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WILL FEMALE PARTICIPATION IN TOP MANAGEMENT TEAMS IMPROVE CORPORATE SOCIAL RESPONSIBILITY EFFICIENCY?

Wang Yishu[1], Wei Xiayi[2]

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Abstract

Recently, the management value of female executives has attracted wide attention in the academic circle, and policy promotion of CSR efficiency has become a research topic. However, there are few literatures on the relationship between female executives and CSR efficiency. Therefore, the SBM-Malmquist model is used to measure and analyze CSR efficiency by taking China's listed companies as samples from 2010 to 2019, and the influence of female executives on CSR efficiency is studied based on social role theory, feminist care ethics and affective commitment. The results show that: (1) The proportion of women in the top management team has an "inverted U-shaped" influence on CSR efficiency. (2) Female executives with older age and higher education level have more promoting effect on CSR efficiency. (3) The higher the proportion of female executives with overseas backgrounds and female executives in a social part-time job, the more obvious the improvement of CSR efficiency will be.

Keywords: *Female executives; CSR efficiency; Malmquist index*
JEL Codes: *M14*

Introduction

The Fifth Plenary Session of the 19th CPC Central Committee pointed out that China has shifted to a stage of high-quality development, and we should adhere to the new development concept to promote efficiency reform and achieve more efficient development. The meeting also called for building a community of responsible social governance and regulating the ways for market players to participate in social governance. Governments play an important role in CSR in developing countries (Riliang Qu, 2007, p.198). As an important micro-market entity, enterprises' social responsibility is an important way for them to participate in social governance. The improvement effect of

[1] doctor, Business School of Changzhou University, Business School of Changshu Institute of Technology, e-mail: Wys124@163.com; ORCID ID: 0000-0003-3097-452X
[2] master, Business School of Changzhou University, e-mail address: 15715290233@163.com; ORCID ID: 0000-0003-3769-4037

external policy impact on CSR is more significant in enterprises with better management level (Kong DongminShu, Yijia & Wang Yanan, 2021, p.101317). Paying attention to the efficiency of corporate social responsibility not only conforms to the macro development trend but also helps to improve the social responsibility awareness and management ability of individual enterprises.

Relevant literature shows that it is of great significance to study CSR behaviour from the perspective of managers' characteristics. Corporate social responsibility decisions are largely shaped by management characteristics (Jinbo Luo & Qigui Liu, 2020, p.43). Female executives have a unique value in improving corporate social responsibility and have an important impact on corporate social responsibility activities (Mustika S.D. & Isnalita., 2019, p.13). Compared with male executives, female executives have a stronger sense of social responsibility and pay more attention to the fulfilment of social responsibility. However, there are few studies on the impact of female executives on CSR, and most of them focus on the perspective of CSR performance. Compared with performance, efficiency may be a better measure of the transformation relationship between CSR input and output, so that subsequent empirical studies can present the management value of female executives.

Based on social role theory, feminist caring ethics and organizational emotional commitment, this paper selects several input-output indicators related to corporate social responsibility to measure efficiency. It is expected to provide theoretical reference for enterprises to improve their management ability and personnel decision-making ability by empirically studying the effect of female executives' characteristics on corporate social responsibility efficiency. The main contributions of this paper are as follows: First, it calculates and analyzes the social responsibility efficiency level and changing trend of listed enterprises in China. According to the measurement results, CSR efficiency does not have obvious industry characteristics but is more affected by the enterprise's management ability. Second, it provides theoretical support for female executives to participate in CSR management. This paper finds that the proportion of female executives has an "inverted U-shaped" influence on CSR efficiency, and within a certain proportion, female participation in the top management team can help enterprises improve their CSR efficiency. Thirdly, the existing literature has not yet focused on the impact of the overseas background of female executives and the proportion of part-time jobs on corporate social responsibility efficiency. Through empirical research, this paper finds that the higher the proportion of female executives with overseas backgrounds and the proportion of part-time jobs of female executives, the greater the corporate social responsibility efficiency will be significantly improved.

Theoretical analysis and hypothesis development

Previous studies believe that gender is one of the most important individual difference variables (Li Yahui et al., 2021, p.102243). In the same situation, female and male executives may exhibit the alienated behaviour pattern of business trips, and then have different effects on the efficiency of social responsibility.

Social role theory holds that individual socialization process is the main cause of gender differences. Individuals are usually expected by society to perform behaviours consistent with defined gender roles and will be punished by speech for behaviours that deviate from roles. Such role positioning tends to make individuals act around social role expectations (Thomas W.H. Ng, Simon S.K. Lam, & Daniel C. Feldman., 2016, p.11). For a long time, women have been given roles such as social orientation and stronger altruistic tendencies. In the context of female identity, female executives are considered to have strong social awareness, pay more attention to "soft" issues such as corporate social responsibility (Ayman Issa & Hong Xing Fang, 2019, p.577), and pay more attention to the value demands of stakeholder groups (Ioanna Boulouta, 2013, p.185). Such a role concept makes female executives have to devote themselves to improving the efficiency of social responsibility. In the case of limited resources, they will still use their management skills to improve the social value of the enterprise to meet the expectations and positioning of the society on the role of women and avoid the doubts and criticism from the role of women.

Feminist ethics of care holds that women have a unique "empathy" and pursue caring ethics that attaches importance to relationship and responsibility. They have a strong ability to empathize with people around them. Female executives can more deeply understand the needs of internal and external stakeholders of the enterprise, perceive the social responsibilities of the enterprise, and then pay more attention to the performance of the enterprise in social responsibility (Maretno Agus Harjoto & Fabrizio Rossi, 2018, p.95). Existing literature shows that Chinese female executives attach importance to CSR, and their preference for CSR is mainly altruistic (Zou et al., 2018, p.2965). Compared with men, this trait makes female executives more effective at improving their social responsibility. They understand the ultimate expectation and demand of stakeholders and the public on the enterprise and know the key links of resource input. Therefore, they can generate higher enterprise value and wider social recognition through efficient utilization of resources.

