CREDIT-BASED INSURANCE SCORES: IMPACTS ON CONSUMERS OF AUTOMOBILE INSURANCE

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Federal Trade Commission

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)
- FTC Study on automobile insurance released in July 2007
- Federal Reserve Board study on credit scores and credit markets released in August 2007
- Still to come: FTC study of homeowners insurance

Negative or Differential Treatment (A)

Sec 215 (a)(2): a study of: "the statistical relationship, utilizing a multivariate analysis that controls for prohibited factors under the (ECOA) and other known risk factors, between … credit based insurance scores and the quantifiable risks and actual losses experienced by businesses;"

Negative or Differential Treatment (B)

Sec. 215 (a)(3): a study of “the extent to which, if any, the use of … credit-based insurance scores impact on the availability and affordability of … insurance to the extent information is currently available or is available through proxies, by geography, income, ethnicity, race, color, religion, national origin, age, sex, marital status, and creed, including the extent to which the consideration or lack of consideration of certain factors by credit scoring systems could result in negative or differential treatment of protected classes under the (ECOA), and the extent to which, if any, the use of underwriting systems relying on these models could achieve comparable results through the use of factors with less negative impact;”

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

Frequency and Severity of Claims

by Credit-Based Insurance Score

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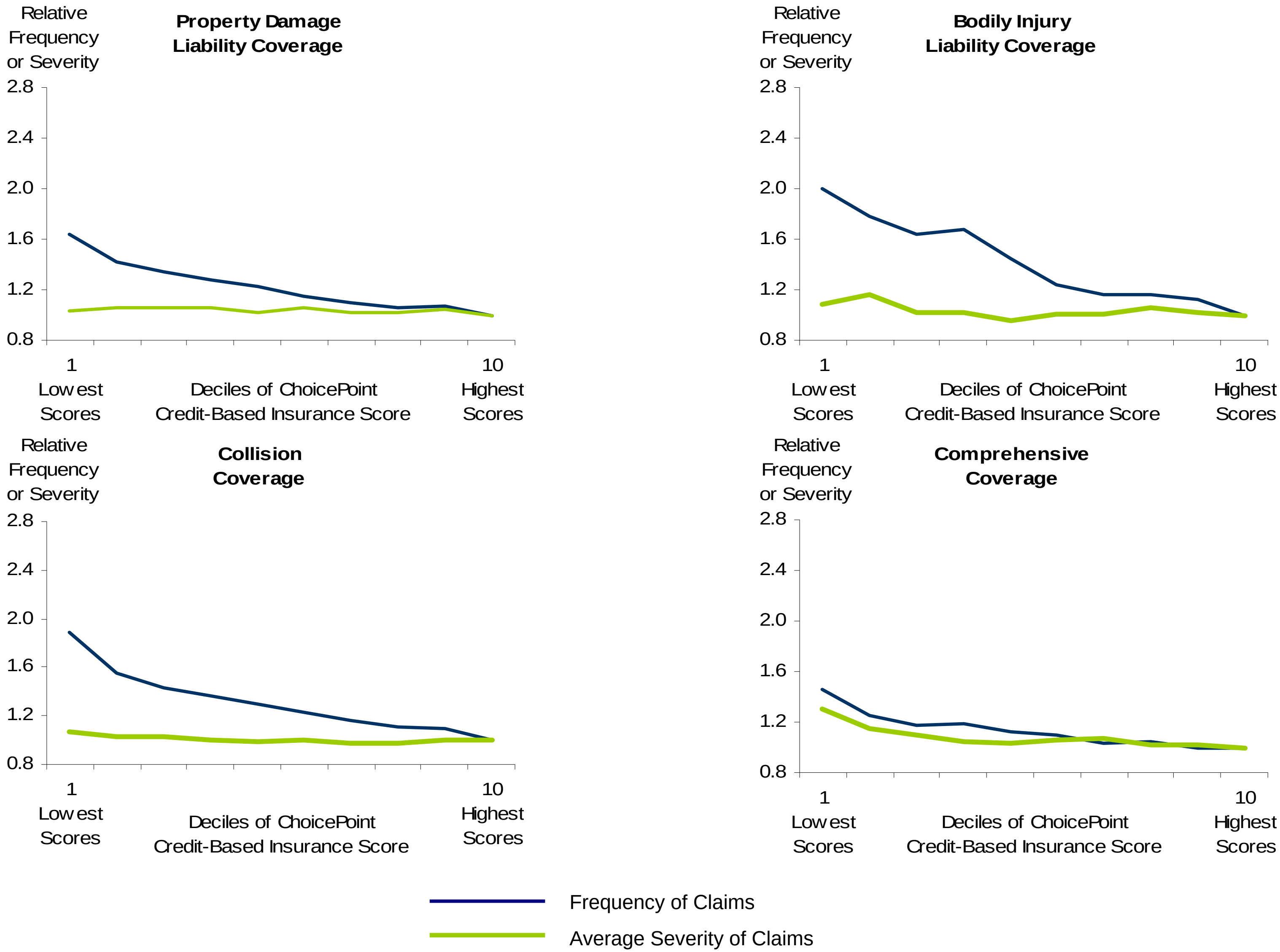
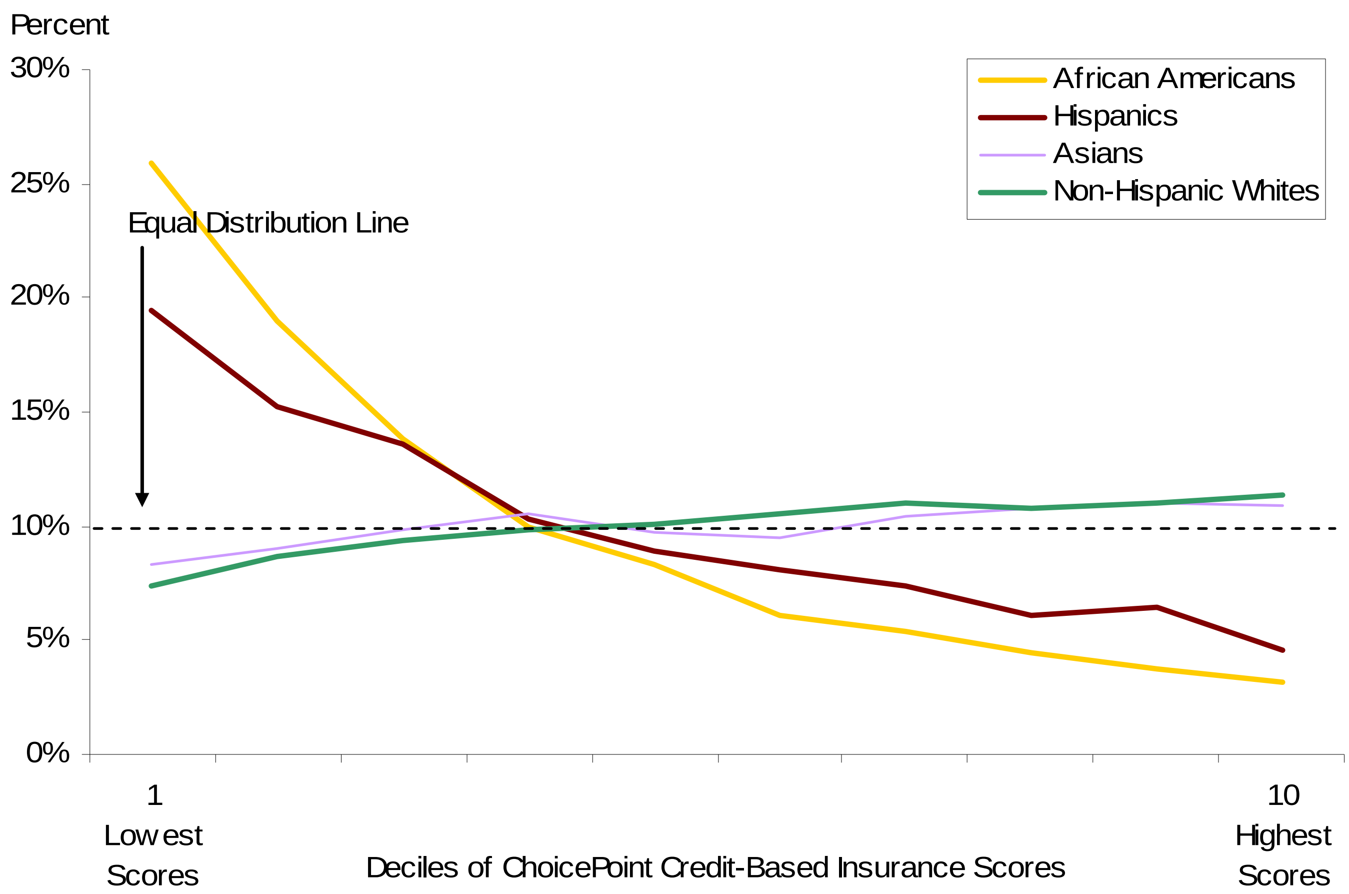
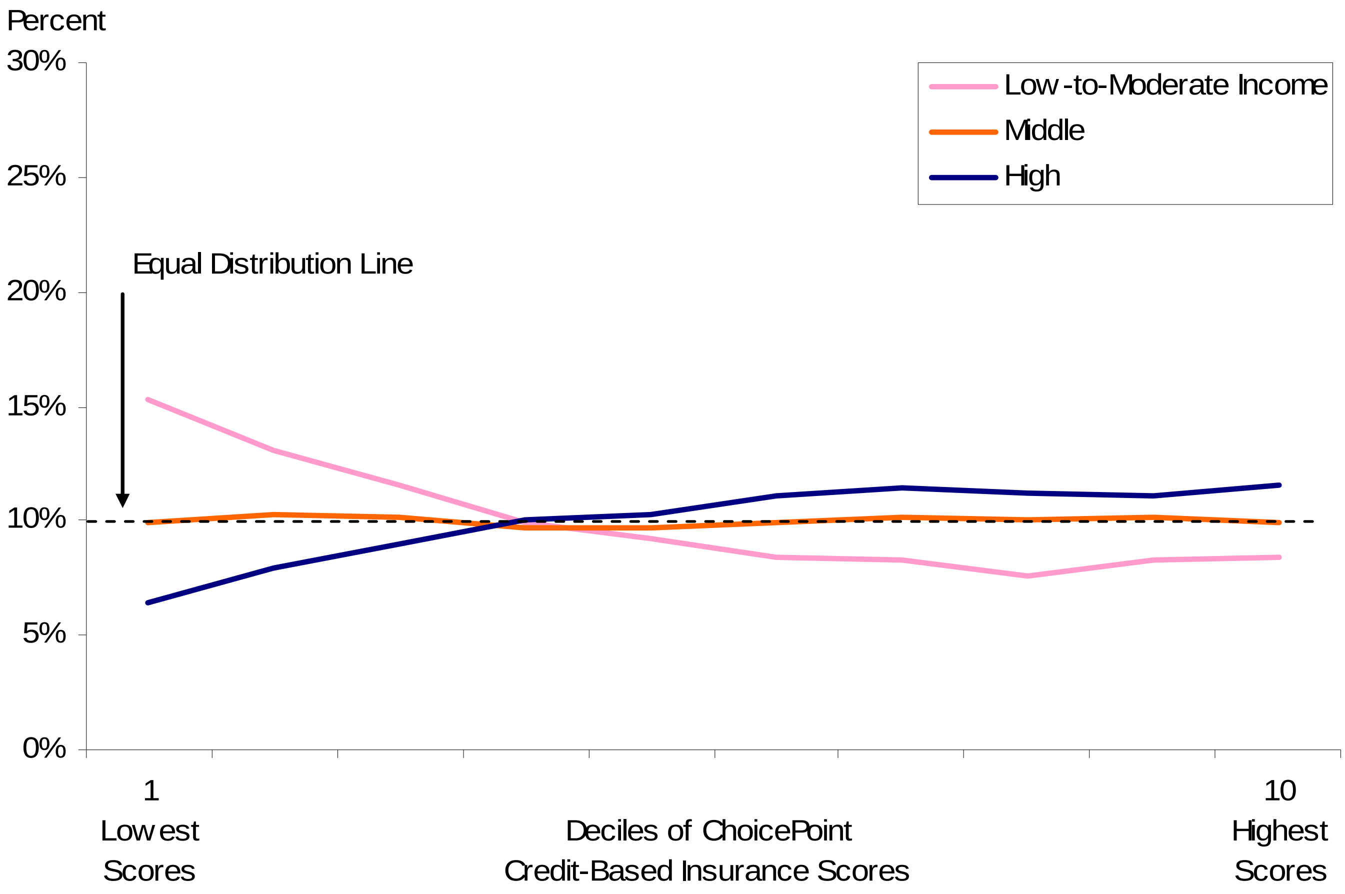


