Race and Insurance

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#GiroConf22

CAS Research Series on Race and Insurance Pricing

CAS RESEARCH PAPER
SERIES ON RACE AND INSURANCE PRICING

APPROACHES TO ADDRESS RACIAL BIAS IN FINANCIAL SERVICES: LESSONS FOR THE INSURANCE INDUSTRY
Members of the 2021 CAS Race and Insurance Research Task Force

CASUALTY ACTUARIAL SOCIETY

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UNDERSTANDING POTENTIAL INFLUENCES OF RACIAL BIAS ON P&C INSURANCE: FOUR RATING FACTORS EXPLORED
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DEFINING DISCRIMINATION IN INSURANCE
Kudakwashe F. Chibanda, FCAS

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SERIES ON RACE AND INSURANCE PRICING

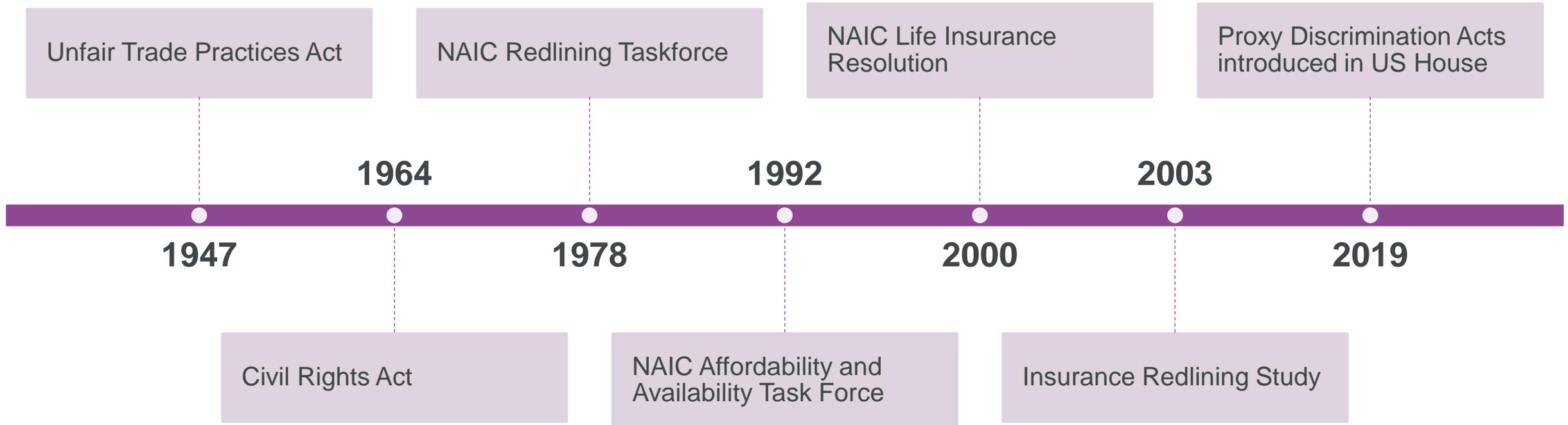METHODS FOR QUANTIFYING DISCRIMINATORY EFFECTS ON PROTECTED CLASSES IN INSURANCE
Roosevelt Mosley, FCAS, and Radost Wenman, FCAS

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https://www.casact.org/publications-research/research/research-paper-series-race-and-insurance-pricing

Race – A Recurring Focus

Unfair Trade Practices Act

NAIC Redlining Taskforce

NAIC Life Insurance Resolution

Proxy Discrimination Acts introduced in US House

1964

1992

2003

1947

1978

2000

2019

Civil Rights Act

NAIC Affordability and Availability Task Force

Insurance Redlining Study

Source: NAIC – Milestones in Racial Discrimination within the Insurance Sector; August 2020
https://content.naic.org/sites/default/files/inline-files/HistoricalContextOutline_Final_0.pdf

Despite Good Driving Records, African-Americans Still Face Higher Insurance Premiums, Expert Blames Variables Used In Formula to Determine Rates
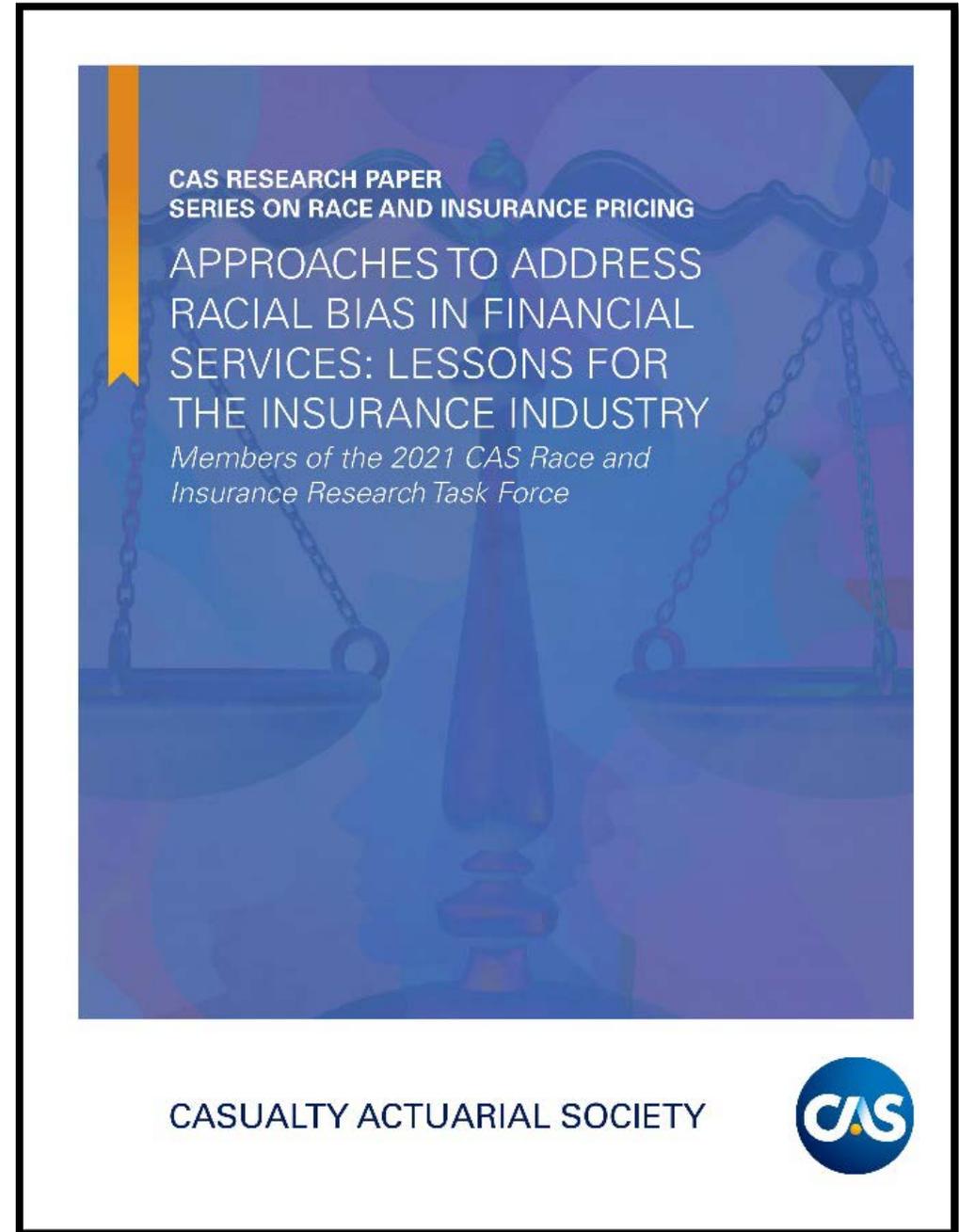
Jul 23, 2020, 04:53pm EDT

Insurance Regulators Pledge To Address Racism And Discrimination Within The Industry

