# The Mismeasure of Disparate Impact

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# Topics

Measurement of differences between outcome rates with regard to:

(a) whether a difference should be deemed large of small;

(b) whether one difference is smaller than another (as it bears on the obligation to implement a less discriminatory alternative to a practice with a disparate impact).

# Key Point

Contrary to the belief underlying numerous civil rights enforcement policies, relaxing a standard or otherwise reducing the frequency of an adverse outcome tends to ***increase, not decrease,*** percentage differences in rates of experiencing it.

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http://jpscanlan.com/images/The_Mismeasure_of_Disparate_Impact.pdf

# Table 1(a). Illustration of Effect of Lowering Test Cutoff on Relative (Percentage) Difference Between Pass Rates of Advantaged Group (AG) and Disadvantaged Group (DG)

| Cutoff | AG Pass Rate | DG Pass Rate | AG/DG Pass Ratio |
|---|---|---|---|
| High | 80% | 63% | 1.27 |

High cutoff: AG pass rate 27% higher than DG pass rate

# Table 1(b). Illustration of Effect of Lowering Test Cutoff on Relative (Percentage) Difference Between Pass Rates of Advantaged Group (AG) and Disadvantaged Group (DG)

| Cutoff | AG Pass Rate | DG Pass Rate | AG/DG Pass Ratio |
|---|---|---|---|
| High | 80% | 63% | 1.27 |
| Low | 95% | 87% | 1.09 |

High cutoff: AG pass rate 27% higher than DG pass rate
Low cutoff: AG pass rate 9% higher than DG pass rate

# Table 1(c). Illustration of Effect of Lowering Test Cutoff on Relative Difference Between Pass Rates of Advantaged Group (AG) and Disadvantaged Group (DG) (digression, non-issue explained)

| Cutoff | AG Pass Rate | DG Pass Rate | AG/DG Pass Ratio | DG/AG Pass Ratio |
|---|---|---|---|---|
| High | 80% | 63% | 1.27 | .79 |
| Low | 95% | 87% | 1.09 | .92 |

Regardless of which figure is used as the numerator in the pass ratio, lowering cutoff reduces relative difference in pass rates:

a) from 27% to 9% (BLUE), or

b) from 21% to 8% (YELLOW).

# Table 1(b) (REPEATED). Illustration of Effect of Lowering Test Cutoff on Relative (Percentage) Difference Between Pass Rates of Advantaged Group (AG) and Disadvantaged Group (DG)

| Cutoff | AG Pass Rate | DG Pass Rate | AG/DG Ratio Pass |
|---|---|---|---|
| High | 80% | 63% | 1.27 |
| Low | 95% | 87% | 1.09 |

High cutoff: AG pass rate 27% higher than DG pass rate
Low cutoff: AG pass rate 9% higher than DG pass rate

- That lowering a test cutoff tends to reduce relative differences in pass rates is widely known and underlies the understanding the lowering a cutoff reduces the disparate impact of a test as well as the principle that a test cutoff must be no higher than necessary.
- Also underlies the understanding that stringent standards have greater disparate impacts than more lenient ones.

- But there is also a part of the picture that very few people understand.

- Lowering a cutoff tends to ***increase*** relative differences in failure rates.

**Table 2. Illustration of Effects of Lowering Test Cutoff on (a) Relative Difference Between Pass Rates and (b)Relative Difference Between Failure Rates**

| Cutoff | AG Pass Rate | DG Pass Rate | AG Fail Rate | DG Pass Rate | DG/AG Ratio Pass | DG/AG Ratio Fail |
|---|---|---|---|---|---|---|
| High | 80% | 63% | 20% | 37% | 1.27 | 1.85 |
| Low | 95% | 87% | 5% | 13% | 1.09 | 2.60 |

As a result of lowering the cutoff:

(a) Pass rate ratio ***decreases*** from 1.27 to 1.09 (i.e., relative difference between pass rates ***decreases*** from 27% to 9%);

(b) Fail rate ratio ***increases*** from 1.85 to 2.60 (i.e., relative difference between pass rates i***ncreases*** from 85% to 160%).

