FTC Studies of Credit-Based Insurance Scores

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Federal Trade Commission

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FACT Act of 2003 – Required Study

- Background on credit scores and credit-based insurance scores ("state of the world")
- Study of effects of credit scores and credit-based insurance scores on:
  - Price and availability of credit and insurance products
  - Negative or differential treatment of protected classes under the ECOA (and other defined groups)
    - Laid out a specific model to estimate (omitted variable bias test)
    - "Disparate impact" type analysis, with score-building mandate
- FTC Study on automobile insurance released in July 2007
- Underway: FTC study of homeowners insurance

Outline of Talk

- Data
- Basic relationship between scores and risk
- Distributional differences in scores by race, ethnicity, and income
- Scores as a proxy for race, ethnicity and income
  - Within-group relationship
  - Omitted variable bias
- Score-building
- Homeowners update

Data

- Policy data – Subset of the "EPIC Database"
  - 5 firms, ~27% of the market
  - 1.4MM policies, 1.8MM earned car years
  - Analysis subset: 275K policies, 400K earned car years
  - Policy data
    - Claims
    - Underwriting and rating variables
  - ChoicePoint Attract credit score

- Race and Ethnicity Data – 3 Sources
  - Social Security Administration
    - Pre-1981: Black/White/Other
  - Census (block level)
  - Hispanic surname match

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Frequency and Severity of Claims

	Average Number of Claims Per Year of Coverage (per hundred)	Average Cost per Claim	Average Total Paid on Claims Per Year of Coverage
	(a)	(b)	[(a) x (b)]
Property Damage Liability	4.1	$2,053	$83
Bodily Injury Liability	1.2	$8,609	$101
Collision	7.6	$2,112	$161
Comprehensive	8.4	$807	$68

Estimated Average Amount Paid Out on Claims

By Credit-Based Insurance Score

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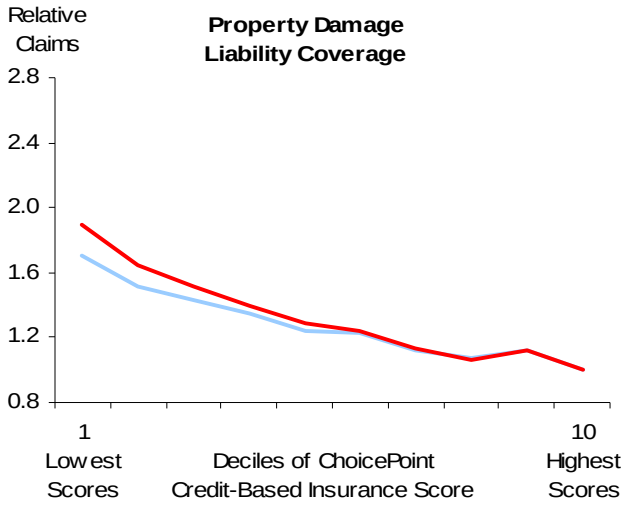
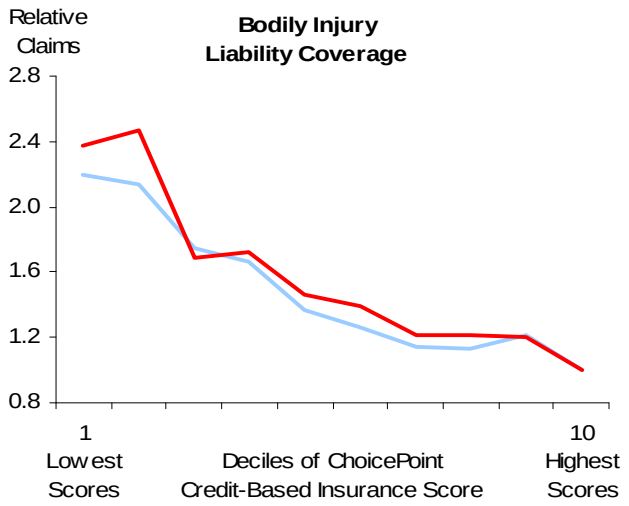
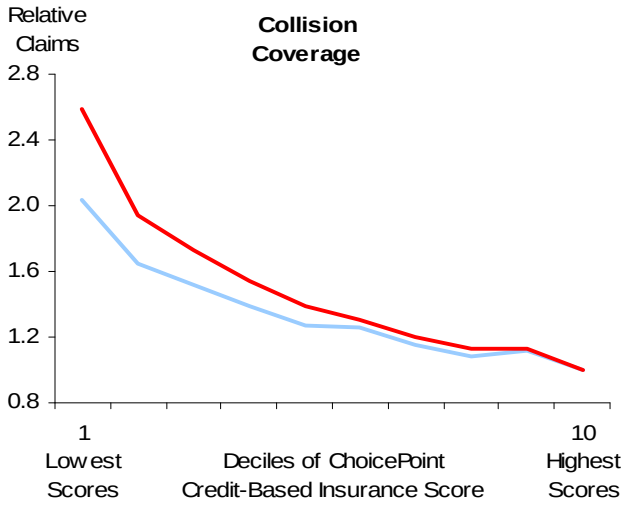
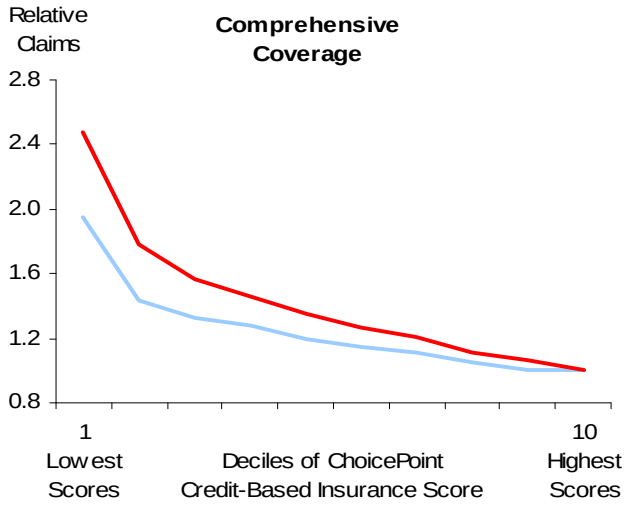






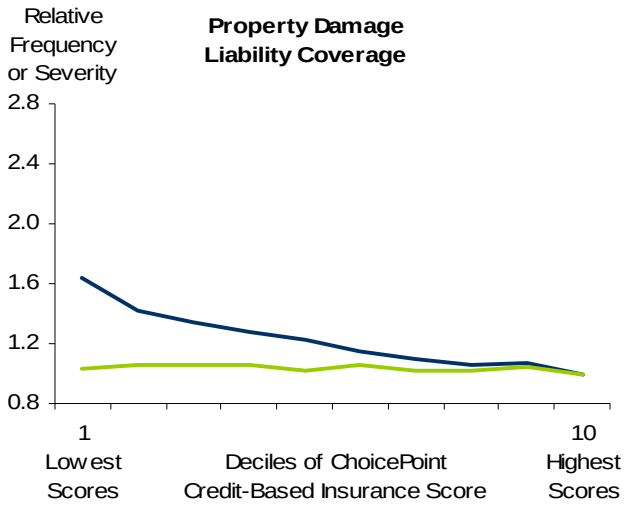


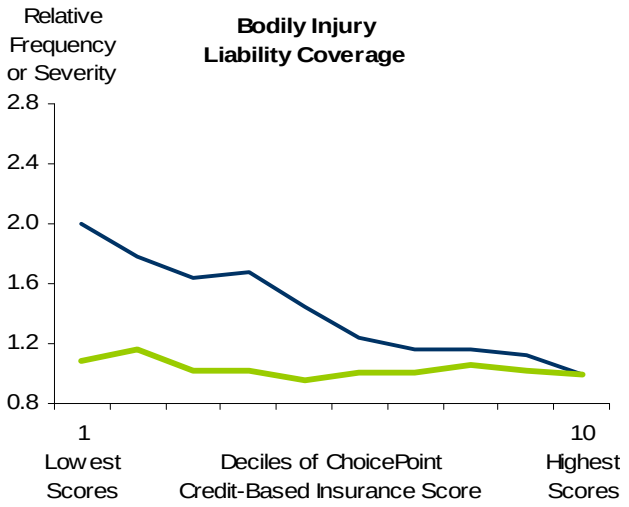
Without Controlling for Other Risk Variables

