

# Consumer Federation of America Residual Income Model Deliverable

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Leading the Nation in Consumer Financial Health

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# Project Context & Approach

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# Project Context

## Purpose

Given the expected review of the Qualified Mortgage rule by the CFPB, the Consumer Federation of America has commissioned this research to explore the development of a residual income model that might be used in mortgage underwriting, in conjunction with other tests, to assess ability to repay in a standardized way that balances the desire to expand mortgage credit with the desire to do so in a way that is beneficial for both borrowers and lenders.

## Objectives

- Understand existing residual income models and use of residual income modeling by practitioners
- Develop a theoretical model for calculating residual income and obtain feedback from stakeholders
- Outline findings and next steps to continue to fully vet and hone the proposed model

# Approach

## PHASE 1: Information-Gathering (literature review and interviews)

- *What residual income models already exist?*
- *What do we know about them and their efficacy?*
- *Which lenders are currently doing some cash flow modeling during underwriting?*
- *What data is generally captured by and available to financial institutions during the underwriting process?*
- *What data is fed into the Fannie/Freddie automated decisioning models? (Is it sufficient to gauge residual income?)*

## PHASE 2: Develop a theoretical model for calculating residual income

- *Outline model assumptions.*
- *Detail which model inputs financial institutions are likely to have (from customers), given the underwriting research.*
- *Review availability of data sources to power assumptions necessary for the model (for example: those related to living expenses and thresholds for approval/rejection).*

## PHASE 3: Obtain feedback about and hone the model

- *Understand responses and concerns about the model; explore what would be necessary to further test it; and begin laying the groundwork for potential partnerships for testing the model.*
- *Work with CFA to identify the right set of interview targets to cover key stakeholder groups.*

FINAL REPORT: document the decisions that pertain to the model, the learnings from industry interviews, and suggested next steps to test the model with provider data.

# Primary & Secondary Research Summary

## Phase 1: information-gathering

- Literature review
- 19 interviews conducted
- Email exchanges with 5 additional contacts
- Breakdown of organizations interviewed or emailed with (uniques):
  - Provider or industry association: 10
  - Academic or research institute: 6
  - Government, including GSEs: 5
  - Consumer advocate: 1

## Phase 3: proposal feedback

- 10 interviews conducted
- Email exchanges with 2 additional contacts
- Breakdown of organizations interviewed or emailed with (uniques):
  - Provider or industry association: 6
  - Academic or research institute: 1
  - Government, including GSEs: 1
  - Consumer advocate, including counseling: 3

*Additionally, three data providers were interviewed to better understand existing and future technology capabilities.*

*See Appendix for the full list of organizations.*

# About Residual Income

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# Current State of Residual Income (or Cash Flow) Modeling

## Process is largely manual

- Some components can be (and are) automatically pulled or validated from pay stubs or tax forms, but much of the data input and validation are still manual.
- Fintech players (like Petal and Finicity) are employing technology to change this and facilitate greater automation, but the technology and practices are very new with a long way to go to achieve widespread adoption. (For example, even a large marketplace lender confirmed that they do not currently have technology to ingest bank account data and automatically model cash flow from it.)

## Lender attitudes are mixed

- Some believe residual income modeling is too complex, manual, and error-prone to be scaled beyond VA lending. They also doubt that the test will add material value from an access or default rate perspective.
- Others have business models wherein manual underwriting (including residual income modeling) is a standard part of their process. They see the potential for residual income modeling to help expand access for those who might otherwise be disqualified.
- Others are open to the idea, provided that necessary testing is done to prove out the model and that implementation is operationally feasible.