4
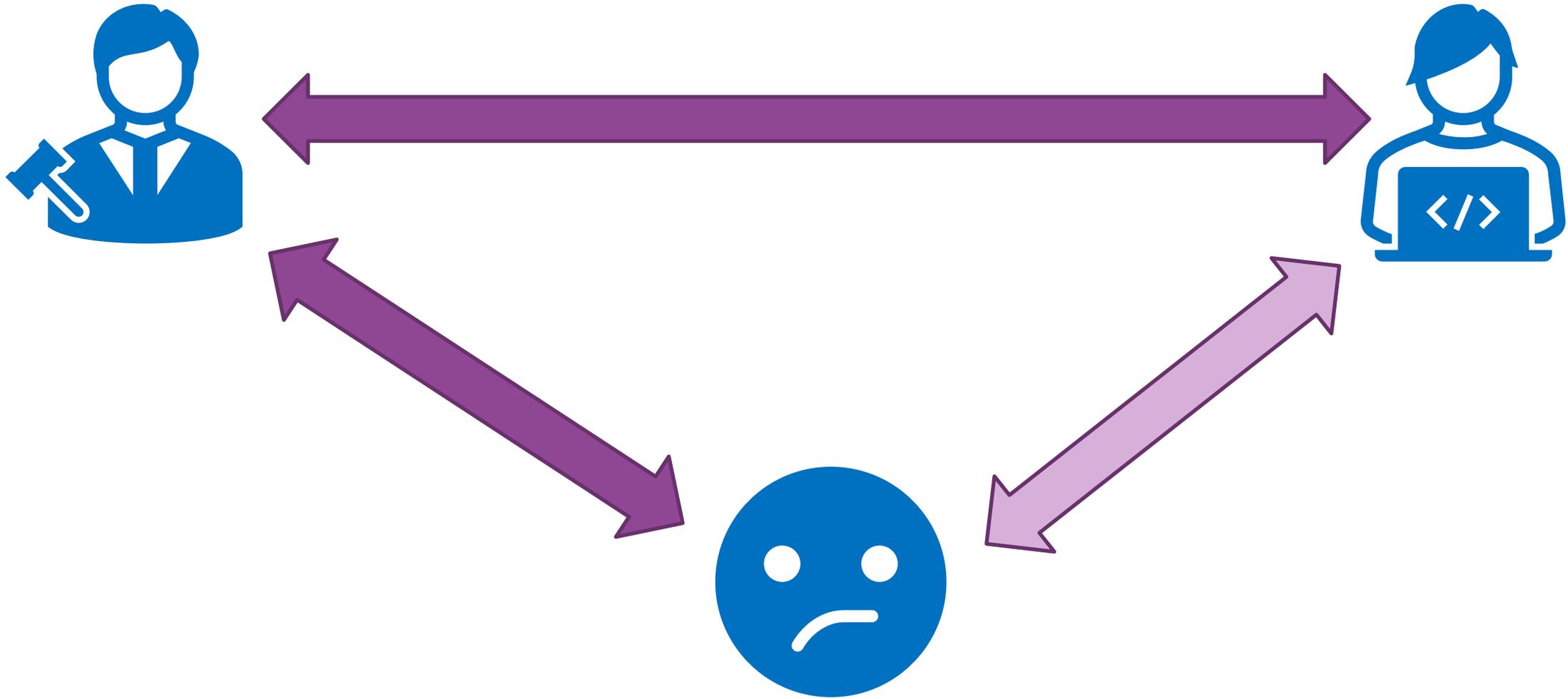
What constitutes *fair* discrimination?

Approaches to Address Racial Bias in Financial Services: Lessons for the Insurance Industry
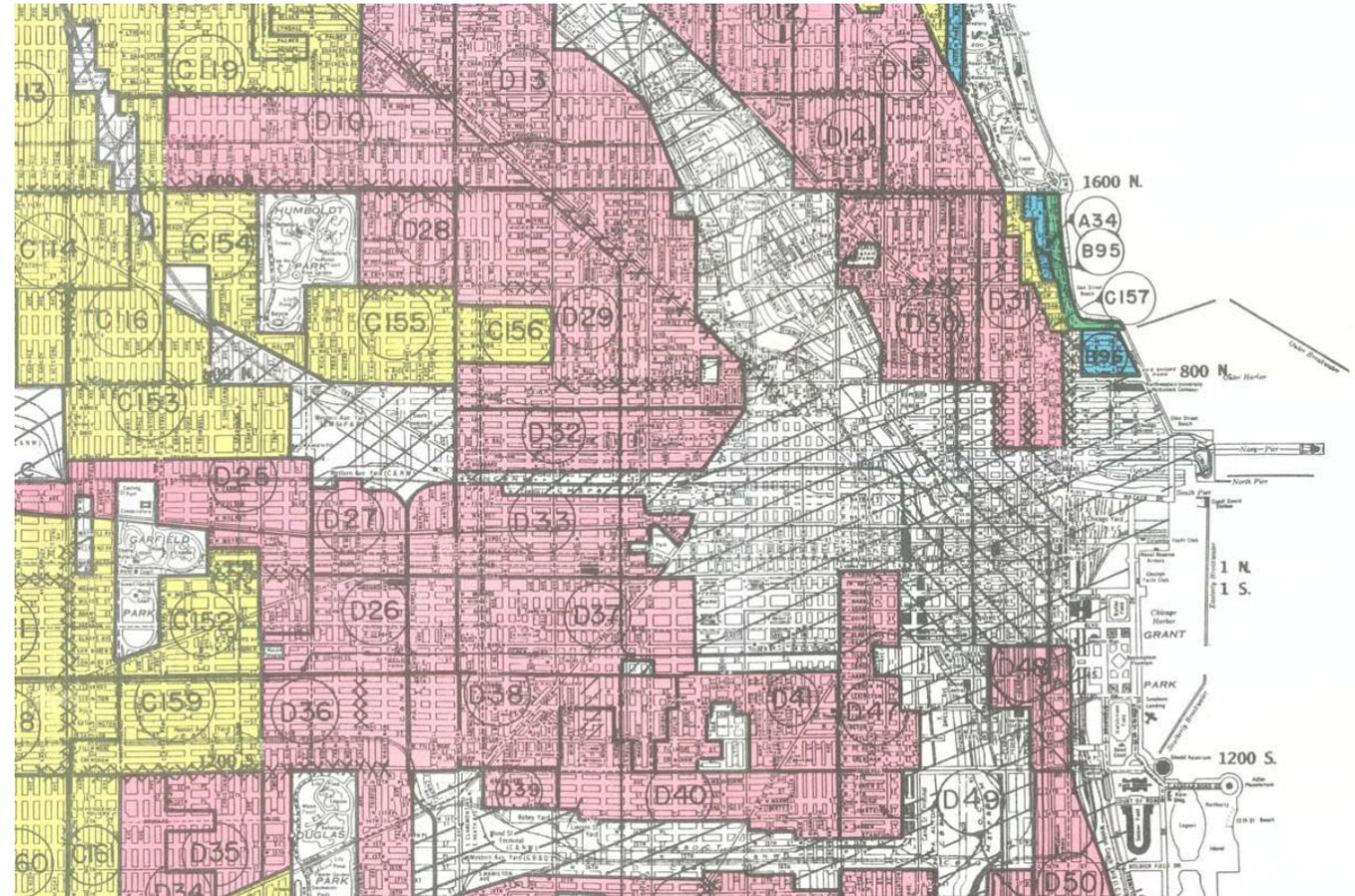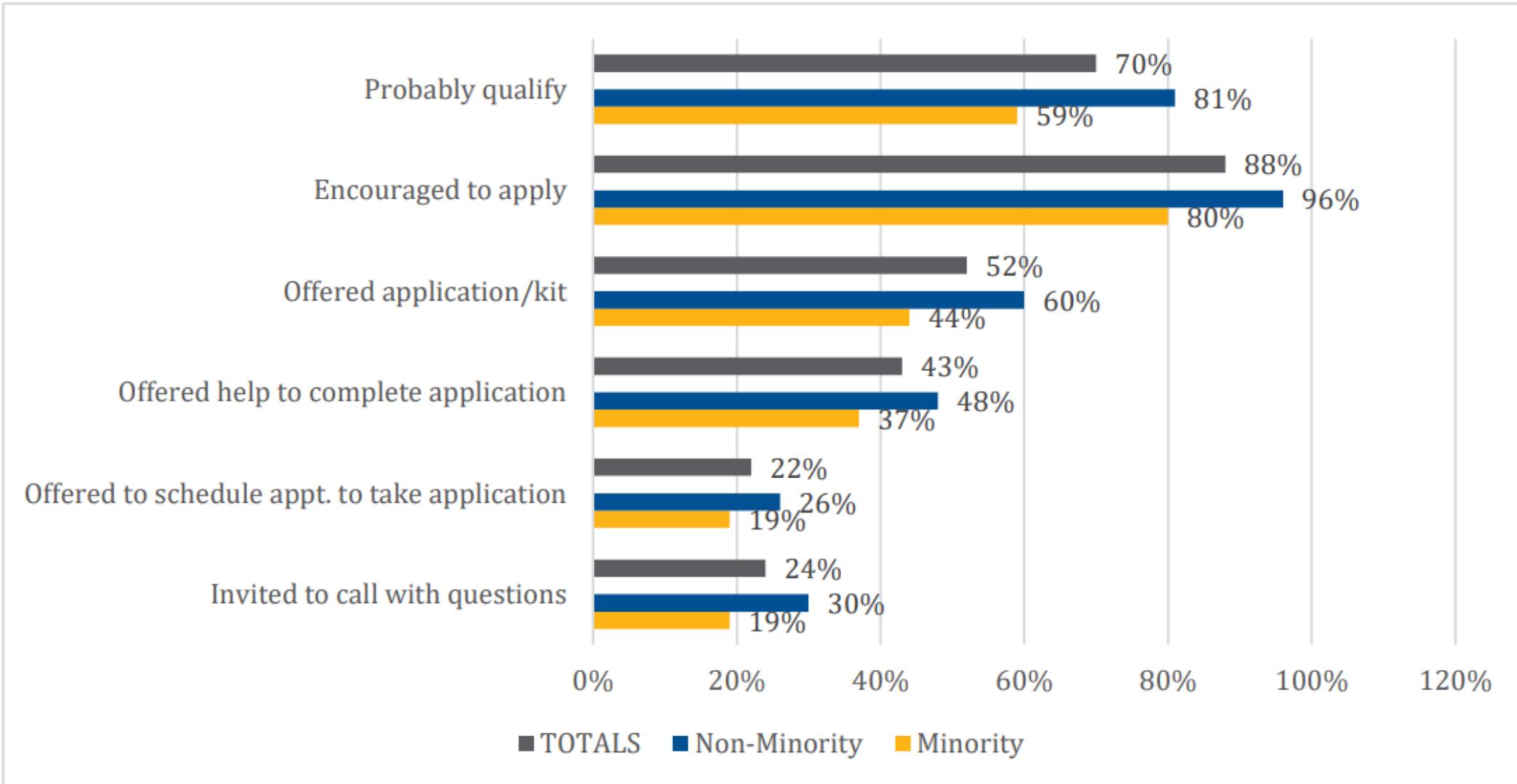
Contributing Policies and Practices

- 1934 Federal Housing Act (New Deal)

- Valuation maps color-coded areas
  - **"Red"** >> As little as 10% minority owned

- Allowed covenants on titles prohibiting sales to Blacks

- 1934-1962 –Underwrote $120B in new housing
  - **< 2%** to non-White groups

- Penalties on "Predatory Loans"

Source: https://www.chicagomag.com/city-life/August-2017/How-Redlining-Segregated-Chicago-and-America/

Ongoing Bias Testing – Matched Pairs

Source: Joint Center for Housing Studies Harvard University, 2008.

