Increasing the Adverse Impact Threshold to Provide Relief To Potential Plaintiffs

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Intro

The professionalization of Title VII-related advice on workforce interventions enables firms contemplating such a move to manage the results to comply with received case-law and enforcement agency regulations.

The objective, reduced to its essence, is to forestall litigation by gerrymandering favorable statistical tests of significance to achieve a seemingly facially neutral employment outcome.

Presumably, the favorable gender-ratios or race-ratios resulting from the planned process will pre-empt litigation or, at the very least, dramatically reduce its chances.

After all, in practically all forums, plaintiff's rebuttable presumption in disparate impact and disparate treatment cases is seemingly established by a statistical showing of outcomes.

A showing of no association between an employment event and gender or race (as the case might be) necessarily follows the traditional methodology of postulating the existence of no ex-ante observable difference in the realized rates – the null-hypothesis significance testing (NHST).

But this formulation provides the right answer to the wrong question posed; a question advanced as an integral part of the active management of the event.

This correct answer to the wrong question is what is known as a type III error (Schwartz and Carpenter 1999).

Guideline Explained

$$AIR = \left(\frac{\frac{NP_{min}}{N_{min}}}{\frac{NP_{maj}}{N_{maj}}} \right)$$

5/20 Women = 0.25

10/18 Men = 0.55

0.25/0.55 = 0.45
0.45 < 0.80 (4/5ths)