# Residual Income (or Cash Flow) Models In Use

VA	HECM	Non-QM Loans or Compensating Factor for QM loans	Non-Mortgage Lending <i>(installment, small business, and credit card lending)</i>
<p>Borrower's after-tax monthly income</p> <ul style="list-style-type: none"> <li>- monthly payments on existing debt</li> <li>- monthly payments on other obligations (like child care, alimony)</li> <li>- proposed new monthly house payment (principle, interest, taxes, ins)</li> <li>- estimated maintenance and utilities</li> <li>- any homeowner association dues or condo fees</li> </ul> <p>= the residual (monthly) amount</p> <p>Guidance: (from BLS data) amount needed for other expenses, adjusted per location and household size</p>	<p>Borrower's monthly income</p> <ul style="list-style-type: none"> <li>- monthly payments on existing debt</li> <li>- monthly payments on other obligations (like child care, alimony)</li> <li>- monthly house payment (principle, interest, taxes, ins)</li> <li>- estimated maintenance and utilities</li> <li>- any homeowner association dues or condo fees</li> </ul> <p>= the residual (monthly) amount</p> <p>Guidance: HUD appears to have added 20% to the VA's cutoffs for households of 1 or 2 people, and 4% to those for larger households (in all geographies)</p>	<p>Non-QM:</p> <ul style="list-style-type: none"> <li>• Ex: One lender uses a simple residual income calculation for some jumbo loans with DTI over 43%. Guideline: Flat dollar amount residual, irrespective of family size and location.</li> </ul> <p>Compensating Factor:</p> <ul style="list-style-type: none"> <li>• Ex: FHA employs a version of the VA model when seeking a compensating factor for high DTI loans.</li> </ul>	<p>Small business:</p> <ul style="list-style-type: none"> <li>• Cash flow models that leverage data from bank statements and tax returns → manual process</li> <li>• Automated processes involve either estimates, fewer data points, and/or lack of verification.</li> </ul> <p>Consumer installment:</p> <ul style="list-style-type: none"> <li>• Ex: One small dollar lender uses a simple cash flow model with a mix of automatic and manual verification.</li> </ul> <p>Credit Card:</p> <ul style="list-style-type: none"> <li>• Ex: Petal has developed technology to automate cash flow modeling from bank account data that is obtained via aggregator technology</li> </ul>

# Why Undertake This Work?

**Limitations of DTI:** While the DTI test provides a QM ‘bright line’ to reduce regulatory risk for lenders, it is an inadequate measure for assessing ability to repay because it ignores other potential compensating factors. The “GSE patch” has enabled borrowers to obtain QM loans with a more sophisticated multifactor underwriting approach, but it is more difficult for non-GSE loans to meet the QM standard. The single-factor QM DTI test precludes some borrowers who would be successful from accessing mortgage credit. Ultimately, we are seeking a test that helps balance increasing access with improving performance, one that would be beneficial for both borrowers and lenders.

## Uncertainty Around the GSE Patch:

### **AMERICAN BANKER** Trump team targets special 'QM' status for GSEs November 3, 2017

*In its June report recommending changes to financial regulatory policy, the Treasury Department said higher-DTI loans that are allowed through the GSEs’ QM Patch and other federal guarantee programs, while other mortgages must stick to the CFPB’s strict limits, create “an asymmetry, and regulatory burden, for privately originated mortgages.”*

*The Treasury report recommended that the CFPB should eliminate the exemption for GSEs. But it also suggested that all market participants could be eligible for more flexible DTI limits.*

*“The CFPB should engage in a review of the... rule and work to align QM requirements with GSE eligibility requirements, ultimately phasing out the QM Patch and subjecting all market participants to the same, transparent set of requirements,” the report said. “These requirements should make ample accommodation for compensating factors that should allow a loan to be a QM loan even if one particular criterion is deemed to fall outside the bounds of the existing framework — e.g., a higher DTI loan with compensating factors.”*

# What Problem Are We Solving?

**Access** to mortgage credit is significantly constrained relative to past years with reasonable lending standards, though the QM DTI standard is not regarded as a significant contributor to this problem.

