
Does Gender Matter for Firm Performance? Evidence from the ECA Region

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Question and Motivation

- Importance of entrepreneurship for economic growth and job creation → are women participating and co-creating?
 - If women face different institutional constraints than men, then these factors can spillover into their performance in entrepreneurship
 - Are their gender gaps in performance? If so, can institutional constraints explain them?
 - Part of a larger study to examine these questions in LAC, Africa, perhaps S. Asia.
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Literature on Relative Performance

□ Size: Women Smaller

- Chagnati and Parsuraman, 1996; Coleman, 2007; Robb, 2002; Watson, 2002, Loscocco and Robinson, 1991
 - US: $\text{Emp}_M = 1.5 \times \text{Emp}_W$ (Coleman, 2007)
 - US: $\text{Sales}_M = 2 \times \text{Sales}_W$ (Coleman, 2007)

□ Profits: Women Smaller

- US – small business - $\text{Profits}_W = .78 \text{Profits}_M$ (Robb and Wolken, 2002)
- Holland – small business (Bosma et al., 2004)
- Sri Lanka – micro enterprises (Mel, McKenzie, Woodruff, 2007)

□ Efficiency: Not systematically Different

- Return on equity
 - Australia, no diff (Watson, 2002)
- Total Factor Productivity (TFP)
 - Africa no diff (Bardasi et al., 2007)
- Other
 - US – no diff (Keppler and Shane, 2007)

□ Growth: Mixed findings

- Employment growth
 - No diff (Fischer et al., 1993; Chagnati and Parsuraman, 1996)
 - Diff (Bosma et al., 2004)
- Sales Growth

Literature on Relative Performance

- Explanations for Differences in Size and Efficiency
 - Gender Composition of Industries
 - heavily concentrated in retail sales and services whereas industries like construction remain heavily dominated by men (Bates, 1995; Kallegerg and Leicht, 1991; Du Rietz and Herekson, 2000; Verheul et al., 2004)
 - Women are overwhelmingly clustered in a narrow range of low investment, low profit activities for the local market (Mayoux, 1995) or in sectors which tend to have lower sales revenue on average (Loscocco and Robinson, 1991)
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Literature on Relative Performance

□ Institutional Factors

- **Formal** (*tax and other laws, labor market legislation, child care infrastructure*) v. **Informal** (*traditional attitudes, religious beliefs, perception of entrepreneurship as a male activity, social attitudes*)
- **Does access to finance differ?** Findings mixed
- **Does discrimination explain differential access to capital or other reasons?**
 - Discrimination story (findings mixed)
 - For: ECA – Muravyev, Schafer and Talavera, 2007; Aidis et al., 2007 v. Against: US and Canada -Fay and William, 1993; Buttner and Rosen, 1989; Wilson et al., 2007; Riding and Swift, 1990).
 - Other reasons
 - Supply side: Banks justified as women running less growth oriented firms at lower capacity
 - Demand side: Women don't ask for loans because more risk averse and hence use less external finance in general

