

**Narrowing the Exceptions**  
**A Risk-Based Process to Optimize  
Fair Lending Monitoring**

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Comptroller of the Currency  
Administrator of National Banks

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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

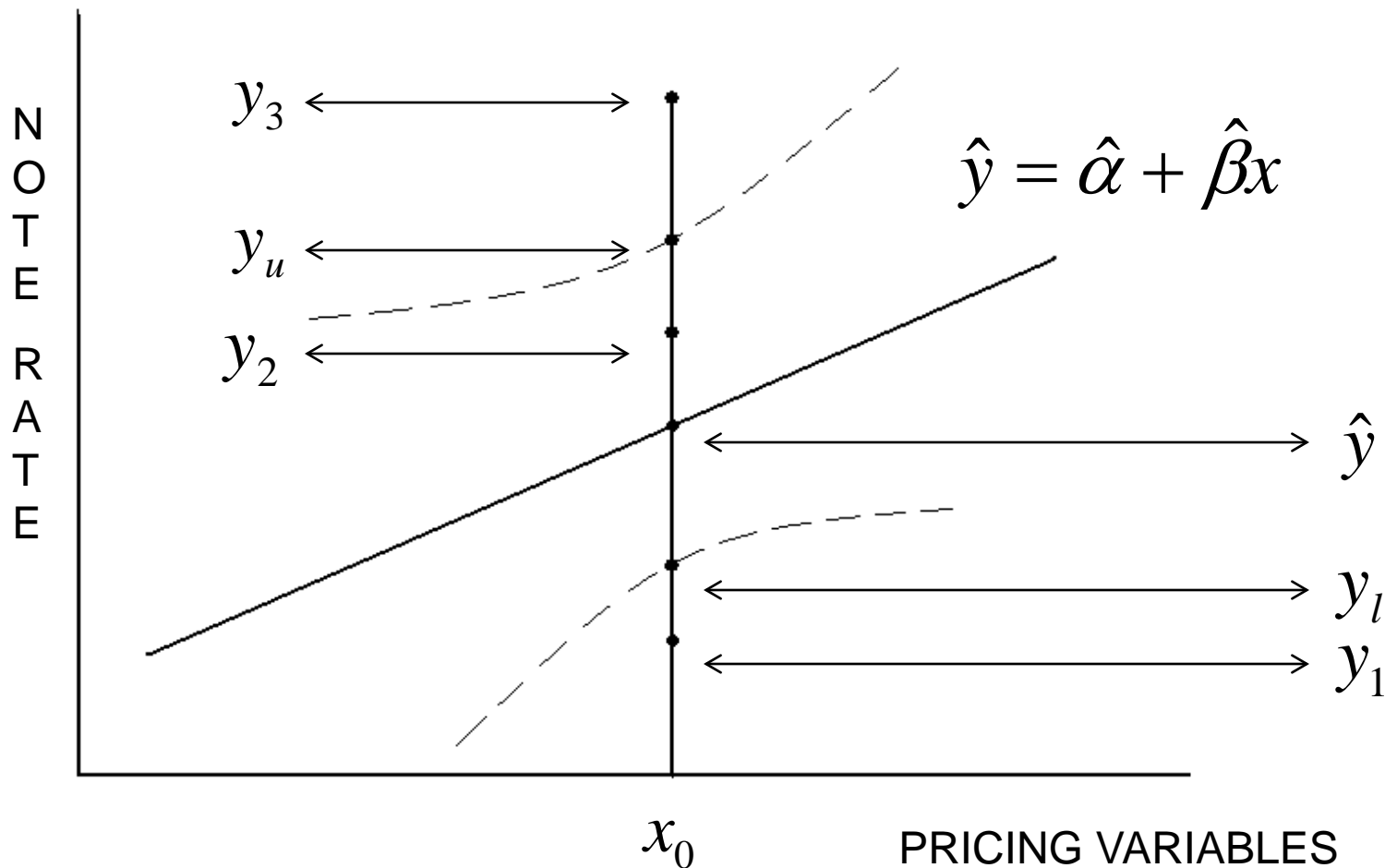


