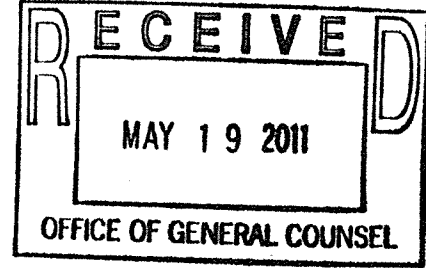




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May 4, 2011



Patrick Lawler
Chief Economist, FHFA
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Re: April 14, 2011, comments to US House of Representatives, Subcommittee on Capital Markets, Insurance, and Government Sponsored Entities:

Request for Public Comment:

Dear Mr. Fowler,

This letter follows up our brief telephone call, in which I asked about responding to the above, and the Notice of Proposed Regulations, during the public comment period. (This revises the email I sent Ms. Richardson.)

I am a thirty-year investor, finding myself in your high-risk investment subsector: high DTI, no- or limited- documentation, investor (non-occupied) residential properties, interest only, and open-ended, or balloon, --“renting money” as it were, -- preferring a straight float, LIBOR-plus, and not 30-year self-amortizing. I have not missed a payment in thirty years of mortgages nor any loan payment in 45 years of all borrowing.

I am also a social science PhD for some forty years and know how to read, and have written, these governmental statistical or quantitative reports.

I take a special interest in DTI, at least regarding seniors, an ECOA-protected population, for whom retirement into a voluntarily lower income is quite financially manageable, including mortgage service, because of high equity, high credit scores, and high assets, with debt service from controlled asset-drawdown, along with episodic, vs. regular, income.

I append some questions re DTI in your comments.

=====

(Regarding seniors, credit discrimination, and DTI, I append my lengthy statistical literature review, via secondary analysis, of: seniors, DTI, and empirical mortgage failure research, titled “Is Graylining the New Redlining?” which was sent to the Office of Thrift

Supervision and Office of the Comptroller of the Currency, at Treasury. Please give it due consideration.

I review “Disparate Impact” regarding seniors and DTI, arguing against “Business Necessity” when other, nondiscriminatory, equal or superior loan performance predictors are available to us in the empirical literature and available to loan officers. I should like to share this with FHFA. It is lengthy, as statistical papers go, and I am afraid necessarily technical and dense and detailed. It is mostly narrative, with some tabular presentations, reformatting or re-presenting existing data.)

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Regarding Risk Retention and public comments:

I see that under the risk-retention NPR, DTI requirements are made even more stringent, or, if one prefers, more financially conservative/ prudent, in order to reduce lender risk and thereby to reduce the necessarily incorporated risk-premium, which increases costs to all; and at the same time to likewise to reduce risk in order to encourage private capital back into housing markets and finance. I focus on this quite closely, in disagreement about the accuracy of DTI as a predictor, generally, and for seniors.

I should like to inquire of the authors of the Mortgage Market Note, 11-02, Qualified Residential Mortgages, of two specific points and perhaps a few general ones.

Specific points:

(1) DTI and accuracy of reporting.

In the Mortgage Market Note of 11-02, on page 3, the authors write: (see next page)

“Debt-to-Income Ratios are Most Restrictive Factor within Proposed QRM

Definition

Among the factors that the NPR uses to define a QRM, the requirement that excludes the most mortgages is that which limits the borrower’s front-end and back-end debt-to-income ratios, **which may in part reflect a tendency for the borrower and/or lender to report an income that met the minimum underwriting requirement and no more.**” [emphasis added]

I inquire as to empirical or even anecdotal/ practitioner data, to suggest that borrowers will underreport income, and minimize it ...“...report ... minimum...and no more...,” to meet criteria, vs. other borrower attributes reported contrary to fact.

(2) DTI relaxation and delinquency outcomes. (see presented next page)

I inquire of the Appendix Tables, Section 3, the left grouping of columns, which talks about loan-delinquency RATES after removing one or another criterion; and likewise the right-grouping of columns, which reports loan (DOLLAR) volume delinquency.

Consider, for example, 'All Loans:' (1) **DTI** relaxation increases loan delinquency RATES (percentages) by the lowest delinquency increase of the three types of possible relaxation of criteria. (2) **LTV** is somewhat higher, meaning that relaxation of LTV requirements give us somewhat more delinquency, and (3) **FICO** is the most severe, in that relaxing FICO gives us the worst (biggest) increase in default RATES. **Conclusion:** FICO predicts most strongly to loan-performance (its relaxation allows for the worst delinquency), LTV less so, and DTI relaxation is the least harmful, in expanding loan RATE failure. In absolute terms, vs. rates, the RATE increase for DTI relaxation is one percent, which *might* be acceptable 'write-off,' (I have worked with credit card data, where write off is factored in), --excepting the Go-Go years 2004-2008, when the RATE of delinquency would have expanded, by DTI relaxation, by multiples of 2 or 3.

HOWEVER, as we shift from RATES to dollar VOLUME, the relative impact of DTI relaxation and LTV relaxation, relative to FICO, tells a reverse story. In DOLLAR volume, DTI relaxation produces, if I am reading this correctly, a 15%-20% increase in dollar delinquency, much less than FICO relaxation.

This is at least counterintuitive, that a *RATE* of delinquency increase is low by DTI relaxation, while the *DOLLAR* increased delinquency is highest, for DTI. LTV behaves similarly, high in dollar delinquency and low in percentage delinquency; FICO reverses, low in dollar volume, while high in percentage delinquency.

At a distance, we may speculate, that SIZE of LOAN predicts to SIZE of DOLLAR loss; that 'rate-based' delinquency counts all loans each as one data point in our denominator, but loans are not all created equal. Accordingly, our default predictor should be SIZE of loan, -- and we now have an empirical question, answerable in the database.

== =

Some general questions:

(3) Assets at time of loan.

I inquire if **assets** at time of loan (vs. income at time of loan) are in the database; nominally, a retiree or other high-asset borrower, even with low DTI, can self-administer a high-equity, high-value loan, by controlled asset drawdown, a form of self-administered reverse mortgage, as a kind of liquidation of accumulations, in the same way that other retirement expenses become a form of life-cycle liquidations of accumulations. I doubt

- Mortgages originated in 2004 through 2008 and subsequently acquired by the Enterprises that would have met the proposed QRM standards had an ever-90-day delinquency rate ranging from 0.7 percent to 2.7 percent. In the same period, the ever-90-day delinquency rate for loans that would not have met the proposed QRM standard ranged from 6.2 percent to 21.5 percent.

Risk-Factors Contributing to Poor Performance of Non-QRM Loans Varied from Typical Years to Boom Years

- For the 2005-2007 origination years, the requirement for product-type (no non-traditional and low documentation loans, or loans for houses not occupied by the owner) was the QRM risk factor that most reduced delinquency rates. For most origination years, requirements for borrower credit score and loan-to-value ratio are the factors that most reduce the ever-90-day delinquency rate of mortgages acquired by the Enterprises that would have met the proposed QRM standards.

Debt-to-Income Ratios are Most Restrictive Factor within Proposed QRM Definition

- Among the factors that the NPR uses to define a QRM, the requirement that excludes the most mortgages is that which limits the borrower's front-end and back-end debt-to-income ratios, which may in part reflect a tendency for the borrower and/or lender to report an income that met the minimum underwriting requirement and no more.

Expanding QRM Definitions Would Add Loans with Much Poorer Performance

- Loans that would have met QRM standards except for having loan-to-value ratios above 80 percent but less than 90 percent had ever-90-day delinquency rates that ranged from 2.0 to 3.9 times as great as QRM loans originated in the same year. Relaxing the PTI/DTI requirement from 28/36 to 30/38 would have resulted in delinquency rates up to 2.1 times as great as for QRM loans.

Risk-Factors in Historic Loan Performance Data

The following data analysis describes how the QRM exemption requirements reduce the occurrence of delinquent mortgages relative to non-qualifying mortgages. In addition, the analysis describes how relaxing or tightening the risk-factors changes the QRM volume and ever-90-day delinquencies. The data come from FHFA's Historical Loan Performance ("HLP") dataset, which contains loan-level information on the characteristics and performance of all single-family mortgages acquired by the Enterprises.⁴ FHFA updates the Historical Loan Performance dataset quarterly with information from each Enterprise.

⁴ The Historical Loan Performance dataset does not include loans backing private-label MBS bought by the Enterprises.

SECTION 3: THE EFFECT OF REMOVING INDIVIDUAL REQUIREMENTS

Change in the QRM Ever-90-Day Delinquency Rate When
Removing One of the Qualification Requirements

Change in the Total QRM Dollar Volume When Removing One of the
Qualification Requirements

ALL LOANS

| Year | QRM Delinquency Rate | Product Type | PTI/DTI | LTV | FICO | All Req'ts | Year | QRM Volume | Product Type | PTI/DTI | LTV | FICO | All Loans |
|------|----------------------|--------------|---------|--------|--------|------------|------|------------|--------------|---------|---------|--------|----------------------|
| 1997 | 0.42% | +0.05% | +0.39% | +0.61% | +3.08% | +2.30% | 1997 | 20.44% | +3.75% | +13.04% | +13.74% | +5.81% | \$ 286,497,878,371 |
| 1998 | 0.39% | +0.10% | +0.31% | +0.52% | +2.34% | +1.68% | 1998 | 23.29% | +2.17% | +13.30% | +17.10% | +6.24% | \$ 691,033,994,509 |
| 1999 | 0.44% | +0.13% | +0.34% | +0.78% | +3.12% | +2.31% | 1999 | 19.48% | +3.16% | +14.83% | +12.95% | +5.37% | \$ 481,450,519,442 |
| 2000 | 0.32% | +0.43% | +0.20% | +0.83% | +2.94% | +2.77% | 2000 | 16.44% | +3.70% | +17.00% | +8.40% | +4.53% | \$ 356,779,731,420 |
| 2001 | 0.31% | +0.35% | +0.27% | +0.59% | +2.52% | +2.27% | 2001 | 19.37% | +3.01% | +14.33% | +13.11% | +4.62% | \$ 1,039,412,013,403 |
| 2002 | 0.33% | +0.41% | +0.32% | +0.73% | +2.34% | +2.09% | 2002 | 22.37% | +4.28% | +15.35% | +10.72% | +4.62% | \$ 1,385,056,256,240 |
| 2003 | 0.55% | +0.64% | +0.66% | +1.06% | +2.95% | +2.40% | 2003 | 24.57% | +4.55% | +16.68% | +10.02% | +4.98% | \$ 1,924,265,340,603 |
| 2004 | 0.95% | +1.72% | +1.16% | +1.58% | +4.27% | +4.33% | 2004 | 17.03% | +6.35% | +17.68% | +6.25% | +4.34% | \$ 937,643,914,289 |
| 2005 | 1.86% | +5.30% | +2.36% | +2.31% | +6.46% | +8.13% | 2005 | 14.41% | +6.74% | +18.78% | +5.45% | +3.36% | \$ 939,069,358,457 |
| 2006 | 2.72% | +7.49% | +3.35% | +3.73% | +7.90% | +13.93% | 2006 | 11.52% | +7.11% | +17.59% | +3.91% | +2.73% | \$ 887,443,942,464 |
| 2007 | 2.37% | +6.34% | +3.59% | +4.39% | +8.66% | +17.12% | 2007 | 10.72% | +5.44% | +16.14% | +4.95% | +2.24% | \$ 1,027,460,511,244 |
| 2008 | 0.68% | +1.48% | +1.64% | +1.68% | +5.50% | +5.94% | 2008 | 17.39% | +4.64% | +22.01% | +9.22% | +2.12% | \$ 793,136,249,487 |
| 2009 | 0.04% | +0.06% | +0.11% | +0.09% | +0.50% | +0.24% | 2009 | 30.52% | +3.38% | +24.47% | +15.26% | +1.74% | \$ 1,176,445,135,548 |

