Sex and the Firm:

Questioning the Gender-Based Performance Differential

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Abstract

Many empirical analyses find that firms held by women (female-firms) have lower performance than firms held by men; ceteris paribus, the greatest part of the performance gap is attributed to gender-related attitudes . In this paper, we evaluate whether this finding holds also for Italian firms in terms of productivity and returns, focussing on corporations. Italy is a particularly interesting case to analyse in this context because a specific law (L215/92) introduced a tight definition of female firms. We find that female firms tend to cluster in those sectors where interpersonal relations are most important, namely retails, restaurant, hotels. Controlling for observable characteristics, we do not find any significant difference in terms of performances.

Keywords: Firms' performance, Gender

1. Introduction (Note 1)

Following a sharp increase in female entrepreneurship around the world (GEM, 2013), a substantial research effort has been devoted to understand the observed gender gaps in firm performance. Although the evidence is not conclusive, it seems that firms started and owned by women underperform their male counterparts (Lee and Marvel, 2014, and the literature cited therein).

This paper tests whether this finding holds for Italian firms, a particularly interesting case, as amongst OECD countries, Italy is towards the extreme in terms of viewing women in a "traditional" role (Alesina et al, 2013). Moreover, Italy is the third largest economic country within Euro Area and is undergoing a deep and prolonged economic downturn. The causes of this performance are not entirely clear and range from the small average size of firms to the slow motion of the judicial decisions, to the non-flexibility in the labour market. Because it is usually estimated that women are more risk averse than men, it is important to understanding to what extent the gender composition of the industries is responsible for the Italian economic performance.

To this aim, we take advantage of a unique dataset and a tight legal definition of female firms. In particular, we first provide a unified framework of reference for the classification of female-firms exploiting the "Database Infocamere" that the Bank of Italy purchased by the Italian Chambers of Commerce, that contains daily information on corporations, partnerships and other companies entered in the Company Register (or REA) of any legal form with the exception of individual proprietorships. The registry considers firms active between December 31, 1995 and December 2011. We do not consider the 2011 censoring as a severe data limitation for at least two reasons: first because this phenomenon remained relatively stable over time, our results are valid over the horizon considered here; second, because until 2011 the economic crisis had not shown the all intensity of the crisis, had we use more recent data (which we did not have) our results would have been partially due to the crisis

Since the registration with the Chamber of Commerce is a necessary step to start a business, the registry contains information on the universe of active firms; therefore, our empirical analysis does not suffer from typical issues of micro-data such as statistical representativeness, unit- or item- non response or systematic measurement errors.

Through basic information such as the legal form, ownership and corporate structure it is possible to identify the "gender" of the company, using a formal definition introduced in the Italian law since 1992. Exploiting this definition of female firm and controlling for observable characteristics, we do not find any significant difference in terms of performances between male and female firms.

Our study is the first to use such a detailed dataset to define the gender of a firm and taking the opportunity to explore a rich array of economic indicators. It follows that the conclusions that we reach are relevant to exclude the gender as a key factor of the poor performance of the Italian firms.

Our paper is organized as follows: in Section 2 we formally define a female firm, in Section 3 we present descriptive statistics, in Section 4 we run regressions to test our hypotheses. Section 5 offers some conclusions.

2. Female Firms

A formal definition of female-firm was introduced in the Italian law only in recent years, with the purpose of designing subsidizing policies. The most recent was introduced in 2006, as a result of changes that have occurred over time that started back in 1992 (when it first was designed a specific policy aimed at promoting substantive equality and equal opportunities for men and women in the economic and business environment, the so-called L215/92) .

According to the most recent legal definition, female-firms are defined as:

-        cooperatives or partnerships in which female members constitute at least 60 percent of the total number of members;

-        corporations whose shares in women's hand are not less than two-thirds women or whose boards are made by at least two-thirds of women;

-        individual businesses run by women;

-        consortia are made by at least 51% by women's cooperatives.

In this work we decided to build also an indicator of "male firms", mirroring the definition of the female firm. The advantage of this choice is a more precise definition of the counterfactual (that is going to be our benchmark) against which to compare the results for female-firms. To appreciate the benefit that derives from it, consider the case of companies belonging to a group where the members are only legal persons: exploiting the definition of male firms, we can contrast the behavior of female firms with respect to this type of company, otherwise the comparison would be limited to a less precise distinction between female-firm versus non female-firm. It should moreover be noted that this choice implies a cost: the price to pay is a "gray area" which consists of those companies which are neither male- nor female-firms.

Even if Italy is a very heterogeneous country from a territorial point of view, the percentage of female-firms in different regions is concentrated around the national aggregate average (Table 1). In Umbria, and in many regions of the North (Valle d'Aosta, Lombardy, Veneto and Friuli), the share of firms nor female nor male is higher than 25 percent, and it reaches 16 in Basilicata; by contrast, in Basilicata, Tuscany, Calabria and Piedmont, over two-thirds are male business while just over 50 percent in Lombardy and Puglia. Several reasons can explain these figures, but unfortunately the available data are not well suited to investigate further the issue. Possible contributing factors are socio-cultural factors, the different speed of civil justice that can facilitate certain types of companies than others, sectorial specialization in certain areas.