# Traditional Solution

- 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

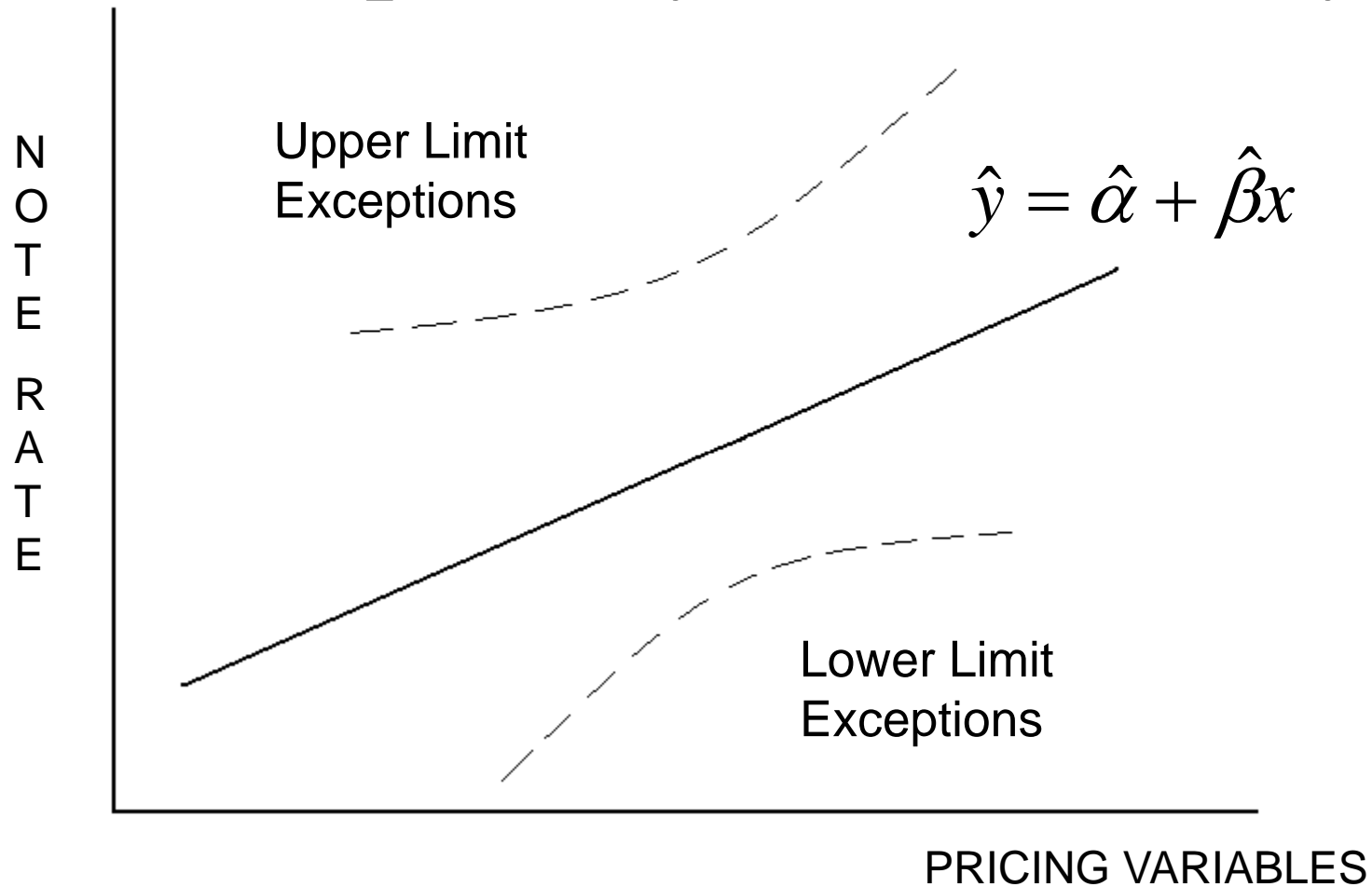


# Graphically – In Detail





# 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  $i^{\text{th}}$  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 Significantly
 Depending 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