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Does the Share of Female Managers Affect the Firm's Geographic Spread? Evidence from the UK

ABSTRACT

The present article aims to add a new thread on the debate of gender quota by assessing gender diversity in senior managerial positions. We utilise UK data drawn from the 2011 Workplace Employment Relations Study (WERS6), the latest survey in the WERS series, to examine the former association. The use of appropriate weights makes our results representative of the UK population. After controlling for firm characteristics, we find statistically negative relationship between the share of female managers employed at the firm-level and the geographic spread of the firm. More specifically, our results uncover a particularly strong association between selling the final product largely on the local market and having a high share of female managers. Possible explanations for the former association can be found in the literature that discusses gender differences due to risk, competition and social preferences.

KEY-WORDS

GENDER DIVERSITY, MANAGEMENT, GEOGRAPHIC SPREAD, CORPORATE GOVERNANCE

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1. Introduction

In the UK labour market, gender equality has traditionally been encouraged through voluntary action from companies; whereas, other developed nations such as e.g., Spain and Norway, have taken a legislative approach by setting explicit targets of at least 40% women on the board of directors and penalties if this is not adhered to (Lückerath-Rovers, 2013). Despite the absence of formal legislation on the matter, the UK has seen great improvements towards gender parity in recent years (Grosvold, Brammer and Rayton, 2007). In 2015, there were no more all male boards in the FTSE 100 and women's representation reached 23.5% of all board members although only 41% of FTSE 100 companies have at least 25% female directors (Vinnicombe et al., 2015).

Having identified a legislative gap, the UK Commons Business Committee proposed that at least half of all new appointments to senior and executive management level positions in the FTSE 350 and all listed companies be women, from May 2020[1]. It needs to be noted that managerial positions and board of directors are different roles with differing impacts and influences for large organisations in particular. However, the two roles amalgamate when SMEs are considered. Latest evidence suggests that, the UK has a share of female to male managers just above the European Union average (i.e., 46%, see Table 1). By the same token, the UK has the largest percentage of female to male managers, when focusing on part-time contracts (see Table 1, columns 3 and 4).

In neo-classical economics where profit maximization has become the fundamental pillar for understanding business behaviour, a large body of literature comes in to bridge the gap between increased female participation in the boardroom and the firm performance[2]. Despite being widely accepted as an important resource-based condition for the behaviour of the firm, profit maximisation itself cannot be seen as a strategy for business growth. When developing an optimal growth strategy for firms, management is crucial in identifying profitable opportunities, within or across markets to overcome demand problems and create growth (Penrose, 1955). Motivated by the UK Commons Business Committee proposal on gender diversity for senior managerial positions, and the Penrosian approach to growth, the present article contributes to the literature by examining how increased female participation in managerial positions relates to firm's *geographic spread*. This particular association has been overlooked in the literature and therefore no such evidence exists, to the best of our knowledge.

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1 It is worth mentioning that the relevant report, published by the UK Commons Business Committee, refers to "*senior and executive managers*" rather than "*board of directors*". The majority of the literature looks at the gender diversity in the board of directors, instead the present article looks at managers and senior officials.

2 See Velte (2017) for a recent review of the literature.

Table 1. Shares of female to male managers by contract type

	Full-time contracts			Part-time contracts	
	(1)	(2)		(3)	(4)
Country	**2015**	**2016**	**Country**	**2015**	**2016**
Latvia	74%	88%	**United Kingdom**	**294%**	**311%**
Poland	67%	71%	Germany	280%	294%
Slovenia	59%	68%	Czech Republic	304%	278%
Hungary	67%	64%	Italy	217%	269%
Sweden	62%	63%	France	212%	268%
Bulgaria	58%	62%	Austria	218%	267%
Lithuania	64%	62%	European Union (28)	228%	251%
Norway	55%	61%	Ireland	255%	248%
Portugal	48%	57%	Switzerland	276%	232%
Estonia	44%	55%	Belgium	184%	206%
Slovakia	47%	54%	Spain	146%	197%
Finland	50%	52%	Poland	124%	176%
Romania	46%	52%	Netherlands	171%	164%
Ireland	48%	51%	Sweden	158%	126%
Iceland	60%	51%	Norway	161%	123%
United Kingdom	**45%**	**46%**	Slovenia	70%	118%
European Union (28)	44%	45%	Turkey	38%	48%
France	43%	45%			
Spain	44%	43%			
Croatia	36%	43%			
Belgium	43%	43%			
Austria	35%	39%			
Denmark	38%	39%			
Cyprus	33%	37%			
Malta	34%	37%			
Germany	36%	36%			
Switzerland	34%	36%			
Italy	33%	35%			
FYROM	32%	34%			
Greece	33%	34%			
Czech Republic	40%	33%			
Netherlands	24%	23%			
Turkey	15%	18%			

Notes: Authors' calculations using LFS Eurostat. Columns (1) and (2) portray female to male ratio in sample of full-time contracts. Columns (3) and (4) portray female to male ratio in sample of part-time contracts. Statistics refer to published figures available on Eurostat. Countries with missing data were omitted. Countries are presented in descending order based in their 2016 figures. 2015 figures are presented for comparison purposes.

Geographic spread captures only one aspect of the two-dimensional *geographic diversification* term which spans over both *spread* and *scope*. When looking at the "spread" aspect of *geographic orientation,* the literature considers the following tiers: *home-oriented*, *regional* and *global* depending on where the greatest share of company's sales rests (Rugman and Verbeke, 2004; Delios and Beamish, 2005; Banalieva and Santoro, 2009). Yet, in the internationalisation literature, the concept of *region* (and sometimes *home* too) extends beyond the country's natural borders to denote a geographical segment that includes more than one country which share commonalities in technological infrastructure, demand, law etc. (e.g., EU or NAFTA) (Ohmae, 1985; Rugman and Verbeke, 2004). To this end, some further clarification is required as to the adopted *geographic spread* term to avoid possible confusion for the reader.

The current dataset holds information on the spread of market the product or service is currently supplied at using geographical segments. The four segments are local market, regional market, national market and international market. With the exemption of firms operating globally (i.e., across their geographical borders), all other three categories (i.e., local, regional, national) refer to domestically orientated firms[3]. As a result, in this work we adopt the term *geographic spread* to record the market at which the main product or service is supplied and is classified as local, regional, national and international in strict geographic sense. Further information on the number of markets, their diversity or other qualitative characteristics define *geographic scope*. We do not hold information on *geographic scope* yet this does not condition the rest of the analysis.