Affective commitment arises from members' affective dependence on the organization. Compared with male members, female members pay more attention to relationships and are more sensitive and delicate, so in the process of their career growth, they pay more attention to the emotional connection with the organization. Meanwhile, the

proportion of female executives at listed companies in China remains low (Lu Qianwen, Chen Shouming & Chen Peien, 2020, p.7730). Thus, the management and decision-making power of female executives in the organization makes them have the status of the organization and are valued by the organization. The feelings of respect and happiness that come with this kind of attention can strengthen the emotional connection with the organization. On the one hand, female executives are more eager than men to improve their professionalism and prove themselves in the workplace. The development of organizations is closely related to the realization of their self-value. They strive to maximize the effectiveness of the social responsibility input of the organization and generate higher enterprise value to gain recognition from the organization and society. On the other hand, to make their own emotions get effective feedback and continuous perceptual organization for its emphasis on the emotional satisfaction, female executives will produce strong will to improve the efficiency of corporate social responsibility, make the enterprise even limited resources still can obtain a high degree of social awareness and reputation, organization deeper emotional feedback gain.

In conclusion, the pressure of social role positioning pushes female executives to improve the efficiency of social responsibility from the outside, the unique "empathy" of women makes female executives have a unique talent and ability to improve the efficiency of social responsibility, and the emotional commitment to the organization makes female executives have a strong desire to improve the efficiency of social responsibility.

Relevant studies show that a certain number (critical number) of female directors has a significant positive impact on corporate environmental investment (Feng Wei, Binyan Ding & Yu Kong, 2017, p.2292). The higher the proportion of female executives in an organization, the more management and decision-making power they have, and the more significant the effect on improving the efficiency of social responsibility. However, when the proportion of females exceeds a certain threshold, the social role of the corporate top management team may be simplified. Women executives face greater pressure from social expectations, which can affect their team's ability to think objectively and independently. In addition, the high proportion of female executives makes the top management team have a richer emotional perception of stakeholders and the organization, and the possibility of rational decision-making is reduced, which makes the efficiency of corporate social responsibility decline rather than increase. Therefore, this paper proposes the following hypotheses:

H1: The proportion of female executives has an "inverted U-shaped" influence on CSR efficiency.

According to relevant studies, the characteristics of senior managers (such as education, age, etc.) are closely related to managers' cognitive ability and values. Therefore,

the age and education level of female executives will inevitably affect their decision-making style. Compared with younger female executives, older female executives have a deeper understanding of social roles. They can perceive the long-held expectations of women's "social orientation" and accumulate experience in effectively fulfilling their role expectations during the practice process, so they may have a more significant positive impact on improving the efficiency of social responsibility. At the same time, their rich experience deepens their "empathy", which further enhances the efficiency of social responsibility (María-Florencia Amorelli & Isabel-María García-Sánchez, 2020, p.204). Some of the older female executives may have joined the organization in its early stages and worked their way up the executive ladder. They have invested their youth and ideals in the organization and hope that the precious resources they have invested can obtain greater emotional feedback from the organization. Therefore, older female executives have a stronger desire to make the organization use limited resources to effectively enhance social value and realize the organization's recognition of themselves at a higher level. To sum up, this paper proposes the following hypotheses:

H2: The average age of female executives has a positive impact on CSR efficiency.

The higher the level of female executives' education, the more they expect their educational input to bring positive outcomes, namely, to be highly recognized by the organization and society. Therefore, they are unlikely to be punished by speech because they violate the long-term role orientation of women. Instead, they will use their professional knowledge to better meet the expectations of the society on the role of women and improve the efficiency of social responsibility to a greater extent. At the same time, a high level of education enables female executives to have a deep level of cognition and empathy, their "empathy" characteristics can be better played, and they have more profound insights to improve the efficiency of social responsibility. In addition, highly educated female executives are more likely to experience the "glass ceiling" of female advancement in the workplace (Erynne E. Landry, Richard A. Bernardi & Susan M. Bosco, 2016, p.27). Therefore, they can deeply feel the respect and trust of the organization and get emotional satisfaction when they obtain the senior executive status. They devote more knowledge and management resources to the organization, and are more emotionally dependent on the organization. Under the influence of affective commitment, female executives will substitute themselves into the situation faced by the development of the organization, thus perceiving the importance of improving the efficiency of social responsibility for the organization. To sum up, this paper proposes the following hypotheses:

H3: The average education level of female executives has a positive impact on CSR efficiency.

Previous studies generally believe that female directors have the same social orientation and have the same impact on corporate social responsibility (CSR). However, due to their past experiences, their social orientation may be different (Yu Wang, Jie Ma & Tienan Wang, 2021, p.1). From the middle of the 20th century, western countries began to form a mature corporate social responsibility system and system. The research on corporate social responsibility in western society is more in-depth, and the expectation on the role of senior executives who should pay attention to corporate social responsibility is also relatively higher. Therefore, female executives with overseas backgrounds are not only faced with the public's expectation that the role of a woman should attach importance to social responsibility, but also shoulder the perceived expectation of the role of a senior executive in Western society while studying or working abroad. In order to meet the dual role expectations, female executives with overseas background will apply their overseas education or work experience to improve the effectiveness of corporate social responsibility. At the same time, overseas experience deepens their "empathy" for stakeholders, and they can introduce relatively mature overseas CSR management methods into domestic enterprises. The higher the proportion of female executives with overseas background in an enterprise, the more mature the social responsibility decision-making system of top management team will be, and the more obvious the improvement of social responsibility efficiency will be. Therefore, this paper proposes the following hypotheses:

H4: The proportion of female executives with overseas background has a positive impact on CSR efficiency.

In addition, the proportion of female executives working part-time in society should also be fully considered. Social part-time makes female executives no longer confined to the enterprise, but deeply close to the society. In the process of social part-time job, they enrich the cognition of women's social role, and have a deep understanding of women's role positioning and role expectation. Also, social part-time for female executives' communication platform is associated with social interests groups, "empathy" talent into full play, they perceive the real appeal to all groups, and so on enterprise management can be more accurate to social responsibility into, make the enterprise resource can be converted into a high level of social recognition, and improve enterprise value. Therefore, female executives with social part-time jobs have unique value for improving corporate social responsibility efficiency (Yang Weiliu, Yang Jinlei & Gao Zhitong, 2019, p.3452). The higher the proportion of female executives with social part-time jobs, the greater the corporate social responsibility efficiency will be significantly improved. This paper proposes the following hypotheses:

H5: The proportion of part-time jobs for female executives has a positive impact on the efficiency of corporate social responsibility.