- According to the Urban Institute, “lenders would have issued 6.3 million additional mortgages between 2009 and 2015 if lending standards had been more reasonable.”<sup>1</sup> Access is particularly constrained for those with lower credit; Laurie Goodman writes that, when compared to 2001, “[t]he number of loans [in 2015] to borrowers with FICOs above 700 is down 1.4%, the number of loans to borrowers with FICOs of 660 to 700 is down 20.3%, and the number of loans to borrowers with FICOs below 660 is down...64.9%.”<sup>2</sup>
- Analyses by both the Federal Reserve and the Urban Institute find little impact on access stemming from the 43% DTI rule.<sup>3</sup>

**Ability to repay** is not adequately assessed by the DTI rule, which can result in suboptimal outcomes.

- Several studies that aimed to quantify the ability of the DTI rule alone to prevent loans that will default find that the rule actually precludes the creation of many good loans (from 9 to 52, depending upon the study) for each default prevented.<sup>4</sup>
- Another study found that adding a 43% DTI cutoff to restrictions in loan features already present in the QM rule did not meaningfully increase benefit with respect to defaults prevented.<sup>5</sup>

1. Urban Institute, Overly Tight Credit Killed 1.1 Mortgages in 2015 (Nov. 21, 2016)

2. Laurie Goodman, Quantifying the Tightness of Mortgage Credit and Assessing Policy Actions, Boston College Journal of Law and Social Justice (May 2017)

3. Bhutta and Ringo, Effects of the Ability to Repay and Qualified Mortgage Rules on the Mortgage Market, Federal Reserve, December 2015 & Goodman et al, Data show surprisingly little impact of new mortgage rules, Urban Institute, August 2014

4. Quercia et al., Balancing Risk and Access: Underwriting Standards for Qualified Residential Mortgages, UNC Center for Community Capital (2012). & CFSI Analysis of Fannie Mae Loan Level Performance and Acquisition Data for the 2010 loan vintage

5. Fioros et al., Qualified Residential Mortgages and Default Risk, Journal of Banking and Finance (2016)

# Does Residual Income Add Value?

## Access

- While opening up FICO and LTV requirements will likely have more significant impact on credit access, a residual income test can provide (a) another way for borrowers to qualify when they do not meet today's FICO, DTI and/or LTV requirements; and (b) a way to balance loosening credit standards with the desire to maintain or improve default rates.<sup>1</sup>

## Ability to repay

- There is evidence that DTI is a considerably weaker predictor of default than either FICO score or LTV.<sup>2</sup>
- One analysis of VA mortgages originated in 2004 and 2006 found that “both residual income and liquid reserves serve as effective compensating factors that can reasonably predict a borrower’s ability to repay, even at higher DTI thresholds. Importantly, borrowers with DTIs over 43% with sufficient residual income and liquid reserves performed better than borrower with DTIs below 43% who did not meet the tests.”<sup>3</sup>

1. In a 2012 Comment Letter to the CFPB on Qualified Mortgage, the Center for Responsible Lending, the Consumer Federation of America, and The Leadership Conference on Civil and Human Rights urged the CFPB “to recognize that no single test can adequately account for the different circumstances borrowers experience or adequately predict their success as a homeowner. Decades of underwriting have confirmed that a failure to meet any one underwriting test can be effectively overcome by considering whether the borrower’s financial situation includes compensating factors that strengthen the likelihood of a successful loan.” It must be noted, though, that there is evidence that use of residual income alone is likely to restrict access for lower income borrowers.

2. Fioros et al., Qualified Residential Mortgages and Default Risk, Journal of Banking and Finance (2016).

3. 2012 Comment Letter to the CFPB on Qualified Mortgage from the Center for Responsible Lending, the Consumer Federation of America, and The Leadership Conference on Civil and Human Rights

# Proposed Model

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# Proposed Residual Income Calculation

<i>Formula</i>	<i>Data source</i>
Borrower's after-tax monthly income	<i>Verify with pay stub(s), bank statements, and/or W2 forms</i>
- monthly payments on existing debt	<i>Verify with credit report</i>
- proposed new monthly house payment (principle, interest, taxes, insurance)	<i>Lender</i>
- homeowner association dues or condo fees <i>(if applicable)</i>	<i>Lender</i>
- estimated other (critical) expenses*	<i>Calculated from CEX data or Obtained from borrower account data (manually or digitally via data provider)</i>
<hr/>	
= monthly residual	