In the next section, we discuss related literature and hypotheses formulation, in Section 3 we present methodology and data, in Section 4 we present our results and Section 5 concludes.

2. Why arguing in favour of greater gender diversity? The business argument and beyond

The need for change accompanied by the hope for better outcomes can be seen as a plausible explanation as to why companies tend to appoint women managers after having experienced bad performance in the last five months and in times of overall stock-market decline (Ryan and Haslam, 2005). Yet, the aforementioned result uncovers the formidable task, widely documented in the literature as *glass-cliff*, which women have to undergo to prove their competence in senior positions within an already gender-biased environment (Ryan and Haslam, 2007; Haslam and Ryan, 2008;

[3] The geographic diversification (or geographic orientation) term came about with the expansion of the literature on internationalisation to denote market expansion strategies on large MNEs mainly (not always though, SMEs have also been considered in the literature). It applies mainly to exporters and it can be used when the destination of the traded product is recorded in the dataset in which case both "scope" and "spread" can be analysed. Beleska-Spasova and Glaister (2010), use the term geographic orientation in a sample of SMEs yet among a sample of exporters. By considering the data at hand, the *geographic spread* can only be discussed in the present article.

Ryan, Haslam and Kulich, 2010; Ryan et al., 2011). Otherwise considered, women face a *double glass-ceiling* problem that prevents them from achieving seats in the board of directors and instead are assigned to roles associated with public affairs or corporate social responsibility (Forster, 1999; Liff and Ward, 2001; Nekhili and Gatfaoui, 2013). Eagly and Karau (2002) explain that the real cause of the problem is prejudice towards women that wish to occupy leadership or managerial roles in general and is born from stereotypical views that dominate in traditional societies. Empirical findings in support come from Oakley (2000) who shows that gender specific characteristics such as leadership style or linguistic style and socialisation may also explain the scarcity of female managers (particularly for large corporations).

The Norwegian affirmative legislative action of 2011 on the evolving pattern of gender diversity in the boardroom, triggered an interest in the relationship between gender diversity and firm performance without conclusive results. The extensive presence of women on the board is positively correlated with better firm performance (see e.g., Carter, Simkins and Simpson, 2003; Erhardt, Werbel and Shrader, 2003; Lückerath-Rovers, 2013). However, the various performance measures used occasionally resulted in conflicting results (Haslam, Reicher and & Platow, 2010) especially when attributes such as age and experience are overlooked (Dalton et al., 1998; Terjesen, Sealy and Singh, 2009; Bøhren and Strøm, 2010; Post and Byron, 2015 are all extended literature reviews). Rose (2007) does not find significant correlation between Tobin's Q and female board representation using Danish data. The lack of correlation is explained by the minority group unconsciously adopting the conventional ideas of the majority group. Adams and Ferreira (2009), using a size-diversified sample of US firms find a negative effect on firm performance (using Tobin's Q and ROA) from a more gender diversified board. On the contrary, Erhardt, Werbel and Shrader (2003) using a sample of large companies find evidence in support of greater board diversity by considering the effect on profits, return on investment capital and return on assets. In keeping with these findings, Adams and Ferreira (2004) show that greater gender diversity on the board is associated with less volatile stock price while Singh et al. (2001) show that it is also associated with higher turnover and larger company size.

Beyond accounting related measures of performance, greater gender diversity can be seen as evidence of good corporate governance which is of great ethical importance to the owners of the company and to the nation as a whole[4]. Female managers are preferred due to their enhanced sensitivity towards the ideas and suggestions of others which may result in a more cohesive board (Burgess and Tharenou, 2002). Women directors show great flexibility in adjusting their strategies in order to gain influence by taking into consideration the composition and nature of the board but most importantly the perception others have of their views (Bradshaw and Wicks,

[4] See for example the 2016 corporate governance failings at "BHS" and "Sports Direct" for the UK. Beyond the UK borders, there is the example of the "Kaupthing" bank in Iceland and of course the "Lehman Brothers" fail with Christine Lagarde (Managing Director of the International Monetary Fund) suggesting that the 2008 economic crisis would look very different if "Lehman Brothers" had been "Lehman *Sisters*".

2000). Moreover, greater diversity may result in better strategic outcomes as long as there are complementary skills and attributes to outweigh or displace the any communication costs (Lazear, 1999). Groysberg and Bell (2013) show that firms with greater female representation on board exhibit a higher degree of involvement to non-work related initiatives, such as community service and philanthropy.

The presence of women in leadership positions within the company who act as role models and mentors has an immense reputational effect symbolising "healthy" corporate governance especially when complemented by an increased prominence of media coverage (De Anca and Gabaldon, 2014). A gender-diverse board shows higher level of monitoring mainly due to better attendance records and the higher probability of women relative to men to join monitoring committees (Adams and Ferreira, 2009). Using corporate social responsibility as a measure of firm's reputation Bear, Rahman and Post (2010) find a positive correlation between the former and the number of women on the board and generalise the result suggesting that a more diverse board will bear significant effects for the firm's reputation. Moreover, the presence of women in senior managerial positions is linked to positive motivational effects for the workforce and this workplace improvement is further linked to better developed organisational performance (Higgs, 2002). This is also confirmed by Krishnan and Park (2005) who additionally tested the moderating impact of environmental instability, munificence and complexion nevertheless these results were found to be insignificant. Evidence from the banking industry suggests a curvilinear relationship between gender diversity and organisational performance (Richard et al., 2004). Similarly, based on "critical mass theory" Torchia, Calabrò and Huse (2007) find that a "token" woman on board does not bear any significant effects; however, by having at least three women on the board, the company enjoys increased organizational innovation.

Some further evidence suggest that gender diversity may not be a holy grail. Although the legislative changes and corporate governance reforms introduced in Spain were not accompanied by documented negative effects (Campbell and Mínguez Vera, 2008, 2010), potential pitfalls may lay ahead particularly when appointments take place due to the wider societal pressures, rather than on merit. What we know so far, is that a less homogeneous board may threaten to delay the decision-making process and poses risks, especially concerning independency via group-thinking (Ujunwa, 2012). Moreover, the possible marginalization of women directors is likely if they are viewed as an "outgroup" who would not receive the loyalty male directors give each other. The greater the differences between the two groups, the more likely is the former situation to occur and therefore the benefits of monitoring that would otherwise arise are likely to be suppressed (Carter, Simkins and Simpson, 2003; Mathisen, Ogaard and Marnburg, 2013).