Research design

Sample selection and data sources

First of all, in order to explore the social responsibility efficiency level and change trend of China's listed companies, this paper selected listed companies that disclosed social responsibility related information from 2010 to 2019 as samples, after eliminating the missing value and outlier value, obtained the social responsibility data of 1493 listed companies in 10 years for efficiency analysis. Secondly, in order to study the impact of female executives on the efficiency of social responsibility, this paper eliminated the characteristics of female executives and the missing and outlier values of control variables on the basis of efficiency data, and finally obtained the unbalanced panel data of 1219 listed companies. Data related to social responsibility in this paper came from HeXun social responsibility scoring report, other data came from CSMAR, and some data were calculated by Excel.

Variable declaration

Output index and input index

In this paper, the market value of enterprises is taken as the output index of social responsibility. According to the research of existing literature, Tobin's Q and price-to-book ratio are selected as the measurement indexes of the market value of enterprises.

Previous studies have started from five aspects of corporate social responsibility, namely, the relationship between shareholder responsibility, employee responsibility, consumer responsibility, environmental responsibility and social welfare and group ownership (Huang Xin et al., 2021, p.2110). Therefore, the social responsibility score of listed enterprises published by HeXun is taken as the input index in this paper. This score is a comprehensive and objective evaluation of the performance of corporate social responsibility from five aspects including shareholder responsibility, employee responsibility, supplier, customer and consumer rights responsibility, environmental responsibility and social responsibility, involving 13 second-level indicators and 37 third-level indicators.

The input-output index system is shown in Table 1.

Table no. 1. Input-output index system of social responsibility efficiency

Indicators		Variable definitions
Output indicators	Tobin's Q value	Market capitalization/total assets
	Price-to-book	Market price per share/net asset value per share
Input indicators	Total social responsibility score	Shareholder liability score
		Employee responsibility rating
		Supplier, customer, and consumer accountability scores
		Environmental responsibility score
		Social responsibility score

Source: CSMAR and HeXun social responsibility scoring report

Explained variables

The variable explained in this paper is corporate social responsibility efficiency, the efficiency growth rate of listed enterprises was calculated based on Malmquist index, and the cumulative value was calculated based on 2010 to measure the CSR efficiency of each year.

Explanatory variables

In this paper, the proportion of female executives, the square term of the proportion of female executives, the average education level of female executives, the average age of female executives, the proportion of female executives with overseas background and the proportion of female executives working part-time in society were selected as explanatory variables.

Control variables

According to the research of scholars such as Atang Hermawan and Ardi Gunardi (2019), Adrian (Waikong) Cheung and Wee Ching Pok (2019), etc., corporate size, equity nature, asset-liability ratio, return on total assets, growth rate of operating income, cash holdings, board size, double positions and management shareholding ratio were selected as control variables. See Table 2 for the variables of corporate and social responsibility efficiency of female executives.

Table no. 2. Definition of female executives and corporate social responsibility efficiency variables

Variable nature	Variable name	Variable definitions
Explained variable	Social Responsibility Efficiency (ECSR)	Taking 2010 as the base period, the value is 1, and the annual cumulative value of Malmquist index is calculated
Explanatory variables	Ratio of Female Senior Executives（Fratio）	Number of women in senior management/total number of senior management
	The square term of the proportion of female executives (Fratio2)	The square of the percentage of women in senior management
	Average Age of Senior Female Executives (Fage)	Total age of female executives/total number of female executives
	Average Female Executive Education Level (Fedu)	The number of female executives with a bachelor's degree or above
	Percentage of female executives with overseas background (Oversea)	Number of female executives with overseas background/total number of senior executives
	Percentage of Female Executive Social Part-time Workers (OtherCo)	Number of female executives working part-time in society/total number of senior executives
Control variables	Enterprise Size (Size)	Take the logarithm of the total assets of the enterprise
	Nature of Equity (Soe)	The value of state-owned enterprise is 1, otherwise it is 0
	Debt to Asset Ratio (Lev)	Total liabilities/total assets
	Return on Total Assets (Roa)	Net profit/total assets
	Growth Rate of Operating Revenue (Growth)	(Operating Income for Year T-1 - Operating Income for Year T-1)/Operating Income for Year T-1
	Holding Cash (Cash)	Ending cash and cash equivalents balance/total assets
	Size of Board (Board)	the number of people on the board
	Dual (Dual)	The concurrent value of chairman and general manager is 1; otherwise, it is 0
	Management shareholding ratio (Shold)	Total management shareholding/total share capital

Source: CSMAR and HeXun social responsibility scoring report

Model specification

SBM-Malmquist exponential model

In order to measure the CSR efficiency of sample enterprises in the past 10 years, the SBM-Malmquist index model is selected in this paper. The traditional DEA model does not take into account the input-output slack, which leads to the high measurement results. However, the SBM model based on non-radial Angle takes the slack variables into account, and the efficiency value is more accurate as it adjusts with the degree of slack of the index.

In 1953, Sten Malmquist first proposed the Malmquist index. In 1997, Rolf Fare combined it with DEA model to measure the change level of efficiency. Malmquist index measures the efficiency change from T period to T +1 period, avoids the error caused by the arbitrariness of period selection, and improves the identification ability of the model. The calculation formula is as follows (Fadzlan Sufian, 2010, p.84):

$$M(x_{t+1}, y_{t+1}; x_t, y_t) = \sqrt{\frac{D^t(x^{t+1}, y^{t+1})}{D^t(x^t, y^t)} \times \frac{D^{t+1}(x^{t+1}, y^{t+1})}{D^{t+1}(x^t, y^t)}}$$

If the Malmquist index is greater than 1, it means that the efficiency of the research sample in the t+1 year is increased compared with that in the t year. Equal to 1 means nothing has changed; Less than 1 means less efficiency. Malmquist index can be decomposed into technical efficiency change index (EC) and technical progress index (TC), namely: MI=EC×TC.EC stands for catch-up situation, which is used to measure the distance change of decision unit from T period to T +1 period to the optimal production front. Tc represents the movement of the production front from the t stage to the t+1 stage (Ke-Liang Wang et al., 2020,140280).

