Time Savings of a Custom Credit Scorecard for USDA's Direct Farm Loan Program

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Summary: The objective of FSA's Application Fast Track is to implement an accelerated underwriting process for lower-risk FSA Direct loan applicants to reduce staff workload while minimizing impact on program risk. This work quantifies significant time savings that can be decomposed into the impacts of model sorting and underwriting process changes.

FSA Farm Loan Programs Overview

The USDA Farm Service Agency (FSA) makes loans to farmers and ranchers who are unable to obtain credit from commercial sources through its Farm Loan Programs (FLP).

To apply for a direct loan with FSA, the producer submits a **current financial statement, 3 years of farm financial records, and a projected cash flow budget.**

For FSA to approve the application, the applicant must meet all **eligibility** criteria, demonstrate **feasibility** of repayment, and have adequate **security** for the loan.

Given the time-intensive nature of developing repayment projections, FSA initiated the **Application Fast Track (AFT) pilot program** to implement a risk-based predictive model of repayment as a substitute for the typical feasibility assessment for low-risk applicants. No applicants were denied based on an AFT evaluation.
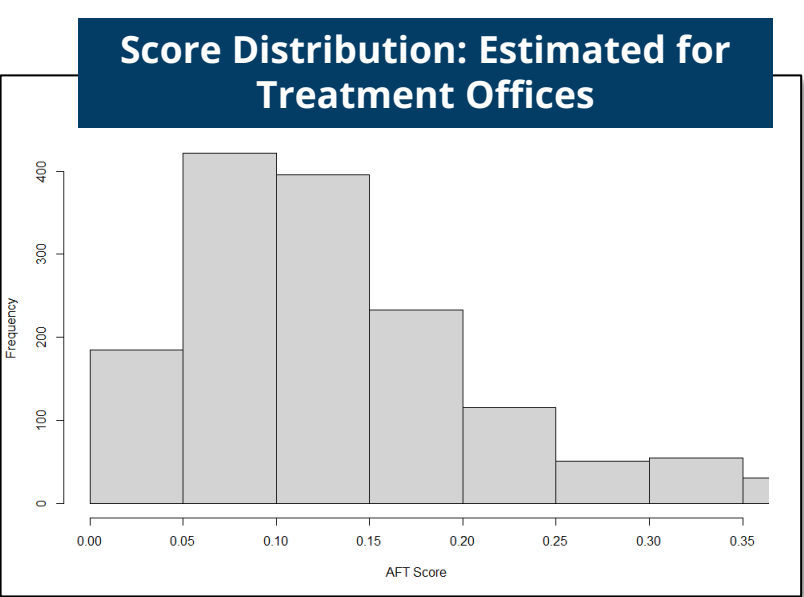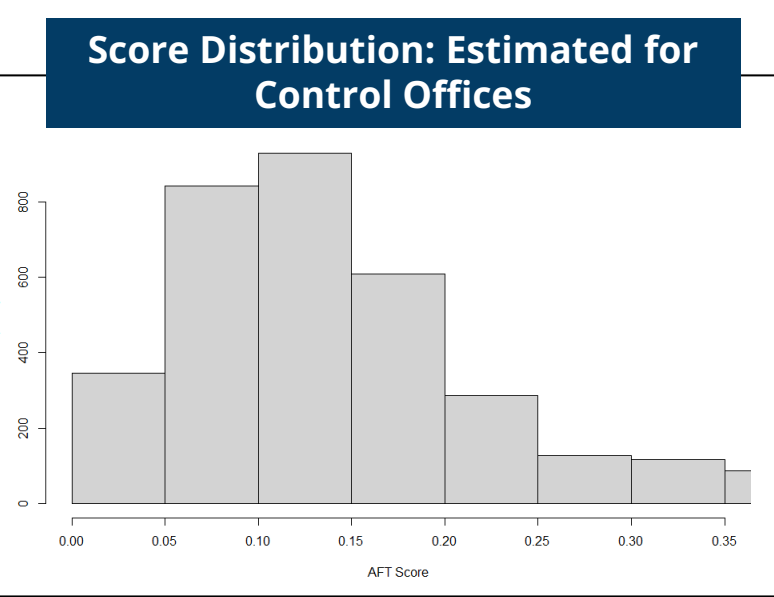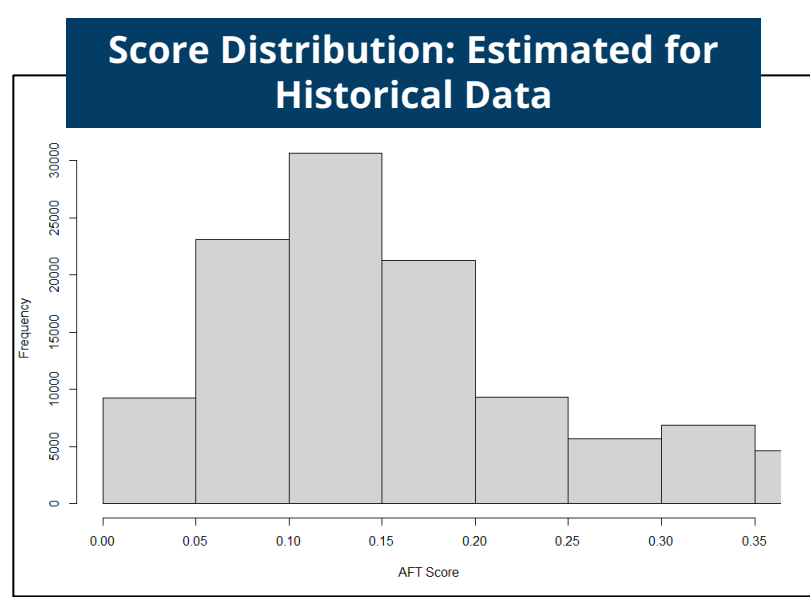
Identifying Low Default Risk