PURCHASES

| Year | QRM Delinquency Rate | Product Type | PTI/DTI | LTV | FICO | All Req'ts | Year | QRM Volume | Product Type | PTI/DTI | LTV | FICO | All Loans |
|------|----------------------|--------------|---------|--------|--------|------------|------|------------|--------------|---------|---------|--------|--------------------|
| 1997 | 0.42% | +0.03% | +0.36% | +0.80% | +3.13% | +2.44% | 1997 | 20.74% | +4.40% | +14.02% | +12.11% | +5.55% | \$ 171,316,168,314 |
| 1998 | 0.46% | +0.04% | +0.30% | +0.90% | +2.70% | +2.13% | 1998 | 22.08% | +2.99% | +15.33% | +13.09% | +6.23% | \$ 243,827,154,269 |
| 1999 | 0.40% | +0.12% | +0.30% | +0.98% | +3.05% | +2.23% | 1999 | 19.86% | +4.02% | +17.29% | +10.39% | +4.93% | \$ 252,736,885,540 |
| 2000 | 0.29% | +0.38% | +0.17% | +0.83% | +2.51% | +2.29% | 2000 | 18.17% | +4.21% | +19.37% | +7.56% | +4.45% | \$ 259,462,348,244 |
| 2001 | 0.38% | +0.35% | +0.28% | +0.97% | +2.72% | +2.59% | 2001 | 19.57% | +4.20% | +18.76% | +7.94% | +4.92% | \$ 334,671,388,428 |
| 2002 | 0.48% | +0.50% | +0.32% | +1.28% | +2.61% | +2.70% | 2002 | 18.43% | +5.80% | +18.86% | +6.12% | +4.51% | \$ 378,648,800,742 |
| 2003 | 0.93% | +0.72% | +0.78% | +1.84% | +3.29% | +3.50% | 2003 | 18.03% | +6.81% | +19.38% | +5.32% | +4.42% | \$ 428,404,858,343 |
| 2004 | 1.16% | +1.97% | +1.24% | +2.53% | +3.93% | +4.71% | 2004 | 16.71% | +9.21% | +20.88% | +3.25% | +3.78% | \$ 397,943,548,815 |
| 2005 | 2.13% | +6.18% | +2.49% | +2.87% | +5.94% | +8.61% | 2005 | 15.67% | +10.22% | +22.25% | +2.51% | +2.92% | \$ 433,917,427,310 |
| 2006 | 2.76% | +8.69% | +3.28% | +3.29% | +6.78% | +13.63% | 2006 | 13.57% | +9.37% | +21.75% | +2.02% | +2.48% | \$ 459,040,004,449 |
| 2007 | 2.33% | +6.76% | +3.31% | +4.33% | +6.79% | +16.51% | 2007 | 12.39% | +6.88% | +19.94% | +3.27% | +1.95% | \$ 504,879,485,500 |
| 2008 | 0.64% | +1.36% | +1.42% | +2.10% | +4.73% | +5.62% | 2008 | 17.33% | +6.08% | +26.06% | +6.40% | +1.86% | \$ 321,485,446,505 |
| 2009 | 0.07% | +0.09% | +0.09% | +0.07% | +0.63% | +0.23% | 2009 | 27.06% | +7.02% | +33.83% | +8.18% | +1.89% | \$ 225,983,942,704 |

that most of us expect to live in retirement only on income and to preserve capital, or principle, for bequest purposes.

AND high equity certainly points away from 'ruthless default.'

Thus, an alternate model, for retirement (seniors) or elsewhere, is a combination of assets, equity, and credit history (FICO), for loan predictions. This omits or downgrades DTI, quite the reverse of the QRM NPR.

DTI is any event is a single time-point snapshot for an arbitrary current-accounts positive cash-flow. I document the unreliability of this, in my long paper.

(4) Covariance among predictors.

I inquire as to what statistical measures you have taken for the question of covariance among predictors, loosely the multi-collinearity problem, this is surely way beyond our legislators, but even so, in work-land this should be of interest

My own work used, further, data-reduction, for example, factor analysis (different research questions, of course), to evaluate covariation (this was only linear covariation, we did not use logarithmic conversions); and also stepwise regressions for incremental prediction, a form of relative weighting of predictors.

It may well be that both FICO and LTV predict, but once we stepwise 'control for' factor (A) to see what is left for factor (B), we might find, for example, that DTI adds little, once we have FICO, to predict delinquency; or is this what you have done?

(5) Data discrepancies, more than a nuisance, and data accuracy.

In one of my various careers, I was database manager for integration of many, large, multi-source data systems, which nominally treated the same unique (individual) analytic unit (here the 'same analytic unit' is unique mortgaged property, or borrower, or lender). We found systematic 'data issues' associated with the various data sources: that is, lender A had many more (or fewer) data issues than lender B; or DTI had many more (or fewer) data issues vs. LTV, for example. For further example, Lender A might have more bad data in Chicago, while Lender B had more bad data in New York (my town).

The discrepancy was systematic, and we could predict who would be removed from database responsibility, and often how soon, based on our inter-system discrepancy count!

Missing data, or bad data, is itself a useful analytic variable, not just a nuisance, and can be identified and then interpreted in the cubicles of analysts and does not need site visits.

(6) DTI and under-reporting, vs. over-reporting, of income.

I should like to close, back to DTI. You offer that:

“a tendency for the borrower and/or lender to report an income that met the minimum underwriting requirement and no more.”

I interpret this as referring to ****underreporting**** income, possibly to avoid tax consequences, given underreporting of income elsewhere. That is, we might underreport income to the taxman, and gamble on getting caught, but not underreport to the lender bank, and guarantee not getting a loan.

I have substantial experience of the reverse, contrived ‘over-reporting’ of income, vs. underreporting, for the immediate three-month DTI ‘look-back’ period, to increase into compliance the Income number, and by extension the DTI number. I have considered this inducement to fraud....

For over- or under-reporting, my ‘data-issue’ comments above in (5) potentially create a statistical/ computational/ secondary data analysis methodology, to let us know who fails, say by lender, allowing us some forensic accounting reconstruction of any patterned loan-approval processing, such as inducement to over-report, for DTI purposes.

(7) Loan size, DTI, and social policy, the ‘starter’ loan and acceptable losses.

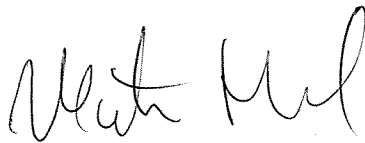
Further, in closing, IF we find that loan failure, high by DOLLAR volume but low by RATE, is an accurate finding, and if my speculation is correct, that SIZE of LOAN predicts to the DOLLAR/ volume of loan failure, then we might stratify our loan requirements to apply more rigor, or fiscal conservatism, to LARGER loans. For now, say with DTI, we do not have one DTI for big loans and another for smaller.

This concept, approval-stratification by SIZE of loan, increased loan rigor (or fiscal conservatism) for bigger loans, has social policy impact, of giving smaller borrower a ‘break,’ presuming the smaller borrower is the ‘starter’ borrower; and if we have a social policy of increasing home ownership, that is, reaching into the borrower (purchaser) population for whom even ‘starters’ are out of reach, we might choose to manage (accept) the increased ‘RATE’ failure risk, by restricting ‘DOLLAR’ risk, as social policy, given that we can pseudo-quantify and then manage DOLLAR risk.

When I worked in credit card analysis, a loss-rate was always factored in, of course.

Thank you.

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May 5, 2011



Submission of Public Comment, Notice of Proposed Regulations:

**Statement April 14, 2011, Patrick J. Lawler, Chief Economist
Federal Housing Finance Agency**

**Before the U.S. House of Representatives
Subcommittee on Capital Markets, Insurance, and
Government-Sponsored Enterprises**

**“Understanding the Implications and Consequences of the
Proposed Rule on Risk Retention”**

Congressman Scott Garrett, Chair
Subcommittee on Capital Markets, Insurance, and
Government-Sponsored Enterprises
2244 Rayburn House Office Building
Washington, DC 20515

Congresswoman Maxine Waters, Ranking Member
Subcommittee on Capital Markets, Insurance, and
Government-Sponsored Enterprises
2344 Rayburn House Office Building
Washington, DC 20515

====

(New York members)

Congresswoman Nan Hayworth, NY, New York 19th District
Subcommittee on Capital Markets, Insurance, and
Government-Sponsored Enterprises
1440 Longworth HOB
Washington, DC 20515

Congresswoman Carolyn Maloney, New York 14th District
Subcommittee on Capital Markets, Insurance, and
Government-Sponsored Enterprises
2332 Rayburn HOB
Washington, DC 20515-3214

I respond to the Notice of Proposed Regulations (NPR) for Qualified Residential Mortgages (QRM). My interest is in Debt-To-Income (DTI) and borrower qualifying.

I inquire specifically, as enclosed, of FHFA Chief Economist Lawler, re DTI and his data interpretation comment, of possible DTI manipulation for loan approval via inaccurate income reporting; and I inquire about policy implications of one appended data table.

I am a residential rental investor of some thirty years with perfect mortgage payment history, and now to my surprise, on the wrong side of the debate. For thirty years I and my lenders coexisted with: high DTI, low- or no- documentation, interest-only, balloon-end-point, and never ever amortization: I call this 'renting money,' LIBOR-plus, etc.

I am by now a retired senior citizen, and cannot refinance, because of 'excess DTI,' after thirty years of perfect mortgage payment history, and 45 years of never missing any debt payment; I have FICO 800; Loan-To-Value of 50%; and a liquid portfolio of many multiples of the mortgage balance. I could pay the balance tomorrow by writing a check!

