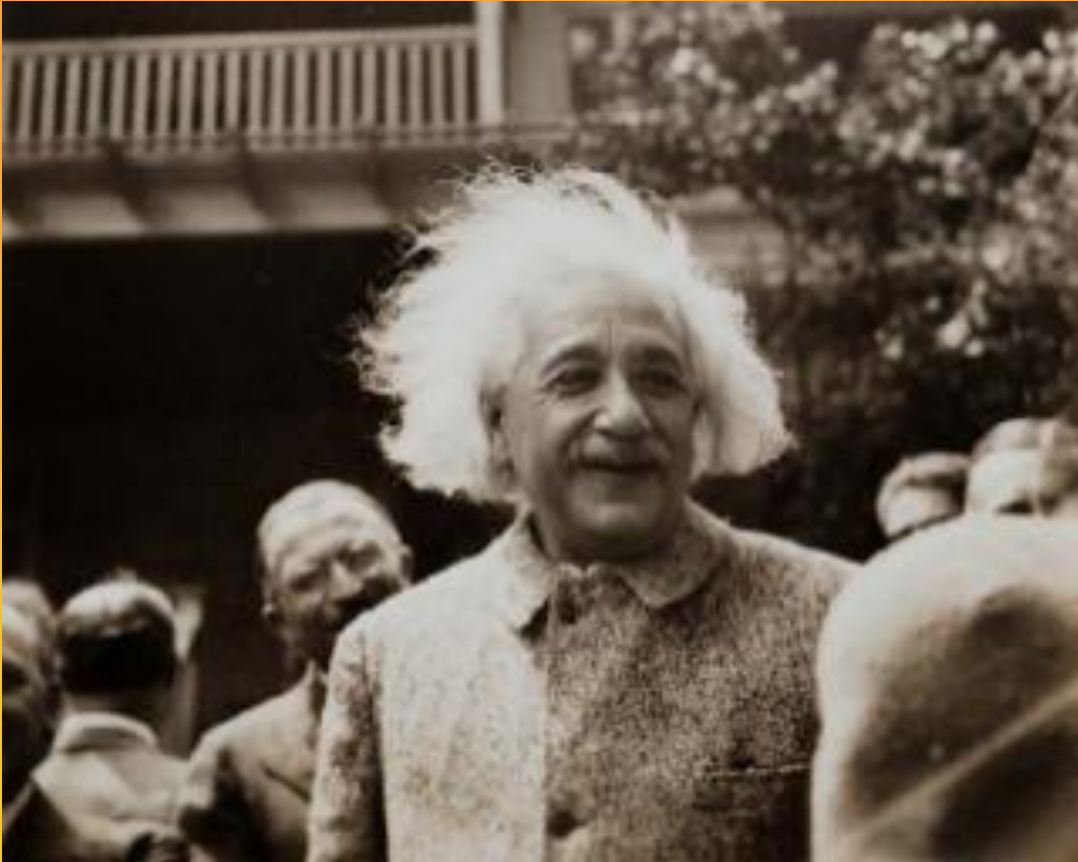
## Simulating BII IRB

**Capital requirements for corporates: Basel I vs. Basel II**



# PCRs & BII implementation

## Calibrating BII



*“Do not worry about your difficulties in Mathematics. I can assure you mine are still greater”* A. Einstein



# PCRs & BII implementation

## Calibrating BII

### Asset correlation thresholds

$$R = 0,24 - 0,12 \times \left[ \frac{(1 - e^{-50 \times PD})}{(1 - e^{-50})} \right] - 0,04 \times \left( 1 - \frac{(S - 5)}{45} \right)$$

### Maturity Adjustment

$$b = (0.08451 - 0.05898 \times \log(PD))^2$$

SME adjustment & SME/retail definition

### Confidence level

$$K = LGD \times \left\{ N \left[ \frac{N^{-1}(PD) + \sqrt{R} \times N^{-1}(0,999)}{\sqrt{1 - R}} \right] - PD \right\} \times \frac{1 + (M - 2,5) \times b(PD)}{1 - 1,5 \times b(PD)}$$

