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Does boardroom diversity impact the financial performance of FTSE 350 firms?

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Jeremy Smith (Head of the Department of Economics, University of Warwick) and Michael Ward (Head of the Department of Economics, Monash University)

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Does boardroom diversity impact the financial performance of FTSE 350 firms?

Iarina Corniciuc*

Abstract

This paper examines the impact of diversity on a firm's financial performance, a topic which requires more research due to the fast changes in boardroom composition and the inconclusive previous literature. The main analysis utilises panel data with a fixed effect model to examine FTSE 350 UK firms between 2001 and 2020. Results show that the percent of females is positively and significantly correlated with the two firm performance variables, Tobin's Q and ROA. Initial results also show that a higher count of nationalities have a positive and significant impact on firm performance. These results are in line with various theories which state that diverse groups are found to be more innovative as they cover a wider range of knowledge. The paper provides empirical proof of token theory, which states that gender diversity below a threshold of 15% has a negative impact on a firm's performance. This could be due to being perceived as a minority causing isolation, which in turn impacts performance. Results also show that the critical mass point, where most benefits are reaped in the relationship, lies at 40% and above female directors. This is in line with the proposed EU directive of a quota of 40% female directors. *JEL* Codes: G34, G38, J15, J16, J48.

Keywords: Corporate Governance, Board Diversity, Critical Mass Theory, Token Theory, Performance

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Online Appendix: https://www.dropbox.com/s/7aq6ipl00170opj/Appendix.pdf?dl=0.

1 Introduction

1.1 Introduction and Motivation

Women and minorities have traditionally been missing from top managerial positions (Farrell and Hersch, 2005). When surveyed in 1998, CEOs argued that one of the main reasons for the lack of boardroom diversity was due to women not being in the pipeline long enough (Ragins et al., 1998). Now an inflexion point is occurring, where boardroom composition is changing rapidly. As of 2020, UK FTSE 350 firms reached an average of 33% female directors (BoardEx, 2020).

The moral argument for attaining a diverse workforce is irrefutable. However, as Karen J. Curtin highlights, former Executive VP of the Bank of America, there exists a contrast in those who argue the moral case and those who argue the economic case for diversity. She concludes that unless we provide proof of the latter, we will only be faced with the rebuttal of tokenism (Brancato and Patterson, 1999).

The aim of this paper is to analyse whether boardroom diversity impacts the financial performance of FTSE 350 firms in the UK. With the objective of reaching a conclusive result on this relationship and breaching the gap on literature that empirically examines token theory and critical mass theory. Previous literature has shown a range of results such as positive (Torchia et al. 2011, Joecks et al., 2012; Post and Byron, 2015), insignificant (Pletzer et al., 2015;), and negative (Ahern and Dittmar 2012).

My contribution to the literature on boardroom composition is fourfold: my paper uses one of the most recent and extensive time periods from 2001 to 2020; it is the first to examine the impact of nationality diversity on the UK's FTSE firms; it questions the 15% threshold proposed by token theory and lastly, it examines the critical mass theory proposing a new critical mass point. Both token and critical mass theory have not yet been empirically examined on FTSE 350 firms in the UK, thus my research is contributing to bridging the gap in literature.

My paper uses panel data fixed effects techniques, using data of FTSE 350 UK firms collected from 2001 to 2020. The two performance variables are Tobin's Q and return on assets, and the two diversity measures are female diversity and nationality diversity. To check the robustness of the initial results a 2SLS regression and the Arellano-Bond estimator are used.

The initial results show that boardroom diversity has a positive and significant impact on the financial performance of FTSE 350 firms in the UK. My paper provides empirical proof of the token theory and concludes that the critical mass point of gender diversity lies at 40% and above in line with the EU directive proposing a quota of 40% female directors.

My paper will be categorised into six sections. Section 2 will cover previous literature and the theoretical framework of diversity. Section 3 provides an overview of my data and methodology including descriptive statistics and diagnostic tests. Section 4 presents my results and section 5 outlines potential issues and alternate models to mitigate them. Lastly, section 6 concludes on the results and discusses possible areas of future research.

2 Literature Review

2.1 Gender Diversity

Kanter studies the discriminatory behaviour of highly skewed male Fortune 500 firms, defining the dominant group as representing 85% and the skewed group as representing 15% or below, thus coining the term 'tokenism'. The theory hypothesizes that individuals in senior positions expend more energy than dominant groups trying to assimilate, causing stress and isolation, which can in turn impact their performance (Singh and Vinnicombe, 2004; Gustafson, 2008). Token theory was developed as an extension of the critical mass theory (Connolly and Schelling, 1979), which hypothesizes that the benefits of heterogenous teams can only be observed beyond a certain threshold, labelled a critical mass point. This specific point is yet to be collectively agreed on in academic literature. Diverging results in previous literature could be attributed to the different methodologies applied, such as measures of firm performance, indexes of boardroom diversity and estimation methods.

Post and Byron (2015) present one of the most recent and extensive papers to explore the relationship between female directors and a firm's financial performance. Their meta-analysis which combines 140 studies finds a statistically significant positive relationship for ROA and female directors. The paper discusses the importance of socio-cultural context, as a stronger relationship is observed in countries with greater gender parity. A similar meta-analysis by Pletzer et. al (2015) using 20 studies finds a non-significant effect, given the similar time period of the two studies, the difference in results could be attributed to the smaller sample size. Both papers present limitations as models to mitigate for endogeneity issues, such as 2SLS estimations and lagged dependant variables, are not possible for meta-analysis.

