Freddie Mac
SINGLE-FAMILY

Return on Quality (ROQ)

How upstream defect prevention creates measurable operating value across the loan lifecycle.



Table of Contents

Executive Summary 3



Part I: Why Loan Quality Matters More Now 5



Part II: Digital Capabilities as the Quality Foundation 10

Part III: Return on Quality-Measurable and Scalable 13



Part IV: Best Practices for Moving from Quality Insight to Action 17

Sources and Methodology 20





Executive Summary

Loan quality is a direct lever for managing cost, capacity and execution risk.

Elevated production costs, a purchase-heavy origination mix, and more varied borrower documentation profiles give lenders less room to absorb avoidable quality issues. Defects that aren't resolved early can lead to additional borrower outreach, underwriting rework, closing disruption, delivery uncertainty, remedy exposure or added servicing costs later in the loan lifecycle.

The central issue is not only whether a defect occurs, but when it's identified. Income documentation gaps, collateral questions and unresolved delivery messages are typically easier to address when controls identify them while the file is still active and decision points remain flexible. As those issues move downstream, they touch more processes, more stakeholders and more cost categories. That timing dynamic is the foundation for upstream defect prevention and for estimating **return on quality (ROQ)**.

What is Loan Quality?

Loan quality refers to loan manufacturing outcomes, including loan defects and quality control findings. The term does not describe a loan's credit characteristics.

What is Return on Quality (ROQ)?

Return on quality is the measurable operating value lenders create by preventing or resolving loan defects before they generate downstream costs.

Key Findings



1. The cost of loan defects increases as they move further downstream.

A small issue at intake can become rework, a closing delay, a delivery exception or a servicing problem if it moves downstream.



2. Most defects are concentrated in a few categories.

Income, assets and collateral accounted for 88% of major defect findings in Q3 2025, making them the clearest areas for operational focus.



3. Greater digital adoption can reduce defects and improve efficiency.

Loans that used automated capabilities in Loan Product Advisor® (LPA®) such as automated collateral evaluation (ACE) and asset and income modeler (AIM) together had a 1.8% Non Acceptable Quality (NAQ) rate—2.5x lower than loans without representation and warranty (R&W) relief. Higher LPA digital usage is also associated with fewer defects, lower costs and shorter cycle times.



4. Preventing defects can create measurable and scalable value.

A representative 10,000-loan lender could avoid approximately $500,000 in annual cost, or about $50 per loan, with additional upside as NAQ performance improves.



Part I: Why Loan Quality Matters More Now

Loan quality is both a compliance and cost management issue.

In today's market, preventable rework is more expensive to absorb as the industry's cost base rises. Freddie Mac analysis of financial statements from retail-only independent mortgage banks shows that average retail loan production costs increased from approximately **$8,900 per loan in Q3 2020 to $12,100 in Q3 2025—a 36% increase over five years**. Labor is a significant driver: payroll expenses account for more than two-thirds of retail loan production costs and increased **32%** over the same period. As a result, defects that require additional review, borrower follow-up or exception handling place even greater pressure on lender resources and operating costs.

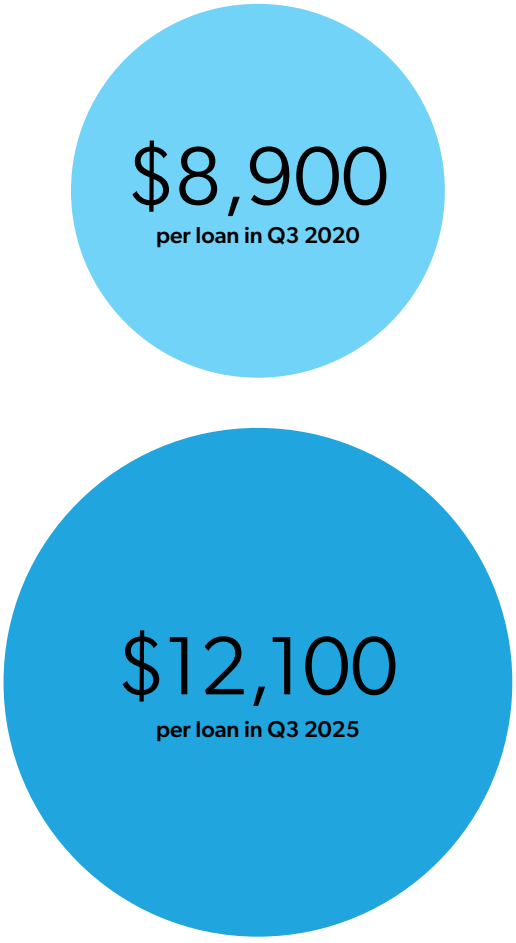
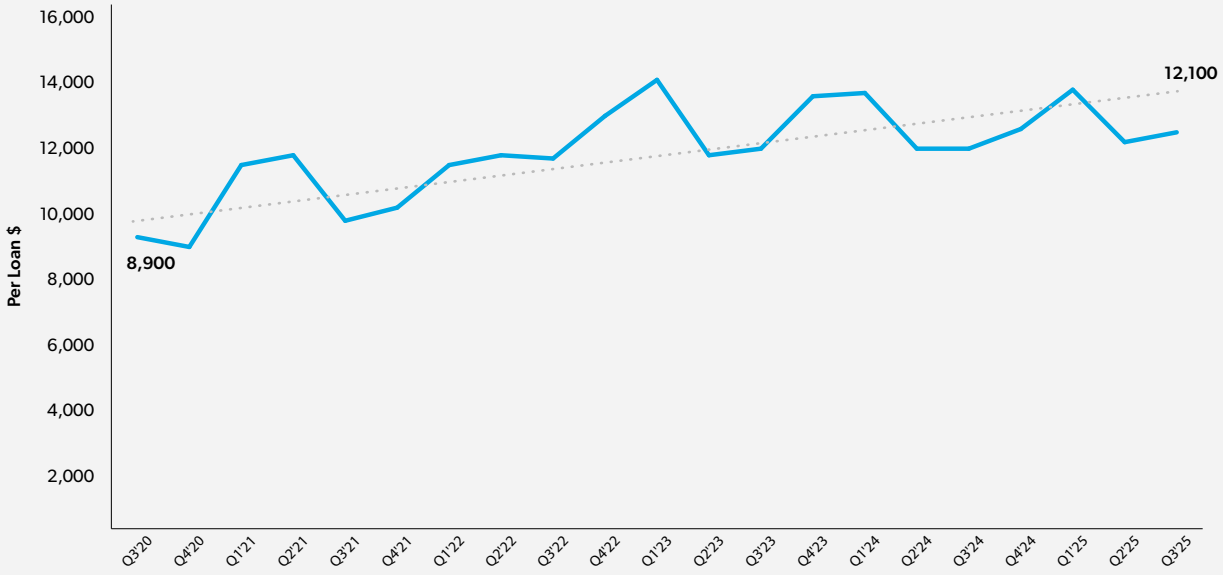


