



Comptroller of the Currency
Administrator of National Banks

US Department of the Treasury

OCC Fair Lending Conference 2008

Statistical Analysis and Modeling for Risk Assessment

September 9, 2008

The opinions expressed in this paper reflect those of the author only and do not necessarily reflect those of the Office of the Comptroller of the Currency or the Treasury Department.

ENSURING A SAFE AND SOUND
NATIONAL BANKING SYSTEM
FOR ALL AMERICANS

Narrowing the Exceptions

A Risk-Based Process to Optimize Fair Lending Monitoring

Rick Preiss

President

Preiss&Associates LLC



Comptroller of the Currency
Administrator of National Banks

US Department of the Treasury

ENSURING A SAFE AND SOUND
NATIONAL BANKING SYSTEM
FOR ALL AMERICANS



Problem and Solutions

- **Problem:**
In Fair Lending Pricing Analyses Often There Are Too Many Exception Files to Review with the Resources Available.
- **Solution:**
Find an Analysis Technique That Highlights Specific Files, on a Risk Adjusted Basis, Thought to be Particularly Problematic.



Alternatives

- Traditional Solution
 - Confidence Intervals

- Other Solutions
 - Raw Residuals
 - Studentized Residuals
 - Deleted Studentized Residuals

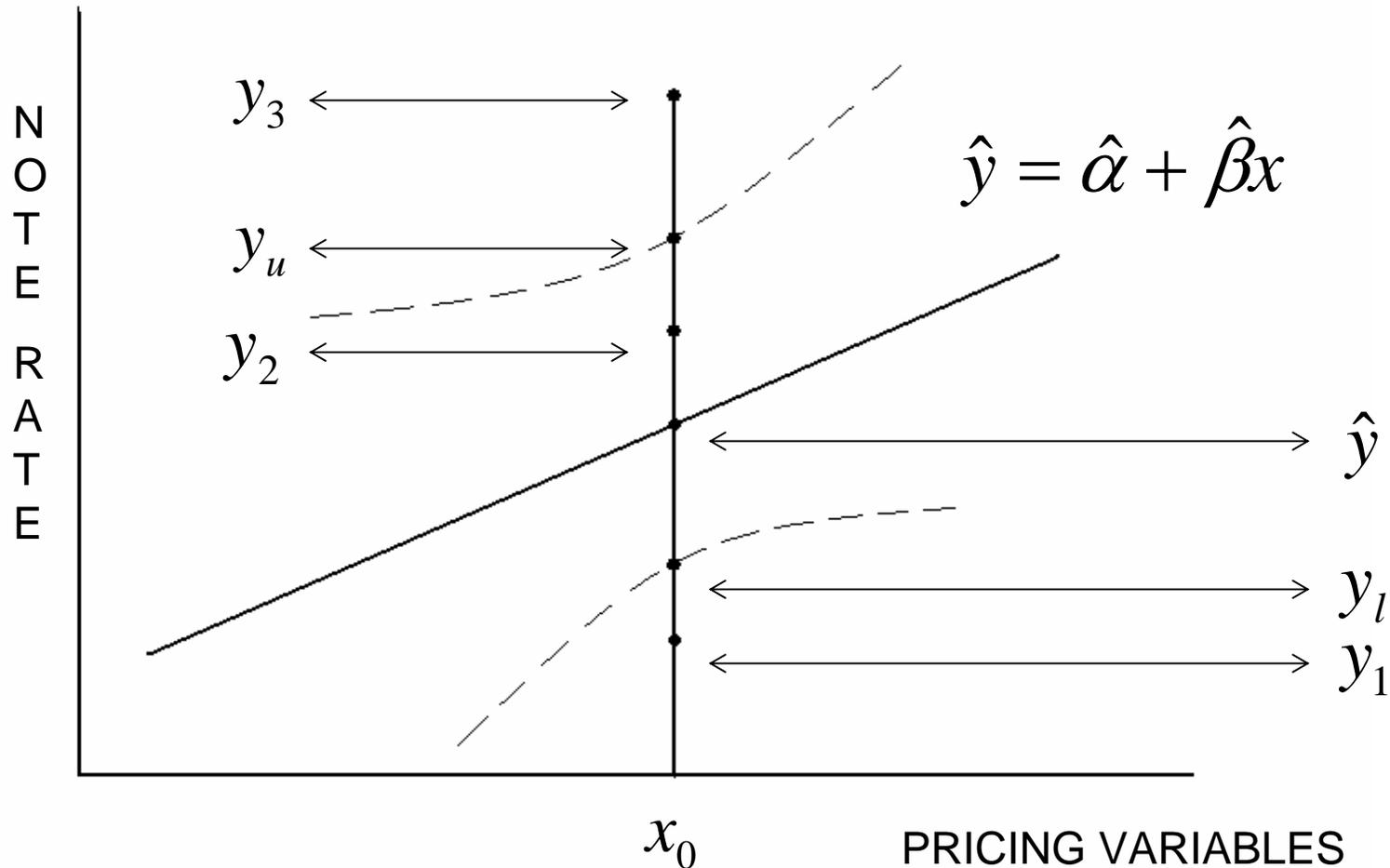


Traditional Solution

- Confidence Intervals – Part of Fair Lending Pricing Process
- Fair Lending Pricing Process
 - Collect Data Using
 - Pricing Policies/Guidelines
 - Price Sheets
 - Promotion Data
 - Estimate Pricing Regression
 - Establish Confidence Intervals (85%, 90%, 95%)
 - Identify Files with Note Rates Outside the Confidence Interval of the Predicted Note Rate

