Do Women Pay More for Credit? Evidence from Italy*

Alberto Alesina - *Harvard University*

Francesca Lotti - Paolo Emilio Mistrulli
Bank of Italy

June 15, 2009

Abstract

The answer is yes. By using a unique and large data set on overdraft contracts between banks and microfirms and self-employed individuals, we find robust evidence that women in Italy pay more for overdraft facilities than men. We could not find any evidence that women are riskier then men. The male/female differential remains even after controlling for a large number of characteristics of the type of business, the borrower and the market structure of the credit market. The result is not driven by lack of credit history, nor by women using a different type of bank than men, since the same bank charges different rates to male and female borrowers. Social capital does play a role: high levels of trust loosen credit conditions by lowering interest rates, but this benefit is not evenly distributed, as women benefit from increased social capital less than men.

*We thank Magda Bianco, Andrea Brandolini, Daniele Franco, Giorgio Gobbi, Bronwyn H. Hall, Andrea Lamorgese, Enrico Santarelli and Andrei Shleifer for their useful comments; seminars participants at Bocconi University, University of Bari, Pavia, Siena and Urbino; Guido de Blasio and Luigi Zingales for providing data on social capital. The views expressed are those of the authors and do not necessarily reflect those of the Bank of Italy.

Table 1: Variable names and definitions.

Firm specific variable	**Description**	**Source**
Rate	Interest rate charged to firm i by bank j, expressed as a difference between the observed interest rate and the ECB marginal rate on lending facilities.	Loan Interest Rate Survey
Female	Dummy variable that takes value 1 if the owner's gender is female (0 if male).	Central Credit Register
Craftsmen	Dummy variable that takes value 1 if the firm is registered as "artisan" (0 if not).	Central Credit Register
Age	Proprietor's age (in log).	Central Credit Register
Loan size	Size of firms' total outstanding loans, in 9 classes (1=$\leq$75; 2=[75; 125], 3=[125; 250], 4=[250; 500], 5=[500; 1,000], 6=[1,000; 2,500], 7=[2,500; 5,000], 8=[5,000; 25,000], 9=$\geq$25,000. In thousand €).	Central Credit Register
Bad loans	Dummy variable that takes value 1 if the the firm had insolvency problems (0 if not).	Central Credit Register
Guarantor	Dummy variable that takes value 1 if the firm is required a personal guarantee to secure its loans (backed up by physical and/or financial assets posted by a third party).	Central Credit Register
Female (Male) guarantor	Dummy variable that takes value 1 if the external guarantor is female (male).	Central Credit Register
Older guarantor	Dummy variable that takes value 1 if the external guarantor is older than the borrower.	Central Credit Register
Credit history	Time elapsed since the first entry in the Central Credit Register in quarters.	Central Credit Register
Bank specific variables	**Description**	**Source**
Female Auditor	Dummy variable that takes value 1 if at least one of the bank' auditors is female.	Supervisory Report
Female Managing Director	Dummy variable that takes value 1 if at least one of the bank' managing directors is female.	Supervisory Report
Market specific variables	**Description**	**Source**
HHI	Herfindahl-Hirschman concentration index, market shares computed on loans to enterprises.	Supervisory Report
Failure rate	Firms' failure rate, i.e. the ratio of firms with an outstanding bankruptcy procedure to the total number of active firms.	Infocamere
Newspapers	Number of newspapers (excl. sport) per th. persons, in log.	Carocci (2007)
Blood donations	Number of blood donations, per th. persons, in log.	Carocci (2007)
Election turnout	Election turnout rates, in log.	Carocci (2007)
Labor market participation	Participation rates to the labor market, by gender, quarter and province.	Istat

Table 2: Firms and credit lines: geographical distribution (in %).

	Firms		Credit lines	
	Female	Male	Female	Male
North East	17.2	82.8	15.4	84.6
North West	16.8	83.2	14.8	85.2
Center	20.4	79.6	18.0	82.0
South & Islands	18.3	81.7	16.9	83.1
Total	18.0	82.0	16.1	83.9

Table 3: Firms and credit lines: sectorial distribution (in %).

	Share of firms		Share of loans	
	Female	Male	Female	Male
Manufacturing	17.9	82.1	15.8	84.2
Constructions	2.8	97.2	2.5	97.5
Retail & Wholesale trade	25.1	74.9	22.9	77.1
Hotels & Restaurants	34.3	65.7	32.8	67.2
Credit & Insurance interm. (excl. banks)	6.9	93.1	6.4	93.6
Business Services	17.0	83.0	14.3	85.7
Total	18.0	82.0	16.1	83.9

Table 4: Credit lines' size (in €).