Government intervention

Fair Housing Act (FHA) - 1968

Home Mortgage Disclosure Act - 1975

Community Reinvestment Act – 1977

National Community Reinvestment Coalition – 1991

Housing Finance Agency (HFA) - 2008

Government Intervention to Mitigate Discriminatory Impacts

Minority Business Development Agency

- 1969
- Support minority businesses through access to capital, contracts and markets

Equal Credit Opportunity Act

- 1974
- Prohibit discrimination in business lending on the basis of race, color, religion, national origin, sex, marital status, or age

Community Reinvestment Act

- 1977
- Focus on community lending includes lending to businesses

Banking Status by Race/Ethnicity

Source: 2020 Federal Reserve data.

12
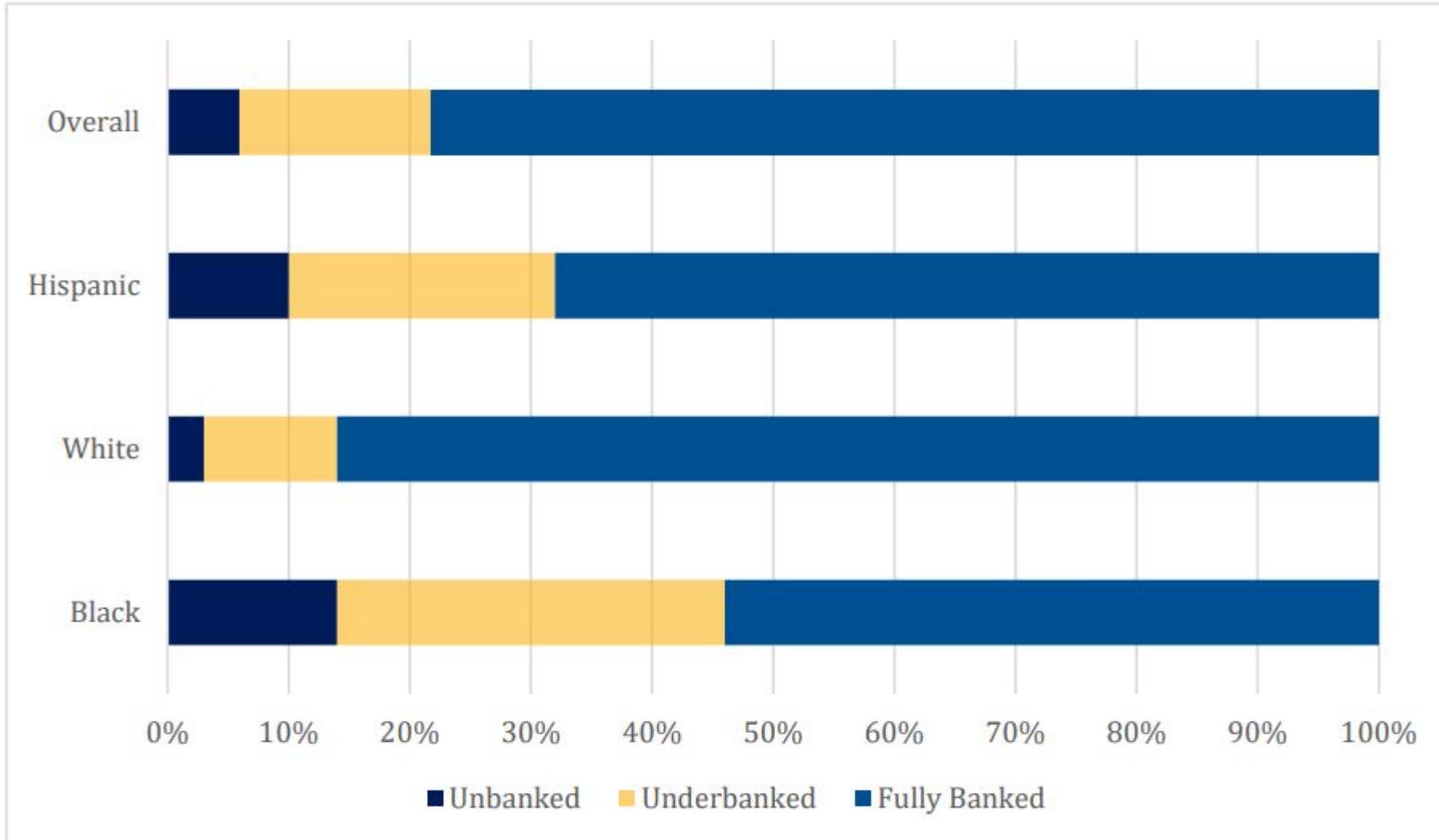
Alternative Data for Credit Scoring

Data Elements that may mitigate racial bias

- Rent

- Utility bills

- Phone bills

- Deposit account history

- Community group affiliation

- Netflix payments

Brookings Institution:

- Utility payments ➡ increased acceptance rates

- New products using such data

  - Experian

  - Trans Union

  - Equifax

Understanding Potential Influences of Racial Bias on P&C Insurance: Four Rating Factors Explored

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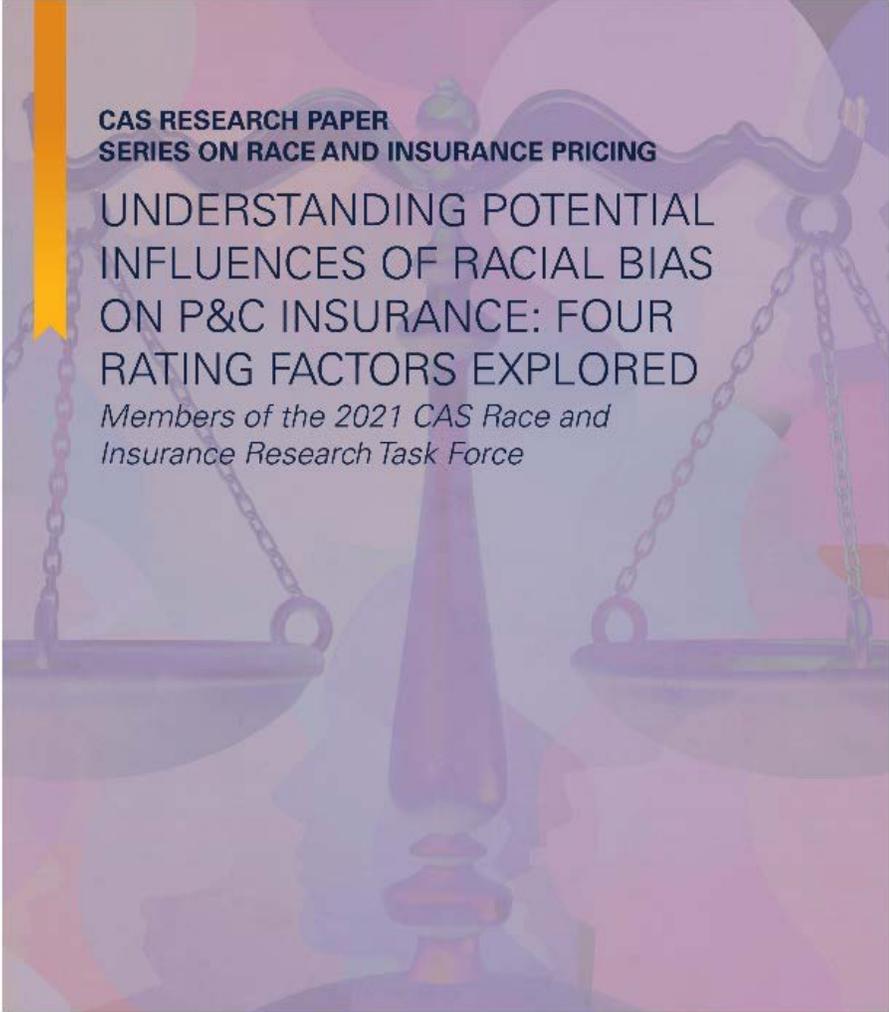
CASUALTY ACTUARIAL SOCIETY

4 commonly used factors in personal lines

Motor Vehicle Record (MVR)