The 4/5ths or 80% guideline compares the percentage of minority applicants hired to the percentage of majority applicants hired. Because the ratio of 0.45 is less than eighty percent, the disparity is actionable under the four-fifths rule.
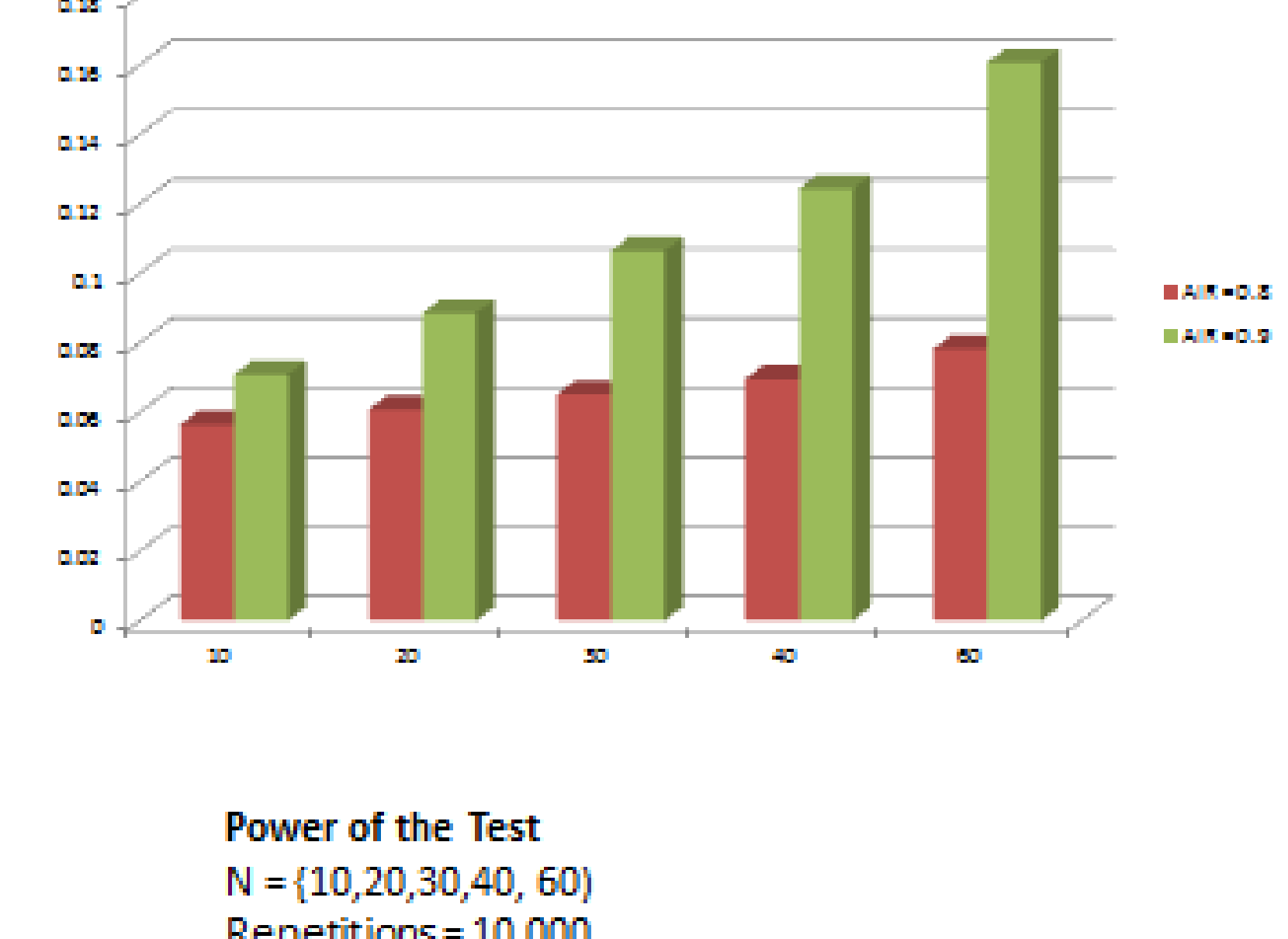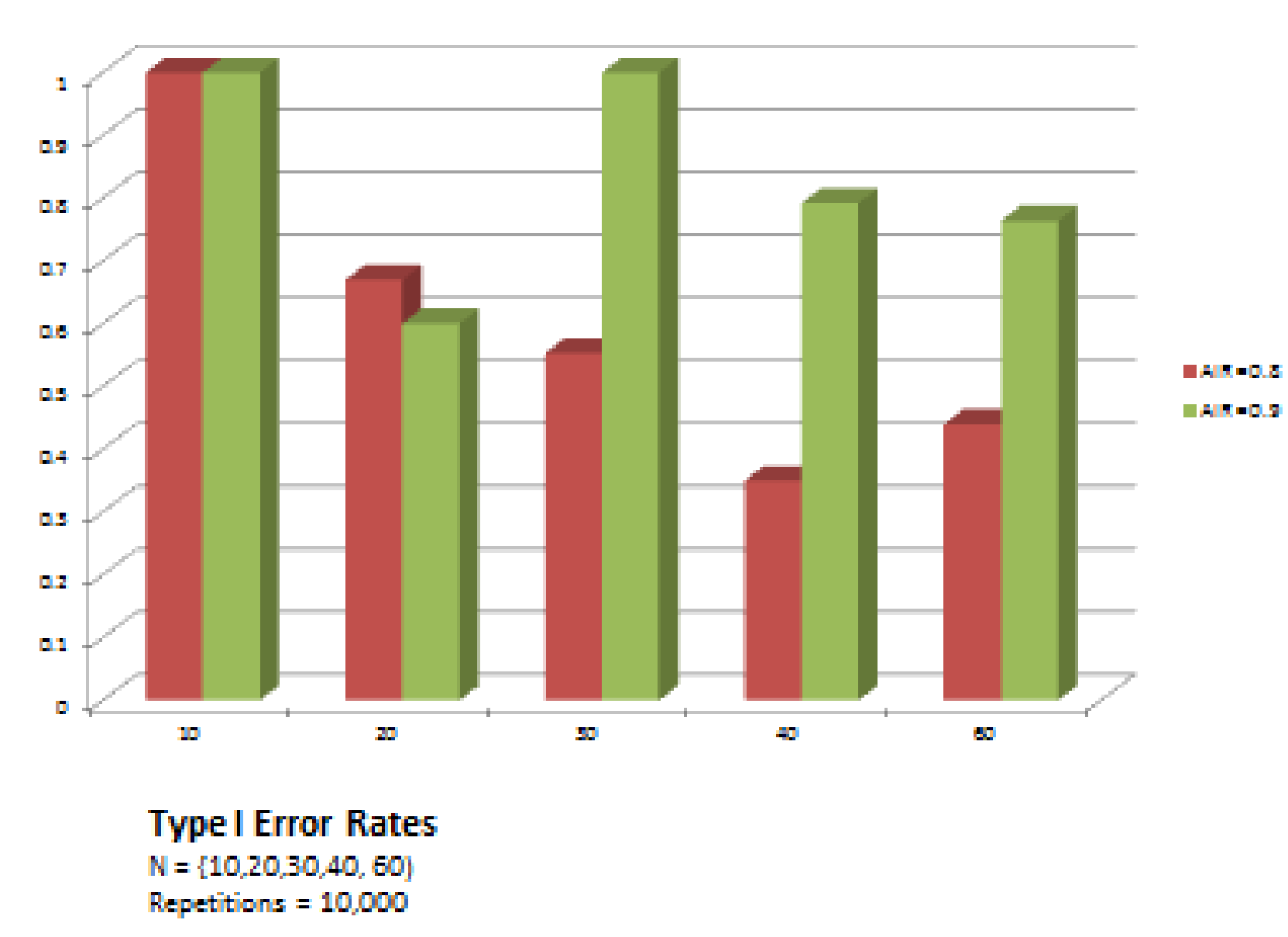