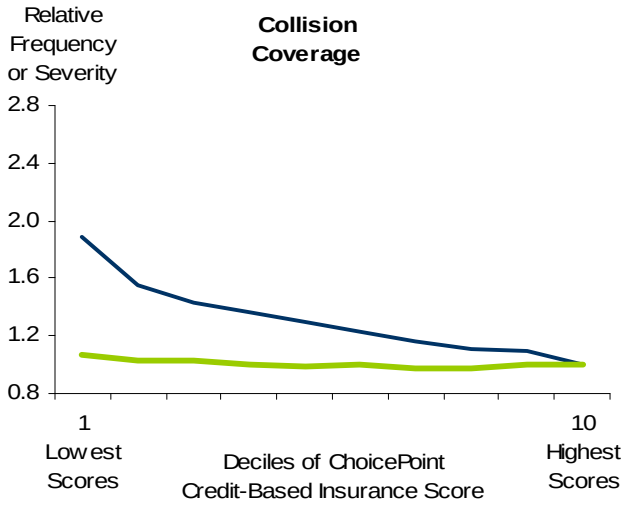
After Controlling for Other Risk Variables

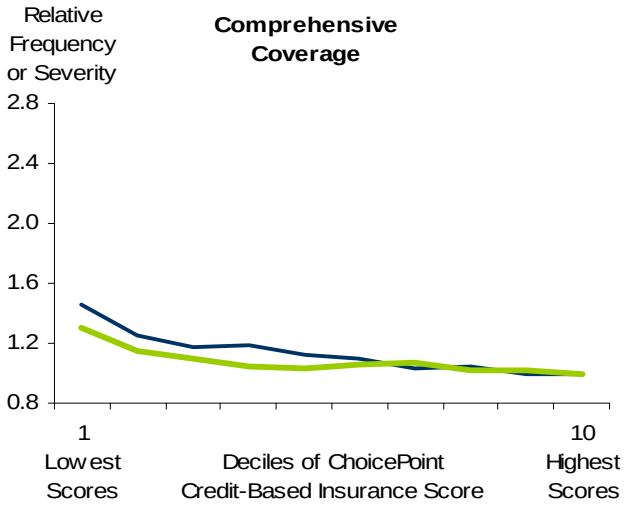
Frequency and Severity of Claims

by Credit-Based Insurance Score









Frequency of Claims

Average Severity of Claims

Outline of Talk

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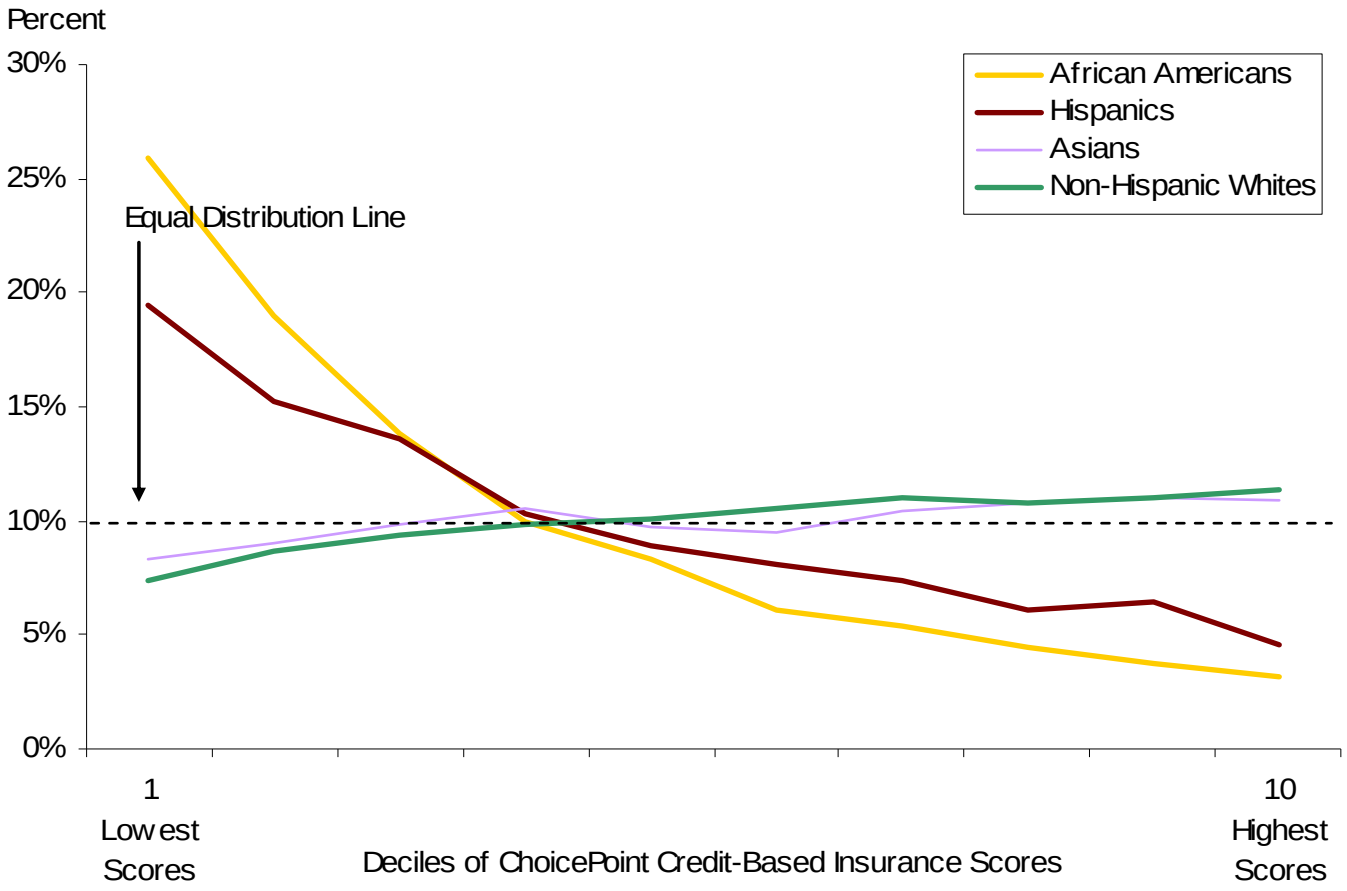
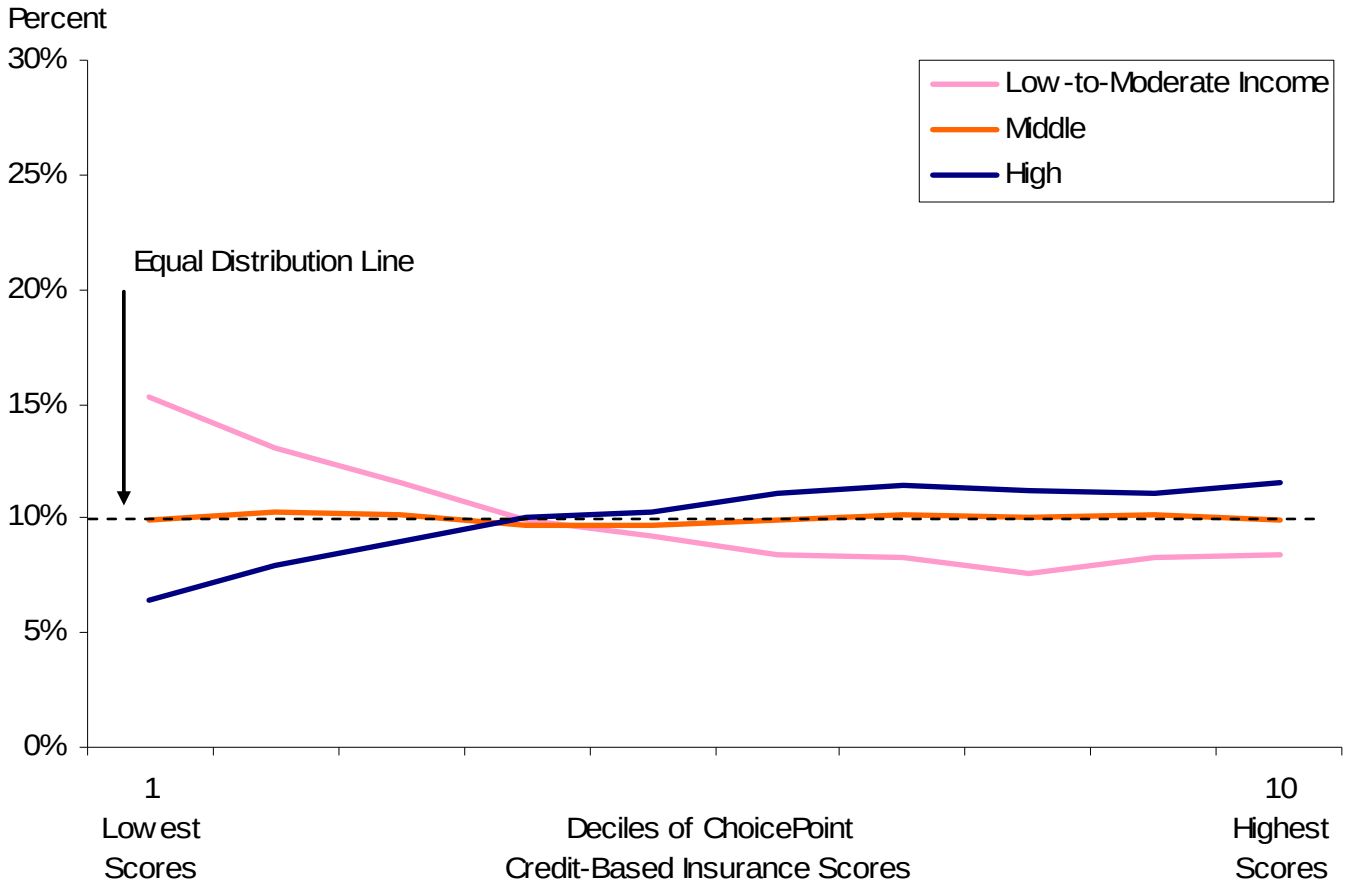
- Score-building

