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A Comment on "Discriminatory Lending: Evidence from Bankers in the Lab?"

Francesca Lipari Marcello Sartarelli

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A Comment on "Discriminatory Lending: Evidence from Bankers in the Lab?"

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A comment on "Discriminatory Lending: Evidence from Bankers in the Lab"*

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Abstract

Brock and De Haas (2023) study the effect of randomising applicant gender in small business loan applications that are reviewed by loan officers at a Turkish bank in a lab-in-the-field experiment based on real-life applications. The main results are: first, that loan approval rates are not gendered (direct discrimination); second loan officers are 6 percentage point (26%) more likely to condition loan approval to a guarantor when the applicant is a female rather than a male (indirect discrimination). In our computational replication we obtain the manuscript results. In addition, a robustness replication shows that the main results are partly driven by the role of loan types, job seniority and population differences among cities.

KEYWORDS: Gender discrimination, lending, lab experiment, field experiment

JEL CODES: C93, G21, G32, J16, L25, L26, O16

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1 Introduction

Brock and De Haas (2023), henceforth BD, investigate gender discrimination in bank employees' decisions over small business loan applications by randomising applicant gender in a lab-in-the-field experiment. The manuscript contributes to the entrepreneurial finance literature by complementing observational studies with an experimental one that has the advantage of quantifying individual characteristics, e.g. risk preferences. In addition, it contributes to the discrimination behaviour literature by providing precise experimental measures of indirect and direct gender discrimination. Thirdly, it contributes to the literature studying underrepresentation of women in the entrepreneurial world by highlighting the role of financial frictions for female entrepreneurs caused by social norms deeply rooted in finance practitioners, namely loan officers in the manuscript experiment.

In the experimental design 334 loan officers at a commercial bank in Turkey receive each real-life applications in which the applicant gender is randomised by using fictitious names. For the experiment 100 applications are drawn randomly from a pool of 250 applications received by the bank from new customers. Bank employees who participated the experiment routinely reviewed loan applications in their job and the experiment was framed as a training exercise. We will refer to them as "participants" or "loan officers" as in the manuscript. For each of the four applications each participant reviewed, participants decided whether to approve or reject the application based on its observable characteristics, such as the loan amount, the applicant name and credit score (the information sheet with loan information used in experiments can be found in the manuscript online Appendix D). In the event of approval, participants also had to decide whether or not to request for a guarantor and, finally, they were asked to provide a subjective repayment probability in the 0-100 range.

When we assess the manuscript computational reproducibility, we successfully reproduce all main results. In addition, in a robustness reproducibility exercise we obtain split-sample estimates by loan type, officer seniority and city. The evidence of no direct gender discrimination is driven by a balance between two underlying results: loan applications that in real-life were declined by the bank tend to be less frequently rejected when the applicant is female although with significance between 5% and 10%, loan applications that were not declined (performing or non-performing) exhibit no applicant gender difference in rejection rates and the latter effect drives the main result in the manuscript since loans not declined are twice as many as declined in the experimental dataset used in the manuscript. In addition, we uncover weakly significant evidence that participants with low seniority, officers, tend to reject female applications less frequently. However, effects by seniority are not significantly different for the two groups. As for the evidence of indirect gender discrimination, we find that it is driven by participants in cities excluding the most populated ones, e.g. Istanbul, Ankara, Izmir and Bursa, with differences being significant at 5%.

2 Main results computational and basic robustness reproducibility

To carry out a computational replication of the published manucript we used the replication package available in the American Economic Association online repository. Raw data were provided in the replication package. We successfully computationally reproduced all the main results, *i.e.*, Tables 3 and 4 in the published manuscript and in this replication exercise, from the raw data. Table 8 in the Appendix summarises features of the replication package.

	Panel C: Decision characteristics
Rejection dummy	Dummy variable equal to 1 if the participant rejects the loan ap-
	plication, 0 otherwise.
Guarantor dummy	Dummy variable equal to 1 if the participant offers credit condi-
	tional on the presence of a guarantor and 0 if the participant offers
	credit but does not request a guarantor.
Subjective repayment probability	Continuous variable which takes values from 0 to 100. For each de-
	cision, the participant estimates the likelihood that the loan would
	be repaid. Higher values indicate a greater chance of repayment.