Torchia et al. (2011) is one of the few papers exploring the critical mass theory. The paper studies 317 Norwegian firms between 2005 and 2006 and finds that three women have a statistically significant positive impact on the firm's self-reported innovation. However, the paper is limited due to the narrow time frame and the use of a subjective firm performance measure, which can run into a number of self-reported response biases. Brahma et al. (2020) examine the relationship between gender diversity and the financial performance of FTSE 100 firms in the UK between 2005 to 2016 and conclude that there is a positive relationship. In line with Torchia et al. (2011), the paper finds that the relationship becomes more significant when three or more females are appointed and hence determines this to be the critical mass point.

Joecks et al. (2012) uses a panel dataset of 151 publicly listed firms in Germany between 2000 and 2005 and finds a U-shaped relationship between gender diversity and firm performance. It examines the critical mass point and determines it to lie at 30%, around 3 women, similar to previous findings (Torchia et al., 2011; Brahma et al., 2020). It is one of the only papers to empirically examine token theory, for which it finds proof that balanced boards of 40% or more female directors outperform skewed boards of 15% or less female directors. However, there is potential to build on the methodology used by Joeck's et al. (2012), directly examining the threshold of 15%, which is carried out in my paper.

2.2 Nationality Diversity

Similar to the literature on gender diversity, previous research on nationality diversity presents mixed results. Sarhan et al. (2018) explore the impact of nationality diversity on 100 firms in the Middle East for the period 2009 to 2014 and find a positive relationship, which holds after further robustness checks. Similarly, Chebri and Bahoussa (2020) analyse the impact of nationality diversity on the financial performance of Moroccan banks for the time period of 2014 to 2018 and find no significant impact on ROA and ROE. However, the insignificant relationship could be due to the small sample size of six banks. Finally, García-Meca et al. (2014) explore the same relationship for 159 banks in nine countries between 2004 and 2010. Their study

finds that nationality diversity decreases the financial performance of firms.

Despite the literature discussed, no consensus has been reached on the impact of gender and nationality diversity on a firm's financial performance. Furthermore, the majority of the literature concerning gender diversity does not consider a critical mass point or token theory. This gap in research provides an opportunity for an extension in my paper examining the two theories. This paper will also develop on previous methodologies used and address the limitations discussed to conclude on the relationship between diversity and firm performance.

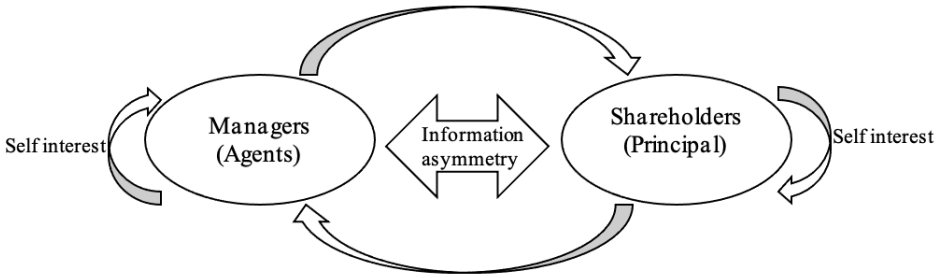
2.3 Diversity: Theoretical Framework

There exist many theoretical frameworks concerning the efficacy of corporate governance. A single theory does not suffice to explain the complex relationship between diversity and firm performance (Gyapong et al. 2016; Salloum et al. 2017; Sarhan et al. 2018). However, some of the most prominent theories such as the agency theory, resource dependence theory and stakeholder theory can be collectively used to provide a theoretical framework for diversity (Kiel and Nicholson, 2003).

2.3.1 Agency Theory

Agency Theory (Jensen and Meckling, 1976) as illustrated in figure 1, proposes that there exists information asymmetry between managers (agents), and the shareholders (principals) due to conflicting objectives motivated by their own self-interest (Reddy Jadhav, 2019). A heterogeneous board of directors can better mitigate the agency problem. This is because directors from diverse backgrounds are more likely to challenge each-others approach and bring a different perspective which can lead to better monitoring and governance. Therefore, according to the Agency Theory, increasing diversity of boardrooms can increase efficacy of corporate governance and consequentially can increase firm performance.

Figure 1: Agency Theory



2.3.2 Resource Dependence Theory

Resource Dependency Theory (Pfeffer and Salancik, 1978) proposes that the board of directors provides important links to outside resources that the firm requires. Directors' access to these external relationships and organisations can provide unique expertise, information and suppliers which can in turn improve a firm's performance. According to the Resource Dependency Theory, directors from different backgrounds can strengthen access to external resources improving a firm's performance.

2.3.3 Stakeholder Theory

Stakeholder Theory (Freeman, 1984) outlines how to best address the interest of firm's stakeholders, such as employees, suppliers and customers. It is hypothesized that heterogenous boardrooms can better represent a wider range of a groups' needs and allows for more open corporate governance (Hillman et al. 2002). Therefore, according to the Stakeholder Theory, a heterogenous board of directors will better account for and represent the needs of all stakeholders and in turn can increase firm performance.

3 Methodology

3.1 Data

The analysis uses panel data collected from the database FAME (Financial Analysis Made Easy), published by Bureau van Dijk. The dataset consists of 3,615 observations from 296 UK firms covering the time-period from 2001 to 2020. The paper examines FTSE 350 firms as it is more policy relevant, due to the government actively monitoring the gender and ethnic diversity of listed companies. However, this is carried out through soft policies such as proposing commitments to voluntary targets, such as the Women in Finance Charter, and pressure to publicly disclose their boardrooms composition. Furthermore, firms in the UK are chosen as they provide the right socio-cultural context to validate women's human capital (Post and Byron, 2015).