As explained above, the business argument in favour or against increased gender diversity is rather ambiguous. Beyond the business argument, increased participation of women in top managerial positions may be desirable for signalling good corporate governance, greater social responsibility, but also improving organisational performance and innovation. In the next sub-section, we discuss how decision-making, market expansion and risk relate to gender in order to formulate our hypotheses to be tested.

2.1 Decision-making, risk and market expansion

In this sub-section, we discuss literature that helps to shape expectations on the relationship between share of female managers and geographic spread. Therefore, we are looking to understand how market expansion or perhaps factors that relate to it (i.e., risk, competitiveness, decision making) and lead to greater geographic spread may be sensitive to gender differences.

To begin with, the decision-making behaviour is sensitive to gender, the literature has shown. The differences observed in decision-making between the two genders, can be attributed to the very different nature of the determinants that shape social preferences for males and females respectively (Kamas and Preston, 2012). Fukuda-Parr and Shiva Kumar (2009) show that women policy makers are more likely to spend financial resources on health, education or other similar community services rather than urban infrastructure, and defence. Further evidence suggest that women favour less aggressive pricing strategies and more social sustainability initiatives than men (Apesteguia, Azmat and Iriberri, 2012).

Using US data, Khan and Vieito (2013) show that firms managed by female CEOs show lower risk level when compared to firms with male CEO's, despite that remuneration package does not differ in its risky component. Experimental evidence suggests that when strategic decisions which affect private earnings are to be made, male managers adopt (on average) a more competitive behaviour than their female counterparts, who in turn show greater preference to the piece-rate earnings scheme (Price, 2012). Furthermore, the greater the size of the market the firm operates, the higher the degree of competition they face. Casby, Servátka and Song (2013) find that *professional priming*[5] can arouse competitive instinct for women; however, the effect will be moderated if *gender priming* is activated too.

Hypothesis 1: The aforementioned literature suggests that geographic spread is likely to be high if the share of female managers is low. The relationship is dictated by social preferences, attitude towards risk and competitiveness.

UK evidence show that the low number of female CEOs is not due to the low number of female employees overall in a sector and that the board's overall diversity is mainly shaped to reflect the diversity of the prevailing customer base (Brammer, Millington and Pavelin, 2007). A more heterogeneous composition, in terms of sex, race and age, helps to better understand the marketplace and increases the ability to penetrate markets (Robinson and Dechant, 1997). Moreover, Croson and Gneezy (2009) explain that women do exhibit different attitude towards risk, competitive and social preferences something that may allow for bringing different perspective into decision-making and possibly diversifying the company's thought process. In this setting, more alternative ideas and

[5] Priming has traditionally used in psychology and refers to the activation of mental concepts through exposure to subtle cues. Priming can take various forms e.g., positive, negative, repetitive etc. For priming in economics see Cadsby, Servátka and Song (2013); Cohn and Maréchal (2016).

views will be proposed increasing the team's problem-solving ability. This in turn allows tackling further complexities in the business environment which otherwise would difficult be understood and therefore tackled (Catalyst, 2004; Smith, Smith and Verner, 2006). Additionally, Hillman, Cannella and Harris (2002), show that women have greater ability relative to men in forming ties with other organisations, making them ideal managers for organisations that look to expand.

Hypothesis 2: A positive relationship between geographic spread and share of female managers should be expected if emphasis is placed on the ability of women for networking and their alternative perspective on decision making is appreciated.

The above suggest that ex-ante, and based on literature alone, it is not possible to argue over positive or negative relationship between geographic spread and gender diversity, confidently. Empirical testing can reveal which of the two competing hypotheses prevails. In the following section, we present data and methods that will allow us to test the relationship between geographic spread and share of female managers.

3. Data and methods

The data come from the 2011 Workplace Employment Relations Study (WERS6)[6], which is the most recent and updated dataset in the WERS series consisting of several questionnaires (Survey of Managers; Survey of Worker Representatives; Survey of Employees; Financial Performance Questionnaire). The deposited data at the UK Data Archive consist of two versions, one of which is restricted and accessible only by "accredited" researchers. The other is publicly available and is intended for general use containing anonymised data and is the one utilized here. The surveys in the WERS series are based on stratified samples in which the sampling fractions vary across the strata of the sampling matrix. An advantage of using the WERS dataset is that it provides the weights required to make the sample nationally representative of the UK population. Weights equal to 1/(probability of selection and response) are already available for use in the analysis thereby removing known biases introduced by the sample selection and response process[7].

In this study, we utilize the Management Questionnaire (MQ) drawing data from the workplace and organisation characteristics section, and the workplace performance section. Given that the Financial Performance Questionnaire (FPQ) is not publicly available, we rely on subjective

[6] For more information see: https://www.gov.uk/government/publications/the-2011-workplace-employment-relations-study-wers

[7] We weight the data following the guidelines described in the "Guide to the analysis of WERS 2011" document available through the UK Data archive. The guide not only explains the weighting process, but also explains which weight is suitable in each and every case depending on the nature of analysis conducted.

workplace performance measures to use as control variables in our analysis[8]. We begin with a sample of 2,680 observations covering all industries (C to S[9]) in the UK economy. After cleaning the sample from missing observations, dropping Public Administration & Defence (SIC07: O) and Education (SIC07: P) we end up with a sample of 1,184 observations[10].

Our dependent variable is the geographic spread of the company and is measured by the size of the market the main product (or service) is supplied at. In an ordinal scale, the dependent variable takes the following values: (1) If the product is supplied locally, (2) if it is supplied regionally, (3) if it is supplied nationally and (4) if it is supplied internationally. Descriptive statistics of the main covariates used are presented in Table 2, both for the unweighted and weighted samples. Noticeable differences between the two samples (i.e., weighted and un-weighted) are observed for some of the objective firm level characteristics (i.e., size, age, ownership), as expected. Our main variable of interest captures the ratio of female to total managers in the establishment.

