

James P. Scanlan
Attorney at Law
1529 Wisconsin Avenue, NW
Washington, D.C. 20007
(202) 338-9224
jps@jpscanlan.com

September 9, 2014

Mathew J. Scirè
Director
Financial Markets and Community Investment
U.S. Government Accountability Office
441 G Street
Washington, DC 20548

BY EMAIL

Re: Recommendation That GAO Examine Federal Fair Lending Enforcement with Respect to Failure of Regulators to Recognize That Standard Measures of Differences Between Outcome Rates Tend to be Systematically Affected by the Frequency of an Outcome or That Reducing the Frequency of Adverse Outcomes Tends to Increase Relative Differences between Adverse Outcome Rates of Advantaged and Disadvantaged Groups

Dear Mr. Scirè:

This is a recommendation that the Government Accountability Office (GAO) examine federal fair lending enforcement policies with respect to the failure of enforcement agencies to recognize that standard measures of differences between outcome rates tend to be systematically affected by the frequency of an outcome or that reducing the frequency of adverse lending outcomes tends to increase relative differences in rates at which advantaged and disadvantaged groups experience those outcomes.

In summary, for more than twenty years, out of concern about the fact that certain minority groups commonly experience adverse lending outcomes several times as often as whites, federal fair lending enforcement agencies have been encouraging lenders to relax criteria and otherwise reduce the frequency of adverse lending outcomes. Reducing an adverse lending outcome (e.g., rejection of a mortgage loan application), while tending to reduce relative difference in rates of experiencing the corresponding favorable outcome, tends to increase relative differences in the adverse outcome. But, because federal agencies are unaware that reducing the frequency of an outcome tends to increase relative differences in experiencing it, they continue to monitor the fairness of lender practices on the basis of relative differences in adverse outcomes. Thus, by complying with regulator encouragements to reduce the frequency of adverse outcomes, lenders increase the chance that the federal government will sue them for discrimination. Equally important, however, federal fair lending enforcement agencies do not understand how to measure the strength of the forces causing outcome rates of advantaged and disadvantaged to differ.

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I discuss the statistics underlying these points further below. Initially, however, I note that, while this letter is principally aimed at prompting a GAO examination of the soundness of actions by other entities, the letter is also akin to those I have written to many institutions or organizations alerting them to ways in which their activities are undermined by the failure to recognize patterns by which standard measures of differences between favorable or adverse outcome rates of advantaged and disadvantaged groups tend to be systematically affected by the overall prevalence of an outcome. Other recipients of letters involving the statistical issues discussed in this letter include (with those specifically addressing fair lending enforcement issues) [Robert Wood Johnson Foundation](#) (Apr. 8, 2009), [National Quality Forum](#) (Oct. 22, 2009), [Institute of Medicine](#) (June 1, 2010), [The Commonwealth Fund](#) (June 1, 2010), [United States Department of Education](#) (Apr. 18, 2012), [United States Department of Justice](#) (Apr. 23, 2012)*, [Federal Reserve Board](#) (March 4, 2013)*, [Harvard University](#) (Oct. 9, 2012), [Harvard Medical School and Massachusetts General Hospital](#) (Oct. 26, 2012), [Senate Committee on Health, Education, Labor and Pensions](#) (Apr. 1, 2013), [Mailman School of Public Health of Columbia University](#) (May 24, 2013), the [Investigations and Oversight Subcommittee of House Finance Committee](#) (Dec. 4, 2013)*, [Education Trust](#) (April 30, 2014), [Annie E. Casey Foundation](#) (May 13, 2014), [Institute of Medicine II](#) (May 28, 2014), [IDEA Data Center](#) (Aug. 11, 2014), and [Education Law Center](#) (Aug. 14, 2014).¹

These letters reflect the fact none of the recipient institutions or organization recognizes that each standard measure of differences between outcome rates commonly used in analyzing group differences is systematically affected by the frequency of an outcome. But the same failure of understanding undermines the activities of virtually every institution or organization whose activities involve analyses of demographic differences in outcome rates. That holds for GAO as well, and it holds with respect to all GAO evaluations of government programs involving appraisals of demographic differences in outcome rates. Thus, I will at some point send GAO a letter similar to those listed in the prior paragraph.

For reasons relating to the shapes of underlying risk distributions, all standard measures of differences between outcome rates tend to be systematically affected by the frequency of an outcome. Most notable with respect to fair lending issues is a pattern whereby the rarer an outcome the greater tends to be the relative difference in experiencing it and the smaller tends to be the relative difference in avoiding it. I have explained this pattern and its bearing on fair lending issues in quite a few articles since 1992.

¹ To facilitate consideration of issues raised in letters such as this I include links to referenced materials in electronic copies of the letters. All such letters may be found by means of the Institutional Correspondence subpage of the Measuring Health Disparities page of [jpscanlan.com](#). If the letter is corrected after it is first posted on the website, such fact will be noted on the final page.

