Journal of Environmental Management 341 (2023) 117988

Contents lists available at ScienceDirect

Journal of Environmental Management

journal homepage: www.elsevier.com/locate/jenvman

Research article

Curse or blessing? The relationship between sustainable development plans for resource cities and corporate sustainability - Evidence from China

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ARTICLE INFO

Keywords:
SDPRC
Corporate sustainable performance
Mechanism test
Heterogeneity test

ABSTRACT

In recent years, the sustainable development of resource cities has become a challenge for all countries. It aims to transform the traditional monolithic economic model and find a way to develop the city's economy and environment in harmony. In this context, we uncover the relationship between sustainable development plan of resource-based cities (SDPRC) and corporate sustainable performance and examine possible pathways for action. Using a difference-in-differences (DID) model and a series of robustness tests, our study reveals the following. First, SDPRC enhances corporate sustainability. Second, possible mechanisms for SDPRC are explored. SDPRC achieves corporate sustainability by optimal resource allocation and increasing green innovation outputs. Third, urban heterogeneity is explored and it is found that SDPRC only has a positive impact on the sustainable performance in growth and mature cities, but not in declining and regenerating cities. Finally, firm heterogeneity was examined, with SDPRC having a more positive impact on the sustainable performance of state-owned firms, large firms and heavily polluting firms. This study sheds light on the impact of SDPRC at the firm level and provides new theoretical insights for urban planning policy reform in developing countries such as China.

1. Introduction

Resource cities are cities that develop extraction and processing industries based on the natural resources of the region, such as minerals, rivers and forests. Resource cities are rich in natural resources and support the economic development of the country (Sachs and Warner, 2001). However, environmental and resource issues hinder green and sustainable economic development (Li et al., 2019), such as pollution emissions, depletion of resource reserves and soil erosion during production and consumption. According to the 2020 United Nations Climate Change News, global cities consume more than 60% of resources and emit more than 70% of carbon emission.[1] As the largest carbon emitting economy, China's environmental problems are becoming increasingly acute (Liu and Raven, 2010). According to the 2021 China Low Carbon Cities Index report, over 70% of China's carbon emissions come from cities. In order to promote the transformation of the economic development model of resource-based cities to achieve sustainable development, the Chinese government released the Sustainable Development Plan of Resource-based Cities (SDPRC) in 2013.

The SDPRC aims to change the traditional over-reliance on resources and crude economic development model and explore a green and circular economic model (Sun et al., 2022). Previous studies have focused on the macro level, such as carbon emissions (Meng et al., 2021), green development (Wang et al., 2022), industrial transformation (Li et al., 2021) and economic growth (Wang, 2022). Little is known about the relationship between SDPRC and firms at the micro level, especially with respect to corporate sustainability. Our study contributes by identifying the relationship between SDPRC and corporate sustainability. As drivers of urban economies, major consumers of resources and major emitters of pollution, the achievement of corporate sustainability can help promote national green development (Zhu and Geng, 2013). Therefore, our research question is: Does the SDPRC promote corporate sustainability?

Corporate sustainability refers to the achievement of sustainable returns and capacity enhancement through the consideration of environmental, social and governance factors (Inderst and Stewart, 2018; Wijethilake, 2017). Most studies have explored the drivers affecting corporate sustainability, such as green intellectual capital (Yusliza et al., 2020), board diversity (Jarboui et al., 2020) and corporate governance (Oyewo, 2023; Ludwig and Sassen, 2022; Dagestani and Qing, 2022). Other scholars have explored the impact of green growth, external uncertainty on corporate sustainability (Jia and Li, 2020; Saufi et al., 2016;

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[1] https://unfccc.int/news/urban-climate-action-is-crucial-to-bend-the-emissions-curve.

https://doi.org/10.1016/j.jenvman.2023.117988
Received 29 March 2023; Received in revised form 9 April 2023; Accepted 18 April 2023
Available online 2 May 2023

Wagner, 2005). The SDPRC establishes resource exploitation constraints and compensation mechanisms to reduce negative externalities of corporate resource consumption, such as pollutant emissions, land pollution and air pollution. In addition, the benefit sharing and product price guarantee mechanisms optimize the resource allocation and market position of enterprises. Therefore, we predict that the SDPRC will promote the corporate sustainable development.