Table 2. Summary statistics

		Unweighted sample				**Weighted sample**	
	N	**Mean**	**S.D**	**Min**	**Max**	**Mean**	**S.D.**
Fem. Managers (%)	1,184	0.335	0.279	0	1	0.378	0.016
Productivity	1,184	2.045	0.374	1	3	2.078	0.019
Profitability	1,184	2.051	0.463	1	3	2.049	0.022
Quality	1,184	2.277	0.484	1	3	2.276	0.022
Size	1,184	4.292	1.553	1.791	9.355	2.867	0.035
Age	1,184	3.096	0.962	0	6.906	2.840	0.043
F.O.	1,184	0.173	0.378	0	1	0.077	0.012

Notes: Authors' calculations using WERS6. Size and Age are logged. F.O. is a dummy variable that captures Foreign Owned establishments. Productivity, Profitability and Quality are subjective measures described in Table 3. Fem. Managers (%) is defined as the ratio of female to male managers.

[8] Described in Table 3.

[9] Industry breakdown according to SIC07.

[10] We drop these sections due to their particular nature. Public administration cannot be seen as private organisation that looks to expand its operation and Education will only serve the local communities or the nation, when Higher Education is considered. These are unlikely to proxy the behaviour of a private firm.

The literature has widely documented that better firms are more likely to overcome costs associated with international engagement and therefore we control for the performance of the establishment using three subjective measures of performance; Productivity, Profitability and Quality[11]. Distributions for each of the three performance measures are presented in Table 3 without significant changes once the sample is weighted. A correlation matrix is presented (see Table 4) indicating a significant correlation among the three performance measures without this being a surprise. Further establishment-controls include the size of the establishment, the age, the ownership and the industry it operates.

Table 3. Distributions of categorical variables

	Unweighted Sample (%)	**Weighted Sample (%)**
Geographic spread		
Local	32.01	43.01
Regional	14.70	15.75
National	33.19	29.68
International	20.10	11.56
Productivity		
Lower than average	4.81	3.43
Around average or above	85.81	85.26
Much higher than average	9.38	11.31
Profitability		
Lower than average	8.28	7.32
Around average or above	78.29	80.38
Much higher than average	13.43	12.31
Quality of Product or Service		
Lower than average	1.69	0.92
Around average or above	68.83	70.50
Much higher than average	29.48	28.57

Notes: Authors' calculations using WERS6.

11 Productivity, Profitability and Competitiveness are described in Table 2.

Table 4. Correlation matrix

		Fem. Managers (%)	2	3	4	5	6
2	Productivity	0.016	1				
3	Profitability	0.030	0.347*	1			
4	Quality	0.057	0.233*	0.222*	1		
5	Size	-0.145*	-0.101*	-0.031	-0.046	1	
6	Age	-0.103*	-0.052	-0.019	-0.037	0.219*	1
7	F.O.	-0.140*	-0.002	-0.065*	-0.009	0.285*	0.076*

Notes: Authors' calculations using WERS6. Variables as described in Table 1. Stars denote significance at $p<0.05$.

In a rather parsimonious setting, our dependent variable can take a binary form discriminating only between firms that operate domestically and internationally. Interestingly, when observing the differences as documented in column (3) of Table 5, negative sign for all variables but the percentage of female managers arises[12]. This suggests that firms which operate globally are (in a pool setting without controls) significantly different to those operate domestically. Firms that sell their product abroad are in general, older (i.e., more experienced), larger in size and are more likely to be foreign owned. With regards to the subjective measure of product quality, we find a statistically significant difference between operating domestically and nationally.

Similar findings emerge for productivity and profitability measures although the differences are insignificant. In contrast to all former variables, when considering the share of female managers, it is on average significantly lower (25.6% against 35.6%) for firms with global activities allowing us to speculate a negative relationship between selling the product in international markets and the share of female managers.

[12] Note that the differences between domestic and international sub-sample are insignificant for productivity and profitability.

Table 5. Two sample T-test with equal variances

	(1) Mean Domestically	(2) Mean Internationally	(3) Difference: (1) – (2)
Fem. Managers (%)	0.356	0.256	0.099***
Productivity	2.041	2.063	-0.021
Profitability	2.044	2.079	-0.035
Quality	2.267	2.319	-0.051*
Size	4.092	5.086	-0.993***
Age	3.033	3.348	-0.314***
F.O.	0.126	0.357	-0.230***

Notes: Authors' calculations using unweighted WERS6. Variables as described in Table 1. Stars denote significance as follows: *** p<0.01 *p<0.10.

We explore this relationship further by employing multivariate analysis which allows testing the robustness of the aforementioned relationship while controlling for other firm level characteristics that may affect the geographic spread of the firm. More specifically, given the nature of our dependent variable we employ an ordered multinomial model with discrete outcomes (McElvey and Zavoina, 1975). We assume that error term is logistically distributed resulting in the following model where the probability of a given observation is:

$$\begin{aligned} Prob(y_j = i) &= \Pr(\mu_{i-1} < \boldsymbol{x}_j\boldsymbol{\beta} + u \le \mu_i) \\ &= \frac{1}{1+\exp(-\mu_i + x_j\beta)} - \frac{1}{1+\exp(-\mu_{i-1} + x_j\beta)} \end{aligned} \quad (1)$$

Where (y) is the observed outcome (i.e., the degree of geographic spread), (μ_i) are the cut-off points to be estimated together with the coefficients (β), where (x) are the covariates (i.e., share of female managers, performance measures, size, age, ownership and industry dummies).

4. Results

Our estimation strategy has as follows: In our baseline specification of (1) we estimate the relationship between the percentage of female managers and the degree of geographic spread controlling for size of firm, age, ownership, industry and performance. To avoid multicollinearity issues, the three performance measures enter our regressions sequentially.

This also allows observing the robustness of the relationship for the variable of interest under the various specifications considered. Our estimation strategy begins with an ordered logit model and marginal effects are calculated next. Subsequently, we weight the sample to make our results representative of the UK economy. Later, we test and relax appropriately the proportional odds (parallel lines) assumption using a generalised multinomial ordered model. Finally, we incorporate interaction between the level of competition faced and share of female managers in our model. The level of competition is a subjective ordinal measure (i.e., low, average, high).

Preliminary findings from estimating (1) with an ordered logit in the unweighted sample are presented in Table 6. The results show a negative significant correlation between the share of female managers and the firm's geographic spread across all three specifications presented *ceteris paribus*. In other words, the probability to move in a higher tier of the depended variable decreases as the share of female managers increases. The corresponding marginal effects holding all covariates at mean values are further presented in Table 7 and are very similar across the three specifications considered. All probabilities are independent of each other and they therefore sum to one as expected. With all covariates at their means the probability to sell the product in the local market is just above 26%; whereas the probabilities to sell regionally, nationally and internationally are near 18%, 41% and 14% respectively. Interestingly, the results show that fully gender diverse firms (i.e., female managers equal to 50%) are more likely to operate at a national level as compared to the other three tiers. Of course, one needs to be cautious on how much emphasis is placed on margins interpretation as all covariates are held at mean values which is unrealistic for dummies and categorical covariates. Operating at a global scale is associated with the lowest probability, possibly due to sunk cost investments that are required when selling abroad. The literature has widely documented that only the "better" (e.g., more efficient, more profitable etc.) firms found at the right-tail of the productivity distribution will be able to cover the costs required for overcoming the entry barriers.