Panel data model

In order to explore the impact of female executives on CSR efficiency, this paper tries to build a panel data model, the specific model is determined according to the data test results in the following paper.

Empirical results and analysis

The change analysis of Malmquist index and decomposition value

According to the data requirements of DEA model, the efficiency cannot be directly measured if some input data are not positive, so this paper needs to standardize the indicators. Since the input-output indicators in this paper are all positive indicators, the calculation formula is as follows:

$$X_+ = 0.01 + 0.99\frac{X - X_{min}}{X_{max} - X_{min}}$$

MaxDEA software is used to calculate the Malmquist index based on the SBM model, and the results are shown in Table 3. In the past ten years, the Malmquist index of CSR efficiency of sample enterprises is all greater than 1, indicating that the efficiency is in a state of steady improvement. According to Figure 1, the CSR efficiency of the sample enterprises increased significantly from 2013 to 2014 and from 2016 to 2017, increasing by 0.89% and 0.97% respectively. On the whole, the efficiency of the sample enterprises shows an upward trend, and the enterprises have made continuous efforts to improve the efficiency of social responsibility and achieved significant results in some periods, which is in line with the law of things fluctuating and rising.

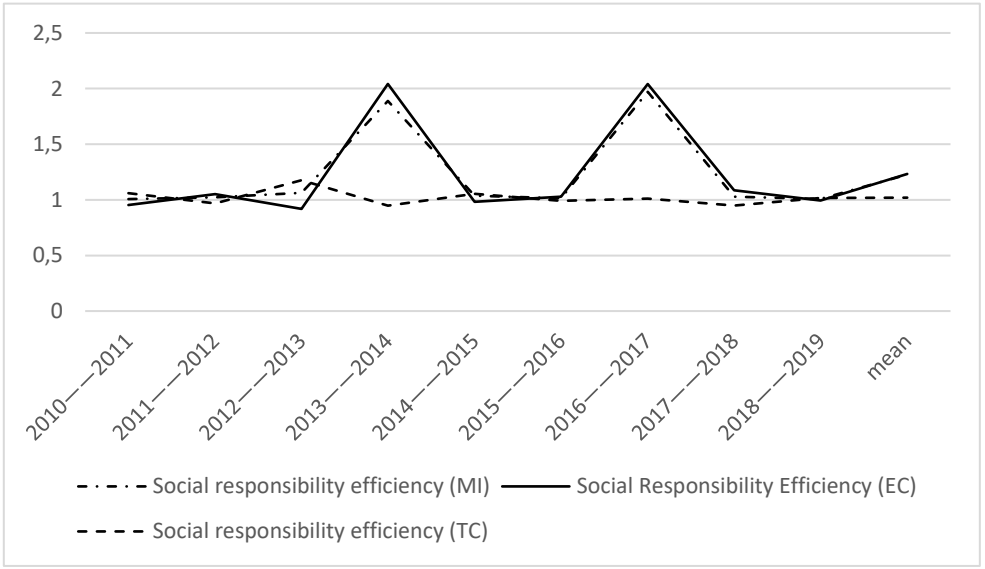
After decomposing Malmquist index into technical efficiency change index (EC) and technical progress index (TC), it can be seen that the technical efficiency change index fluctuates greatly, while the technical progress index fluctuates slightly around 1.According to Figure 1, the fluctuation of technological progress index tends to be level in 10 years, and the fluctuation trajectory of Malmquist index and technical efficiency change index is close to each other, indicating that the fluctuation of these two indexes is synchronized. It is further concluded that Malmquist index is mainly affected by the change index of technical efficiency. According to the existing literature, the change index of technical efficiency reflects the ability to achieve the maximum output or the minimum input under the given input, while the change index of technological progress mainly reflects the changes in the production front of the whole industry. It can be seen that the change of social responsibility efficiency is mainly affected by the application and management ability of the input-output factors of each enterprise, but is less affected by the overall technological change of the industry. According to table 4 and figure 2, industry efficiency of social responsibility in recent 10 years gap is smaller, the biggest increase and minimum gap between growth was 0.25%, that social responsibility efficiency has no obvious change of industry characteristics, the efficiency of corporate social responsibility level is more likely affected by their own management level, to some extent, support the study of this paper tries to female executives impact on the efficiency of corporate social responsibility in the first place.

Table no. 3. Malmquist index and decomposed value of social responsibility efficiency of listed enterprises from 2010 to 2019

Year	Social responsibility efficiency (MI)	Social Responsibility Efficiency (EC)	Social responsibility efficiency (TC)
2010-2011	1.0067	0.9541	1.0594
2011-2012	1.0231	1.0512	0.9688
2012-2013	1.0614	0.9184	1.1761
2013-2014	1.8897	2.0415	0.9486
2014-2015	1.0358	0.9820	1.0533
2015-2016	1.0131	1.0284	0.9906
2016-2017	1.9710	2.0412	1.0106
2017-2018	1.0291	1.0851	0.9483
2018-2019	1.0084	0.9923	1.0170
mean	1.2265	1.2327	1.0192

Source: the authors' calculation by MaxDEA software

Figure no. 1 Malmquist index and decomposed value of social responsibility efficiency of listed enterprises from 2010 to 2019