Table 1. Variable definitions, decisions characteristics

We also fully replicated the summary statistics table in the manuscript (Table 2). We report summary statistics of participants' decisions in Table 2 and we will use them to interpret the magnitude of discrimination estimates. In addition, we report the full set of summary statistics in Table 10 in the Appendix. We also report in Table 1 definitions of choice variables. The full set of variables definitions in the published manuscript can be found in Table 9 in the Appendix.¹

¹The experiment was carried out in 2016 and 2017 although the study was registered in the AEA RCT registry with ID AEARCTR-0009025 in 2022. Anecdotal evidence about randomised control trials suggests that this is a fairly common practice by journals, that receive several good experimental studies for publication although a number of them was not pre-registered Brodeur et al. (2024). RCT studies published in the AEA journals have to register their experiment in the AEA RCT registry.

	Ν	Mean	Sd.	
Panel C: Decision characteristics				
First round				
Guarantor dummy	814.00	0.27	0.44	
Subjective repayment probability	1,329.00	60.11	30.81	
Rejection dummy	$1,\!336.00$	0.39	0.49	

 Table 2. Summary statistics of participants' decisions (computational reproducibility)

Notes: This table displays summary statistics for the variables at the decision level (participant-file combination). Appendix Table 9 contains all variable definitions.

We now describe the two main results in the manuscript that we were able to fully computationally replicate. Table 3 reports coefficients of loan rejection regressions in which the dependent variable is a dummy equal to 1 if a participant rejected a loan application and 0 otherwise. The table reports standard errors in circular brackets and p-values in squared brackets. Estimates of the female applicant dummy show that the probability of rejection is not significantly different for female relative to male applications. Point estimates are negative for all specifications although small in absolute value, with the greatest point estimates being -0.012, and relative to the mean rejection probability, 39%, that is reported in the summary statistics in Table 10 in the Appendix. When we compare estimates obtained under different assumptions across columns in Table 3, we notice that point estimates and standard errors are little sensitive to the type of fixed effect (FE) used or to using a LASSO estimator. In Table 3 columns (1) to (3) replicate results in Brock and De Haas (2023). Columns (0) and (4)-(5) instead are not reported in the published manuscript. Column (0) is a baseline specification with no FE. As for columns (4)-(5), we used city-level FE and a double LASSO procedure to select control variables, a combination of estimators not reported in the published manuscript. In both cases estimates do not differ from those reported in the published manuscript. Overall, estimates in Table 3 offer evidence of absence of direct gender discrimination

We now turn to Table 4, that reports coefficients of guarantor dummy regressions in which the dependent variable is a dummy equal to 1 if a participant approved a loan application subject to a guarantor and 0 if the application is approved unconditionally. The table reports standard errors in circular brackets and p-values in squared brackets. Estimates of the female applicant dummy show that the probability of loan application approval subject to a guarantor request is significantly higher for female applicants by 5-6 percentage points, or 19-22% relative to the mean probability of a loan application

	Deper	ndent variab	le: Rejectio	n dummy		
	(0)	(1)	(2)	(3)	(4)	(5)
	b/se/p	$\rm b/se/p$	b/se/p	$\rm b/se/p$	b/se/p	b/se/p
Female applicant	-0.012	-0.008	-0.008	-0.008	-0.012	-0.012
	(0.028)	(0.024)	(0.024)	(0.024)	(0.028)	(0.028)
	[0.670]	[0.748]	[0.750]	[0.748]	[0.671]	[0.671]
R-squared	0.000	0.259	0.264	0.259	0.007	0.007
Ν	$1,\!336$	$1,\!336$	$1,\!336$	1,336	$1,\!336$	1,336
File FE		1	1	1		
City FE			1		1	1
Double LASSO				\checkmark		1

Table 3. Applicant gender and loan rejection (computational reproducibility)

Notes: Columns (1)-(3) are manuscript replication and have the same column number as in the manuscript. The remaining columns are additional robustness checks. The dependent variable is a *Rejection dummy* that equals '1' if the participant declines the credit application and '0' if the participant approves it. In columns (3) and (5), a double-LASSO procedure is used to select controls from participant covariates and city FE (set of potential controls). The sample is restricted to the first round of the experiment. Cluster robust standard errors are shown in parentheses and clustered at the participant level. Appendix Table A1 in the manuscript contains all variable definitions.

approval subject to a guarantor at 27% in the summary statistics in Table 10 in the Appendix. Columns (1)-(3), reporting the same regressions as in the published manuscript, show that two out of three specifications are significant at 5%. When we add additional specification, without FE in column (0), using city-level FE and a double LASSO procedure to select control variables in column (4) and only city-level FE in column (5), instead, estimates are only significant at 10%.

