US Banks Loan Applications – 5 Year HMDA Analysis

Based on HMDA (Home Mortgage Disclosure Act) data – New York sample

Prepared by Ishita Arora

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Data Source & Methodology

Dataset Overview

- **Source:** HMDA loan application data (2018–2022)
- **Volume:** ~2 million applications from New York
- **Coverage:** 1,633 unique applicants across financial institutions

Technical Architecture

- Star schema with fact table + dimensional models
- Power Query for data cleaning & transformation
- DAX measures for comprehensive KPI calculations

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Data Processing Challenges

Performance Issues

Dataset size created 30+ minute refresh times, requiring optimization strategies and selective column inclusion to maintain dashboard responsiveness.

Data Quality Concerns

Raw HMDA data contained missing entries, inconsistent coding, and fragmented denial reasons requiring extensive harmonization efforts.

Schema Limitations

Applicant data complexity prevented full integration into star schema, requiring standalone modeling approach for demographic analysis.

Executive Summary: Key Performance Indicators

2M	68%	1M	1,633
Total Applications	Approval Rate	Loans Funded	Unique Applicants
Loan applications processed across five-year analysis period	Successfully approved and funded mortgage applications	Mortgage loans successfully originated and disbursed to borrowers	Individual borrowers represented in New York dataset

The analysis reveals strong loan conversion efficiency with the majority of approved applications resulting in successful funding across the study period.

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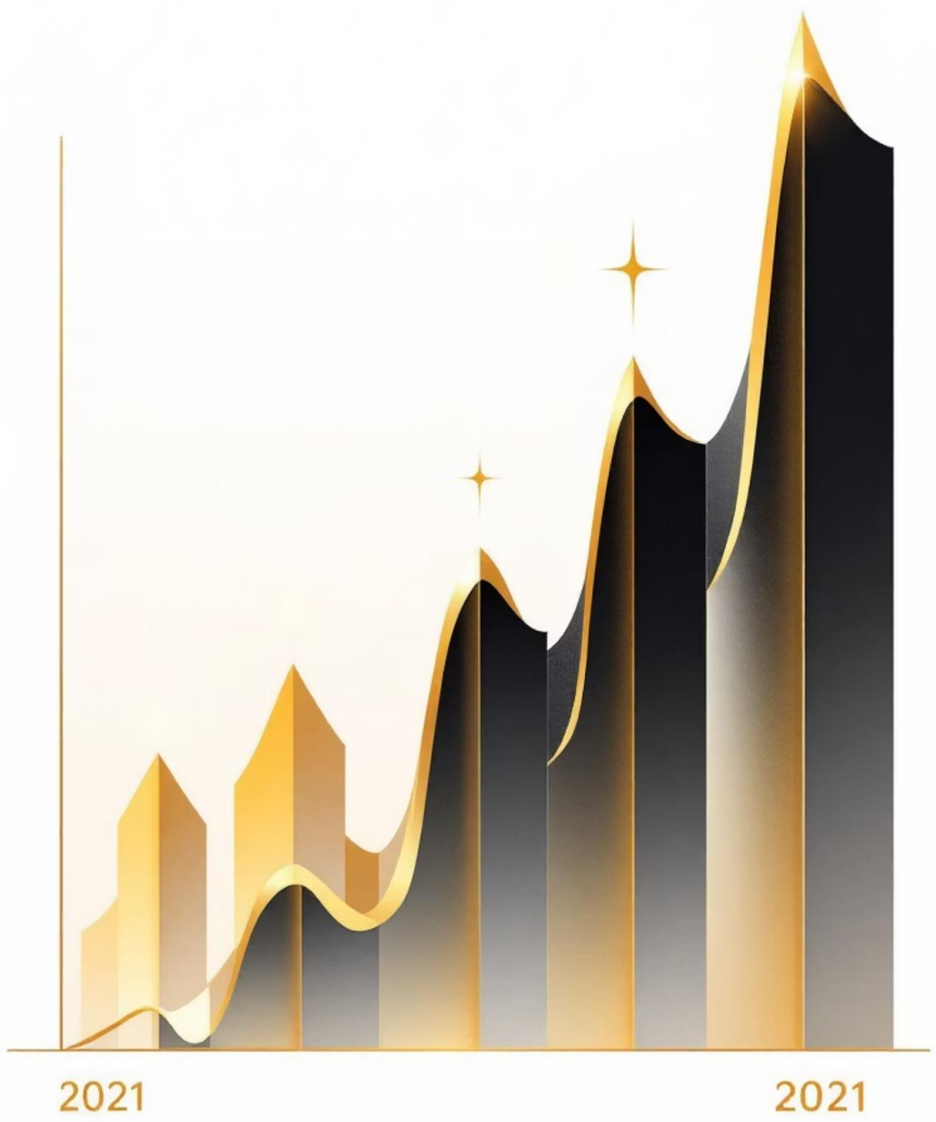

Mortgage Application Trends: 2018-2022

1

2018-2019

Baseline application levels with steady, consistent mortgage demand across traditional lending channels.