Outstanding debt [a]	Share of credit lines, in %		Av. granted credit per line, in €	
	Female	Male	Female	Male
Below 250,000	65.1	55.5	34,060	36,850
Between 250,000 and 2,500,000	34.2	42.7	84,889	83,388
Between 2,500,000 and 100,000,000	0.7	1.8	253,401	305,205
Total	100	100	53,048	61,511

[a] Outstanding debt refers to the firms' total amount of loans.

Table 5: Average credit drawn per line (in €).

Outstanding debt [a]	Average drawn credit per line, in €		Credit line usage [b]	
	Female	Male	Female	Male
Below 250,000	27,840	28,749	81.7	78.0
Between 250,000 and 2,500,000	59,757	59,886	70.5	71.9
Between 2,500,000 and 100,000,000	177,526	219,884	70.0	72.1
Total	39,850	45,455	75.2	73.9

[a] Outstanding debt refers to the firms' total amount of loans.

[b] The credit line usage is the ratio of drawn to granted credit, in %.

Table 6: Share of secured loans (in%).

Outstanding debt [a]	Share of secured credit lines [b]	
	Female	Male
Below 250,000	58.0	54.0
Between 250,000 and 2,500,000	60.0	53.8
Between 2,500,000 and 100,000,000	62.0	42.9
Total	58.7	53.7

[a] Outstanding debt refers to the firms' total amount of loans.
[b] Secured loans are backed up by either physical and financial assets posted by a third party, which the lender can realize n case of default.

Table 7: Basic regression: interest rates on firm's characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	0.285***	0.274 ***	0.291***	0.643***	0.180***	0.163***	0.202***	0.532***
	(0.019)	(0.018)	(0.020)	(0.008)	(0.019)	(0.018)	(0.020)	(0.008)
Age					-0.017***	-0.904***	-0.018***	-0.016***
					(0.001)	(0.026)	(0.001)	(0.000)
Loan size (class)					-0.248***	-0.264***	-0.171***	-0.257***
					(0.005)	(0.005)	(0.004)	(0.002)
Bad Loans					1.805***	1.724***	0.526***	1.915***
					(0.068)	(0.064)	(0.053)	(0.035)
Bank fixed effects	No	Yes	No	No	No	Yes	No	No
Estimate	OLS	OLS	Panel R.E.	I.V.	OLS	OLS	Panel R.E.	I.V.
N. obs.	1,209,078	1,209,078	1,209,078	1,209,078	1,122,556	1,122,556	1,122,556	1,122,556

All regressions control for industry, and time and province fixed effects. Columns (3) and (6) are panel estimates with random effects. Columns (4) and (8) are IV estimates, using female labor market participation as instrument.
Robust standard errors in brackets. * = significant at 10%, ** = significant at 5%, *** = significant at 1% .

Table 8: Interest rates and third party secured loans: neutral and personal guarantors.

	(1)	(2)	(3)	(4)	(5)
Female	0.635***	0.773***	0.725***	0.874***	0.550***
	(0.009)	(0.012)	(0.010)	(0.011)	(0.009)
Guarantor	0.107***	0.145***			
	(0.005)	(0.005)			
Female* Guarantor		-0.246***			
		(0.015)			
Neutral Guarantor			-0.088***		
			(0.006)		
Male Guarantor				0.074***	
				(0.011)	
Female Guarantor					-0.014**
					(0.006)
Female* Neutral Guarantor			-0.267***		
			(0.016)		
Female * Male Guarantor				-0.613***	
				(0.019)	
Female * Female Guarantor					1.592***
					(0.041)
N. obs.	1,209,078	1,209,078	1,209,078	1,209,078	1,209,078

IV estimation. All regressions control for industry and time fixed effects. Robust standard errors in brackets.
* = significant at 10%, ** = significant at 5%, *** = significant at 1% .

Table 9: Interest rates and third party secured loans: characteristics of personal guarantors.

	(1)	(2)	(3)
Female	0.885***	0.793***	0.644***
	(0.012)	(0.010)	(0.009)
Older Guarantor	0.110***		
	(0.006)		
Older Male Guarantor		0.149***	
		(0.013)	
Older Female Guarantor			0.220***
			(0.009)
Female * Older Guarantor	-0.526***		
	(0.016)		
Female * Older Male Guarantor		-0.591***	
		(0.021)	
Female * Older Female Guarantor			0.161***
			(0.034)
N. obs.	1,209,078	1,209,078	1,209,078

IV estimation. All regressions control for industry and time fixed effects.
Robust standard errors in brackets.
* = significant at 10%, ** = significant at 5%, *** = significant at 1% .

Table 10: Interest rates and banks' board of directors.