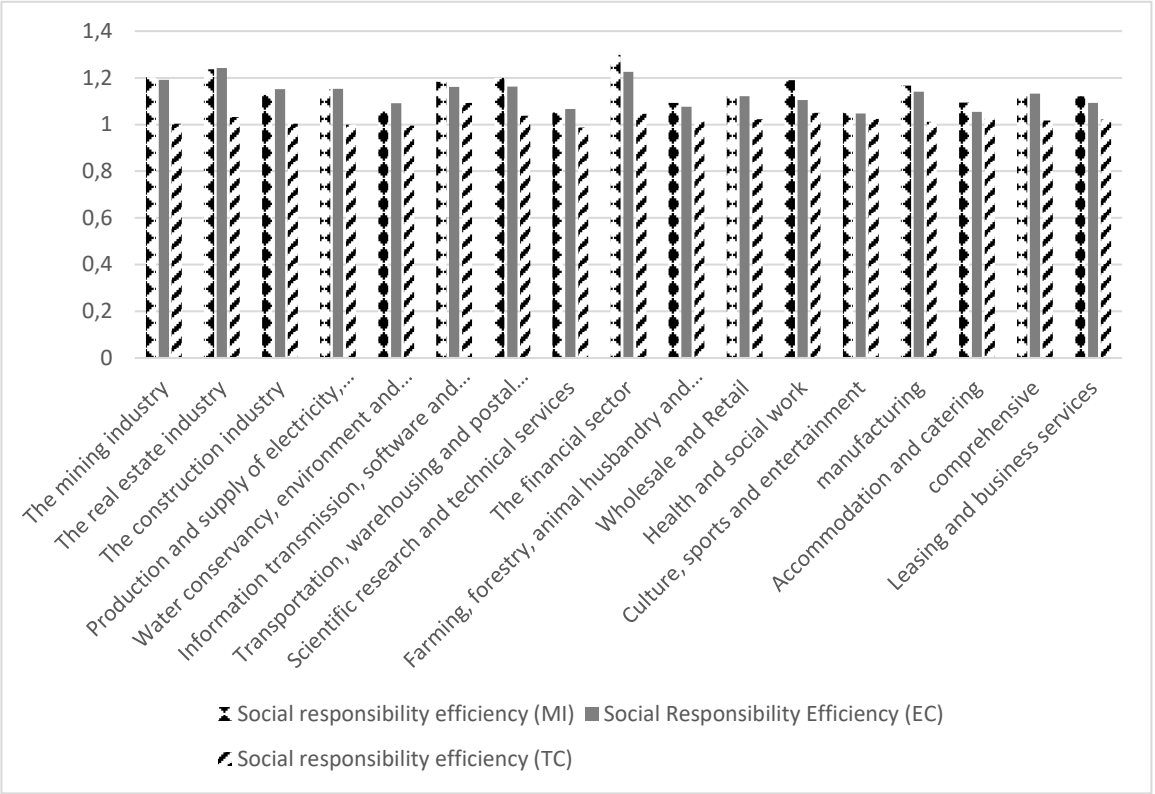
Source: organized by the authors

Table no. 4. Malmquist index and decomposed value of social responsibility efficiency in different industries from 2010 to 2019

Industry	Social responsibility efficiency (MI)	Social Responsibility Efficiency (EC)	Social responsibility efficiency (TC)
The mining industry	1.2024	1.1914	1.0031
The real estate industry	1.2361	1.2417	1.0322
The construction industry	1.1269	1.1514	1.0029
Production and supply of electricity, heat, gas and water	1.1519	1.1532	0.9988
Water conservancy, environment and public facilities management industry	1.0554	1.0913	0.9958
Information transmission, software and information technology services	1.1830	1.1608	1.0929
Transportation, warehousing and postal services	1.1990	1.1626	1.0384
Scientific research and technical services	1.0521	1.0671	0.9874
The financial sector	1.2977	1.2258	1.0464
Farming, forestry, animal husbandry and fishery	1.0925	1.0755	1.0133
Wholesale and Retail	1.1288	1.1218	1.0227
Health and social work	1.1893	1.1047	1.0507
Culture, sports and entertainment	1.0498	1.0471	1.0242
manufacturing	1.1672	1.1406	1.0115
Accommodation and catering	1.0934	1.0547	1.0274
comprehensive	1.1221	1.1330	1.0172
Leasing and business services	1.1214	1.0928	1.0214

Source: the authors' calculation by MaxDEA software

Figure no. 2 Malmquist index and decomposed value of social responsibility efficiency in different industries from 2010 to 2019



Source: organized by the authors

Descriptive statistics

According to the explanation of explained variables above, since the social responsibility scoring report was published in 2010, the social responsibility efficiency was set as 1 based on 2010 with reference to existing literature, and the cumulative value of Malmquist index was taken as the social responsibility efficiency in subsequent years. Explanatory variables and control variables were added on the basis of the above calculated data, and after missing values and outliers were removed, the unbalanced panel data of 1219 listed companies from 2011 to 2019 were obtained, with a total of 8,402 observed values, as shown in Table 5.

Table no. 5. Descriptive statistics of variables

VarName	Obs	Mean	SD	Min	Median	Max
ECSR	8402	1.478	1.254	0.000	1.003	16.360
Fratio	8402	0.231	0.128	0.067	0.200	0.667
Fratio2	8402	0.069	0.081	0.004	0.040	0.444
Fage	8402	46.018	5.868	32.000	46.000	61.000
Fedu	8402	0.514	0.733	0.000	0.000	3.000
Oversea	8402	0.009	0.036	0.000	0.000	0.200
OtherCo	8402	0.002	0.017	0.000	0.000	0.143
Size	8402	22.507	1.480	19.658	22.279	28.269
Soe	8402	0.432	0.495	0.000	0.000	1.000
Lev	8402	0.463	0.219	0.054	0.467	0.940
Roa	8402	0.033	0.061	0.275	0.030	0.198
Growth	8402	0.164	0.481	0.593	0.087	3.430
Cash	8402	0.157	0.126	0.010	0.120	0.621
Board	8402	8.832	1.825	5.000	9.000	15.000
Dual	8402	0.237	0.425	0.000	0.000	1.000
Shold	8402	0.079	0.153	0.000	0.000	0.639

Source: the authors' calculation by stata16 software

The difference between the maximum and minimum values of social responsibility efficiency of the explained variable is large, indicating that there are obvious individual differences in social responsibility efficiency. The proportion of women in the top management team of the sample companies was about 23.1%.The average age of female executives is about 46;The number of female executives with bachelor degree or above in the sample enterprises is 0~3;On average, female executives with overseas backgrounds accounted for 0.9% of the total number of senior executives, and the average proportion of female executives working part-time in society was 0.2%.The standard deviation of the control variables, the size of the enterprise and the size of the board of directors, is larger, so it is reasonable to take them as the control variables. The mean value of equity property is 0.432, which reflects that the proportion of state-owned enterprises and other enterprises in the sample is roughly the same. The asset-liability ratio was 46.3% on average, the return on total assets was 3.3% on average, and the proportion of cash held was 15.7%. In average 23.7% of sample enterprises, there were two jobs concurrently, and the average shareholding ratio of management was 7.9%.