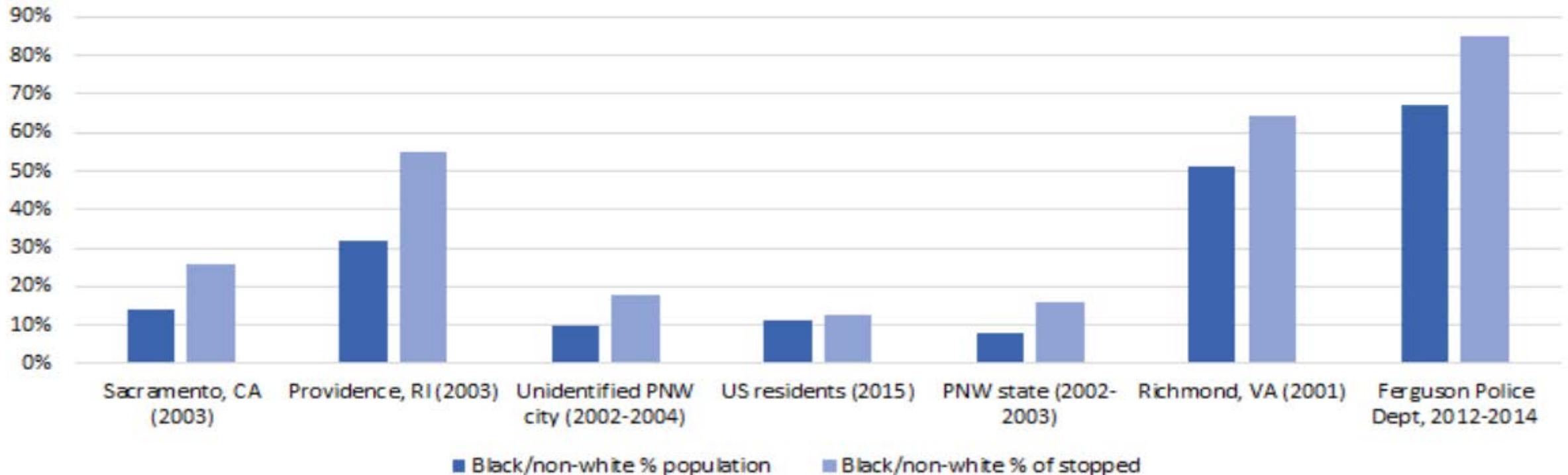Credit Based Insurance Score (CBIS)
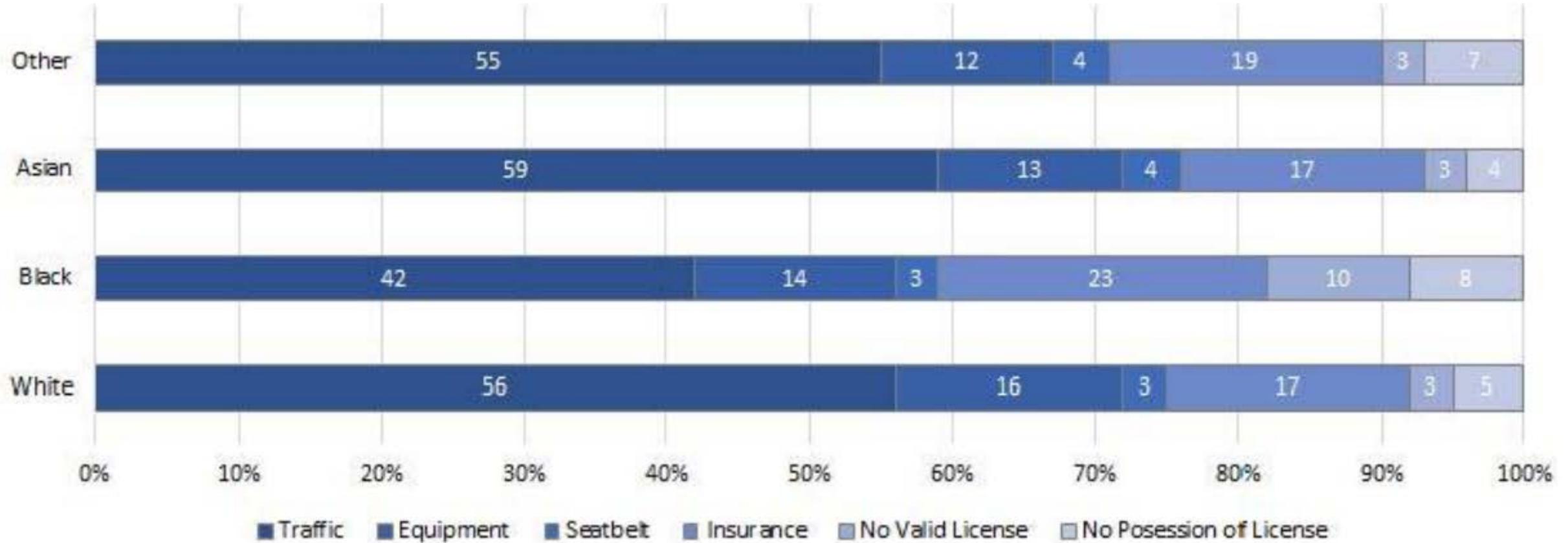
Geographic location

Homeownership

Several studies on traffic stops indicate that Black and other minority drivers are stopped at a disproportionately higher rate than White drivers.

Sources:
- Davis, Elizabeth, Anthony Whyde, and Lynn Langton, "Contacts Between Police and the Public, 2015," Bureau of Justice Statistics Special Report, NCJ 251145, October 2018, https://bjs.ojp.gov/library/publications/contacts-between-police-and-public-2015.
- Greenleaf, Richard G., et al., "Race-Based Decisions: Traffic Citations and Municipal Court Dispositions," Justice Policy Journal, The Center of Juvenile and Criminal Justice, 8(1), Spring 2011, http://www.cjcj.org/uploads/cjcj/documents/Race-based_decisions.pdf.
- McDevitt, J., A. Farrell, and M. Yee, "Providence traffic stop statistics compliance report," Northeastern University, Institute on Race and Justice, October 31, 2003, https://repository.library.northeastern.edu/files/neu:344642.
- National Consumer Law Center (NCLC), "Past Imperfect: How Credit Scores and Other Analytics 'Bake In' and Perpetuate Past Discrimination," May 2016, Racial Justice and Equal Economic Opportunity Project, https://www.nclc.org/images/pdf/credit_discrimination/Past_Imperfect050616.pdf.

Black drivers were less likely than other groups to be cited for moving violations

Legend: Traffic, Equipment, Seatbelt, Insurance, No Valid License, No Posession of License

Group	Traffic	Equipment	Seatbelt	Insurance	No Valid License	No Posession of License
Other	55	12	4	19	3	7
Asian	59	13	4	17	3	4
Black	42	14	3	23	10	8
White	56	16	3	17	3	5

Source: Greenleaf et al., 2011.

Credit score –vs- Credit-Based Insurance Scoring

Credit score and CBIS models use the same underlying information with respect to credit behaviors:

|	
Derogatory	negative indications on credit reports that generally mean a loan wasn't paid back as agreed.
Shopping	inquiries into a credit report (e.g., when shopping for car loan and applying for credit).
Utilization	how much available credit one uses at any given time (i.e., total balances to total credit limits)
History	components of a credit report such as number of payments on time or late, number of credit cards and loans, how long credit accounts have been open.

Fair Credit Reporting Act (FCRA) and **Equal Credit Opportunity Act (ECOA)**
- enacted to protect against credit discrimination

CBIS results in increased premium for minority groups, but not itself a strong proxy for race/ethnicity
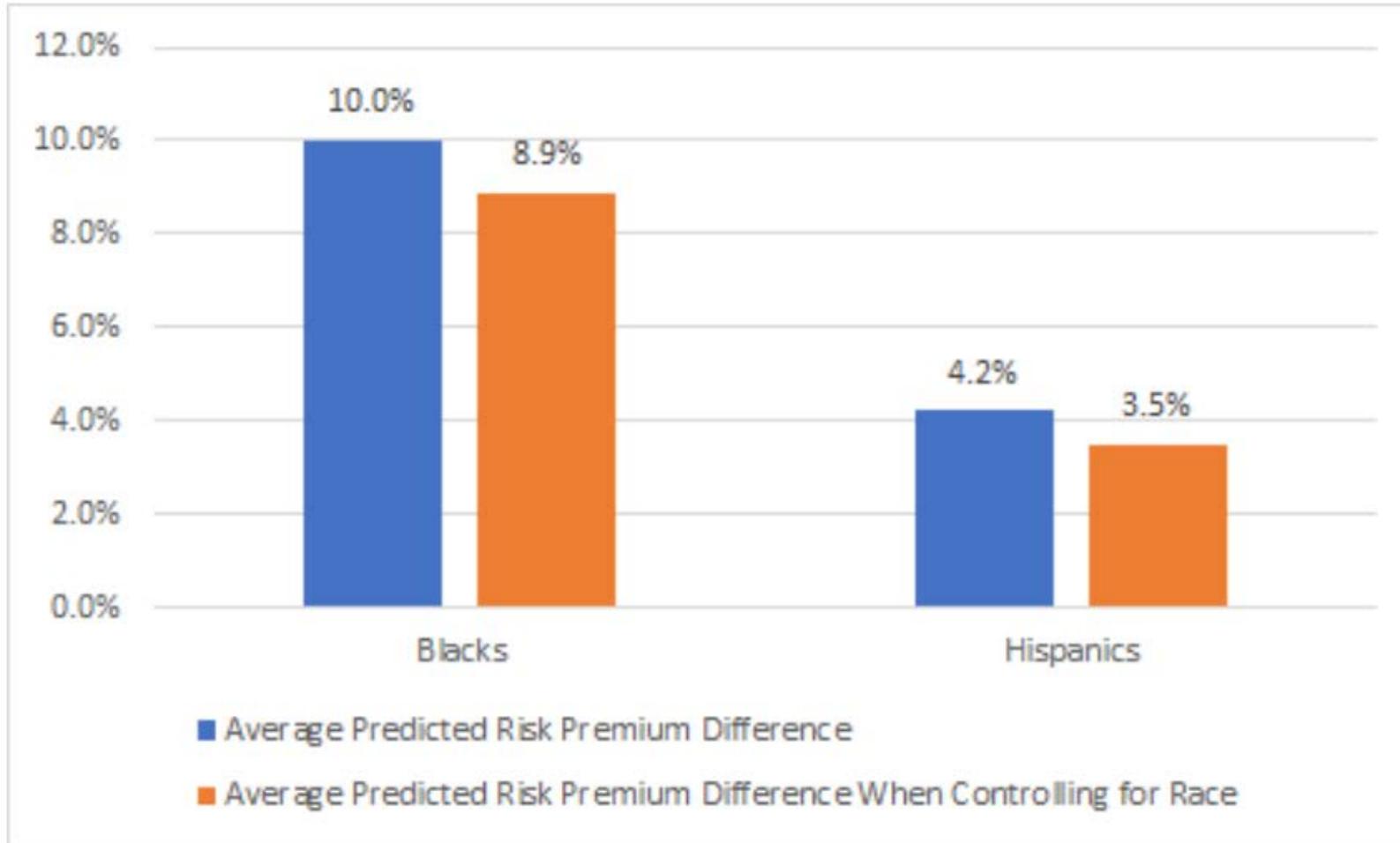