The FPAC Economic and Policy Analysis Division (EPAD), in collaboration with FLP, developed and optimized a custom loan default risk model based on over 100,000 historical loan requests. The model aimed to **optimize negative predictive value** and **select 25%** of lower-risk borrowers for expedited underwriting. This is distinct from credit scoring models that identify high-risk borrowers for the purposes of denial. The model is based on borrowers' balance sheet information and repayment history.

Predictive Model Results using Historical Data at Different Thresholds
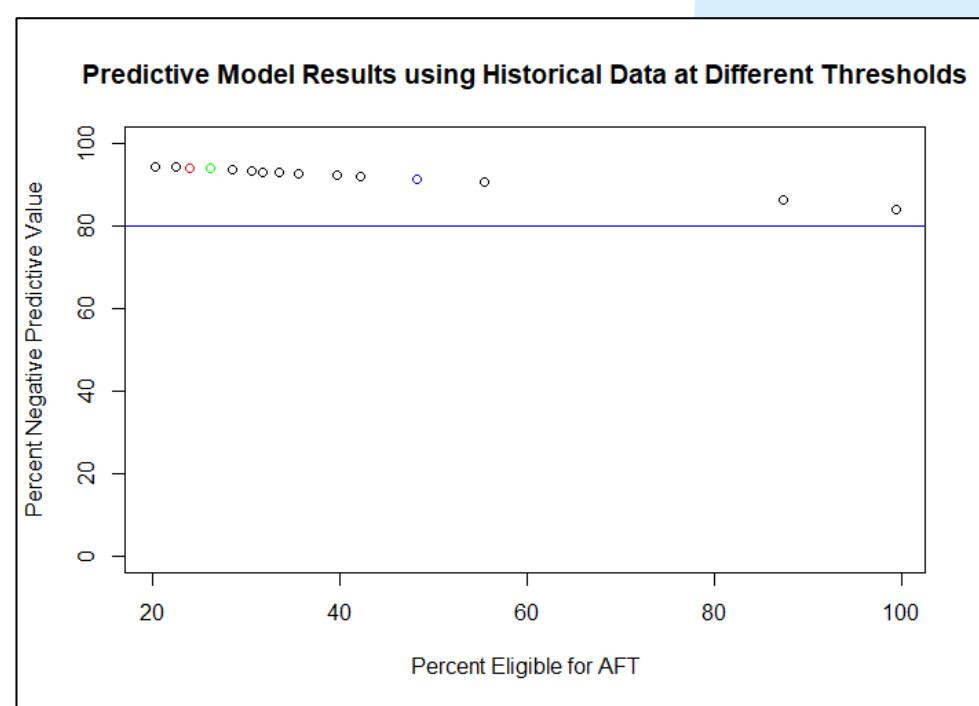
The loan default risk model was based on three layers of supervised model optimization:

1. **Variable Selection:** Variables were selected to improve model quality and for feasibility of implementation
2. **Binary Thresholds:** Variables were coded as binaries vs. continuous
3. **Prediction Cutoffs:** Cutoffs were evaluated using cross validation with 10 different slices of training/test sets

After the randomized controlled trial (RCT) pilot phase, we compared the distribution of risk scores calculated from historical data to those forecasted using borrower financial information collected during loan-making in both treatment and control offices.