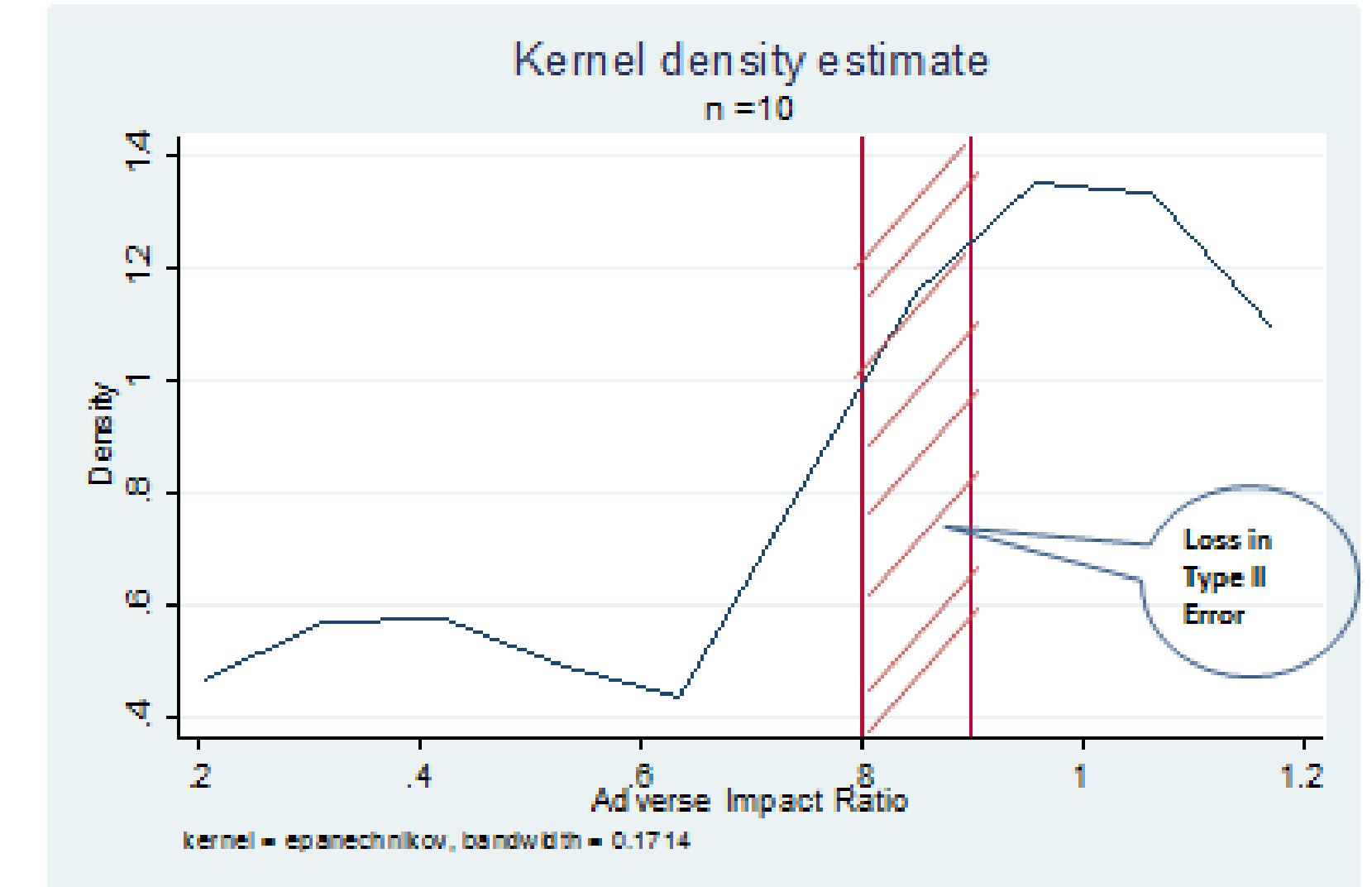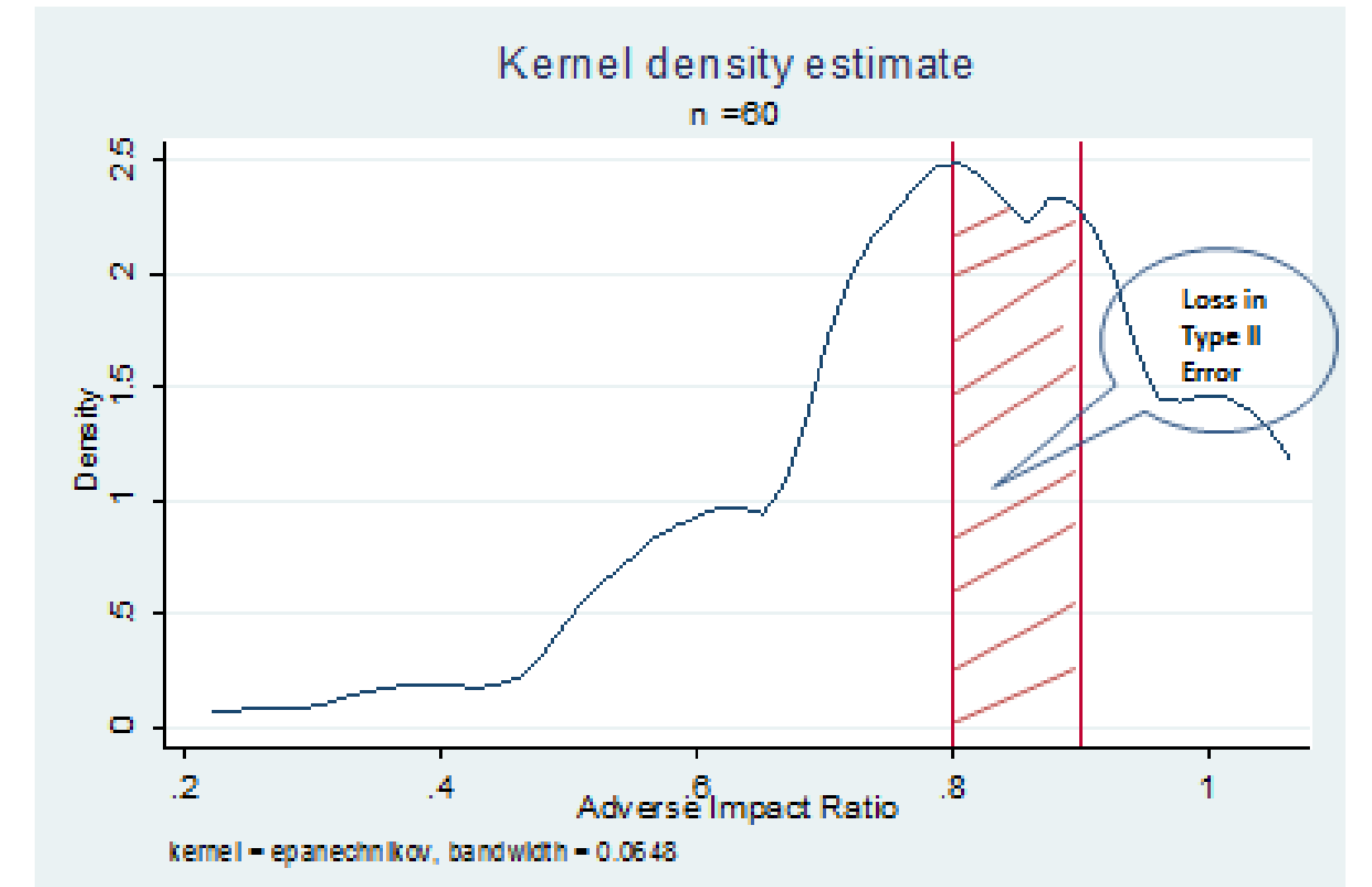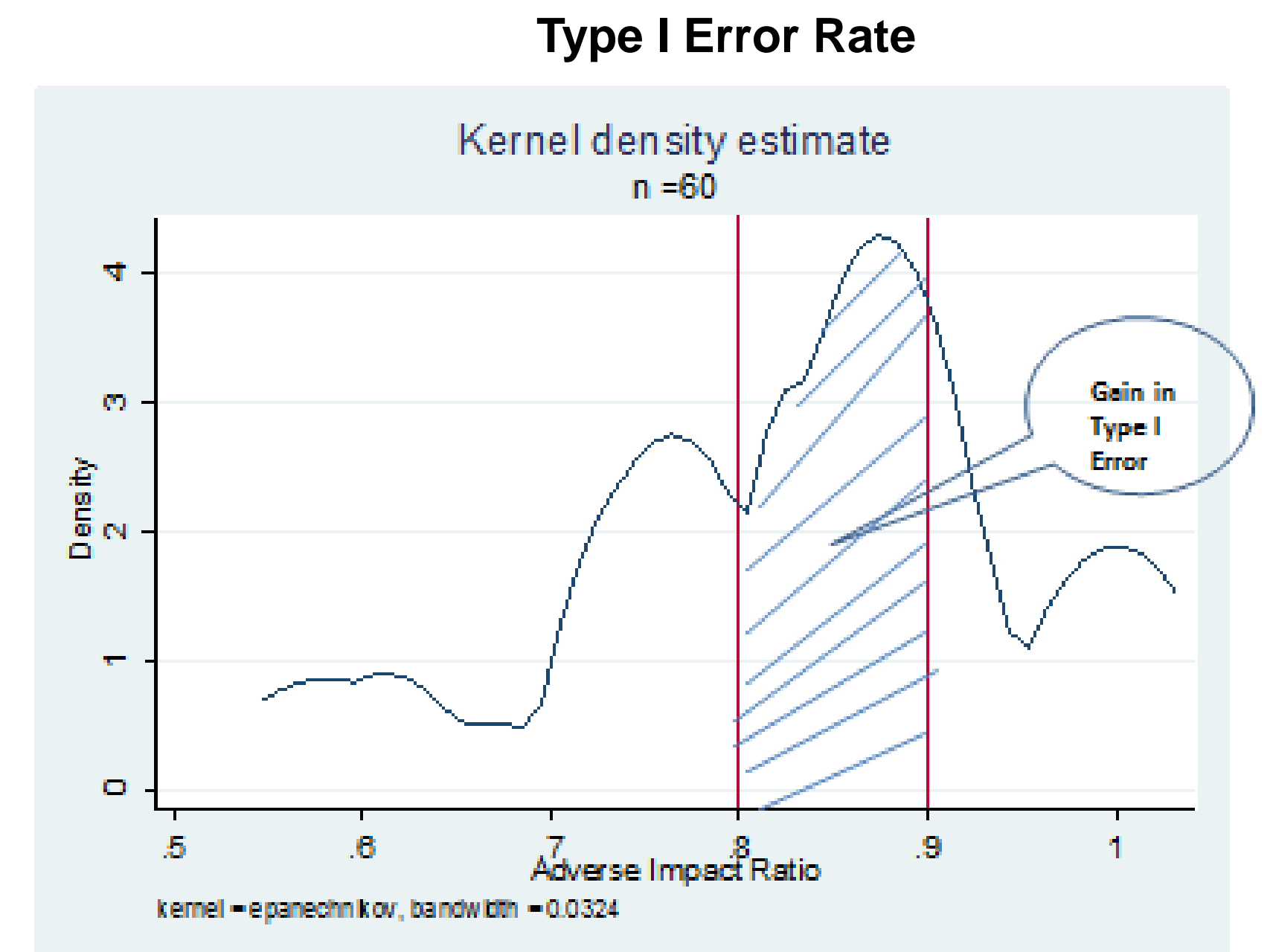