I am defeated, as a retired person, by DTI, which is nothing more than a current-accounts positive-cash-flow short-term look-back with zero thirty-year predictive power* (and described to your Subcommittee by Chief Economist Mr. Lawler as manipulable!). It excludes retired senior citizens (ECOA-protected, by the way) with lifecycle financial management skills, ample assets, controlled drawdown, and ample episodic income.

I submit that a system with this result is broken, even more than headlines tell us.

*I dismiss DTI as a predictor, after reviewing the mortgage failure statistical literature. My appended review, lengthy, technical, dense, is from a forty-year statistical social science (PhD) career. Data show: DTI is irrelevant, and loan review disfavors seniors.

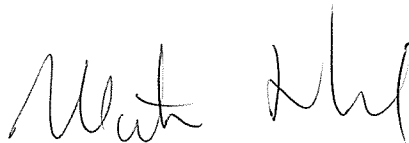
From my experience, and anecdotal data, DTI disfavors seniors by Disparate Impact of facially neutral criteria, absent Business Necessity, given that non-discriminatory alternatives are substantiated in the research literature and available to lenders. Avoidable disfavoring is illegal discrimination under ECOA. I petition that DTI be excluded.

Disparate Impact is nominally monitored by Treasury Department guidelines, which I present. Disparate Impact is a statistical doctrine, and Treasury's guidelines are presented.

The matter has of course gone to the lawyers, with duly filed complaints to Treasury regulatory oversight, with case numbers, legal fees, abundant correspondence, etc.

I beg to you to rationalize and legalize the loan system, not make it worse.

Cordially
Martin Heiweil



~~~~ IS GRAYLINING THE NEW REDLINING? ~~~~

A STATISTICAL REVIEW OF  
A REVIEW OF RECENT FINDINGS FROM THE CURRENT SYSTEMIC AND  
INSTITUTIONAL MORTGAGE FINANCING FAILURES,  
WITH A DISSENTING CONCLUSION,  
AND WITH DISCONFIRMABLE RESEARCH HYPOTHESES.

===

ABSTRACT:

CREDIT-WORTHY SENIORS, WITH HIGH ASSETS, HIGH EQUITY, AND EXCELLENT CREDIT MEASURES, ARE ILLEGALLY DENIED MORTGAGE CREDIT, BY DE FACTO PASS-FAIL ONE-SIZE-FITS-ALL FNMA- (AND OTHER-) USE OF CURRENT-ACCOUNTS POSITIVE CASH-FLOW (AKA DEBT-TO-INCOME (DTI) RATIO)), TO PREDICT THIRTY YEARS OF MORTGAGE PAYMENT.

DATA SHOW DTI DOES NOT PREDICT MORTGAGE DEFAULT; VIOLATES ECOA-LAW BY DISPARATE IMPACT AGAINST SENIORS; CREATES MORAL HAZARD AND INDIVIDUAL HARDSHIP; AND HAMPERS HOUSING RECOVERY BY RESTRICTING CREDIT ACCESS FOR CREDIT-WORTHY BORROWERS.

DATA SHOW SENIORS HAVE HIGHER LOAN-DENIAL RATES, AND LOWER LOAN-DEFAULT RATES. THESE RESULTS TOGETHER INDICATE THAT BECAUSE OF DISCRIMINATION, SENIORS ARE WRONGLY HELD TO HIGHER CREDIT STANDARDS: ILLEGAL HIGHER STANDARDS DO PRODUCE LOWER DEFAULTS, HOWEVER.

CREDIT-MODELS SHOULD EQUALIZE LOAN-DEFAULT RATES BY USING LEGAL LOAN-APPROVAL CRITERIA FOR ECOA-PROTECTEES.



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| 15.         | 11:           | Department of The Treasury, Office of the Comptroller of the Currency, Credit Risk Analysis Division, 2005 (“OCC: II”)                       |
| 20.         | 11.1:         | SUMMARY. The data show statistical, and trend, results, disfavoring elderly, even as the authors “explain this away” and conclude otherwise. |

~~~~ IS GRAYLINING THE NEW REDLINING? ~~~~

- 21. 12: Harvard Joint Center for Housing Studies: (“Harvard JCHS”) Publication W10-8, Predictors to Mortgage Default. A Review of Results.
- 24. 12.1: What predicts to mortgage failure.
- 24. 12.1.1: Interim Summary.
- 24. 12.2: What does age tell us about mortgage failure
- 26. 12.3: DTI, a passing comment.
- 27. 12.4: SUMMARY: Harvard JCHS data point away from DTI.

- 27. 13: Further commentary.
Hypothetical or non-hypothetical borrower,
moral hazard vs. playing by the rules.
- 27. 13.1: Geezers, coots, dinosaurs, oldsters, and victims.

- 28. 14: FNMA, fiscal conservatism, and maximum adverse construal:
Assets, imputed income, thirty year percentage-yield predictions, income
fluctuations, income loss.
- 28. 14.1: FNMA, summarized:.

- 28. 15: Conclusion; entreaty to FNMA and its heirs.

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- 29. 16: Appendix A:
- 29. 16.1: Price-point: what is our optimal marketing and pricing) decision to maximize yield.
- 29. 16.2: Price -point: working backwards from loan-default to loan-approval.
- 30. 16.3: DISPARATE IMPACT.
- 30. 16.4: SUMMARY: PRICE-POINT DISCONFIRMABLE PREDICTIONS, COMMENTS:

- 31. 17: Appendix B:
Disparate Impact: Department of the Treasury guidelines for bank examiners:
 - 17.1 Office of Thrift Supervision
 - 17.2 Office of the Comptroller of the Currency.