	Depen	dent variabl	le: Guarant	or dummy		
	(0)	(1)	(2)	(3)	(4)	(5)
	$\rm b/se/p$					
Female applicant	0.054^{*}	0.063^{**}	0.058^{*}	0.060^{**}	0.052^{*}	0.052^{*}
	(0.030)	(0.030)	(0.030)	(0.030)	(0.029)	(0.029)
	[0.073]	[0.037]	[0.054]	[0.046]	[0.079]	[0.079]
R-squared	0.004	0.152	0.188	0.173	0.054	0.054
Ν	814	814	814	814	814	814
File FE		1	1	1		
City FE			1		1	1
Double LASSO				\checkmark		\checkmark

 Table 4. Applicant gender and guarantor requirements (computational reproducibility)

Notes: Columns (1)-(3) are manuscript replication and have the same column number as in the manuscript. The remaining columns are additional robustness checks. The dependent variable is a *Guarantor dummy* that equals '1' if the participant approves the credit application but requests a guarantor and '0' if the participant approves it without requesting a guarantor. In columns (3) and (5), a double-LASSO procedure is used to select controls from participant covariates and city FE (set of potential controls). *Better Lee Bounds* are not reported pending signing of a confidentiality agreement with the manuscript authors. The sample is restricted to the first round of the experiment. Cluster robust standard errors are shown in parentheses and clustered at the participant level. Appendix Table A1 in the published manuscript contains all variable definitions.

The estimates in Table 4 offer evidence of indirect gender discrimination, the most

important results in the manuscript according to the authors. When we interpret the result strength in the light of the additional specifications we estimated we are reassured by the fact that estimates precision is high, i.e. 5% significance, when absorbing file FE because they absorb loan-specific unobserved heterogeneity. In an ideal experiment, we envisage strong evidence in favour of indirect gender discrimination being such that most estimates in Table 4 are significant at conventional levels, i.e. at least 5%, and when absorbing file FE estimates, to account for unobserved heterogeneity across files, become even more precise. However, as the authors point out in the manuscript repeatedly, their experiment offers a proof of concept to detect gender discrimination although high statistical power is not their main objective, inter alia as it would require more funds to increase the sample size, i.e. a combination of a greater number of real-life loan applications and a greater number of applications reviewed per participant.

In addition, we carried out a computational replication of heterogeneous effects underlying the main results and report them in Table 11 and 12 in the Appendix. All estimates of heterogeneous effects in the published manuscript have been fully replicated. To sum up the main results, the evidence of indirect gender discrimination documented in Table 4 seems to be mainly driven by younger participants, by those with lower seniority (officers), and by loan application assessed as performing loans by the bank.

3 Robustness reproducibility: loan rejection by loan type and heterogeneity by city size

In the previous section we carried out a computational replication of the manuscript main results and of how the indirect gender discrimination effect, i.e. requesting a guarantor to approve a loan, varies with participants' or loans characteristics (heterogeneous effects). In this section we carry two robustness replication exercises to extend the rich analysis in the published manuscript. First, we assessed whether not only indirect gender discrimination but also direct one, i.e. loan rejection, exhibits heterogeneous effects. We uncovered heterogeneity in direct gender discrimination by loan type, with female applications being weakly favoured among declined loans and, in addition, by job seniority with weakly significant evidence of direct discrimination by participants with low job seniority (officers). Second, we assessed whether direct or indirect discrimination depended on city size, since experiments were carried out in 8 different cities with substantial population differences (from Samsun with less than 1,5 millions in 2023 to Istanbul with more than 15 millions). We find no evidence of indirect discrimination in the two most populated cities, Istanbul and Ankara, and it is instead driven by smaller cities, with the difference between the two groups of cities being significant at 5%.

	D	1 / 1	1 D ' /'	1		1
	Depe	ndent variat	ble: Rejectio	on dummy	(.)	()
	(0)	(1)	(2)	(3)	(4)	(5)
		Per	forming			
	b/se/p	b/se/p	$\rm b/se/p$	$\rm b/se/p$	b/se/p	$\rm b/se/p$
Female applicant	0.029	0.024	0.024	0.024	0.028	0.028
	(0.036)	(0.033)	(0.033)	(0.033)	(0.036)	(0.036)
	[0.415]	[0.472]	[0.456]	[0.472]	[0.436]	[0.436]
R-squared	0.001	0.186	0.198	0.186	0.017	0.017
N	677	677	677	677	677	677
File FE		1	1	1		
City FE			1		1	1
Double LASSO				1		1
		Non-p	erforming			
	b/se/p	b/se/p	b/se/p	b/se/p	b/se/p	b/se/p
Female applicant	-0.021	0.004	0.000	0.004	-0.025	-0.025
	(0.056)	(0.050)	(0.051)	(0.050)	(0.056)	(0.056)
	[0.701]	[0.935]	[0.995]	[0.935]	0.660	0.660
R-squared	0.000	0.235	0.243	0.235	0.020	0.020
N	325	325	325	325	325	325
File FE		1	1	1		
City FE			1		1	1
Double LASSO			-	1	-	1
		De	eclined	-		
	b/se/p	b/se/p	b/se/p	b/se/p	b/se/p	b/se/p
Female applicant	-0.090*	-0.083*	-0.092*	-0.083**	-0.112**	-0.112**
	(0.055)	(0.049)	(0.050)	(0.049)	(0.055)	(0.055)
	[0.099]	[0.094]	[0.066]	[0.094]	[0.043]	[0.043]
R-squared	0.008	0.260	0.277	0.260	0.040	0.040
N	334	334	334	334	334	334
File FE		1	1	1	001	001
City FE		•		•	1	1
Double LASSO			•	1	-	
Double LIDDO				~		•