To test these predictions, we use the difference-in-differences (DID) model to estimate the policy effects of sustainable cities. Using the SDPRC as a quasi-natural experiment, we estimated the impact of the SDPRC on corporate sustainability using a sample of Chinese non-financial listed firms from 2010 to 2020. In addition, we address endogeneity through PSM(propensity score matching)-DID, placebo and other methods. Finally, we conduct additional tests to examine potential pathways of action as well as urban, firm heterogeneity.

Our study makes the following contributions to the existing literature. We investigate the impact of SDPRC on firm sustainability. The existing literature focuses on macro-level impacts (Li et al., 2021), with little research at the firm level. A micro-level firm study can provide more detailed theoretical insights into the promotion of sustainable corporate development. In addition, our study can answer whether SDPRC is a resource blessing or a curse for corporate sustainability. Second, we examine the potential mechanisms through which SDPRC affects firm sustainability: green innovation and resource allocation. Third, we examine urban and firm heterogeneity. Heterogeneity in economic development and resource endowments results in cities being at different stages of development (growth, maturity, decline and regeneration) and firms responding differently to policy, which may further influence policy effects. Through this study, we hope to provide new experimental evidence for urban policy planning and the promotion of sustainable business development in other developing countries.

2. Theoretical analysis and hypotheses

As an important policy tool for sustainable development, SDPRC has become an important component of environmental governance and economic development. Unlike general environmental policies, SDPRC policies emphasize the sustainable development of resource cities and scientific and effective governance at the source (Yang et al., 2019).

There are two opposing views in existing research on resource cities. The first is resource blessing, a view that suggests that resource abundance has a positive impact on financial development and economic development (Stevens, 2003). Resource abundance promotes employment, investment, financial stability and more infrastructure (Wen and Jia, 2022). Using natural resources in the United States from 1960 to 2016, Shahbaz et al. (2018) found that natural resource abundance contributes to financial development. Using the G7 countries as an example, Wei et al. (2020) examined the relationship between resource abundance and financial development. The cited authors found that natural resources improve financial development by stabilizing resource prices. Nawaz et al. (2019) argue that natural resource abundance in Pakistan contributes to financial development and economic growth, and that the relationship is long term. However, since the 1980s, the term ‘resource curse’ has emerged, arguing that resource-rich countries do not perform as well as expected in terms of economic and financial development (Asif et al., 2020). Using income data for 35 resource-rich countries from 1992 to 2009, Crivelli and Gupta (2014) found a significant negative correlation between resource income and economic development.

Several scholars have explored the causes of the resource curse, such as institutions and systems (Lal and Myint, 1998). Sarmidi et al. (2014) find that differences in institutional quality affect the use and management of natural resources. Adams et al. (2019) show that the key to overcoming the resource curse is quality governance, quality institutions, effective governance and effective regulation. As a result, countries around the world have announced sustainable development policies for resource cities to escape the resource curse. Zheng and Ge (2022) studied China’s urban sustainable development policy and found that the policy significantly reduced urban carbon emissions. Li et al. (2021) found that sustainable policies promote local industrial transformation by limiting mining development and promoting tertiary sector development. Hou et al. (2022) suggest that environmental controls in resource cities have improved industrial eco-efficiency. In addition, several studies have examined the economic performance of sustainable development (Sebri and Dachraoui, 2021). Li et al. (2023) suggest that sustainable development policies reduce income inequality by improving institutional quality, reducing rent-seeking and corruption, and promoting education and human capital.

Previous research on resource city policies has mainly focused on the macro level, and research on the micro level is still lacking. Corporate sustainability not only strengthens the potential drivers of economic development, but also promotes environmental governance (Van Zanten and van Tulder, 2021). With this in mind, this paper focuses on exploring the impact of resource city policies on corporate sustainability.

