

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

DIVISION OF RESEARCH AND STATISTICS

Date: March 15, 2004
To: Mark Van Der Weide, Legal
From: Jim Follain
Subject: Meeting with Citigroup on Treatment of Subprime Mortgages in Basel II

Date and Place: January 22, 2004 at the Federal Reserve Board

Attendees: Citigroup Representatives: Dennis McLaughlin; Michael Bradley; Mark Beardsell; Eric Aboaf, John Watkins, and Grayden Barz by phone). Agency representatives: Dave Jones, Paul Calem, and Jim Follain of the FRB; Michael Solomon of OTS; Jason Cave of FDIC; Roger Tufts (OCC via phone).

Purpose: To discuss research done by Citigroup staff on the specification of the Basel II capital rule for subprime mortgages.

Meeting Highlights: Citigroup began with a review of a formal presentation prepared for the meeting, which has been forwarded to you along with this summary of the meeting. The new presentation is similar to its earlier public comments on the issue of subprime with one major addition. This version includes a number of comments about “meta” issues related to retail credit risk and operational risk.

Key elements of the discussion of the document that followed included:

1. A discussion of potential competitive effects made several points:
 - a. A key question thru out the discussion of potential competitive effects is whether the regulatory capital rules are binding on bank investment decisions. We interpreted Citigroup as comments yesterday as confirmation that they can matter in certain investment decisions and do impact the pricing of some loans. More specifically, Citigroup said that the currently proposed rules would incent them to move the subprime business outside the normal banking channels and into others, e.g. finance business. They felt such a move would not be a good idea from either a business or public policy perspective.
 - b. The FRB staff raised this question: if regulatory rules exceed capital market requirements via securitization, then wouldn't this become an option for Citigroup. Citigroup responded that such a route would be expensive. They mentioned 15-50 bps in cost, which is a substantial portion of the profit of such business (125 bps or so).

- c. The FRB emphasized that the regulatory framework cannot deal precisely with the specific features of each bank's product offerings — it is much too blunt an instrument. For this reason, it has been purposely built into the framework to allow for the possibility of using securitization and other CRM tools so that effective capital charges are no higher than what would be demanded if the markets covered the underlying credit risks. This is not problematic 'arbitrage', it is a deliberate 'safety-valve' built into the system for banks that are able and willing to meet such a market test. Evidently, many nonbank competitors in this arena are both able and willing to meet these tests.
2. The following question was discussed: is there still an opportunity to alter the specification of the asset correlation parameter for subprime? Dave Jones of the FRB spoke on this and indicated an affirmative if convincing evidence is presented. One window is the next few months and the expected publication of the proposed rule. Another extends beyond May and the expected opportunity to make revisions in light of new research and QIS 4.
3. A discussion of the role of expected maturity or duration on capital and asset correlation followed. Citigroup uses this information to suggest that, all else equal, subprime and other types of home equity loan products should have lower asset correlations. Additional work on this topic was suggested. Postscript: Paul Calem is pursuing this issue
4. The major concern expressed by the Agencies on the specific issue of subprime mortgages is the lack of a serious housing price stress event with which to calibrate subprime models. The cross-section evidence offered by Citigroup is a valuable attempt to address this problem, but did not seem to constitute enough evidence to warrant a change among those in the room.
5. Several suggestions were made to extend the analysis.
 - a. One focused upon the use of securities information relating to subordination levels and credit spreads.
 - b. Another builds upon a memo being prepared by Paul and Jim to lay out an alternative conceptual basis and work plan to determine whether a different asset correlation parameter for subprime and home equity loans is warranted. This memo is expected to be distributed to Citigroup and others in the near future.
 - c. Roger also raised the more general suggestion that the current specification for residential mortgages be replaced with a function that relates the asset correlation parameter to PD. He envisioned a downward sloping function — higher PDs imply lower asset correlation parameter.
 - d. Citigroup also suggested an analysis based upon pg. 66 of the WAMU study, which Paul and Jim will review.