Table 1. Geographic distribution of firms by gender (year 2011)

Regions	Male firms (%)	Female firms (%)	"Neither" (%)	Total (%)
Abruzzo	61.2	17.3	21.5	100
Aosta	55.1	15.1	29.8	100
Basilicata	69.1	14.6	16.3	100
Calabria	65.2	14.9	19.8	100
Campania	61.7	16.1	22.1	100
Emilia-Romagna	59.6	15.5	24.9	100
Friuli	60.0	14.3	25.6	100
Lazio	60.3	15.6	24.1	100
Liguria	60.2	17.3	22.5	100
Lombardia	54.8	17.4	27.8	100
Marche	60.9	14.2	24.9	100
Molise	60.7	15.6	23.8	100
Piemonte	64.0	16.0	20.0	100
Puglia	54.8	16.6	28.6	100
Sardegna	62.9	15.3	21.8	100
Sicilia	59.7	17.6	22.7	100
Toscana	65.5	16.5	18.0	100
Trentino	58.8	17.1	24.1	100
Umbria	58.4	11.1	30.5	100
Veneto	56.8	17.1	26.1	100
ITALY	**60.3**	**15.6**	**24.1**	**100**

Source: authors' calculations on the Chamber of Commerce data.

3. Descriptive statistics

In this section we analyse some specific characteristics of enterprises in order to assess how they differ between male- and female-firms. Recall that we focus on companies. We focus on legal form, sector of economic activity and shareholders' characteristics. Since these characteristics are mostly time invariant, we limit the analysis to the most recent year (2011).

3.1 Legal form

The legal forms analyzed are limited to i) partnerships, ii) corporations and iii) other companies (these include consortia of various kinds). As shown in Table 2, the presence of female-firms in corporations is limited to 5 percent, while there exists a overwhelming presence of male companies. Slightly higher is the proportion of female-firms in partnerships (18 percent). Interestingly, more than 80 percent of female-firms are in fact partnerships, suggesting for women a preference for a smaller scale of operation and a strong sectorial specialization.

Table 2. Distribution of firms by gender and legal form (year 2011)

	Male firms (%)	Female firms (%)	"Neither" (%)	Total (%)
Corporations	84.2	5.3	10.6	100
Partnerships	46.1	18.5	35.4	100
Others	80.8	6.1	13.1	100

Source: authors' calculations on the Chamber of Commerce data.

3.2 Sector

Female-firms are typically active in specific sectors, and this has become a stylized fact in the literature. Although male-firms are present in almost every sector, female-firms tend to be concentrated in the sectors of "caring", i.e. those activities in which contact with the costumers requires good interpersonal skills. Table 3 shows the gender composition of firms in the various sectors of economic activity (2-digits NACE).

Table 3. Sectorial composition by gender (year 2011)

Section	Description	Male firms (%)	Female firms (%)	"Neither" (%)	Total (%)
A	Agriculture, hunting and forestry	71.7	14.2	14.0	100
B	Fishing, fish farming and related service activities	65.4	8.5	26,1	100
C	Mining	57.8	7.5	34.7	100
D	Manufacturing	61.1	13.1	25.8	100
E	Production and distribution of electricity, gas and water	56.7	3.7	39.6	100
F	Construction	70.1	8.4	21.5	100
G	Commerce; reconst. of motor vehicles, motorcycles and personal and household goods	57.5	17.3	25.1	100
H	Hotels, restaurants, bars	59.8	19.0	21.2	100
I	Transport, storage and communication	65.6	12.6	21.7	100
J	Financial	53.8	9.7	36.5	100
K	Real estate, renting, information technology, research and business activities	55.9	16.1	28.0	100
M	Education	61.3	26.4	12.3	100
N	Health and social work	54.9	29.8	15.3	100
O	Other community, social and personal services	56.1	21.5	22.4	100

Source: authors' calculations on the Chamber of Commerce data.

As can be seen from Table 3, the presence of female-firms is minimal in the construction industry, mining and mineral production and distribution of electricity, gas and water, while it is at its highest in the field of health and social care, education and in the hotels and restaurant sector. More importantly, 70 percent of female-firms are concentrated in three sectors: hotels, trade and real estate activities (Table 4).

Table 4. Sectorial distribution by gender (year 2011)

Section	Description	Male firms (%)	Female firms (%)	"Neither" (%)
A	Agriculture, hunting and forestry	4.3	3.3	2.1
B	Fishing, fish farming and related service activities	0.2	0.1	0.2
C	Mining	0,2	0.1	0.3
D	manufacturing	16.2	13.4	17.1
E	Production and distribution of electricity, gas and water	0.4	0.1	0.7
F	Construction	12.9	6	9.9
G	Commerce; reconst. of motor vehicles, motorcycles and personal and household goods	19.4	22.6	21.2
H	Hotels, restaurants, bars	20	24.6	17.7
I	Transport, storage and communication	3.5	2.6	2.9
J	Financial	2.3	1.6	3.9
K	Real estate, renting, information technology, research and business activities	15.5	17.3	19.4
M	Education	0.6	1	0.3
N	Health and social work	1	2.1	0.7
O	Other community, social and personal services	3.5	5.2	3.5
Total		100	100	100

Source: authors' calculations on the Chamber of Commerce data.

3.3 Characteristics of the shareholders

In this subsection we analyze some of the characteristics of people who are part of the firms as simple as members or office holders. The finding is of interest since the gender composition of the shareholders is the foundation for identifying female firms according to the aforementioned Law 215/92.

