Stress Testing/Provisioning Models for Commercial Real Estate Loans

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Outstanding Concerns with Current Stress Testing Strategies

- Importance of Data Quality and Data Management Systems
  - Integrity of contract descriptors, performance measures, and historical access.
  - Accounting for soft information or changes in internal business strategies (risk appetite).
  - Resources to develop and validate models – modelling fundamentals (RE price dynamics, drift, volatility, and correlation)

- Benefits of Diversified Modeling Strategies
  - Structural models are needed for new products and long horizons.
  - Reduced-form and Hybrids may have poor out-of-sample power.
  - Structural and Hybrids maintain optimizing framework of agents.

- Pro-cyclical Effects of Provisioning and Liquidity Spirals
  - Implications for dynamic provisioning – FASB versus SEC.

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Data Quality and Integrated Data Access are the Foundation of Stress Testing

- CRE loans are highly heterogeneous and are hard to fully characterize with available data fields:
  - Lack of standardized loan-level fields for balance sheet loans.
  - Heterogeneity in vendor specific fields for securitized loans.
  - Problems with identifying cross-collateralization and cross-selling.
  - Limitations with data for embedded options: extensions, prepayment/defeasance/yield maintenance, delinquency, renegotiations, and default.

- Data warehousing strategies often limit “real-time” access to validated historical data.
  - Integrity of CRE data and line-of-business access – who has control of the data.
  - Problems with resource constraints and strategic risk management integration.

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Within-Firm Modeling Integrity

Maintaining transparency and inter-temporal consistency in stress-testing models

– Consistency in CRE underwriting models, stress testing/provisioning models, and pricing models within the firm.
  » What do underwriting spreads imply about volatility bets??

– Transparency in modeling key drivers of simulations:
  » Interest rate dynamics.
  » Commercial real estate asset price dynamics
  » Other macro-fundamentals.

– Role of risk manager in documenting modeling strategy, record of model modifications, and model validation.
Commercial Real Estate Loan Spreads Embed Implied CRE Volatility

(a) Industrial

(b) Multifamily

(c) Office

(d) Retail

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Advantages of Mixed Modeling Strategies

- Currently there is an over-reliance on reduced-form hazard models in stress testing.
  - Often estimable even though historical data does not span outcomes of interest (e.g. high interest rates/low asset prices; low interest rates/low asset prices; etc).
  - Reduced form models poorly control for correlation and volatility (both systematic and idiosyncratic) in coefficient estimation.
  - Challenges estimating reduced form models with path dependence in outcomes (ordered logits for outcome sequences).

- Structural and hybrid models are informative for new products, new risk strategies, accounting for volatility and correlation in underlying fundamentals, accounting for full contract structure.
Implied Volatilities Generate Cumulative Default Expectations – A Structural Model
Cyclicality in CRE Performance?

- Empirical evidence of 20 year cycle in CRE performance.
- Possible reasons may include:
  - The balloon structure of CRE loans may induce risk exposure over business cycles – a “timing risk” of capital gains.
  - As a factor input, CRE is susceptible to business cycle effects.
- Significant need for better data sets and more research!!
Cyclical Structure of CRE Loans 60+ Day Delinquency Performance

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60+ Day Delinquency Rate by Year of Origination and Loan Age

60+ Day Delinquency Rate, by Year of Origination and Loan Age (months), as of March 2011

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Source: JP Morgan, MBA
Banks and Thrifts: Annualized Charge-off Rates of Bank Loans

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Pro-cyclicality Effects: GAAP Rules FAS 5 and FAS 114 versus SEC Staff Accounting Bulletin, 99

x FAS 5 and FAS 114 (requirement to provision for losses that are “probable and estimable”):
  – FAS 5: account for historical losses with discretion on length of history, discretion to overweight recent performance, and/or use migration analysis and models.
  – FAS 114: model distinctions between doubtful, substandard, and short-term delinquency of loans; loan-by-loan or pool basis.

x SEC SAB 99: GAAP does not allow the creation of reserve accounts where the only motive is to smooth income.
  – “Cookie jar” reserves: Smooth income reporting through unrealistically high estimates of future liabilities for loan losses.

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Could Dynamic CRE Provisioning Be Used to Dampen Pro-cyclicality?

- Set provisioning relative to long-run mean or median performance of cyclical asset classes (e.g. Long-run CRE implied volatility)
  - A rule-based rather than a discretionary system.
  - Establish minimum provisioning requirements for cyclical asset classes, these minima would be public and transparent.
  - Modeling task to establish system-wide rules (e.g. long-run means and confidence intervals).

- Banco de España is the only central bank to have established such a system (2000 to present)
  - Requires asset specific provisioning with business cycle effects.
  - BdE claims the system has been very useful over the crisis in enforcing margins.

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