Attachment (1)

**Issues with the Retail Section of Basle II:
Citigroup Global Consumer Bank**

Discussion document
January 22, 2004

AGENDA

- **Recap Citigroup's concerns with current Basle II proposals**
- **Review case for recalibrating Basle II non-prime mortgage model**
- **Outline approach to recalibrate Basle II non-prime mortgage model**

CITIGROUP HAS A NUMBER OF GENERAL CONCERNS WITH BASLE II

| Under active review

Key issues

Treatment of reserves	Expected Losses <ul style="list-style-type: none">• Should be fully deductible from capital requirements• Under CP3, only cards receives a deduction (75%)
Home host issues	<ul style="list-style-type: none">• Inconsistent standards<ul style="list-style-type: none">• Different AMA qualification criteria overseas and consequent competitive impact• Different definition of key parameters (esp. default) across countries. Will the AVC calibration be modified accordingly?• Which solvency standards apply to legal vehicles in other jurisdictions?
Competitive dynamics	<ul style="list-style-type: none">• Migration of riskier assets to less sophisticated banks with competitive advantage in capital requirements for low quality credits
Implementation issues	<ul style="list-style-type: none">• Slippage in timeline<ul style="list-style-type: none">• Unavoidable, since Citi is unable to spec data capture systems without a quick resolution to above issues
Operational Risk	<ul style="list-style-type: none">• Conceptual barrier to AMA<ul style="list-style-type: none">• Impossible to avoid subjectivity• Potential approach no nearer despite 6 years of work in industry

CITIGROUP ALSO HAS A NUMBER OF ISSUES SPECIFIC TO RETAIL

Focus of today's discussion

Key issues

Mortgages

- **10% Loss Given Default floor**
 - Currently floor applies to all mortgages not covered by a sovereign guarantee
 - PMI is not exempt from floor
 - Same floor is used regardless of product type
- **One size-fits-all**
 - **Same** model used for first mortgages, second mortgages/HELOCS
- **Treatment of non-prime**
 - **Basle II** requires too much capital for non-prime mortgages

Revolving

- **Treatment of Unused Lines**
 - Industry consensus that unused lines attract too much capital under Basle II

“Level playing field”

- Card issuers under the Advanced IRB approach will be disadvantaged relative to those allowed to use the Standardized Approach
- Finance companies and banks not subject to Basle II will have a significant advantage over Citigroup in cards, leases and non-prime mortgages

THE MORTGAGE MODEL NEEDS TO BE RECALIBRATED FOR NON-PRIME

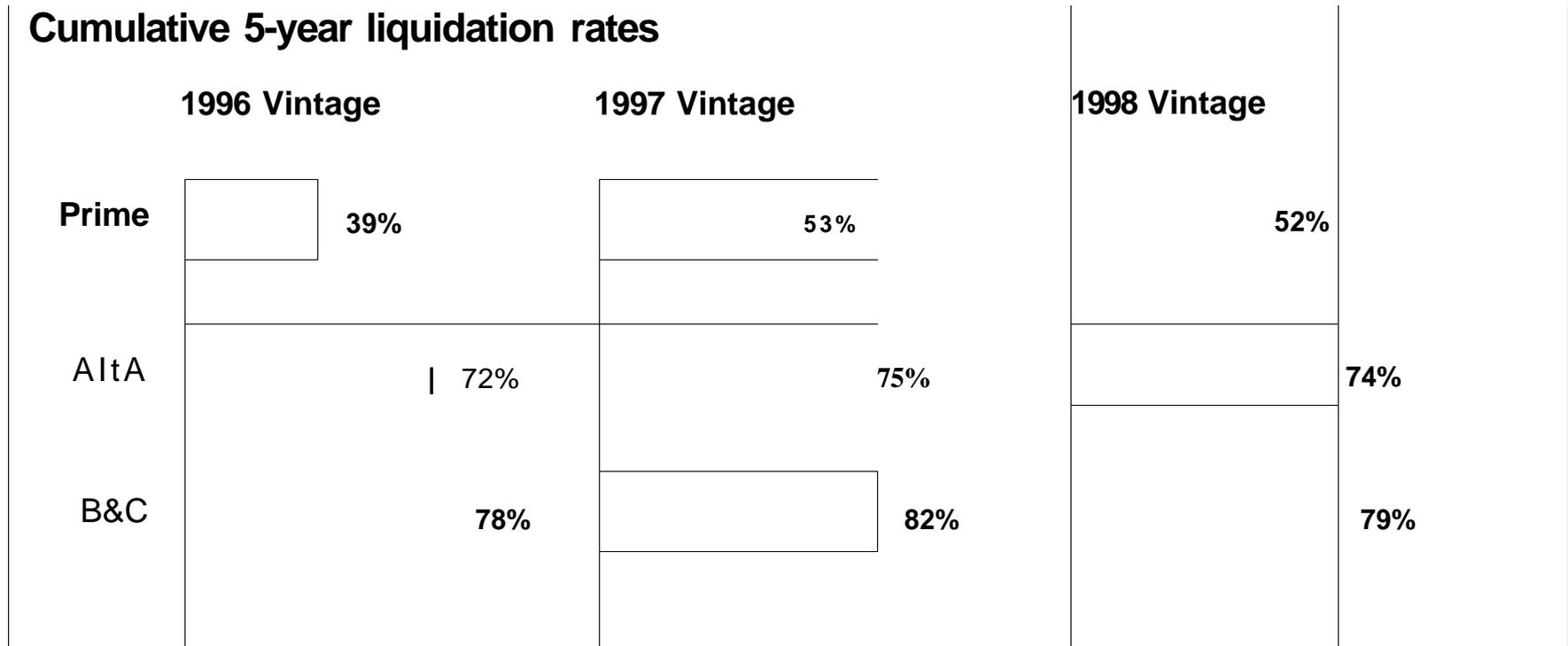
Case for recalibrating AVC for non-prime mortgage exposures