Federal Trade Commission (FTC), "Credit-Based Insurance Scores: Impacts on Consumers of Automobile Insurance," July 2007, https://www.ftc.gov/sites/default/files/documents/reports/credit-based-insurance-scoresimpacts-consumers-automobile-insurance-report-congress-federaltrade/p044804facta_report_credit-based_insurance_scores.pdf.

Residential segregation exists everywhere, but varies in severity

Milwaukee: #1 most segregated
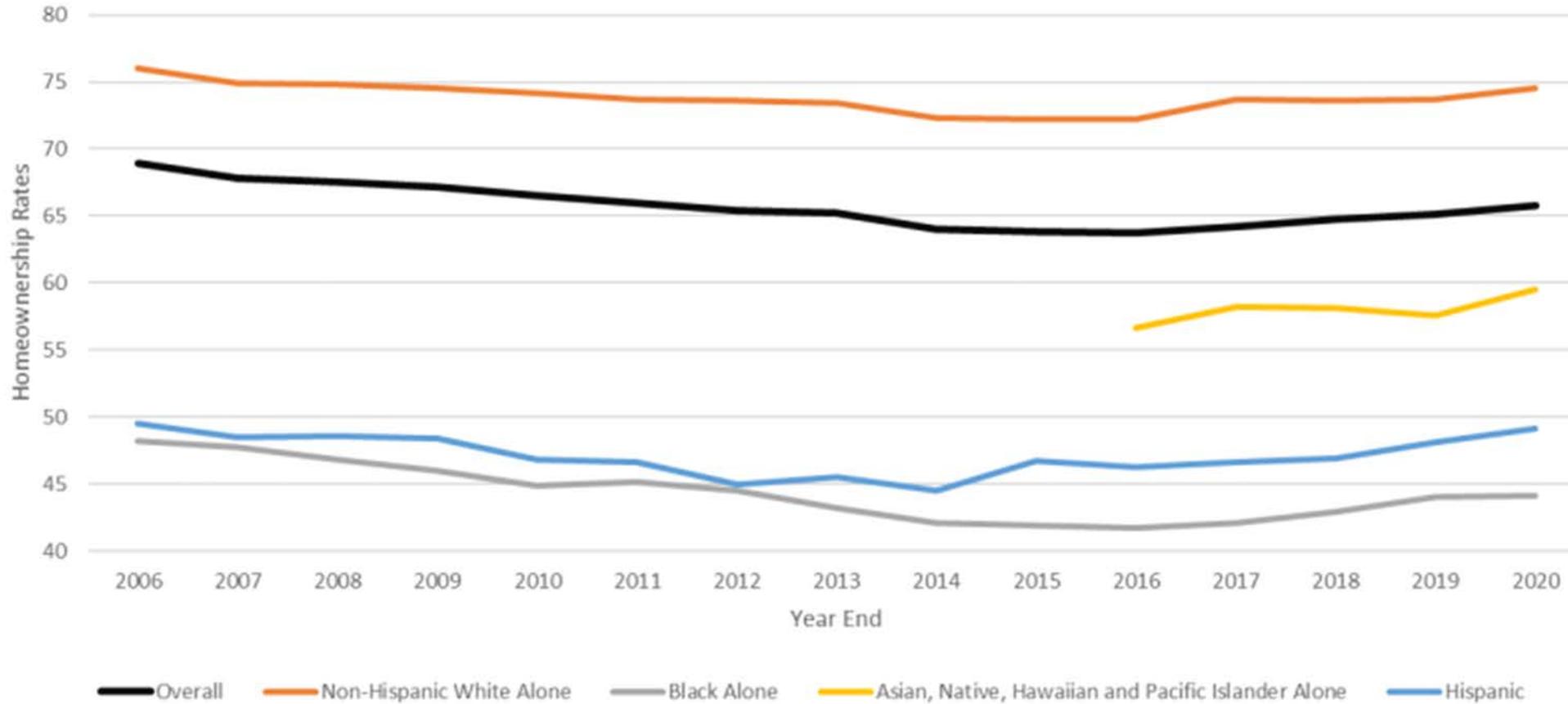
Seattle: #2 least segregated
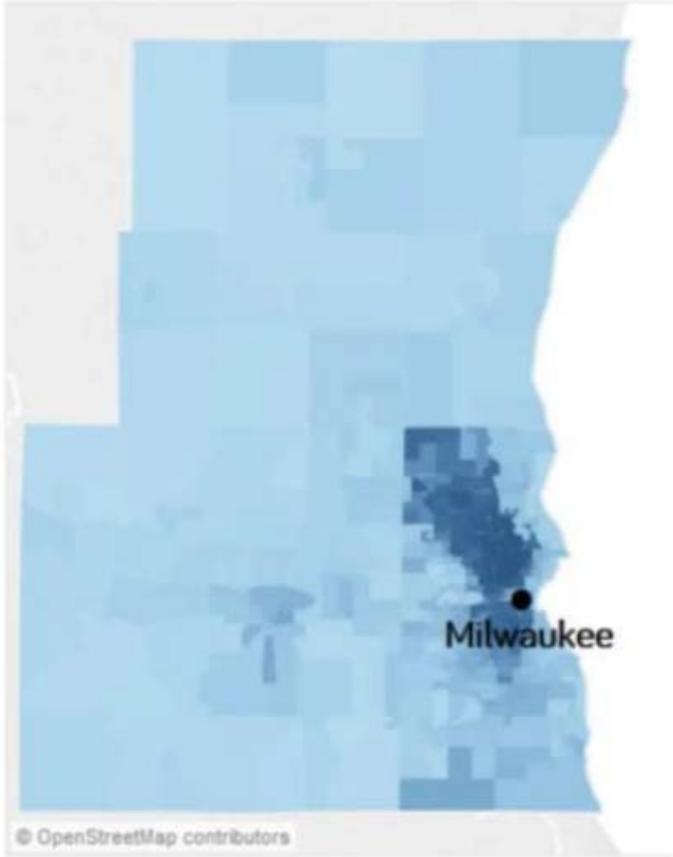
White Population Share:

0% ▮▮▮▮▮▮▮▮▮▮ 100%

apartment list

Source: Census ACS 5-year estimates. Apartment List calculations.
Note: Overall segregation indexes are 0.61 for Milwaukee and 0.32 for Seattle.

20

Wide gap in Homeownership remains

Figure 7. Homeownership Rates by Race and Ethnicity of Householder: 2006-Present

Legend: Overall, Non-Hispanic White Alone, Black Alone, Asian, Native, Hawaiian and Pacific Islander Alone, Hispanic

Source: United States Census Bureau. April 2021.

Despite reform attempts racial discrimination in lending remains a significant issue today