Table 6. Baseline regression, ordered logit model

	(1)	(2)	(3)
	Coef.	**Coef.**	**Coef.**
Fem. Managers (%)	-0.430*	-0.570**	-0.492**
	(0.231)	(0.232)	(0.226)
Size	0.289***	0.277***	0.274***
	(0.041)	(0.040)	(0.040)
Age	0.148**	0.149**	0.131**
	(0.063)	(0.062)	(0.061)
F.O.	0.769***	0.869***	0.799***
	(0.157)	(0.156)	(0.152)
Productivity			
Around average or above	0.123		
	(0.227)		
Much higher than average	0.658**		
	(0.289)		
Profit			
Around average or above		0.061	
		(0.198)	
Much higher than average		0.537**	
		(0.248)	
Quality			
Around average or above			0.174
			(0.306)
Much higher than average			0.257
			(0.316)
Constant cut1	-0.518	-0.677**	-0.667
	(0.357)	(0.327)	(0.414)
Constant cut2	0.312	0.130	0.141
	(0.358)	(0.328)	(0.415)
Constant cut3	2.331***	2.162***	2.152***
	(0.367)	(0.332)	(0.419)
Industry Dummies	Yes	Yes	Yes
Observations	1,184	1,184	1,184
Pseudo R^2	0.141	0.143	0.139
Log Likelihood	-1611	-1633	-1690

Notes: The dependent variable takes values 1(locally), 2(regionally), 3(nationally) and 4(internationally). Other variables as described in Table 1. Table reports coefficients. Lowest group omitted for productivity, profitability and quality variables. Unweighted sample. Robust standard errors in parentheses. Stars denote significance as follows: *** p<0.01, ** p<0.05, * p<0.1

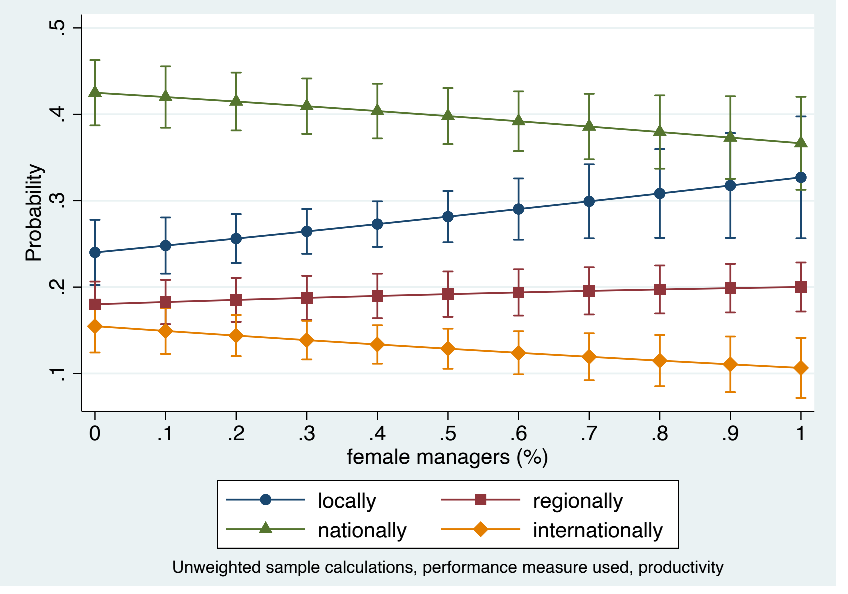
Table 7. Margins when all covariates held at their means

	(1)	**(2)**	**(3)**
Outcome of Dependent	**Productivity**	**Profitability**	**Quality**
(1) Locally	26.7%***	26.4%***	26.3%***
	(0.013)	(0.013)	(0.012)
(2) Regionally	18.8%***	18.1%***	18.1%***
	(0.013)	(0.012)	(0.012)
(3) Nationally	40.7%***	41.3%***	41.1%***
	(0.016)	(0.016)	(0.015)
(4) Internationally	13.6%***	13.9%***	14.2%***
	(0.011)	(0.011)	(0.011)

Notes: Table presents the margins related to the results presented in Table 6. Margins calculated while holding covariates at their means. Each column controls for a different performance measure. Robust standard errors in parentheses. Stars denote significance as follows: *** p<0.01, ** p<0.05, * p<0.1

To gain further insight into the relationship between gender diversity in the managerial team and geographic spread, we plot adjusted predictions against "*female managers (%)*" holding all other covariates at means. The outcome that appears more sensitive to changes in "*female managers (%)*" is the probability to sell locally. It also comes with a positive slop meaning that as the share of female managers increases it is more likely that the firm will have low geographic spread. If we know consider the two extremes of "geographic spread" (i.e., locally and internationally), we notice that for very low shares of "*female managers (%)*" the confidence intervals will overlap making therefore statistical significance disappear. As the share of female managers gradually increases, the confidence intervals stop to overlap and the slopes of the adjusted predictions for the two tiers move in opposite direction explaining the negative coefficient of Table 6.

Figure 1. Adjusted predictions with 95% CIs from ordered logit, unweighted sample



We challenge preliminary findings by weighing the sample to make it representative of the UK population. Weights applied here correct for sample-selection and non-response bias as discussed in the WERS documentation. Tables 8 and 9 present ordered logit estimates and margins respectively from the weighted sample to be contrasted with earlier findings presented in Tables 6 and 7, respectively. The negative relationship between "*geographic spread*" and "*female managers (%)*" is robust to the weighted sample as is its significance. The difference we pick up from the weighted sample is only the increase in magnitude of the estimated coefficient for "*female managers (%)*" which may be partially explained by the loss of significance on age and ownership variables. The application of weights impacts significantly the margins presented in Table 9. With all covariates at means, a firm that is fully gender diverse in managerial roles has 41% probability of selling its product or service locally making this outcome the one with the highest probability. The lowest probability remains associated with selling the product/service internationally as was the case in the unweighted sample. As results in Table 9 are again point estimates we plot adjusted predictions to get a better insight of how changes in the "*female managers (%)*" variable relate to geographic spread, *ceteris paribus*.