EXHIBIT 1: AVERAGE RETAIL LOAN PRODUCTION COST



Source and methodology: Freddie Mac analysis of average retail loan production cost using Quarterly Mortgage Bankers Financial Reporting Form (MBFRF/WebMB) data for a sample of retail-only independent mortgage banks.

Market mix continues to add operational pressure. Purchase mortgages have accounted for most originations for several years—66% in 2025, according to MBA[1]—and continue to bring more documentation, more stakeholders and tighter execution timelines into the production workflow on a sustained basis. Documentation complexity is likely to increase as well: Freddie Mac research shows that 49% of prospective homebuyers planning to purchase within the next five years report variable income[2]. That doesn't make them less qualified; it reinforces why clear documentation paths need to be in place early, before varied income profiles become a source of rework or delay.

Quality issues often begin before a formal quality control review. If required income documentation is not clear at intake, the file may need another borrower document request later. If asset documentation is incomplete, underwriting clearance may take longer. If the collateral doesn't meet eligibility requirements, questions that arise closer to closing or delivery may be more disruptive and could delay or prevent closing. The common thread is timing: small gaps are easier to resolve while the file is still active and decision points remain flexible. Once those gaps carry forward, they're more likely to require additional review, exception handling or delivery follow-up that can slow the closing process or put it at risk altogether.

In a higher-cost, purchase-heavy market, preventable rework isn't incidental—it's an operating cost lenders need to manage earlier.

With production costs, labor pressure and purchase complexity already elevated—and borrower documentation complexity likely to remain an important factor—the analysis turns to where earlier controls can have the greatest effect in preventing defects from compounding.

Where Defect Issues Concentrate

Freddie Mac quality control (QC) analysis shows that most major defect findings are concentrated in a few categories. Exhibit 2 shows that the largest defect categories were:

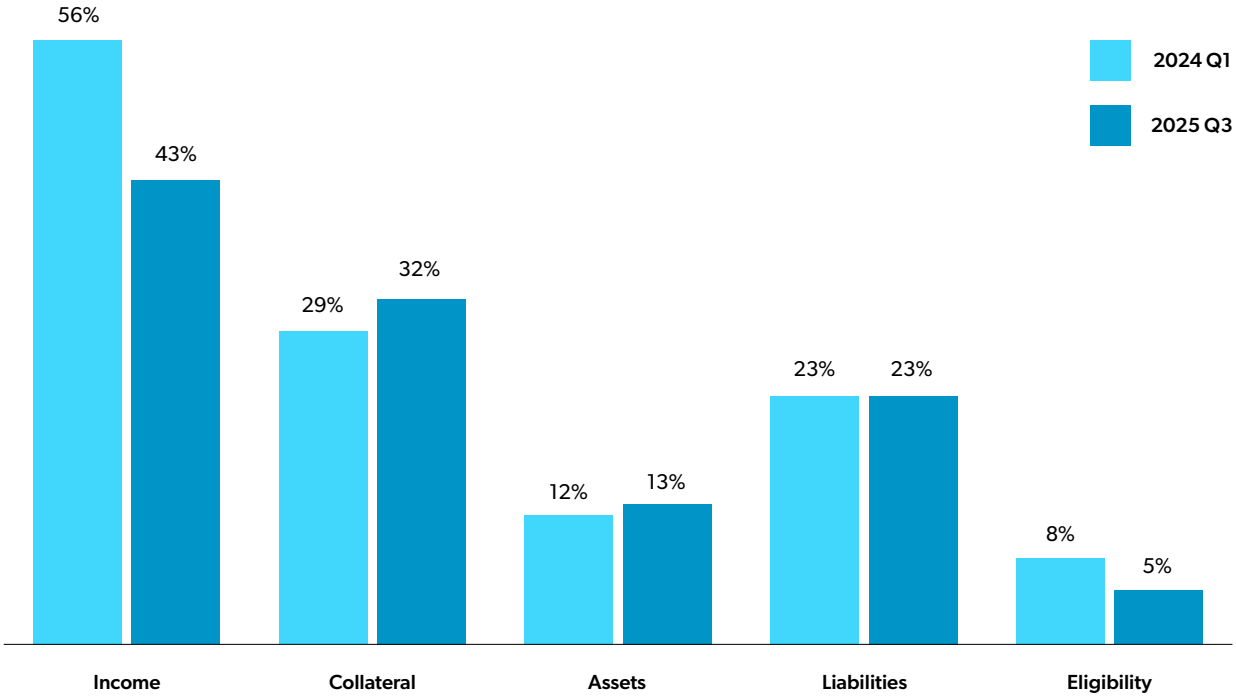
Income:
Approximately 43% of major findings in Q3 2025, down from 56% in Q1 2024, but still the largest source of defects.