Our Contribution

- Rigorous measures of performance gap for an entire region (26 countries) which not studied to date
 - Analysis of gender differences in production technology
 - In depth look at institutional constraints in financial markets (objective and subjective measures)
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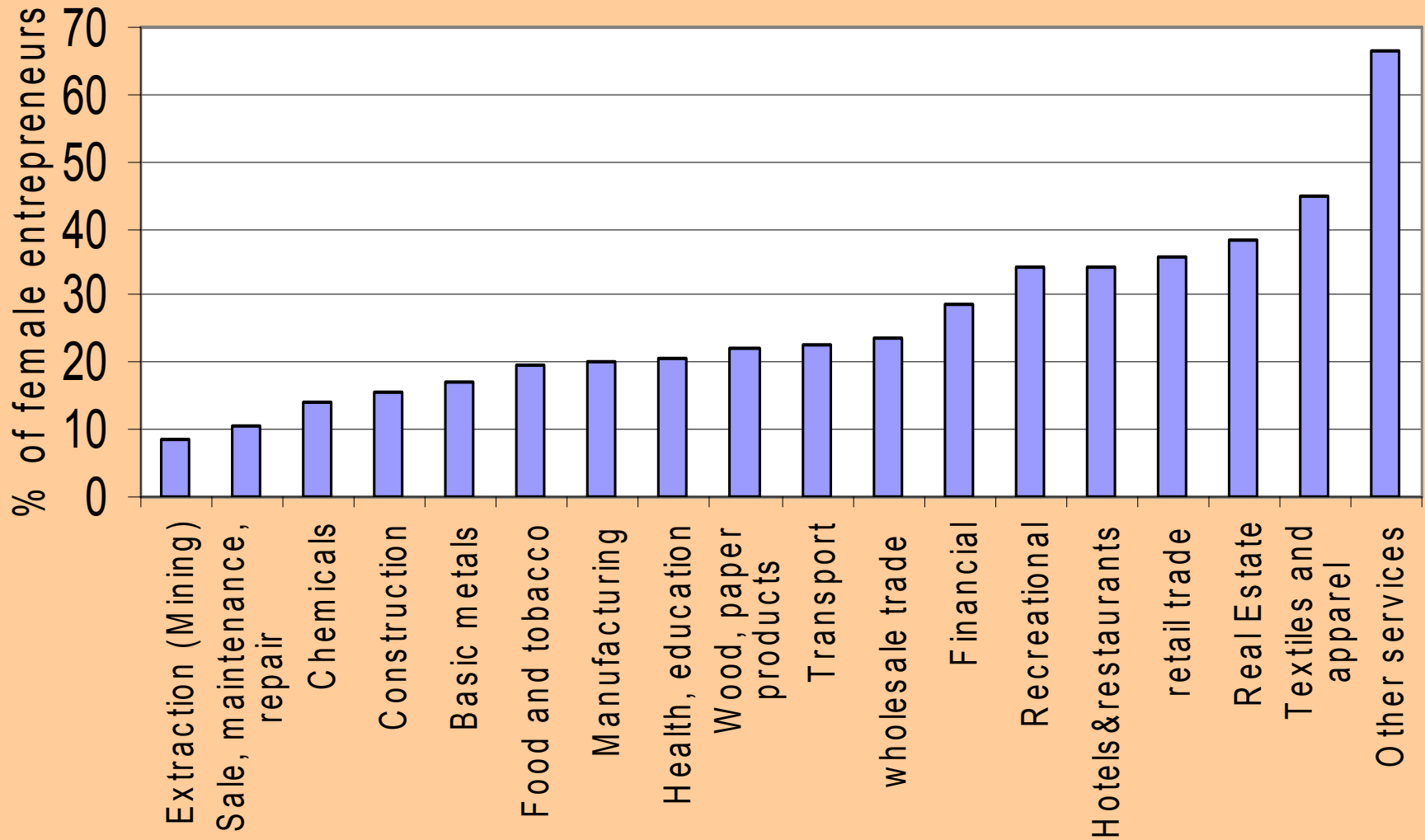
Data

- 2005 Business Enterprise and Performance Surveys (BEEPS)
 - Same sample design and survey instrument for 26 post-socialist economies;
 - We restrict sample to about 3,500 firms:
 - Use only firms where major shareholder is an individual or family and which have data on sales, capital, labor and materials. Delete observations in industries with only 5 or fewer firms.
 - We define Female Entrepreneur as the female owner (or primary owner) of an individually or family owned business – existing firms not “nascent entrepreneurs”
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Breakdown of entrepreneurial enterprises by gender and size



Share of female entrepreneurs by industry



Summary statistics on firm production

Variable	Male	Female	Difference
InSales	6.01	5.46	0.56***
InLabor	2.89	2.44	0.45***
InCapital	4.92	4.44	0.48***
InMaterial	5.09	4.51	0.58***
Profits	227.3	166.1	61.16**
***sig at 1% level, ** sig at 5% level			

Performance Gaps: Overview

■ Size

- Sales
- Profits

■ Efficiency

- Financial – Profits/sales
- TFP – from Cobb-Douglas Production Fcn.:

$$\ln Y_{ij} = \alpha^k \ln K_i + \alpha^L \ln L_i + \alpha^M \ln M_i + \delta F_{ij} + I\phi + C\eta + \varepsilon_{ij}$$

We use the robust regression method (Huber weighting) for all regressions.