The positions analyzed are "Partners with responsibility", "Members without responsibility", "Mayors", "Directors", "Directors with delegated powers". As shown in Table 5, the percentage of women in senior positions in the firms, while being partners, is substantially higher than for men. The data indicates that the percentage of men with senior office within the company but not the expression of ownership (it's basically external managers), is higher than for women. This implies that women must be the owners of shares of the company to reach high positions.

Table 5. People with positions in the company and equity participation (year 2011)

	With position, partner (%)	With position, non partner (%)
Male firms	42.5	57.5
Female firms	57.9	42.1

Source: authors' calculations on the Chamber of Commerce data.

To confirm the rarefied presence of women in the capital or in executive positions in business, notice that about two-thirds are men, while the remaining third are women (less than 5 percent is made up of legal persons).   In Table 6 we jointly consider the gender of the firms, that of their shareholders and of the people who hold office. The rows show the gender of people, while the column is the gender of the firms: on the main diagonal is the correspondence between the gender of the people and of the firm. In male-firms there is a predominance of men (52 percent), whereas in female-firms women prevail (14 percent).

Table 6. People with positions in the company and share participation (year 2011)

	Male firms (%)	Female firms (%)	"Neither" (%)
Men	51.7	2.0	11.1
Women	5.7	13.8	11.9
Legal	0.7	0	3.2

Source: authors' calculations on the Chamber of Commerce data.

The average number of shareholders per company confirms the small size of the companies, even though there is a lot of heterogeneity. Female-firms appear to be smaller than male-firms, with 2 members on average, compared with 3 of the latter. The age of the people is lower for female- (48 years) than form male-firms (51), confirming evidence that women have entered the world of entrepreneurship later than men.

3.4 Family ties

In order to understand what is the importance of family ties, we built an indicator based on the count of the people with the same last name (surname) within the firms. Two disadvantages are immediately apparent from this definition: on the one hand, there may be coincidence of last names, more or less frequent in some areas of the country, leading to a false relationships (overestimation); on the other hand, it is impossible to identify some relatives, namely wives, daughters or genres (underestimation). With this *caveat*, we represent a rough measure of relationships in Table 7. On average, about 13 per cent of the firms have at least two people with the same last name (16 for male-firms, 11 for female ones), and the share decreases as the number of individuals with the same last name increases (so about 10 percent of the companies have two individuals with the same surname, 2.5 percent have three individuals with the same last name and so on).

Table 7. Number of persons in charge with the same last name (year 2011)

Number of people with same surname	Total firms (%)	Male firms (%)	Female firms (%)
1	86.7	84	88.7
2	10.1	12.2	8.4
3	2.4	2.9	2.1
4	0.6	0.6	0.5
5	0.1	0.1	0.1
6	0.1	0.1	0.1

Source: authors' calculations on the Chamber of Commerce data.

There is no huge cross area variation: the wider variation between one area and the other is by 2 percentage points between the North-West and Central Italy, where family ties are respectively 14.7 percent and 12.7 percent. This number is likely to reflect a longer industrial tradition in the former area.

4. Firms' performance

In the literature there are many attempts to compare the performance of male- and female-firms. The usual finding is that the former perform better, at least in aggregate (Du Rietz and Henrekson, 2000, Sabarwal and Terrell, 2008). Other authors highlight how businesses run by women, particularly smaller ones, have worse performance because they are discriminated or because women have less managerial experience (Fischer, Reuber, and Dyke, 1993). In a more recent paper by Gottschalk and Niefert (2011), using data on business start-ups in Germany, found that much of the average gap in performance between male and female firms can be explained by observable characteristics at the individual level: indeed, women tend to have lower levels of education, less managerial experience and choose to become employer to avoid unemployment. Finally, the most recent behavioral theories are that women tend to avoid situations of high competition, which may lead to suboptimal results (Croson and Gneezy, 2009; Gneezy et al, 2003).

As for Italy, there are some estimates that correlate the presence of women on the boards of the companies and the risk: using data from the Commercial Register of the Chamber of Commerce and limited only to the corporation, a study of Cerved Group (2010) shows that women-led companies have default rates lower than the others.

In this paper, to assess whether female-firms show a different performance than other firms, we have matched the registry data of the companies of the Chamber of Commerce with those of the database Cerved to find balance-sheet information: this has resulted in a significant reduction in the sample size. (Note 2) We considered indicators of profitability (ROE, ROI, ROA and the ratio of cash flow and assets) and productivity (value added per capita operating) for the period 2005-2010.

Table 8 shows mean, median and standard deviation of indicators by year. Compared to male-, female-firms are characterized, at least in appearance, to lower levels of profitability and productivity and less cash flow. The size of firms between the two groups is very different, being that of female-firms for nearly half of the men (31 employees versus 60, in 2010).