Collateral:
Roughly 32% of major findings in Q3 2025, up from 29% in Q1 2024, making it a larger loan quality driver.

Liabilities and Assets:
Remained meaningful contributors to major findings in Q3 2025, with shares broadly consistent with Q1 2024, particularly when documentation is incomplete, inconsistent or resolved too late.



EXHIBIT 2: DEFECT MIX



Source and methodology: Freddie Mac QC analysis of major defect category data. The exhibit shows defect distribution by category. Percentages add up to more than 100% because a single loan may be counted in more than one defect category.

Income + Assets + Collateral =

88%

of major defect findings in Q3 2025.

Together, income, assets and collateral accounted for 88% of major defect findings in Q3 2025, making them the clearest targets for earlier quality controls. The trend also shows that quality risk isn't isolated to one checkpoint; it forms across the file when income, asset and collateral information is incomplete, inconsistent or resolved too late.

These categories matter because issues found late in the process can be especially disruptive. Income or asset gaps may require additional borrower outreach, underwriting rework or closing delays. Collateral issues can create timing challenges, delivery exceptions or added review once the loan has moved downstream. The most effective controls are those that identify and resolve common file issues before they become late-stage execution problems. These concentration patterns point to where upstream controls may have the greatest impact.

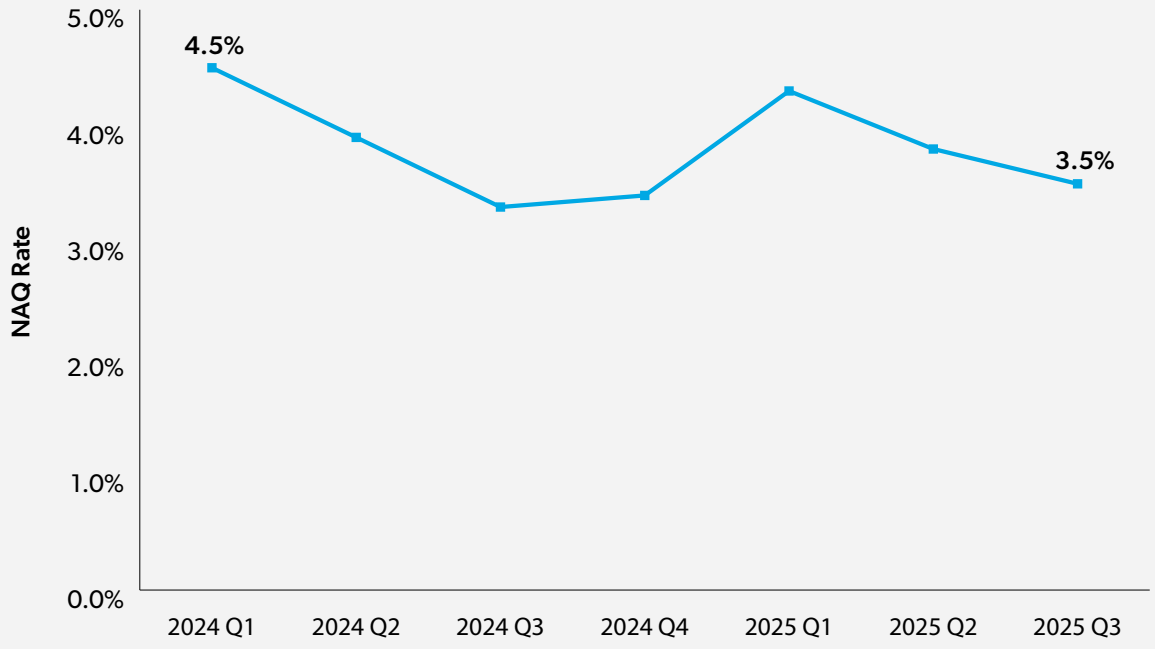
Measuring Quality Performance

To connect defect categories to overall quality performance, this analysis uses Freddie Mac's NAQ rate as a practical measure of loan quality. As shown in Exhibit 3, Freddie Mac's NAQ rate declined from 4.5% in Q1 2024 to 3.5% in Q3 2025, a 1.0 percentage-point improvement. That progress is encouraging, but it doesn't eliminate the need for earlier prevention across the loan lifecycle.