Distribution of Scores by Race and Ethnicity

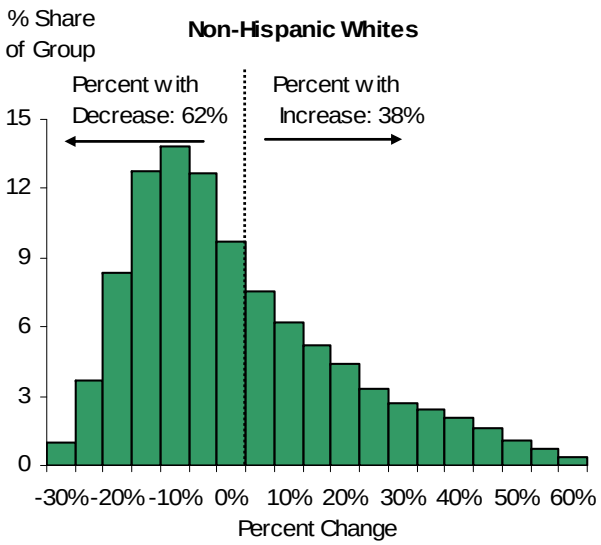


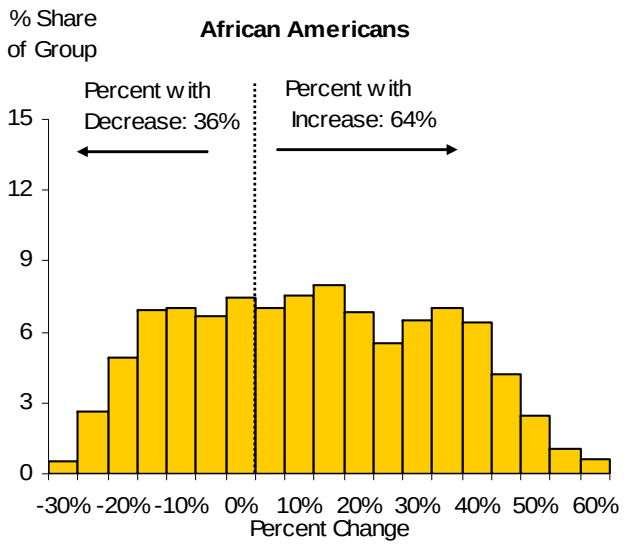
Distribution of Scores by Income

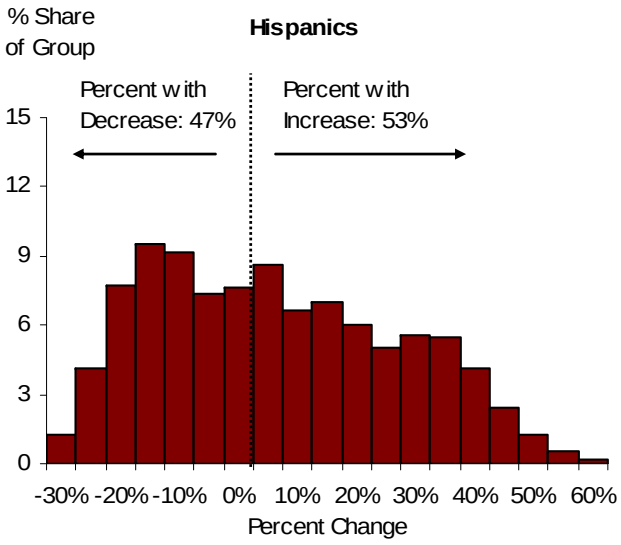


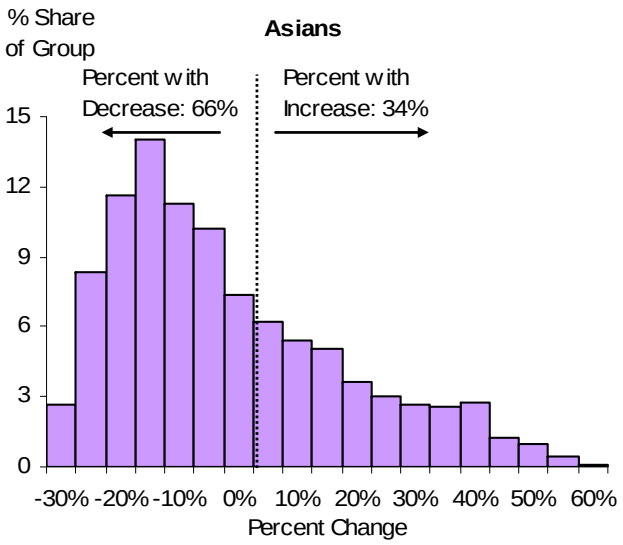
Effect of Scores on Estimated Claims Cost

By Race and Ethnicity









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Estimated Relative Claims Cost
by Race and Ethnicity