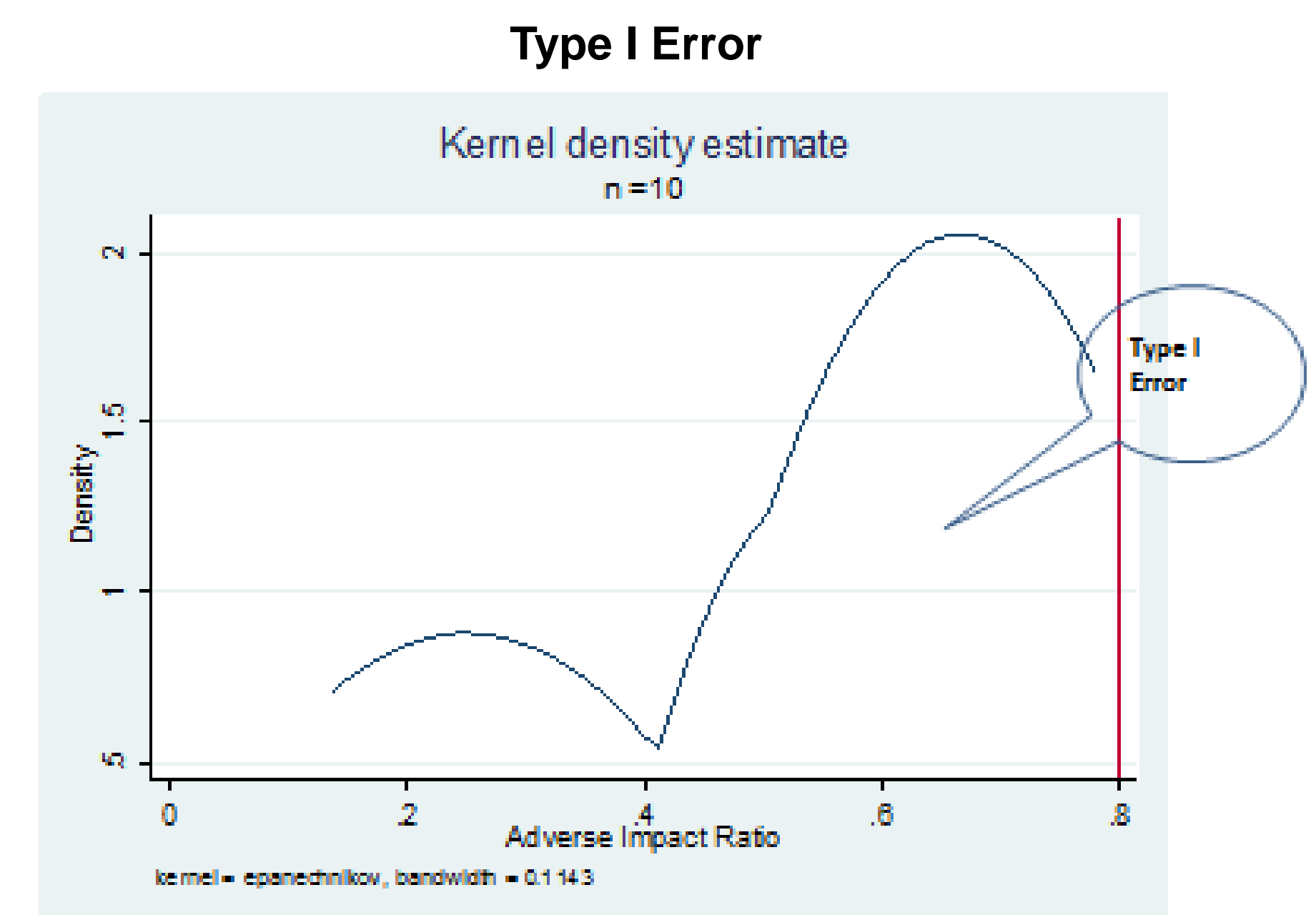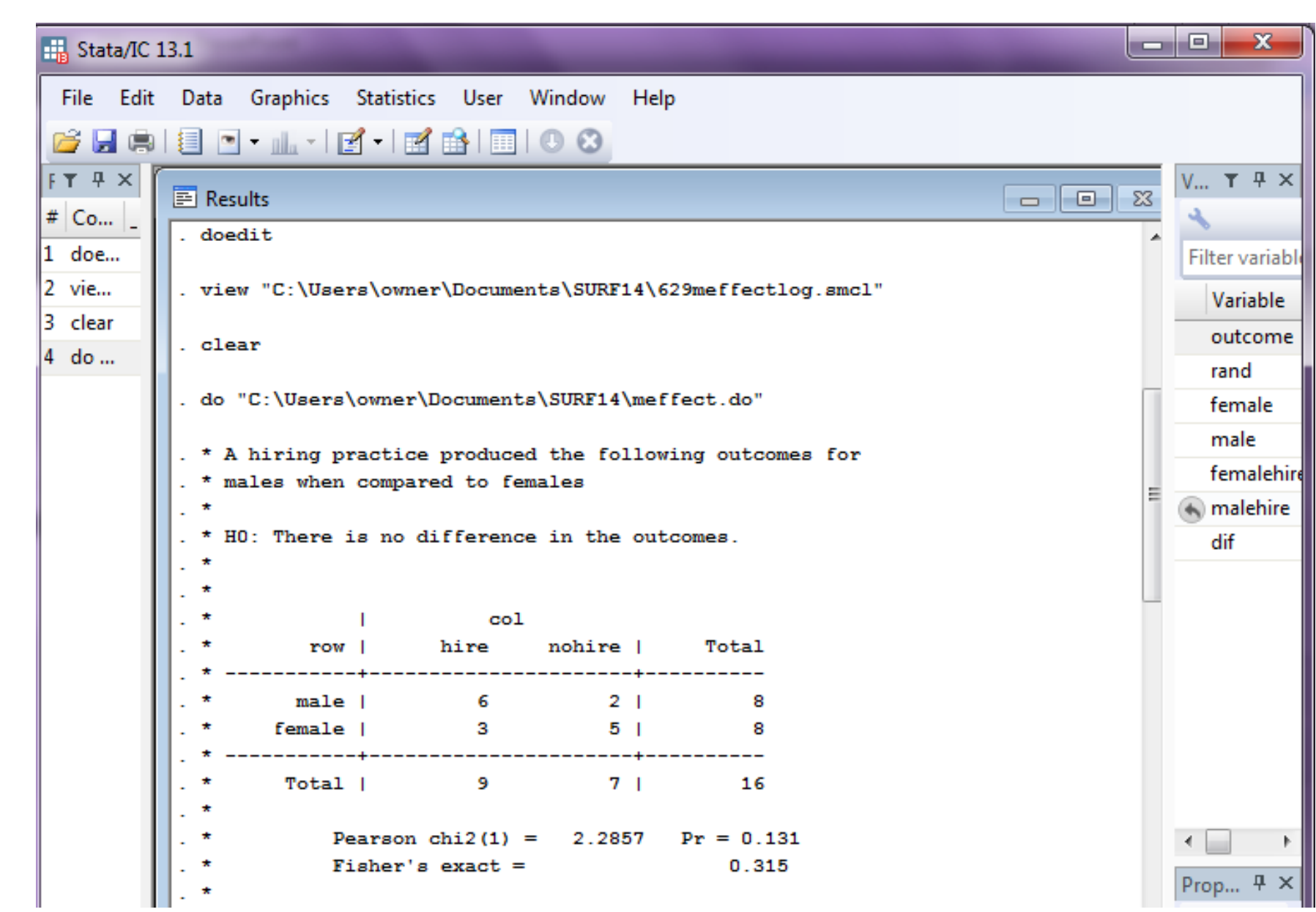
Methods