2.1. SDPRC and corporate sustainability

Based on the resource dependence theory, organizations cannot develop without the supply of resources (Tehseen and Sajilan, 2016). Policies can provide organizations with unique resources and information, which in turn can enhance the strategic capabilities of the firm (Zhao and Tian, 2022). The impact of sustainability policies in promoting corporate sustainability is based on two main mechanisms: technology and cost. Based on a technology perspective, the SDPRC encourages companies to achieve sustainable development through green innovation. SDPRC aims to change the energy consumption mix and promote sustainable energy development to reduce pollution emissions (Sun et al., 2022; He et al., 2022). Green innovation refers to organizations that develop environmentally friendly products and technologies to improve resource efficiency and reduce pollution emissions (Albort-Morant et al., 2016; Shen et al., 2023). Existing research suggests that organizations that are successful in green innovation tend to have good environmental performance (Chiou et al., 2011) and better economic performance than their peers (Chapple et al., 2011). Based on a study of small and medium-sized manufacturing firms, Singh et al. (2020) found that the combination of both green transformational leadership and green innovation affects firm performance. Charmondusit et al. (2016) argue that green innovation helps to achieve cleaner production. Song et al. (2011) find that more new product development leads to higher firm performance. Other studies suggest that sustainable development policies regulate resource flows and provide a sound infrastructure for innovation (Lee et al., 2011; Dagestani et al., 2022), and that the benefit-sharing mechanism established by the SDPRC helps firms interact with each other in terms of information and resources, reducing concerns about innovation uncertainty.

From a cost perspective, SDPRC can optimize resource allocation to achieve sustainable development. As policies shape strong environmental pressures outside the firm, this can force production factors to shift to efficient sectors in order to increase the overall benefits to the organization (Ryan, 2012). In other words, due to institutional pressures, limited resources may be shifted from highly polluting sectors or firms to low-carbon, high-performing sectors in order to reduce costs (Nakamura et al., 2001). Liu et al. (2021b) point out that policies may not only increase the cost of pollution control, but also expose firms to high fines. Du and Li (2019) show that environmental regulations accelerate the exit of zombie firms (firms in financial distress), and achieve corporate energy surplus and waste management. Geng and Cui (2020) show that environmental regulation has a significant positive impact on regional capital allocation efficiency and promotes industry. Appannan et al. (2022) mention that environmental management helps firms to effectively adjust their resource allocation, which in turn

improves environmental performance. Liu and Liang (2015) argue that by optimizing resource allocation, firms can gain competitive advantage. Therefore, based on theoretical analysis and previous empirical results, we propose the following hypothesis:

H1. SDPRC can promote corporate sustainability.

3. Variable description and methodology

To test our hypothesis, we explored the relationship between resource curse and corporate sustainability performance using Chinese listed companies from 2010 to 2020. Corporate sustainability performance was obtained from the ESG (environment, social and governance) published by Bloomberg (Ng and Rezaee, 2015). Corporate financial data was obtained from the China Securities Market and Accounting Research Database (CSMAR). We have processed the data as follows: firstly, we have excluded the financial sector. Secondly, we excluded companies with continuous losses (ST, ST*). Finally, we manually queried companies' annual reports to fill in the missing values. Finally, we obtained a sample of 26,958 firm-year observations.

We explored the relationship between the resource curse and corporate sustainability performance based on the DID (difference-in-differences) model, which was developed as follows (Li et al., 2023).

$$CSP_{i,t} = \alpha_0 + \beta_0 Treat_i \times Post_t + \sum_{i=1}^{8} \gamma_i control + \delta_i + \theta_t + \varepsilon_{i,t} \quad (1)$$

In equation (1), the dependent variable is corporate sustainability performance (CSP), which is measured by the ESG score. The index is based on three measures: environmental, social and governance, and provides a comprehensive response to corporate sustainability (Eccles et al., 2014). The dependent variable is a dummy variable (Treat × Post), which is the sustainable development plan of resource-based cities aimed at escaping the resource curse. China promulgated the "Sustainable Development Plan of Resource-based Cities" (SDPRC) in 2013, which aims to help cities that are heavily dependent on resources to achieve transformation and upgrade and green high-quality development. The "treat" variable is defined as Treat = 1, if the city is labelled as resource-based city, otherwise Treat = 0. The "post" variable is defined as Post = 1, if the year>2012, otherwise Post = 0 (Li et al., 2023). Our control variables consist of two parts: the first part is the firm financial data (Yuan et al., 2019; García-Sánchez et al., 2019; Ullah et al., 2022): age (logarithmic treatment), firm size (logarithm of employees), growth rate of operating income (Growth), debt ratio (Lev) and inventory turnover ratio (ITR). The second part is city characteristics (Gao et al., 2021; Liu et al., 2021a; Wang et al., 2022): log of GDP per capita (GDP), log of foreign direct investment (FDI) and share of secondary industry (IS). City data are taken from the China City Statistical Yearbook. In addition, we controlled for individual effects and time effects to reduce the effect of unobserved variables on the regression results.