Table 5. Applicant gender and loan rejection by loan type (robustness reproducibility)

Notes: We estimated the same regression as in Table 3 except splitting the sample by loan type (performing, non-performing and declined). The dependent variable is a *Rejection dummy* that equals '1' if the participant declines the credit application and '0' if the participant approves it. In columns (3) and (5), a double-LASSO procedure is used to select controls from participant covariates and city FE (set of potential controls). The sample is restricted to the first round of the experiment. Cluster robust standard errors are shown in parentheses and clustered at the participant level. Appendix Table A1 in the manuscript contains all variable definitions.

Table 5 reports estimates of applicant gender differences in the probability of a loan rejection by loan type. Estimates from subsamples for performing loans and non-performing, in the top and central panel, are in line with one of the two main results in the manuscript, i.e. no direct gender discrimination, in Table 3. Evidence of no direct gender discrimination is driven by a balance between two underlying results: loan applications that in real-life were declined by the bank tend to be less frequently rejected when the applicant is female although with significance between 5% and 10%, loan ap-

plications that were not declined (performing or non-performing) exhibit no applicant gender difference in rejection rates and the latter effect drives the main result in the manuscript. The reason is loans not declined are twice as many as declined ones in the experimental dataset used in the manuscript. However, tests of differences in rejection rates between applications with declined loans and non-declined ones (pooling performing and non-performing) show they are not significant.

	Depen	dent variabl	e: Rejectior	ı dummy		
	(0)	(1)	(2)	(3)	(4)	(5)
		Of	ficer			
Female applicant	-0.060	-0.047	-0.047	-0.047	-0.060	-0.060
	$(0.036)^*$	(0.031)	(0.031)	(0.031)	(0.036)	(0.036)
	[0.100]	[0.126]	[0.126]	[0.126]	[0.101]	[0.101]
R-squared	0.004	0.310	0.315	0.310	0.007	0.007
N	768	768	768	768	768	768
File FE		1	1	1		
City FE			1		1	1
Double LASSO				1		1
		Supe	ervisor			
	b/se/p	b/se/p	$\rm b/se/p$	b/se/p	b/se/p	b/se/p
Female applicant	0.053	0.012	0.011	0.011	0.053	0.053
	(0.044)	(0.038)	(0.038)	(0.038)	(0.044)	(0.044)
	[0.230]	[0.760]	[0.774]	[0.772]	[0.233]	[0.233]
R-squared	0.003	0.345	0.357	0.353	0.022	0.022
Ν	568	568	568	568	568	568
File FE		1	1	1		
City FE			1		1	1
Double LASSO				1		1

 Table 6. Applicant gender and loan rejection by participant job seniority (robustness reproducibility)

Notes: We estimated the same regression as in Table 3 except splitting the sample by participant job seniority (officer or supervisor). The dependent variable is a *Rejection dummy* that equals '1' if the participant declines the credit application and '0' if the participant approves it. In columns (3) and (5), a double-LASSO procedure is used to select controls from participant covariates and city FE (set of potential controls). The sample is restricted to the first round of the experiment. Cluster robust standard errors are shown in parentheses and clustered at the participant level. Appendix Table A1 in the manuscript contains all variable definitions.

Table 6 reports estimates of applicant gender differences in the probability of a loan rejection by job seniority, i.e. officers and supervisors. Estimates from the officers subsample show female applications have a lower rejection rate. However, the effect is weakly significant for only one out of six specifications and tests of differences between officers and supervisors show they are not significant.