- 33. 18: Appendix C:
Author biography.

~~~~ IS GRAYLINING THE NEW REDLINING? ~~~~

**(1) Policy Question:**

- Is “Graylining” (age discrimination, illegal under Equal Credit Opportunity Act (ECOA)) the new redlining? Pass-fail reliance on Debt-To-Income (DTI) ratios for mortgage loan approvals, ignoring other equivalent or superior loan-payment indicators.

- Credit Discrimination and seniors, via illegal Disparate Impact from facially neutral current Debt-to-Income (DTI) requirements, adverse to credit-worthy seniors.

- DTI as an unsecured ‘promissory note,’ a promise to not get fired or otherwise lose income, for the next thirty years.

**(1.1) Research questions.**

(1) what are mortgage default predictors,

(1a) does income and by extension debt-to-income, predict? (it does not);

(1b) what does predict: answer,

(1) Macro-economics: underwater loans and

(2) Micro-economics: credit failures elsewhere in the borrower’s world.

(2) credit discrimination

(2a) are seniors good credit risks (credit scores and credit histories say they are),

(2b) related, are they adversely treated by lending decisions (they are).

**(1.2) Methodological approach:**

Data and review/ reanalysis, are accordingly from two domains: (a) macroeconomics, to show indicia/ correlates of failure, and (b) microeconomics, loan denial to evaluate age discrimination.

**(2) Preview of conclusions:**

**(2.1) Loan failure. Macroeconomic factors.**

Empirical literature shows that mortgage failure is primarily from macroeconomic factors of (a) economic downturns (asset devaluation), and (b) property attributes, particularly ‘underwater/or ‘negative equity.’

For example, the Boston Fed, see below, discussing foreclosure, distressed loans, and loan ‘adjustment’ to make loans more affordable (presuming affordability is related to income of borrower), specifically rejects “**Income At Time Of Loan**” (IATOL) as a predictor. They dismiss the predictive power of IATOL, because of lifetime fluctuations in income. The ‘income fluctuation’ dismissal should b that logic apply as well to DTI at time of loan, as predictor.

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(2.2) Loan failure. Microeconomic factors.

Given the major predictive power of macroeconomic factors, and property attributes, are we reduced to random loan approvals, the dart board approach, or random walk?

Predicting loan failure: Individual economics (microeconomics) play a small role; the primary failure-predictor is ‘income shock’ with ‘shock’ taken as unexpected /unplanned loss.

Predicting loan-payment: our strongest borrower-based predictors are: available credit, assets, and credit histories. These show intention to pay, ability to pay, and borrower triage of less-destructive defaults.

Re: borrower-based illegal discrimination: We have an abundant literature on loan-discrimination, race primarily, and correctives. **Age discrimination (‘seniors’)** is a difficult quantitative research inquiry; there are limited published results, and definitional variability ambiguity, over 50s, vs. over 60s /retirees, the latter being the nominal subject of this paper).

(2.2.1) Age-discrimination in credit is reported empirically, in a report from the Office of the Comptroller of the Currency, Department of the Treasury (herein “**OCC: II**”).

I will differ with their interpretations, to be discussed below at some necessary length.

(1) One difference is my interpretation vs. the authors, of observed numerical differences. Note: differences are either ‘statistical,’ meaning statistically significant, or individually not statistically significant, but with repetitive cumulative consistent directionality, also called ‘trend,’ disfavoring an ECOA-group.

(2) A second difference is my treatment vs. the authors, of observed senior-adverse outcomes. I submit that the authors ‘explain away’ these senior-adverse outcomes, by interposing intermediating or mitigating variables; this is misleading or worse. “explaining away’ adverse results, via intermediating or mitigating variables, is discussed in detail below, in the Boston Federal Reserve’s study on redlining (herein “**BF:II**”), in their internal debate, does it exist or not.

(3) Literature review.

(4) Boston Federal Reserve Bank, 2009. (“BF: I”)

The Boston Fed brought redlining into our awareness, mid-90s, and is revisited below. Before we do that, the Boston Fed has something more recent and more direct to say about Income At Time Of Loan, as an unreliable predictor, because of lifetime income fluctuations. As explained, this is the equivalent of Debt To Income at the time of loan.

Please see, <http://www.bos.frb.org/economic/ppdp/2009/ppdp0902.pdf>.

Federal Reserve Bank of Boston/ Public Policy Discussion Papers, April 2009.

Reducing Foreclosures

Christopher L. Foote, Kristopher S. Gerardi, Lorenz Goette, and Paul S. Willen

Comment: This paper seems to grow out of our current approach of loan modification (downwards, to make loans income-based affordable) to reduce foreclosure.

Abstract:

This paper takes a skeptical look at a leading argument about what is causing the foreclosure crisis and what should be done to stop it. We use an economic model to focus on two key decisions: the borrower's choice to default on the mortgage and the lender's choice on whether to renegotiate or "modify" the loan. **The theoretical model and econometric analysis illustrate that "unaffordable" loans, defined as those with high mortgage payments relative to income at origination, are unlikely to be the main reason that borrowers decide to default. Rather, the typical problem appears to be a combination of household income shocks and an unprecedented fall in house prices. [emphasis added]**

From p.1 (at some length)

We first study the "affordability" of a mortgage, typically measured by the DTI ratio, which is the size of the monthly payment relative to the borrower's gross income.¹ **We find that the DTI ratio at the time of origination is not a strong predictor of future mortgage default. A simple theoretical model explains this result.** While a higher monthly payment makes default more likely, other factors, such as the level of house prices, expectations of future house price growth and intertemporal variation in household income, matter as well. Movements in all of these factors have increased the probability of default in recent years, so a large increase in foreclosures is not surprising. **Ultimately, the importance of affordability at origination is an empirical question and the data show scant evidence of its importance. [emphasis added]**

We estimate that a 10-percentage-point increase in the DTI ratio increases the probability of a 90-day-delinquency by 7 to 11 percent, depending on the borrower.² By contrast, an 1-percentage-point increase in the unemployment rate raises this probability by 10-20 percent, while a 10-percentage-point fall in house prices raises it by more than half.

To belabor this point, from p.2

The fact that origination DTI explains so few foreclosures

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should not surprise economists, given the mountain of economic research on the sources and magnitude of income variation among U.S. residents. The substantial degree of churning in the labor market, combined with the trial-and-error path that workers typically follow to find good job matches, **suggests that income today is an imperfect predictor of income tomorrow. Consequently, a mortgage that is affordable at origination may be substantially less so later on, and vice versa. [emphasis added]**

**(5) Office of Comptroller of the Currency, Credit Risk Analysis Division, 2009. (“OCC: I”)**

Another report comes from Office of the Comptroller of the Currency (OCC), Department of the Treasury, which oversees National Banks. OCC has a Credit Risk Analysis Division, and performs audits, apparently on-site at banks, and also performs large-dataset statistical analyses.

For a description of this group, please see, <http://www.occ.treas.gov/topics/economics/index-economics.html>, sometimes called the Credit Risk Analysis Division.

I use the report, cited at the home page of Deputy Director, please see: <http://www.occ.treas.gov/topics/economics/economics-staff/bio-min-qi.html>, "Loss Given Default of High Loan-to-Value Residential Mortgages," (with Xiaolong Yang), *Journal of Banking and Finance*, 33(5), 2009, p. 788-799. (Note: this is not available publicly, but must be purchased.)

The paper is directed NOT at default, but at the narrow issue of **Loss Give Default (LGD)**, for oversight for loan-default reserves. Not all default creates loss, we are reminded.

a b s t r a c t

This paper studies loss given default using a large set of historical loan-level default and recovery data of high loan-to-value residential mortgages from several private mortgage insurance companies. We show that loss given default **[LGD]** can largely be explained by various characteristics associated with the loan, the underlying property, and the default, foreclosure, and settlement process. **We find that the current loan-to-value ratio is the single most important determinant.** More importantly, mortgage loss severity in distressed housing markets is significantly higher than under normal housing market conditions. These findings have important policy implications for several key issues in Basel II implementation. **[Emphasis added]**

GSE [aka FNMA] data are discussed, focusing on Current Loan To Value (CLTV)

More recently, Pennington-Cross (2003) and Calem and LaCour-Little (2004) study determinants of mortgage loss severity based on government-sponsored enterprise (GSE) data, and their regression analysis shows improved explanatory power. The R2 reported in Calem and LaCour-Little is



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0.25, whereas it is 0.95–0.96 in Pennington-Cross (2003). Although the latter study reports very high R², it uses a much smaller sample and covers a shorter sample period (1995–1999) that contains no serious housing market depreciation. (fn5 Coupled with the problems in LGD definition and the timing of the current loan-to-value (CLTV) calculation, the findings of Pennington-Cross (2003) should be interpreted with caution....

Overall the existing studies have found that CLTV or LTV are strongly related to recovery rates (Calem and LaCour-Little, 2004; Pennington-Cross, 2003; Lekkas et al., 1993; Clauretie and Herzog, 1990). The age and size of the loan have also been shown to affect mortgage recovery rates (Calem and LaCour-Little, 2004; Pennington-Cross, 2003; Lekkas et al., 1993). In addition, recovery rates are found to vary with state foreclosure laws (Pennington-Cross, 2003; Clauretie and Herzog, 1990), prime or subprime mortgages (Pennington-Cross, 2003), and the relative median income (Calem and LaCour-Little, 2004). These studies are summarized in Appendix A.....[emphasis supplied]

In this paper, we study residential mortgage loss given default using a large set of historical loan-level default and recovery data of high-LTV mortgages from several private mortgage servicer companies. **We show that LGD can be largely explained by various characteristics associated with the loan, the underlying property, as well as the default, foreclosure, and settlement process. As expected, CLTV is the single most important determinant. More importantly, mortgage loss severity in distressed housing markets is significantly higher than under normal housing market conditions.** [emphasis supplied]

COMMENT: there is nothing here on DTI, or any microeconomic factors.

The authors also discuss ‘data issues.’

The following descriptive statistics are generated from the entire 241,293 mortgage insurance claims in the data set....The raw data, compiled by MICA from its member companies contain many missing values and data errors (e.g., negative loan amount and invalid settlement date). With assistance from MICA experts, the data were cleaned and scrubbed, resulting in 106,857 clean observations that are used for the analysis contained in the rest of this paper. All data exclusion criteria are listed in Appendix C, and descriptive statistics from the cleaned data are provided in Tables 2 and 3. **Although more than half of the original 241,293 observations were lost**, most of the data losses are due to missing values. [emphasis supplied] [11] [emphasis added]

And so, what do we know?

More than half (51.7%) of the defaulted mortgages in our sample have a

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CLTV greater than 100%. This is consistent with the “ruthless” default explanation from the options-based mortgage default theory, which considers default as an optimal decision of rational consumers. The rational borrower will default only when the value of the collateral falls below the mortgage value by an amount equal to the net transaction costs, such as the costs of moving, future deficiency payments, and the stigma associated with default (Crawford and Rosenblatt, 1995).

The CLTV of slightly less than half of the defaulted mortgages in our sample is LE 100%, and 23.6% and 7.4% have CLTV LE 90% and LE 80%, respectively.[19] Some of the defaults are triggered by unexpected non-financial reasons, such as job loss, a significant change in health status, and change in family structure, and especially divorce. In these cases the default option is exercised even while it is not “in-the-money” (Ambrose et al., 1997; Pennington-Cross, 2006). Other defaults might be optioned by rational borrowers who consider selling expenses (brokerage fees and taxes) and additional benefit of default [20], and hold an unbiased estimation of the property value [21], when determining whether to sell the property, to maintain the mortgage, or to default.

By now, no boldfacing for emphasis is needed, for the causal factors, and the absence of DTI.

**(6) A third report comes from proprietary research., 2010.**

Please see, <http://www.housingwire.com/2010/03/01/who-in-the-end-will-strategically-default>.

This is a freestanding, probably commercial, non-scholarly, non-peer reviewed, publication, HousingWire, self-titled: “Financial News for the Housing Market.” Reporter/ author Linda Lowell references internal data results from Bank Of America/ Merrill Lynch;, I excerpt at some length, please forebear.

===== excerpt starts here =====

**“ Healthy Borrowers to the Other Side of the Room**

One of the finest broker/dealer MBS research groups, at **Bank of America/Merrill Lynch**, is rarely permitted to share its research with media.

The usual approach to credit modeling is to estimate the amount, timing and severity of loan losses. Instead, BofA/ML Analysts Vipul Jain and Tim Isgro turned the problem upside down and tried to isolate “a relatively healthy group with a very low probability of default.”

To do this, they use new data provided by credit bureau **Equifax**. (Note, both data sets do not identify borrowers or addresses, so complex matching algorithms must be used.) By matching original loan amount, zip code and other data items in the LoanPerformance (LP) loan level security

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databases to those Equifax data, the BofA/ML researchers are able to ascertain if the borrower has other first-lien or second lien-mortgages (both closed end and HELOC), extent of other credit lines and utilization of revolving debt and current delinquent status on other debt....

It should come as no surprise that, when actual loan performance is in conjunction with CLTV, that the more underwater borrowers are, the more likely they are to default....

Jain and Isgro also look at the relationship between mortgage performance in context of borrower's other debt service. Of course the propensity to be delinquent on other debt, even among borrowers current on their mortgage, rises the lower the mortgage credit class. But they tease this interesting observation out of the data: **delinquency on other debts is a “much more powerful indicator of mortgage health in the better credit sectors.** For poorer credit borrowers, going delinquent on other debts may be a way of life, but for prime borrowers, it is more indicative of distress.” (emphasis supplied)....

Bottom Line

Low risk borrowers are those who have CLTVs [Current Loan To Value] less than 100% (not underwater), have always been current on their mortgage and are current now on other debts.

===== excerpt ends here =====

(7) INTERIM SUMMARY: default is a result of market values, unrelated to DTI.

LITERATURE REVIEW, CONTINUED.

(8) Boston Fed and redlining* (1994-1996), a review with current relevance. Lessons from pre-meltdown mortgage review. (“BF: II”)

(* There is actually some controversy as to whether 'redlining' which exists in the public mind, exists in the statistical database. Of course statisticians are central to this debate. I digress here, at perhaps excessive length, a weakness of wonks and quants, to review that controversy and literature, because it provides useful conclusions, or at least observations, for the within 'graylining' matter.)

(8.1) *Is redlining real? The Fed's Chief exec said no.