Figure 6. Home Purchase and Refinance Loan Denial Rates for Conventional Loans from 2004-2019.
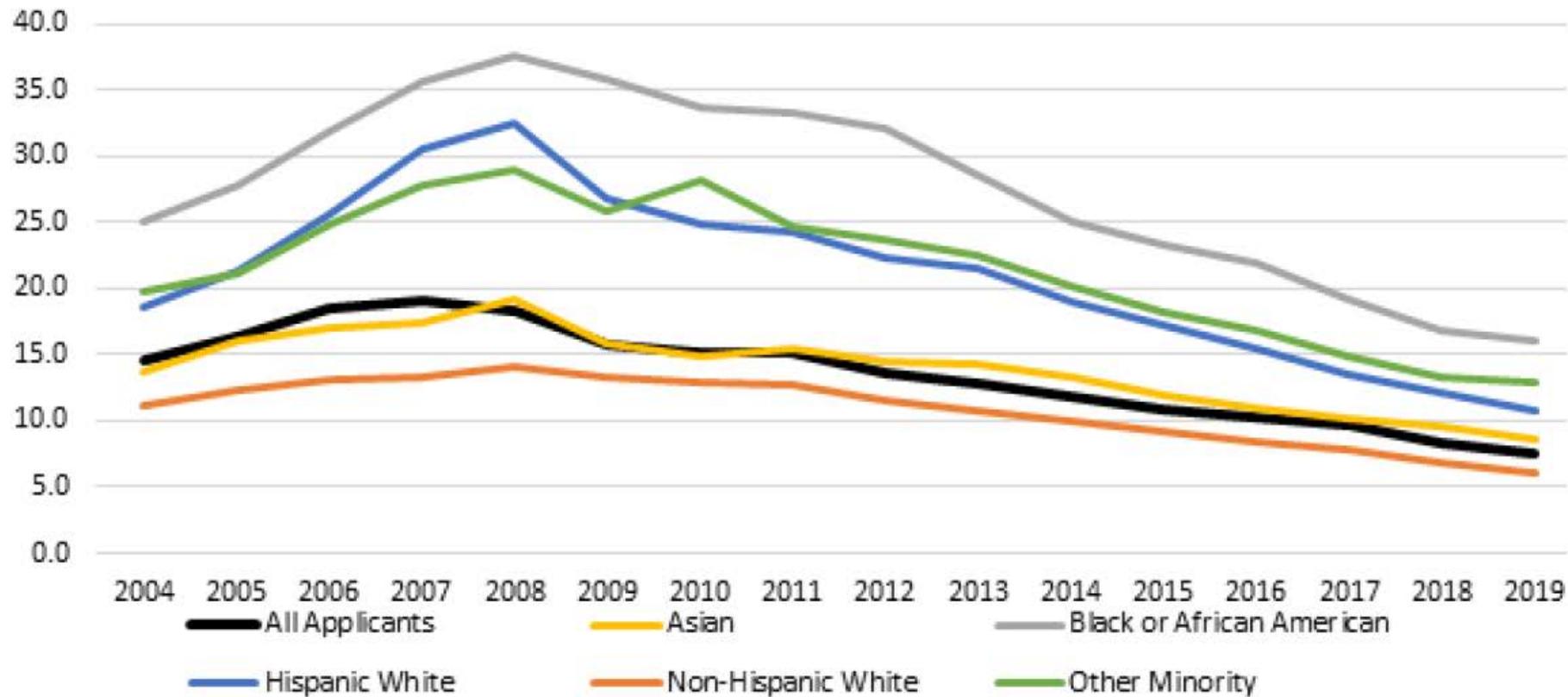
4 commonly used factors in personal lines

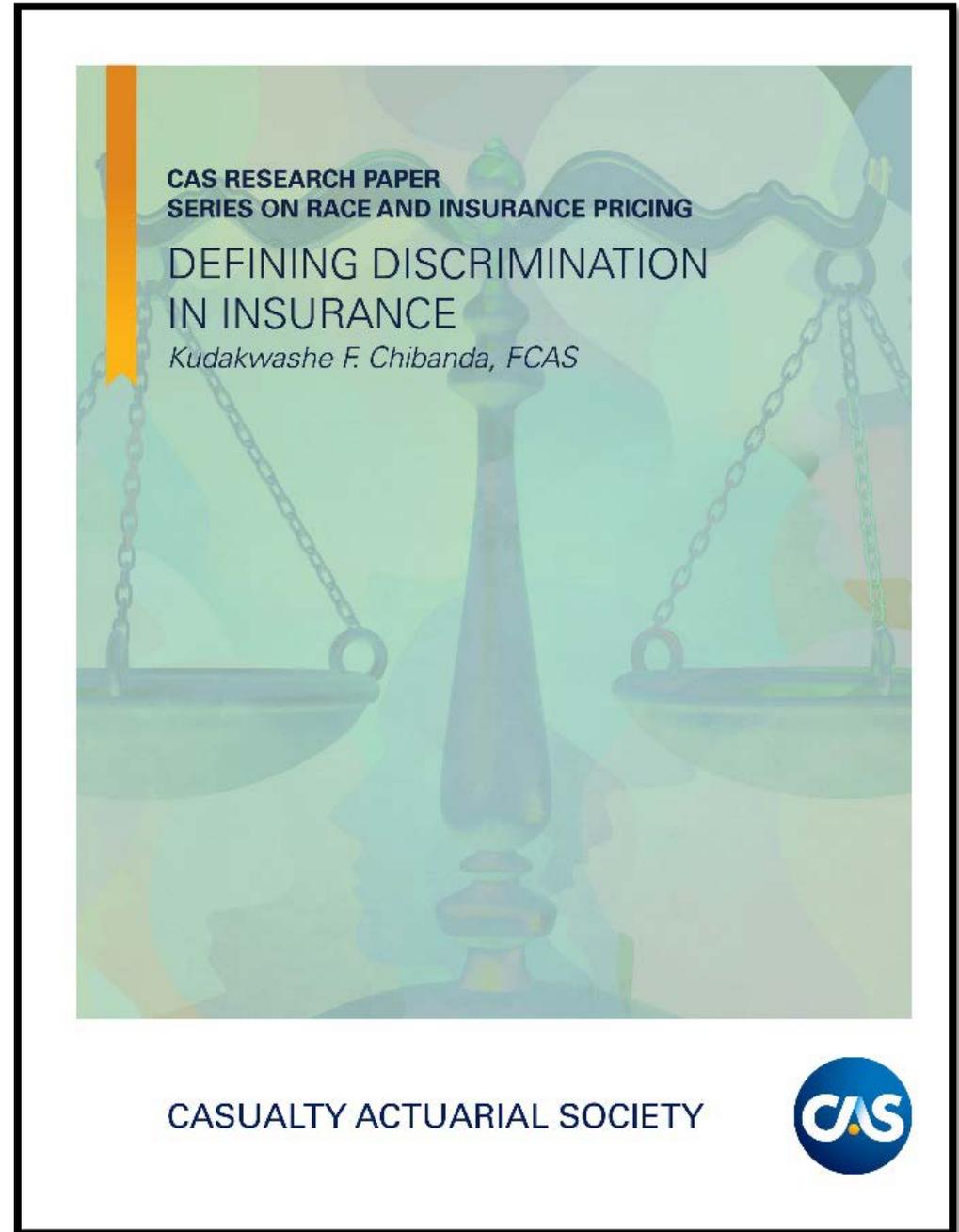Motor Vehicle Record (MVR)

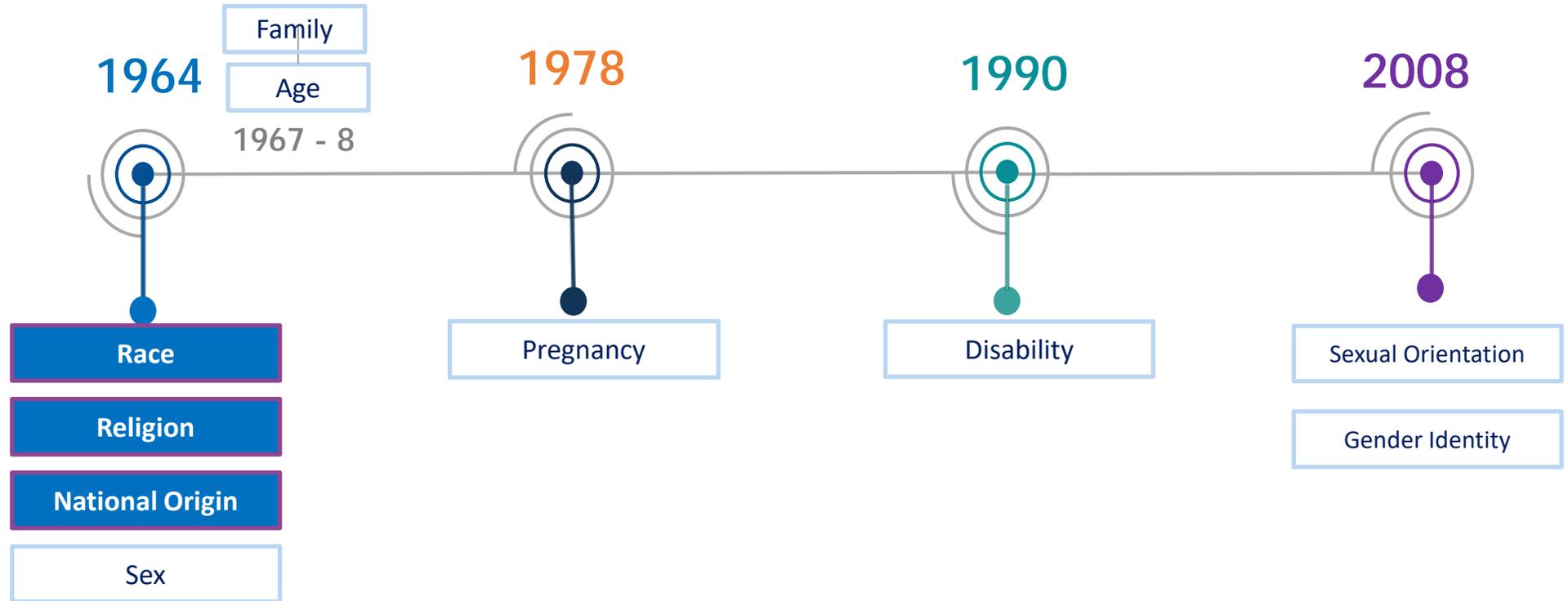Credit Based Insurance Score (CBIS)

Geographic location

Homeownership

Defining Discrimination In Insurance

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What is a protected class?

A protected class is a group of people who **share a common characteristic**, for whom federal and state laws have created protections that prohibit against discrimination because of that trait.

Family

Age

1967 - 8

1964

1978

1990

2008

Race

Religion

National Origin

Sex

Pregnancy

Disability

Sexual Orientation

Gender Identity

# Revisiting Unfair Discrimination

Unfair Discrimination

rates must not be excessive, inadequate, or unfairly discriminatory[1]

Established in McCarran Ferguson Act (1945)

- Discrimination ~ Differentiation
- No protected class mention
- Most states define protected class as part of unfair discrimination, but not all!