Stationary test

According to the result of Fisher's unit root test, when variables of order 0 are used for testing, all the P values of variables are 0, so the original data can be used for regression.

Correlation test and multicollinearity test

Table 6 lists the correlation analysis results of explained variables, explanatory variables and some control variables. Independent variables such as the proportion of female executives, average age and average education level are all correlated with CSR efficiency, and are significant at the level of 1%. However, no significant relationship has been found between the proportion of female executives with overseas background, the proportion of female executives working part-time in society and CSR efficiency, which will be further discussed by regression analysis later. The relationship between all the control variables and the efficiency of social responsibility is significant at the 1% level, which indicates that the selection of control variables is reasonable.

Table no. 6. Correlation analysis

	ECSR	**Fratio**	**Fratio2**	**Fage**	**Fedu**	**Oversea**	**OtherCo**	**Size**
ECSR								
Fratio	0.058***							
Fratio2	0.048***	0.965***						
Fage	0.082***	0.085***	0.067***					
Fedu	0.083***	0.211***	0.188***	0.005				
Oversea	0.004	0.141***	0.134***	0.031***	0.200***			
OtherCo	0.002	0.100***	0.102***	0.004	0.030***	0.014		
Size	0.325***	0.189***	0.161***	0.172***	0.176***	0.040***	0.040***	

Source: the authors' calculation by stata16 software

Secondly, the population variance inflation factor is only 1.27, so it can be determined that there is no multicollinearity.

Finally, this paper carries out F test and Hausman test. The statistical value of F test is 33.37 and P value is 0.0000, so the use of mixed effect is strongly rejected. The statistical

value of Hausman test is 80.31, and the P value is 0.0000, so the use of random effect is strongly rejected. In summary, fixed effect was selected for regression in this paper.

Regression analysis

In this paper, explanatory variables were successively added on the basis of control variables to form models 1-6. The empirical test results are shown in Table 8. According to the existing literature testing method of "inverted U-shaped" relationship and the empirical results of Model 2, firstly, the regression coefficient of the proportion of female executives is significantly positive and the pre-square coefficient is significantly negative, which preliminarily verifies that the proportion of female executives has an "inverted U-shaped" influence on corporate social responsibility efficiency. Secondly, the curve equation of Model 2 is ECSR=-1.6073× FRatio2+1.6250×Fratio+C, after the correlation coefficient is substituted, (ECSR)'= 3.2146×Fratio+1.6250. When the minimum value of independent variable Fratio is 0.067, the derivative value is 1.4096; When the maximum value is 0.667, the derivative value is -0.5191, indicating that the curve equation presents an increasing and decreasing trend at both ends of the value interval of independent variables. Finally, the inflection point of the curve equation is 0.5055, which is within the reasonable value range of independent variable and also within the value range of sample data. The general trend of the curve is shown in Figure 3. Therefore, it can be concluded that the proportion of female executives has an "inverted U-shaped" influence on CSR efficiency, that is, when the proportion of female executives increases, CSR efficiency level will increase along with it, but after exceeding the critical value, the proportion increase will reduce CSR efficiency. Hypothesis 1 is verified.

According to Model 3, the average age of female executives is significantly positively correlated with corporate social responsibility efficiency (β=0.0122, P <0.05), as shown in Figure 4. It shows that with the increase of the age of female executives, the efficiency of corporate social responsibility also significantly improves. Hypothesis 3 is verified. According to Model 4, the average education level of female executives is significantly positively correlated with corporate social responsibility efficiency (β=0.0488, P <0.1), as shown in Figure 5. It indicates that the higher the average education level of female executives is, the higher the corporate social responsibility efficiency is. Hypothesis 4 is supported by data. According to Model 5, the proportion of female executives with overseas background has a significant positive correlation with CSR efficiency (β=0.9221, P <0.1), as shown in Figure 6. As the proportion of female executives with overseas background increases, corporate social responsibility efficiency increases accordingly. Hypothesis 4 is confirmed. According to Model 6, the proportion of part-time jobs for female executives is significantly positively correlated with corporate social

responsibility efficiency (β=0.3435, P <0.1), as shown in Figure 7. It is proved that corporate social responsibility efficiency increases with the increase of the proportion of female executives taking part-time jobs in the society. Hypothesis 5 passes the data test.

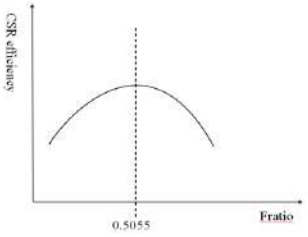
Table no. 7. Empirical test results

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Fratio	0.5863***	1.6250***	1.6442***	1.4908***	1.4637***	1.4649***
	(3.163)	(2.746)	(2.772)	(2.505)	(2.468)	(2.469)
Fratio2		1.6073**	1.6431**	1.5133**	1.5140**	1.5128**
		(2.031)	(2.076)	(1.918)	(1.916)	(1.913)
Fage			0.0122**	0.0123**	0.0124**	0.0124**
			(1.950)	(1.974)	(1.992)	(1.989)
Fedu				0.0488*	0.0435*	0.0438*
				(1.128)	(1.013)	(1.021)
Oversea					0.9221*	0.9200*
					(1.182)	(1.179)
OtherCo						0.3435*
						(1.408)
Size	0.3670***	0.3672***	0.3498***	0.3430***	0.3402***	0.3403***
	(9.442)	(9.448)	(8.734)	(8.493)	(8.413)	(8.416)
Soe	0.1963***	0.1950***	0.1892***	0.1891***	0.1882***	0.1887***
	(2.675)	(2.661)	(2.610)	(2.623)	(2.611)	(2.618)
Lev	0.6563***	0.6524***	0.6331***	0.6317***	0.6300***	0.6298***
	(4.239)	(4.198)	(4.030)	(4.017)	(4.000)	(3.999)
Roa	2.2275***	2.2184***	2.1803***	2.1719***	2.1724***	2.1742***
	(8.282)	(8.243)	(8.044)	(8.044)	(8.043)	(8.059)
Growth	0.0344**	0.0351**	0.0324**	0.0318**	0.0311**	0.0311**
	(2.134)	(2.176)	(2.013)	(1.973)	(1.932)	(1.930)
Cash	0.3334**	0.3218**	0.2814*	0.2752*	0.2747*	0.2746*
	(2.056)	(1.984)	(1.727)	(1.685)	(1.679)	(1.679)
Board	0.0571***	0.0563***	0.0524***	0.0534***	0.0531***	0.0531***
	(3.398)	(3.356)	(3.095)	(3.145)	(3.118)	(3.113)
Dual	0.0459	0.0456	0.0475*	0.0474*	0.0463*	0.0466*
	(0.991)	(0.983)	(1.029)	(1.027)	(1.002)	(1.009)
Shold	0.1371	0.1441	0.1482	0.1557	0.1591	0.1604
	(0.604)	(0.635)	(0.651)	(0.684)	(0.696)	(0.701)