Distribution of Scores by Race and Ethnicity

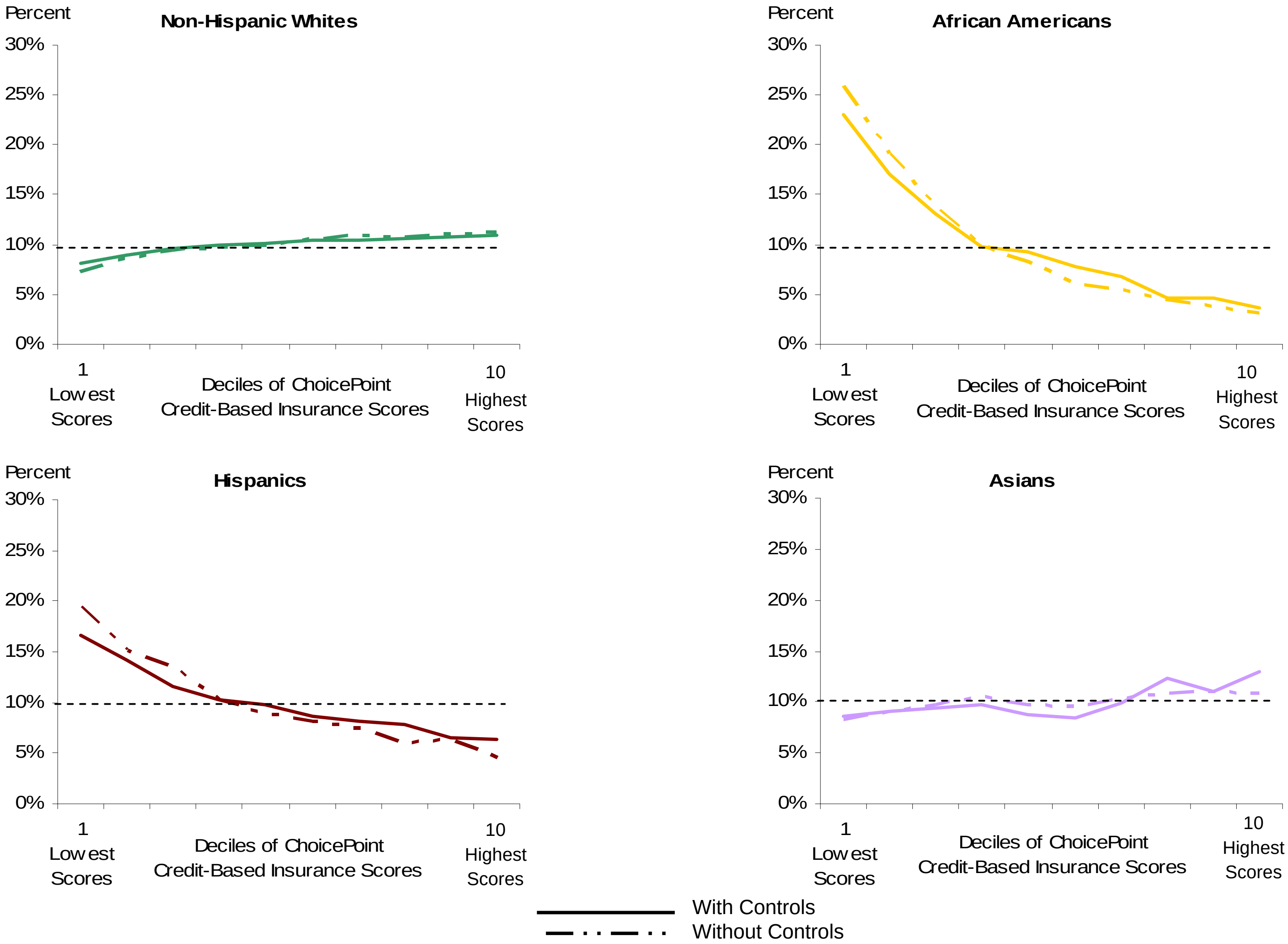


Distribution of Scores by Income



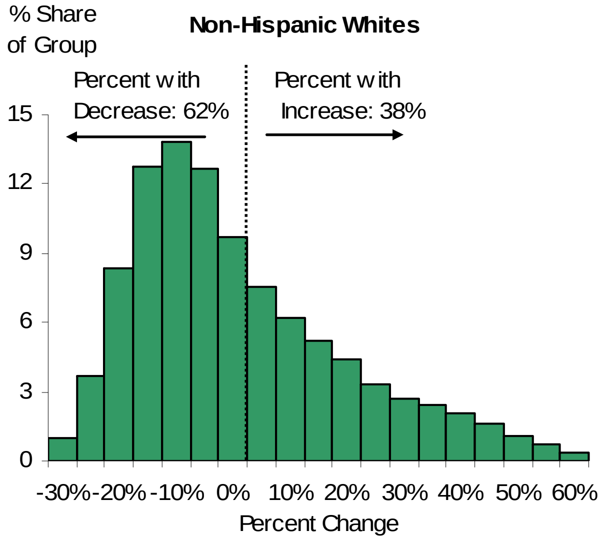
Distribution of Scores by Race and Ethnicity

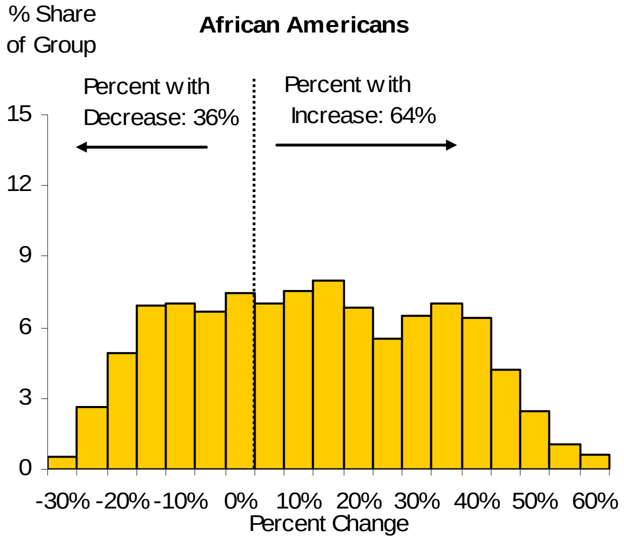
Controlling for Age, Gender, and Neighborhood Income

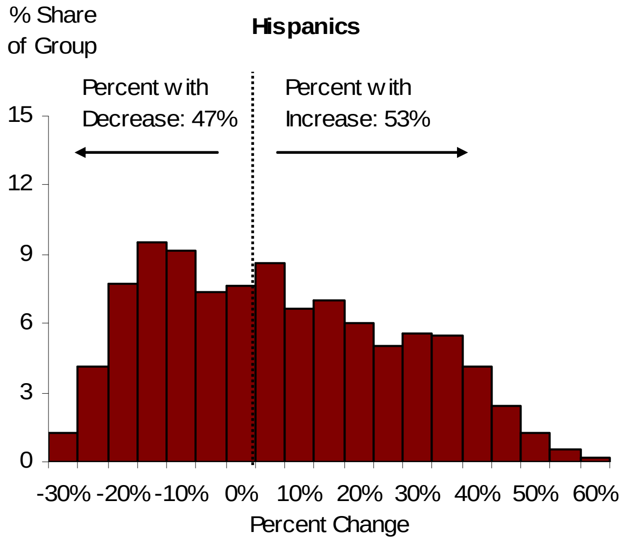


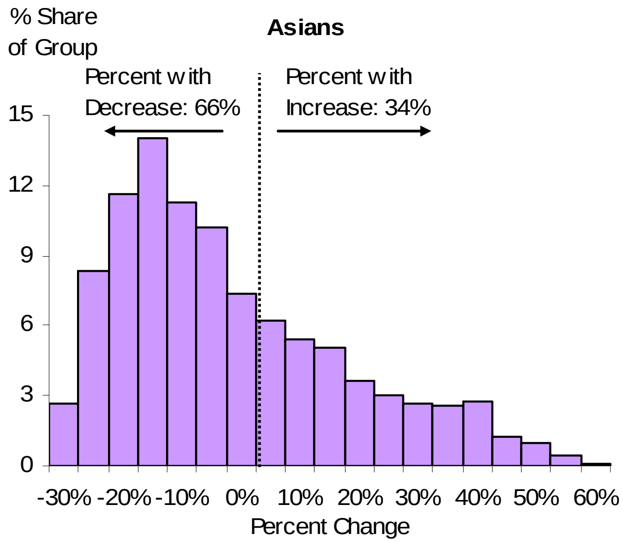
Effect of Scores on Predicted Pure Premium