What is NAQ?

Non Acceptable Quality (NAQ) reflects the share of loans reviewed through Freddie Mac quality control that are identified as having significant quality issues.

EXHIBIT 3: NAQ RATE TREND AS A PROXY FOR LOAN QUALITY



Source and methodology: Freddie Mac QC analysis of loans reviewed through the quality control process. NAQ rate reflects loans with significant quality issues as a share of loans reviewed.

The next section examines how digital capabilities can help lenders identify and address these issues earlier in the workflow.



Part II: Digital Capabilities as the Quality Foundation

The greatest value of automated assessments comes from identifying potential issues early in the loan lifecycle.

When lenders use digital tools as upstream quality control inputs, they're better positioned to identify income, collateral, eligibility and delivery issues before they become late-stage issues. These tools help reduce defects, shorten cycle times and improve execution through closing and delivery[3].

Freddie Mac technology supports loan quality throughout the loan lifecycle, from origination decisioning and verification to collateral assessment to pre-delivery review and post-close feedback.

Loan Product Advisor® (LPA®)—our automated underwriting system—helps lenders identify underwriting, documentation, collateral and delivery risks earlier, giving teams more time to resolve issues before closing or delivery. Key digital capabilities include:

- **Asset and income modeler (AIM):** Automated assets, income and employment verification using verified third-party data.
- **Automated collateral evaluation (ACE) and ACE+ PDR (ACE plus property data report):** Automated appraisal waiver eligibility and property data report (PDR) review[4].

Condo Project Advisor®: Receive feedback about a condo project's compliance with project review requirements and easily request unit-level exceptions for otherwise ineligible condo projects.

Loan Collateral Advisor®: Leverage data sent to the Uniform Collateral Data Portal to analyze appraisal reports and get a clear view of their valuation risk.

Loan Quality Advisor®: Our risk and eligibility assessment tool helps bring upstream quality control into pre-delivery review by identifying salability, data and documentation issues before they become delivery or suspense items.

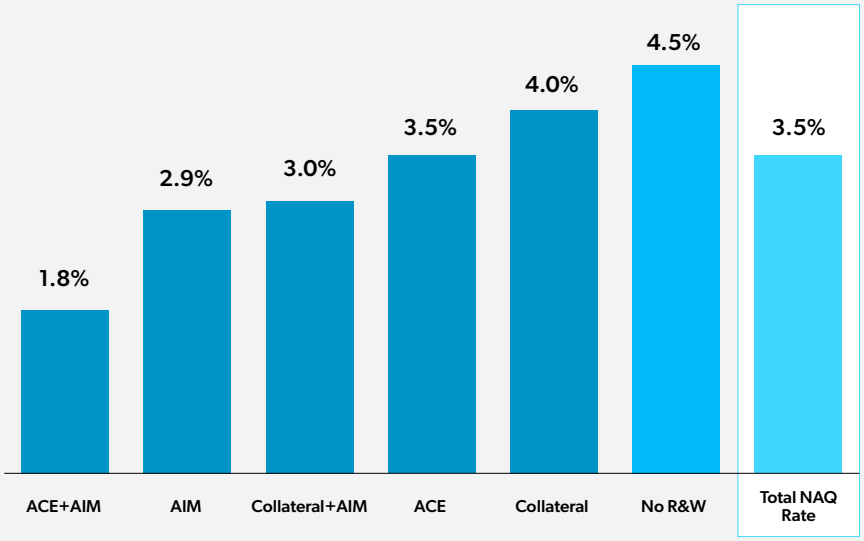
Exhibit 4 shows that loans using both ACE and AIM had the lowest NAQ rate, at 1.8%, compared with 4.5% for loans without R&W relief, making them 2.5x less likely to produce a major defect. AIM-only loans showed the next strongest quality association, with a 2.9% NAQ rate, or roughly 1.6x lower than loans without R&W relief. ACE-only loans also performed better than loans without R&W relief, with a 3.5% rate, or about 1.3x lower. These results suggest that digital capabilities have the greatest quality impact when income, asset and collateral validation are used together in the workflow.

Digital validation delivers the most value when income, asset and collateral controls are used together in the workflow.

2.5x less likely ↘

to produce a major defect when using ACE and AIM

EXHIBIT 4: NAQ RATE BY DIGITAL CAPABILITY AND R&W RELIEF PATH



AIM: Automates borrower assets and income

ACE: Automates appraisal waiver eligibility

Collateral: Automates R&W relief eligibility (Includes ACE and ACE+ PDR)

Source and methodology: Freddie Mac QC analysis of loans reviewed through the quality control process in Q3 2025. NAQ (Defect) rates (used interchangeably) are shown by digital capability and representation and warranty (R&W) relief path. Categories reflect digital offering usage and applicable R&W relief. Results aren't controlled for borrower or loan characteristics, such as LTV, FICO®, DTI, loan purpose, occupancy or documentation type. These results should be interpreted as directional associations, not causal estimates of tool impact.