Table 1 shows the financial and city characteristics in resource and non-resource cities. The mean value of corporate sustainability performance in resource-based cities is 7.591, while corporate sustainability in non-resource-based cities is only 6.255. The means of the other variables show that there are significant differences between resource and non-resource cities.

Table 1
The descriptive statistics.

	Treatment group			Control group		
Variable	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
CSP	3083	7.591	10.131	25,115	6.255	9.492
Age	3083	2.791	0.355	25,113	2.770	0.405
Growth	3061	0.231	0.769	24,814	0.344	0.840
Size	3059	6.890	1.907	24,853	6.400	1.780
Lev	3082	0.455	0.247	25,115	0.448	1.314
ITR	3062	7.064	8.203	24,668	7.313	9.538
GDP	3083	10.775	0.593	25,115	11.374	0.539
FDI	3017	10.180	1.589	24,936	12.466	1.621
IS	3083	51.160	9.836	25,115	41.672	10.802

4. Regression results and discussion

4.1. Correlation test

Table 2 shows the results of the correlation test. We have preliminary confirmation that the sustainable development plan of resource-based cities (SDPRC) promotes corporate sustainable development. The correlation coefficients between all variables are less than 0.7 and the multicollinearity test showed a VIF value of 1.27 (1.27 < 10), which indicated that there was no multicollinearity.

4.2. Baseline regression

Table 3 provides the results of the underlying regressions. Column (2) is based on column (1) controlling for time effects, and we find that SDPRC can promote corporate sustainability. Column (3) adds firm financial characteristics, column (4) adds city characteristics, and it can be seen that the effect of SDPRC is unchanged. Taking column (7) as an example, the coefficient of Treat × Post on CSP is 0.346 at the 5% significance level, confirming hypothesis H1. This implies that the SDPRC helps firms to escape the resource curse.

4.3. Parallel trend test

The conditions for use of the DID model was that there was no difference between the control and treatment groups before the policy was implemented (Li et al., 2023). We used the parallel trend test to test for this difference. As shown in Fig. 1, we found no significant difference between the control and treatment groups prior to the policy.

4.4. Endogeneity and robustness test

In our study, we found that SDPRC promotes corporate sustainable development. To mitigate the effect of endogeneity on the regression results, we used a variety of robustness methods to test the regression results.

1) PSM-DID: Policy makers may decide which city is a resource city because of its urban characteristics, which leads to selection bias. To mitigate the endogeneity problem caused by selection bias, we use the PSM, which involves selecting non-resource cities with the same characteristics as resource cities based on a propensity score. We constructed two new control groups using the nearest neighbor matching (1:1) method and the radius matching (0.01) method. The DID model was then used to measure the policy effects. Matching balance tests were omitted due to space limitations, and we only compared the propensity score distributions of the treatment and control groups before and after PSM. According to Figures A1 and A2 in supplemental material, the PSM probability densities were close after matching, which indicates that the PSM is valid. Table 4 shows the results of the PSM-DID model and the results were found to be consistent with Table 3.
2) Placebo test. To reduce the effect of other unpredictable variables on the regression results, we used a placebo test (Zheng and Ge, 2022). Namely, 500 random bootstraps were conducted on 26,958 observations. We found that the coefficient of SDPRC was normally distributed and zero, indicating that the results of the DID regression analysis were robust (See Fig. 2).

4.5. Mediation effect analysis

The above analysis, suggests that SDPRC significantly enhances

Table 2
Correlation test.

	1	2	3	4	5	6	7	8	9	10
1.CSP	1.000									
2.Treat × Post	0.070*	1.000								
3.Age	0.125*	0.070*	1.000							
4.Growth	−0.0227*	−0.049*	−0.023*	1.000						
5.Size	−0.170*	0.052*	−0.170*	−0.084*	1.000					
6.Lev	0.171*	0.031*	0.171*	−0.015*	0.104*	1.000				
7.ITR	0.078*	0.019*	0.078*	−0.153*	0.062*	0.120*	1.000			
8.GDP	0.130*	−0.230*	0.130*	0.048*	−0.196*	−0.035*	0.030*	1.000		
9.FDI	0.016*	−0.321*	0.016*	0.081*	−0.159*	−0.032*	0.025*	0.659*	1.000	
10.IS	−0.142*	0.186*	−0.142*	−0.111*	0.217*	−0.004	−0.009	−0.356*	−0.483*	1.000

Note: ***, **, * indicate significance at the level of 1%, 5% and 10%.