3.2 Methodology

The diversity of boardrooms is measured by gender and nationality. Gender diversity is captured firstly by the percent of females and secondly by female presence which is a dummy variable equal to one when there is at least one female director and zero otherwise. Nationality diversity is measured by the different numbers of nationalities present on the board, grouped into 12 different categories. As a robustness check two firm performance variables are used: an accountancy-based measure (ROA) and a stock-based measure (Tobin's Q). The control variables include firm size and board size and a time dummy (D_t), to control for factors changing over time. Detail on how the variables are constructed is available in table 10 in the appendix. Three estimation methods are used, Pooled OLS, Random Effects and Fixed Effects, of which the latter two include year and industry fixed effects. This can be summarised in my baseline equation:

$$\begin{aligned}\text{FirmPerformance}_\text{i}\text{t} = \alpha + \text{D}_\text{t} + \beta_1\text{DiversityVariable}_\text{it} + \beta_2\text{logFirmSize}_\text{it} \\ +\beta_3 BoardSize_{it} + \epsilon_{it}\end{aligned} \tag{1}$$

As an extension, this paper examines the token theory using the dummy variable token female equalling to 1 when percent of female directors is below 15% and zero otherwise. This examines the impact that female directors, forming a minority part of the boardroom, has on firm performance. The following equation is constructed:

$$\begin{aligned}\text{FirmPerformance}_\text{i}\text{t} = \alpha + D_t + \beta_1 TokenFemale_{it} + \beta_2 logFirmSize_{it} \\ +\beta_3 BoardSize_{it} + \epsilon_{it}\end{aligned} \tag{2}$$

This paper further examines the critical mass theory, which is categorised into five dummy variable groups. The first dummy variable, group one, is equal to one when the percent of females is less than 10% and 0 otherwise, this is used as a base group so is excluded from the regression. Groups two to five measure the percent of females between 10% and 20%, 20% and 30%, 30% and 40% and of 40% and above accordingly. The following equation is constructed:

$$\begin{aligned}\text{FirmPerformance}_\text{i}\text{t} = \alpha + D_t + \beta_1 Group2_{it} + \beta_2 Group3_{it} \\ +\beta_3 Group4_{it} + \beta_4 Group5_{it} + \beta_5 logFirmSize_{it} \\ +\beta_6 BoardSize_{it} + \epsilon_{it}\end{aligned} \tag{3}$$

3.3 Descriptive Statistics

Table 1 shows the descriptive statistics of the main variables in the dataset. The mean Tobin's Q lies 1.36, this is above 1 which means that the market value of FTSE 350 firms is higher than their recorded value of assets. Therefore, investors expect that the firm's existing assets are able to generate higher value. The mean ROA lies at 8.25 per cent, indicating that the average company is utilizing its assets to generate profit. However, there is a lot of variation, as Tobin's Q ranges from 0.00 to 78.17, and ROA ranges from -84.04 to 311.17. The boardroom has a mean number of 1.83 female directors and a mean number of 2.45 nationalities. The mean number of total directors is 10.88, and female directors form on average 16.56% of the total.

Table 1: Summary Statistics

	Mean	Median	Standard Deviation	Minimum	Maximum
Tobin's Q	1.360	0.843	3.116	0.006	78.168
ROA	8.251	6.026	16.466	-84.036	311.173
Total Females	1.834	2.000	1.410	0.000	8.000
Percent Females	16.557	16.667	11.764	0.000	66.67
Female Dummy	0.813	1.000	0.390	0.000	1.000
Token Female	0.471	0.000	0.499	0.000	1.000
Nationality Count	2.451	2.000	0.823	1.000	6.000
Board Size	10.881	11.000	3.140	3.000	26.000
Firm Size	14.635	14.295	1.823	10.559	21.599

Figure 2 shows the average number of female directors and total directors of FTSE 350 firms between 2001 and 2020. There is a clear positive trend between the relationship of female directors and total directors. This indicates that firms have not substituted boardroom directors with female directors, but rather have increased the size of the boardroom to incorporate female directors, thus board size is used as a control variable.

Figure 2: Board Composition of UK FTSE 350 Firms

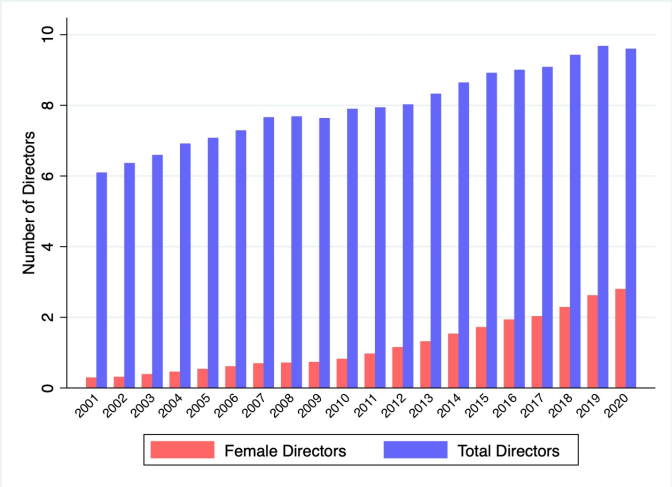
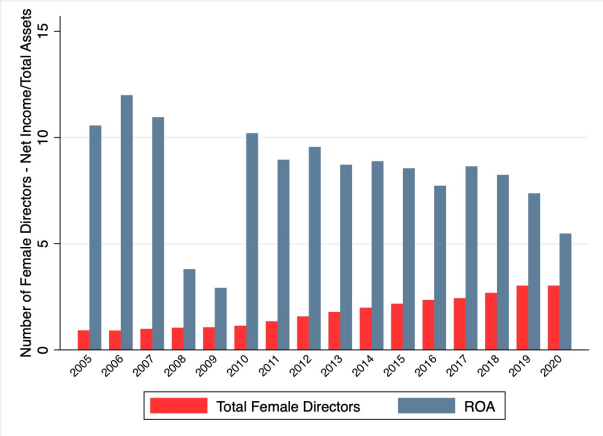