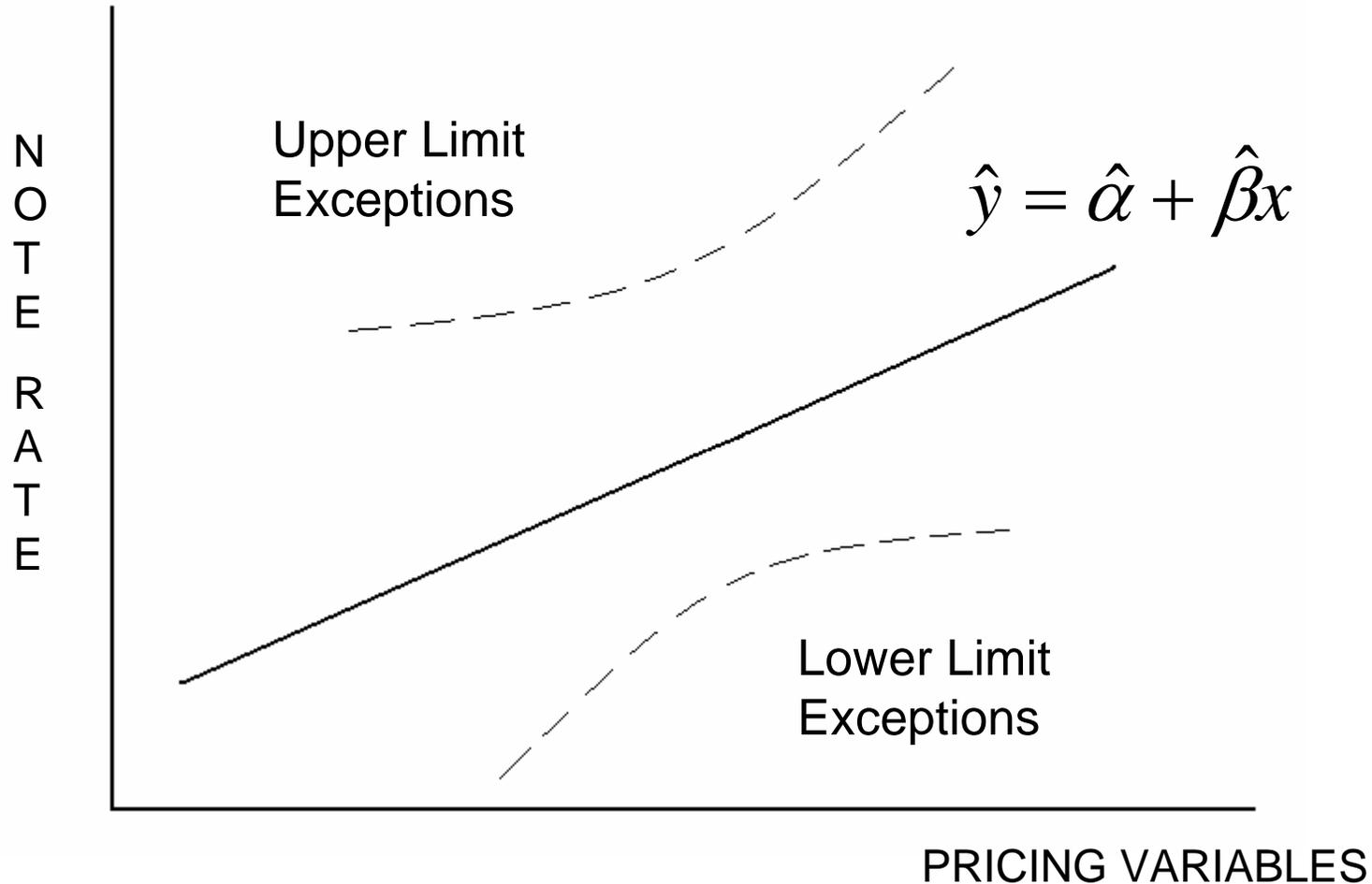


Graphically – In Detail





Graphically – In Summary





Example

Note Rate Extract					
Application Number	Number Apps	Note Rate	Lower Bound	Upper Bound	Result Group
1	116	6.75	6.16	6.33	Above C.I.
2	656	6.50	6.43	6.71	In C.I.
3	148	6.50	6.52	6.69	Below C.I.

- Issue: 116 Applications in Above CI group, 148 in Below CI group
- 264 Exceptions – May Be Too Many Exceptions to Review Given Resources/Time
- Need to Prioritize



Possible Solutions

- Raw Residuals
 - Raw Residual = Actual Note Rate – Predicted Note Rate
 - Problems with Using Raw Residuals to Prioritize File Review
 - Raw Residuals Do Not Have Scale, Hence May or May Not Be Important Statistically
 - Distribution of Raw Residuals is Unknown
 - Raw Residuals May Be Correlated
 - Need a Normalizing Factor



Possible Solutions

- Studentized Residuals
 - Studentized Residuals are Raw Residuals Normalized
 - Normalize with Standard Deviation of the Residuals
 - Problem: Numerator & Denominator of This Statistic Are Not Independent
 - Both Contain Some of the Same Information



Possible Solutions

- Deleted Studentized Residuals (DSRs)
 - Same as Studentized Residuals Except the Residual Standard Deviation Calculation Does Not Include the i^{th} Observation, the File Being Examined.