Table 8. Descriptive statistics by type of firm and year

		2005			**2006**			**2007**		
		Niether	Male firms	Female firms	Niether	Male firms	Female firms	Niether	Male firms	Female firms
ROE	Mean	-13.16	-14.64	-17.64	-11.40	-11.76	-15.32	-9.10	-9.84	-13.50
	Median	5.09	4.5	4.77	5.35	4.88	5.51	6.06	5.63	6.01
	Std. dev.	255.30	242.94	211.80	253.77	206.56	222.21	349.86	219.28	202.96
ROI	Mean	0.32	-1.66	-4.51	0.77	-0.79	-1.42	1.04	1.32	-2.79
	Median	5.36	5.02	4.96	5.55	5.32	5.31	6.09	5.92	5.58
	Std. dev.	136.84	109.59	145.57	100.54	124.28	121.69	97.22	184.97	116.30
ROA	Mean	2.72	4.04	0.61	3.73	2.45	1.89	3.77	2.76	2.24
	Median	4.01	3.37	3.23	4.51	3.91	3.81	4.64	4.18	4.11
	Std. dev.	19.05	1138.46	22.10	24.07	19.19	21.60	20.94	22.71	22.42
Cash flow	Mean	3.96	2.76	2.03	4.08	2.68	2.63	4.70	3.05	-20.79
	Median	4.5	3.88	4.11	4.46	3.94	4.21	4.49	4.05	4.37
	Std. dev.	58.13	133.15	65.21	61.40	84.93	32.60	254.29	152.22	4613.42
Value added per employee	Mean	70.11	67.10	62.86	75.74	71.18	62.62	81.72	73.88	69.39
	Median	51.97	49.08	46.48	54.87	52.55	49.86	57.24	54.89	50.83
	Std. dev.	387.09	356.90	262.97	405.15	353.31	131.30	451.12	279.91	126.60
Employees	Mean	77.72	61.37	27.11	80.91	63.43	27.23	83.70	64.24	26.82
	Median	28.00	25.00	13.00	29.00	25.00	13.00	30.00	25.00	13.00
	Std. dev	917.51	197.34	65.89	922.00	220.93	66.86	887.63	221.67	63.06

		2008			**2009**			**2010**		
		Neither	Male firms	Female firms	Neither	Male firms	Female firms	Neither	Male firms	Female firms
ROE	Mean	-21.02	-15.65	-20.20	-24.76	-18.12	-22.38	-18.31	-12.59	-18.60
	Median	4.81	5.13	5.42	3.17	3.42	3.88	4.55	4.77	5.35
	Std. dev.	261.22	244.05	225.16	255.70	233.71	238.16	258.82	215.21	238.84
ROI	Mean	-4.01	-0.61	-5.31	-7.14	-3.74	-7.26	-3.59	-1.22	-5.19
	Median	5.47	5.56	5.06	3.56	3.80	3.62	3.82	3.85	3.77
	Std. dev.	130.00	146.11	137.36	139.59	120.17	128.85	158.05	121.78	153.37
ROA	Mean	1.11	1.98	1.17	-0.12	0.66	-0.64	1.31	1.79	0.71
	Median	3.69	3.65	3.33	2.65	2.64	2.48	3.16	3.04	2.99
	Std. dev.	25.85	48.29	95.39	25.62	24.13	26.87	23.87	22.44	25.31
Cash flow	Mean	2.55	2.79	2.50	1.73	1.96	0.96	2.94	3.19	2.54
	Median	3.99	3.84	4.08	3.53	3.35	3.64	4.24	3.98	4.24
	Std. dev.	75.43	57.32	70.45	70.58	72.53	62.42	50.47	60.87	32.14
Value added per employee	Mean	77.33	71.70	65.67	76.79	70.83	61.09	90.68	78.01	61.16
	Median	55.77	53.62	50.21	52.35	50.46	46.78	56.71	54.61	48.45
	Std. dev.	473.54	210.74	120.44	723.75	288.46	105.37	974.24	390.63	66.75
Employees	Mean	82.51	60.48	27.93	85.33	60.30	29.71	91.58	59.32	31.02
	Median	28.00	23.00	13.00	29.00	24.00	14.00	30.00	24.00	14.00
	Std. dev	881.92	211.09	65.50	920.15	200.23	71.41	998.56	200.20	71.29

Most likely these aggregate averages reflect a composition effect, as suggested by Du Rietz and Henrekson (2000). In a sample of Swedish Enterprise, they find that on average female-firms show worse performance than the male-firms, but only because they tend to be concentrated in small firms and in sectors that exhibit a lower profitability. Therefore, for given preferences - that is, the choice of the industry and the optimal scale of production - no significant differences between male and female businesses arises.

This type of analysis was carried out for Italy in Tables 9-14. The purpose of the regressions reported in the tables is to give an account of simple correlations between being a female firm and some performance indicators, in order to control for additional factors than with simple averages.

Table 9. OLS estimates; whole sample, 2005-2010

	ROE	ROI	ROA	Cash flow	Value added per employee
Female	-0.48	-1.195 ***	-0.488 ***	-3.8	-5.869 ***
	(0.516)	(0.409)	(0.067)	(3.179)	(2.481)
Constant	-24.934 ***	-2.064 **	-1.905 ***	0.579	44.019 ***
	(1.499)	(0.924)	(0.177)	(1.158)	(4.241)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	OLS	OLS	OLS	OLS	OLS
Female	-3.9 **	-1.296	-0.133	-0.926 ***	-7.72
	(1.947)	(1.205)	(0.158)	(0.339)	(7.371)
Constant	13.033	4.971 **	3.771 ***	5.178 ***	59.228 ***
	(11.338)	(2.387)	(1.221)	(1.379)	(14.214)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects
Female	-0.923	-1.358 **	-0.486 ***	-3.8	-5.889 ***
	(0.796)	(0.610)	(0.068)	(3.179)	(3.597)
Constant	-22.874 ***	-1.272	-1.934 ***	0.579	44.1 ***
	(1.971)	(1.505)	(0.180)	(1.158)	(4.578)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Random Effects	Random Effects	Random Effects	Random Effects	Random Effects
Female	-2.467	-0.868	-0.095	-1.061 ***	-7.251
	(1.904)	(1.154)	(0.154)	(0.377)	(6.436)
Constant	-65.524 ***	-32.021 ***	-12.296 ***	-7.526 ***	34.87 ***
	(3.421)	(2.334)	(0.210)	(2.039)	(7.252)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Mundlak	Mundlak	Mundlak	Mundlak	Mundlak
N.obs	2583143	1504594	3030043	3003825	316226