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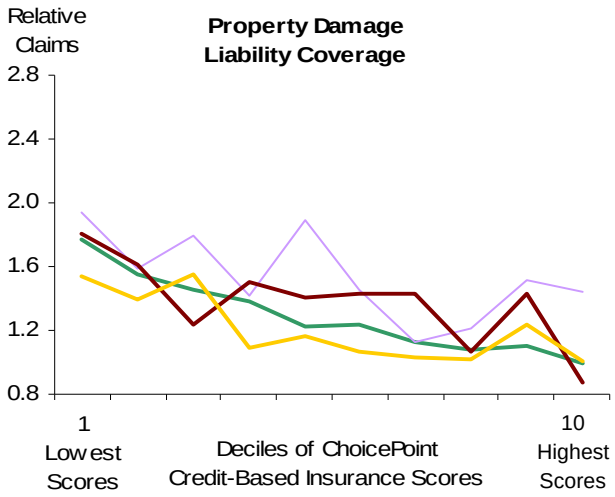
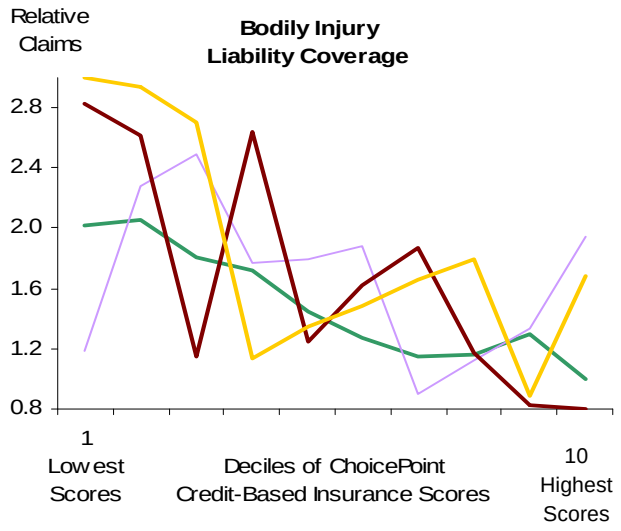
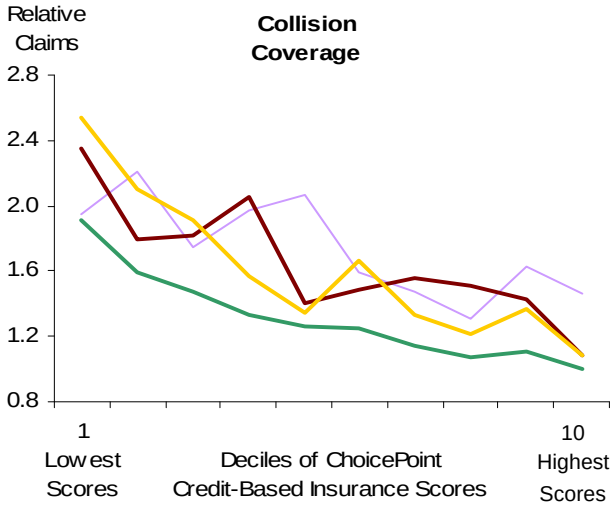
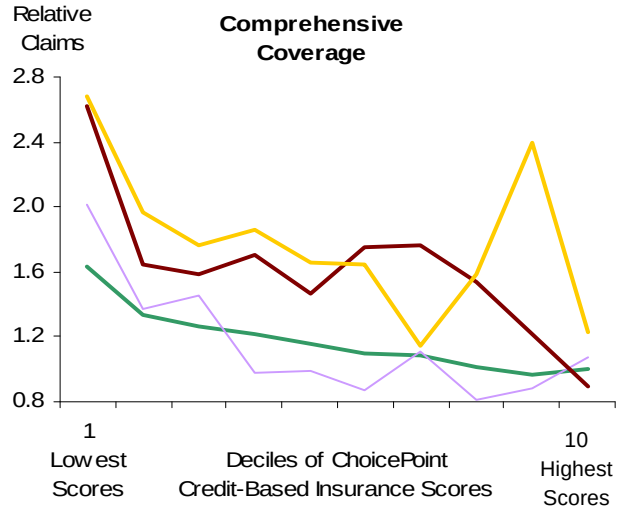
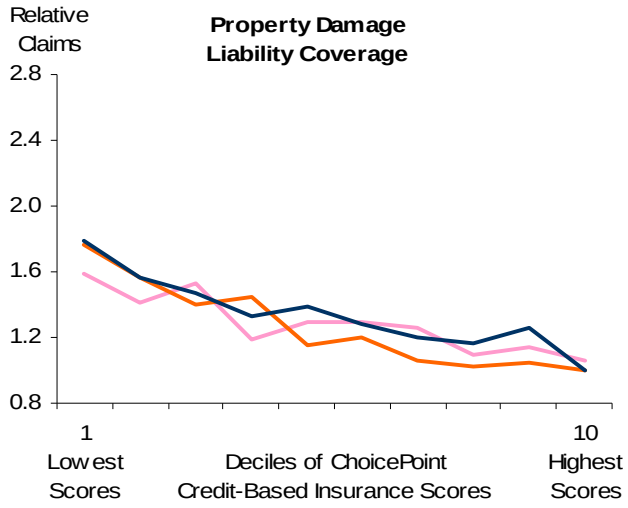


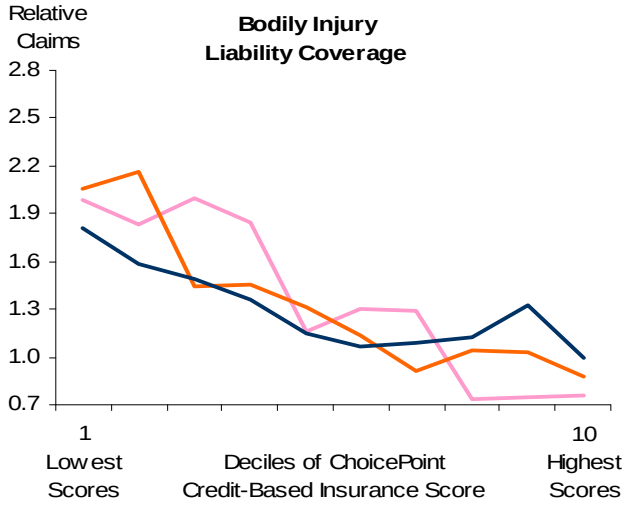


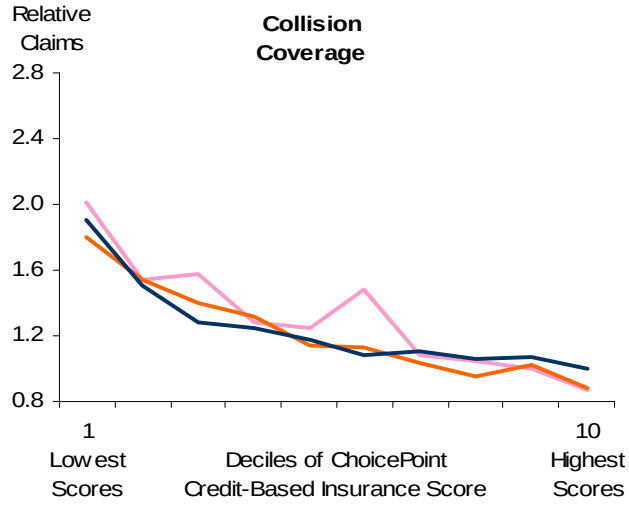


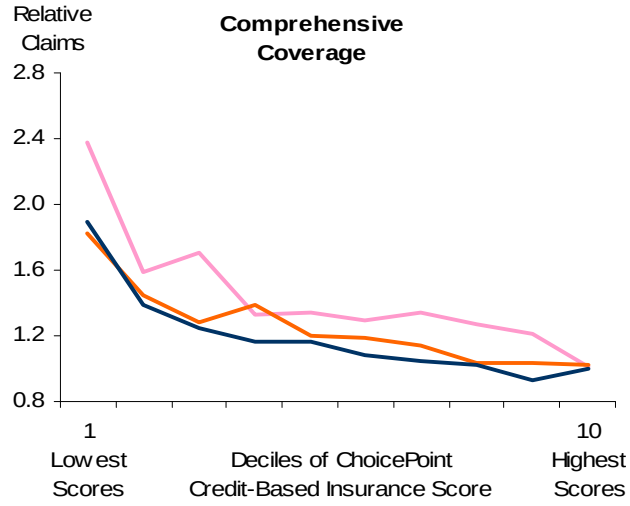


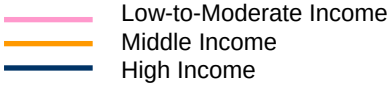
Estimated Relative Claims Cost
by Neighborhood Income











Estimated Relative Claims Cost

With Controls for Race, Ethnicity, and Income

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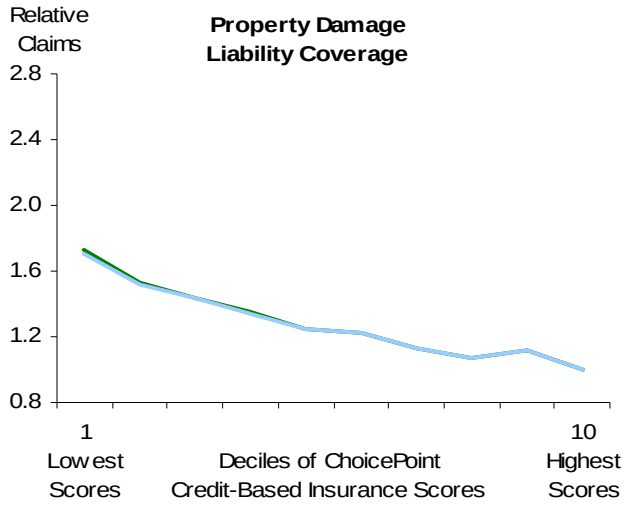