See, please, <http://www.nytimes.com/1994/09/10/opinion/1-mortgage-study-found-race-discrimination-not-redlining-204862.html>, wherein, in 1994, CATHY E. MINEHAN President & Chief Exec. Officer Federal Reserve Bank of Boston Sept. 7, 1994, said:

“The study found discrimination in mortgage lending based on race, not on geography (redlining), as you assert. Indeed, in a follow-up effort using the study's

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data we found no redlining in Boston.“

**(8.2) The wonks respond:**

Somewhat later, 1995-96, see, [http://www.bostonfed.org/economic/wp/wp1995/wp95\\_10.htm](http://www.bostonfed.org/economic/wp/wp1995/wp95_10.htm),

Discrimination, Redlining, and Private Insurance, October 1995, Working Paper No. 95-10.

Abstract:

The existence of discrimination and or redlining in mortgage lending has been debated intensively for years. ... Little evidence is found that discrimination is occurring among insurers, but there is **some evidence** that redlining is. [**emphasis supplied**]

So, in 1995-96, the wonks disagreed with the 1994 press-release.

For this ‘some evidence,’ please see, [http://www.bostonfed.org/economic/wp/wp1996/wp96\\_6.pdf](http://www.bostonfed.org/economic/wp/wp1996/wp96_6.pdf),

Working Paper, No. 96-6 November 1996, Redlining in Boston: Do Insurers Discriminate Against Neighborhoods?,

wherein the authors find no statistical support for redlining defined as ‘racial component of the neighborhood’ but DO find their statistical measure of redlining, via the requirement for Private Mortgage Insurance (PMI). They then attribute some of this PMI-requirement back to the banks.

See, please, p.13:

Omitting that variable [PMI insurance requirement] makes the lenders alone responsible for that rejection. In truth, lenders share responsibility for these rejections.

There is little evidence that the racial composition of the tract directly increases the probability that a mortgage will be denied. However, some evidence suggests that the decision to require PMI depends on the minority composition of the tract. **This indirect form of redlining** would increase the price paid by applications from these areas. [**emphasis added**]

**(Comment:** We will continue to talk about graylining via intermediating variables.)

Back to the article, prior paragraph, see page 13, preceding the above excerpt::

Including a dummy variable to indicate whether an application was denied PMI gives the lenders credit for granting basically every loan in a minority area once PMI is acquired, even though they were forced to acquire PMI.

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(I digress re the Boston Fed, and predictors to loan discrimination, as I use credit-denial as a proxy for expected default. The authors discuss many lender predictor variables.)

In fact, the HMDA data include only one piece of economic information about the applicant - namely, income.

Income alone actually has less explanatory power than one might expect because lower-income borrowers usually buy lower-priced homes.

Lenders put much more weight on measures of the applicant's ability to support the loan, such as:

- the ratio of housing expense to income,
- the ratio of total debt to income, and
- the stability of the applicant's employment;

Comment: these are DTI-type measures. The Fed continues:

- **on the applicant's commitment to debt repayment, as measured by credit history; [emphasis added]**

- **on measures of potential loss, such as the loan-to-value ratio,] the presence of private mortgage insurance, and the stability of the value of the mortgaged property; [emphasis added]**

and on the characteristics of the property, such as single-family versus multifamily units.)

COMMENT: At no point is DTI taken as a pass-fail dispositive, except by FNMA and its secondary market influence.

(9) INTERIM SUMMARY:

(9.1) The Boston Fed, mid 90s through 2009 finds that DTI is either irrelevant (2009) or only one factor (1995).

(9.2) The Department of the Treasury, via Office of the Comptroller of the Currency/ Credit Risk Analysis Division ("**OCC I**"), finds no relationship between DTI and banking-loss, as they comply with international banking agreements for loan-loss set-asides.

OCC does have a specific age-discrimination review, discussed below. ("**OCC: II**")

(9.3) The industry's own into proprietary research, dismisses DTI, if only by omission.

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(9.4) The Boston Fed, mid 90s, redlining-then (maybe) and lessons for graylining now..

**In Sum**, all available data point away from DTI, for pass-fail for loan-failure.

In light of this, FNMA is in la-la-land. We may speculate on this disconnect, but prior to that, let us discuss federal statistical guidelines and standards.

**(10) Statistical standards and federal guidelines.**

In discussion of statistical predictors, it is useful to restate required statistical standards.

For convenience, I draw from OTS, Office of Thrift Supervision..

(We do not know if FNMA is constrained by these federal guidelines. FNMA, as GSE, may or may not be a government entity. I submit that **IF** FNMA discriminates, it does so under coloration of law qua government entity, itself a law violation.)

**Statistical disciplines are central.** Our federal credit overseers (initially Dept of the Treasury, but upon review, many others also -- Federal Reserve, HUD, FTC, etc) on credit approval or denial, present their guidelines. Please see,

Office of Thrift Supervision, Department of the Treasury, Regulatory Bulletin, RB 37-29, November 24, 2008, Section:1205, Equal Credit Opportunity Act, page 1205.6: :

In an empirically derived, demonstrably and statistically sound credit scoring system [EDDSS], a financial institution may use an applicant's age as a predictive factor, provided that the age of an elderly applicant is not assigned a negative factor or value.

See, also FDIC on this: <http://www.fdic.gov/regulations/laws/sarc/sarcappeals/sarc200503.html>

**A. ECOA and Regulation B.**

The Equal Credit Opportunity Act was enacted in 1974 to prevent discrimination in the extension of consumer credit. The Act makes it "unlawful for any creditor to discriminate against any applicant, with respect to any aspect of a credit transaction on the basis of . . . age." 15 U.S.C. § 1691(a). Regulation B proscribes discrimination against an applicant on a prohibited basis regarding any aspect of a credit transaction. 12 C.F.R. § 202.4(a). Although age is a prohibited basis<sup>2</sup>, Regulation B permits age to be used as a predictive variable

[i]n an empirically derived, demonstrably and statistically sound, credit scoring system . . .

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12 C.F.R. § 202.6(b)(2)(ii).

To qualify as “empirically derived, demonstrably and statistically sound,” Regulation B mandates, among other requirements, that the system be

(iii) Developed and validated using accepted statistical principles and methodology; and

(iv) **Periodically revalidated by the use of appropriate statistical principles and methodology and adjusted as necessary to maintain predictive ability. [emphasis added]**

12 C.F.R. § 202.2(p)(1)(iii), (iv).

(11) OCC and evaluation of age discrimination, a specific investigation. (“OCC: II”)

Please see, <http://www.occ.treas.gov/publications/publications-by-type/economics-working-papers/2008-2000/wp2005-2.pdf>,

Searching for Age and Gender Discrimination in Mortgage Lending Jason Dietrich and Hannes Johannsson. Office of the Comptroller of the Currency Economic and Policy Analysis Working Paper. August 2005

Abstract: This paper tests for the presence of age and gender discrimination in the loan underwriting process. We modify the tools used during the past exams to test for racial discrimination and apply them here to test for the presence of disparate treatment on the basis of age and gender. Using HMDA data along with data from 18 fair lending exams recently conducted by the OCC, between 1996 – 2001, **we find no evidence of systematic discrimination on the basis of age or gender.** Further, the tools used and tested for in this analysis are now readily available for use in future fair lending exams. **[emphasis added]**

Please note, I differ with their conclusions, from review of their published data. This next section presents my alternate conclusions from their data. As an alternate statement of their conclusions, the discussion is necessarily long, to explain disagreement.

I start with summarizing their methodology. They use a statistical approach that has found race-based statistical disfavoring. (I use ‘**disfavoring**’ in preference to **discrimination**; in this usage ‘disfavoring’ is a quantitative term, discrimination is a legal term .)

They apply this methodology in secondary analysis, to data collected for race-discrimination examination; they apply it first to gender, and second to age. Their data are from eighteen bank-inspection sites. OCC inspects banks and prioritizes resources according to areas of discrimination.

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They start by searching for gender loan-discrimination, presuming equal credit-worthiness for Female and Male, expecting find to F-disfavoring. Of eighteen exams (bank-sites) two statistically favor F and one favors M. From this low occurrence of statistical disfavoring, in offsetting directions, they conclude no gender differences exist. (These data are NOT presented here, and may only be reviewed at the original source.)

They then apply this statistical model to age. These data ARE presented next, their Table 4, where 'seniors' are GE 62 ("GE" is Greater than or Equal to), and Table 6, where 'seniors' are GE 55.

These data are presented next because I will be discussing them a some length. Discussion follows after the data presentation.



**Table 4: Test of Differences in Denial Percentages by Age for 10 Lenders Recently Examined by the OCC**

Statistics are weighted to account for non-proportional sampling.

| Exam | Young (24 and under) vs. all other ages |        | Elderly (62 and older) vs. all other ages |        |
|------|-----------------------------------------|--------|-------------------------------------------|--------|
|      | Denial Rate Disparity                   | Chi-sq | Denial Rate Disparity                     | Chi-sq |
| 4    | 1.16                                    | 0.42   | 1.55                                      | 0.04   |
| 7    | 1.39                                    | 0.23   | 0.63                                      | 0.13   |
| 8    | 1.96                                    | 0.00   | 1.94                                      | 0.30   |
| 9    | 1.61                                    | 0.00   | 0.42                                      | 0.00   |
| 10   | 1.89                                    | 0.01*  | 0.90                                      | 0.16   |
| 11   | 4.48                                    | 0.00*  | 1.18                                      | 0.32   |
| 12   | 1.69                                    | 0.00   | 1.00                                      | 0.94   |
| 14   | 1.94                                    | 0.00   | 0.90                                      | 0.18   |
| 16   | 1.16                                    | 0.39   | 0.91                                      | 0.78   |
| 17   | 0.46                                    | 0.26*  | 0.38                                      | 0.75   |

\* Based on Fisher's Exact test, because of small strata sizes.

Gray shading indicates the null hypothesis that there is no association between the denial rates, and the prohibited factor can be rejected at the 95 percent confidence level.

**Table 6: Multivariate Tests of Age Differences for 10 Exams Recently Conducted by the OCC**

Model specification is identical to the final model specification used during the exam.

A weighted logit estimator is used to estimate each model.

The dependent variable equals 1 if applicant is denied and 0 otherwise.

The age group 41 – 54 is the excluded category.

95 percent confidence levels are used for hypothesis tests.

| Exam | N   | Psuedo-Rsquare | Age 30 and under |             | Age 31 to 40 |             | Age 55 and older |             |
|------|-----|----------------|------------------|-------------|--------------|-------------|------------------|-------------|
|      |     |                | Sign             | Significant | Sign         | Significant | Sign             | Significant |
| 4    | 281 | 0.33           | Negative         | No          | Negative     | Yes         | Negative         | No          |
| 6    | 345 | 0.46           | Negative         | No          | Negative     | No          | Negative         | No          |
| 7    | 425 | 0.45           | Negative         | No          | Negative     | No          | Positive         | No          |
| 8    | 322 | 0.39           | Negative         | No          | Negative     | No          | Positive         | No          |
| 9    | 494 | 0.57           | Negative         | No          | Negative     | No          | Positive         | No          |
| 10   | 293 | 0.51           | Positive         | No          | Positive     | No          | Positive         | No          |
| 11   | 457 | 0.62           | Positive         | No          | Negative     | Yes         | Positive         | No          |
| 12   | 306 | 0.42           | Positive         | No          | Positive     | No          | Positive         | No          |
| 13   | 232 | 0.28           | Negative         | No          | Negative     | No          | Positive         | No          |
| 14   | 340 | 0.48           | Negative         | Yes         | Negative     | No          | Negative         | No          |

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For age 62-plus, they find, p.8:

Table 4 presents the weighted denial rate disparity results for the 10 exams where age data were available. Gray shading indicates the null hypothesis that there is no association between the denial rates, and the prohibited factor **was rejected** at the 95 percent confidence level based on a chi-square test statistic. **[emphasis added]**

(A word on statistical language here: statisticians evaluate the ‘null-hypothesis,’ defined as ‘no-relation’ between the variables under examination, herein, ‘no relation’ between age and lending decisions. ‘Rejecting’ the null hypothesis, means there is NOT ‘no relationship’ (a double negative) and, by default, there is YES a relationship between the variables, herein age and lending decisions.

As the table shows, for young applicants, the null hypothesis of no association is rejected at the 95 percent confidence level for six of the 10 exams.

For elderly applicants, the null hypothesis is rejected for three of the 10 exams. Compared with the bivariate gender results from Table 1, age appears to present more fair lending risk. [emphasis added]

For six of ten exams (bank lending sites), the young are statistically disfavored. For three of ten lending sites examined, seniors (GE 62) were disfavored.

They continue their analysis, see p.8, discussing Table 6

The final model from the fair lending exam again is the specification we estimate, with the race indicator variables replaced by age indicator variables. Similar to the gender analysis, the dependent variable equals 1 if the applicant is denied and 0 otherwise, and we use a weighted logit estimator to estimate each model. The age group 41 to 54 is always the excluded category, so all age estimates are relative to that age group. Individuals aged 41-54 are typically in the highest earnings period of the life cycle, settled down, have jobs and income stability, and assets and wealth. **As a result, if lenders discriminate on the basis of age by using age as a proxy for creditworthiness, we would expect the coefficients on each of the other three age groups to be positive. [emphasis added]**

Comment: ‘Positive’ shows disfavoring, ‘Negative’ shows no disfavoring. .

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They find:

Table 6 shows the results for the 10 exams. Applicants age 55 and older appear more likely, in general, than applicants 41 to 54 to be denied, **as seven of the 10 exams show a positive coefficient estimate. [emphasis supplied]**

They note:

**However, none of these results were statistically significant at the 95 percent confidence level. [emphasis added] [see Comment (1) next]**

**[Comment 1:]** We should not so quickly dismiss that when seven of 10 coefficients are elder-disfavoring, even if each individually not significant, that no cumulative pattern or trend exists:

Were elderly and non-elderly equally credit-worthy, as the authors assert for gender analysis, what is the likelihood of three of ten results statistically disfavoring seniors (Table 4), and seven of ten, non-statistical, disfavoring seniors (Table 6)?

Data presented below, in section 7, show that seniors have lower loan-failure rates, while ‘young’ have higher loan-failure rates. This age/ loan-performance divergence is at least provocative, yet the authors make no reference to credit-worthiness, i.e., loan-performance, stating instead, @ page 9:

**Overall, these results suggest that lenders are not considering age during the underwriting process. [emphasis added]**

This summation, ‘lenders...not considering age,’ given performance divergence by borrower age, seems to require explanation, which is offered, @ page 9.

**By controlling for the legitimate economic factors that lenders consider during the underwriting process, many of the statistically significant effects from the bivariate analysis presented in Table 5 disappear. This matches our expectations that age is highly correlated with these economic factors. [emphasis supplied] (see Comment (2) below)**

Consider: “**age is highly correlated with these economic factors.**” We have absolutely NO REASON for this **expectation**, and none is supplied. Further, we have TWO age groupings, the Young, variably defined, and Seniors, variably defined, **and divergent outcomes.**

I submit that, per data presented by these authors, this ‘matches expectations’ is mere assertion, inconsistent with above federal statistical criteria and requirements, as to predictive power.

Their conclusion is arguable: given the directionality of the seniors’ data, age discrimination is the parsimonious and likely explanation. Again, see section 7, next, for presentation that seniors, have preferable loan-payment rates, contrary to the here-asserted poorer credit predictors. (We will return

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to this, for seniors, loan disfavoring along with payment superiority.)

Intermediating and adverse-outcome mitigating variables. The authors globally and non-specifically introduce ‘economic factors’ as intermediating mitigating variables, to offset or undo age-disfavoring results. Once we start to mitigate ECOA-group adverse findings, by intermediating explanatory variables, we are likely to find that all ECOA-protection (e.g. race) ‘goes away’. Indeed this is exactly what the Boston Fed mid-90s redlining analysis found, that a bank’s discretionary insistence Private Mortgage Insurance ‘explained away’ redlining.

The PURPOSE of Disparate Impact Law is to precisely identify these ‘intermediating, bias-mitigating’ variables, and statistically exclude them, to develop alternate credit-evaluation criteria, or in the alternative, to show inescapable “Business Necessity.” These authors have not done so.

The purpose of THIS paper is to show that NO SUCH “Business Necessity” exists, by minimal review of published data, and that alternate criteria are fully available.

Comment 2: “By controlling for the legitimate economic factors that lenders consider during the underwriting process...”

This is circular logic: the authors assert ‘legitimate economic factors’ yet the allegation herein is that ‘legitimate economic factors’ are explicitly **not legitimate**, precisely per Disparate Impact Law.

Disparate Impact law requires that we specify these ‘legitimate...factors.’ The purpose and need for specificity is to permit statistical evaluation of ‘Business Necessity’ or ‘less intrusive alternate credit-evaluation criteria,’ e.g., stepwise regression, following data-reduction (factor-analysis, e.g. to control for predictor covariation), to identify **incremental predictive power** for loan payment/default, OTHER than those disproportionately burdening the elderly or the retired.

(11.1) SUMMARY. The data show statistically significant, and trend, results -- disfavoring the of elderly, even as the authors conclude otherwise.

The authors ‘explain away’ this age-disfavoring result, **“By controlling for the legitimate economic factors that lenders consider during the underwriting process...”** - thus ‘resolving’ (explaining away) the issue under review and dispute herein, by research fiat.

SPECULATIVE CONCLUSION AND DISCONFIRMABLE HYPOTHESES.

We may combine age-discrimination, presented here, at least somewhat, perhaps only heuristically, and loan-performance data, next, as follows:

If seniors **are properly** denied loans, as less credit-worthy, as the authors conclude, at the ‘explained-away’ above-average loan-denial rate, then loan-failure rates for **seniors** should equal loan failure generally. Otherwise stated, legitimacy of inclusion of unspecified unexamined purported legitimate economic factors can be measured by outcomes, loan-failure.

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In the alternative, if seniors are **improperly** denied loans, analytic parsimony says that seniors who are loan-approved have overcome this disfavoring bias, leaving only superior credit-worthy seniors in the approved-borrower pool, for whom we should find superior loan performance. (We may, and will, test proper vs. improper loan-denial hypothesis also for the younger borrower, measuring loan-failure or payment /non-payment rates.)

In other words, seniors who have survived this discriminatory process were held to a higher standard, and should have superior loan-payment rates.

This is exactly what we will find next, superior loan performance by seniors (and poorer performance for 'young').

**(12) Harvard JCHS: W10-8, predictors to mortgage default.**

We make two analyses here; (a) what do we know about loan-failure; and (b) what do we know about age of borrower and loan-failure?

Please see, **Table 2: Modeled Probabilities of Missing Mortgage Payments**, which I have reformatted, replacing the VIF column, absolute value, by the p. (prob) level, presenting only the significant or near-significant results (p. le .10).

The data are presented next, followed by discussion.

Discussion here looks first at what DOES predict to loan failure. DTI is nowhere found as a predictor. Other predictors are found.

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| | | Missed | Missed 4+ | | |
|------|---|---------------|------------|----------|------|
| | | payment | payments | | |
| | | All borrowers | Delinquent | | |
| item | | | prob | prob | |
| num | item name | log odds | | log odds | |
| 1 | Race/Ethnicity - Minority [not non-Hispanic white] | 0.08 | | 0.01 | |
| 2 | Family Type – Married | -0.10 | | -0.19 | |
| 3 | Family Type – Children in household | 0.43 | | 0.14 | |
| 4 | Age of Bankruptcy Filer - Age 35 and under | -0.30 | | -0.64 | |
| 5 | Age of Bankruptcy Filer - Over age 55 | 0.09 | | -0.31 | |
| 6 | Education - High school graduate or less | -0.02 | | 0.46 | |
| 7 | Education - College graduate or higher | 0.30 | | -0.64 | 0.90 |
| 8 | Employment – Household head was self employed | 0.04 | | 0.93 | 0.95 |
| 9 | Income - Head or spouse experienced a gap | 0.05 | | 0.24 | |
| 10 | Income - Household experienced a drop | 0.65 | 0.99 | 0.20 | |
| 11 | First time homebuyer | -0.05 | | 0.21 | |
| 12 | Mortgage Loan - Used a mortgage broker for original loan | 0.50 | 0.95 | -0.32 | |
| 13 | Mortgage Loan - Original loan was an adjustable rate mortgage | 0.10 | | -0.55 | |
| 14 | Filed Chapter 13 bankruptcy | 0.66 | 0.95 | -0.48 | |
| 15 | Filed bankruptcy because of burden of mortgage payments | 1.11 | 0.95 | 0.03 | |
| 16 | Filed bankruptcy because of constant debt collectors | 0.64 | 0.95 | -0.19 | |
| 17 | Filed bankruptcy because of medical reasons | -0.09 | | 0.05 | |
| 18 | Coped with bills by borrowing from family/charity | 0.64 | 0.95 | 0.31 | |
| 19 | Coped with bills by relying heavily on credit cards -0.81 | -0.82 | 0.99 | -0.56 | 0.90 |
| 20 | Had bad access to mainstream credit | 0.77 | 0.99 | 0.22 | |

Consider first, the second column, “Missed 4+ more payments/ delinquent”

I have numbered the items, for convenience of reference: there are twenty items.

When we use a $p < .05$ (or .95) level of significance, we will get .05 or 5% of results to be significant, or one of twenty. This is exactly our result, one item, **Item 8**, one of twenty achieves the 5% significance level. We may have random data.

By extension, using a $p < .10$ (or .90) level of significance, we get .10 or 10% of results to be significant, or two of twenty. This is almost our result, relaxing the p-level to .10 gives us two additional items, **Items 7 and 19**, for a total now of three items of twenty at the 10% significance level. We may consider three to be two, for this purpose of evaluating whether we have random data. By using this test, of the number of significant results, three of twenty, when we would expect two of twenty, we may conclude that these data are not patterned with respect to these predictors and outcomes.

By contrast, the column titled “Missed payment/ all borrowers” shows **eight of twenty significant** (with no relaxation of p. significance level). We may consider that these data are indeed patterned, that is, have causal relationship (or aligned variables, at least, holding aside alternate causality vs. predictor correlation).

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**(12.1) What predicts to mortgage failure:**

Let us now examine these patterned data, for all borrowers, one missed payment..

These data are subset of data, reformatted for visual emphasis. I have selected only the patterned data, and rank ordered the results by their significance.

**Data from W10-8, Table 2, reformatted, ranked by significance of relationship**

| Table 2, Missed Single Payment     |                                                               |  |          |      |
|------------------------------------|---------------------------------------------------------------|--|----------|------|
| items rank-ordered by significance |                                                               |  |          |      |
| item num                           | item                                                          |  | log odds | prob |
| 19                                 | Coped with bills by relying heavily on credit cards           |  | -0.820   | 0.99 |
| 10                                 | Income shock - Household experienced a drop                   |  | 0.650    | 0.99 |
| 20                                 | Had had access to mainstream credit                           |  | 0.770    | 0.99 |
| 12                                 | Mortgage Loan - Used a mortgage broker for original loan      |  | 0.500    | 0.95 |
| 16                                 | Filed bankruptcy because of constant debt collectors          |  | 0.640    | 0.95 |
| 18                                 | Coped with bills by borrowing from family/charity             |  | 0.640    | 0.95 |
| 14                                 | Filed Chapter 13 bankruptcy                                   |  | 0.660    | 0.95 |
| 15                                 | Filed bankruptcy because of burden of mortgage payments       |  | 1.110    | 0.95 |
| 4                                  | Age of Bankruptcy Filer - Age 35 and under                    |  | -0.300   |      |
| 2                                  | Family Type - Married                                         |  | -0.100   |      |
| 17                                 | Filed bankruptcy because of medical reasons                   |  | -0.090   |      |
| 11                                 | First time homebuyer                                          |  | -0.050   |      |
| 6                                  | Education - High school graduate or less                      |  | -0.020   |      |
| 8                                  | Employment - Household head was self employed                 |  | 0.040    |      |
| 9                                  | Income - Head or spouse experienced a gap                     |  | 0.050    |      |
| 1                                  | Race/Ethnicity - Minority [not non-Hispanic white]            |  | 0.080    |      |
| 5                                  | Age of Bankruptcy Filer - Over age 55                         |  | 0.090    |      |
| 13                                 | Mortgage Loan - Original loan was an adjustable rate mortgage |  | 0.100    |      |
| 7                                  | Education - College graduate or higher                        |  | 0.300    |      |
| 3                                  | Family Type - Children in household                           |  | 0.430    |      |

**Examination of these items shows NO connection to Debt-To-Income, the thesis of this paper.**

**Item 19, “coped...by... credit cards.”** As the authors discuss, the strongest (negative) predictor to a missed payment (negative means “didn’t miss”) is use of credit cards. Phrased in the reverse, access to credit predicts to continued loan payment. This is not surprising, and as always, data which confirm our intuitions (non-counter-intuitive) are always reassuring.

Access to credit cards may be taken as a proxy for good credit scores/ credit history, and so we may see that CREDIT SCORES AND HISTORY are the BEST predictor for outcomes, here predicting to non-default. Back to our seniors, if they have good credit, this finding should apply. **NOTHING in DTI pertains to credit.**

**Item 10, “income shock”** again, as intuitive, predicts to non-payment. **NOTE: DTI at time of loan**



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does not, and cannot, predict to income shock.

Nothing here informs us about DTI, or Income At Time Of Loan.

Retired persons, simply put, cannot lose their jobs, and so do not suffer income shocks based on employment.

Item 20, “Household has bad access to mainstream credit,” predicts at $p < .01$, to missed payments; This is almost certainly an inverse to item 19; and likewise tells us that **credit predicts to outcomes; DTI does not.**

The remaining $p < .05$ variable, **Item 18, “Coped with bills by borrowing from family/ charity.”**

This may be interpreted variously. I expect that this is the inverse of credit scores card access; folks with credit cards do not borrow from family and charities. This is speculative.

However, since bankruptcy discharges credit card debt, the planned defaulter, who wishes to buy time, will max the credit cards, buy some time, lose the house anyway, and walk away.

To borrow from family, with the imminence of default, and possible or probable non-repayment, means to impose on and destroy family financial ties, speculatively, and is a sign, again, of bad credit leading to default, and also family or charitable exhaustion. I expect that borrowing from family is different from borrowing from a charity; only the data can tell us.

(12.1.1) Interim Summary.

Credit access predicts to payment; “income shock” predicts to non-payment.

(12.2) What does age tell us about mortgage failure?

Please consider Table 4, inserted next page.

Two data columns are presented:

- the first is for two-stage -least squares (2SLS) analyses;
- and the second for ordinary least squares (OLS) analysis.

The coefficients as cell entries are negative or positive. Positive means YES predicts to delinquency, negative means NOT predict to loan delinquency. Cell entries are also described as statistically significant or not.

Statistical significance is denoted by symbol:

- * : significant at the 99% level
- ** : significant at the 95% level
- ~ : significant at the 90% level

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Table 4: Results of 2 Stage Least Squares Models – Delinquent Borrowers Only<sup>13</sup>

|                                                               | 2SLS Foreclosure Initiated                   | OLS Foreclosure Initiated                            |
|---------------------------------------------------------------|----------------------------------------------|------------------------------------------------------|
| Universe                                                      | All Delinquent:<br><i>1+ Missed Payments</i> | Moderately Delinquent:<br><i>3-5 Missed Payments</i> |
|                                                               | Coefficient                                  | Coefficient                                          |
| Intercept                                                     | -0.40                                        | 0.27                                                 |
| Number of Mortgage Payments Missed (Predicted)                | 0.22 *                                       |                                                      |
| Race/Ethnicity - Minority [not non-Hispanic white]            | 0.20 *                                       | 0.18                                                 |
| Family Type – Married                                         | -0.07                                        | -0.17                                                |
| Family Type – Children in household                           | -0.17 **                                     | -0.17                                                |
| Age of Bankruptcy Filer - Age 35 and under                    | 0.23 **                                      | 0.30 ~                                               |
| Age of Bankruptcy Filer - Over age 55                         | -0.18 ~                                      | -0.45 *                                              |