***, **, * = confidence level: 99, 95 e 90 percent, respectively. Firm level clustered standard errors.

Table 10. OLS estimates; sub-sample [#]; 2005-2010

	ROE	ROI	ROA	Cash flow	Value added per employee
Female	7.722 ***	2.8 ***	0.977 ***	-1.655	-5.869 **
	(1.731)	(0.935)	(0.182)	(1.741)	(2.481)
Constant	-22.227 ***	3.032 ***	1.672 ***	4.663 ***	44.019 ***
	(8.575)	(0.485)	(0.190)	(0.752)	(4.241)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	OLS	OLS	OLS	OLS	OLS
Female	-3.305	2.476	0.26	-0.006	-7.72
	(4.495)	(2.887)	(0.232)	(0.213)	(7.371)
Constant	6.915	5.55 **	5.097 ***	6.977 ***	59.228 ***
	(10.524)	(2.493)	(0.915)	(0.977)	(14.214)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects
Female	4.994 *	3.592 ***	0.617 ***	-0.118	-5.889
	(2.746)	(1.257)	(0.163)	(0.224)	(3.597)
Constant	-16.151 *	4.286 ***	2.49 ***	6.083 ***	44.1 ***
	(9.287)	(0.598)	(0.198)	(0.799)	(4.578)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Random Effects	Random Effects	Random Effects	Random Effects	Random Effects
Female	-2.039	2.906	0.509 **	-0.064	-7.251
	(4.037)	(2.413)	(0.216)	(0.220)	(6.436)
Constant	-45.471 ***	-7.098 ***	-2.032 ***	6.114 ***	34.87 ***
	(12.899)	(2.631)	(0.397)	(1.346)	(7.252)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Mundlak	Mundlak	Mundlak	Mundlak	Mundlak
N.obs	304676	278619	318012	317949	316226

[#] Only firms with *non-missing* number of employees.

***, **, * = Confidence level: 99, 95 e 90 percent, respectively. Firm level clustered standard errors.

Table 11. (Part A) – OLS estimates; sub-sample [#]; 2005-2010

	ROE	ROI	ROA	Cash flow	Value added per employee
Female	7.738 ***	2.795 ***	0.975 ***	-1.642	-6.461 ***
	(1.732)	(0.936)	(0.182)	(1.742)	(2.495)
Empl	0.000	0.000	0.000	0.001 **	-0.013 ***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.002)
Empl_sq	0.000	0.000	0.000	0.001 **	0.001 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-22.218 ***	3.029 ***	1.67 ***	4.672 ***	43.583 ***
	(8.574)	(0.485)	(0.190)	(0.748)	(4.241)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	OLS	OLS	OLS	OLS	OLS
Female	-3.305	2.476	0.260	-0.006	-7.733
	(4.495)	(2.887)	(0.232)	(0.213)	(7.373)
Empl	0.000	0.003 **	0.001 **	0.000	-0.421
	(0.002)	(0.001)	(0.000)	(0.000)	(0.311)
Empl_sq	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	6.93	5.614 **	5.117 ***	6.986 ***	48.125 ***
	(10.522)	(2.495)	(0.914)	(0.977)	(17.468)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects

[#] Only firms with *non-missing* number of employees.

***, **, * = Confidence level: 99, 95 e 90 percent, respectively. Firm level clustered standard errors.

Table 11. (Part B) – OLS estimates; sub-sample [#]; 2005-2010

	ROE	ROI	ROA	Cash flow	Value added per employee
Female	4.992 *	3.616 ***	0.622 ***	-0.117	-9.131 **
	(2.748)	(1.256)	(0.163)	(0.225)	(4.472)
Empl	0.000	0.001 **	0.001 **	0.000	-0.137
	(0.001)	(0.000)	(0.000)	(0.000)	(0.090)
Empl_sq	0.000	0.001 **	0.001 **	0.000	0.000 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-16.154 *	4.319 ***	2.502 ***	6.094 ***	38.862 ***
	(9.286)	(0.599)	(0.198)	(0.798)	(5.923)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Random Effects	Random Effects	Random Effects	Random Effects	Random Effects
Female	-2.036	2.909	0.51 **	-0.064	-7.466
	(4.037)	(2.413)	(0.216)	(0.220)	(6.455)
Empl	0.000	0.001 **	0.001 **	0.000	-0.137
	(0.001)	(0.000)	(0.000)	(0.000)	(0.090)
Empl_sq	0.000	0.001 **	0.001 **	0.000	0.000 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-45.459 ***	-7.086 ***	-2.027 ***	6.123 ***	34.376 ***
	(12.900)	(2.632)	(0.397)	(1.345)	(7.311)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Estimation	Mundlak	Mundlak	Mundlak	Mundlak	Mundlak
N.obs	304676	278619	318012	317949	316226

[#] Only firms with *non-missing* number of employees.

