

**IN THE UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT**

BETTY DUKES, PATRICIA SURGESON, DEBORAH GUNTER, CHRISTINE
KWAPNOSKI, and EDITH ARANA

Plaintiffs/Petitioners

v.

WAL-MART STORES, INC.,

Defendant/Respondent.

ON APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA

**BRIEF OF *AMICI CURIAE* STATISTICIANS AND
OTHER EMPLOYMENT ANALYSTS IN SUPPORT OF
PLAINTIFFS' PETITION FOR LEAVE TO APPEAL
PURSUANT TO FED. R. CIV. P. 23(f)**

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INTEREST OF *AMICI CURIAE*

The 21 labor economists, statisticians and related employment analysts named in the signature block teach, write, consult and/or testify about discrimination in the workplace. They have spent much of their careers thinking, writing, teaching and testifying about the statistical issues before the Court. Their affiliations and a partial list of their scholarship appear as an Appendix.

Based on this expertise, *amici* argue that the District Court used faulty reasoning in applying the Supreme Court's mandate to the statistical evidence in this case. That faulty reasoning led the District Court to conclude that Plaintiffs' statistical evidence did not meaningfully support a showing that their claims against Wal-Mart raise issues common to the class. *Amici* advocate a different approach to address the Supreme Court's concerns about how to evaluate statistical evidence with respect to commonality, based on mainstream statistical theory and practice. Under this suggested approach, the data presented by Plaintiffs support the conclusion that the commonality requirement was satisfied.

Amici do not have a professional interest in whether the class proposed by Plaintiffs is certified, but do have an interest in having this Court review the decision below. Review could serve two purposes of interest to *amici*: rejection of a standard in this case that does not accord with statistical theory, and provision of

guidance concerning analyses that *amici* and other employment analysts should provide in future class certification motions.

No counsel for any party to this case authored any part of this brief and, other than *amici* on whose behalf this brief is submitted and their counsel, no person or entity contributed money or services to the preparation and submission of this brief. Pursuant to Circuit Rule 29-3, all parties consented to the filing of this brief.

ARGUMENT

Two years ago, the Supreme Court explained that statistical evidence supports the existence of commonality if it shows that the gender disparities in a company's decision-making units are "uniform." The District Court erroneously interpreted this direction as requiring statistical analyses to show that gender disparities are statistically significant in the majority of the decision-making units. That standard was not mandated by the Supreme Court and conflicts with statistical theory. Concurrently, the District Court discounted without explanation Plaintiffs' statistical evidence that most directly supported the existence of commonality. Contrary to the District Court's belief, employment decisions do not have to produce statistically significant disparities within individual units to be part of a statistically significant, "uniform" overall pattern. .

I. THE DISTRICT COURT'S REQUIREMENT THAT A MAJORITY OF UNITS HAVE STATISTICALLY SIGNIFICANT DISPARITIES CONFLICTS WITH STATISTICAL THEORY AND IS NOT MANDATED BY THE SUPREME COURT

The District Court effectively adopted a standard that statistical analyses do not support commonality unless gender disparities are statistically significant in the majority of the decision-making units. In concluding that Plaintiffs' analyses did not substantially support class certification, the District Court stated that Plaintiffs "have not identified statistically significant disparities in even a majority of the relevant decision units in any region across the challenged pay and promotion

decisions.” Slip op. at 6; *see also id.* at 5 (summarizing the analysis of promotions to Management Trainees as “in two regions a majority of districts showed no statistically significant results, and in the last region, only a little over half of the districts had statistically significant disparities”). Further reinforcing its misplaced emphasis on statistically significant disparities within decision-making units, the District Court incorrectly discounted an analysis showing that a statistically significant number of the units had disparities adverse to women, albeit generally to an insignificant extent within each unit, as not nearly enough to support a finding of commonality. *Id.* at 6.

Commonality is a legal, not an economic, concept. Nonetheless, statistical theory offers guidance concerning proper methods of organizing and interpreting data to address the commonality issue. Judicially announced standards for class certification should be consistent with this theory. A rule that claims do not raise common issues unless a majority of the decision-making units individually have statistically significant disparities directly conflicts with statistical theory, as shown by the following hypotheticals.