Score Distribution: Estimated for Historical Data

Score Distribution: Estimated for Control Offices

Score Distribution: Estimated for Treatment Offices

Methodology

Pilot: FSA conducted a 21-week pilot study in 136 offices nationwide. Over the initial pilot period, FSA received 7,117 loan requests across all offices. In treatment offices, loan officials completed 2,144 AFT evaluations and **561 loan requests were processed under AFT.** The first, measurable outcome of interest is loan processing time, measured from receipt of a complete application to approval decision.

Chart 1. **Application Processing Times by Treatment Status and AFT Eligibility**
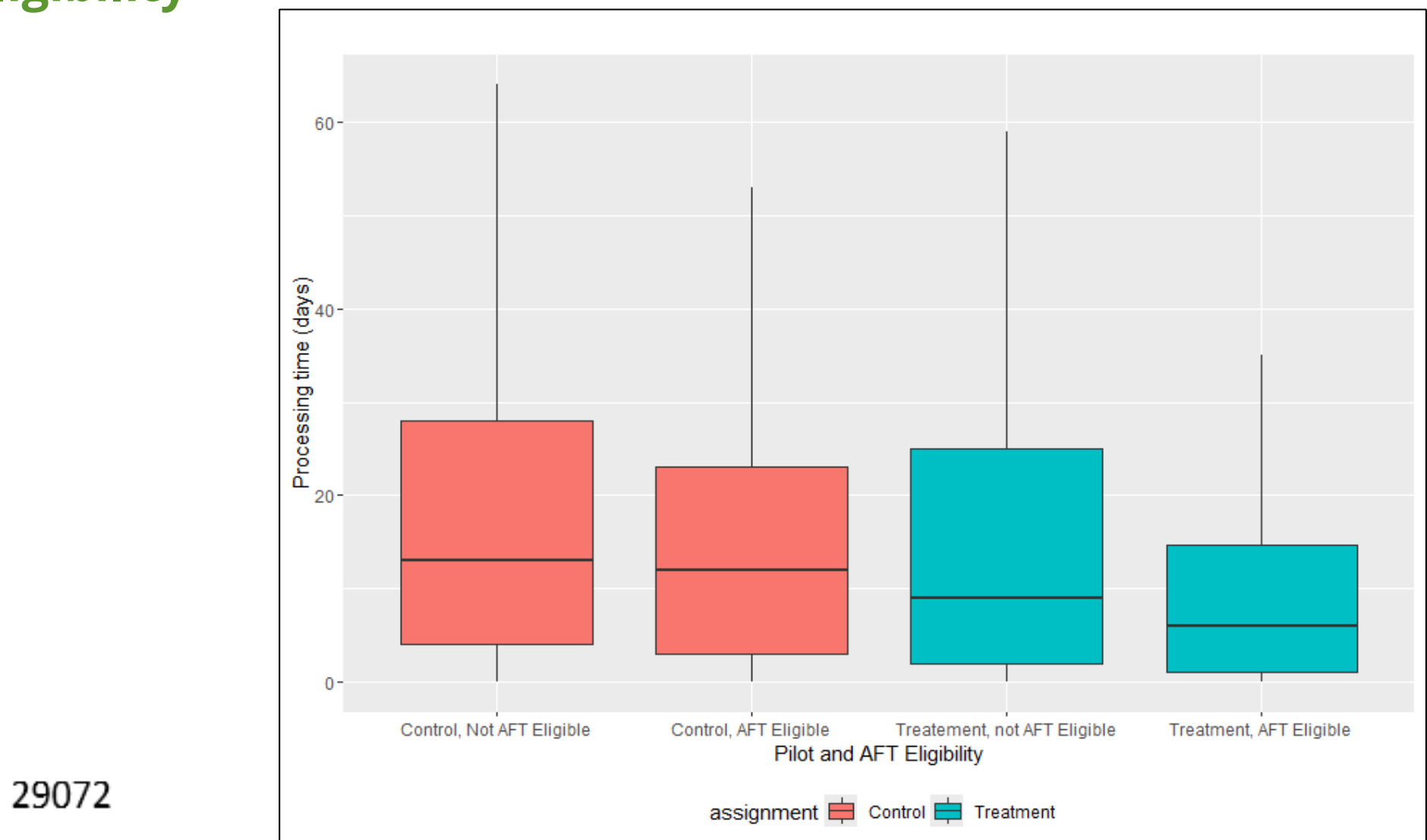
Sample Selection: Treatment offices were selected using a systematic sampling design. *Table 1* below shows balance across the 4 sorting criteria as well as other variables likely to impact processing time.