***, **, * = Confidence level: 99, 95 e 90 percent. Firm level clustered standard errors.

Table 12. OLS estimates; sub-sample [#]; 2005-2010

	ROE	ROI	ROA	Cash flow	Value added per employee
Agriculture, hunting and forestry	31.254 ** (12.500)	6.709 ** (3.217)	1.895 (1.398)	1.285 (1.166)	-10.96 (13.493)
Fishing, fish farming and related service activities	56.194 *** (8.921)	2.655 (13.308)	-11.508 (19.754)	28.145 *** (6.220)	9.81 (31.864)
Mining	7.91 ** (3.075)	2.922 (2.091)	0.949 (1.436)	-0.286 (1.313)	-70.359 (50.963)
Manufacturing	7.957 *** (1.725)	3.408 *** (0.702)	0.902 *** (0.275)	0.48 (0.338)	-8.411 *** (2.530)
Production and distribution of electricity, gas and water	35.618 *** (6.553)	6.181 (5.065)	0.713 (0.725)	-1.29 (0.801)	-253.955 ** (99.130)
Construction	-6.793 (8.748)	-2.131 (2.732)	0.076 (0.503)	0.324 (0.571)	1.774 (25.292)
Commerce; reconst. of motor vehicles, motorcycles and personal household goods	7.254 ** (3.275)	0.706 (2.690)	0.637 ** (0.268)	-4.933 (5.407)	-6.314 ** (3.117)
Hotels, restaurants, bars	10.83 (11.864)	4.867 (3.164)	0.99 (2.318)	0.981 (1.883)	3.659 (13.436)
Transport, storage and communication	2.853 (9.293)	5.583 *** (2.129)	1.327 * (0.692)	-0.246 (0.572)	-17.381 *** (5.236)
Financial	13.972 (9.158)	-0.889 (9.781)	7.485 (5.546)	5.408 (3.343)	-15.77 (57.281)
Real estate, renting, information technology, research and business activities	2.632 (13.202)	5.867 *** (1.669)	1.318 * (0.778)	-4.597 (4.812)	-10.369 (17.148)
Education	34.831 ** (13.479)	9.948 (7.784)	-1.431 (2.625)	-0.656 (2.055)	63.339 * (34.995)
Health and social work	18.07 *** (4.149)	4.894 *** (1.480)	2.75 ** (1.166)	2.531 *** (0.892)	-1.918 (5.096)
Other community, social and personal services	24.652 *** (9.485)	3.689 (3.110)	0.481 (0.945)	-6.059 (7.031)	-45.714 (41.569)

[#] Only firms with *non-missing* number of employees.

***, **, * = Confidence level: 99, 95 e 90 percent, resp. Firm level clustered standard errors in parenthesis.

We always included fixed effects for sector and time, and number of employees and its square.

Table 13. FE estimates; sub-sample [#]; 2005-2010

	ROE	ROI	ROA	Cash flow	Value added per employee
Agriculture, hunting and forestry	5.274 (8.599)	0.663 (1.261)	0.802 (1.140)	2.625 (3.077)	30.026 (23.105)
Fishing, fish farming and related service activities	-	-	-	-	-
Mining	2.524 (12.357)	2.45 (6.370)	3.809 (4.069)	2.707 (4.090)	22.633 *** (8.106)
Manufacturing	-2.619 (2.637)	1.297 (1.670)	-0.025 (0.365)	-0.316 (0.331)	-2.658 (3.359)
Production and distribution of electricity, gas and water	-2.131 (5.760)	-1.719 (8.137)	0.586 (0.768)	-0.125 (1.146)	-70.337 (94.661)
Construction	-46.062 (41.414)	3.599 (2.359)	2.089 * (1.182)	1.073 (0.722)	-132.664 (122.707)
Commerce; reconst. of motor vehicles, motorcycles and personal household goods	-3.622 (11.542)	1.144 (1.351)	0.311 (0.443)	0.039 (0.420)	0.409 (4.353)
Hotels, restaurants, bars	-41.593 (42.494)	-2.019 (3.581)	-2.226 ** (1.042) **	-0.23 (0.841)	-6.985 (13.411)
Transport, storage and communication	42.619 (28.805)	59.875 (57.397)	1.795 (1.164)	0.93 (1.075)	7.417 (9.870)
Financial	1.305 (11.595)	-9.341 (9.198)	5.399 (6.530)	3.277 (4.731)	0.567 (10.711)
Real estate, renting, information technology, research and business activities	-2.148 (4.551)	-15.722 (17.489)	0.746 (0.454)	0.366 (0.568)	1.544 (4.618)
Education	-	-	-	-	-
Health and social work	0.457 (4.337)	0.442 (1.898)	-1.115 (0.791)	-0.55 (0.809)	-1.489 (2.035)
Other community, social and personal services	15.776 (15.854)	-1.795 (3.520)	-1.15 (1.678)	-1.569 (1.623)	-65.171 (44.331)

[#] Only firms with *non-missing* number of employees.

***, **, * = Confidence level: 99, 95 e 90 percent, resp. Firm level clustered standard errors in parenthesis.

We always included fixed effects for sector and time, and number of employees and its square.