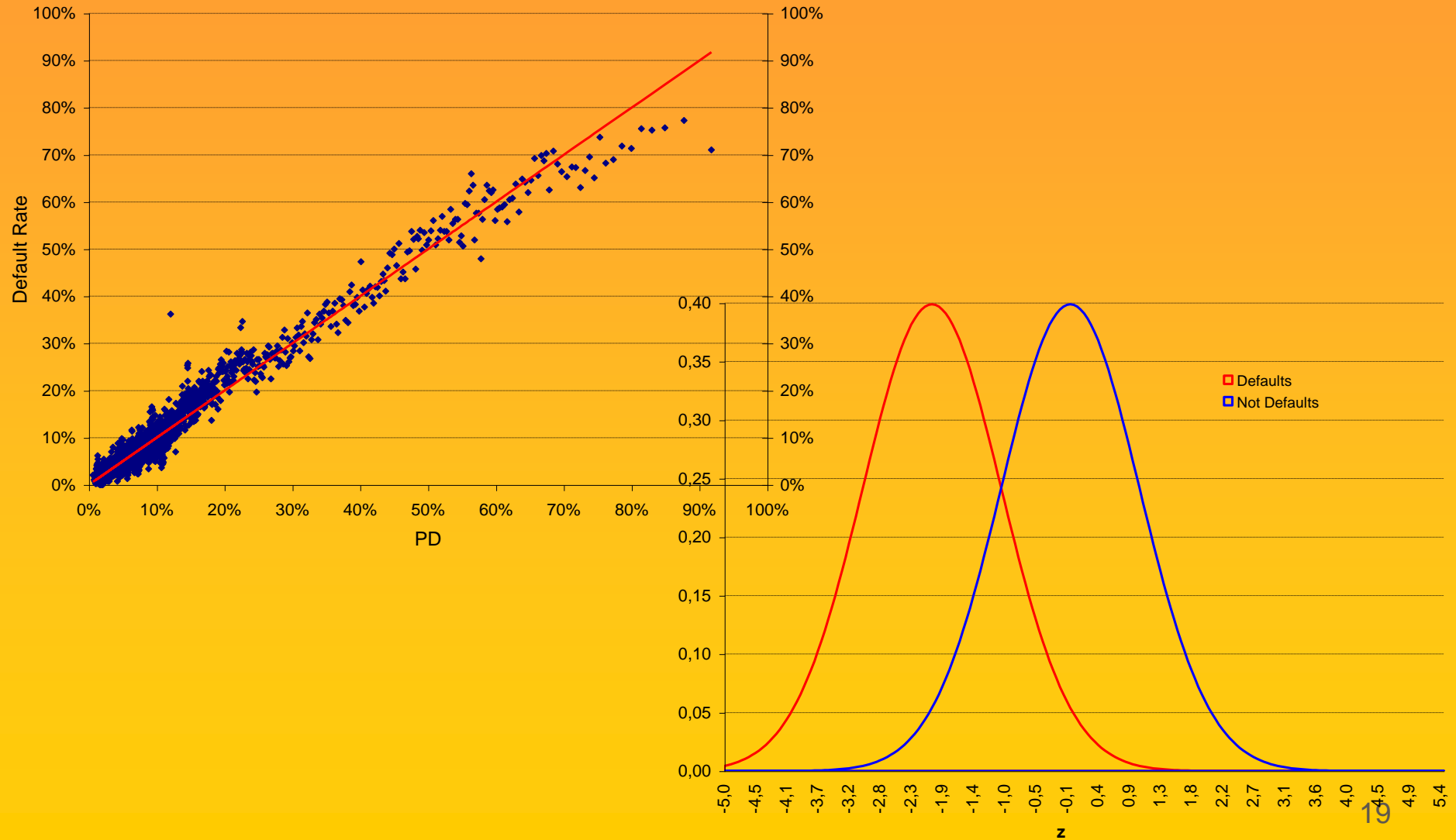
# PCRs & BII implementation

## Validation

- Regularly revising a bank's rating system
- Has two dimensions:
  - qualitative: data quality, use, documentation
  - quantitative: has predictive power
- There are statistical techniques available,
  - easily computed with PCR data
  - **discriminatory power**: separates goods from bad
    - e.g. KS (Kolmogorov-Smirnov) test, accuracy ratio
  - **calibration**: good PD estimates