	(1)	(2)	(3)	(4)
Female	0.643***	0.749***	0.643***	0.580***
	(0.008)	(0.009)	(0.008)	(0.009)
Female Auditor	-0.106***	-0.022***		
	(0.006)	(0.007)		
Female Managing Director			0.017***	-0.020***
			(0.005)	(0.006)
Female * Female Auditor		-0.538***		
		(0.019)		
Female * Female Managing Director				0.235***
				(0.017)
N. obs.	1,209,078	1,209,078	1,209,078	1,209,078

IV estimation. All regressions control for industry and time fixed effects.
Robust standard errors in brackets.
* = significant at 10%, ** = significant at 5%, *** = significant at 1% .

Table 11: Interest rates and credit markets' characteristics.

	(1)	(2)	(3)	(4)	(5)
Female	0.668***	0.671***	0.538***	0.943***	1.027***
	(0.008)	(0.008)	(0.008)	(0.017)	(0.016)
HHI	-6.717***	-9.992***		-6.167***	
	(0.060)	(0.200)		(0.067)	
HHI sq.		13.222***			
		(0.713)			
Failure rate			0.153***		0.173***
			(0.001)		(0.001)
Female * HHI				-3.566**	
				(0.187)	
Female * Failure rate					-0.114***
					(0.003)
N. obs.	1,209,078	1,209,078	1,209,078	1,209,078	1,209,078

IV estimation. All regressions control for industry and time fixed effects.
Robust standard errors in brackets.
* = significant at 10%, ** = significant at 5%, *** = significant at 1% .

Table 12: Interest rates and credit history.

	(1)	(2)	(3)	(4)
Female	0.543***	0.582***	0.306***	0.397***
	(0.008)	(0.008)	(0.016)	(0.015)
Length of credit history	-0.027***		-0.029***	
	(0.000)		(0.000)	
Dummy (Credit history¿3 yrs)		-0.541***		-0.589***
		(0.006)		(0.006)
Female *			0.011***	
Length of credit history			(0.001)	
Female *				0.263***
Dummy (Credit history ¿3 yrs)				(0.017)
N. obs.	1,209,078	1,209,078	1,209,078	1,209,078

IV estimation. All regressions control for industry and time fixed effects.
Robust standard errors in brackets.
* = significant at 10%, ** = significant at 5%, *** = significant at 1% .

Table 13: Interest rates and social capital.

	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.413***	0.477***	0.379***	0.294***	0.422***	0.380***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
N. of newspapers	-0.426***			-0.450***		
	(0.005)			(0.005)		
Blood Donations		-0.662***			-0.492***	
		(0.008)			(0.008)	
Election Turnout			-1.725***			-1.092***
			(0.021)			(0.021)
Failure rate				0.156***	0.142***	0.141***
				(0.001)	(0.001)	(0.001)
N. obs.	1,209,078	1,209,078	1,209,078	1,209,078	1,209,078	1,209,078