By Race and Ethnicity



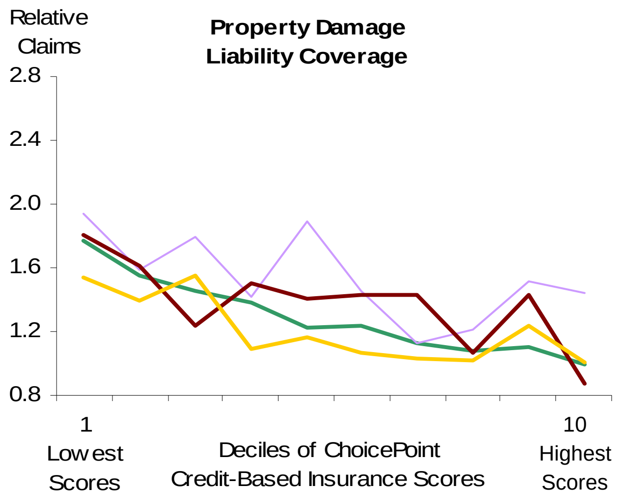


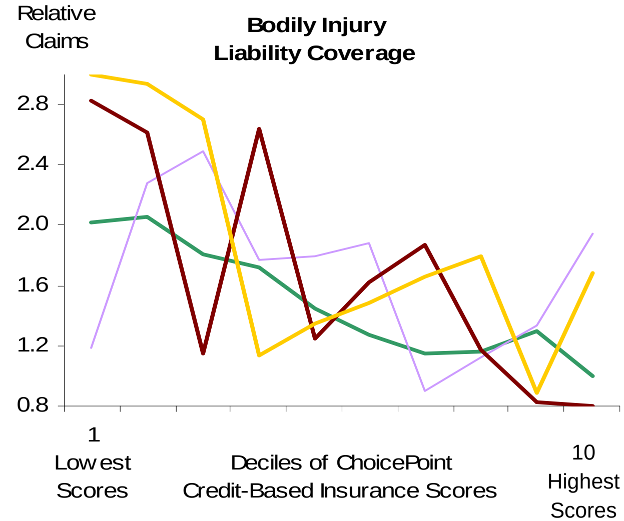


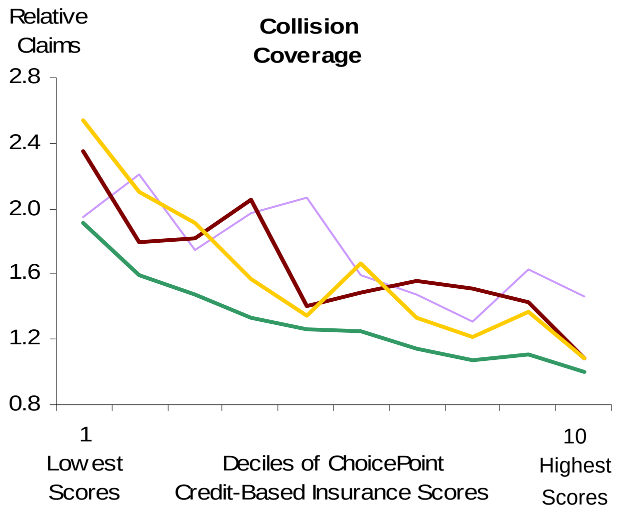


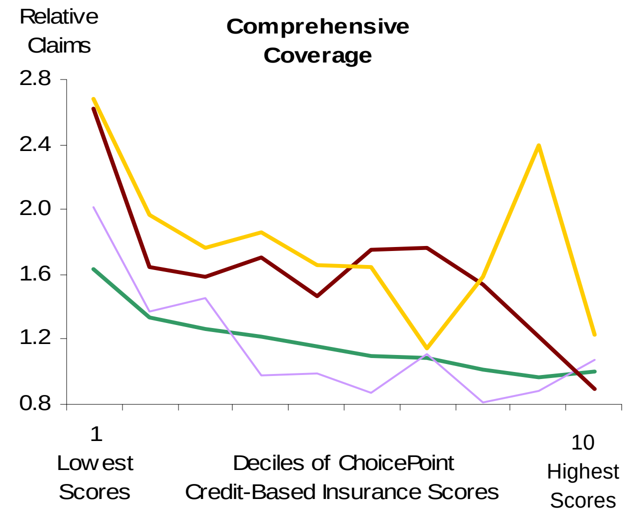
Estimated Relative Pure Premium

by Race and Ethnicity



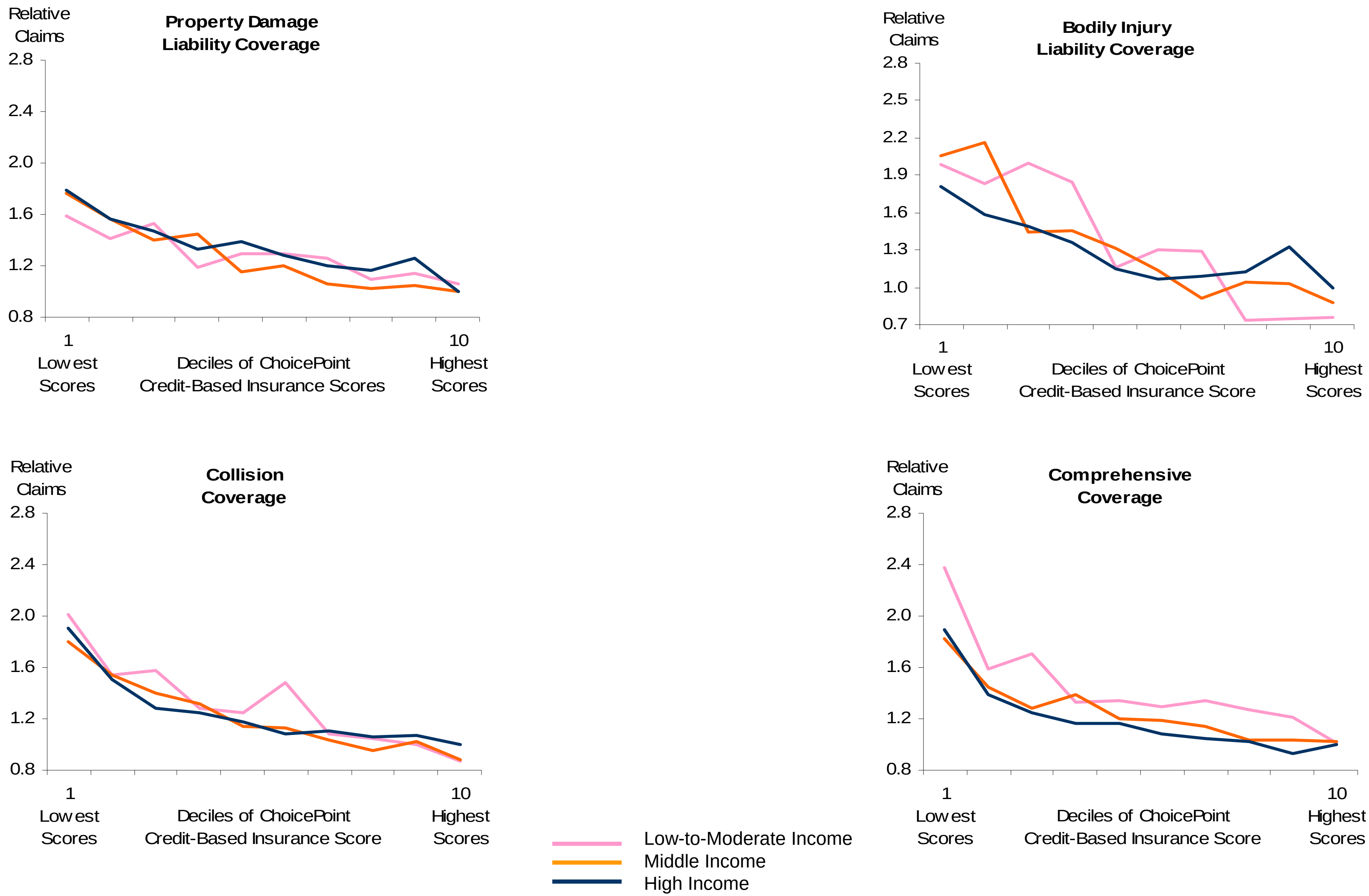






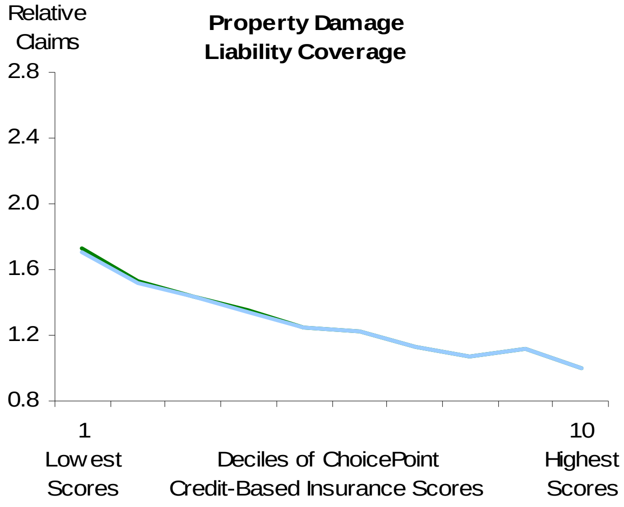
Non-Hispanic Whites
African Americans
Hispanics
Asians

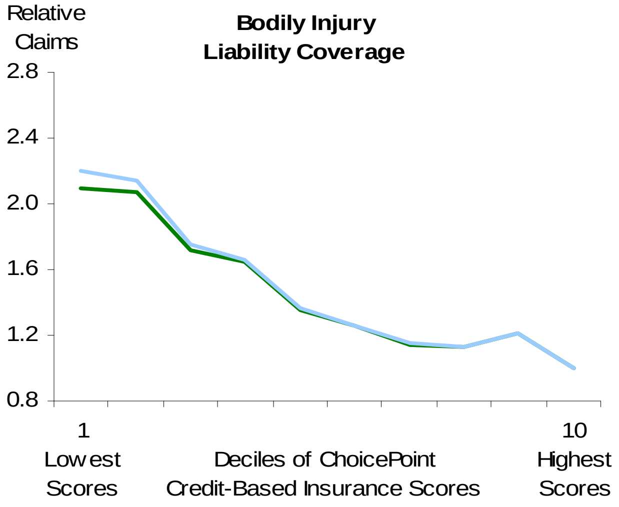
Estimated Relative Pure Premium
by Neighborhood Income

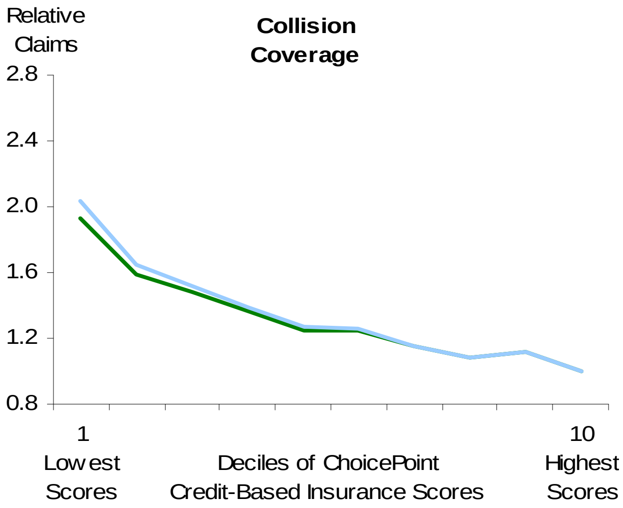


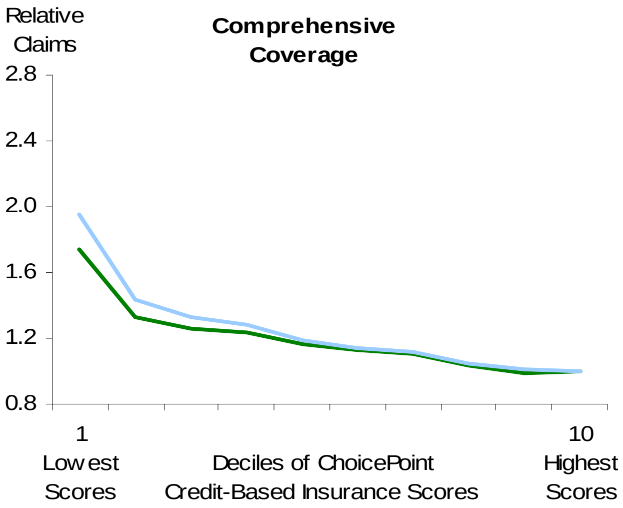
Estimated Relative Pure Premium

With Controls for Race, Ethnicity, and Income