Table 7 reports estimates of the probability of accepting a loan application subject to a guarantor separately for participants in the two most populated cities in Turkey, Istanbul and Ankara, and for participants in the remaining cities. The two cities are in the top decile of the population distribution (using data from Turkey Statistics Bureau). Evidence of indirect gender discrimination seems not to be driven by Istanbul or Ankara and, instead, by the remaining cities. Tests of differences in the probability of requiring

· · ·		* /				
	Deper	ndent variab	le: Rejectio	n dummy		
	(0)	(1)	(2)	(3)	(4)	(5)
		Istanbul	and Ankara	ı		
	$\rm b/se/p$	$\rm b/se/p$	$\rm b/se/p$	$\rm b/se/p$	$\rm b/se/p$	$\rm b/se/p$
Female applicant	-0.027	-0.045	-0.044	-0.045	-0.032	-0.032
	(0.040)	(0.045)	(0.046)	(0.045)	(0.039)	(0.039)
	[0.499]	[0.325]	[0.337]	[0.325]	[0.415]	[0.415]
R-squared	0.001	0.329	0.353	0.329	0.023	0.023
Ν	328	328	328	328	328	328
File FE		1	1	1		
City FE			1		1	1
Double LASSO				1		1
Double LASSO		Oth	er cities	1		1
Double LASSO Female applicant	0.107	Oth 0.097	er cities 0.096	✓ 0.097	0.108	0.108
Double LASSO Female applicant	0.107 (0.042)	Oth 0.097 (0.044)	er cities 0.096 (0.044)	✓ 0.097 (0.044)	0.108 (0.041)	✓ 0.108 (0.041)
Double LASSO Female applicant	$\begin{array}{c} 0.107 \\ (0.042) \\ [0.011] \end{array}$	Oth 0.097 (0.044) [0.027]	er cities 0.096 (0.044) [0.029]	0.097 (0.044) [0.027]	$0.108 \\ (0.041) \\ [0.009]$	0.108 (0.041) [0.009]
Double LASSO Female applicant R-squared	0.107 (0.042) [0.011] 0.013	Oth 0.097 (0.044) [0.027] 0.221	er cities 0.096 (0.044) [0.029] 0.243	✓ 0.097 (0.044) [0.027] 0.221	0.108 (0.041) [0.009] 0.052	0.108 (0.041) [0.009] 0.052
Double LASSO Female applicant R-squared N	$\begin{array}{c} 0.107 \\ (0.042) \\ \hline 0.011 \\ 0.013 \\ 486 \end{array}$	Oth 0.097 (0.044) [0.027] 0.221 486	er cities 0.096 (0.044) [0.029] 0.243 486	✓ 0.097 (0.044) [0.027] 0.221 486	$\begin{array}{c} 0.108 \\ (0.041) \\ \hline [0.009] \\ 0.052 \\ 486 \end{array}$	✓ 0.108 (0.041) [0.009] 0.052 486
Double LASSO Female applicant R-squared N File FE	$\begin{array}{c} 0.107 \\ (0.042) \\ \hline 0.011 \\ 0.013 \\ 486 \end{array}$	Oth 0.097 (0.044) [0.027] 0.221 486 ✓	er cities 0.096 (0.044) [0.029] 0.243 486 ✓	✓ 0.097 (0.044) [0.027] 0.221 486 ✓	$\begin{array}{c} 0.108 \\ (0.041) \\ [0.009] \\ 0.052 \\ 486 \end{array}$	 ✓ 0.108 (0.041) [0.009] 0.052 486
Double LASSO Female applicant R-squared N File FE City FE	$\begin{array}{c} 0.107\\ (0.042)\\ \hline [0.011]\\ 0.013\\ 486 \end{array}$	Oth 0.097 (0.044) [0.027] 0.221 486 ✓	er cities 0.096 (0.044) [0.029] 0.243 486 ✓ ✓	✓ 0.097 (0.044) [0.027] 0.221 486 ✓	0.108 (0.041) [0.009] 0.052 486 ✓	✓ 0.108 (0.041) [0.009] 0.052 486 ✓

Table 7. Applicant gender and guarantor requirements by whether participants are from 2 biggest cities: Istanbul and Ankara (robustness reproducibility)

Notes: We estimated the same regression as in Table 4 except splitting the sample to isolate data from participants in the two most populated cities: Istanbul and Ankara. The dependent variable is a *Guarantor dummy* that equals '1' if the participant approves the credit application but requests a guarantor and '0' if the participant approves it without requesting a guarantor. In columns (3) and (5), a double-LASSO procedure is used to select controls from participant covariates and city FE (set of potential controls). The sample is restricted to the first round of the experiment. Cluster robust standard errors are shown in parentheses and clustered at the participant level. Appendix Table A1 in the manuscript contains all variable definitions.

a guarantor between the two groups show they are significant at 5% level. Similar results are obtained if we consider the three most populated cities (Istanbul, Ankara and Izmir) or the four most populated ones (Istanbul, Ankara, Izmir and Bursa).