*\* Note: As digital data and automated modeling becomes more readily available, this could be customized even further to take into account elements such as age of the home (which will impact expected maintenance costs), availability of solar panels (which will impact expected utility costs), and other elements which will impact expected household expenses moving forward.*

# Proposed Approach: Overview & Rationale

	Near-term ( <i>leverage CEX data</i> )	Evolve over time ( <i>leverage borrower data</i> )
<b>SUMMARY</b>	<ul style="list-style-type: none"> <li>Back-test and pilot a residual income model (RI) that includes a minimal list of easily verified inputs and 'other expense' estimates that use updated, publicly available data customized to borrower geography, family size, and other available variables.</li> <li>To start, focus on leveraging the residual income test in conjunction with other criteria, as an additional compensating factor, to help those who might not otherwise have access due to high DTI or lower FICO.</li> </ul>	<ul style="list-style-type: none"> <li>Leverage data from the RI pilot to better understand impact and advocate for use where appropriate.</li> <li>Evolve to an expanded set of borrower inputs that can be obtained and verified automatically using technology that ingests bank account data and models cash flows.</li> <li>Evolve the specificity of the model to take into account home characteristics that will have material impact on expenses (like age, solar panels, and/or weatherization which impact maintenance and utility costs).</li> </ul>
<b>RATIONALE</b>	<ul style="list-style-type: none"> <li>Focusing on a limited set of verifiable borrower inputs addresses lenders' operational concerns.</li> <li>Account for other expenses with estimates that, while inexact, are customized to borrower characteristics, balancing the inherent complexity of this exercise with lenders' operational and feasibility concerns.</li> </ul>	<ul style="list-style-type: none"> <li>While not yet mature or widespread, the technology to automatically model cash flows for individual borrowers exists today. Lenders can begin experimenting with these capabilities to encourage and accelerate development.</li> </ul>
<b>LIMITATIONS &amp; CHALLENGES</b>	<ul style="list-style-type: none"> <li>The expense estimates pulled from CEX will be inexact for any given borrower (though additional analysis should shed light on the variance).</li> <li>CEX data table or API or will need to be created &amp; lenders will need to create corresponding processes.</li> </ul>	<ul style="list-style-type: none"> <li>Lenders will need to retain manual underwriting capabilities, particularly as automation matures, as systems will not always correctly categorize and interpret data gleaned from bank statements. However, if use of RI modeling scales with the availability of enabling technology, adoption should be feasible.</li> </ul>

# Leveraging CEX Data to Estimate Other Expenses

- **Proposal:** Create a publicly available database (lookup table and/or API), updated annually, from which lenders can pull total estimated “other expenses” for use in the residual income calculation. Expense estimates would be customized for borrower characteristics: age, income, household size, region, and urban/rural.
- **Data & Methodology:** Use the Bureau of Labor Statistics’ Consumer Expenditure Survey (CEX) data to estimate typical consumer expenditures in the categories listed below.

For example: Using the past 12 months of available data, develop a methodology (e.g. series of regression estimates for each expense category) to estimate a ‘typical’ monthly expenditure amount, controlling for age, income, household size, region, and urban/rural designation.\*

Expense Categories	CEX fields to include
Utilities: heat, water, A/C, phone (incl. mobile)	Utilities, Fuels, and Public Services
Utilities: internet	Internet and Data Services
House maintenance	Maintenance and repair, services and commodities; Housekeeping supplies
Food	Food (includes restaurants)
Childcare	Household Personal Services (includes adult dependent care); School books, supplies, equipment for elementary, high school
Transportation (including auto insurance)	Cars and Truck, used; Gasoline and Motor Oil; Other Vehicle Expense; Public and other transportation
Medical Expenses (including health insurance)	Health Insurance; Medical Services; Medical Supplies
Clothing	Apparel and Services
Other Insurance (doesn't include: homeowners, auto, or medical)	Personal Insurance and Pensions

\* Regression techniques will allow lenders to customize the expense estimates based upon the designated characteristics.