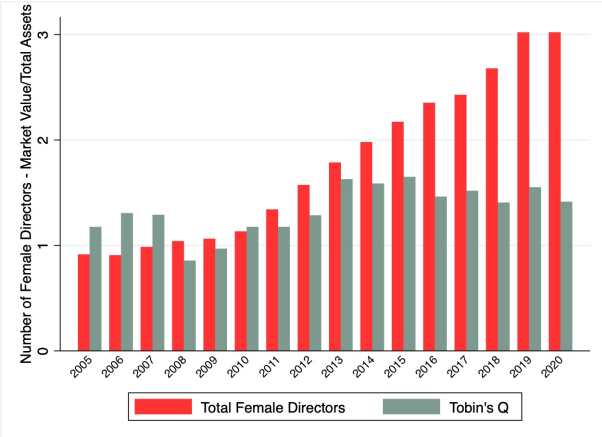
Figure 3 shows the average firm performance and number of female directors of FTSE 350 firms between 2001 to 2020. Across this time there is a gradual increase of female directors from around 1 to 3. Figure 3a (a) shows the average number of female directors and ROA. There appears to be no clear trend between female directors and ROA. Figure 3b shows the average number of female directors and Tobin's Q. There appears to be a clearer relationship between the two variables albeit nonlinear. Similar graphs are plotted for nationality diversity and firm performance in figure 4 and 5 in the appendix, for which no clear relationship is observed.

Figure 3: Female Directors and Performance Variables

(a) Female Directors & ROA



(b) Female Directors & Tobin's Q



3.4 Diagnostic Tests

A number of diagnostic tests are run previous to my analysis. Firstly, to determine whether there is an issue of multicollinearity, I construct a pair-wise correlation matrix. As can be seen in table 11 in the appendix, there is no multicollinearity problem as no two variables exceed 0.9. This is further supported by the VIF test, which does not exceed the threshold of 10 proposed by Gujarati (2009). Furthermore, to test for heteroscedasticity, I run the Breusch-Pagan test. As can be seen in table 12 in the appendix, given that the p value is 0, the null hypothesis that the error term is normally distributed is rejected. Thus, heteroscedasticity is accounted for by using robust standard errors in all the estimation models. Lastly, to determine the best fit model, I run the Hausman test, as can be seen in table 13 in the appendix. Given that the p value is 0, I reject the null hypothesis that the random effects are independent and select the fixed effects estimator as the most appropriate model to estimate the relationship between diversity and firm performance.

4 Results

4.1 Percent of Females

Table 2: Regression Table Using Percent of Females

	(1) POLS ROA	(2) RE ROA	(3) FE ROA	(4) POLS Tobin's Q	(5) RE Tobin's Q	(6) FE Tobin's Q
PFemale	0.173***	0.174***	0.162**	0.0316***	0.0316**	0.0301**
	(0.0319)	(0.0628)	(0.0612)	(0.00610)	(0.0134)	(0.0132)
FirmSize	-3.512***	-3.549***	-3.049*	-0.747***	-0.748**	-0.697**
	(0.438)	(1.208)	(1.354)	(0.0981)	(0.296)	(0.308)
BoardSize	1.035***	1.060***	0.786*	0.225***	0.226***	0.197*
	(0.170)	(0.377)	(0.383)	(0.0361)	(0.0877)	(0.0891)
_cons	44.05***	41.94***	37.50**	9.290***	9.221***	8.794**
	(4.216)	(13.86)	(14.51)	(0.951)	(3.256)	(3.281)
Industry FE		X	X		X	X
Year FE		X	X		X	X
N	3615	3615	3615	3615	3615	3615
R^2	0.114		0.089	0.117		0.099

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2 shows the pooled OLS, random effects and fixed effects regressions for the two performance variables, ROA and Tobin's Q accordingly using the explanatory variable percent of females. The results show a positive and statistically significant relationship for all three models. However, the fixed effects estimation, seen in model 3 and 6, is the best fit model to analyse the relationship between percent of females and firm performance. Fixed effects accounts for time-constant unobserved heterogeneity and hence has more limited sources of bias than the pooled OLS estimator (Collischon and Eberl, 2020). Further to this, as determined by the Hausman test, the fixed effects model is a better fit than the random effects model.

The coefficient for model 3 and 6 is positive and significant at the 0.05 percent level. This means that increasing the percent of female directors on the board will increase the financial performance of FTSE 350 firms. This supports the theoretical framework of agency theory, resource dependence theory and stakeholder theory which provide various arguments as to why heterogenous teams can improve the efficacy of corporate governance. Regarding the control variables, the firm size coefficient is negative and significant at the 0.1 percent level for models 3 and at the 0.05 percent level for model 6. This means that larger firms have weaker financial performance. The coefficient for board size is positive and significant at the 0.05 percent level for both models 3 and 6. This means that firms with larger boardrooms will have stronger financial performance.