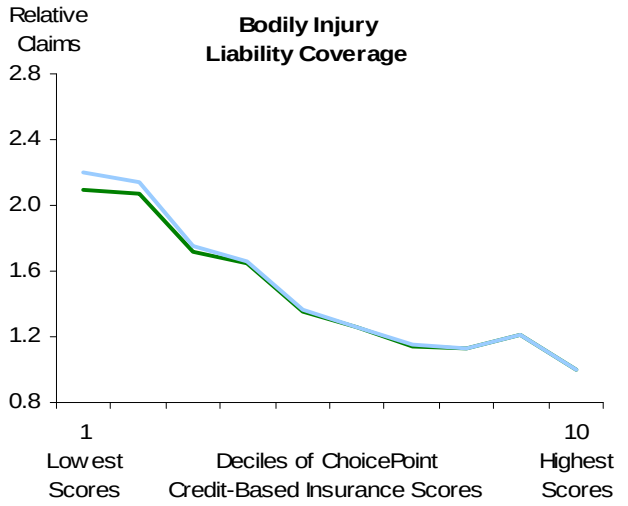

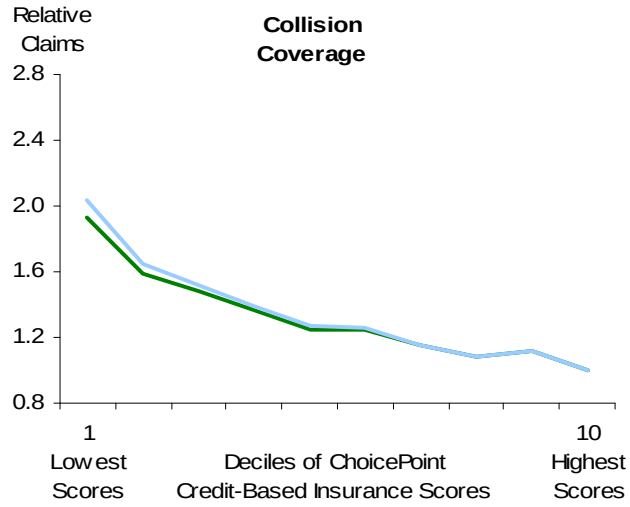

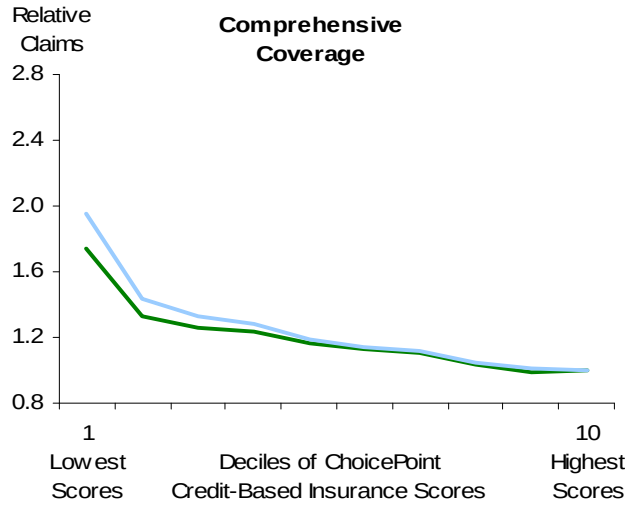

Without Race, Ethnicity and Neighborhood Income Controls
With Race, Ethnicity and Neighborhood Income Controls

Effects of Scores on Predicted Claims Cost

With Controls for Race, Ethnicity, and Income

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	Average Score Effect From Model Without Race, Ethnicity, and Income Controls (a)	Average Score Effect from Model With Race, Ethnicity, and Income Controls (b)
African Americans	10.0%	8.9%
Hispanics	4.2%	3.5%
Asians	- 4.9%	-4.8%
Non-Hispanic Whites	- 1.6%	-1.4%

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FTC Score-Building - Data

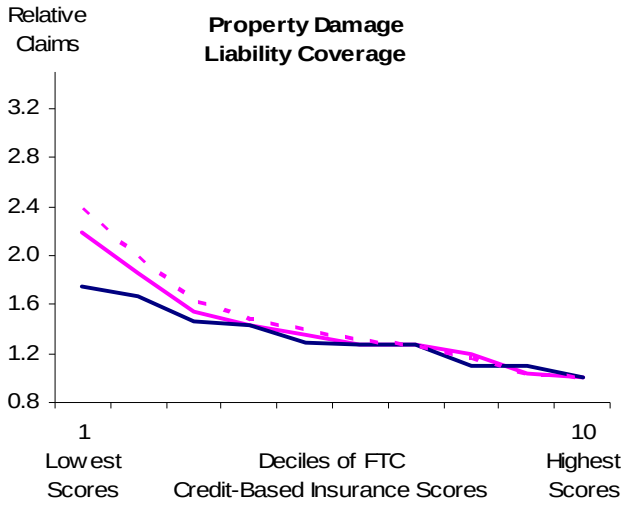
- Policy database with race, ethnicity, income

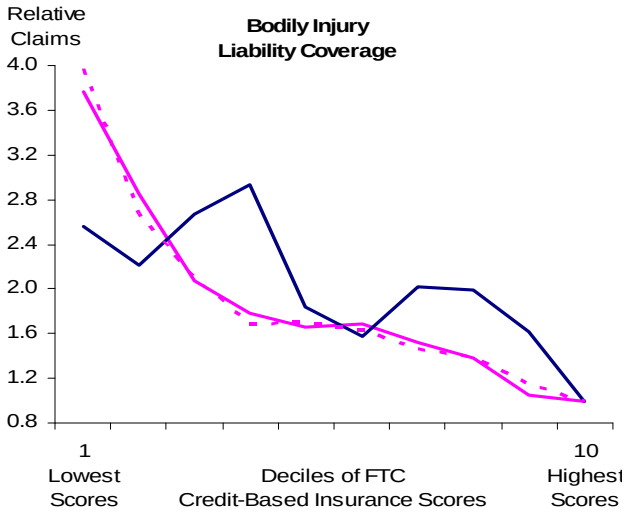
- ChoicePoint credit-history variables
  - Have for all records except “no-hits”
  - 180 variables designed to capture information in consumer credit reports
    - Various delinquency measures
    - Public records
    - Inquiries
    - Length of history
    - etc.
  - Used by ChoicePoint in their model building
  - Not all variables appear in a ChoicePoint model
  - Proprietary