4 Conclusion

The published manuscript Brock and De Haas (2023) we chose to replicate, as we believe it is an innovative study on gender discrimination documenting a very relevant indirect dimension of discrimination, is 100% computationally replicable. In our replication exercise we also carried out two types of robustness replications.

In our first robustness replication we tried to replicate the main results by slightly modifying assumptions of the manuscript specifications. We found that the sign and magnitude of the results is unchanged and changes in significance levels are small, thus confirming the robustness of the manuscript main results. Secondly, we tried to extend the rich set of results documenting heterogeneous effects of indirect gender discrimination (i.e. applicant gender differences in the probability of requiring a guarantor). We complemented the manuscript heterogeneous effects by looking at the probability of rejection. We find weak evidence of differences in applicant gender effect by loan type, with female application being less frequently rejected among real-life declined applications and by job seniority, with less experienced participants (officers) under-rejecting female applications. The low significance of these results suggests that the ambitious experimental design would benefit from additional observations to obtain higher test power and verify whether the weakly significant heterogeneous effects of direct discrimination are confirmed or not.

In our second robustness replication we tested whether the indirect gender discrimination documented in the manuscript was observed in participants' behaviour in all the eight cities in which the experiment was carried out. We find no evidence of indirect gender discrimination in the behaviour of participants in the most populated cities, suggesting the effect documented in the published manuscript is driven by participants in smaller cities. This difference is significant at conventional levels. A potential explanation is that gender norms vary by city size and in the biggest cities, with a potentially more balanced share of entrepreneurs by gender, indirect gender discrimination is lower than in smaller cities. However, it would be advisable to obtain additional experimental observations (more subjects and more applications per subject) from subjects in all cities in which the experiment was carried out to obtain more high-powered estimates.

References

- Brock, J. M. and De Haas, R. (2023). Discriminatory lending: Evidence from bankers in the lab. *American Economic Journal: Applied Economics*, 15(2):31–68.
- Brodeur, A., Cook, N. M., Hartley, J. S., and Heyes, A. (2024). Do preregistration and preanalysis plans reduce p-hacking and publication bias? evidence from 15,992 test statistics and suggestions for improvement. *Journal of Political Economy Microeconomics*, 2(3):527–561.

5 APPENDIX

Table 8. Replication Package C	Contents and	d Reproducib	ility
Replication Package Item	Fully	Partial	No
Raw data provided Analysis data provided	\checkmark		
Cleaning code provided Analysis code provided	\checkmark		
Reproducible from raw data Reproducible from analysis data	\checkmark		

Notes: This table summarizes the replication package contents contained in Brock and De Haas (2023).

	Table 9. Variable definitions
	Panel A: Participant characteristics
Participant is female	Dummy variable equal to 1 for female and 0 for male participants.
Participant experience (years)	Number of years the participant has been an employee of any bank's
	credit division.
Participant age (years)	Age of the participant in years.
Participant is supervisor	Dummy variable equal to 1 for participants who are a supervi-
	sor/branch manager, 0 for those who are a loan officer.
Participant risk aversion	Integer variable ranging from 1 to 6, with 1 indicating risk loving
	and 6 indicating the highest level of risk aversion.
Participant gender bias (IAT)	Takes values from -1 to 1. Positive (negative) values indicate that
	the participant associates careers and entrepreneurship with being
	male (female). A score of zero indicates no implicit gender bias.
	Panel B: File characteristics
Real life performing	Dummy variable equal to 1 if the loan was performing in real life.
	0 otherwise.
Real life non-performing (NPL)	Dummy variable equal to 1 if the loan was non-performing in real
recent file from portorining (1.1.2)	life 0 otherwise
Real life declined	Dummy variable equal to 1 if the loan application was declined by
near me deciment	the lending staff in real life 0 otherwise
Fomale applicant	Dummy variable equal to 1 if the randomized conder of the laser
remale applicant	application is female and 0 otherwise
Female applicant (animinal)	application is tentate and 0 otherwise.
remaie applicant (original)	building variable equal to 1 if the gender of the real-life loan appli-
Cara l'ita anna	Caulon was originally remain and U otherwise.
Credit score	Credit score as taken from the KKB credit registry. Higher values
~	indicate less ex ante credit risk.
Credit limit requested	The total amount of credit requested by the applicant.
Micro	Dummy variable equal to 1 if the credit file was from a micro firm
	and 0 if the credit file was from an SME firm.
Female-dominated sector	Dummy variable equal to 1 if the share of firms with majority female
	ownership, in a given industry, is greater than the median industry
	share; 0 otherwise. The share of female-owned firms is calculated
	at the 2-digit ISIC level using pooled observations from the EBRD–
	World Bank BEEPS V and VI surveys.
Male-dominated sector	Dummy variable equal to 1 if the share of firms with majority female
	ownership, in a given industry, is less than or equal to the median
	industry share; 0 otherwise. The share of female-owned firms is
	calculated at the 2-digit ISIC level using pooled observations from
	the EBRD–World Bank BEEPS V and VI surveys.
Guarantor dummy (original)	Dummy variable equal to 1 if a guaranteer is mentioned or approved
castanosi auniny (originar)	in either the collateral terms sections or opinions section of the loan
	file. 0 otherwise
	Panal C. Decision characteristics
Rejection dummy	Dummy variable equal to 1 if the participant rejects the loss an
nejection dummy	plication 0 otherwise
Cuerenter dummer	Dummy variable agual to 1 if the participant offers and it and it
Guarantor dunniny	tional on the presence of a manual or if the maticipal of the maticipal of the presence of a manual of the maticipal of the m
	tional on the presence of a guarantor and 0 if the participant offers
	credit but does not request a guarantor.
Subjective repayment probability	Continuous variable which takes values from 0 to 100. For each de-
	cision, the participant estimates the likelihood that the loan would
	be repaid. Higher values indicate a greater chance of repayment.
	Panel D: Treatment characteristics
No subj.	Dummy variable equal to 1 if information subjectively provided by
	lending staff is removed from the loan application file, 0 otherwise.
No obj.	Dummy variable equal to 1 if objective information (the credit
-	score) from the credit bureau is removed from the loan application
	file, 0 otherwise.