One recent article in which I explain this patterns and the implications of the failure to understand it in the fair lending enforcement context (as well as other problems in standard fair lending analyses) is [“The Perverse Enforcement of Fair Lending Laws,”](#) *Mortgage Banking* (May 2014). Other recent articles include [“Race and Mortality Revisited,”](#) *Society* (July/Aug. 2014) (which addressed a great many issues concerning the failure to understand the patterns by which measures change as the prevalence of an outcome changes, while addressing fair lending issues mainly at 14-16); [“Things government doesn’t know about racial disparities,”](#) *The Hill* (Jan. 28, 2014); [“Misunderstanding of Statistics Leads to Misguided Law Enforcement Policies,”](#) *Amstat News* (Dec. 2012); [“Disparate Impact’: Regulators Need a Lesson in Statistics,”](#) *American Banker* (June 5, 2012); and [“The Lending Industry’s Conundrum,”](#) *National Law Journal* (Apr. 2, 2012).² The most comprehensive treatment of the issues as they bear on discrimination issues may be found in my September 20, 2013 University of Kansas School of Law Faculty Workshop paper titled [“The Mismeasure of Discrimination.”](#)

Table 1 below is based a hypothetical used in each of the articles listed in the prior paragraph. It shows the implications, with respect to relative differences in pass rates and failure rates, of lowering a test cutoff where two groups’ average test scores differ by half a standard deviation. At the higher cutoff (first data row), the pass rate is 80 percent for the advantaged group (AG) and 63 percent for the disadvantaged group (DG); the corresponding failure rates are 20 percent for AG and 37 percent for DG. At that that cutoff, AG’s pass rate is 1.27 times DG’s pass rate, while DG’s failure rate is 1.85 times AG’s failure rate.

Table 1. Pass and fail rates of advantaged group (AG) and disadvantaged group (DG) at different cutoffs, with measures of difference between rates.

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

Lowering the cutoff to the point where 95 percent of AG passes (second data row) would result in a situation where approximately 87 percent of DG passes; the corresponding failure rates

² My other articles addressing fair lending issues include [“Let’s Hope Insurer Lawsuit Makes HUD Rethink ‘Disparate Impact’,”](#) *American Banker* (Jan. 8, 2014); [“Regulators Need Schooling on Measuring Lending Bias,”](#) *American Banker* (June 14, 2013); [“Fair Lending Studies Paint Incomplete Picture,”](#) *American Banker* (April 24, 2013); [“Statistical Quirks Confound Lending Bias Claims,”](#) *American Banker* (August 14, 2012); [“Race and Mortality,”](#) *Society* (Jan.-Feb. 2000); [“Both Sides Misuse Data in the Credit Discrimination Debate,”](#) *American Banker* (July 22, 1998); [“Perils of Using Statistics to Show Presence or Absence of Loan Bias,”](#) *American Banker* (Jan. 3, 1997); [“Statistical Anomaly Penalizes Fair-Lending Effort,”](#) *American Banker* (Nov. 18, 1996); [“When Statistics Lie”](#) (*Legal Times*, Jan. 1 1996); [“Getting it Straight When Statistics Can Lie,”](#) *Legal Times* (June 23, 1993); [“Bias Data Can Make the Good Look Bad,”](#) *American Banker* (Apr. 27, 1992).

would be 5 percent for AG and 13 percent for DG. At the lower cutoff, AG's pass rate would be only 1.09 times DG's pass rate, while DG's failure rate would be 2.6 times AG's failure rate.

Thus, lowering the cutoff, while decreasing the relative difference in pass rates, increased the relative difference in failure rates.

The pattern whereby the relative difference in the favorable outcome and the relative difference in the corresponding adverse outcome tend to change in opposite directions as the frequency of an outcome change is not peculiar to test score data or the numbers I chose to illustrate it. Rather, the pattern can be found in virtually any data that allow one to examine various points on a continuum of factors associated with experiencing or avoiding an outcome or simply examine relative differences in favorable and adverse outcomes at various levels of the frequency of an outcome. Many illustrations may be found in recent *Society* articles and various pages of jpscanlan.com. See especially the [Collected Illustrations](#) subpage of the [Scanlan's Rule](#) page.

Figure 1 (at page 4) of the April 23, 2012 letter to the Department of Justice uses the same hypothetical test score data underlying Table 1 above to illustrate the pattern shown in the table across a full range of pass and fail rates. Figure 1 (at page 4) of the March 4, 2013 letter to the Federal Reserve Board illustrates a similar pattern using actual credit score data for black and white borrowers from a lending discrimination suit. That is, the figure shows that the lower the credit score cutoff, the smaller the relative difference in meeting it but the larger the relative difference in failing to meet it.

Absolute differences and differences measured by odds ratios tend also to be systematically affected by the prevalence of an outcome. But, inasmuch as most fair lending analyses rely on relative differences in outcome rates, it is not necessary to treat absolute differences and odds ratios at length here. I note, however, that Appendix Figure 2 (at Appendix page 2) of the Federal Reserve letter illustrates the pattern by which absolute differences tend to be systematically affected by the frequency of an outcome.