1. Race was prohibited for the purposes of accepting a risk
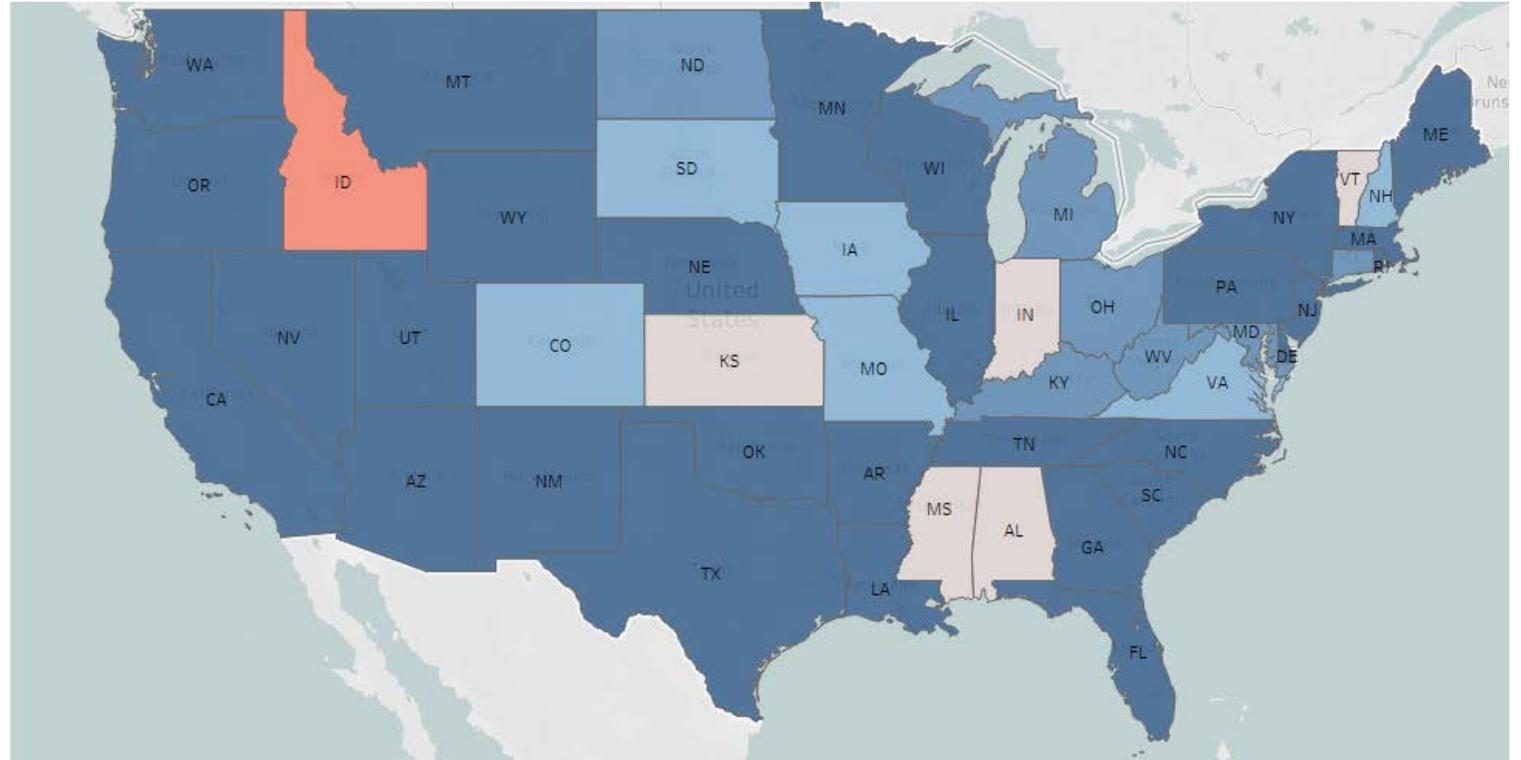
- Dark blue = restrict protected class in classification and rating
- Lighter colors → less restrictive of protected class in classification (or silent)