- Community of risk practitioners believe that EC, as currently calculated by the regulatory model for non-prime mortgage exposures, is too high.
- The current mortgage AVC of 15% was calibrated by extrapolating from a prime dataset. However, an AVC of 15% is too high in that it leads to an EC that is considerably above that calculated using non-prime data and best practice models such as that outlined in the WAMU study*.
- To be consistent with empirical evidence and the treatment of credit in the QRE and “Other Retail” models, AVC should decline as PD increases.
- The current regulatory model does not incorporate the empirical fact that non-prime mortgages liquidate faster than prime mortgages.
- Analysis of Alt A, B&C mortgage data in the LoanPerformance ABS database since 1996 indicates that ***an AVC significantly <15% is more appropriate for non-prime mortgage exposures.***
- The FRB itself has recognized that these issues need more attention**.

* Best Practices in Mortgage Default Risk Measurement and Economic Capital

** FRB Presentation to the 2003 Loan Performance Risk Summit, August 11, 2003: Paul Calem, James R. Follain

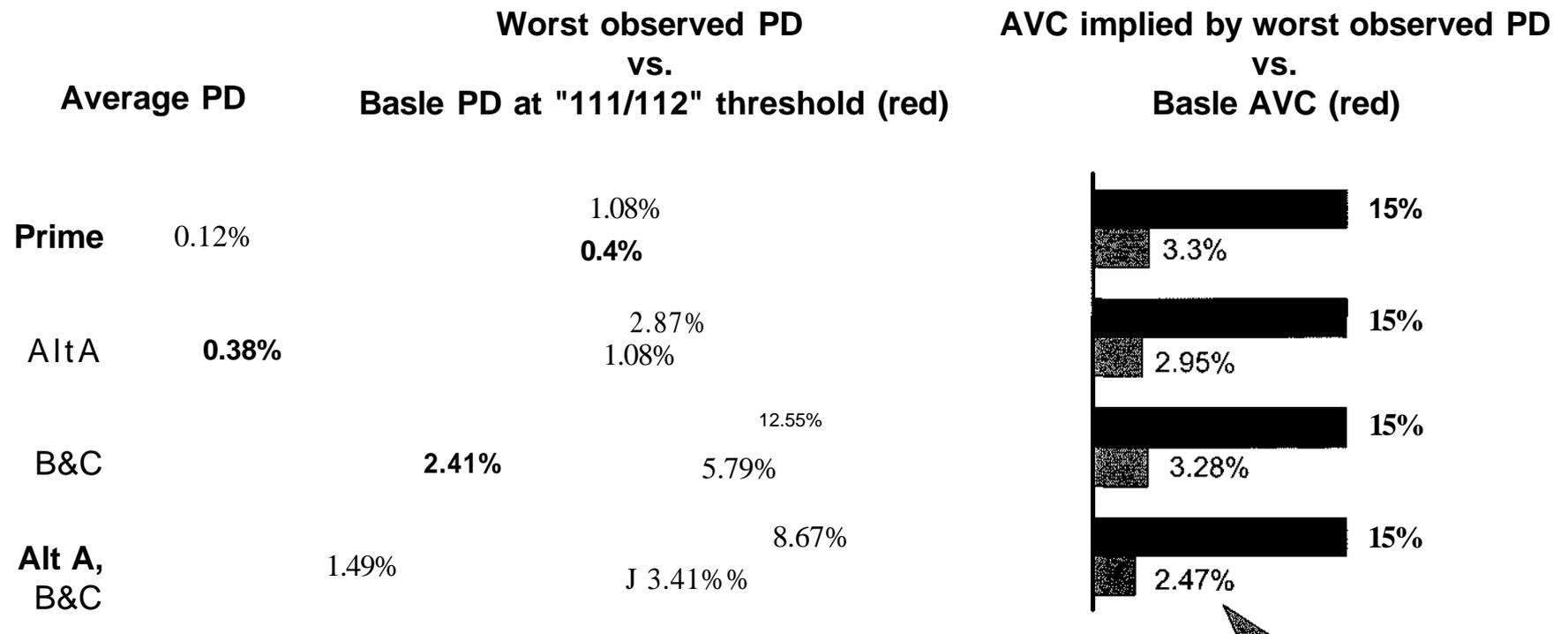
NON-PRIME MORTGAGES LIQUIDATE FASTER THAN PRIME MORTGAGES



Methodology

- Prime figures based on Citigroup conventional mortgage data
- Alt A, B&C figures derived from LoanPerformance data
- Stated liquidation measured in unit rates including loan termination (exit) due to prepayment / default
- Loan level performance tracked for 60 months from origination
- All data reflect originations between January 1996 and April 1998