Table 14. RE estimates; sub-sample[#]; 2005-2010

	ROE	ROI	ROA	Cash flow	Value added per employee
Agriculture, hunting and forestry	24.878 ** (11.792)	3.678 * (1.895)	0.949 (0.855)	0.96 (1.255)	-3.328 (12.819)
Fishing, fish farming and related service activities	54.871 *** (9.468)	1.182 (14.617)	-11.46 (19.562)	25.417 *** (7.330)	3.4 (26.802)
Mining	9.822 * (5.456)	4.979 (3.411)	2.886 (2.395)	1.583 (2.019)	-2.859 * (18.603)
Manufacturing	5.788 *** (2.194)	3.431 *** (1.028)	0.461 * (0.260)	0.028 (0.312)	-17.306 (13.383)
Production and distribution of electricity, gas and water	23.269 *** (6.337)	-1.124 (8.055)	0.715 (0.774)	-0.258 (1.001)	-153.507 ** (78.191)
Construction	-9.811 (10.903)	-0.675 (2.753)	0.596 (0.626)	0.803 (0.667)	-25.387 (31.157)
Commerce; reconst. of motor vehicles, motorcycles and personal household goods	6.121 (5.562)	2.161 (2.228)	0.574 * (0.293)	-0.19 (0.479)	-3.104 (2.947)
Hotels, restaurants, bars	5.568 (18.603)	4.45 (2.722)	-1.017 (1.057)	-0.056 (1.390)	3.659 (13.440)
Transport, storage and communication	12.985 (15.676)	25.137 (20.409)	1.272 * (0.699)	-0.16 (0.654)	4.758 (8.997)
Financial	13.972 (9.222)	0.341 (9.345)	5.07 (5.334)	3.014 (3.432)	12.491 (30.742)
Real estate, renting, information technology, research and business activities	-3.629 (16.072)	5.514 *** (1.798)	1.137 ** (0.573)	-6.109 (6.290)	-0.094 (22.570)
Education	37.414 * (20.379)	19.048 (14.121)	-0.149 (2.343)	-0.283 (2.183)	57.581 * (33.993)
Health and social work	14.109 *** (3.637)	2.72 * (1.484)	0.618 (0.705)	0.811 (0.657)	-2.314 (2.968)
Other community, social and personal services	25.534 ** (12.513)	4.084 (3.924)	-0.473 (1.111)	-1.576 (1.623)	-71.32 * (41.373)

[#] Only firms with *non-missing* number of employees.

***, **, * = Confidence level: 99, 95 e 90 percent, resp. Firm level clustered standard errors in parenthesis.

We always included fixed effects for sector and time, and number of employees and its square.

Table 15. Mundlak estimates; sub-sample [#]; 2005-2010

	ROE	ROI	ROA	Cash flow	Value added per employee
Agriculture, hunting and forestry	1.284 (10.282)	1.106 (1.418)	1.215 (1.115)	2.218 (2.482)	14.477 (17.647)
Fishing, fish farming and related service activities	-64.153 ** (26.219)	9.278 * (5.415)	-50.627 *** (19.187)	-286.251 *** (8.018)	3.683 (28.880)
Mining	6.683 (10.080)	5.809 (6.374)	6.699 (4.808)	4.159 (4.034)	23.847 *** (7.236)
Manufacturing	-0.196 (2.481)	2.215 (1.526)	0.347 (0.334)	0.014 (0.311)	-6.479 (4.443)
Production and distribution of electricity, gas and water	14.938 * (8.935)	0.846 (7.058)	1.174 (0.759)	0.007 (1.007)	-142.265 (100.395)
Construction	-24.298 (33.715)	3.757 * (2.174)	1.794 * (0.998)	1.011 (0.638)	-85.817 (89.558)
Commerce; reconst. of motor vehicles, motorcycles and personal household goods	-5.577 (9.609)	1.113 (1.209)	0.335 (0.406)	-0.156 (0.452)	-1.14 (4.195)
Hotels, restaurants, bars	-36.1 (35.887)	0.134 (4.280)	-1.774 * (1.012)	0.004 (0.846)	-18.2 (39.611)
Transport, storage and communication	27.879 (25.800)	52.018 (47.778)	1.943 * (1.174)	1.132 (1.107)	12.76 (11.405)
Financial	4.569 (11.060)	0.641 (10.237)	5.603 (6.493)	3.383 (4.630)	-0.075 (11.513)
Real estate, renting, information technology, research and business activities	-1.41 (8.326)	-10.41 (13.751)	0.969 * (0.562)	-6.787 (7.360)	-6.593 (11.875)
Education	35.385 (40.870)	96.371 (65.380)	7.192 (4.420)	5.77 (4.133)	41.816 (60.217)
Health and social work	1.688 (4.157)	1.027 (1.799)	-0.565 (0.807)	-0.122 (0.795)	0.628 (2.016)
Other community, social and personal services	17.071 (14.013)	1.901 (4.276)	-1.079 (1.560)	-1.576 (1.628)	-47.103 (33.356)

[#] Only firms with *non-missing* number of employees.

***, **, * = Confidence level: 99, 95 e 90 percent, resp. Firm level clustered standard errors in parenthesis.

We always included fixed effects for sector and time, and number of employees and its square.