# PCRs & BII implementation

## Validation: calibration and discriminatory power



# PCRs & BII implementation

## Validation: benchmarking

- PCR data can be also used to,
  - benchmark M and EAD estimates
    - identification of the operation, type of credit, date of default, outstanding amount, maturity and cash flow structure
  - benchmark LGD estimates
    - identification of the operation, date of default and recoveries
  - assess other desirable features
    - detect undue concentrations in risk buckets
    - measure rating system stability

# PCRs & BII implementation

## Auxiliary rating systems

- Can be used to:
  - grandfather institutions that want to adopt risk based credit management techniques, but can not develop these systems themselves
  - benchmark banks' rating systems
- limitation: lack of sufficient variables and resources
- advantage: pooling & sample size
  - important for smaller banks

# PCRs & BII implementation

## Example: auxiliary rating systems

Rating System Structure

Rating	Floor	Cap	% borrow.	Avge. PD	DR
G	30%	100%	6.0%	50.9% ↔	50.5%
F	15%	30%	8.3%	20.3% ↔	22.3%
E	10%	15%	14.2%	11.9% ↔	11.8%
D	7.5%	10%	12.9%	8.7% ↔	8.4%
C	5%	7.5%	20.4%	6.1% ↔	5.7%
B	2.5%	5%	19.2%	4.0% ↔	4.0%
A	0%	2.5%	19.2%	1.8% ↔	1.9%

# PCRs & the macroprudential perspective

- allows widening the scope of supervisory oversight
  - systemic non-bank/non-financial creditors
    - size
    - interconnectedness
    - lack of substitutability



# PCRs & the macroprudential perspective

- financial stability/vulnerability indicators
  - over-indebtedness (i.e. debt-to-income ratios)
  - maturity/currency mismatches
  - exposure to interest rate risk
  
- financial soundness indicators
  - NPL-Provisions (% equity)
  - sectoral/regional concentration of exposures
  - FX denominated loans (% total loans)



# PCRs & the macroprudential perspective

- macroprudential indicators
  - cross sectional dimension
    - i.e. systemic importance & contagion
  - time series dimension
    - e.g. exposure to commercial mortgages
- early warning indicators

# Optimal architecture

## Information on the Credit

- Credit's internal number
- Purpose or type of credit
- Date of origination
- Contractual maturity (date the credit will be completely repaid)
- Currency
- Amount outstanding (if revolving: drawn amount)
- Initial amount (if revolving: authorized limit)
- Interest rate
- Days past due
- Indicate if the credit is considered to be in default.
- Indicate if the credit has been refinanced
- Risk rating (of the borrower or the credit) and associated PD
- Include "transversality indicator": before a borrower ceases to be reported (for example, the last month it is reported), indicate the reason (write-of, matured, securitized, etc.)

### ***Credit Risk Mitigation***

- Type: guarantee, collateral, credit risk derivative, on-balance sheet netting agreement
- Amount
- Date of last valuation
- Valuation
- Seniority
- Risk rating of the guarantor or protection seller

## Information on the Borrower *(including each cosignor)*

- Name
- ID number
- Economic group's name (if belongs to one)
- Business activity
- Region or country
- Type of borrower
- Size
- Rating – Internal Model
- If connected to the bank, the type of connection

## Information on the Creditor

- In case of syndicated loans, all the creditors must be identified.
- In case of credits sold to another bank or securitized: both the originating bank and the bank/structure holding the credit should be identified. In these cases, some basic features of the structure should also be collected.

# Optimal architecture

## Key aspects

- Extensive coverage
  - at least all financial intermediaries
  - all types of borrowers
    - matrix of interbank exposures & risk of contagion
  - all financings: on-balance & off-balance
  - detailed collateral data
    - important for monitoring trends in asset valuations
  - securitized credits
    - important for look-through approaches

# Final remarks

- induces banks to organize their information systems
- demands on IT and human resources
- regulatory overkill: burdensome reporting demands vs. once-and-for-all catch up
- floor calibration
- database sharing with reporting institutions
  - to improve cost/benefit
- useful in assessing other risks
  - interest rate & liquidity risk

thank you for your attention

[jhwang1@worldbank.org](mailto:jhwang1@worldbank.org)

[mggirault@bcra.gov.ar](mailto:mggirault@bcra.gov.ar)