# Leveraging Account Data to Automate Cash Flow Modeling

**Enabling Technology:** Automatically modeling cash flows from account data is possible today. Credit card provider Petal has developed its own technology to do so (using borrower account data obtained via data aggregators). Data aggregators are already thinking about how they can create and productize similar services for distribution more broadly, per the comments below from Investnet | Yodlee's CEO.

**TheAdviser**

## Predictive machine learning could come to mortgages

November 8, 2017

*Big data and machine learning could soon help lenders offer tailored mortgages based on the real-time financial picture of a borrower, according to the CEO of a data aggregation firm.*

*Anil Arora, CEO of Investnet Yodlee, a leading data aggregation and analytics platform for digital financial services, explained that by monitoring and tracking the historical transaction data of customers, lenders could see a real-time risk analysis of them.*

*It's this type of machine learning and technology that could be applied to the mortgage industry to provide better tailored products to users, Mr. Arora said...*

*The company currently offers its risk insight solutions as a white label product to banks — and it's here that Mr. Arora suggests the tailored mortgage solutions could be adopted...*

*"You're using more holistic data, so you can actually come up with some really scientific levels of prediction on whether this person really can repay their loan or mortgage."*

# Income & Expense Volatility

Research from the U.S. Financial Diaries (USFD), the JPMorgan Chase Institute (JPMC Institute), the Federal Reserve and others have shed light on the widespread challenges around income and expense volatility experienced by American households across the income spectrum.

- USFD: Only 2% of the sample had no spikes or dips in income in the year they were studied, where a spike or dip was defined as 25% above or below average monthly income. Expenses were nearly as variable as income, with the average household experiencing spending spikes or dips in about 5 months of the year. In 70% of months with a spending spike, there was no corresponding spike in income.<sup>1</sup>
- JPMC Institute: Individuals experienced high levels of income volatility and higher levels of consumption volatility across the income spectrum. Median-income families needed \$4,800 in liquid assets to weather 90% of the income and expense volatility observed, but that they had only \$3,000.<sup>2</sup>
- Both USFD and JPMC Institute found that a significant amount of income volatility stems from variation in take-home pay *within* a job rather than from job transitions (nearly half in USFD and 86% in the JPMC Institute research).<sup>3</sup>
- The Federal Reserve: 32% and 43% of adults say their income and expenses (respectively) vary to some degree from month to month.<sup>4</sup>

1. Morduch & Schneider, "The Financial Diaries", p. 29, 53, 54.

2. JPMorgan Chase Institute, "[Weathering Volatility](#)".

3. Morduch & Schneider, "The Financial Diaries", p. 35; JPMorgan Chase Institute "[Paychecks, Paydays, and the Online Platform Economy](#)"

4. Federal Reserve's "[Report on the Economic Well-Being of U.S. Households in 2015](#)", p. 151.

# Proposed Near-Term Residual Income Test

## Proposed Guidance:

**Monthly residual  $\geq$  Dollar amount that is large enough to provide a buffer for income and expense volatility**

### Determining the dollar amount:

- Context: The residual income formula (outlined on an earlier slide) aims to account for household obligations and critical expenses. However, we know that (a) households at all income levels experience income and expense volatility, (b) CEX expense estimates will have a margin of error for individual borrowers, & (c) non-critical expenses are not accounted for in the model.
- Objective: Determine a residual amount that will enable families to cope with income and expense volatility while managing other critical obligations. Determine whether that amount should vary by income, household size, and/or geography, as well as whether it should differ based upon other borrower characteristics like loan size, DTI, etc.