Table 1. **Office-Level Treatment-Control Balance**

	Control (n = 369)	Treatment (n = 136)
Delinquency Category[1]	3.08	+0.03 (0.09)
3-Year Historical Average Number of Loans Obligated	42.29	+3.86 (3.74)
3-Year Historical Average Obligation Value (in dollars)	125,907	+369 (5001)
3-Year Historical Average of Processing Days	15.22	-0.30 (0.76)
Beginning Farmer Applicants (as %)	68.45	-0.62 (1.89)
Farm Ownership Loan Requests (as %)	39.87	-0.17 (2.74)
Borrowers New to FSA (as %)	46.73	-1.05 (2.58)
Loan Request Amount	167,375	+541 (8377)

Robust standard errors shown in parentheses. No differences identified as statistically significant.
[1] Three-year average of a categorization of the offices' delinquency rates where 1 = no delinquency, 2 = less than 1%, 3 = 1-2%, 4 = 2-5%, and 5 = 5% or higher.

Caveats: Loan applicants who qualified for AFT had the ability to opt out and be processed under conventional methods. The number of opt-outs was small (n = 24) and these requests were included with other Treatment office requests not processed under AFT. Some loan applicants in control offices (n = 548) were not able to be scored.

Results

Table 2 below shows the results of the following linear regression models:

$$(1)\ Y_i = \alpha + \beta_1 T_i + \beta_2 A_i + \varepsilon_i$$
$$(2)\ Y_i = \alpha + \beta_1 T_i + \beta_2 Q_i + \beta_3 T_i Q_i + \gamma Z_i + \varepsilon_i$$

where T_i indicates a loan request processed in a treatment office, A_i indicates an application processed under AFT, Q_i indicates a request with a score sufficient to qualify for AFT, and Z_i represents a vector of covariates with the potential to impact loan processing time.

Table 2. **Regression Outputs for Processing Time**

	(1) Only AFT Approved Loans	(2) AFT Approved or AFT Qualified	(2) with covariates
Intercept	18.577	18.563	17.488
Treatment Office	-2.071 (1.906)	-2.056 (1.934)	-2.168 (1.909)
AFT Approved Loan	-5.373*** (1.452)		
AFT Approved or Qualified		-2.599*** (0.817)	-2.228*** (0.834)
AFT Approved or Qualified * Treatment Office		-2.774* (1.666)	-2.843* (1.643)
Loan Type: Microloan			-2.892*** (0.972)
Loan Type: Operating Loan			0.538 (0.878)
New Borrower			3.020*** (0.770)
Num. Obs.	5,305	4,757	4,757
Adjusted R[2]	0.012	0.013	0.022
Standard Errors		By Office Code	

Robust standard errors shown in parentheses.
* p < 0.10, ** p < 0.05, *** p < 0.01

Discussion

Finding: This work finds that **implementation of AFT in FSA's loan processing results in significant time savings**. Loans qualifying for AFT are processed faster on average across treatment and control offices; loans actually processed with AFT are even faster. The true reduction in hands-on staff time required to process an application may vary, as staff manage multiple loan activities.

Contributions: This effort represents **successful execution of a clustered RCT in government** and the analysis provides further insight into the common use of credit scoring models in ag lending.

Future Analysis: Further work will explore the relationship between Application Fast Track and loan **default rates** and will explore the use of **regression discontinuity methods**.