LOAN PERFORMANCE DATA INDICATES THAT AN AVC SIGNIFICANTLY <15% IS MORE APPROPRIATE FOR NON-PRIME



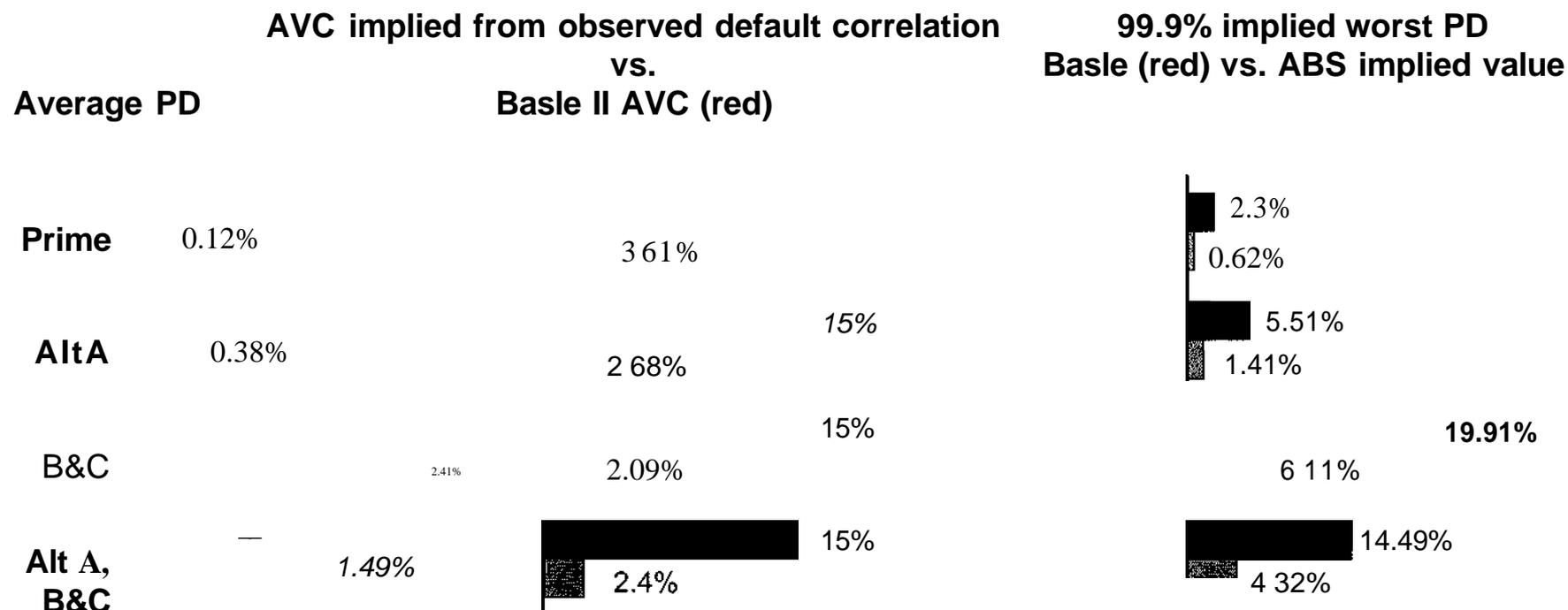
Methodology

- Estimate worst / in 112 loss observed in the ABS data and calculate implied AVC*:
 - Uses fact that Basel formula holds true for all quantiles
 - Analysis based on 4 tiers of house price index growth rates: 5-year growth rates for each specific index (zip 5, property type, property value tier) measured and merged with ABS data at most disaggregated level
 - Prime statistics derived from Citigroup's conventional mortgage book

Our analysis produces AVC's in the range recommended by the WAMU study

* Calculations include a foreclosure to default adjustment of 1/0 75

LOAN PERFORMANCE DATA INDICATES AN AVC SIGNIFICANTLY <15% IS MORE APPROPRIATE FOR NON-PRIME (contd.)



Methodology

- Estimate AVC through **observed default correlations** based on PD variances in Loan Performance ABS data*:
 - Analysis based on 4 tiers of house price index growth rates: 5 year growth rates for each specific index (zip 5, property type, property value tier) measured and merged to the ABS data at most disaggregated level
 - Prime statistics derived from Citigroup's conventional mortgage book

* Calculations include a foreclosure to default adjustment of 1/0 75

THE ABS DATA CAN BE USED TO EXTRAPOLATE RESULTS FOR NON-PRIME MORTGAGES BACK IN TIME

Analysis Performed

- Using LoanPerformance data going back to 1996, calculate

$$X = \text{PDdc}(\text{non-prime})/\text{pDC}(\text{prime})$$

-the ratio of non-prime default correlation to prime default correlation

Key Challenge

- No extensive data for non-prime extending back further than 1996

- Next recalculate the prime default correlation (pDCprime) using the more extensive history available
- Infer a value for the non-prime default correlation over this corresponding longer time period ***assuming that the ratio of default correlations for prime and non-prime is constant across the credit cycle***