2

2020-2021 Peak

Dramatic surge driven by historically low interest rates and pandemic-related financial uncertainty, creating unprecedented demand.

3

2022 Stabilization

Market correction with applications returning to normalized levels as rates increased and economic conditions stabilized.

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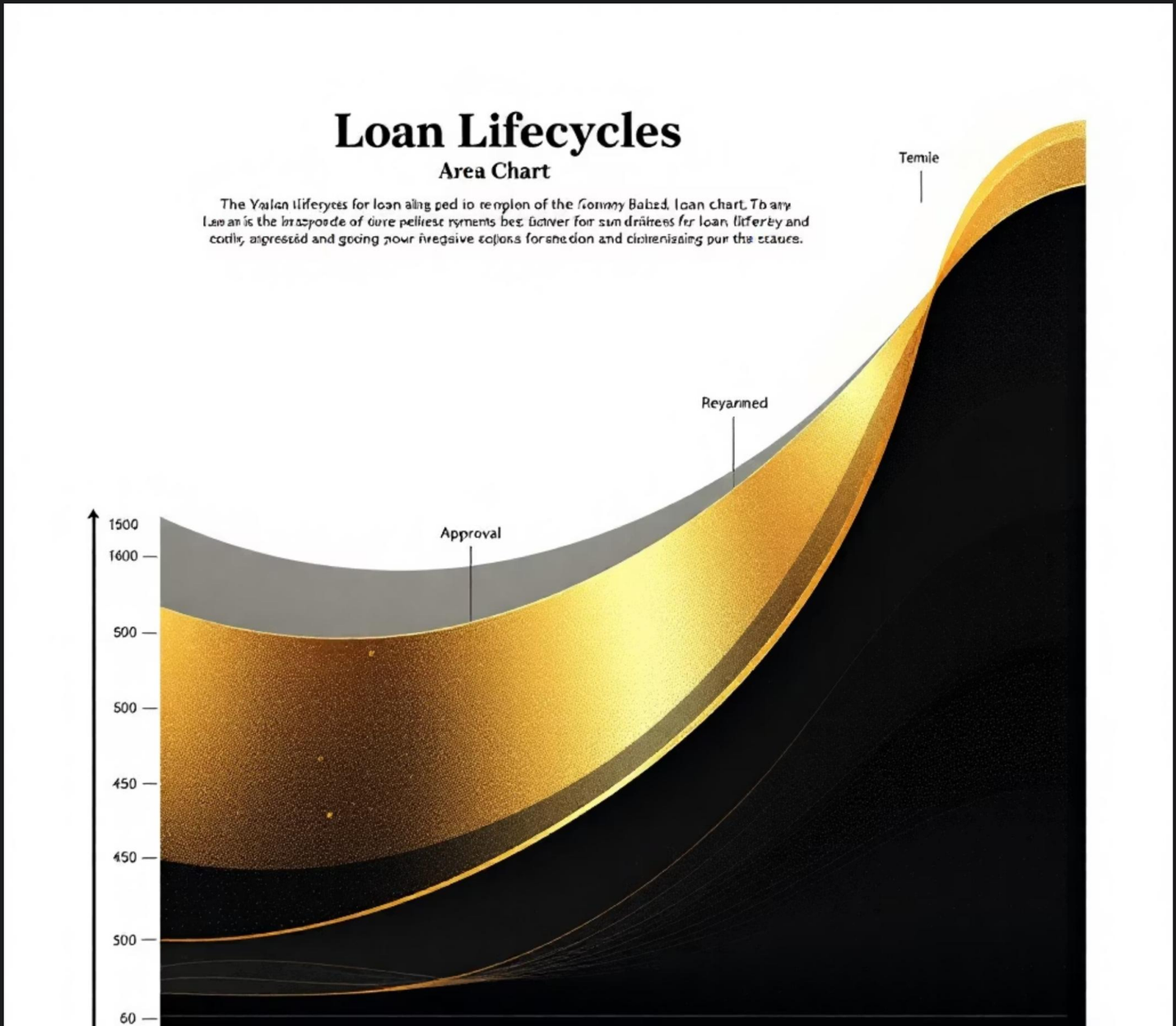
Loan Lifecycle Analysis



Key Insights

- Originated loans represented the majority during peak demand
- Approvals not funded remained consistently low (~5%)
- Denial and withdrawal rates stabilized around one-third of total activity
- Strong conversion efficiency from approval to funding

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Borrower Demographics: Age Distribution Insights

20s: Entry Level

Fewest applications due to limited income, credit history, and down payment capacity in early career stages.

40s-50s: Peak Demand

Highest application volume driven by established careers, family responsibilities, and optimal home ownership timing.

60s+: Declining Activity

Reduced applications reflecting retirement income constraints and completed housing transitions in later life stages.