Performance Gaps by Gender

					Efficiency	
Depen Var:	Profits	Profits	InSales	InSales	Profits	InSales
Female-owned	-11.4*** (2.0)	-7.2*** (2.1)	-0.63*** (0.1)	-0.37*** (0.1)	0.83 (1.3)	-0.025** (0.01)
InSales					33.5*** (0.4)	
InLabor						0.20*** (0.006)
InCapital						0.02*** (0.003)
InMaterials						0.80*** (0.005)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	Yes	Yes
Observations	3287	3287	3332	3332	3287	3203
R Squared	0.06	0.51	0.13	0.24	0.76	0.98
***Sig at 1%, **Sig at 5% ; Robust Regressions						

Summary of Performance Gap Findings

- *Women's firms are smaller in terms of sales revenues and profits.*
 - *Controlling for industry reduces relative difference, but remains significant.*
 - *No difference in financial efficiency.*
 - *Very small differences in productive efficiency.*
 - ➔ *Could this be due to mismatch?*
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Comparing Mean Male and Female TFP using Propensity Score Matching (PSM)

InSales	Female Mean	Male Mean	Difference	SE	% Difference
Nearest Neighbor Matching with replacement	5.45	5.60	-0.15**	0.05	-0.027
Nearest Neighbor Matching without replacement	5.45	5.69	-0.24**	0.07	-0.041

**Sig at the 5% level
Matching on country, industry, labor, capital and materials

Are women's firms operating
at a suboptimal scale?

Comparing Returns to Scale for Male and Female Entrepreneurs

Depen Var: InSales	Male	Female
InLabor	0.29*** (0.038)	0.33*** (0.064)
InCapital	0.04*** (0.007)	0.01 (0.009)
InMaterials	0.702*** (0.037)	0.71*** (0.049)
Sum (Returns to Scale)	1.024	1.049
Observations	2343	860

Note: SE clustered by industry

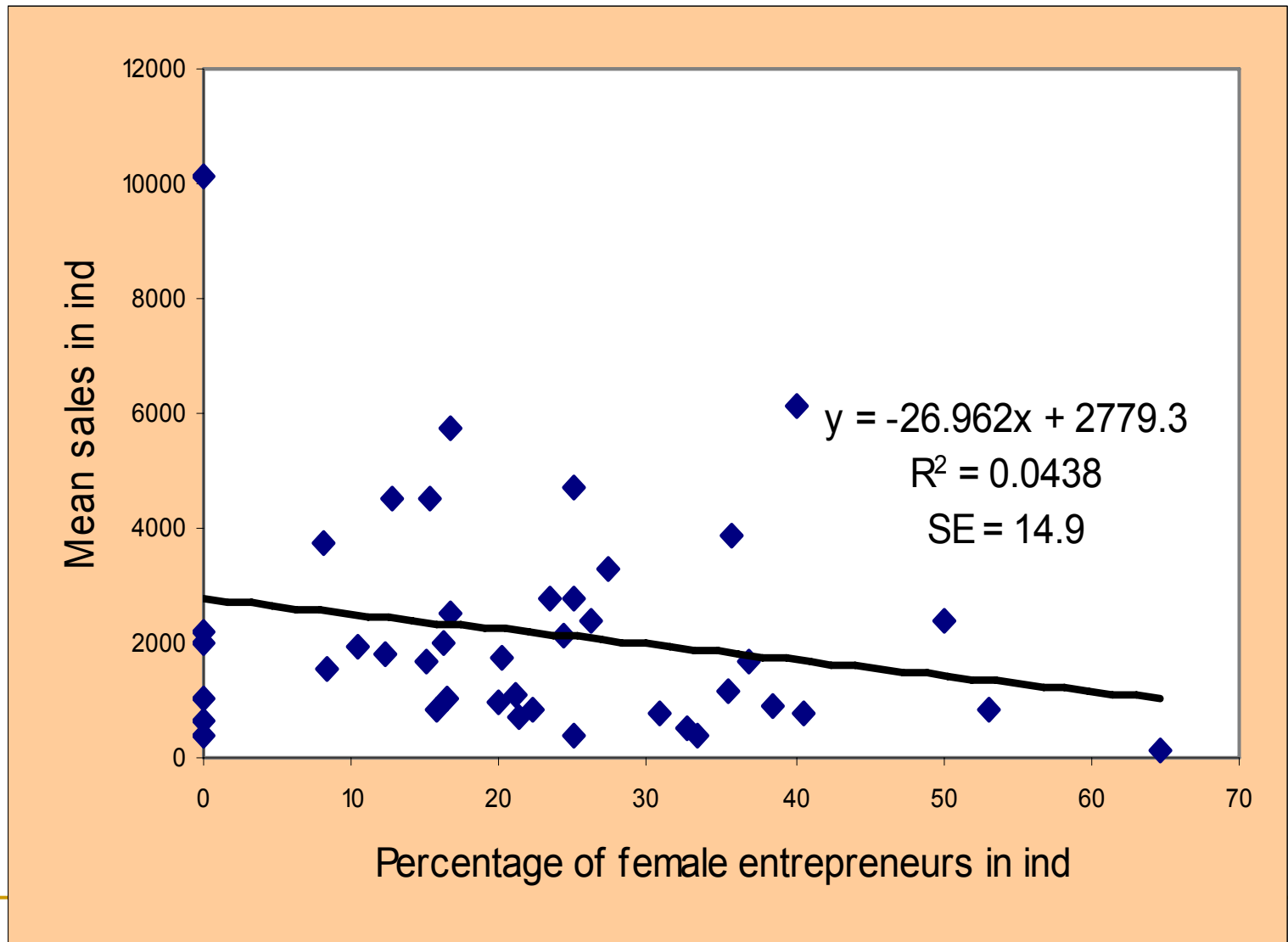
Wald Test:

- Cannot reject the hypothesis that Returns to Scale for Male entrepreneurs are greater than one.
- Cannot reject the hypothesis that Returns to Scale for Female entrepreneurs are greater than one.
- Cannot reject the hypothesis that Returns to Scale for Female entrepreneurs are greater those for Male entrepreneurs.

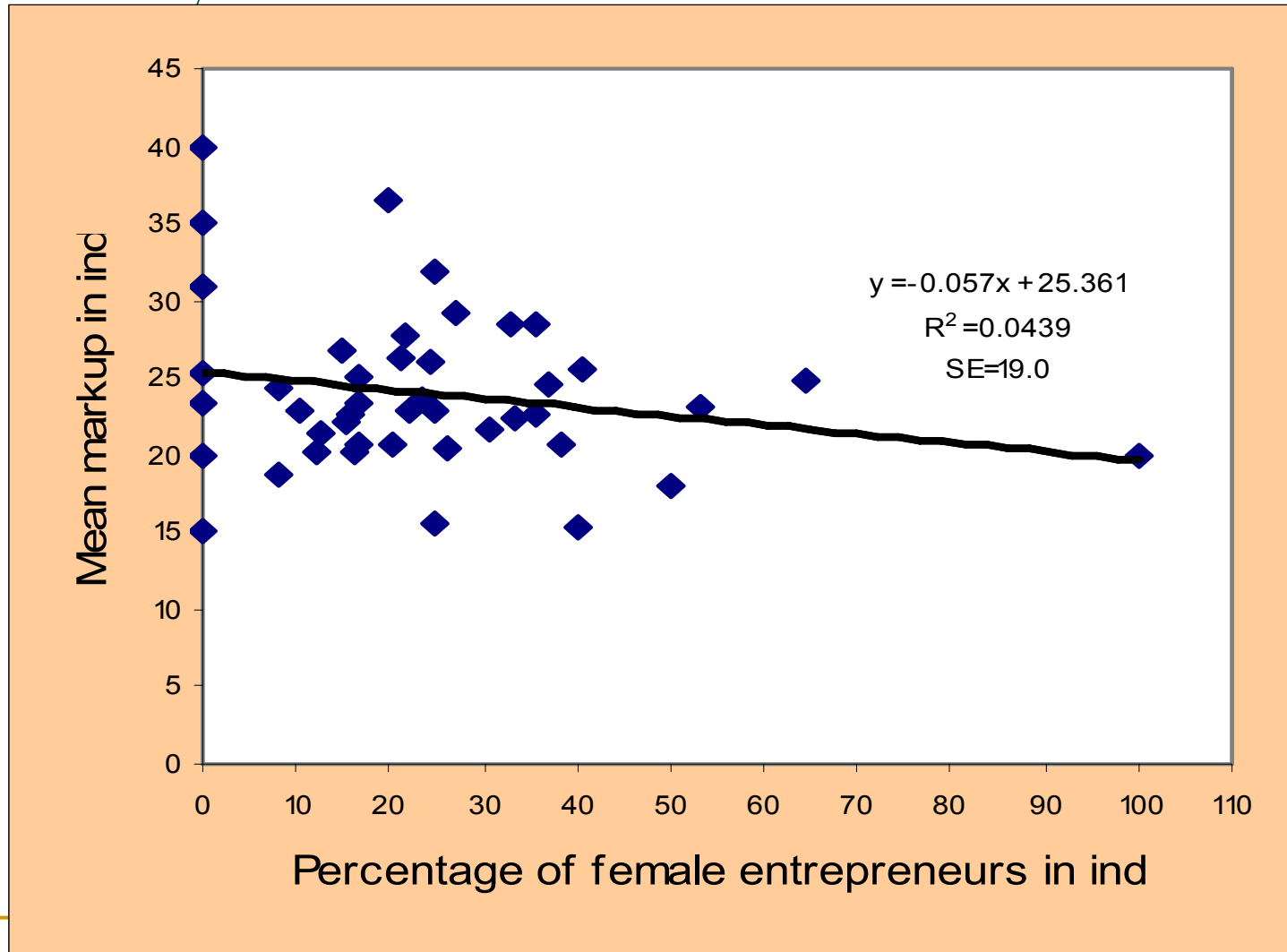
What explains why women are operating smaller (suboptimal) businesses?