| Education - High school graduate or less                      | -0.05                                        | -0.03                                                |
| Education - College graduate or higher                        | -0.03                                        | 0.18                                                 |
| Employment – Household head was self employed                 |                                              | 0.16                                                 |
| Income - Head or spouse experienced a gap                     |                                              | 0.42 *                                               |
| Income - Household experienced a drop                         | -0.02                                        | 0.00                                                 |
| Home was a mobile home                                        | -0.15 ~                                      | -0.10                                                |
| First time homebuyer                                          | 0.01                                         | 0.10                                                 |
| Mortgage Loan - Used a mortgage broker for original loan      | 0.17 **                                      | 0.01                                                 |
| Mortgage Loan - Original loan was an adjustable rate mortgage |                                              | -0.14                                                |
| Filed Chapter 13 bankruptcy                                   | 0.04                                         | -0.11                                                |
| State foreclosure process timeline in quickest 33% of states  | -0.04                                        | 0.26                                                 |
| State foreclosure process timeline in slowest 33% of states   | -0.18 **                                     | 0.04                                                 |
| Filed bankruptcy because of burden of mortgage payments       | 0.17 **                                      | 0.32 *                                               |
| Filed bankruptcy because of constant debt collectors calls    | -0.08                                        | 0.06                                                 |
| Filed bankruptcy because of medical reasons                   | 0.02                                         | 0.21 ~                                               |
| Coped with bills by borrowing from family/charity             | -0.04                                        | 0.03                                                 |
| Coped with bills by relying heavily on credit cards           |                                              | -0.20 ~                                              |
| Had bad access to mainstream credit                           | 0.19 *                                       | -0.07                                                |

<sup>13</sup> Significance of coefficients were obtained from heteroskedasticity-consistent regressions using methods HC4 as described in Hayes, Andrew F. & Li Cai. 2007. "Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation." *Behavior Research Methods*, 39 (4), 709-722. F statistics and coefficient significances displayed use heteroskedasticity-consistent controls.

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Age is reported in Table 4, our predictor variable of interest for this report. It is reported twice:

- 'Age of bankruptcy filer - Age 35 and under' ('young')
- 'Age of bankruptcy filer - Over age 55.' ('seniors')

(We are again at an analytic disadvantage, with variable definitions of 'age.' Even so:)

Note: This table uses negative coefficients to predict AWAY from delinquency, positive coefficients predict TO delinquency.

For our group of interest, **seniors**, in column titled 2SLS have a coefficient of -0.18, significance of $p > .90$, marginal; and column titled OLS has the coefficient of -.45, ($p > .99$). Hence: Seniors are less likely to default, than average.

As a contrast group, '**young**' delinquency is predicted at a positive 0.23 ($p > .95$) for 2SLS column; and positive .30 (marginal $p > .90$), for OLS. Hence: the young are more delinquent than average, the old less delinquent than average.

The authors comment themselves on this, to explain (vs. 'explain away.") see p.19.

Younger borrowers may be more exposed to foreclosure for a number of reasons not controlled in this model. They have had fewer years to build credit, build equity in their homes, or build savings for emergency expenses, while at the same time they may have lower wages or less tenure giving them more tenuous employment situations.

See also at page 19, for the direct statement of this:

Being older (over age 55) was also associated with a lower likelihood of being initiated with foreclosure. As described in the case of younger householders, older householders may have more equity built up, longer credit histories, and more stable income sources, and more savings that may enable them to self-cure their delinquency even in the time of a bankruptcy.

(12.3) There is a passing comment on DTI, @ p. 8:

This includes critical factors that may affect the likelihood of cure, such as a direct measure of contemporaneous credit scores, as well as other critical missing elements such as the loan amount at the time of the bankruptcy filing, the loan-to-value ratio at the time of serious delinquency or foreclosure filing, and the debt-to-income ratios at the time of loan origination. Although data were collected on some of these variables, the number of missing values of them [fn 3 Appendix tables A-1 and A-2] provide additional descriptive statistics

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about the housing telephone in our sub-sample was too great and the bias too systematic between the cases in our sub-sample with and without these missing variables to include them in our models. [fn 4]

[fn 4] 4 We did try running models using these variables to see if we could extract any usable information about them despite the large number of missing values and systematic bias in missing values. **Results are volatile, but suggest that having a high original mortgage payment to income ratio has a positive impact on the number of missed payments, [emphasis supplied]** and low loan levels at bankruptcy have a negative impact. See Appendix A for further discussion.

Mortgage-payment-to-income ratio (not quite DTI, but perhaps close enough for our discussion), makes a **single appearance in the entire report, in a footnote, found in ‘volatile’ results**; and we are referred Appendix A for further discussion but Appendix A has no further discussion.

**(12.4) SUMMARY: HARVARD JCHS WO10-8 DATA POINT AWAY FROM DTI**, and point towards credit. For these data-grounded reasons, DTI, should be discarded, as we seek to comply with Disparate Impact prohibitions on seniors and instead rely on credit indicators. (DTI makes a single “volatile” appearance in these data, in a footnote, with results not achieving report-worthiness).

**(13) Further commentary. Hypothetical or non-hypothetical borrower, moral hazard vs. playing by the rules.**

**(13.1) Geezers, coots, oldsters, and victims.**

Consider now our statistical “composite preferred risk senior mortgage borrower.” This is a retired person, who lives on assets, comfortable, has low income (perhaps by choice), unlikely to have shocks, with high equity, and high credit scores and payment history.

Asset liquidation, controlled, measured, under the borrower’s sole discretion, episodic as needed, is de facto a reverse mortgage, self-managed, by the borrower. After a lifetime of financial management, people are able, we should consider, to manage life-cycle finances, given that lenders are protected by equity, which as we have seen is the premier predictor for Loss Given Default.

Our non-hypothetical senior cannot get a loan, from the same FNMA with lack of competence at portfolio management. BUT our taxpayer resources are devoted to the moral hazard borrower, and to the moral hazard lender as well. Everyone gets into the taxpayer pocket except the folks who played by the rules.

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(14) FNMA, fiscal conservatism, and Maximum Adverse Construal:

Assets, imputed income, thirty year percentage-yield predictions, income fluctuations, income loss on assets.

The aggrieved frustrated borrowers report that FNMA (or its dependent lenders) accommodate assets into an income model, via 'projected interest' at 4% annually. This is of course nonsense. No thirty year imputed percentage is possible; but we cannot by now be surprised by FNMA imaginary numbers .

Once FNMA has imputed income (from assets) at this invented fixed 4% interest, FNMA then looks at expenses (from variable interest rates), maximized at 10%, with loan worthiness projected not on 4% income but again 10% expenses. Thus borrowers get low imputed interest income, but high imputed interest expense. This is, we may say, Maximum Adverse Construal, proper for long-term conservative fiscal management.

FNMA likewise 'adjusts' income from rental properties, by a fiat one-size-fits-all reduction of income by 25%, presumably for costs, vacancy time, etc. This obviously rewards the profligate or incapable, and penalizes the capable. This is not even fiscally prudent Maximum Adverse Construal. This is, charitably, decision-making in the absence of data. We will not speculate as to motive.

HOWEVER, as by now we are informed ad tedium, there is NO PROJECTION for lost income, once the loan is sold to the 'greater fool' down the line. NO Maximum Adverse Construal where it counts, lost income.

(14.1) FNMA, summarized:.

Maximum adverse construal at the economic margins, automatic and data-free income adjustments, for rental income, (where data are available), and incomprehensible omission of lost-income, once the loan is resold to the 'greater fool' downstream.

(15) Conclusion; entreaty to FNMA and its heirs.

This is a niche victim-sector of course. From anecdotal information, it is much larger. Further, in discrimination analysis, we never see the discouraged applicant, so we just do not know how big the pool is, how extensive the injustice is.

To find these discouraged lenders is possible, we have advertising campaigns to do so, but not easily, and well beyond the resources of these folks who played by the rules for a lifetime, and are now tired of being played by the rules, in return.

The heirs and survivors and current occupants of FNMA etc have, I submit, a responsibility to undo or mitigate the damage caused by these idiotic policies,

(16) APPENDIX A: PRICE POINT ANALYSIS, EXPANDED

(16.1) Price-point: what is our optimal marketing (pricing) decision to maximize yield.

Our microeconomic (individual) ‘pricing’ decision is the credit attribute threshold to approve or disapprove loans. If our criteria (threshold) are too strict, we have few failures, but few successes. In the reverse, for criteria (loan-threshold) that are too lax, we have many failures and many successes. Either approach generates a profitability model, but either also creates a predictor model.

We might seek lender profit maximization, via safe loans, optimally priced, with optimal loan-threshold, adjusted for the external social disutility of mass foreclosures, but, perhaps we seek to maximize successful loans, ie, home ownership, thus maximizing the number of successful loans, NOT profit maximization for the lender.

(16.2) Price-point tell us how to work backwards from loan-default to loan-approval.

If Gender F has equal (or equalized) loan approval rates, as per OCC’s own analysis, but uneven failure rates (unreported), then the criteria are set unevenly across gender, IF we seek to equalize, and optimize, loan-failure.

An example may illustrate. Consider FICO scores as pass-fail indicators for a loan. If both M and F are granted \$X,000 based on FICO NNN (in the alternative, loan-approved at 65%) but M default at 3% while F default at 6%, then the same FICO score, which predicts differently for M v. F, cannot be used to screen for equal outcomes, loan-failure.

We should, I submit, find FICO (or other predictor) score that equalizes the loss rate, across ECOA-demographics.

Within this example, IF we found, that a 50-point FICO difference in loan-approval favoring Gender M (or F) produced an equivalent default rate, of 3%, would we be obliged to do so under Disparate Impact law. I submit the preliminary answer is yes.

Plausibly we could ‘explain away’ the differences by an empirical predictor variable (we might find differences in wealth management and income/expense cash-flow impulse purchase management, differentially associated with gender), and if so, we could then neutralize or ‘explain away’ or parse the gender variable by a more abstract economic variable, ratio of income to savings, for example.

And so we might find ‘thrift’ is distributed unevenly across gender. We find in global poverty-level microcapitalism, that women are better borrowers/ re-payers than men.

But ‘explaining away’ outcomes by intermediate variables, is dangerous, as shown above, the original mid-1990s ‘redlining,’ was ‘explained away’ by an intermediating variable.

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Thus, loan criteria may be used to work backwards, from failure, to our available predictors. Accordingly, loan-approval (denial) rates must be aligned with loan-failure rates. Further, we need not wait for default; we might merely look at one or another of our intermediate loan-failure predictor variables, such as missed payments.

Back to seniors: if fewer seniors are granted loans, and fewer seniors' loans fail, then seniors are held to a too-high standard. That is, seniors should fail at the same rate as any other identifiable ECOA group. Whether seniors should fail at the same rate as African Americans or women, is a separate question, but we start with an initial yes.

**(16.3) DISPARATE IMPACT.**

We have not yet specifically addressed **Disparate Impact**, the central theme of this paper.

By simple enough extension, though, our empirical and analytic model should tell us which set of borrower attributes, the microeconomic indicators, predicts to ECOA-borrower loan-failure levels.

In the research proposed herein, via secondary data review, if seniors have **lower** loan-failure rates and but equal FICO (DTI, etc etc etc) scores, then we must lower their FICO (etc) approval threshold so as to **increase** their loan-failure rate to the overall cross-group loan failure rate.

If not, we are discriminating, and **IF** FICO (or DTI) can 'explain away' seniors' lower loan-failure rate, and **IF** we eliminate the equal DTI threshold, to let seniors have credit with lower DTI but higher 'thrift' measures, and so equalize loan failure as an outcome, then we must do so.

By extensions, if F's lower DTI but higher 'thrift' is followed by lower F loan failure, we would be obliged, by Disparate Impact theory, to lower DTI threshold, as an available alternative for loan-approval and loan-failure, so as to predict empirically equalize the M-F based loan failure rate.

**(16.4) SUMMARY: PRICE-POINT PREDICTIONS, COMMENTS:**

In sum, what is the senior loan-default rate, compared to the failure rate of others. **PREDICTION:** Herein, I predict that seniors have superior loan-performance rates, once we equalize on the recommended preferred predictor variables here, equity, assets, credit history.

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(17) APPENDIX B: DISPARATE IMPACT:
DEPARTMENT OF THE TREASURY BANK EXAMINER GUIDELINES

(17.1) For Office of Thrift Supervision, please see, <http://www.ots.treas.gov/files/422333.pdf>

Office of Thrift Supervision August 2009 Examination Handbook p. 1201A.1

A. Structure and Organization of the Scoring System

Determine the utilization of credit scoring at the institution including:

For each customized credit scoring model or scorecard for any product, or for any credit scoring model used in connection with a product held in portfolio, identify and obtain:

The types of monitoring reports generated (including front-end, back-end, account management, and **any disparate impact analyses**), the frequency of generation, and recent copies of each. (emphasis added)

(17.2) For Office of the Comptroller of the Currency, please see, <http://www.occ.treas.gov/topics/consumer-protection/fair-lending/index-fair-lending.html>

Fair Lending

The Fair Housing Act (FHA) and Equal Credit Opportunity Act (ECOA) protect consumers by prohibiting unfair and discriminatory practices. Read OCC's Answers about Consumer Loans and Answers about Consumer Mortgages for more information.

Discrimination

The FHA prohibits discrimination in residential real estate-related transactions based on...

- Race or color
- National origin
- Religion
- Sex
- Familial status
- Handicap
-

The ECOA prohibits discrimination in credit transactions based on

- Race or color
- National origin
- Religion
- Sex
- Marital status