 - Numerator & Denominator of the Statistic Are Independent
 - DSRs Are T Distributed
 - T Distribution Property Allows
 - Determination of Statistically Significant Residuals
 - Ranking of Applicants by DSR
 - Reviewing files by Appropriate Level of Risk for Your Institution



The Clear Advantage

File Review: CI vs. DSR

Result Group	95% C.I.	95% DSR	Percent Difference	90% DSR	Percent Difference	80% DSR	Percent Difference
Above C.I.	116	20	-82.7	32	-72.4	60	-48.3
Within C.I.	656	880	34.1	864	31.7	824	25.6
Below C.I.	148	20	-86.5	24	-83.8	36	-75.7

- Using DSRs to Prioritize File Reviews Can:
 - Reduce the Number of Exceptions to Review by 80+% at the 95% CI
 - Achieve Lesser, But Important, Reductions at 80%, 90% CIs
 - Decrease Matching File Review Costs SignificantlyDepending on the Number of Protected Class Comparables



Conclusion

- Due to Large Volumes of Applications in Pricing File Reviews, Banks Often Need a Way to Focus Their Manual File Reviews.
- Traditional Method of Using CIs Does Not Provide Optimal Selection for File Reviews
- DSRs, Because They Are T Distributed, Allow Prioritization of Exception & Matching File Reviews
 - DSRs Are Easy to Use
 - Calculated in Statistical Programs Such as SPSS & SAS.
- DSRs Permit More Cost Effective Exception & Matching File Reviews