Proxy Discrimination

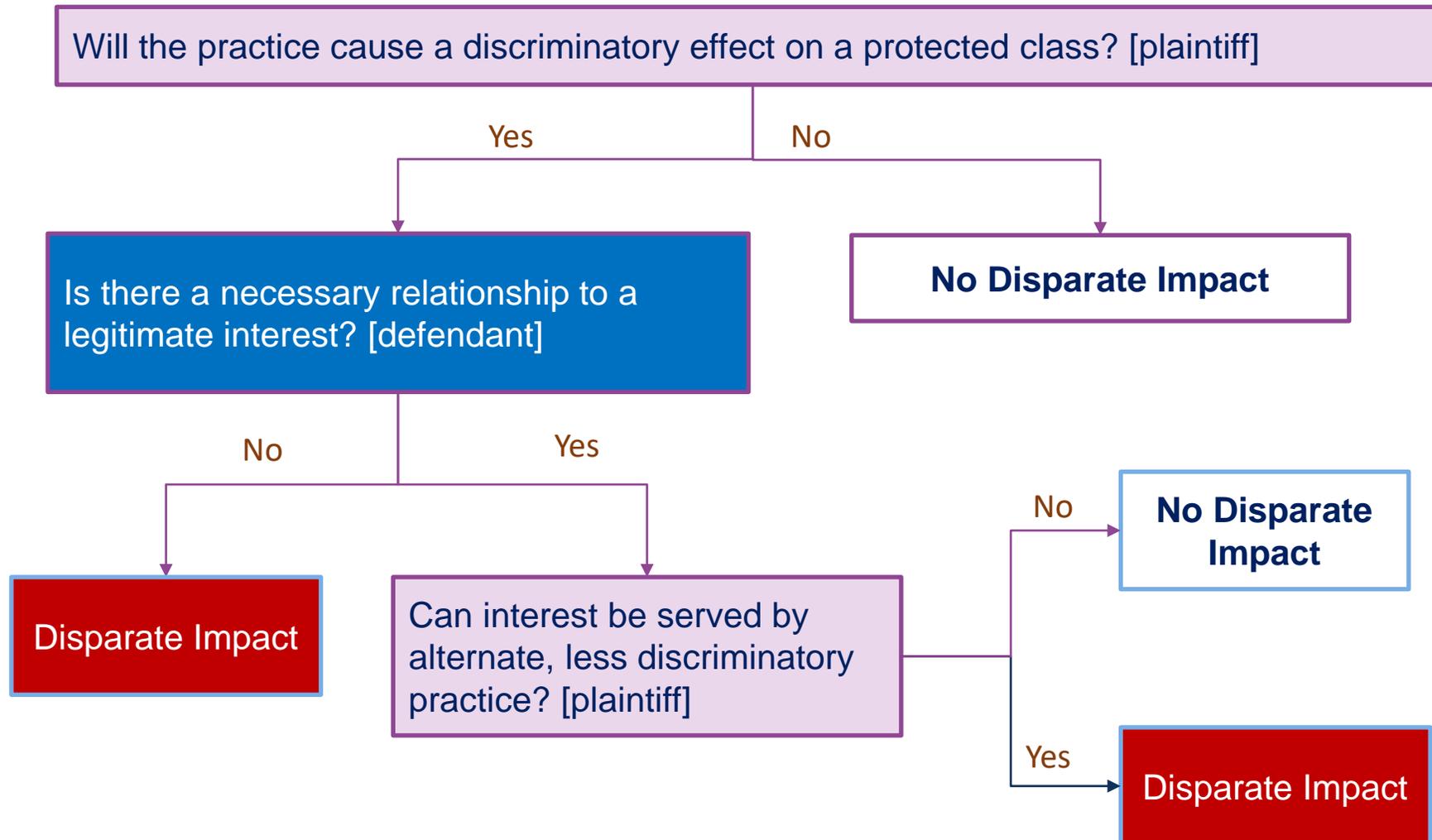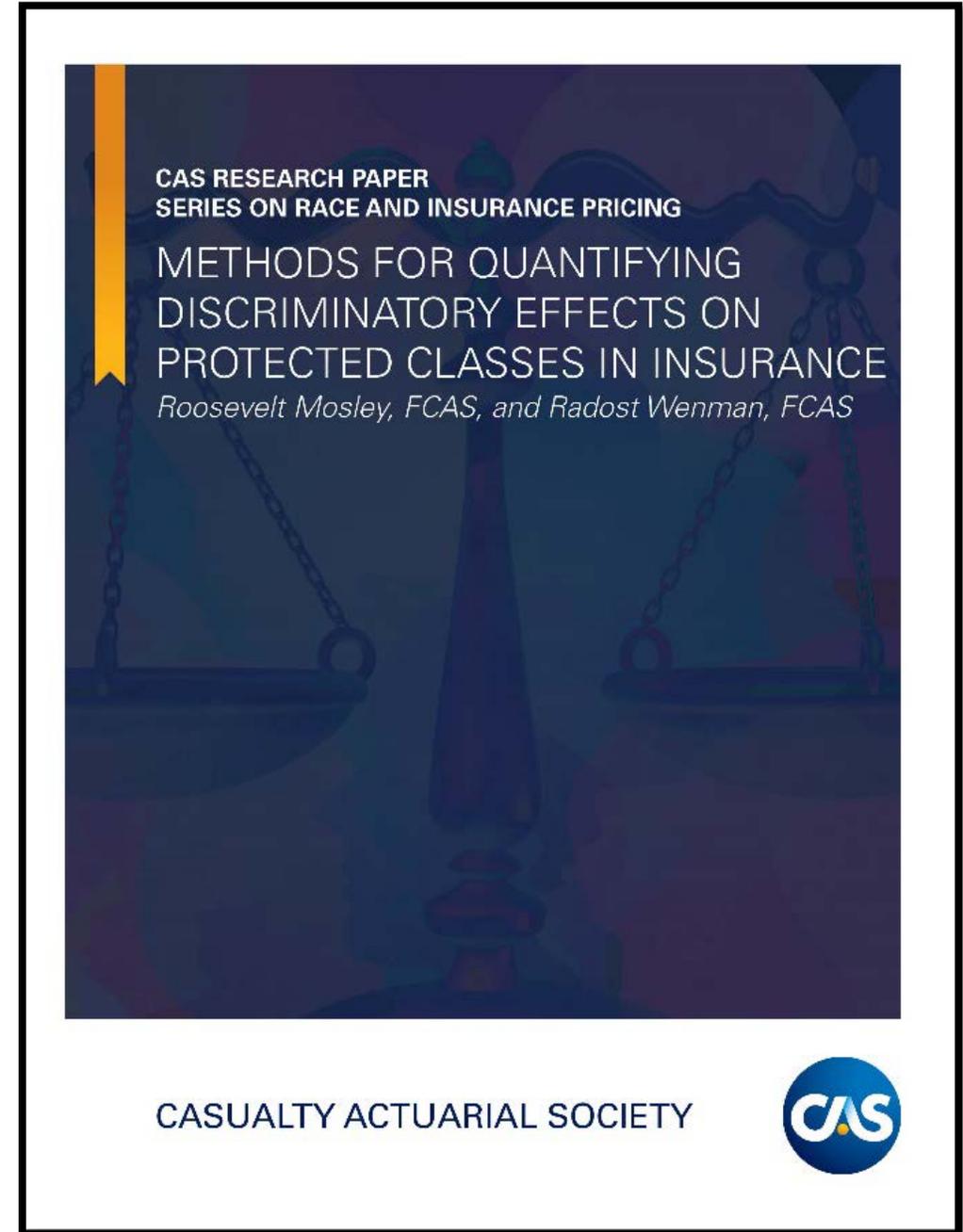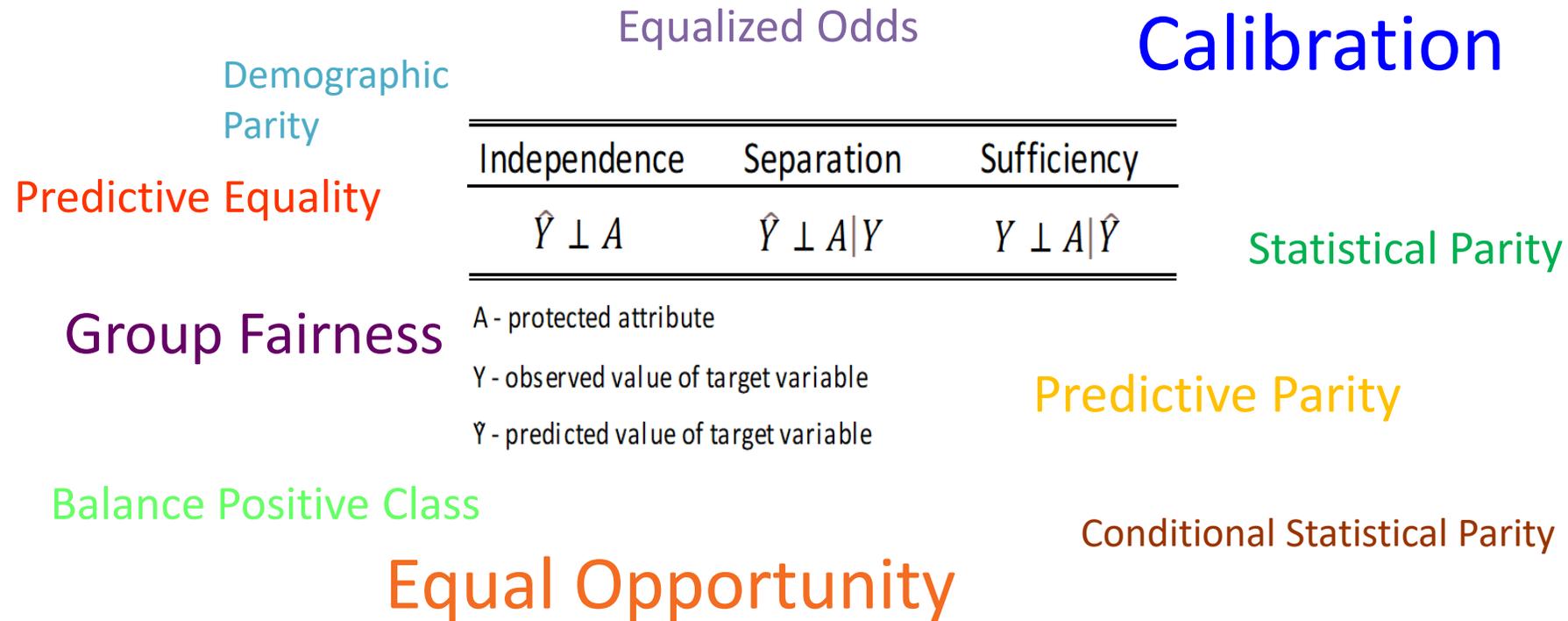| American Property Casualty Insurance Association INSURING AMERICA	NCOIL	FTC	NAIC	CEJ CENTER FOR ECONOMIC JUSTICE
"Proxy theory" was adopted by the courts as an *element of disparate treatment* to recognize a policy should not be allowed to use a technically neutral classification as a proxy to evade Title VII's prohibition	Proxy Discrimination means *the intentional substitution of a neutral factor* for a factor based on color, creed…for the purpose of discriminating against a consumer	Whether an included variable acts in whole or in part as a *statistical proxy* for excluded variables such as race, ethnicity and income	**Principles on AI:** "AI actors should…avoid proxy discrimination against protected classes. AI systems should…*avoid harmful or unintended consequences*"	Use of a non-prohibited factor that, due in whole or in part to a *significant correlation with a prohibited class* causes unnecessary, disproportionate outcomes
Intent Required	**Intent Required**	**Unclear**	**Intent Not Required**	**Intent Not Required**
Assert this is the legal definition	Assert this is a type of unfair discrimination	What counts as a statistical proxy?	How do insurers avoid unintended consequences?	How do you determine an outcome is unnecessary?

Disparate Impact

Will the practice cause a discriminatory effect on a protected class? [plaintiff]

Yes

No

Is there a necessary relationship to a legitimate interest? [defendant]

No Disparate Impact

No

Yes

Disparate Impact

Can interest be served by alternate, less discriminatory practice? [plaintiff]

No

No Disparate Impact

Yes

Disparate Impact

Disparate Impact

Will the practice cause a discriminatory effect on a protected class? [plaintiff]

Methods for Quantifying Discriminatory Effects on Protected Classes in Insurance

Classification of Fairness Metrics

Equalized Odds

Calibration

Demographic
Parity

Predictive Equality

Independence	Separation	Sufficiency
$\hat{Y} \perp A$	$\hat{Y} \perp A \mid Y$	$Y \perp A \mid \hat{Y}$

A - protected attribute

Y - observed value of target variable

Ŷ - predicted value of target variable

Statistical Parity

Group Fairness

Predictive Parity

Balance Positive Class

Conditional Statistical Parity

Equal Opportunity

https://fairmlbook.org

Independence

The predictions and the protected attribute are statistically independent

$$\hat{Y} \perp A$$

$\hat{P}(claim\ occ | Male) = \hat{P}(claim\ occ | Female)$

$\hat{P}(claim\ occ | Male) = 10\%$ **and** $\hat{P}(claim\ occ | Female) = 10\%$ **FAIR**

$\hat{P}(claim\ occ | Male) = 10\%$ **but** $\hat{P}(claim\ occ | Female) = 20\%$ **UNFAIR**

Separation

The predictions and the protected attribute are statistically independent, conditional on the actual response

$$\hat{Y} \perp A | Y$$

$\hat{P}(claim\ occ | Male \cap claim = yes) = \hat{P}(claim\ occ | Female \cap claim = yes)$

$\hat{P}(claim\ occ | Male \cap claim = yes) = 10\%$ **and** $\hat{P}(claim\ occ | Female \cap claim = yes) = 10\%$ **FAIR**

$\hat{P}(claim\ occ | Male \cap claim = yes) = 10\%$ **but** $\hat{P}(claim\ occ | Female \cap claim = yes) = 20\%$ **UNFAIR**

Sufficiency

The actual response and the protected attribute are statistically independent, conditional on the predicted response

$$Y \perp A | \hat{Y}$$

$\hat{P}(Y = 1 | Male \cap \hat{P} = p) = \hat{P}(Y = 1 | Female \cap \hat{P} = p) = p$

$P(Y = 1 | Male \cap \hat{P} = 10\%) = 10\%$ **and** $P(Y = 1 | Female \cap \hat{P} = 10\%) = 10\%$ **FAIR**

$P(Y = 1 | Male \cap \hat{P} = 10\%) = 10\%$ **but** $P(Y = 1 | Female \cap \hat{P} = 10\%) = 2\%$ **UNFAIR**

Current State of Affairs

WATCH THIS SPACE! 🔍

There is no concrete solution yet proposed and uniformly accepted

Research into best practices is still ongoing

Most research has focused on binary targets

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Institute and Faculty of Actuaries

Thank you

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Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

20 November 2022