We constructed STATA model to replicate the data generating process underscoring various Adverse Impact Ratio distributions.
The generated distributions are parameterized by The SRs for each of two subgroups, a majority and a minority. The steps of the simulation are as follows:

I. We chose an applicant pool of size, n, where n = {10, 20, 30, 40, 60}; a composition of the minority group within the pool (Pmin); and the pool selection rate (Psel).

II. The number of minorities selected for each particular realization is a result of a random draw from a hypergeometric distribution with integer valued parameters; N is the population size, K is the number of elements in the population that have the attribute of interest, and n is the sample size.

III. We estimate the realized distribution of the Adverse Impact Ratio (AIR).

IV. We measure the Type I error rate for both adverse impact ratios, AIR = {0.8, 0.9} – assuming that the data generating process reflects an AIR of 1, i.e. a state of the world of no discrimination.

V. We measure the Type II error rate for both adverse impact ratios, AIR = {0.8, 0.9} – assuming that the data generating process reflects an AIR of 0.5; i.e. a state of the world where discrimination is present.

VI. This process is reproduced 10000 times via a Monte Carlo simulation.

Results

Reference	Fail / Not Selected	Pass / Selected	Total	Proportion
Minority	NF_{min}	NP_{min}	N_{min}	P_{min}
Majority	$NFmaj$	$NPmaj$	$Nmaj$	$1 - P_{min}$
Total	NF_T	NP_T	N	-
Proportion	$1 - SR_T$	SR_T	-	-

An example of a Monte Carlo Simulation in Stata 13.1

Type I Error — Kernel density estimate n =10

Type I Error Rate — Kernel density estimate n =60

Kernel density estimate n =60

Kernel density estimate n =10

Type I Error Rates
N = {10,20,30,40, 60}
Repetitions = 10,000

Power of the Test
N = {10,20,30,40, 60}
Repetitions = 10,000

Conclusions

We conclude that raising the threshold ratio to establish a rebuttable presumption of discrimination from the current rule-of-thumb of 0.8 increases the likelihood of a plaintiff obtaining legal relief.