The quality benefits associated with digital adoption also raise an important operating question: Do they translate into broader performance gains?

Lender outcomes using LPA digital capabilities at high rates:

45% ↘
Lower Defect Rate

8-day ↘
Shorter Cycle Time

$1,700 ↘
Lower Loan Production Cost

LPA Digital Adoption and Lender Operating Performance

Technology creates value when it's embedded in daily workflow and used consistently on eligible loans. Freddie Mac analysis shows that stronger digital adoption is associated with better operating outcomes across loan quality, cycle time and production cost[5]. Exhibit 5 shows that lenders with higher use of LPA digital capabilities had a 45% lower NAQ rate and an 8-day shorter cycle time than lower-usage lenders. In addition, our most recent cost to originate study found that higher-use lenders had production costs that were $1,700 lower per loan[6].

EXHIBIT 5: AVERAGE LENDER OPERATING OUTCOMES BY LPA DIGITAL USE

	High Digital Use	Low Digital Use	Improvement for High Digital Use
Cycle Time	37 days	45 days	8 days shorter
NAQ Rate	2%	4%	45% lower

Source and methodology: Freddie Mac analysis of a Q3 2025 sample of approved lenders using Freddie Mac technology offerings, LPA and Loan Coverage Advisor® data. NAQ uses a loan-count-weighted defect rate, with a loan-count size filter of ≥8 applied where applicable to reduce volatility from very small lenders. High digital use refers to lenders leveraging LPA digital offerings for at least 75% of all volume sold to Freddie Mac in the applicable period; low usage refers to lenders below 60%. Results are directional and may reflect differences in lender size, channel mix, loan composition, technology maturity and operating discipline; they should not be interpreted as causal estimates of tool impact.

The operating implications extend beyond the back office. In a purchase-driven market, fewer late-stage surprises and repeat document requests can help lenders protect the borrower experience while giving real estate agents, builders and investors more confidence in execution.

The impact may also extend beyond closing. If stronger controls reduce defects earlier in the process, they may support cleaner loan performance after origination. Freddie Mac portfolio analysis shows that loans using LPA digital offerings, including AIM and ACE, perform as well as, if not better than, comparable eligible loans that didn't use those offerings. That finding is consistent with prior Freddie Mac research on ACE and credit risk performance[7].

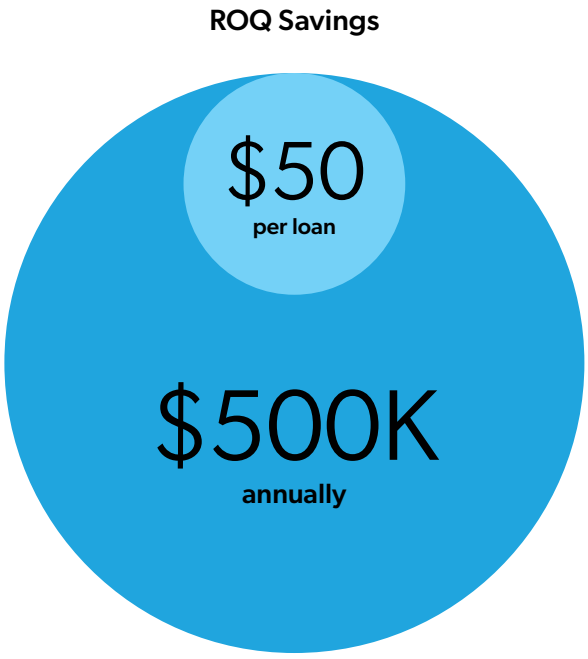
The economic question follows naturally: If earlier controls can reduce defects, improve execution and support comparable or stronger loan performance, how much value can lenders create by preventing defects before they move downstream?



Part III: Return on Quality-Measurable and Scalable

Loan quality has a measurable return: every defect prevented upstream is a downstream cost avoided.

We estimate that, for a representative lender originating 10,000 loans annually, the baseline ROQ benchmark is approximately $500,000 annually, or $50 per loan. That value reflects costs lenders may avoid when defects are resolved before they require post-close review, delivery remediation, repurchase alternatives or additional servicing activity. When those costs are reduced, the benefit can extend beyond expense control to stronger net income, better operating leverage and higher operational returns.





How Defect Prevention Creates ROQ

The ROQ analysis is built around four loan workflow events where unresolved quality issues commonly become measurable lender expenses. Each has measurable exposure and a practical lever for prevention:

1. Reverification

Post-close QC reviews can cost up to $800 per reviewed loan when borrower and loan information must be independently reverified. When loans receive eligible income, asset, employment or collateral relief, lenders may be able to reduce post-close review work.

2. Defect resolution

Each defect identified through an agency QC process may cost $500 or more to resolve, depending on complexity. Preventing defects upstream reduces handoffs and follow-ups.