Many illustrations of the patterns by which the two relative differences, the absolute difference, and the difference measured by the odds ratio tend to be affected by the frequency of an outcome can also be found in my October 17, 2012 applied statistics workshop at Harvard's Institute for Quantitative Social Science titled "[The Mismeasure of Group Differences in the Law and the Social and Medical Sciences](#)" and my September 5, 2014 methods workshop for the demography and epidemiology arms of the University of Minnesota titled "[The Mismeasure of Association: The Unsoundness of the Rate Ratio and Other Measures That Are Affected by the Prevalence of an Outcome.](#)"

These workshops, as well as the 2014 *Mortgage Banking* article and the 2014 *Society* article and the 2013 Kansas Law paper, also explain a method for appraising differences in the circumstances of two groups reflected by a pair of outcome rates that is unaffected by the frequency of the outcome.

On October 10, 2014, I will be giving a methods workshop similar to the University of Minnesota workshop at the Maryland Population Research Center of the University of Maryland. The workshop, titled “[Rethinking the Measurement of Demographic Differences in Outcome Rates](#),” will be held from 10:00 a.m. to 12:00 p.m. at 1101 Morill Hall and will be open to the public. Members of your staff dealing with quantitative issues may benefit from attending.

In addition, by email of July 24, 2014 to George Scott, the GAO contact persons for the GAO report *Standards Needed to Improve Identification of Racial and Ethnic Overrepresentation in Special Education* (Mar. 29, 2013),³ I proposed my giving a methods workshop to GAO staff involved with activities such as drafting of the referenced report. As made evident in the second to fourth articles mentioned in this letter, as well as the Department of Justice letter, the federal government’s enforcement of fair lending laws and its enforcement of laws concerning fairness in public schools share the same failure to recognize that reducing the frequency of an outcome tends to increase relative differences in experiencing it. In the event that GAO does allow me to conduct a workshop, GAO staff involved with fair lending issues would benefit from it as much as GAO staff involved with education issues.

Finally, I maintain a number of web pages devoted to fair lending issues, many of which provide more detailed discussion of such issue than found in the references mentioned above. The main [Lending Disparities](#) page broadly addresses the issues discussed above, but also discusses some particular issues, including, in Section 7, issues regarding the interpretation of data on demographic differences under the Home Affordable Mortgage Program.

The page has thirteen subpages. The [Disparities – High Income](#) subpage addresses the erroneous perception that the fact that relative differences in adverse outcomes tend to be greater among higher-income than lower-income mortgage applicants indicates that differences in income do not explain rejection rate disparities. The [Underadjustment Issues](#) subpage addresses the fact that efforts to adjust for racial differences in characteristics related to securing some outcome are invariably inadequate. The [Absolute Differences – Lending](#) subpage addresses issues concerning the measurement of lending disparities by means of absolute differences.

The [Lathern v. NationsBank](#) subpage discusses a putative class action brought against NationsBank Mortgage Corp. on the basis of its comparatively large relative differences in mortgage rejection rates even though it had comparatively small relative differences in mortgage approval rates. The [United States v. Countrywide](#) subpage addresses several issues involving the lending discrimination claims that were subject of \$335 million settlement announced in December 2011. The [United States v. Wells Fargo](#) subpage addresses several issues involving the lending discrimination claims underlying the \$175 million dollar settlement announced in

³ The report is also discussed in my [IDEA Data Center Disproportionality Guide](#) subpage of the [Discipline Disparities](#) page of [jpscanlan.com](#). The subject of that subpage is addressed in Table 19 and 20 of the University of Minnesota workshop.

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July 2012. The [Partial Picture Issues](#) subpage addresses a fundamental problem with analyses underlying claims of discrimination in assignment to subprime status and discrimination in loan pricing at issue in cases like *United States v. Countrywide* and *United States v. Wells Fargo* that was not present in analyses of rejection rate disparities – *i.e.*, that the analyses of the claims fail to examine the entire universe of persons seeking the desired outcome (an issue also addressed in the 2014 *Mortgage Banking* article and the 2013 Kansas Law paper). The [File Comparison Issues](#) subpage discusses the problematic nature of efforts to identify discrimination by means of comparisons of files of rejected and approved applicants. The [FHA/VA Steering Study](#) discusses a study that regarded the fact that a larger proportion of minority than white mortgage loans were FHA/VA loans as suggesting that minorities were steered to such loans but without providing an estimate of what the difference in proportions would be absent discrimination. The [CAP TARP Study](#) subpage employs data from a 2009 Center for American Progress study of subprime loans at banks in the Troubled Asset Relief Program to illustrate the extent to which lenders with lower proportions of total loans assigned to subprime status show comparatively large relative differences between black and white rates of assignment to subprime status. The [Foreclosure Disparities](#) subpage discusses attention given to large relative differences in foreclosure rates without recognizing that generally reducing the number of foreclosures, while reducing relative differences between rates at which advantaged and disadvantaged groups avoid foreclosure, will tend to increase relative differences in foreclosure rates.

The [Holder/Perez Letter](#) subpage addresses the April 23, 2012 letter to the Department of Justice and the [Federal Reserve Letter](#) subpage discusses the March 4, 2013 letter to the Board of Governors of the Federal Reserve System, as well as the responses of those agencies.

Sincerely,

/s/ James P. Scanlan

James P. Scanlan