 Table 9.
 Variable definitions

	Ν	Mean	Sd.
Panel A: Participant characteristic	s		
Participant is female	332.00	0.47	0.50
Participant age (years)	321.00	37.30	5.84
Participant gender bias (IAT)	325.00	0.33	0.32
Participant is supervisor	334.00	0.43	0.50
Participant is risk averse	333.00	4.11	1.37
Participant experience (years)	326.00	8.67	5.77
Panel B: Loan-file characteristics			
Real life performing			
Female applicant (original)	50.00	0.66	0.48
Credit score	48.00	1,057.27	451.32
Credit limit requested (lira)	50.00	$90,\!593.50$	$134,\!848.50$
Female-dominated sector	49.00	0.73	0.45
Real life non-performing (NPL)			
Female applicant (original)	25.00	0.32	0.48
Credit score	25.00	924.88	404.57
Credit limit requested (lira)	25.00	76,105.00	87,420.88
Female-dominated sector	24.00	0.71	0.46
Real life declined			
Female applicant (original)	25.00	0.40	0.50
Credit score	24.00	731.38	476.43
Credit limit requested (lira)	25.00	117,762.00	271,263.77
Female-dominated sector	23.00	0.74	0.45
Panel C: Decision characteristics			
First round			
Guarantor dummy	814.00	0.27	0.44
Subjective repayment probability	1,329.00	60.11	30.81
Rejection dummy	1,336.00	0.39	0.49
U U	/		

 Table 10.
 Summary statistics (computational reproducibility)

Notes: This table displays summary statistics for the variables used in the empirical analysis. Panel A summarizes the main characteristics of all participants who took part in the experiment. Panel B displays summary statistics for the 100 loan application files used in the experiment. Panel C displays summary statistics at the decision level (participant-file combination). Appendix Table A1 contains all variable definitions.