This demographic pattern aligns perfectly with typical life cycle financial needs and mortgage market expectations.

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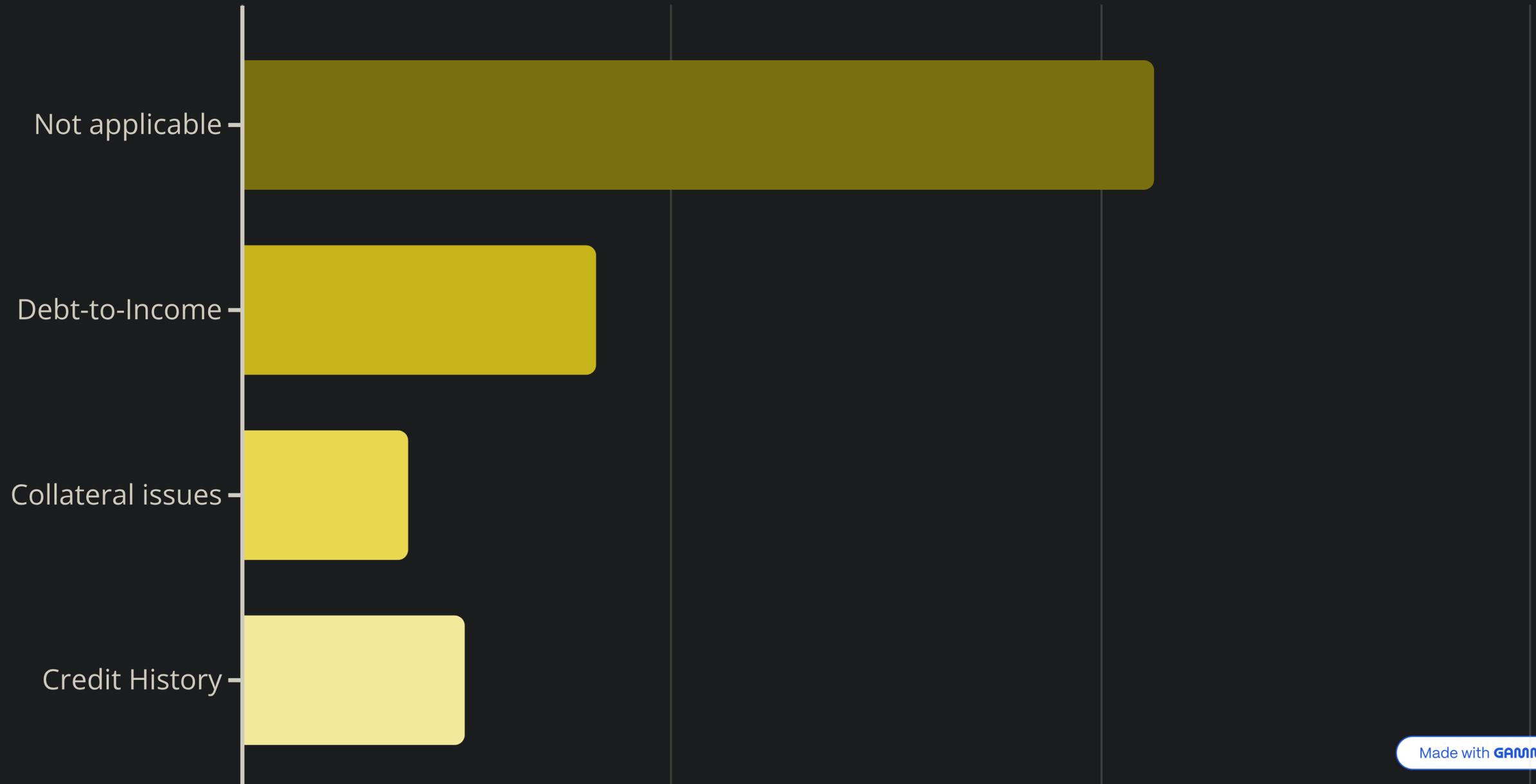
Denial Analysis: Primary Risk Factors



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Loan Purpose Analysis

Home Purchase

Dominated applications during stable periods, representing primary market activity for first-time and move-up buyers seeking housing stability.

Refinancing

Surged dramatically during 2020-2021 low interest environment, as existing homeowners capitalized on rate opportunities.

Home Improvement

Steady minority share, typically driven by property value enhancement and renovation financing needs.

The strong correlation between loan purpose and demographic life stages validates our age-based application patterns and market timing insights.

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Strategic Recommendations & Future Enhancements

Immediate Opportunities

- Geographic expansion: Scale analysis across all US states for national insights
- Applicant integration: Full demographic modeling within star schema
- Interactive mapping: Drill-through capabilities for regional analysis

Key Findings

- 68% approval rate demonstrates healthy lending standards
- Credit and DTI remain primary risk factors
- Life cycle patterns drive application timing

This New York analysis establishes a strong foundation for national mortgage market intelligence, providing

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