A company has 20 decision-making units, each with 100 similarly-situated employees, 50 men and 50 women.¹ Each unit grants ten promotions, with 7 going to men and 3 to women. In each unit, the disparity between the expected number

¹ We talk of gender disparities, but the analysis applies equally to race and other bases for discrimination claims.

of female promotions (5) and the actual number (3) corresponds to 1.33 standard deviations, which falls short of the 1.96 standard deviation standard for statistical significance used in this Circuit. *See Bouman v. Block*, 940 F.2d 1211, 1225 n.1 (9th Cir. 1991); *Eldredge v. Carpenters 46 N. Cal. Counties JATC*, 833 F.2d 1334, 1340 n.8 (9th Cir. 1987). Aggregated across units, however, the disparity between the expected number of female promotions (100) and the actual number (60) corresponds to 5.96 standard deviations, which is highly statistically significant.

Now alter this hypothetical so that zero women are selected for promotion in 14 units and ten women are selected in the other six units, producing the same overall 60 promotions of women. Under the District Court's standard, statistically significant disparities in the majority (70%) of units would be evidence of a common issue.² Yet, any rational analysis would see that the first hypothetical provides far stronger evidence of an issue common to the class. In the first, the results are not just "common," they are identical and equally contribute to the overall disparity. By contrast, the altered hypothetical presents a clear division of decision-making units into two differently behaving groups. The District Court's standard reverses the correct outcome. *See Joseph L. Gastwirth, Efstathia Bura & Weiwen Miao, Some important statistical issues courts should consider in their assessment of statistical analyses submitted in class certification motions:*

² If all ten promotions in a given unit were awarded to members of one sex, and none to the other sex, this disparity would be equivalent to 3.333 standard errors.

implications for Dukes v. Wal-Mart, 10 LAW, PROBABILITY & RISK 225, 234 (hereafter “Gastwirth, Bura & Miao”) (“the seemingly intuitive criterion requiring statistical significance in a majority of the units or strata is fundamentally flawed from a statistical view”).

Nothing in the Supreme Court’s opinion in this case mandates adoption of this “fundamentally flawed” standard. The Supreme Court stated that Plaintiffs’ expert Dr. Richard Drogin had failed to “establish the existence of disparities at individual stores,” *Wal-Mart Stores, Inc. v. Dukes*, 131 S. Ct.2541, 2555 (quoting *Dukes v. Wal-Mart Stores, Inc.*, 603 F.3d 571, 637 (9th Cir. 2010) (Ikuta, J., dissenting)), not that he had failed to “establish the existence of **statistically significant** disparities at **the majority of the** individual stores.” (Emphasis added.)

A requirement that plaintiffs show statistically significant disparities in a majority of units would devastate most or all cases because analyses of separate unit often have low statistical power. The statistical power of an analysis is the chance that a test for statistical significance “will declare an effect when there is an effect to declare. This chance depends on the size of the effect and the size of the sample.” David H. Kaye & David A. Freedman, *Reference Guide on Statistics*, in FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 83, 125-126 (2d ed. 2000). Other things being equal, the statistical power will be low

when the size of the sample is small. *See Washington v. Elec. Jt. Apprenticeship & Training Comm.*, 845 F.2d 710, 713 (7th Cir. 1988) (Posner, J.).

Small sample size resulting in low statistical power was a reason none of the units in the first hypothetical yielded statistically significant gender disparities. It also was a reason the *Dukes* Plaintiffs could not demonstrate statistically significant gender disparities in the majority of units. *See Slip. Op.* at 5-6. The District Court ignored the problem of low statistical power in incorrectly focusing on units with statistically significant disparities.

The District Court's decision in this case stands in stark contrast to that of a different judge from the same District in *Ellis v. Costco Wholesale Corp.*, 285 F.R.D. 492 (N.D. Cal. 2012). In *Ellis*, the court described as “telling” for commonality “that *all seven non-Texas regions* show a raw gender disparity in promotions ... and the absence of statistical significance within each individual region is of limited value” because the relatively small number of promotions in some of the regions “increase[s] the chance that random error has an effect on the data.” *Id.* at 522-23 (emphasis in original).

The contrasting attitudes of these two judges reflect lack of guidance from appellate courts concerning standards courts should apply to statistical proof concerning commonality. It would assist experts in future cases if this Court addressed this issue, and did so in a way consistent with statistical theory.

II. WHEN DECISION-MAKING UNITS ACT “UNIFORMLY,” STATISTICAL EVIDENCE WILL REPORT A BELL-SHAPED DISTRIBUTION ADVERSE TO MEMBERS OF THE PROTECTED GROUP

The Supreme Court in 2011 also stated, “A regional pay disparity, for example, may be attributable to only a small set of Wal-Mart stores, and cannot by itself establish the uniform, store-by-store disparity upon which the plaintiffs' theory of commonality depends.” 131 S. Ct. at 2555. This sentence sets out two complementary principles: overall statistical disparities do not provide evidence of commonality if the disparities are attributable to only a small percentage of the decision-making units, and the disparities among the units must be “uniform.”