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

Effects of Scores on Predicted Pure Premium

With Controls for Race, Ethnicity, and Income

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

FTC Score-Building - Data

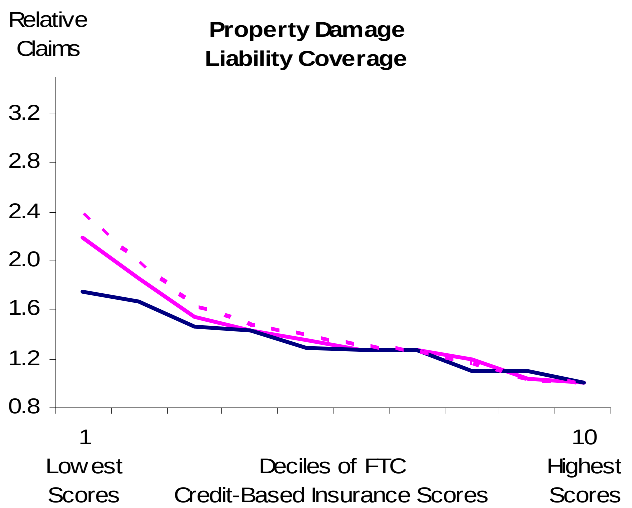
- Policy database with race, ethnicity, income

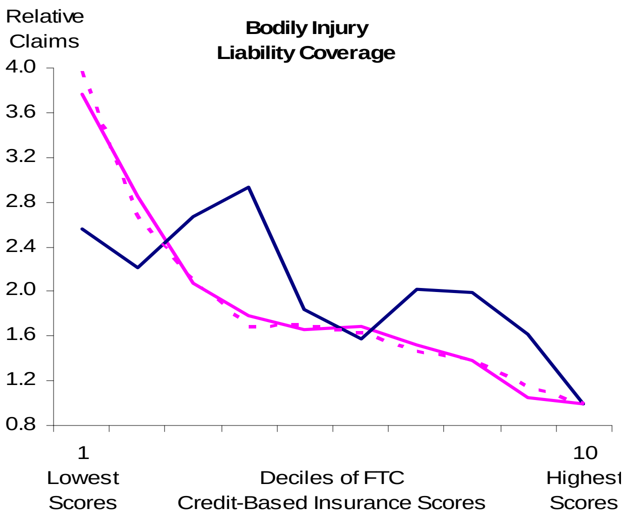
- ChoicePoint credit-history variables
  - Have for all records except “no-hits”
  - 180 variables designed to capture information in consumer credit reports
    - Various delinquency measures
    - Public records
    - Inquiries
    - Length of history
    - etc.
  - Used by ChoicePoint in their model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