4.2 Female Presence

Table 3: Regression Table Using Female Presence

	(1) POLS ROA	(2) RE ROA	(3) FE ROA	(4) POLS Tobin's Q	(5) RE Tobin's Q	(6) FE Tobin's Q
DFemale	2.809***	2.736**	2.497*	0.531***	0.528**	0.482*
	(0.590)	(1.386)	(1.290)	(0.0736)	(0.260)	(0.223)
FirmSize	-3.440***	-3.476***	-2.979*	-0.734***	-0.736**	-0.684**
	(0.429)	(1.177)	(1.320)	(0.0962)	(0.289)	(0.301)
BoardSize	0.997***	1.025***	0.758*	0.218***	0.219***	0.191*
	(0.170)	(0.356)	(0.366)	(0.0360)	(0.0821)	(0.0851)
_cons	45.68***	43.56***	39.00**	9.577***	9.497***	9.062**
	(4.510)	(14.48)	(15.15)	(1.008)	(3.371)	(3.409)
Industry FE		X	X		X	X
Year FE		X	X		X	X
N	3615	3615	3615	3615	3615	3615
R^2	0.107		0.082	0.111		0.093

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3 shows the pooled OLS, random effects and fixed effects regressions for the two performance variables, ROA and Tobin's Q accordingly using the explanatory variable female presence. This is a dummy variable which explores whether there is a difference in the performance of firms that have at least one female director in comparison to firms that have no female directors present. The female presence coefficient is positive and significant at the 0.1 percent level for both models 3 and 6. This means that FTSE 350 firms with at least one female director have higher financial performance than firms with no female directors.

It should be noted that the significance level is lower when using female presence in comparison to the models using percent of females in table 2 which is significant at the 0.05 percent level. This could be due to Kanter's token theory, which specifies that below a 15% threshold female presence will not be as significant due to not being treated as an individual, but rather being perceived as a token. When the dummy variable is equal to one, it also includes firms that have female directors below the 15% threshold who are in the minority group and hence this could be weakening the relationship.

4.3 Token Theory

Table 4: Regression Using Token Female

	(1) FE ROA	(2) FE TobinQ
TokenFemale	-2.494***	-0.470**
	(0.688)	(0.181)
FirmSize	-3.040**	-0.695**
	(1.331)	(0.305)
BoardSize	0.784*	0.196*
	(0.378)	(0.0884)
_cons	42.34**	9.700**
	(15.95)	(3.618)
Industry FE	X	X
Year FE	X	X
N	3615	3615
R^2	0.084	0.095

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, ***$p < 0.01$

Table 4 shows the fixed effects regressions for the two performance variables, ROA and Tobin's Q accordingly using the explanatory variable token female to test for Kanter's token theory. The variable token female is a dummy variable equalling to 1 when the percent of female directors is below 15% an equalling to 0 otherwise. The coefficient token female is negative and highly statistically significant at the 0.01 percent level for model 1 and significant at the 0.05 percent level for model 2. This means that firms whose boardrooms have less than 15% female directors have a lower financial performance in comparison to those that have more than 15% female directors. These results provide empirical proof of the token theory, showing that female directors forming a skewed proportion of the boardroom of 15% and less underperform due to being perceived as a token.

4.4 Critical Mass Theory

Table 5: Regression Table Using Sex Ratios

	(1) FE ROA	(2) FE TobinQ
10-20%	1.750***	0.291**
	(0.505)	(0.104)
20-30%	3.915**	0.686**
	(1.216)	(0.292)
30-40%	4.037***	0.648**
	(0.981)	(0.219)
40%>	9.233*	1.766*
	(4.281)	(0.960)
FirmSize	-3.028**	-0.690**
	(1.322)	(0.301)
BoardSize	0.816*	0.202*
	(0.392)	(0.0918)
_cons	37.21**	8.747**
	(14.17)	(3.202)
Industry FE	X	X
Year FE	X	X
N	3615	3615
R^2	0.091	0.101

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5 shows the fixed effects regressions for the two performance variables, ROA and Tobin's Q accordingly using five sex ratios to examine the critical mass theory. Critical mass theory states that there exists a specific point, known as the critical mass point, where most benefits are reaped in a relationship. The sex ratios are categorised into five groups, of which the first grouping, of 0-10% percent female directors is used as a base group and is excluded from the regression.

The results show that balanced boardrooms of 40% and above have the highest positive coefficient. This means that firms with 40% or more female directors will have the highest financial performance. The coefficients for both models 1 and 2 are statistically significant at the 0.1 percent level. This is not as significant as the other sex ratio groupings, but this could be due to the limited data for balanced boardrooms, as many firms are yet to reach this level. From these results, it can be concluded that the critical mass point lies at 40%, or 4 or more female directors given that the mean board size in the sample is 10.88. This differs from previous literature which concludes that the critical mass point lies at 30% or 3 female directors.

4.5 Nationality Diversity

Table 6: Regression Table Using Count of Different Nationalities

	(1) POLS ROA	(2) RE ROA	(3) FE ROA	(4) POLS Tobin's Q	(5) RE Tobin's Q	(6) FE Tobin's Q
NationalityCount	1.030***	1.226***	0.882***	0.215***	0.217***	0.175***
	(0.238)	(0.183)	(0.142)	(0.0361)	(0.0390)	(0.0316)
PFemale	0.171***	0.171***	0.160**	0.0310***	0.0310**	0.0297**
	(0.0319)	(0.0606)	(0.0593)	(0.00609)	(0.0130)	(0.0128)
FirmSize	-3.620***	-3.673***	-3.161**	-0.770***	-0.770***	-0.719**
	(0.438)	(1.185)	(1.346)	(0.0981)	(0.293)	(0.307)
BoardSize	0.970***	0.979***	0.739*	0.212***	0.212**	0.187*
	(0.172)	(0.374)	(0.373)	(0.0363)	(0.0875)	(0.0870)
_cons	43.62***	41.71***	37.51**	9.200***	9.179***	8.797**
	(4.216)	(13.93)	(14.51)	(0.951)	(3.266)	(3.283)
Industry FE		X	X		X	X
Year FE		X	X		X	X
N	3615	3615	3615	3615	3615	3615
R^2	0.116		0.090	0.120		0.101

Robust standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6 shows the pooled OLS, random effects and fixed effects regressions for the two performance variables, ROA and Tobin's Q accordingly using the explanatory variable nationality count. This variable measures the different number of nationalities on the board of directors. The coefficient is positive and highly statistically significant at the 0.01 percent level. This means that increasing the number of different nationalities on the boardroom will increase the financial performance of FTSE 350 firms, in line with the theoretical framework set out in section 2.3.