In statistics, “uniform” generally does not mean “identical.”³ Because of random variations, statisticians expect that the pay in a sufficiently large sample of employees will form a bell-shaped or “normal” curve. *See generally Palmer v. Schultz*, 815 F.2d 84, 93-94 (D.C. Cir. 1987). For example, employees with outstanding initiative, creativity or other not-readily-measurable attributes typically will be paid more than employees who are below average on these attributes, even controlling for relevant measurable factors. The majority of employees will be paid near the mean.

³ The Supreme Court in this case quoted *General Telephone Co. of Southwest v. Falcon*, 457 U.S. 147 (1982), to identify proof that the defendant “operated under a general policy of discrimination” as one means of proving commonality. *Dukes*, 131 S. Ct. at 2553 (quoting *Falcon*, 457 U.S. at 159 n.15). A “general policy” does not require “identical” effects in each unit.

Absent gender discrimination, it is expected that similarly situated women and men will be similarly distributed throughout this bell curve. Statistical analyses provide evidence of discrimination when, after controlling for factors such as education, position and tenure, women instead are clustered near the bottom of the bell curve rather than scattered throughout.

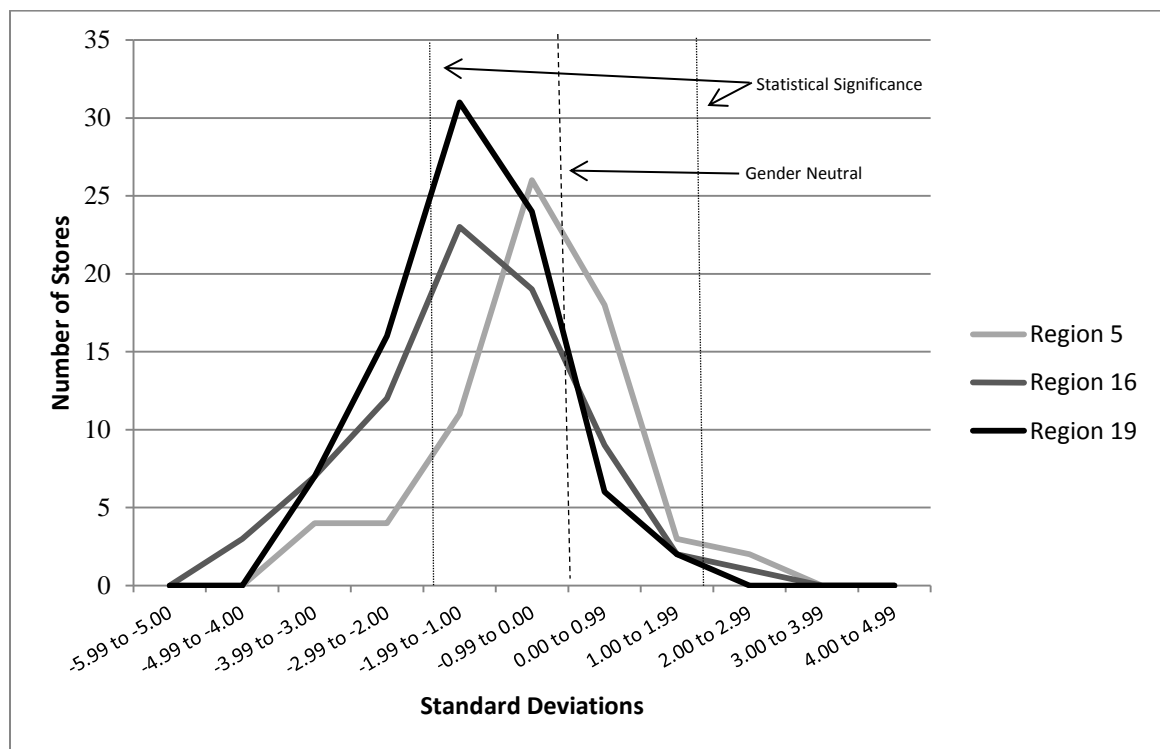
A similar pattern is expected among an employer's multiple decision-making units. If a sufficient number of units and employees are available for analysis, statisticians expect a bell curve distribution of the units in terms of gender disparities in pay. In the absence of gender discrimination, the apex of this curve is expected to be centered at zero; about 50% of the units would have disparities adverse to women; and about 2.5% of the units would be adverse to women to a statistically significant extent.