Table 3
Baseline regression result.

	(1)	(2)	(3)	(4)
Variables	CSP	CSP	CSP	CSP
Treat × Post	4.727***	0.320*	0.321*	0.346**
	(0.193)	(0.171)	(0.173)	(0.175)
Age			0.410	0.452*
			(0.268)	(0.269)
Growth			−0.072**	−0.068*
			(0.035)	(0.035)
Size			−0.051**	−0.058**
			(0.023)	(0.023)
Lev			0.003	0.005
			(0.025)	(0.025)
ITR			−0.014***	−0.012**
			(0.005)	(0.005)
GDP				0.069
				(0.154)
FDI				0.087**
				(0.043)
IS				−0.022***
				(0.008)
C	6.006***	−2.160***	−2.733***	−3.555**
	(0.031)	(0.090)	(0.653)	(1.758)
Firm	Yes	Yes	Yes	Yes
Year	No	Yes	Yes	Yes
Obs	28,198	28,198	27,196	26,958
R-sq	0.805	0.865	0.869	0.869

Note: ***, **, * indicate significance at the level of 1%, 5% and 10%.

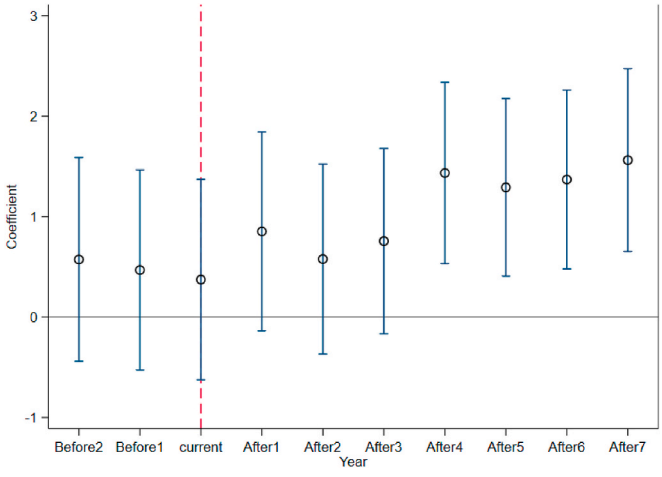

Fig. 1. Parallel trend test.

Table 4
PSM-DID regression results.

Variables	(1)	(2)
	1:1	0.01
	CSP	CSP
Treat × Post	1.180***	1.156***
	(0.371)	(0.372)
C	−4.738	−4.581
	(4.448)	(4.452)
Control	Yes	Yes
Firm	Yes	Yes
Year	Yes	Yes
Obs	4121	4113
R-sq	0.923	0.922

Note: ***, **, * indicate significance at the level of 1%, 5% and 10%.

Table 5
Robustness test.

Variables	(1)	(2)
	CSP	CSP1
Treat × Post	0.579***	0.015***
	(0.203)	(0.006)
C	−5.611***	0.151***
	(2.118)	(0.057)
Control	Yes	Yes
Firm	Yes	Yes
Year	Yes	Yes
Obs	18,186	26,958
R-sq	0.864	0.461

Note: ***, **, * indicate significance at the level of 1%, 5% and 10%.

corporate sustainability. We further tested the potential mechanisms of action. According to the SDPRC, green economic development is achieved through optimal resource allocation, and transformation and upgrading. Based on this, we introduce two pathways: resource use efficiency and green innovation. First, resource use efficiency (RUE) is measured by investment efficiency; the lower the investment efficiency, the higher the resource use efficiency (Chen et al., 2021). Green innovation (GI) is defined as the logarithm of the number of green patented innovations (Ley et al., 2016).

In Table A1 in supplemental material, the results in column (1) indicate that the coefficient of Treat × Post is −0.003 on RUE at the 10% significant level. The results in column (2) indicate that the coefficient of Treat × Post is 0.041 on GI at the 10% significant level. This evidence tells us that SDPRC achieves corporate sustainable development by improving resource use efficiency and green innovation.