5 Robustness Checks

5.1 Endogeneity

While panel data fixed effects technique addresses some endogeneity issues arising from omitted variable bias and unobserved changes over time, there still exists a problem of reverse causality. This puts into question whether the increase in financial performance is due to the contribution of a diverse boardroom, or alternatively, whether high-performing firms are attracting a more diverse pool of candidates due to their success. Reverse causality plagues many previous papers looking at the governance of boardrooms and can explain the mixed results in previous literature. Adam and Ferreira (2009) highlight the challenge of mitigating this problem, as potential instrumental variables that correlate with gender diversity are already included in the regression to control for performance. Therefore, I choose to explore the exogenous shock from a policy change to corporate governance in order to obtain an instrumental variable and run a pooled and fixed effects 2SLS regression. As a further robustness check, to mitigate for issues such as reverse causality, I use an Arellano-Bond Dynamic Panel GMM estimation. As a last robustness check, as seen in table 18 in the appendix, I run the baseline regression with a higher sample size for ROA and identify that sample size doesn't impact the initial relationship observed.

5.2 2SLS Analysis

Table 7: 2SLS Regression Table

	(1) pooled-2SLS ROA	(2) FE-2SLS ROA	(3) pooled-2SLS TobinQ	(4) FE-2SLS TobinQ
PFemale	0.145**	0.123**	0.0624***	0.0603***
	(0.0564)	(0.0557)	(0.0108)	(0.0108)
FirmSize	-3.555***	-3.101***	-0.775***	-0.727***
	(0.455)	(0.450)	(0.103)	(0.101)
BoardSize	1.075***	0.840***	0.223***	0.195***
	(0.169)	(0.162)	(0.0357)	(0.0340)
_cons	48.54***		9.322***	
	(4.394)		(0.985)	
Kleinbergen-Paap Wald F		1263.331		1026.727
Kleibergen-Paap rk LM		954.467		749.064
Industry FE		X		X
Year FE		X		X
N	3615	3615	3615	3615
R^2	0.097	0.069	0.105	0.087

Notes: Stock–Yogo critical values for partial F statistics are 6.38 for 10% and 8.96 for 15%. The Kleibergen-Paap rk Wald F statistic tests for weak instruments, the statistic is above the critical value suggesting a strong instrument. Kleibergen-Paap rk LM statistic tests for underidentified in the equation, the p value is 0 thus the null hypothesis that the equation is underidentified is rejected.
Standard errors in parentheses, $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

I choose to exploit the exogenous variation from the change to the Corporate Governance Code (The Code) in order to find a suitable instrumental variable. The change to The Code demanded that "all Chairmen of FTSE 350 companies should set out the percent of women they aim to have on their boards in 2013

and 2015" (Davies, 2011). Policy changes are a form of natural experiments, as they exhibit similar characteristics to a randomised experiment (Angrist and Krueger, 2001). This is a similar approach to previous papers carried out in countries like Norway and Italy, where boardroom quotas have been introduced (Ahern and Dittmar, 2012). I perform a pooled and fixed effects 2SLS estimation, instrumenting for the endogenous variable percent of females with a dummy variable accounting for the year that the 'The Code' was amended in October 2011.

A valid instrumental variable needs to satisfy the instrumental exogeneity and relevance criteria (Wooldridge, 2013). While the exogeneity criteria is hard to be tested for, it can be argued that it is met due to the exogenous nature of the policy change, and hence it is independent of the error term. The Kleibergen-Paap Wald F statistics seen in table 7 testes for the weakness of the instrument. Given that it is above the 15% critical value it meets the second criteria of instrumental relevance.

Table 7 shows the pooled and fixed effects 2SLS estimation for the two performance variables, ROA and Tobin's Q accordingly. The coefficients across all the models are positive and highly statistically significant at the 0.01 percent level in line with the main findings in section 4. Given the assumption that the instrumental exogeneity criteria is met, this is a more robust model as it accounts for unobserved heterogeneity and reverse causality.

5.3 Arellano-Bond Estimator

A further method to mitigate for reverse causality is to use a cross-lagged panel model with fixed effects (Allison et al. 2017). Therefore, as a further robustness check I use the Arellano-Bond Dynamic Panel GMM estimation for the two explanatory variables gender and nationality which contains the dependent variables (ROA and Tobin's Q) as lagged independent variables. This model accounts for the dynamic relationship between boardroom diversity and previous firm performance and controls for possible endogeneity issues arising from reverse causality (Leszczensky and Wolbring, 2019). As can be seen in tables 14, 15, 16 and 17, The J p value, MBIC, MQIC and MAIC criteria imply an optimal lag of a one time period, hence the performance variables are lagged by one year.