dummy
Guarantor
variable:
Dependent

	Particip	oant gender	Participant	t experience	Particiț	pant age
	Female	Male	Below median	Above median	Below median	Above median
	[1]	[2]	[3]	[4]	[5]	[9]
Female appli- cant	0.065	0.084	0.123	0.047	0.126	0.020
	(0.048)	(0.043)	(0.055)	(0.044)	(0.053)	(0.042)
t-test p -values		0.387		0.139		0.060
K-squared N	0.307 365	0.223	0.293 367	0.268	0.278 333	0.244 $AA7$
File FE	>	~		>	,	
	Particip	ant position	Participant	risk aversion	Participant	gender bias
	Officer	Supervisor	Below median	Above median	Below median	Above median
	[7]	8	[6]	[10]	[11]	[12]
Female appli-	0.120	-0.030	0.081	0.074	0.015	0.111
cant	(0.038)	(0.054)	(0.060)	(0.035)	(0.048)	(0.043)
t-test n -values	(0000)	0.012	(000.0)	0.466		0.067
R-squared	0.230	0.322	0.312	0.176	0.296	0.284
N	491	323	230	582	399	393
File FE	>	>	>	>	>	>
Notes: The dependent ' participant approves it w "Below median" sample c risk aversion variable, hi biua measures implicit g women more with house! stepdown <i>p</i> -values which wolf's (2016) bootstrap1 procedure that considers brackets below these bou	ariable is a Gua ithout requesting prevent requesting prevalues indice gher values indice ander bias based old tasks. The t-1 control for the f e-sampling algori all participant c ods. Cluster robu	rantor dummy that calls a guarantor. The ss city below the media ate greater risk avers; on an implicit associ test <i>p-vulue</i> correspo tamilywise error rate amilywise error rate thm with 10,000 repl tovariates (Semenova, st standard errors ar	equals '1' if the participa equals '1' if the participa a while is vesticed to the an while the "Above median ion so that participants w iation test (IAT). Higher 1 mds to one-sided tests. Ro and are robust to multip ications. <i>Better Lee Boun</i> (2221). Stoye (209)-adi e shown in parentheses an	int approves the credit applications application of the experimination of the experimination of the experimination of the experiment of the participation of the expert of the expert of the expert of the expert of the experiment of th	plication but requests a g put. When but requests a g ut. When partitioning and abd sion are the most risk aver articipants associate men own in square brackets an adjust for 12 hypothesis a divist for 12 hypothesis a (2004) 95% confidence in the level. Appendix Table	guarantor and '0' if th on-binary variables, th ove. For the <i>Participan</i> rase. <i>Participant gende</i> . more with careers and d refer to Romano-Wo and follow Romano an ough a LloSSO selectio ough a LloSSO selectio and retervals are reported i A1 contains all variabl

0	
an performance	
lo	
ıd real-life	
an	
requirements,	
guarantor	
gender,	
Applicant	•
12.	
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Tabl	

Dependent variable: Guarantor dummy

	Particip	unt position	Participant	risk aversion	Participant	gender bias
	Officer	Supervisor	Below median	Above median	Below median	Above median
	[6]	[10]	[11]	[12]	[13]	[14]
Female applicant	0.149	0.025	060.0	0.117	0.101	0.148
$t-test \ p-values$	(een.n)	(0.078) 0.078	(0.00)	(0.049) 0.393	(100.0)	(0.030) 0.287
R-squared	0.194	0.247	0.319	0.140	0.298	0.241
Ν	292	194	133	351	228	242
File FE	>	>	>	>	>	>
Notes: The dependent variable is a <i>Guarantor dummy</i> that (participant approves it without requesting a guarantor. The the "Below median" sample corresponds to strictly below the the <i>Participant risk aversion</i> variable, higher values indicate <i>t</i> <i>Participant gender bias</i> measures implicit gender bias based more with careers and women more with household tasks. brackets and refer to Romano-Wolf stepdown <i>p</i> -values which hypothesis and follow Romano and Wolf's (2016) bootstrap r are tightened through a LASSO selection procedure that consi 95% confidence intervals are reported in brackets below these level. Appendix Table A1 contains all variable definitions.	equals '1' if t sample is res e median wh greater risk z on an implic The t-test '1 The t-test '1 e-sampling a riders all part iders all part	he participant i tricted to the fi lie the "Above version so that it association to it association to the familywise er- lgorithm with 1 icipant covariate uster robust stan	approves the credit irst round of the ex- median" sample con participants with a est (IAT). Higher L ands to one-sided the ands to one-sided the ror rate and are rob 0,000 replications. es (Semenova, 2021) ndard errors are sho	application but requestion the pariment. When pariment. When pare responds to values bove median risk away AT values indicate the asts. Romano-Wolf must to multiple hypore Better Lee Bounda i. Stoye (2009)-adjus wwn in parentheses a	titioning non-binary at the median and at the median and rersion are the most hat participants ass p-values are shown thesis testing; we ac effer to Lee (2009) b sted Imbens and Ma and clustered at the	 d' îf the v variables, above. For above. For risk averse. oriate men n in square ijust for 12 ounds that nski (2004) participant

Above median

Below median

Above median

Below median

Male

Female

NPL & Declined

Performing

Ξ

Loan in real life All

[9]

5

4

 \mathbb{S}

5

Performing loans

Participant experience

Participant gender

Participant age

 ∞

 $\begin{array}{c} 0.095 \\ (0.056) \\ 0.274 \\ 0.225 \\ 262 \end{array}$

 $\begin{array}{c} 0.102 \\ (0.059) \\ 0.245 \\ 0.271 \\ 256 \end{array}$

0.214 205

0.237 221

0.231 225

0.128 486

t-test *p*-values R-squared N

File FE

 $\begin{array}{c} 0.128 \\ (0.061) \\ 0.292 \\ 0.205 \\ 257 \end{array}$

-0.014(0.054)0.0310.190328

 $0.149 \\ (0.071)$

0.166(0.070)

 $0.080 \\ (0.063)$

0.111(0.040)

Female applicant