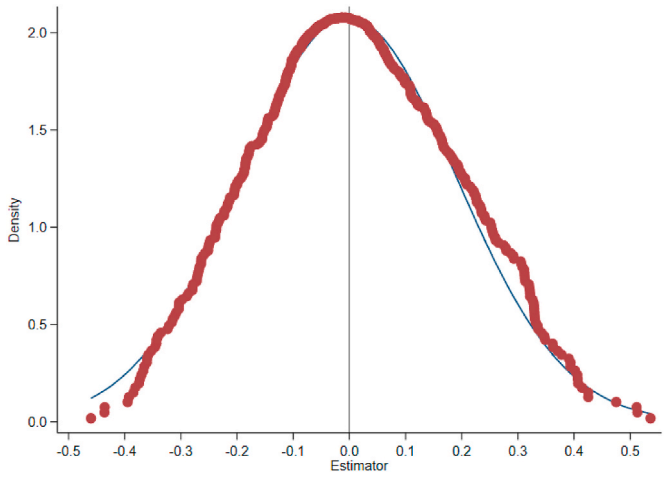

Fig. 2. Placebo test.

3) New samples. We construct a sample of manufacturing industries from the original sample, which are important in the economic development and pollution emissions of cities. In the first column of Table 5, we find that the SDPRC has a significant impact on the sustainability performance of the manufacturing sector.
4) Replace the dependent variable. We constructed a new dependent variable (SCP1) using the entropy weight method with reference to the studies of Khan et al. (2022) and Zhang et al. (2022)b, based on social responsibility and environmental responsibility published by Hexun and ROA. The second column of Table 5 shows that the SDPRC still has a positive effect on the new dependent variable.

4.6. Further analysis

4.6.1. Urban heterogeneity analysis

There are a large number of resource-based cities, with varying resource reserves and development profiles. In order to further ease the harmonious development of economic and environment, we refer to the SDPRC and classify resource-based cities into growth cities, mature cities, declining cities and regenerating cities. In Table A2 in supplemental material, the results in column (1) indicate that the coefficient of Treat × Post is 3.087 on CSP for growth cities at the 1% significant level. The results in column (2) indicate that the coefficient of Treat × Post is 0.797 for mature cities on CSP at the 5% significant level. The effect of SDPRC on CSP for other cities is insignificant. This means that the SDPRC only has a significant impact on the corporate sustainability in growth and mature cities, but not in other cities.

4.6.2. Firm heterogeneity analysis

The response to the SDPRC is inconsistent across enterprises. Namely, firms are able to obtain more policy support and resources through their political connections and market position. Therefore, based on firm ownership and firm size, we classify the sample into state-owned and non-state-owned enterprises (SOE and non-SOE), and large and small and medium-sized enterprises (LE and SME), respectively. In addition, based on institutional theory, firm development is influenced by the external environment, and external pressures force firms to adjust corporate strategies. Based on the guidelines of environmental information disclosure of listed companies, we divide the sample into heavily and non-heavily polluting (HP and non-HP). In Table A3 in supplemental material, the results in column (1) indicate that the coefficient of Treat × Post is 1.702 for SOE on CSP at the 1% significant level, while Treat × Post has a non-significant effect for non-SOE. The results in column (2) show that the coefficient of Treat × Post is 0.612 for LE on CSP at the 5% significant level, while the effect on SMEs is significantly negative. The results in column (3) show that the coefficient of Treat × Post is 0.929 for PE on CSP at the 1% significant level, while the effect on non-PE is significantly negative (-0.665, $p < 0.005$). This means that the SDPRC has a more positive impact on the sustainable development of SOE, LE and HP.

5. Conclusions and discussion

Our study reveals for the first time the relationship between SDPRC and corporate sustainable performance and examines possible pathways of action. Using a DID model and a series of robustness tests, our study shows the following. First, SDPRC enhances corporate sustainability. Second, possible mechanisms of SDPRC are explored. SDPRC achieves corporate sustainability by improving the corporate resource use efficiency and green innovation output. Third, urban heterogeneity is explored and it is found that SDPRC only has a positive impact on the sustainable performance of firms in growth and mature cities, while it has little impact on declining and regenerating cities. Finally, firm heterogeneity was examined, with SDPRC having a more positive impact on the sustainable performance of state-owned enterprises, large enterprises and heavily polluting. This study reveals the firm-level performance of SDPRC and provides novel theoretical insights for urban planning policy reform in developing countries such as China.