Table 8: Dynamic Panel Estimation with Percent Female

	(1) ROA	(2) TobinQ
PFemale	0.0496***	0.00215
	(0.0172)	(0.00135)
L.ROA	0.693***	
	(0.169)	
L.TobinQ		0.971***
		(0.0124)
FirmSize	-1.117***	-0.100***
	(0.175)	(0.0327)
BoardSize	0.296***	0.0294**
	(0.0883)	(0.0120)
[1em] _cons	-241.3	1.087***
	(318.7)	(0.376)
Industry FE	X	X
Year FE	X	X
N	3299	3299
R^2		

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8 shows the dynamic panel data results of the explanatory variable percent of females. The coefficient of percent of females is positive and strongly statistically significant at 0.01 percent level for ROA and positive but statistically insignificant for Tobin's Q. These results reinforce the main findings that there is a positive relationship between gender diversity and the financial performance of FTSE 350 firms.

Table 9: Dynamic Panel Estimation with Nationality Count

	(1) ROA	(2) TobinQ
NationalityCount	-4.352	0.436
	(4.740)	(0.384)
PFemale	0.0640**	0.000650
	(0.0285)	(0.00233)
L.ROA	0.694***	
	(0.170)	
L.TobinQ		0.971***
		(0.0123)
logTA	-0.646	-0.148**
	(0.586)	(0.0705)
BoardMembers	0.566*	0.00321
	(0.318)	(0.0180)
_cons	-363.8	1.007***
	(261.8)	(0.348)
Industry FE	X	X
Year FE	X	X
N	3299	3299
R^2		

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9 shows the dynamic panel data results of the explanatory variable nationality count. The coefficients of both models 1 and 2 are statistically insignificant, with ROA having a negative coefficient and Tobin's Q having a positive coefficient. These mixed results may have resulted from endogeneity issues biasing the initial findings of a strong and statistically significant relationship. Therefore, as the main results do not withstand the robustness checks, the relationship between nationality diversity and firm performance remains inconclusive.

6 Concluding Remarks

6.1 Discussion

The results of the fixed effects model, in line with the 2SLS and Arellano-Bond estimators, show a positive relationship between gender diversity and the firm performance of FTSE 350 firms in the UK. This means that increasing the percent of female directors increases firm performance. This is in line with previous research by Joecks et al. (2012) and Post and Byron (2015). Similar to the findings of Torchia et al. (2011), my paper finds empirical proof of the token theory. Furthermore, in line with previous findings by Sarhan et al. (2018), my initial results show a positive relationship between nationality diversity and firm performance. However, these results are not robust, and the initial findings may have been biased due to endogeneity issues.

One way my paper deviates from the findings by Torchia et al. (2011) and Joecks et al. (2012) is the critical mass point which I determine to lie at 40% as opposed to 30%. The reason why prior studies found a lower critical mass point may be due to there not being enough data of firms with a high proportion of female directors to draw a significant result. The critical mass point identified in my paper is in line with the proposed EU directive of a quota of 40% female directors, which was vetoed in 2012 by the UK. Nevertheless, other countries such as Spain, Norway, Germany and Italy have adopted mandatory quotas ranging from 30% to 40% female directors aligning with the critical mass points observed in previous literature and my paper. Therefore, my results would also encourage the UK to adopt a mandatory quota of 40% female directors. A further implication of my study is to encourage firms to increase the diversity of their boardrooms, which is supported both from a moral and an economic standpoint.

6.2 Conclusion

In recent years there has been increased awareness of the key role that boardroom diversity plays towards corporate governance, which has encouraged more research (Goyal et al., 2019). Nonetheless, research has provided mixed results, hence a consensus is yet to be reached on the relationship. For this reason, my paper examines the impact of boardroom diversity on financial performance of FTSE 350 firms in the UK from 2001 to 2020. It carries out this research by using panel data techniques, 2SLS analysis and the Arellano-Bond estimator. The results show that there is a statistically significant positive relationship between gender diversity and the two performance variables ROA and Tobin's Q. My results provide empirical proof of the benefits of heterogeneous teams and hence support hypotheses such as the agency theory, resource dependence theory and stakeholder theory. Furthermore, they provide proof of the token theory and of a critical mass point which lies at 40%. Regarding nationality diversity, initial regressions using panel techniques show a statistically significant positive relationship, however further models provide mixed results leading to an inconclusive result.

Despite my contribution, there are limitations to using demographic characteristics such as gender to measure diversity. While they form a critical aspect of diversity, Torchia et al. (2015) highlight that it can be seen as an essentialist view that is concealing further diversity characteristics someone may be contributing. Diversity can be captured in a multitude of ways, one being nationality as shown in my research. Further research could also include aspects such as education, professional background, and age (Adams and Borsellino, 2015; Bruno et al., 2018). These variables were not available in my data set, thus present a limitation to my paper, which future research can explore. Lastly, a key future area of research is the impact of ethnic minority directors on firm performance in the UK, for which I did not have data available. Particularly the exogenous shock generated from the Parker Review, which includes a soft policy implementation of a target of "beyond one by 2021" (Parker, 2017).

References

Adams, M. and Borsellino, G., 2015. Is there a positive link between corporate governance and board diversity? Lessons from Asia. Journal of Law and Governance, 10(1).

Adams, R. and Ferreira, D., 2009. Women in the boardroom and their impact on governance and performance. Journal of Financial Economics, 94(2), pp.291-309.

Ahern, K. and Dittmar, A., 2012. The Changing Of The Boards: The Impact On Firm Valuation Of Mandated Female Board Representation. Quarterly Journal of Economics, 127(1), pp.137-197.

Allison, P., Williams, R. and Moral-Benito, E., 2017. Maximum Likelihood for Cross-lagged Panel Models with Fixed Effects. Socius: Sociological Research for a Dynamic World, 3(1).

Angrist, J. and Krueger, A., 2001. Instrumental Variables And The Search For Identification: From Supply And Demand To Natural Experiments. SSRN Electronic Journal.