If, instead, a policy of gender discrimination uniformly affected all of a company's decision-making units, employment analysts would expect to see a shift in the bell curve placing its apex adverse to women instead of in a gender-neutral position. While the percentage of units with disparities significantly adverse to women would increase, the curve would not typically move so far that the majority of the units would exhibit statistically significant disparities.

As the Supreme Court pointed out, a statistically significant gender disparity for an entire company might arise not from a uniform practice of discrimination

but instead from the discriminatory behavior of a small percentage of decision-making units. An analysis in terms of a bell curve is well-designed to detect such circumstances. If discrimination is isolated in a small number of units, the data would not form a single bell-shaped curve. For example, if a company had 50 decision-making units, of which only ten engaged in gender discrimination, analysis would reveal either one large bell curve centered over gender neutrality and then a second, smaller curve, or an asymmetrical shape with a long tail on the 40-unit curve adverse to women.

Amici have prepared the chart below showing the distribution of gender disparities in pay of hourly employees during 2001 in each of the three regions:



All three curves are approximately bell-shaped. Regions 16 and 19 have no unusually large negative tails. If true for other years and other analyses, this provides strong evidence that disparities were “uniform” across the stores in those regions, not attributable to a small subset of the stores.

The results in Sam’s Club Region 5 were more ambiguous because of the slightly elongated negative tail. However, by analyzing this result using well-established statistical procedures such as the Shapiro-Will test, experts can inform the Court whether or not this elongation indicates a statistically significant difference between the predicted bell curve and the observed curve.

Although neither expert engaged in this analysis, Plaintiffs’ expert performed two analyses that together serve as a proxy. For the promotion claims and pay claims for hourly employees in each region, Dr. Drogin computed: (1) the percentage of units with disparities adverse to women to determine whether this percentage significantly differs from the expected 50% (“sign test”); and (2) the percentage of units with statistically significant disparities adverse to women to determine whether this percentage significantly differs from the 2.5% expected to be statistically significant adverse to women (“significance test”). (Drogin Rebuttal Decl., at 12-13.)

This combination of analyses was proposed in a recent peer-reviewed article and captures most of the same information as the curve analyses discussed above.

Gastwirth, Bura & Miao, *supra*, at 230. Indeed, the combination of the sign test and the significance test is superior to an analysis of distribution curves in one important respect – practicality. For employers smaller than Wal-Mart, the limited number of employees in each decision-making unit and limited number of decision-making units often make a distribution curve analysis impossible, but an expert still may be able to perform sign tests and significance tests.

According to Dr. Drogin, the sign test yielded statistically significant disparities in every analysis except for promotion to Area Manager (the Sam’s Club analog to Support Manager). The great majority of the significance tests also yielded statistically significant disparities. (Drogin Rebuttal Decl., at 15-16.) Nonetheless, the District Court gave little weight to these findings, explaining only that they were “submitted for the first time with [the] reply brief.” Slip op. at 6. The District Court should have considered the results more carefully. They clearly suggest that the overall disparities are not driven by a subset of the units, and that there is a uniform pattern across the stores.

CONCLUSION

The Court should grant review of Plaintiffs’ 23(f) petition. This would allow the Court to correct errors in statistical interpretation that *amici* believe were committed below, and also provide guidance to employment analysts concerning the statistical analyses that courts expect on the commonality issue.

August 16, 2013

Respectfully submitted,



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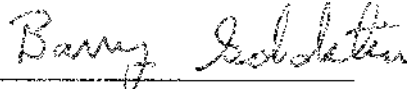
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CERTIFICATE OF COMPLIANCE

I certify that this brief complies with the length limits set forth at Fed. R. App. P. 5(c) and 29(d). The brief's type size and type face comply with Fed. R. App. P. 32(a)(5) and (6).



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CERTIFICATE OF SERVICE

I am over the age of eighteen years and not a party to this action. My business address is Mehri & Skalet, PLLC, 1250 Connecticut Avenue N.W., Washington, DC 20036. On August 16, 2013, I served:

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on Plaintiff-Appellant and on Defendant-Respondent Wal-Mart Stores, Inc., through their attorneys of record, by placing true copies thereof in sealed envelopes addressed as shown below for service BY US. MAIL FIRST CLASS to the office of the address of the former and BY FEDERAL EXPRESS to the office of the address of the latter following ordinary business practices:

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