- Derive the AVC corresponding to the non-prime default correlation ***assuming that AVC is constant across PD bands, but that prime and non-prime are separate segments*** _____

THE ABS DATA CAN BE USED TO EXTRAPOLATE RESULTS FOR NON-PRIME MORTGAGES BACK IN TIME (contd.)

	Results from ABS data (1996-98)	Through the cycle estimates	
Default correlation (from prime AVC of 3.61%)	0.53%	2.71%	<p>Estimate implied by the 15% Basle II AVC</p> <p>Calculated as 56.2% of prime default correlation</p>
Default correlation (from non-prime AVC of 2.09%)	0.30%	1.53%	
Ratio X	56.2%	56.2%	

Comments

- All calculations performed using underlying B&C default rate of 2.41%
- **At non-prime B&C PD of 2.41% and default correlation of 1.53%, the corresponding AVC for non-prime is 9.35%**

POTENTIAL CAUSES OF DISAGREEMENT OVER AVC CALIBRATION

Underlying data employed

- Non-prime data was not included in the AVC calibration

Choice of Horizon

- Industry best practices is to calculate Economic Capital over a 3 to 5 year horizon, in contrast to the 10 years used in the Basel calibration

Current AVC calibration depends on a specific annualization scheme not applicable to non-prime

- The current mortgage calibration was based on 10-year cumulative default probability which was then annualized to obtain a 1-year PD using the geometric average
- This specific annualization scheme underlying the current 15% AVC does not apply to non-prime since:
 - A 10-year default history is not available to generate a full 10-year cumulative default curve
 - A non-prime portfolio has much shorter duration
 - The cumulative default probability curve is very different from a geometric average of the final cumulative default probability: it rises sharply in the first 2-3 years and flattens quickly thereafter

THE AVC CALIBRATION ISSUES CAN BE RESOLVED EMPIRICALLY

Recommendations

- Follow the analysis laid out on page 66 of the WAMU study to reconcile the Basle II calibration with industry best practices:
 - Run the LoanPerformance “sub-prime” module out 10 years and calculate the required capital ***K***
 - Annualize the PDs and solve for the AVC which equates the Basle formula with ***K***