Constant	5.9150***	6.0582***	6.2854***	6.1309***	6.0759***	6.0777***
	(6.785)	(6.919)	(7.216)	(6.939)	(6.875)	(6.875)
Observations	8402	8402	8402	8402	8402	8402
R-squared	0.062	0.063	0.064	0.065	0.065	0.065
Number of id	1219	1219	1219	1219	1219	1219
Ajusted R2	0.0636	0.0636	0.0636	0.0636	0.0636	0.0636

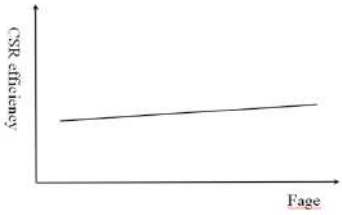
Source: the authors' calculation by stata16 software

Figure no. 3 Fratio and CSR efficiency



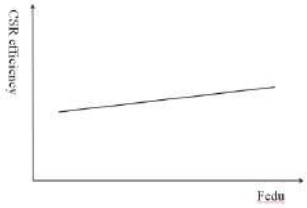
Source: organized by the authors

Figure 4. Fage and CSR efficiency



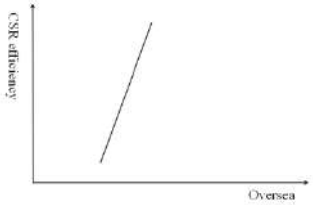
Source: organized by the authors

Figure no. 5 Fedu and CSR efficiency



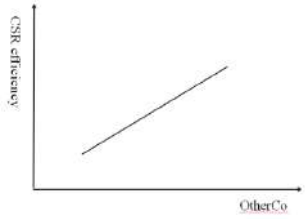
Source: organized by the authors

Figure no. 6 Oversea and CSR efficiency



Source: organized by the authors

Figure no. 7 OtherCo and CSR efficiency



Source: organized by the authors

Conclusion and Recommendations

Fulfilling social responsibility is the foundation of sustainable development of enterprises and society (Zhang Guiling et al., 2021, p.100794). CSR participation is a strategy for enterprises to seek political legitimacy from the government and general legitimacy from the public (Mengmeng Guo, Luo He & Ligang Zhong, 2018, p.37). Social responsibility efficiency is a key indicator to measure the degree to which the social responsibility input to various stakeholder groups is transformed into enterprise value output. Under the condition of limited resources, enterprises with high efficiency of social responsibility can achieve more significant value output. With the development of The Times and the improvement of women's social awareness, more and more women have achieved outstanding achievements in the workplace. As a special group of women in the workplace, female executives play a pivotal role in enterprise management activities. Based on the social role theory, feminist caring ethics and organizational emotional commitment, this paper takes China's listed companies from 2010 to 2019 as research objects to explore the impact of female executives on corporate social responsibility efficiency.

The research conclusions are as follows: First, there is an "inverted U-shaped" relationship between the proportion of female executives and CSR efficiency. The expectation of social role drives female executives to improve their effectiveness in social responsibility. The trait of "empathy" gives them the talent and ability to improve their effectiveness and the affective commitment strengthens their will to improve their effectiveness. However, when the proportion of female executives exceeds a certain threshold, the social role of top management team becomes simple and too much emotional input has a major impact on decision-making, thus significantly reducing the efficiency of corporate social responsibility. Second, female executives with older age and higher education level have unique advantages in improving the efficiency of social responsibility. The rich experience and education accumulated with the growth of age have deepened female executives' cognition of social roles and their ability to empathize with stakeholders, and the deepening emotional commitment has prompted them to think about the social responsibilities of enterprises from a long-term perspective. Their input of social responsibility resources is more precise and accurate so that the process of turning them into value output is more efficient. Third, the higher the proportion of female executives with overseas background, the higher the CSR efficiency level. In order to meet the dual role expectations of female roles and executive roles, female executives with overseas backgrounds will apply their relatively sound corporate social responsibility management knowledge and experience accumulated overseas to the companies they work for, which will greatly improve corporate social responsibility efficiency. Fourth, the proportion of

female senior executives in the top management team is increasing, so is the efficiency of corporate social responsibility. Social part-time job enables female executives to deeply understand the real demands of various groups on the enterprise, so the investment of resources can be effectively transformed into social recognition, and then enhance the value of the enterprise.

Based on the research conclusions, this paper draws the following enlightenment: First, taking social responsibility is a kind of investment behavior, and the effectiveness of investment depends on the enterprise's own management ability. Enterprises with higher management level can transform limited input into more ideal enterprise value output, which reflects higher efficiency of social responsibility and high efficiency of investment. Second, a comprehensive consideration of multi-stakeholder groups to build a sound social responsibility scoring and assessment system. Enterprises should comprehensively incorporate the input of internal and external stakeholder groups into the evaluation system and avoid paying attention to one or the other. Third, we should make scientific personnel decisions and rationally allocate female resources in the top management team. Enterprises should carefully consider the proportion of female executives, so that the top management team can not only reflect the advantages brought by gender diversity, but also play the role of female executives in improving the efficiency of social responsibility. Fourth, employ senior, experienced, highly educated, overseas or part-time female executives in charge of corporate social responsibility.