### Relevant data points:

- The JPMC Institute calculated the 'everyday cash buffer' required for households to weather typical levels of volatility, and found that they vary by age and income. In the lowest income quintile, buffers range from \$600 - \$1,800.<sup>1</sup>
- EARN, a microsavings provider focused on LMI consumers, finds that the vast majority of their clients experience months when income does not cover regular expenses; the shortfall is usually \$200 - \$500.<sup>2</sup>
- The Homeownership Preservation Foundation examined data about borrowers who were current on their mortgage but whose financial circumstances had deteriorated enough for them to be at risk of default. They found that the average monthly deficit among these homeowners was \$525 (51% have a shortfall over \$300). A loan modification generally helps the borrower reach break-even, while subsequent financial counseling helps borrowers generate a monthly cash flow surplus of about \$250. After the modification and counseling borrower re-default falls by 20%.<sup>3</sup>

1. JPMorgan Chase Institute, "[The Monthly Stress-Test on Family Finances](#)" March 2017.

2. <https://www.earn.org/insights/>. The data was self-reported by EARN clients via a survey deployed in July 2017. The sample consisted of: 740 people, located across the U.S., whose household income is 80% of AMI or lower. (EARN clients' average income is about \$25,000/year.)

3. Shared by the Homeownership Preservation Foundation, the data comes from Fannie Mae and Treasury (through reporting of its SD 13-08 post mod counseling program).

# Next Steps

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# Next Steps: Quantitative Analysis & Testing

## I. Expense Proxies

- Develop a regression-based methodology to estimate typical monthly expenditures for a consumer profile with a given set of inputs (age, income, location, household size).
- Understand the relationship between estimates and actuals for individual consumers.
- Develop a tool that facilitates pulling estimated expenses for a consumer with a given set of inputs (age, income, location, household size).

## II. Residual Guidance Parameters

- Determine the appropriate dollar amount (large enough to provide a buffer for income and expense volatility) for the residual income test. Guidelines may vary by income, location, and/or household size. They may also vary based upon other borrower characteristics (like DTI, loan size, etc).

## III. Model Impact

- Test the potential impact of the model, to the extent possible with existing data, to build the case to at least pilot the idea and collect data needed to support wider adoption.

*For a list of potential data sources, please see the accompanying data source deliverable.*

# Research Questions

## Expense Proxies

- How significant are the variances among CEX estimates for the range of consumer profiles (defined by age, income, location, household size) and the actual expenses for individual consumers in those groups? Which individual characteristics best predict actuals?
  - Data source: CEX data
  - Rationale: There is considerable and understandable concern about using estimated expense figures (rather than actuals) in residual income calculations, given what we know about volatility and variances in spending across individual households. Before moving ahead, it will be important to better understand the extent of the variability in and predictability of the data.
- How do CEX estimates compare to actuals (gleaned from transactional data) for a set of potential borrowers?
  - Data source: CEX data & potentially: HPF and/or lender (with transactional data access)
  - Rationale: There is considerable and understandable concern about using average expense figures (rather than actuals) in residual income calculations, given what we know about volatility and variances in spending across individual households. It will be useful to understand how estimates from the CEX differ from actuals pulled from transactional data.

*For a list of potential data sources, please see the accompanying data source deliverable.*

# Research Questions

## Residual Guidance Parameters

- What are the appropriate residual guidelines and how should they vary based upon borrower characteristics?
  - What is the relationship between residual income and borrower characteristics (income, location, household size, DTI, loan size, etc.)?
  - How do those relationships inform the development of appropriate residual income test guidelines?

## Model Impact

- What is the potential impact of a residual income test on access to credit?
  - How much incremental volume are we likely to see from the introduction of a residual income test?
  - To what extent, if any, will use of a residual income test constrain access? Which groups of potential borrowers are most likely to be impacted?
- What is the potential impact of the residual income test on performance?
  - When is DTI alone not a good predictor of success? When is residual income alone not a good predictor? When do the two tests provide better predictive power together?
- Do we see any evidence of disparate impact?

*For a list of potential data sources, please see the accompanying data source deliverable.*