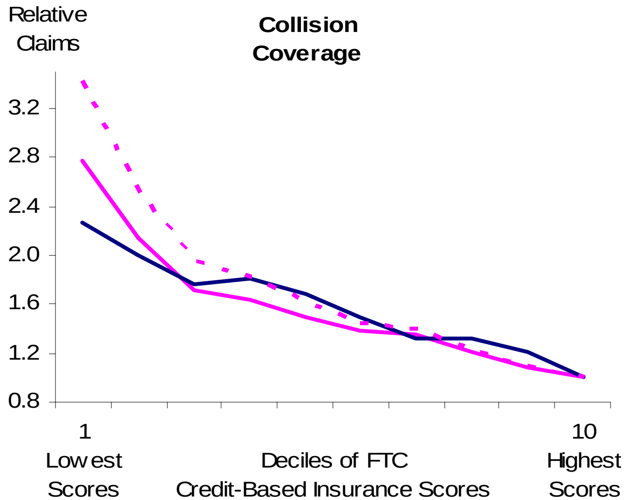
FTC Score-Building

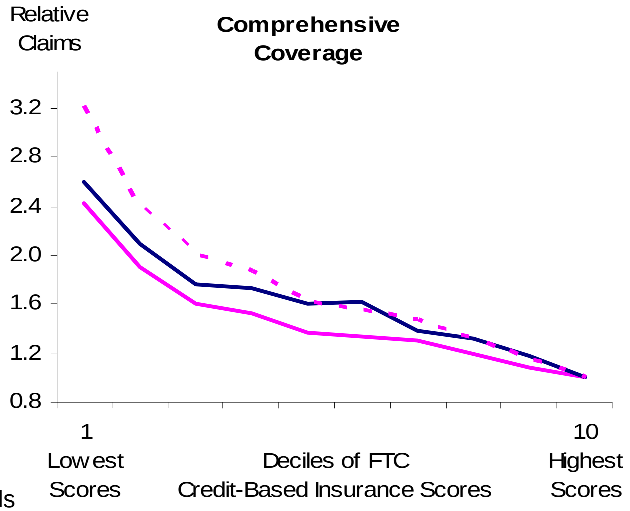
- Step 1: Tweedie GLM of pure premium on "usual suspects" risk variables. Use predicted pure premium to create adjusted pure premium.
- Step 2: Bin credit history variables using a mechanical (non-judgmental) procedure.
- Step 3: Forward-selection OLS with adjusted total claims as dependent variable and 180 binned credit history variables as candidate explanatory variables.
- Step 4: Tweedie GLM of pure premiums on "usual suspects" risk variables and "winning" credit history variables. Use estimated parameters on credit history variables to create FTC scorecard.

FTC Baseline Scoring Model





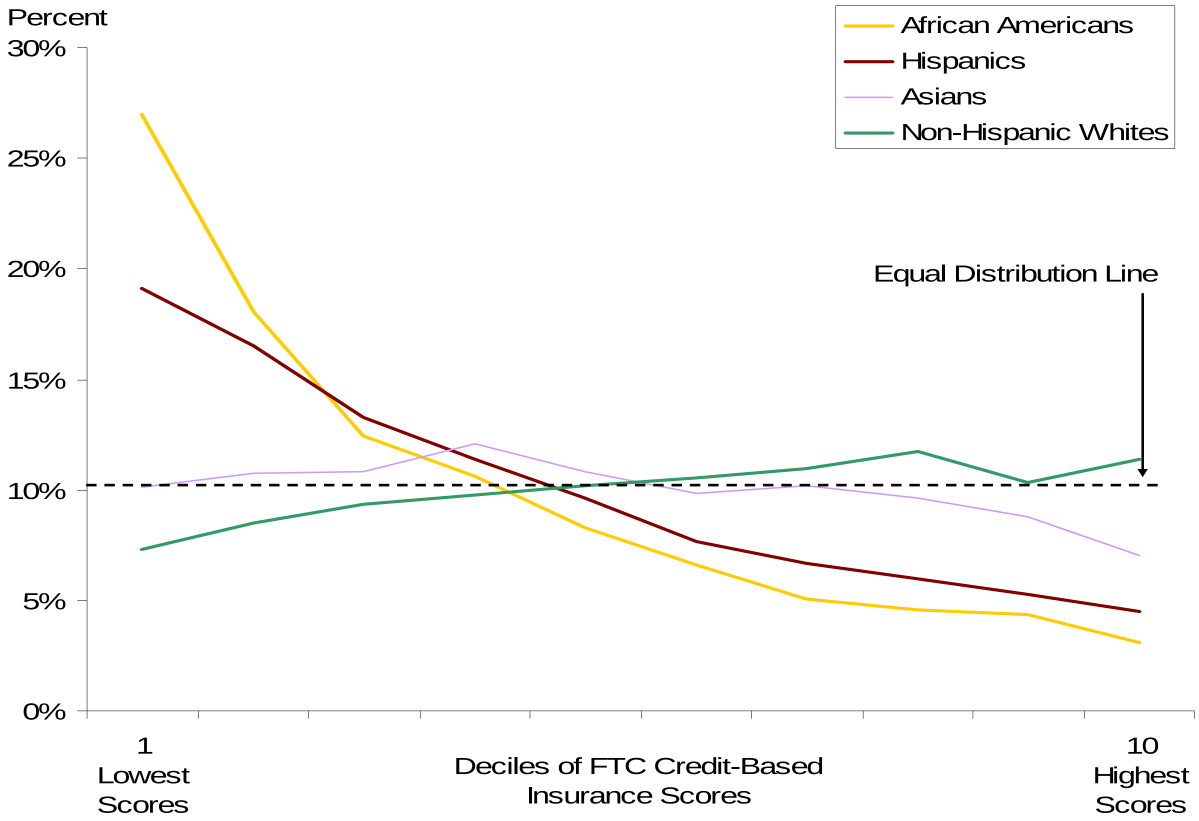




Within Sample with Controls
Within Sample without Controls
Out of Sample without Controls