Table 15. Mundlak estimates; sub-sample[#]; 2005-2010

	ROE	ROI	ROA	Cash flow su attivo	Valore aggiunto pro capite
Agricoltura, caccia e silvicoltura	1,284 (10,282)	1,106 (1,418)	1,215 (1,115)	2,218 (2,482)	14,477 (17,647)
Pesca,piscicoltura e servizi connessi	-64,153 ** (26,219)	9,278 * (5,415)	-50,627 *** (19,187)	-286,251 *** (8,018)	3,683 (28,880)
Estrazione di minerali	6,683 (10,080)	5,809 (6,374)	6,699 (4,808)	4,159 (4,034)	23,847 *** (7,236)
Attività manifatturiere	-0,196 (2,481)	2,215 (1,526)	0,347 (0,334)	0,014 (0,311)	-6,479 (4,443)
Produzione e distribuzione di energia elettrica, gas e acqua	14,938 * (8,935)	0,846 (7,058)	1,174 (0,759)	0,007 (1,007)	-142,265 (100,395)
Costruzioni	-24,298 (33,715)	3,757 * (2,174)	1,794 * (0,998)	1,011 (0,638)	-85,817 (89,558)
Commercio; riparaz. di autoveicoli, motocicli e di beni personali e per la casa	-5,577 (9,609)	1,113 (1,209)	0,335 (0,406)	-0,156 (0,452)	-1,14 (4,195)
Alberghi, ristoranti, bar	-36,1 (35,887)	0,134 (4,280)	-1,774 * (1,012)	0,004 (0,846)	-18,2 (39,611)
Trasporti, magazzinaggio e comunicazioni	27,879 (25,800)	52,018 (47,778)	1,943 * (1,174)	1,132 (1,107)	12,76 (11,405)
Attività finanzarie	4,569 (11,060)	0,641 (10,237)	5,603 (6,493)	3,383 (4,630)	-0,075 (11,513)
Attività immobiliari, noleggio, informatica, ricerca, servizi alle imprese	-1,41 (8,326)	-10,41 (13,751)	0,969 * (0,562)	-6,787 (7,360)	-6,593 (11,875)
Istruzione	35,385 (40,870)	96,371 (65,380)	7,192 (4,420)	5,77 (4,133)	41,816 (60,217)
Sanità e assistenza sociale	1,688 (4,157)	1,027 (1,799)	-0,565 (0,807)	-0,122 (0,795)	0,628 (2,016)
Altri servizi pubblici, sociali e personali	17,071 (14,013)	1,901 (4,276)	-1,079 (1,560)	-1,576 (1,628)	-47,103 (33,356)

[#] Only firms with *non-missing* number of employees.

***, **, * = Confidence level: 99, 95 e 90 percent, resp. Firm level clustered standard errors in parenthesis.

We always included fixed effects for time, and number of employees and its square.

In each specification we included industry (2-digits) and time (year) fixed effects; standard errors are clustered at the firm level and robust against the presence of heteroskedasticity. For each specification, we estimated an OLS, a fixed effects (FE), and a random effects (RE) model. The fixed effects approach allow us to remove all time-invariant unobservable firm characteristics that may bias the estimates. We also estimated the random effects model using the correction of Mundlak (1978), which allows to obtain consistent estimates, as in the fixed effects estimation, but more efficiently. We are confident that purging from time invariant characteristics removes much of the sorting in sectors and dimensionality of female-firms that may arise from some utility maximization of the employer. We will refer to FE estimates.

Table 9 contains estimates of the performance of the company (through profitability and productivity) as a function of gender of the company and other characteristics. By using the fixed effects estimates as a benchmark, there is no significantly difference in terms of ROI and ROA between male and female firms. Female-firms seem to have a lower ROE and lower liquidity (cash flow on assets) than male-firms. No significant differences emerge in terms of productivity. Table 10 presents the same estimates of Table 9, carried out on a sub-sample of companies, made by those for which data on the number of employees was available. In this case there is no difference between male and female firms. Even after controlling for firm size (Table 11), there are no differences in profitability or productivity.

As a further analysis, given the high sample size, we conducted the same regressions contained in Table 9, by sector (Table 12-13-14): still there are no obvious differences in profitability, even within sectors.

5. Conclusions

The aim of this study was to assess whether female-firms show systematic difference in terms of profitability and productivity with respect to the other firms. This is key to understand the performance of the Italian economy because female firms are usually estimated to be more risk averse than male firms: because Italian law gave some incentives to female firms, it is important to understand whether the monetary return on investment was negative or not (apart from social considerations).

By exploiting a rich dataset from the Register of firms, which therefore does not suffer from typical micro-data problems, such unit- or item- non response, we built a definition of female firms based on the existing legal framework (L215 / 92). We focus on corporations because for them balance sheet data are completely available. To make the comparison as tight as possible, we implemented a definition of male-firms which closely mimics the same definitions as females'.

In interpreting the results, one cannot refer to causal effects, although by estimating fixed effects it was possible to correct for the presence of unobserved heterogeneity at the firm level. Even bearing in mind the limitations of the analysis, the so-called female underperformance hypothesis does not seem to be confirmed in the Italian context. Therefore, the gender composition of Italian firms cannot be blamed to have undermined the performance of the economy in the country.

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Notes

Note 1. A previous version of this paper circulated in Italian under the title "Che Genere di Impresa? Differenziali di performance tra imprese maschili e femminili". We thank Magda Bianco and Marianna Brunetti and two referees for their comments and Marco Chiurato for his editorial assistance. The views expressed in this paper are those of the authors and do not imply any responsibility of their institutions.

Note 2. It was possible to obtain information on the balance-sheets for about 20 percent of the companies in the database Infocamere. Of these, more than 11 percent is made of women-owned businesses. We further trimmed the values of the indicators at the 1st and 99th percentile.