Ho: $\pi_2 - \pi_1 = 0$ (No Adverse Impact in RIF)
Ha: $\pi_2 - \pi_1 \neq 0$
    Reject H0 (Actionable)
    Do Not Reject H0
False Positive(I): No AI in RIF, but we reject H0
False Negative(II): We do not reject H0, but there is AI present

Relative Gains and Losses from Increasing the Threshold from .8 to .9
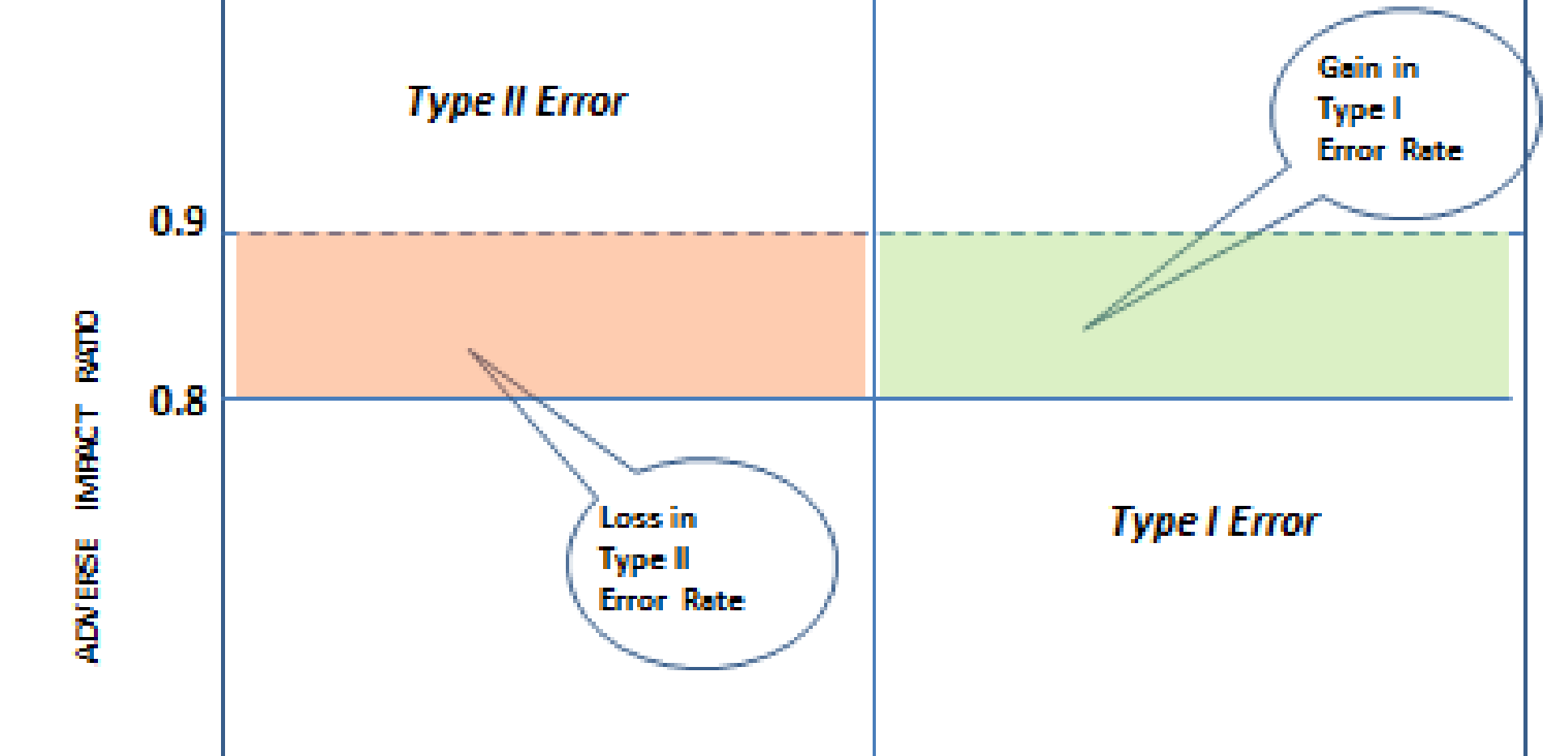
A type I error (false positive) will result in an actionable case in which adverse impact is not present, while a type II error (false negative) will result in a case that is not actionable, but in which adverse impact is present.

A type III error results when the case is not actionable, but it is for a reason other than a natural lack of adverse impact—i.e. the use of a workforce intervention that results in an inorganic employment outcome.

By increasing the threshold, we raise the power of the test, thereby increasing the rate of type I errors and reducing the rate of type II errors.

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Acknowledgements