~~~~ IS GRAYLINING THE NEW REDLINING? ~~~~

- Age*
 - Applicant's receipt of income from a public assistance program
 - Applicant's exercise, in good faith, of any right under the Consumer Credit Protection Act
- *Age is a prohibited factor provided the applicant has the capacity to enter into a contract.

Disparate Impact

A lender's policies, even when applied equally to all its credit applicants, may have a negative effect on certain applicants. For example, a lender may have a policy of not making single family home loans for less than \$60,000. This policy might exclude a high number of applicants who have lower income levels or lower home values than the rest of the applicant pool. That uneven effect of the policy is called disparate impact.

Disparate Treatment

Illegal disparate treatment occurs when a lender bases its lending decision on one or more of the prohibited discriminatory factors covered by the fair lending laws. For example, if lender offers a credit card with a limit of \$750 for applicants age 21 through 30 and \$1,500 for applicants over age 30. This policy violates the ECOA's prohibition on discrimination based on age.

(18) APPENDIX C. AUTHOR BIOGRAPHY

Martin Heilweil received his PhD from the University of Michigan in 1973, in Social Psychology, an intensive interdepartmental program, which trained in both empirical social science methods (including statistical analysis, database management, computer science, and research design), and also trained in clinical psychology issues and methods. Training included a third substantive area, small group dynamics, for both quantitative and clinical evaluation. Undergraduate work was at Columbia College, for social science.

Proprietary (commercial) work includes:

financial analyses (damages), litigation support (2nd Federal Circuit patent infringement, for a Big Eight accounting firm); financial outcome research for a major credit card promotional intervention (time sensitive, zero error tolerance); statistical (financial and legal) evaluation for several land use litigation matters (zero error tolerance), with one as pro bono community liaison; statistical and data management (clinical trials) for pharmaceutical NDA (New Drug Application) for FDA approvals (zero error tolerance).

Non-proprietary work includes policy intervention and evaluation for methods and outcomes:

child support enforcement (intensified), combined Federal, New York State, New York City demonstration intervention project (financial, administrative, cost-benefit analysis); urban criminology, intervention and outcome (national praise for an innovative, simplified, and successful statistical approach); drug law enforcement, processes and outcomes of intensified prosecution, ripple effects in court and prison; drug and polydrug perinatal use, remediation (zero error tolerance); biostatistician, cancer interventions, outcome research (retrospective open-label treatment comparisons) (zero error tolerance). child development and behavior change in a successful preschool intervention for the disadvantaged (doctoral work);

Litigation Support: Dr. Heilweil has provided substantial litigation support research service in technology and data and database review.

Direct litigation support includes written and oral presentations to judicial and administrative law forums; litigation management via strategic legal planning; witness preparation; Westlaw specialization; and, per psychological graduate training, and many years of legal immersion, jury consultant (defense) in one white collar criminal prosecution.