3. Repurchase exposure

When a significant defect is not resolved earlier and reaches the remedy stage, it can create an estimated $17,500 traditional repurchase loss on a performing loan. Freddie Mac's Performing Loan Repurchase Alternative Pilot program can meaningfully reduce traditional repurchase cost for eligible loans[8].

4. Servicing performance

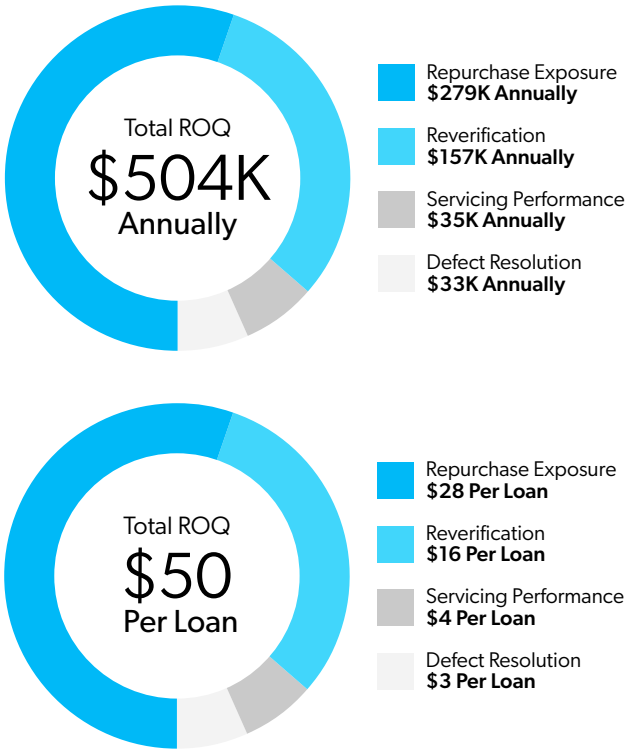
For lenders that retain servicing, a non-performing loan can cost an estimated $1,400 more per year to service than a performing loan[9]. Cleaner upfront validation may reduce the likelihood that documentation or quality issues contribute to downstream servicing burden.

Not every cost layer applies to every loan. Some defects may be resolved through documentation cleanup, while others may continue into delivery, remedy or servicing. The value of the framework is that it connects decisions made early in origination to costs that may not appear until much later.

ROQ for a Representative Lender

Exhibit 6 breaks the estimate into four cost layers. For a representative lender originating 10,000 loans annually—approximately $3.5 billion in unpaid principal balance, with a weighted NAQ rate of 3.5%—the model estimates $504,000 in annual benefit, or about $50 per closed loan. The purpose is not to create a universal lender benchmark, but to show the order of magnitude of avoided cost when quality controls prevent defects from moving downstream.

EXHIBIT 6: FROM COST EXPOSURE TO ROQ



Source and methodology: Freddie Mac ROQ analysis. Baseline estimate reflects a representative lender originating 10,000 loans annually, an assumed $350K average unpaid principal balance and a weighted NAQ rate of 3.5%. Results are directional and illustrative; lenders should recalibrate assumptions using lender-specific volume, defect rate, cost, remedy and servicing data. Components may not sum to totals due to rounding. The framework excludes benefits and costs that are harder to quantify, including borrower experience, cycle-time capacity, staff experience and technology investment costs.

For a representative 10,000-loan lender, upstream defect prevention represents about $500K in annual ROQ—with upside as NAQ performance improves.

Repurchase exposure is the largest component in Exhibit 6. Freddie Mac's Performing Loan Repurchase Alternative Pilot program can reduce the severity of traditional repurchase cost for eligible performing loans while preserving lender accountability for loan quality. That distinction matters because remedy stage defects can create disproportionate cost once quality issues move downstream.

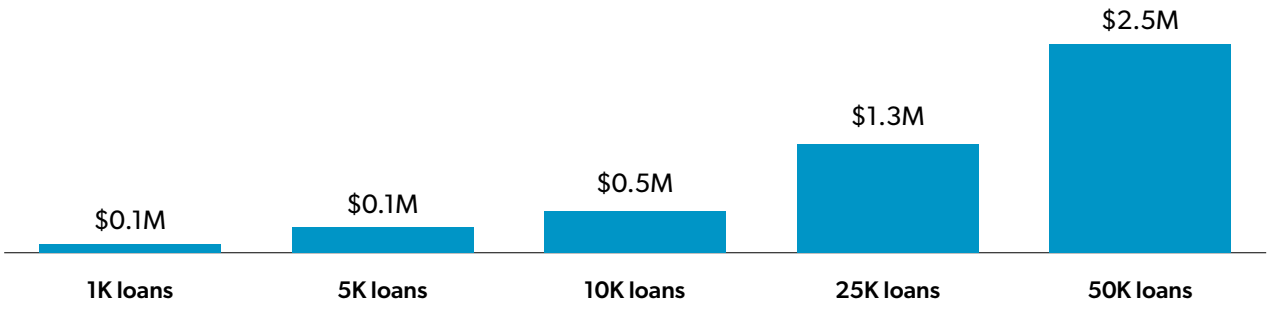
This estimate should be read as a sizing framework, not a discounted cash flow projection or proof that one tool caused a specific dollar outcome. Lenders can use it as a starting point, then recalibrate the assumptions with their own defect rates, review costs, production volume, servicing strategy and remedy experience.