The adjusted predictions plotted in Figure 2, agree to those generated from the unweighted sample as far as the slopes on the four outcomes are concerned. There is a good deal of overlap between the two intermediate tiers (i.e., "regionally" and "nationally") just beyond the 50% of female managers. The main difference with respect to the predictions in Figure 1 is the upward shift of the curve associated with the local outcome. When looking at the two extreme outcomes, locally and internationally, the difference persists and are better marked for all levels of the "*female managers (%)*" variable. A final observation from Figure 2 is that the probabilities to sell "locally" and "nationally" appear to have some sensitivity to the "*female managers (%)*" whereas the remaining two tiers are relatively flat.

Table 8. Ordered logit estimates from weighted sample

	(1)	(2)	(3)
	Coef.	**Coef.**	**Coef.**
Fem. Managers (%)	-0.623*	-0.957***	-0.803**
	(0.345)	(0.323)	(0.348)
Controls			
Size	0.375***	0.320***	0.313***
	(0.085)	(0.090)	(0.087)
Age	-0.063	-0.033	-0.121
	(0.113)	(0.102)	(0.108)
F.O.	0.385	0.681	0.581
	(0.422)	(0.432)	(0.418)
Productivity			
Around average or above	0.385		
	(0.331)		
Much higher than average	1.175***		
	(0.444)		
Profit			
Around average or above		0.485	
		(0.314)	
Much higher than average		1.263***	
		(0.423)	
Quality			
Around average or above			-0.450
			(0.330)
Much higher than average			-0.220
			(0.352)
Constant cut1	-0.579	-0.613	-1.774***
	(0.544)	(0.503)	(0.555)
Constant cut2	0.223	0.152	-1.021*
	(0.549)	(0.502)	(0.552)
Constant cut3	2.162***	2.178***	0.913
	(0.589)	(0.516)	(0.575)
Industry Dummies	Yes	Yes	Yes
Observations	1,184	1,184	1,184

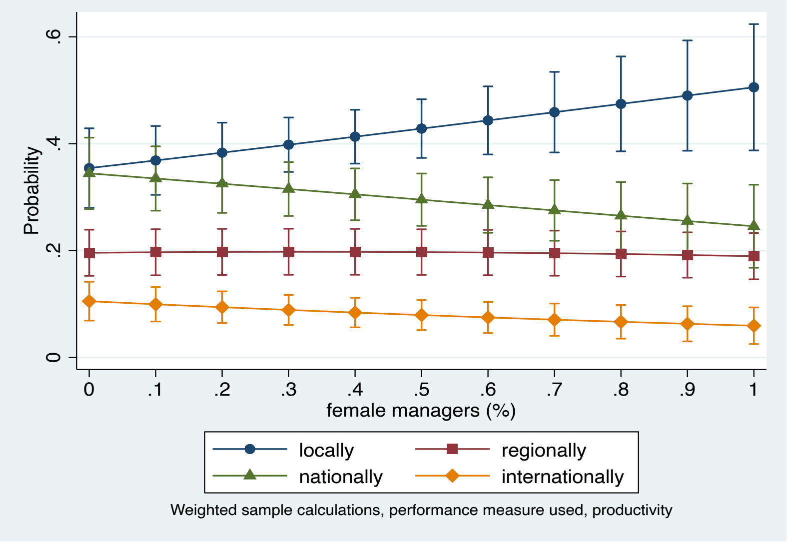
Notes: The dependent variable takes values 1(locally), 2(regionally), 3(nationally) and 4(internationally). Other variables as described in Table 1. Table reports coefficients. Lowest group omitted for productivity, profitability and quality variables. Robust standard errors in parentheses. Stars denote significance as follows: *** p<0.01, ** p<0.05, * p<0.1

Table 9. Margins when all covariates at their means in the weighted sample

Outcome of Dependent	(1) Productivity	(2) Profitability	(3) Quality
(1) Locally	41.1%***	40.7%***	40.4%***
	(0.025)	(0.025)	(0.025)
(2) Regionally	19.7%***	18.8%***	18.6%***
	(0.021)	(0.020)	(0.020)
(3) Nationally	30.6%***	32.1%***	31.8%***
	(0.024)	(0.025)	(0.024)
(4) Internationally	8.46%***	8.18%***	9.10%***
	(0.014)	(0.012)	(0.014)

Notes: Table presents the margins related to the results presented in Table 8. Margins calculated while holding the covariates at their means. Each column controls for a different performance measure. Robust standard errors in parentheses. Stars denote significance as follows: *** p<0.01, ** p<0.05, * p<0.1

Figure 2 Adjusted predictions with 95% CIs from ordered logit, weighted sample



Overall, weighted and unweighted estimates agree on a negative relationship between *geographic spread* and *female managers (%)*. The weighted results and in particular the curves presented in Figure 2 offer a persuasive explanation, especially if one ignores the "regional" outcome. That is, for relatively low share of female managers there is high probability that a firm will operate locally or nationally and low probability that it will operate globally. As the share of female managers slowly increases, the probability to sell internationally will marginally decrease further, the probability to sell nationally will also fall and only the probability to sell locally will increase. Of the four tiers of *geographic spread* the probabilities of selling "locally" and "nationally" appear more sensitive to changes in the *female managers (%)* and move in opposite directions. These results support *hypothesis 1* which advocates a negative relationship on the basis of social preferences, and attitude towards risk and competitiveness. Interestingly also, there seems to be some support of the argument underpinning *hypothesis 2*, when contrasting the two intermediate outcomes of *geographic spread* (i.e., nationally and regionally) yet, the probability to sell regionally is rather flat for all levels of female managers.