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- Due to characteristics of industry? (Women concentrated in “poorly performing” or competitive industries)
 - Women are capital constrained?

Sales and female concentration by industry



Competition and female concentration by industry



Are female entrepreneurs
constrained to be small?

Are women entrepreneurs in ECA capital constrained?

- Muravyev, Schafer and Talavera (2007)
 - Women 5.4% less likely to get a loan (controlling for profit, capacity utilization, competition...) and are charged 0.6% higher interest rate than men
 - Evidence in BEEPS data: significantly more women who need a loan and don't get it compared to men (25% v. 19% for men)
 - Women rely more on internal financing and less on banks
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Source of finance by gender

	Share of Working Capital		Share of New Investment	
	Male	Female	Male	Female
Internal Funds/Retained Earnings	67.8	71.7	64.3	68.5
Equity	5.2	5.3	4.9	4.9
Banks	12.6	8.9	17.1	12.7
Loans from family/friends or Money Lenders	5.3	3.8	4.8	4.7
Trade Credit	5.2	6.4	1.4	2.3
Leasing Arrangement	1.9	1.5	5.5	4.3
Government & Others	2.0	1.9	2.0	2.5

Women's TFP is lower in K Intensive Industries

Dependent Var.: ln(Sales)	
female owned (F)	0.083 (0.066)
Avg. K in Industry	-0.021** (0.008)
F*Avg. K in Ind.	-0.032** (0.016)
Avg. L in Industry	-0.043*** (0.012)
F*Avg. L in Ind.	0.025 (0.024)
Observations	3203
R-squared	0.98

Standard errors in parentheses: **significant at 5%; ***significant at 1%

Note: Coefficients from estimating a Cobb-Douglas production function augmented by the variables in the table; coefficients on lnK, lnL, lnM and country fixed effects have been suppressed

How does the capital constraint affect their Size? Efficiency?