How ROQ Scales

Because ROQ is expressed on a per-loan basis, the framework can be scaled by annual production for illustrative planning purposes. Exhibit 7 illustrates that, at approximately $50 per loan, annual ROQ increases from roughly $500,000 for a 10,000-loan lender to approximately $2.5 million for a 50,000-loan lender.

EXHIBIT 7: ROQ BY INSTITUTION SIZE

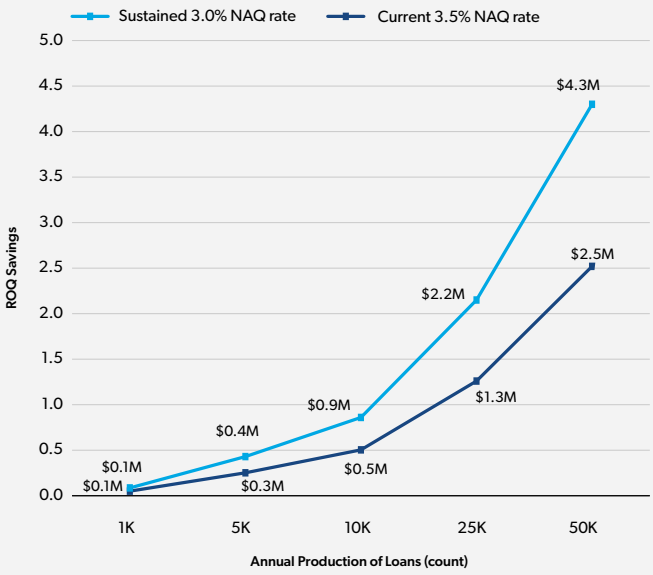


Source and methodology: Freddie Mac ROQ analysis. Institution-size scenarios scale the Exhibit 6 baseline benchmark linearly by annual volume using an assumed $350K average unpaid principal balance and the same baseline ROQ assumptions. Results are directional and illustrative; lenders should recalibrate assumptions using lender-specific volume, defect rate, cost, remedy and servicing data.

ROQ Sensitivity to NAQ Improvement

ROQ can increase meaningfully as loan quality improves. Reducing the NAQ rate from 3.5% to a sustained 3% could increase illustrative annual ROQ by roughly 70%—from approximately $500,000 to $900,000 for a lender originating 10,000 loans and from $2.5 million to $4.3 million for one originating 50,000 loans a year. The value grows as production scales, increasing the total impact of sustained quality improvement.

EXHIBIT 8: ROQ SENSITIVITY TO NAQ RATE IMPROVEMENT



The sensitivity analysis shows that ROQ is not a fixed benchmark.

As NAQ performance improves, lenders may generate a higher return from the same production volume by avoiding more downstream costs.

Source and methodology: Freddie Mac ROQ analysis. Each scenario assumes fixed cost inputs for the applicable loan-level events, sustained NAQ performance across a full origination cycle, and proportional changes across all four ROQ components as the NAQ rate improves. Results are directional and illustrative; lenders should recalibrate the assumptions using lender-specific production volume, defect rates, costs, remedy experience and servicing data.



Part IV: Best Practices for Moving from Quality Insight to Action

Loan quality has a measurable return: every defect prevented upstream is a downstream cost avoided.

The practical path to better loan manufacturing outcomes is to turn quality findings into repeatable operating practices. The preceding sections show that defects become more costly when found late and are concentrated in categories—income, assets and collateral—where consistent use of digital capabilities can help reduce quality risk. For lenders, the opportunity is to apply those lessons through focused quality practices that prevent common issues from becoming downstream costs.



Best Practice	Why It Matters	Practical Actions
Prioritize the highest impact defect categories	Defects tend to concentrate in income, collateral, liabilities, and assets.	• Focus automated controls on income, collateral, liabilities and assets. • Escalate complex income, asset, collateral or high debt-to-income (DTI) files earlier in the process.
Use LPA digital capabilities as part of the workflow	Digital value depends on consistent workflow use, not tool availability alone.	• Use LPA digital capabilities (AIM, ACE, ACE+ PDR, and collateral R&W relief) consistently on eligible loans. • Use Loan Quality Advisor before delivery and resolve salability, data or documentation issues. • Use the reports in ECO®, Freddie Mac's business data and analytics tool, to assess digital tool use.
Connect quality performance to operating outcomes	ROQ becomes measurable when lenders connect defect prevention to avoid downstream cost.	• Monitor NAQ alongside adoption, cycle time and rework. • Track defect timing to confirm whether issues are moving from post-close discovery to pre-close resolution.
Build a continuous quality feedback loop	Sustained quality improvement depends on turning recurring findings into ongoing workflow, training and control updates.	• Review recurring findings across production teams. • Update training, checklists and escalation standards. • Compare outcomes before and after process changes.

Together, these practices translate this paper's findings into a practical operating agenda that lenders can adapt to their loan mix, workflows and quality goals.

Bringing Loan Quality Forward

The opportunity ahead is to make loan quality a measurable source of operating value—not in theory, but in how lenders plan, execute and measure performance across the loan lifecycle.