# Interpretive Rule 1 (IR1):
# (aka Heuristic Rule X (HRX), Scanlan's Rule)

The rarer an outcome,

(a) the ***greater*** tends to be the relative difference in experiencing it, and

(b) the ***smaller*** tends to be the relative difference in avoiding it.

(See "Race and Mortality Revisited," *Society* (July/Aug. 2014) and letter to American Statistical Association (Oct. 8, 2015).)

# Implications of Failure to Understand IR1

- General
  - lending disparities
  - school discipline disparities
  - arrests disparities
  - drawing any inference on the basis of the comparative size of two relative differences
- Employment
  - arrest and conviction record policies
  - credit checks
  - performance and discipline standards

Often discrimination issues, whether characterized as disparate impact or otherwise, are analyzed

- not in terms of differences between favorable or adverse outcome rates,
- but in terms of differences between the proportion a group makes up of persons potentially experiencing an outcome (the pool) and the proportion it makes up of persons actually experiencing the outcome.

# Corollary 2 to IR1

The rarer an outcome, the ***greater*** tends to be the proportion groups most susceptible to the outcome make up of

(a) persons experiencing the outcome, and

(b) persons avoiding the outcome.

(for Corollary 1, see slide 16 of Harvard workshop)

**Table 3. Illustration of Effects of Lowering Cutoff on Proportion DG Makes Up of Persons (a) Passing the Test and (b) Failing the Test (where DG makes up 50% of test takers)**

| Cutoff | AG Pass Rate | DG Pass Rate | AG Fail Rate | DG Pass Rate | DG Prop Pass | DG/AG Prop Fail |
|---|---|---|---|---|---|---|
| High | 80% | 63% | 20% | 37% | 44% | 65% |
| Low | 95% | 87% | 5% | 13% | 48% | 72% |

As a result of lowering the cutoff:

(a) Proportion DG makes up of persons passing increases from 44% to 48%.

(b) Proportion DG makes up of persons failing increases from 65% to 72%.

# Implications of Failure to Understand Corollary 2 to IR1

- HHS /DOE December 2014 preschool discipline Policy Statement
  - Letter to HHS/Department of Education (Aug. 24, 2015)

- DOJ March 2015 report on, and February 2016 suit against, Ferguson, Missouri
  - Letter to DOJ and Ferguson (Mar. 9, 2015)
  - "Things DoJ doesn't know about racial disparities in Ferguson," *The Hill* (Feb. 22, 2016)
  - Submission re Ferguson Consent Decree (Apr. 11, 2016)

# Does relaxing a standard increase or reduce a disparate impact?

- If meeting/failing to meet standard dictates the ultimate outcome for those meeting and failing to meet it, there is no difference (performance and discipline standards, certification tests).
- If meeting/failing to meet standard is only part of the process, issue is more complicated (tests, minimum qualifications, arrest records).
  - "The Mismeasure of Discrimination, " U Kansas Law Faculty Workshop paper (2013), Sec. E
  - Amicus curiae brief in TDHCD case (2014), Sec. 1.A.3
  - Federalist Society Blog post (May 5, 2016)