4.1 Robustness

One of the assumptions underlying ordered multinomial models is that the relationship between each pair of outcome groups is the same. In other words, an ordered logistic regression assumes that the coefficients describing the relationship between firms mainly selling their product locally versus all higher categories of the response variable are the same as those illustrating the relationship between the next lowest category (i.e., regionally) and all higher categories, etc. This is called "the proportional odds assumption" or "the parallel regression assumption" (Williams, 2006). When the relationship between all pairs of groups is the same, there is only one set of coefficients (i.e., only one model). We fit a generalised ordered model using STATA's "gologit2" which goes through a stepwise process. That is, it fits an unconstraint model first and performs a Wald test for each one of the covariates. The parallel lines constraint is imposed in the final model for those variables that pass the Wald test and is relaxed for all the others. A Likelihood Ratio Statistic is finally calculated for the final model to test its validity[13]. The result is a partial proportional odds model. Table 10 presents estimates for our partial proportional odds model using both weighted and unweighted samples. For the weighted sample, national and international tiers have been merged to allow the model to run[14]. The estimates presented in Section 1 and Section 2 of Table 10 agree with earlier finding. The Wald test has already confirmed the *female managers (%)* do not violate the parallel lines assumptions; therefore, as can be seen, there is a unique coefficient for all tiers of *geographic spread* both in the weighted and unweighted samples in line with those presented in the constraint models in Tables 6 and 8. The negative coefficients presented in Table 10 indicate that greater share of female managers increases the probability being in the current or lower tier of *geographic spread*.

[13] An insignificant result indicates that the final model does not violate the proportional odds assumption.

[14] This is because the regression could not identify the "national" tier. We tried also merging national and regional tiers. This resulted in almost identical results, which are available upon request.

Table 10. Generalized ordered logit model

	(1)			(2)	
	Local Coef.	**Regional Coef.**	**National Coef.**	**Local Coef.**	**Regional Coef.**
Fem. Managers (%)	-0.445*	-0.445*	-0.445*	-0.643*	-0.643*
	(0.233)	(0.233)	(0.233)	(0.357)	(0.357)
Size	0.309***	0.309***	0.309***	0.388***	0.388***
	(0.043)	(0.043)	(0.043)	(0.096)	(0.096)
Age	0.135**	0.135**	0.135**	-0.058	-0.058
	(0.065)	(0.065)	(0.065)	(0.117)	(0.117)
F.O.	0.804***	0.804***	0.804***	0.096	0.096
	(0.160)	(0.160)	(0.160)	(0.344)	(0.344)
Productivity					
Around average or above	0.138	0.138	0.138	0.490	0.490
	(0.248)	(0.248)	(0.248)	(0.445)	(0.445)
Much higher than average	0.657**	0.657**	0.657**	1.394**	1.394**
	(0.300)	(0.300)	(0.300)	0.490	0.490
Constant	1.039***	-0.136	-2.514***	0.857	-0.080
	(0.397)	(0.392)	(0.398)	(0.657)	(0.662)
Industry Dummies	Yes	Yes	Yes	Yes	Yes
LR-Chi^2		17.91			1.46
p-value		0.711			0.106
Observations		1,184			1,184

Notes: The dependent variable takes values 1(locally), 2(regionally), 3(nationally) and 4(internationally). Other variables as described in Table 1. Table above reports coefficients. Lowest group of the "Productivity" variable omitted as reference group. The generalised ordered logit has been fitted with the "autofit" option resulting in a partial proportional odds model that is less restrictive than the models presented earlier. A global likelihood ratio statistic is calculated for the final model to test the parallel lines assumption. An insignificant statistic implies that parallel lines assumption is not violated. Robust standard errors in parentheses. Stars denote significance as follows: *** p<0.01, ** p<0.05, * p<0.1

4.2 The effect of competition

Given that competition and attitude towards it, underpins our original hypothesis and subsequent discussion, we decided to test how it interacts with the share of female managers in our original regressions. As previously explained when arguing *hypothesis 1*, women may be more hesitant embarking on market expansion projects, or simply prefer to apply for jobs with associated low geographic spread. The argument is primarily supported by evidence stemming from experimental studies documenting that women shy away from competition on average more than men do (see e.g., Apesteguia, Azmat and Iriberri, 2012; Price, 2012). Omitting competition from original regressions creates an endogeneity problem which can be corrected if the degree of competition faced in the market is controlled for in our regressions. Table 11, presents estimates from augmenting Eq.1 with a three-level ordinal variable that measures subjective competition faced in the market (i.e., low, average, high) and it also includes interaction between the *level of competition* and *female managers (%)*. Estimates have been generated from a weighted sample using an order logit model. The results show a statistically significant difference between low level of competition and high level of competition. We therefore plot the interactions for these two levels to facilitate interpretation of the findings.

Figure 3 presents predictive margins that correspond to estimates presented in Table 11 column 1. When competition is subjectively considered to be high the plotted probabilities agree to those presented in Figure 2 and derived from our benchmark model. They render therefore validity to earlier findings and agree on a negative relationship between geographic spread and share of female managers[15]. Gradually moving from an "all-men" to "all-women" managerial composition, the probability to operate locally increases whereas the probabilities to sell nationally or internationally gradually decrease. Once again, we do not observe significant crossings among the curves beyond some subtle overlaps for extreme values of the *female managers (%)"*.

The left panel of Figure 3 is more intriguing because some cross-overs are observed. To begin with, we observe that there is relatively high probability to sell at a greater geographic spread (i.e., nationally or locally) only for small presence of female managers. As this share increases the probabilities to sell nationally of internationally fall fast making space for the probability to sell locally. We see a rapid shift in favour of the local tier and at the expense of the other three as the female presence increases in the managerial team. The left panel of Figure 3 suggests that it may not be just competition the main factor behind the great shares of female managers when firms operate locally. Women may actually prefer to apply and engage with job and roles that have more local rather than national or international engagement because of the specific requirements of the role (e.g., long hours, trips, commuting, time spent far from home) that make it easier to achieve work-life balance. Working women that have taken on relatively more household related responsibilities will naturally be attracted to jobs that offer greater flexibility but also jobs that allow them to contribute and engage locally as women show on average greater response than men for contributing to community services (Fukuda-Parr and Shiva Kumar, 2009).