The deficiencies and prospects of this study are as follows: First, this paper does not carry out a subdivided study on the impact of female directors, female supervisors and other female executives on CSR efficiency. In the future, we can further explore whether there are differences in the impact of different female executives. Secondly, on the basis of existing literature, this paper chooses input-output indicators related to social responsibility efficiency, and subsequent studies can use more reasonable indicators in different dimensions to build a social responsibility indicator system.

REFERENCES

Adrian (Waikong) Cheung and Wee Ching Pok. (2019). Corporate social responsibility and provision of trade credit. Journal of Contemporary Accounting & Economics, 15(3), DOI: 10.1016/j.jcae.2019.100159

Atang Hermawan and Ardi Gunardi. (2019). Motivation for disclosure of corporate social responsibility: evidence from banking industry in Indonesia. Entrepreneurship and Sustainability Issues, pp. 1297-1306. DOI: doi:10.9770/jesi.2019.6.3(17)

Ayman Issa and Hong Xing Fang. (2019). The impact of board gender diversity on corporate social responsibility in the Arab Gulf states. Gender in Management: An International Journal, 34(7), pp. 577-605. DOI: 10.1108/GM-07-2018-0087

Erynne E. Landry and Richard A. Bernardi and Susan M. Bosco. (2016). Recognition for Sustained Corporate Social Responsibility: Female Directors Make a Difference. Corporate Social Responsibility and Environmental Management, 23(1), pp. 27-36. DOI: 10.1002/csr.1358

Fadzlan Sufian. (2010). Banks total factor productivity change in a developing economy: Does ownership and origins matter?. Journal of Asian Economics, 22(1), pp. 84-98. DOI: 10.1016/j.asieco.2010.07.007

Feng Wei and Binyan Ding and Yu Kong. (2017). Female Directors and Corporate Social Responsibility: Evidence from the Environmental Investment of Chinese Listed Companies. 9(12), pp. 2292. DOI: 10.3390/su9122292

Huang Xin et al. (2021). Business Group-Affiliation and Corporate Social Responsibility: Evidence from Listed Companies in China. Sustainability, 13(4), pp. 2110-2110. DOI: 10.3390/SU13042110

Ioanna Boulouta. (2013). Hidden Connections: The Link Between Board Gender Diversity and Corporate Social Performance. Journal of Business Ethics, 113(2), pp. 185-197. DOI: 10.1007/s10551-012-1293-7

Jinbo Luo and Qigui Liu. (2020). Corporate social responsibility disclosure in China: Do managerial professional connections and social attention matter?. Emerging Markets Review, 43 DOI: 10.1016/j.ememar.2020.100679

Kong Dongmin and Shu Yijia and Wang Yanan. (2021). Corruption and Corporate Social Responsibility: Evidence from a Quasi-Natural Experiment in China. Journal of Asian Economics, pp. 101317-. DOI: 10.1016/J.ASIECO.2021.101317

Li Yahui et al. (2021). An empirical investigation of the utilitarian, social benefits in LBS information disclosure—The moderating effect of the gender based social role theory. International Journal of Information Management, 56pp. 102243-. DOI:10.1016/j.ijinfomgt.2020.102243

Lu Qianwen and Chen Shouming and Chen Peien. (2020). The Relationship between Female Top Managers and Corporate Social Responsibility in China: The Moderating Role of the Marketization Level. Sustainability, 12(18), pp. 7730-7730. DOI: 10.3390/su12187730

Maretno Agus Harjoto and Fabrizio Rossi. (2018). Religiosity, female directors, and corporate social responsibility for Italian listed companies. Journal of Business Research, 95 DOI: 10.1016/j.jbusres.2018.08.013

María-Florencia Amorelli and Isabel-María García-Sánchez. (2020). Critical mass of female directors, human capital, and stakeholder engagement by corporate social reporting. Corporate Social Responsibility and Environmental Management, 27(1), pp. 204-221. DOI: 10.1002/csr.1793

Mengmeng Guo and Luo He and Ligang Zhong. (2018). Business groups and corporate social responsibility: Evidence from China. Emerging Markets Review, 37 DOI: 10.1016/j.ememar.2018.05.002

Mustika S.D. and Isnalita. (2019). THE EFFECT OF FEMALE COMMISSIONERS AND DIRECTORS ON CORPORATE SOCIAL RESPONSIBILITY WITH PROFITABILITY AS MEDIATION ON BASIC AND CHEMICAL INDUSTRIES DURING 2014-2016. Russian Journal of Agricultural and Socio-Economic Sciences, 90(6), pp. 13-16. DOI:10.18551/rjoas.2019-06.02

Riliang Qu. (2007). Corporate social responsibility in China. Chinese Management Studies, 1(3), pp. 198-207. DOI: 10.1108/17506140710779302

Thomas W.H. Ng and Simon S.K. Lam and Daniel C. Feldman. (2016). Organizational citizenship behavior and counterproductive work behaviorDo males and females differ?. Journal of Vocational Behavior, 93pp. 11-32. DOI: 10.1016/j.jvb.2015.12.005

Wang, K. L. , Pang, S. Q. , Ding, L. L. , & Miao, Z. . (2020). Combining the biennial malmquist–luenberger index and panel quantile regression to analyze the green total factor productivity of the industrial sector in china. Science of The Total Environment, 739, 140280. DOI: 10.1016/j.scitotenv.2020.140280

Yang Weiliu and Yang Jinlei and Gao Zhitong. (2019). Do Female Board Directors Promote Corporate Social Responsibility? An Empirical Study Based on the Critical Mass Theory. Emerging Markets Finance and Trade, 55(15), pp. 3452-3471. DOI: 10.1080/1540496X.2019.1657402

Yu Wang and Jie Ma and Tienan Wang. (2021). Do all female directors have the same impact on corporate social responsibility? The role of their political connection. Asia Pacific Journal of Management, pp. 1-28. DOI: 10.1007/S10490-021-09754-0

Zhang Guiling et al. (2021). Does corporate internationalization affect corporate social responsibility? Evidence from China. Emerging Markets Review, pp. 100794-. DOI: 10.1016/J.EMEMAR.2021.100794

Zou et al. (2018). Do Female Executives Prioritize Corporate Social Responsibility?. Emerging Markets Finance and Trade, 54(13), pp. 2965-2981. DOI: 10.1080/1540496X.2018.1453355