Distribution of FTC Baseline-Model Scores

by Race and Ethnicity



FTC Scoring Models

Built Controlling for Race, Ethnicity, and Income

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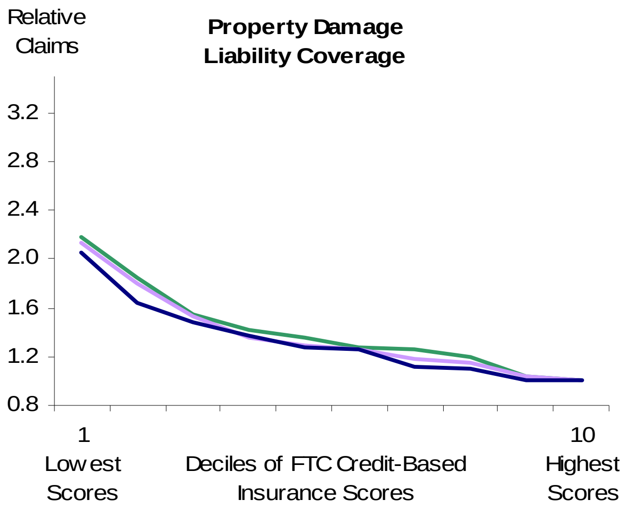
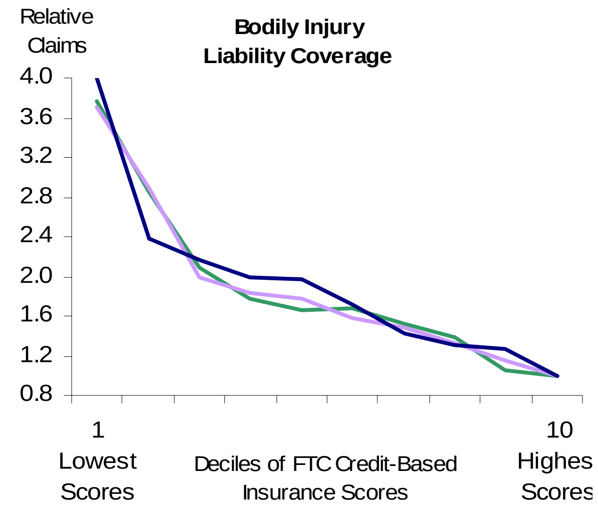
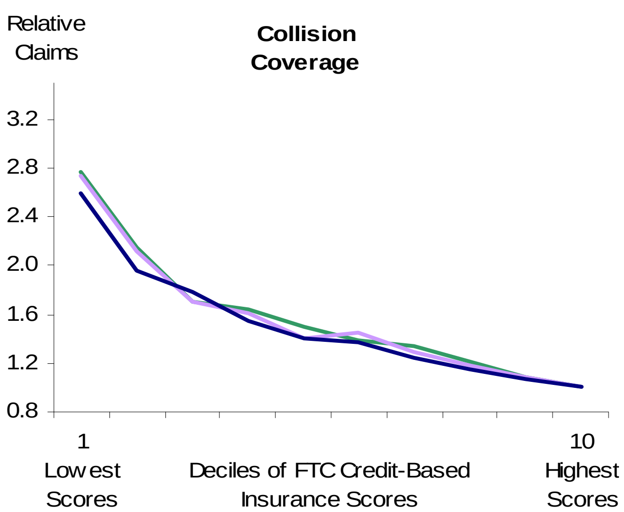
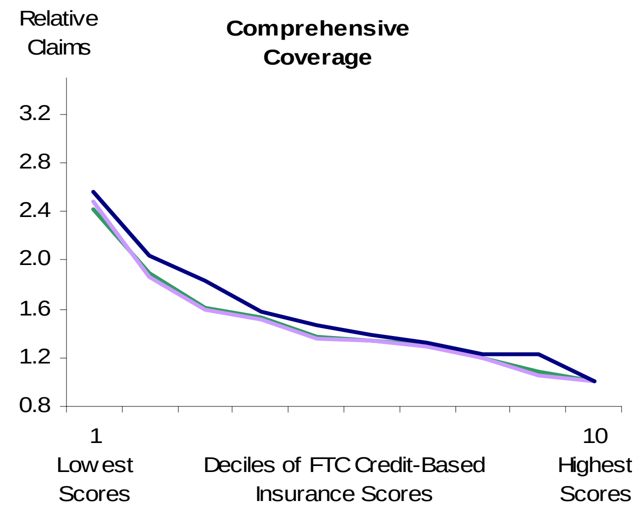