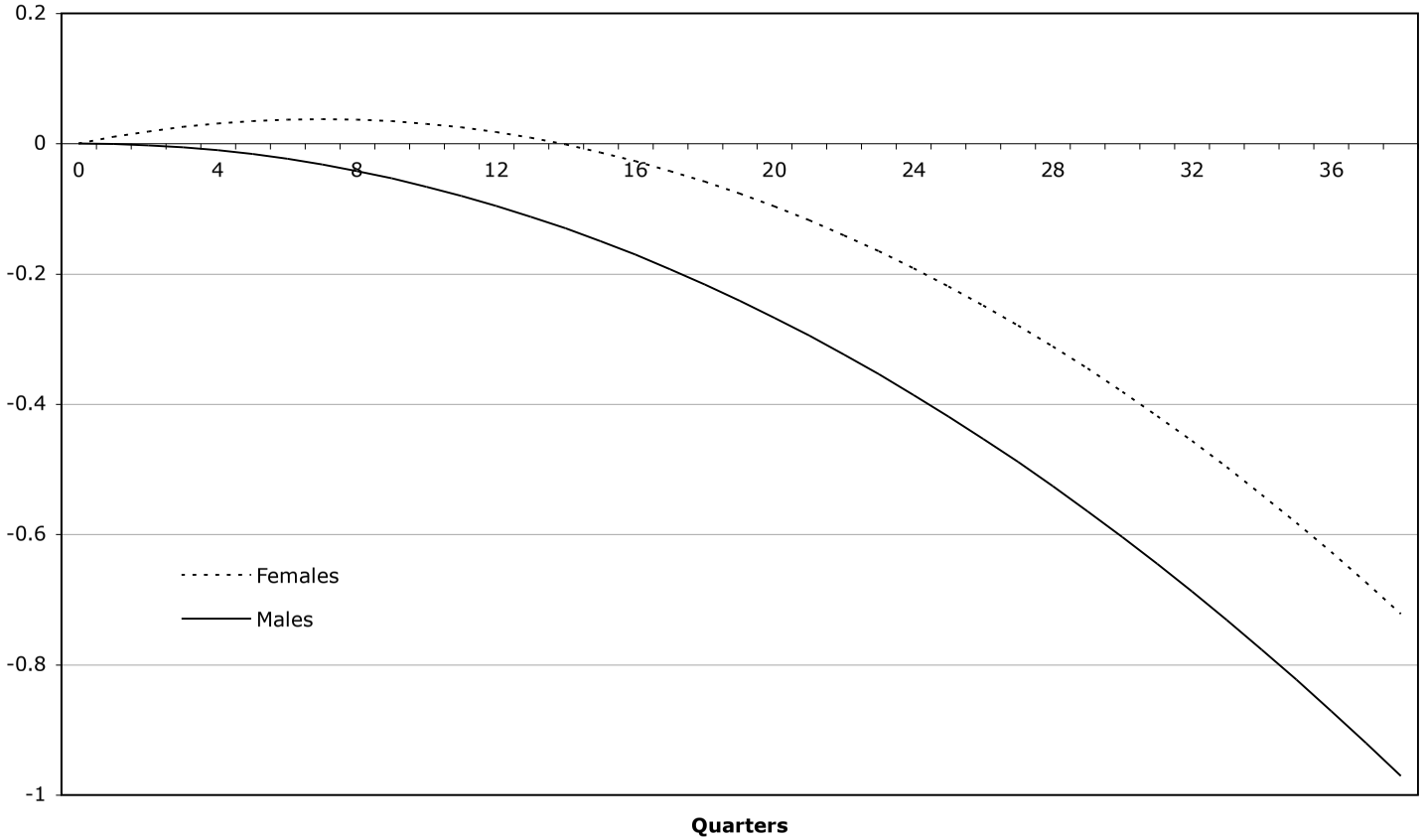
IV estimation. All regressions control for industry and time fixed effects. Robust standard errors in brackets. * = significant at 10%, ** = significant at 5%, *** = significant at 1%.

Table 14: Interest rates and social capital: interactions.

	(1)	(2)	(3)
Female	-0.061	-0.066	-0.064
	(0.068)	(0.075)	(0.025)
N. of newspapers	-0.466**		
	(0.006)		
Blood Donations		-0.724***	
		(0.009)	
Election Turnout			-2.014***
			(0.024)
Female * N. of newspapers	0.242***		
	(0.016)		
Female * Blood Donations		0.362***	
		(0.023)	
Female * Election Turnout			1.708***
			(0.063)
N. obs.	1,209,078	1,209,078	1,209,078

IV estimation. All regressions control for industry and time fixed effects. Robust standard errors in brackets.
* = significant at 10%, ** = significant at 5%, *** = significant at 1%.

Figure 1: Credit history and interest rates.



Results from a separate estimate of the impact of credit history on interest rates for male and female firms.

Appendix

Table A.1: First stage regression. Dependent variable: dummy variable for female firm.

Female	(1)	(2)
Female labor market participation rates (at the province level, quarterly)	-0.030*** (0.000)	-0.030*** (0.000)
Age		-0.001*** (0.000)
Loan size (class)		-0.005*** (0.000)
Bad Loans		-0.019*** (0.003)
Endogeneity Tests		
Wooldridge's score test (χ^2)	5788.06***	5825.21***

First stage regression. Column (1) is the firs stage of specification (4) in Table 7. Column (2) is the firs stage of specification (8) in Table 7. Robust standard errors in brackets. * = significant at 10%, ** = significant at 5%, *** = significant at 1%.

Table A.2: Interest rates and industries.

Industry	(1)	(2)	% of credit lines held by Females
Manufacturing	0.698***	0.548***	24.96
	(0.016)	(0.016)	
Constructions	2.234***	2.155***	2.99
	(0.057)	(0.057)	
Retail & Wholesale trade	0.451***	0.396***	50.30
	(0.012)	(0.012)	
Hotels & Restaurants	0.563***	0.517***	11.80
	(0.026)	(0.025)	
Credit & Insurance interm. (excl. banks)	0.962***	0.949***	2.40
	(0.052)	(0.052)	
Business Services	0.781***	0.595***	7.55
	(0.028)	(0.028)	

(1) and (2) are the same specifications as in Table 7, column (1) and (4) respectively. Only "female" dummy coefficients are reported. All regressions control for 3-digits industry and time fixed effects. Robust standard errors in brackets. * = significant at 10%, ** = significant at 5%, *** = significant at 1%.