Use 3 sets of *dummy* variables for K constraint:

- “*Financing from a Bank*” for working capital or new invest.
- Subjective measure on “*Access to Finance*” is a constraint:
- “*Need and do not have a loan*” v. “*Have a loan*” v.
“*Do not have or need a loan*”

and a measure for the price of K (*interest rate*)

Effect of External Financing on Size

Dependent Variable: LnSales							
Female-owned (F)	.014 (0.009)		Female-owned	-.011* (0.10)		Female-owned (F)	-.016 (0.018)
Financing from Bank	.015** (0.006)		Access to finance (subj. constr.)	-.01 (0.007)		Loan constr.	-.013 (0.009)
F*Finan. from Bank	-.015 (0.012)		F*Access to finance	.026** (0.013)		F*Loan Constr.	.006 (0.022)
						Have loan	.017** (0.007)
						F*Have Loan	-.021 (0.020)
						F*Do not need loan	-.013 (0.020)
Obs.	2510			2432			2510

Robust regression, including country and industry fixed effects and Sales in 2002.

Effect of External Financing on TFP

- Estimate Cobb-Douglas - find that none of the capital constraint variables nor rate of interest are significant
 - ➔ *bank financing constraint does not affect the efficiency of male or female-owned businesses*
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Do male and female entrepreneurs use different $K:L$ and if so is the ratio affected by K constraints or price of K ?

- Estimate same robust regression of $\ln(K/L)$, but holding $\ln(\text{Sales})$ (output) constant and learn:
 - Men and women use same K/L ratio for given Q
 - K/L decreases with sales (hence not a homothetic production process or prices rise with Q)
 - K/L increases with financing from a bank and for those who received a loan, but no diff. btwn. Men and Women.
 - Effect of interest rate is not significant
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Can K constraints explain why women are operating at suboptimal scale?

- Stratify data on female and male entrepreneurs into two groups:
 - **Unconstrained**: those who have a loan
 - **Constrained**: those who need a loan and do not have one
 - Estimate a Cobb-Douglas for each -- test whether constrained female entrepreneurs are operating at higher returns to scale than unconstrained female entrepreneurs.
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Returns to scale for Constrained and Unconstrained Entrepreneurs by Gender

	Constrained		Unconstrained	
	Male	Female	Male	Female
	lnYY	lnYY	lnYY	lnYY
lnLL	0.279*** (0.031)	0.302*** (0.053)	0.301*** (0.046)	0.351*** (0.061)
lnKK	0.036** (0.016)	0.013 (0.021)	0.037*** (0.008)	0.026** (0.009)
lnMM	0.698*** (0.029)	0.739*** (0.047)	0.694*** (0.042)	0.665*** (0.056)
Sum	1.013	1.054	1.032	1.042
Obs	454	218	1851	1150
Standard errors clustered by industry shown in parentheses				
* significant at 10%; ** significant at 5%; *** significant at 1%				

Wald Test

- Cannot reject the hypothesis that either constrained or unconstrained entrepreneurs have increasing returns to scale.
- Cannot reject the hypothesis that constrained and unconstrained male entrepreneurs have the same returns to scale.
- Cannot reject the hypothesis that unconstrained female entrepreneurs have higher returns to scale than constrained female entrepreneurs.

Summary and Conclusions

- Using 2005 firm level data for 26 countries in ECA we estimate gender **performance gaps**, controlling for industry and country, and find:
 - **sales** are significantly smaller
 - **profits** are also smaller (by small amt.); but once control for size, there is no difference
 - **TFP** is smaller (but by a small amount)
 - robust evidence with 2 specifications of CD and PSM
 - **Are women inefficiently (suboptimally) small?**
 - Yes, operating at increasing returns to scale, which are greater than men – but not to far from constant returns
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Summary and Conclusions

■ Why are women's firms suboptimally small?

- In part because concentrated in industries that have smaller firms; but no evidence that concentrated in competitive or less capital intensive industries (still begs question...)
 - Are women as efficient as men in K or L intensive industries?
 - Equally efficient in L intensive, but fare worse in K intensive
 - Are women capital constrained?
 - Yes
 - Does the capital constraint lower their K:L relative to men?
 - No
 - Does capital constraint explain why less efficient?
 - No
 - Does the capital constraint explain why suboptimally small?
 - Yes - constrained women's firms operating at higher returns to scale than unconstrained women's firms.
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Summary and Conclusions

- We conclude that if capital constraints are lifted on women that they will grow since their firms are sub optimally small
 - Some argue that women are selecting to operate smaller firms given time allocation problem, and hence will not grow given greater access to capital.
 - however, we find that they get larger when they have bank financing (although need to correct for endogeneity)
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