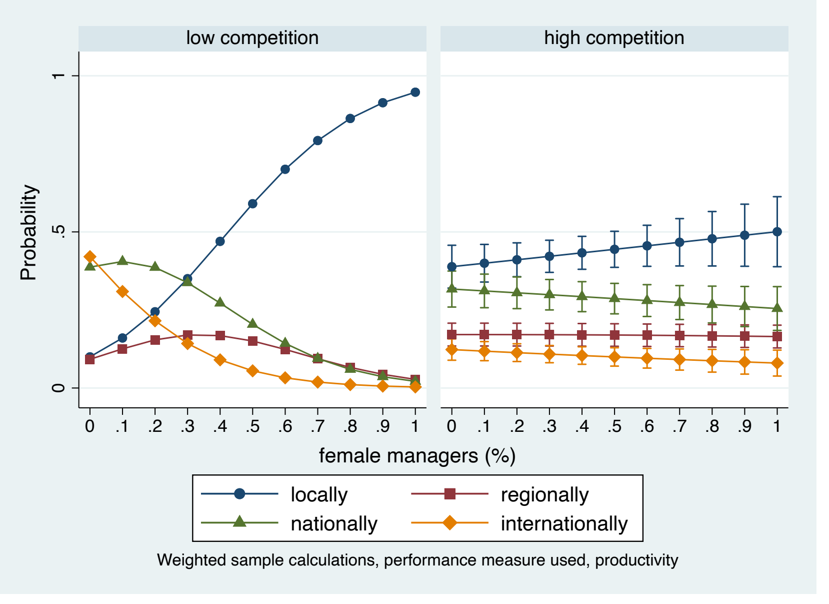
[15] It should also be noted here that approximately 75% of the firms fall in the top tier of the competition variable and only 8% in the low competition variable, which also justifies the similarities of the plots presented between Figure 2 and high competition in Figure 3. The results broadly agree with those generated when different cut-off points are used to create the competition tiers.

Table 11. The combined effect of competitiveness and % of female managers, ordered logit

	(1) Coef.	(2) Coef.	(3) Coef.
Fem. Managers (%)	-5.760***	-5.802***	-5.526***
	(1.684)	(1.641)	(1.646)
Level of competition			
Average	-1.095	-1.121	-1.103
	(0.900)	(0.858)	(0.872)
High	-1.918**	-1.803**	-1.833**
	(0.750)	(0.726)	(0.730)
Competition interactions			
Average* Fem. Managers (%)	3.617**	3.779**	3.443*
	(1.837)	(1.785)	(1.796)
High*Fem. Managers (%)	5.228***	5.239***	4.870***
	(1.698)	(1.662)	(1.662)
Controls			
Size	0.380***	0.337***	0.342***
	(0.090)	(0.094)	(0.096)
Age	-0.009	-0.016	-0.041
	(0.102)	(0.100)	(0.102)
F.O.	0.409	0.466	0.455
	(0.440)	(0.468)	(0.475)
Productivity			
Around average or above	0.398		
	(0.348)		
Much higher than average	1.320***		
	(0.468)		
Profit			
Around average or above		0.518	
		(0.318)	
Much higher than average		1.357***	
		(0.448)	
Quality			
Around average or above			-0.432
			(0.370)
Much higher than average			-0.305
			(0.392)
Constant cut1	-2.252**	-2.148**	-3.229***
	(0.910)	(0.876)	(0.922)
Constant cut2	-1.438	-1.339	-2.435***
	(0.909)	(0.873)	(0.918)
Constant cut3	0.574	0.676	-0.446
	(0.922)	(0.879)	(0.931)
Industry Dummies	Yes	Yes	Yes
Observations	1,181	1,181	1,181

Notes: The dependent variable is geographic spread as previously defined. The level of competition is a subjective categorical measure (i.e., low, average and high). Other variables as described in Table 1. Lowest group omitted for productivity, profitability, quality and level of competition. Ordered logit estimation with robust standard errors in parentheses. Stars denote significance as follows: *** p<0.01, ** p<0.05, * p<0.1

Figure 3. Predictive margins with 95% CIs from ordered logit, weighted sample



5. Conclusions

Motivated by previous literature on the relationship between gender diversity on the board and firm performance this article provides for the first time evidence of how the gender composition of the managerial team relates to the firm's degree of geographic spread. We explore the former relationship using data from the WERS6, the latest survey in the WERS series and we use appropriate weights to make our results representative of the UK population. Firms that sell their product/ service internationally have the highest degree of geographic spread instead firms that operate locally have the lowest degree of geographic spread.

Overall, we observe a negative relationship between the *share of female managers* and *geographic spread* that holds both in the unweighted and weighted samples. When holding the various controls (e.g., size of the firm, age, productivity etc.) at their mean values, the UK weighted sample reveals that for a fully gender diversified managerial team there are relatively high probabilities the firm to operate at a local scale and low probability to operate at a global scale. As the share of female managers increases, these probabilities will increase for selling locally and decrease for selling globally but will not cross-over. Based on previous literature, we hold gender-differences towards risk and competition responsible for these findings. This on the basis that managerial roles within firms that operate nationally or globally bear greater levels of risk and competition, and it has been documented that on overage women shy away from risk and competition. We moved on further to control for the competition faced in the market by augmenting initial regression with an ordinal competition variable. This allows interacting the share of female managers with competition levels to gain further insights. Specifically, for high levels of competition in the market predictive probabilities remain largely unchanged. For low levels of competition, we highlight two features. Firstly, low share of female managers is associated with greater geographic spread; this is opposite to what we get for high competition and from the original model. Secondly, when competition is considered low, there is a rapid increase of the probability to sell locally against all other three tiers, as the share of female managers increases. These two new observations point towards further justifications for the phenomenon of high concentration of women managers in firms that operate locally. For example, greater job flexibility of working hours that facilitates work-life balance is particularly important for working women that also have enhanced household responsibilities; additionally, women have been documented to be significantly more prone than men towards community related activities and services making it therefore more likely to have greater representation of women managers in firms that operate locally.

With these results at hand, it can be argued that a legislative action in favour of gender-parity in senior and executive managerial positions may trigger both positive and negative welfare effects. On the one side, as women are more prone to engage their companies in philanthropy and community related activities, we should expect a positive welfare effect coming from the contributions of the larger and more productive companies to the community. These can take the form of donations or even interactions between firms and communities that will offer great enrichment of experiences and motivation for future career paths. On the other side, reducing the flexibility at which managerial appointments are made may create within firm inefficiencies as it may prevent firms from operating on or close enough to their productivity frontier. This potential loss in productivity may have wider regional or national impact if exemplified.

Of course, our results are not without limitations. To begin with, the dataset has lastly updated in 2011 yet, is the only publicly available dataset that links employers and employees and allows to answer a broad range of questions. Due to restrictions on data access, we do not incorporate objective measures of performance. A panel dataset would also allow us to make some of our covariates predetermined and therefore address reverse causality which would further allow us to interpret the results as causal effects rather than associations. Until future data availability and development of more sophisticated techniques which will allow addressing the former limitations, we believe our results serve a starting point for investigating further the relationship between gender diversity and firm's geographic spread and allow to add some thoughts on the greater debate of gender diversity in the workplace.

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