5.1. Theoretical implications

This paper fills a gap in SDPRC research in several ways. First, we contribute to SDPRC research by exploring the relationship between SDPRC and corporate sustainability. Existing SDPRC studies have focused on macro-level aspects, such as green development, carbon emissions and income inequality (Zhang et al., 2022a; Li et al., 2023; Wang et al., 2022), and few studies have been conducted at the firm level. Firms are major consumers of resources, emitters of pollution and major contributors to the economy (Fan et al., 2021). To mitigate the decoupling of economic and environmental development, corporate governance contributes to the achievement of sustainable development (Lafferty, 2004). Therefore, this paper focuses on the relationship between SDPRC and corporate sustainability to enrich this stream of literature.

Second, we explain the positive impact of SDPRC on sustainable performance through resource dependence theory, which provides new theoretical insights to promote sustainable development of firms. As mentioned earlier, the existing research on SDPRC has mainly focused on the macro level, neglecting the impact on the micro level. As a result, our study shows that SDPRC promotes corporate sustainable development and that SDPRC breaks the resource curse. Using a resource dependence theory perspective, we show that SDPRC reduces the waste of non-essential resources by integrating resources to achieve sustainable development. Therefore, our research improves the understanding of whether and how SDPRC affects corporate sustainability.

Third, we explore possible mechanisms of action for SDPRC: resource allocation and green innovation. SDPRC enhances corporate sustainability through transformation and upgrading and improved resource use (Liao et al., 2022). Research on both pathways not only reveals how SDPRC affects corporate sustainability, but also provides new perspectives on how to promote corporate sustainability. Our study shows that SDPRC achieves sustainable development through optimal resource allocation. In other words, SDPRC encourages firms to reduce resource costs or direct resources to productive sectors in order to achieve sustainable development (Ryan, 2012). It is interesting to note that green innovation is another way in which the SDPRC promotes corporate sustainability. This is in line with the legitimacy perspective of institutional theory, where we argue that the SDPRC shapes the environmental legitimacy pressure on firms, which in turn encourages resource-dependent firms to transform and upgrade or engage in cleaner production (Shuna and Zhaohuai, 2011). This can also be explained by the Porter hypothesis that environmental pressures force firms to innovate in response to external demands (Berrone et al., 2013).

Finally, we tested for city heterogeneity. We find that SDPRC has a significant effect on firm sustainability only in growing and mature cities. Growing and mature cities have higher levels of resource endowment and economic development (Zhang and Qu, 2020). SDPRC can fully mobilise resource development and utilisation to shape the unique sustainability capabilities of firms. Moreover, the heterogeneity of enterprises suggests that SDPRC has a more positive impact on the sustainable development of SOEs, large enterprises and heavily polluting enterprises. State-owned enterprises and large enterprises use their market position to obtain more resource support (Rudy et al., 2016) or have better corporate governance systems (Tan and Wang, 2007), to effectively achieve sustainable development.

5.2. Practical implications

Our research provides recommendations for policy makers. Despite the growing body of research on SDPRC, its impact at the firm level is unknown. Our research suggests that SDPRC can contribute to sustainable development. Therefore, we suggest that governments should expand the scope of pilot resource cities or strengthen policy efforts to achieve sustainable development at the national level. Second, the government should establish an innovation platform and create a favorable innovation environment to promote business innovation. Third, the government should recognize the disadvantages of declining and regenerating cities in terms of sustainable development and develop policies to promote their sustainable development, for example by supporting innovation and clean energy development. Finally, the government should increase its support for non-state enterprises, small and medium-sized enterprises and non-heavy polluters that are at a disadvantage in the marketplace to reduce their concerns about the transition to sustainable development.

In addition, our research has implications for business managers. Enterprises in pilot cities should take full advantage of the policy in terms of establishing a sound system of resource use and technology development. For example, establishing a resource regulation system to reduce the waste of non-essential resources, and attracting skilled personnel and increasing innovative ways of cooperation to enhance innovation capabilities.

5.3. Limitations

This paper examines the impact of SDPRC on corporate sustainability, but there are some limitations. First, it focuses on non-financial firms in China, and different industries may respond differently to SDPRC. Second, this paper only explores the mechanisms of SDPRC, ignoring the moderating role of the internal and external environment, such as corporate governance, the degree of marketisation and regulatory pressure. Finally, this paper ignores regional heterogeneity due to the uneven development across regions in China. Therefore, we will investigate the impact of the SDPRC at the micro level in future research.

Credit author statement

Pengyu Chen: Conceptualization, Methodology, Formal analysis, Resources, Writing – original draft, and Review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

Not applicable.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jenvman.2023.117988.

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