This analysis shows that opportunity is real and quantifiable. The question is whether it remains latent or becomes embedded in operations.

The answer will likely come down to operating discipline. When defect prevention is embedded in daily workflow—using digital capabilities consistently, connecting post-close findings to pre-close controls and tracking quality alongside cost and cycle time—lenders are better positioned to turn avoided cost into sustained margin improvement.

The environment reinforces this shift. As borrower documentation grows more varied and purchase transactions remain the dominant mix, the complexity that drives quality risk is unlikely to recede. Lenders that build upstream controls now aren't just solving today's cost problem—they're building resilience against a market that will continue to demand more from origination execution.

The $50-per-loan benchmark is a starting point, not a ceiling. As digital adoption deepens, NAQ performance improves and feedback loops mature, the ROQ opportunity can grow. The framework, tools and data provide lenders with a practical foundation for making loan quality a measurable and sustained source of operating strength.

Sources and Methodology

This analysis draws on Freddie Mac research, Freddie Mac QC reporting, MBFRF/WebMB production-cost data, LPA and Loan Coverage Advisor usage data, and directional ROQ framework estimates. The ROQ benchmark evaluates four areas of potential avoided cost: reverification savings, defect-resolution cost avoidance, remedy exposure reduction and servicing-cost impact. The baseline estimate reflects a representative lender originating 10,000 loans annually, an assumed average unpaid principal balance of $350K, and a weighted NAQ rate of 3.5%. The assumptions are directional and illustrative rather than lender-specific. Actual results will vary based on loan mix, technology adoption, defect severity, remedy path, servicing-retention strategy, operating model and internal cost structure. The framework excludes benefits and costs that are harder to quantify, including borrower experience, referral-partner confidence, cycle-time capacity, staff experience and technology investment costs.

Data and Tools Referenced

Quarterly Mortgage Bankers Financial Reporting Form (MBFRF/WebMB). The underlying cost and production data are derived from the Quarterly Mortgage Bankers Financial Reporting WebMB Form, through a joint agreement with the Mortgage Bankers Association, Freddie Mac, Fannie Mae and Ginnie Mae. Independent mortgage companies submit quarterly MBFRF data to the agencies and may release their data for use in aggregate industry statistics.

Loan Product Advisor® (LPA®). Freddie Mac's automated underwriting system. It provides access to Freddie Mac credit requirements and helps lenders assess overall underwriting risk, documentation requirements and eligibility.

Loan Coverage Advisor®. Freddie Mac's tool for calculating and tracking the selling representation and warranty (R&W) relief date for loans sold to Freddie Mac, based on the requirements of the representation and warranty framework.

Loan Quality Advisor®. Freddie Mac's tool for providing eligibility requirements and a view of credit risk on non-LPA loans to see if they are eligible for sale to Freddie Mac.

[1] Mortgage Bankers Association. Mortgage Finance Forecast. July 2026. Purchase share of total originations, 2025.

[2] Freddie Mac. 2026 Freddie Mac Omnibus Survey, cited in Freddie Mac Single-Family research on first-time homebuyer income profiles.

[3] Freddie Mac Single-Family. "Reducing Risk and Costs While Advancing Efficiency." May 18, 2026.

[4] Freddie Mac. "Freddie Mac Announces Automation of Key Underwriting Enhancements." May 2025.

[5] Freddie Mac Single-Family. "Digital Innovation Drives Loan Quality." February 2023.

[6] Freddie Mac Single-Family. "2025 Updates to the Cost to Originate Study." November 2025.

[7] Freddie Mac Capital Markets. "ACE-ing the Credit Risk Test." June 2024.

[8] Freddie Mac Single-Family. "Performing Loan Repurchase Alternative Pilot Expansion." April 2025. In response to industry feedback, Freddie Mac piloted the Performing Loan Repurchase Alternative in 2024 to provide eligible sellers with an alternative to traditional repurchase for most performing loans with significant defects. The approach is now available to all Freddie Mac sellers and replaces many eligible performing-loan repurchases with a fee-based structure tied to the lender's Non Acceptable Quality (NAQ) rate, preserving quality incentives while reducing potential liquidity strain, operational burden and loan-by-loan repurchase exposure. Together with enhancements to Freddie Mac's loan-level remedy path, the pilot provides lenders with more control throughout the remedy process. Approximately 540 lenders are currently participating in the pilot, have collectively avoided millions of dollars in performing-loan repurchases and, in many cases, are seeing a consistent reduction in their NAQ rates.

[9] Mortgage Bankers Association servicing operations cost benchmark used to estimate the incremental cost of servicing a 90+ day delinquent loan.

Prepared by the Single-Family Market Insights Group:

Yana Davidovich, Director of Market Research and Insights

Tendo Nassozi, Data Analytics Senior

Research authors would like to thank the following contributors: Alexandra Chambers, Tanya DeLia, Jaya Dey, Jodi Eberhardt, Kevin Kauffman, Allison Koehler, Mayur Maniar, Tony Ma, Daniel Minthorne, Lauren Myers, Mike Orlov, Jeff Smith, Yi Song, Nick Tague, Cindy Waldron, Chad Wandler, Brian Wright, Cece Xiong, Kelly Zacchini