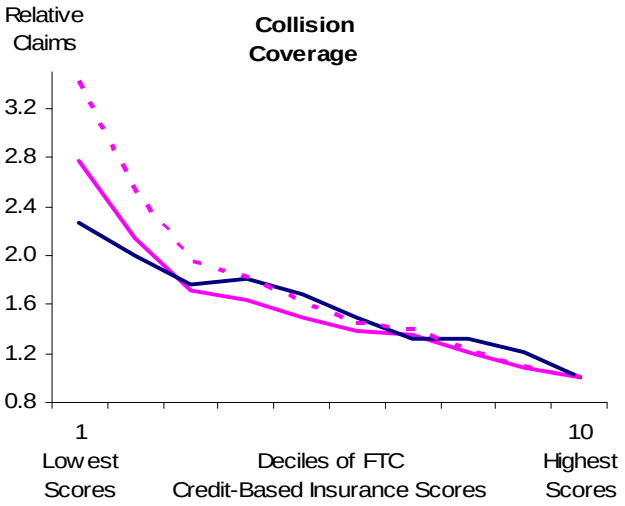
FTC Score-Building

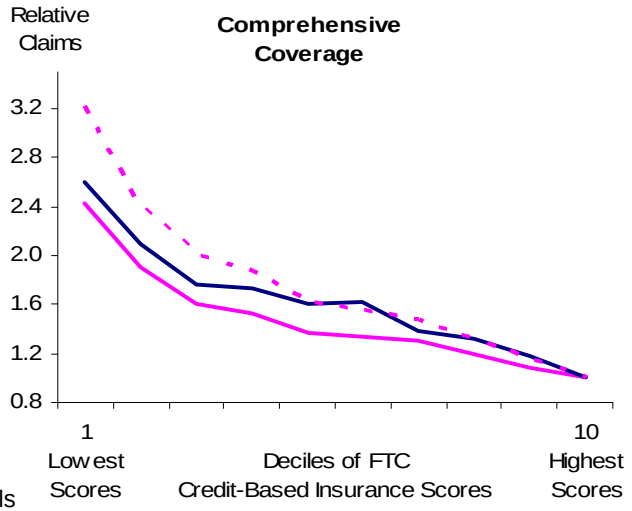
- Step 1: Adjust claims for non-credit risk variables.
- Step 2: Bin credit history variables using a mechanical (non-judgmental) procedure.
- Step 3: Forward-selection OLS with adjusted total claims as dependent variable and 180 binned credit history variables as candidate explanatory variables.
- Step 4: Claims model using non-credit risk variables and “winning” credit history variables. Use estimated parameters on credit history variables to create FTC scorecard.

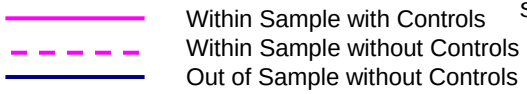
FTC Baseline Scoring Model



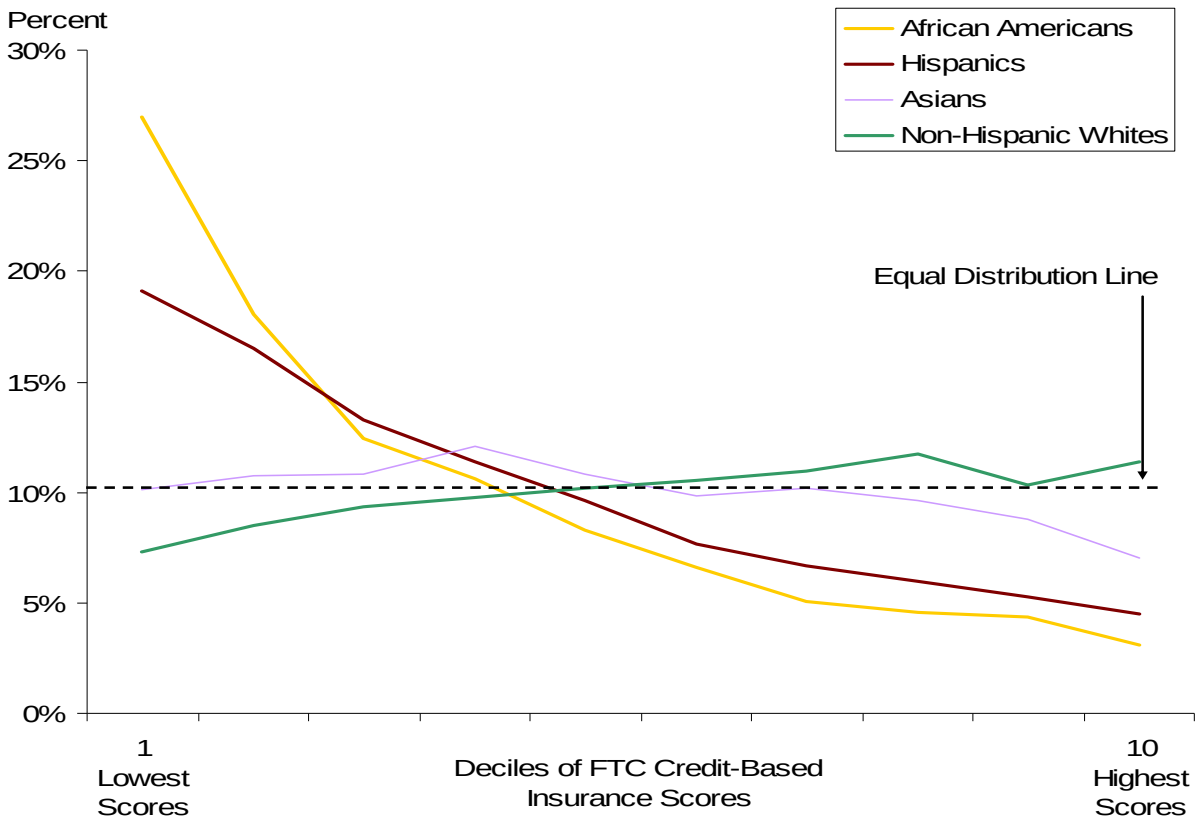








Distribution of FTC Baseline-Model Scores
by Race and Ethnicity



FTC Scoring Models

Built Controlling for Race, Ethnicity, and Income

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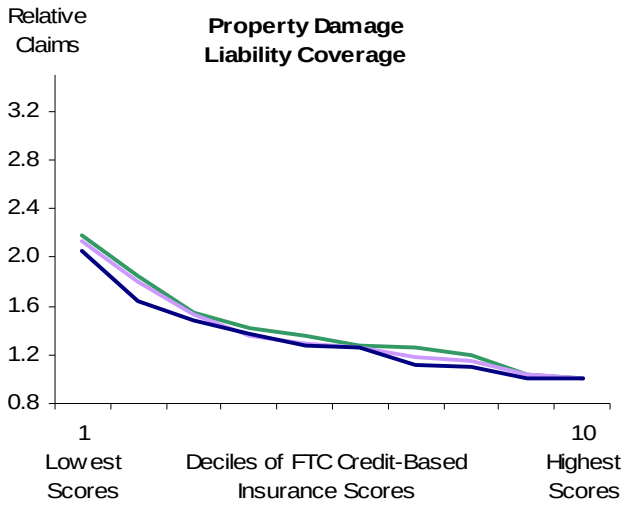

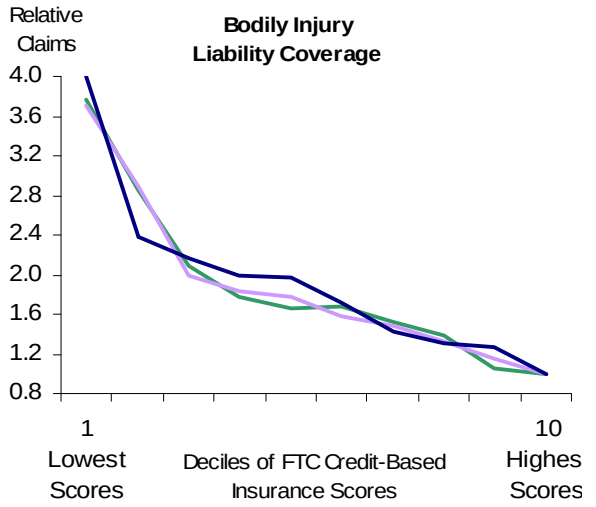

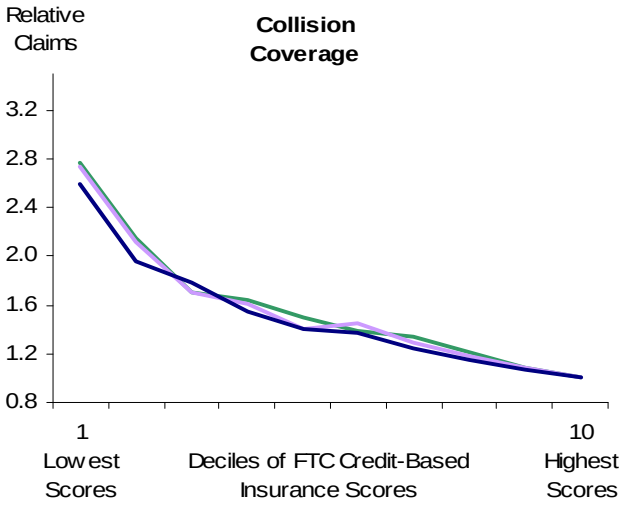

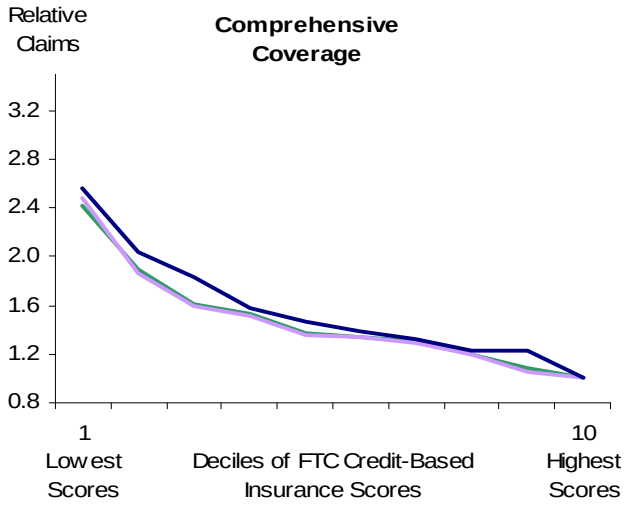

FTC Baseline Model
Model Built with Controls
Model Built with Non-Hispanic Whites Only