# When will government learn/how can it not know?

- Consortium of Social Science Associations (Apr. 6, 2016)*
- Population Association of America and Association of Population Centers (Mar. 29, 2016)*
- Council of Economic Advisers (Mar. 16, 2016)*
- City of Madison, Wisconsin (Mar. 12, 2016)
- Stanford Center on Poverty and Inequality (Mar. 8, 2016)
- City of Boulder, Colorado (Mar. 5, 2016)
- Houston Independent School District (Jan. 5, 2016)
- Boston Lawyers' Comm for Civil Rights and Econ Justice (Nov. 12, 2015)
- House Judiciary Committee (Oct. 19, 2015)
- American Statistical Association (Oct. 8, 2015)*
- Chief Data Scientist of White House OSTP (Sept. 8, 2015)*
- McKinney, Texas Independent School District (Aug. 31, 2015)
- Departments of HHS and Education (Aug. 24, 2015)
- Agency for Healthcare Research and Quality (July 1, 2015)
- City of Minneapolis, Minnesota (June 8, 2015)
- Texas Appleseed (Apr. 7, 2015)
- Senate Committee on Health, Education, Labor and Pensions (Mar. 20, 2015)
- United States Department of Justice and City of Ferguson, MO (Mar. 9, 2015)
- Vermont Senate Committee on Education (Feb. 26, 2015)
- Portland, Oregon Board of Education (Feb. 25, 2015)
- Wisc Council on Families and Children's Race to Equity Project (Dec. 23, 2014)
- Financial Markets and Community Investment Program, GAO (Sept. 9, 2014)
- Education Law Center (Aug. 14, 2014)
- IDEA Data Center (Aug. 11, 2014)
- Institute of Medicine II (May 28, 2014)
- Annie E. Casey Foundation (May 13, 2014)
- Education Trust (April 30, 2014)
- Investigations and Oversight Subcomm of House Finance Comm (Dec. 4, 2013)
- Mailman School of Public Health of Columbia University (May 24, 2013)
- Senate Committee on Health, Education, Labor and Pensions (Apr. 1, 2013)
- Federal Reserve Board (March 4, 2013)
- Harvard University et al. (Oct. 26, 2012)
- Harvard University (Oct. 9, 2012)
- United States Department of Justice (Apr. 23, 2012)
- United States Department of Education (Apr. 18, 2012)
- The Commonwealth Fund (June 1, 2010)
- Institute of Medicine (June 1, 2010)
- National Quality Forum (Oct. 22, 2009)
- Robert Wood Johnson Foundation (Apr. 8, 2009)

Three Things One Needs to Know (apart from IR1 and its implications) When Faced with a Discrimination Issue (whether or not characterized as disparate impact):

(1) Invalidity of standard measures;

(2) Problematic nature of proportional comparisons;

(3) Partial picture problem.

# Things One Needs to Know – One (invalidity of standard measures)

## Table 4 : Illustration That Standard Measures of Differences Between Outcome Rate Cannot Quantify a Disparity

| Employer/ Setting | AG Sel Rate | DG Sel Rate | (1) AG/DG Ratio Selection | (2) DG/AG Ratio Rejection | (3) Abs Diff (pp) | (4) Odds Ratio |
|---|---|---|---|---|---|---|
| A | 20.0% | 9.0% | 2.22 (1) | 1.14 (4) | 11 (4) | 2.53 (1) |
| B | 40.1% | 22.7% | 1.77 (2) | 1.29 (3) | 17(2) | 2.29 (3) |
| C | 59.9% | 40.5% | 1.48 (3) | 1.48 (2) | 19 (1) | 2.19 (4) |
| D | 90.0% | 78.2% | 1.15 (4) | 2.18 (1) | 12 (3) | 2.50 (2) |

Approach 1 (relative selection) (BLUE): A,B,C,D
Approach 2 (relative rejection) (RED): D,C,B,A (opposite of Approach1)
Approach 3 (absolute diff) (GREEN): C,B,D,A
Approach 4 (odds ratio) (ORANGE): A,D,B,C (opposite of Approach 3)

# Things One Needs to Know – Two (proportional comparison problems)

- In order to quantify a disparity one needs the actual outcome rates.
- One cannot quantify a disparity based solely on the difference between the proportion a group makes up of the pool and the proportion it makes up of persons experiencing an outcome.
- Kansas Law paper, Sec. C
- TDHCD brief , Sec. B
- IDEA Data Center Disproportionality Guide subpage of Discipline Disparities page of jpscanlan.com

# Things One Needs to Know – Three (partial picture problem)

- Highly successful discrimination cases have almost invariably involved analyses solely of persons who accepted some outcome or situation (Stender v. Lucky Stores, Butler v. Home Depot, US v. Countrywide, US v. Wells Fargo).
- Such analyses are fundamentally unsound because they fail to examine the entire universe at issue.
- "The Perverse Enforcement of Fair Lending Laws," *Mortgage Banking* (May 2014), Kansas Law paper, Section F, TDHCD brief , Section I.C