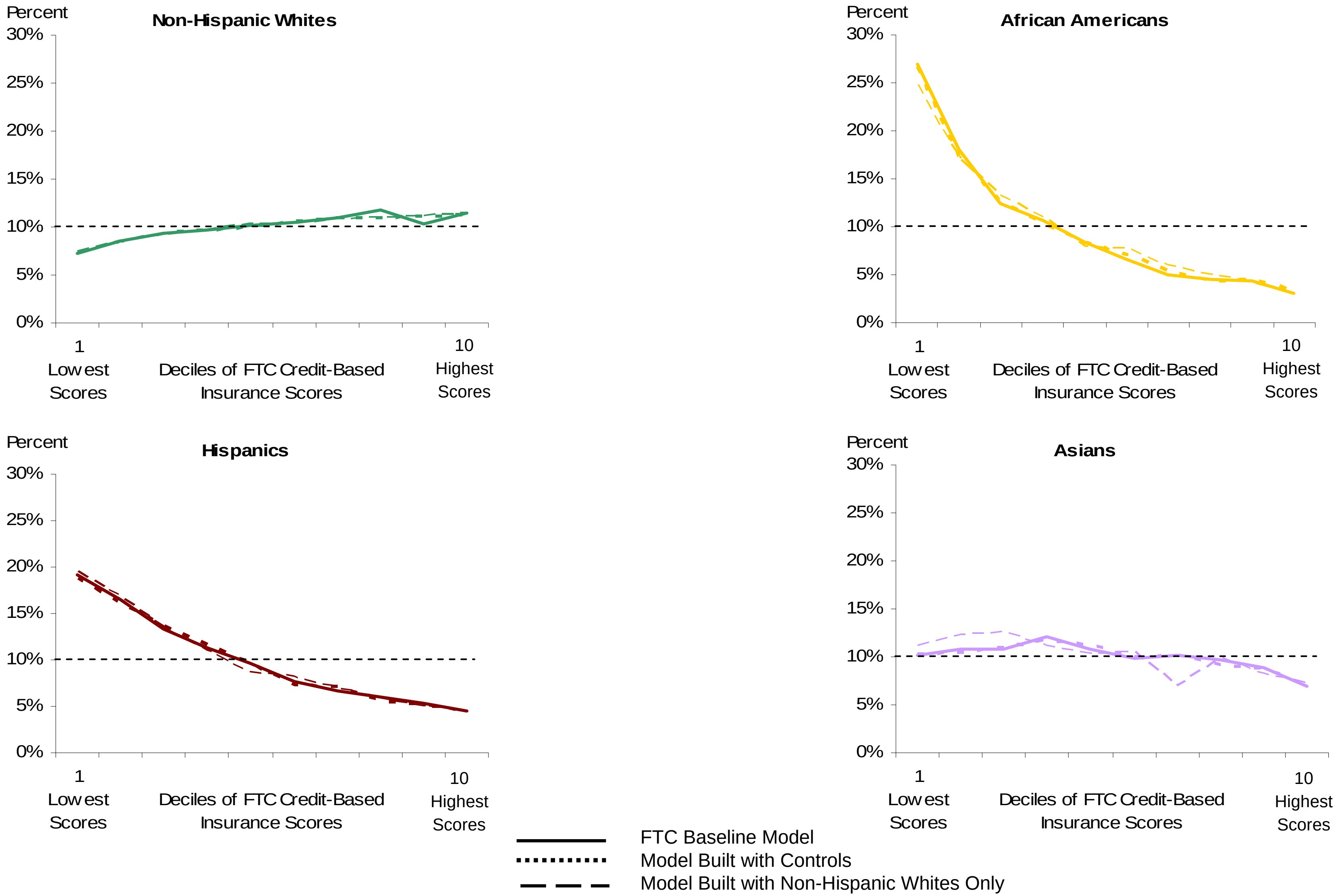




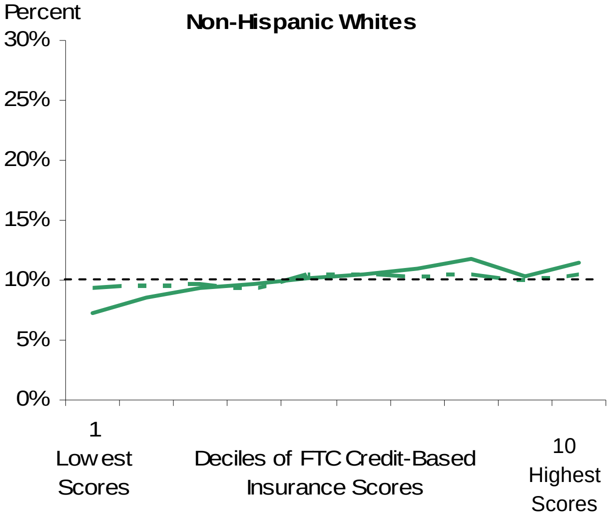


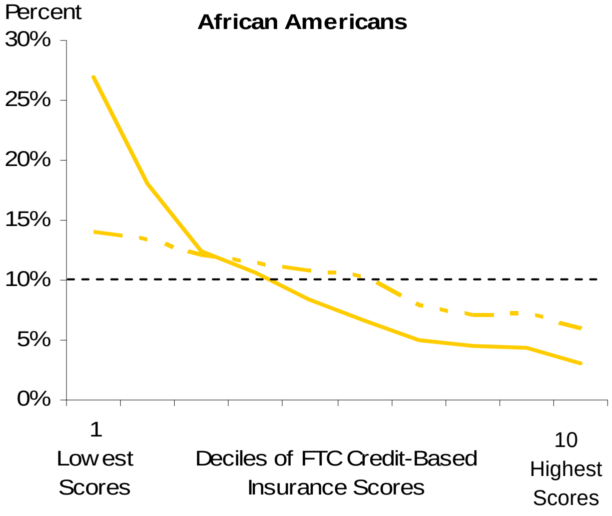
FTC Baseline Model
Model Built with Controls
Model Built with Non-Hispanic Whites Only

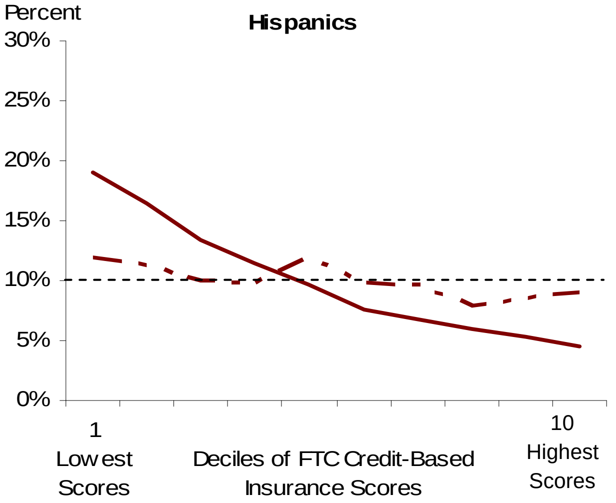
Distribution of FTC Scores
by Race and Ethnicity (A)

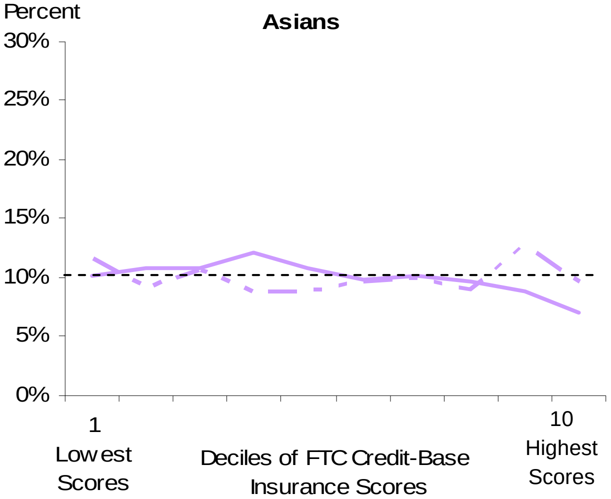


Distribution of FTC Scores
by Race and Ethnicity (B)



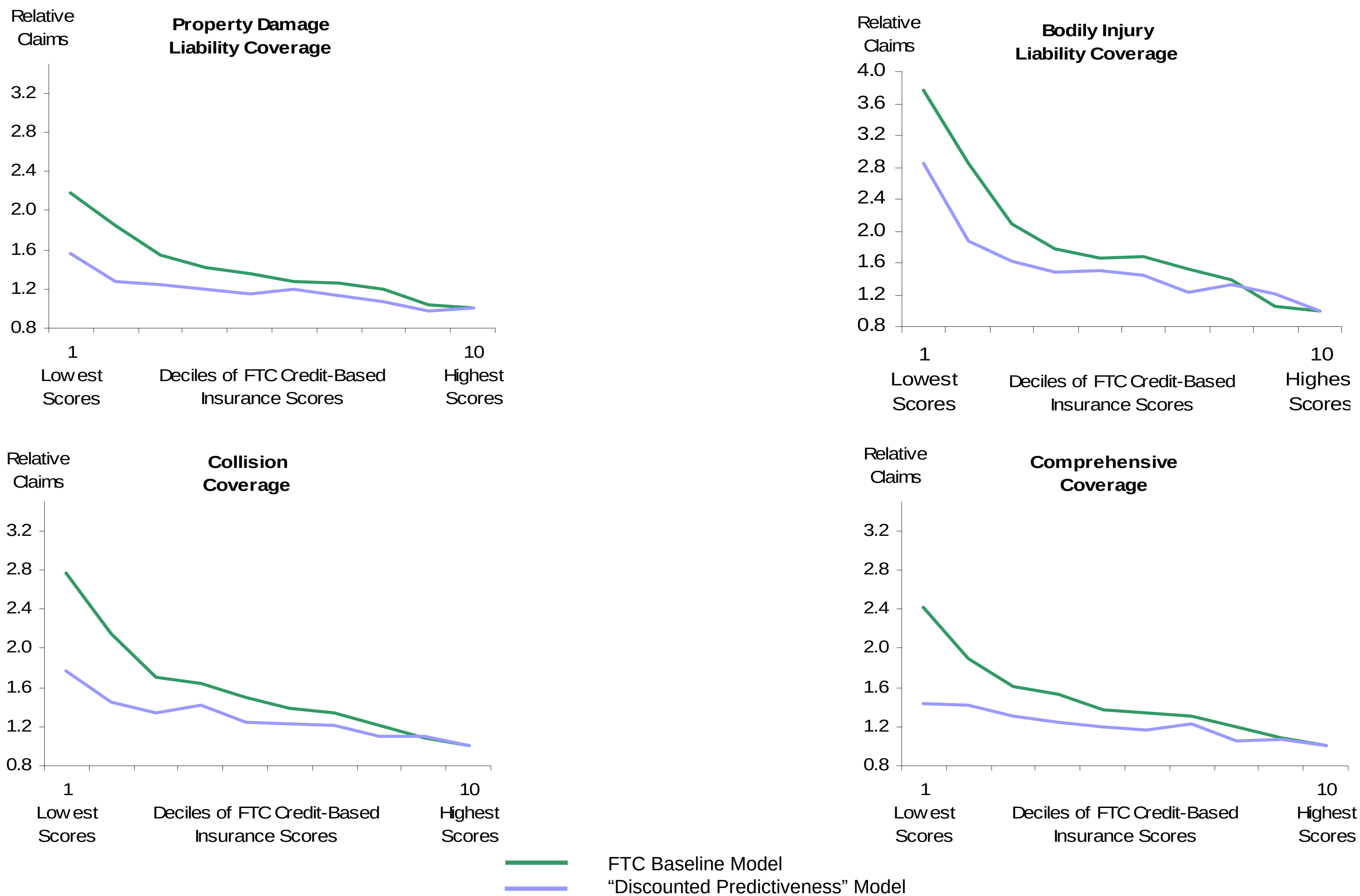






FTC Baseline Model
"Discounted Predictiveness" Model

FTC "Discounted Predictiveness" Model



Conclusions and Next Steps

- 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 pure premiums 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 scoring model with smaller differences across groups.
- Up next: Homeowners!