Distribution of FTC Scores
by Race and Ethnicity (A)

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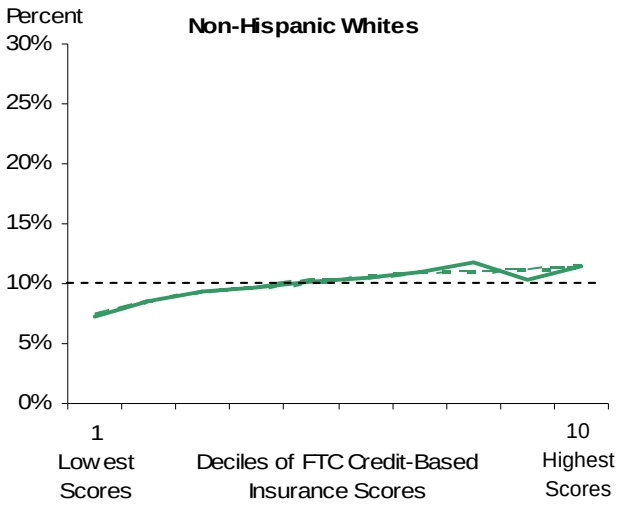
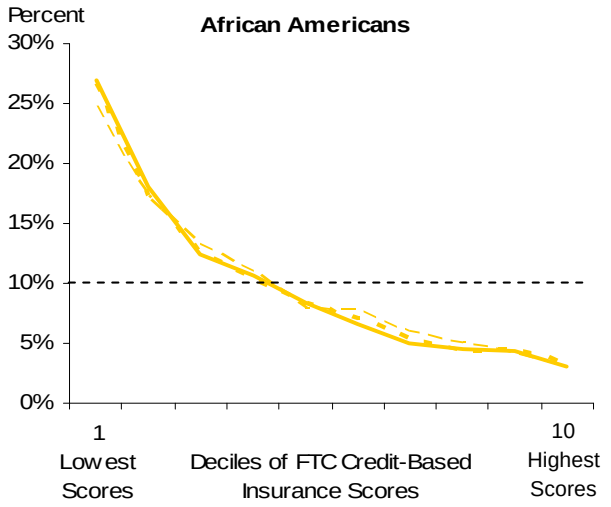
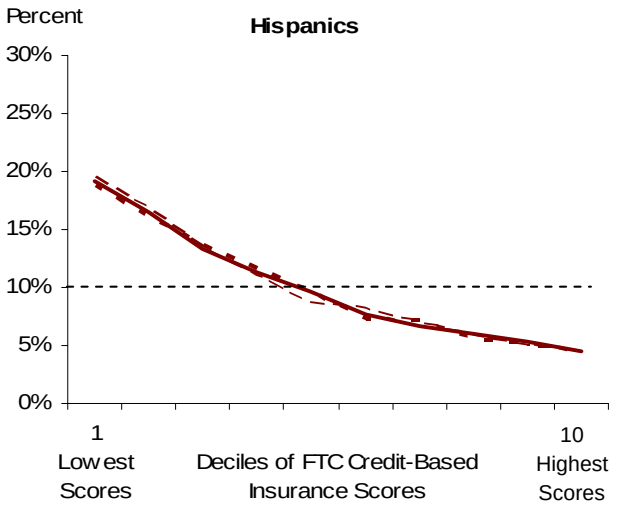
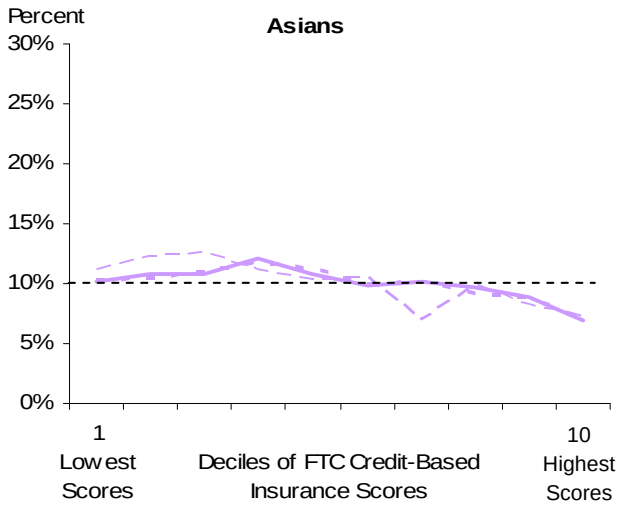
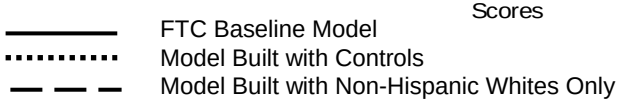