Architektonidis, A., 2021. UK FTSE 350 Reaches 33% Females on Board - BoardEx. [online] BoardEx. Available at: ¡https://www.boardex.com/ftse-350-reaches-33-females-on-board/¿ [Accessed 28 January 2021].

Brahma, S., Nwafor, C. and Boateng, A., 2020. Board gender diversity and firm performance: The UK evidence. International Journal of Finance Economics.

Brancato, C.K. and D.J. Patterson, 1999. Board diversity in U. S. corporations: Best practices for broadening the profile of corporate boards, Research Report 1230-99-RR, The Conference Board.

Bruno, G., Ciavarella, A. and Linciano, N., 2018. Boardroom Gender Diversity and Performance of Listed Companies in Italy. SSRN Electronic Journal.

Chebri, M. and Bahoussa, A., 2020. Impact of gender and nationality diversity on financial performance: A study of listed banks in Morocco. Corporate Ownership and Control, 18(1), pp.56-68.

Collischon, M. and Eberl, A., 2020. Let's Talk About Fixed Effects: Let's Talk About All the Good Things and the Bad Things. KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie, 72(2), pp.289-299.

Connolly, T. and Schelling, T., 1979. Micromotives and Macrobehavior. Administrative

Science Quarterly, 24(3), p.500.

Davies, M., 2011. Women on Boards. Government Equalities Office.

Fame, Financial Analysis Made Easy, available at: https://fame.bvdinfo.com

Farrell, K. and Hersch, P., 2005. Additions to corporate boards: the effect of gender. Journal of Corporate Finance, 11(1-2), pp.85-106.

Freeman, R. E., 1994. The politics of stakeholder theory. Business Ethics Quarterly, 4(4), pp. 409-421.

García-Meca, E., García-Sánchez, I. and Martínez-Ferrero, J., 2015. Board diversity and its effects on bank performance: An international analysis. Journal of Banking Finance, 53, pp.202-214.

Goyal, R., Kakabadse, N. and Kakabadse, A., 2019. Improving corporate governance with functional diversity on FTSE 350 boards: directors' perspective. Journal of Capital Markets Studies, 3(2), pp.113-136.

Gujarati, D. and Porter, D., 2009. Basic econometrics. 5th ed. Boston: McGraw-Hill Education.

Gustafson, J., 2008. Tokenism in policing: An empirical test of Kanter's hypothesis. Journal of Criminal Justice, 36(1), pp.1-10.

Gyapong, E., Monem, R. and Hu, F., 2016. Do Women and Ethnic Minority Directors Influence Firm Value? Evidence from Post-Apartheid South Africa. Journal of Business Finance Accounting, 43(3-4), pp.370-413.

Hillman, A., Cannella, A. and Harris, I., 2002. Women and Racial Minorities in the Boardroom: How Do Directors Differ?. Journal of Management, 28(6), pp.747-763.

Jensen, M. and Meckling, W., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), pp.305-360.

Joecks, J., Pull, K. and Vetter, K., 2012. Women on Boards and Firm Performance: What Exactly Constitutes a 'Critical Mass'?. SSRN Electronic Journal.

Kanter, R., 1977. Some Effects of Proportions on Group Life: Skewed Sex Ratios and Responses to Token Women. American Journal of Sociology, 82(5), pp.965-990.

Kiel, G. and Nicholson, G., 2003. Board Composition and Corporate Performance: how the Australian experience informs contrasting theories of corporate governance. Corporate Governance, 11(3), pp.189-205.

Leszczensky, L. and Wolbring, T., 2019. How to Deal With Reverse Causality Using Panel Data? Recommendations for Researchers Based on a Simulation Study. Sociological Methods Research.

Parker, J., 2017. A Report into the Ethnic Diversity of UK Boards. The Parker Review Committee.

Pletzer, J., Nikolova, R., Kedzior, K. and Voelpel, S., 2015. Does Gender Matter? Female Representation on Corporate Boards and Firm Financial Performance - A Meta-Analysis. PLOS ONE, 10(6), p.e0130005.

Post, C. and Byron, K., 2015. Women on Boards and Firm Financial Performance: A Meta-Analysis. Academy of Management Journal, 58(5), pp.1546-1571.

Reddy, S. and Jadhav, A., 2019. Gender diversity in boardrooms – A literature review. Cogent Economics Finance, 7(1), p.1644703.

Ragins, B., Townsend, B. and Mattis, M., 1998. Gender gap in the executive suite: CEOs and female executives report on breaking the glass ceiling. Academy of Management Perspectives, 12(1), pp.28-42.

Salloum, C., Jabbour, G. and Mercier-Suissa, C., 2017. Democracy across Gender Diversity and Ethnicity of Middle Eastern SMEs: How Does Performance Differ?. Journal of Small Business Management, 57(1), pp.255-267.

Sarhan, A., Ntim, C. and Al-Najjar, B., 2018. Board diversity, corporate governance, corporate performance, and executive pay. International Journal of Finance Economics, 24(2), pp.761-786.

Singh, V. and Vinnicombe, S., 2004. Why So Few Women Directors in Top UK Boardrooms? Evidence and Theoretical Explanations. Corporate Governance, 12(4), pp.479-488.

Torchia, M., Calabrò, A. Huse, M. Women, 2011. Directors on Corporate Boards: From Tokenism to Critical Mass. Journal of Business Ethics 102, pp.299–317.

Torchia, M., Calabrò, A. and Morner, M., 2015. Board of Directors' Diversity, Creativity, and Cognitive Conflict. International Studies of Management Organization, 45(1), pp.6-24.

Wooldridge, J., 2013. Introductory Econometrics: A Modern Approach. 5th ed. Boston, MA: Cengage Learning.