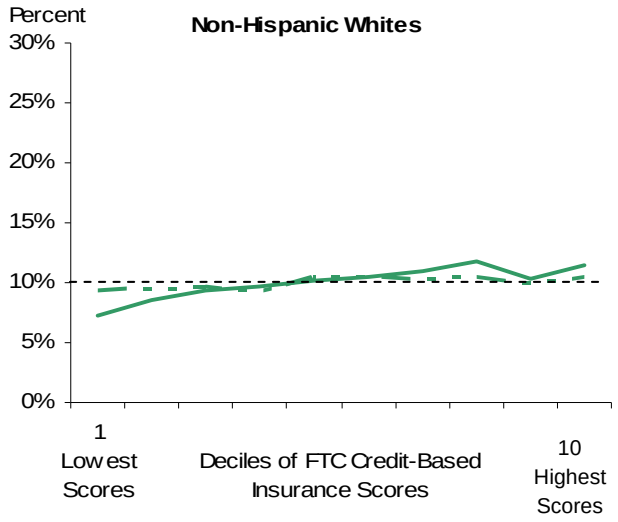


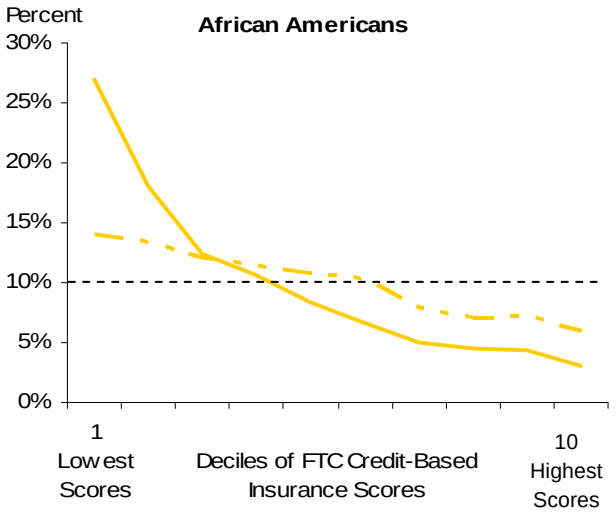


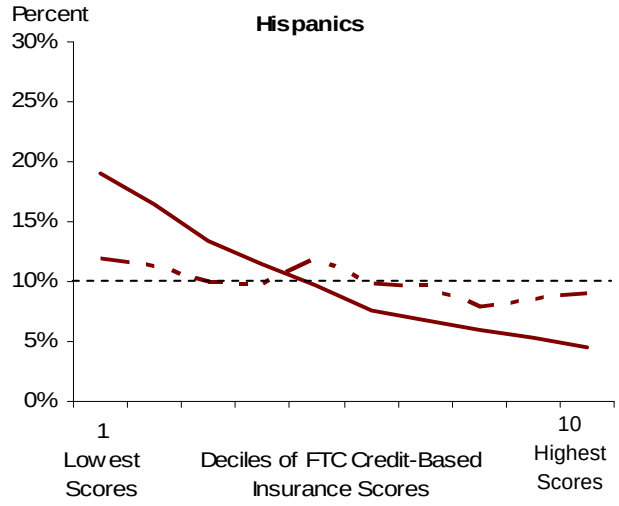


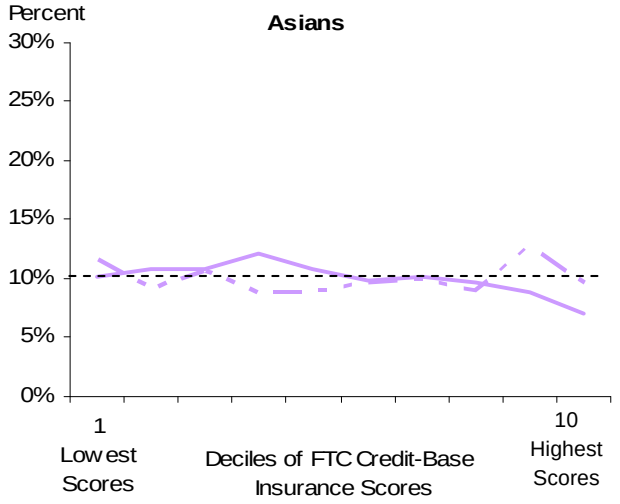


Distribution of FTC Scores
by Race and Ethnicity (B)





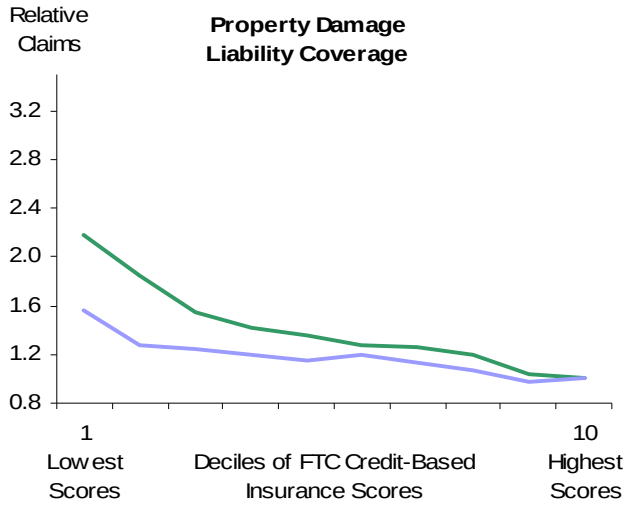


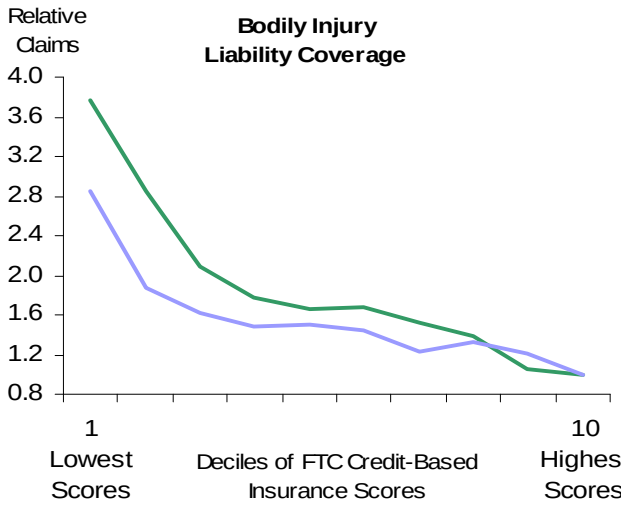


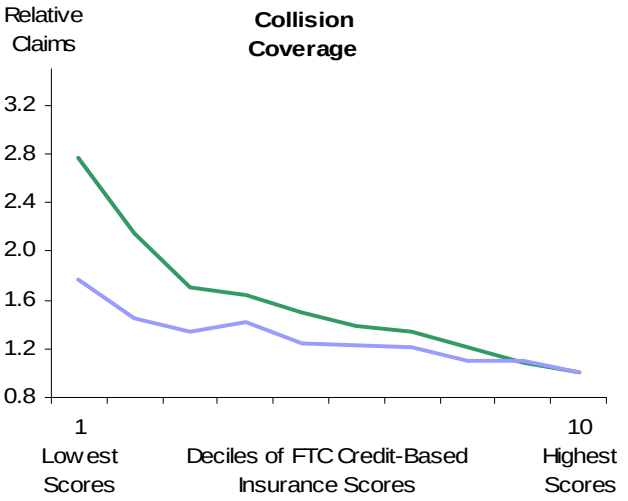
FTC Baseline Model

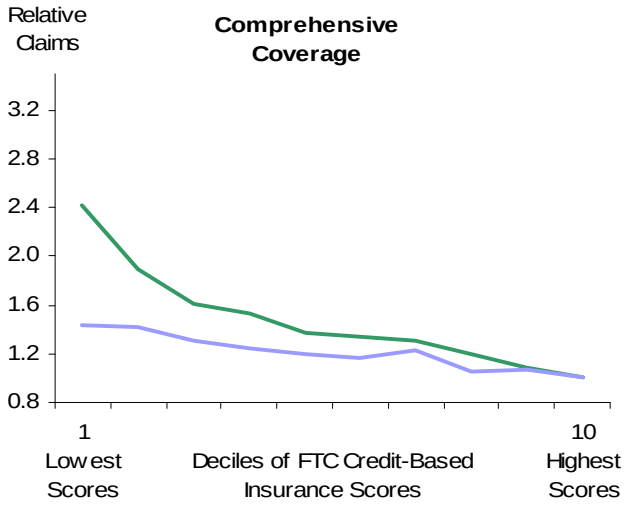
"Discounted Predictiveness" Model

FTC "Discounted Predictiveness" Model









FTC Baseline Model

"Discounted Predictiveness" Model

Conclusions of Auto Study

- Scores predict risk
  - Lowest decile 1.7 to over 2 times riskier than highest
- Scores differ across racial and ethnic groups
  - Using scores raises average predicted dollars of claims of African Americans by 10% and Hispanics by 4.2%.
- Little of the relationship between scores and claims comes from the relationship between scores and race/ethnicity (the “proxy effect”).
- We could not develop an effective credit-based scoring model with smaller differences across groups.

Outline of Talk

- Data
- Basic relationship between scores and risk
- Distributional differences in scores by race, ethnicity, and income
- Scores as a proxy for race, ethnicity and income
  - Within-group relationship
  - Omitted variable bias
- Score-building
- Homeowners update

Homeowners update

- The FTC issued compulsory process orders in December 2008, with revised orders issued in March 2009.
  - Orders were sent to nine largest firms, based on written premiums in 2006.
  - Requested anonymized data on:
    - All single-family owner-occupied policies in place between July 1, 2004 and June 30, 2007
    - Data on recent quotes and applications
- Once all the final data have been received and checked, we will select a subset of policies. The PII for that subset of data will be submitted to our contractor and the Social Security Administration so that we can obtain the data needed to complete the study:
  - Scores and credit attributes
  - Race and ethnicity data

Homeowners update

- We expect to conduct analyses of homeowners data that are similar to the analyses conducted for the auto study.
  - Risk/score relationship
    - And, does it vary by peril?
  - Race/score relationship (may be somewhat different for population of homeowners)
  - Omitted variable bias
- Quotes and applications - did not have for auto study

New issues in Homeowners

- Tasks done by consultants on auto data
  - Standardization across companies
  - Geographic risk variables
- Cat claims!
    - Katrina
    - Wilma
    - Midwest tornadoes
    - Etc.!

Questions?