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Investment Incentives and Corporate Sustainability: Evidence from China¹

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Abstract

This research studies the effect of the Accelerated Depreciation Policy (ADP) on the corporate sustainability of Chinese A-share firms between 2012 and 2017. We employ difference-in-differences estimation and reveal that ADP has a significant positive effect on corporate sustainability, particularly regarding employment, remuneration, and stakeholder rights. The effect is mostly attributed to increases in total factor productivity and short-term leverage, with a lesser role played by workforce skill structure upgrades. This effect is consistent and particularly prominent in firms with higher visibility and labor intensity, lower probability of obtaining long-term bank loans, and firms that are not state-controlled or politically connected. Our findings demonstrate that tax policy is vital in sustainability-related corporate decision-making.

Keywords: investment incentives, accelerated depreciation policy, corporate sustainability

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Introduction

Investment incentives, such as grants, tax credits, accelerated depreciation allowances, and tax holidays, are commonly used by governments to stimulate industrial growth and technological advancement. Research has shown that these incentives positively impact various economic indicators, including fixed capital investments [1–3], innovation [4], employment [5], productivity [6; 7], foreign direct investments [8], and exports [9; 10].

However, the current international agenda, guided by the United Nations' Sustainable Development Goals (SDGs), calls for economies to prioritize sustainable development beyond economic objectives, considering social and environmental performance [11]. In line with this trend, researchers have begun exploring the impact of investment incentives on corporate social responsibility (CSR) engagement [12–15]. Nevertheless, there is a lack of research on the influence of these incentives on overall corporate sustainability, which encompasses economic, social, and environmental indicators with a longer-term orientation and less focus on corporate governance quality, thus going beyond CSR's assessment of meeting current stakeholder interests [16; 17]. Our study addresses this gap by investigating the influence of investment incentives on corporate sustainability in Chinese firms, as measured by the novel Common Prosperity Index.

We investigate the sustainability effect of investment incentives using China's Accelerated Depreciation Policy (ADP) pilots implemented in 2014–2015 as a quasi-natural experiment. ADP pilots, introduced by the Ministry of Finance and the State Administration of Taxation, enabled firms from targeted industries to take advantage of an accelerated depreciation schedule for newly acquired fixed assets.

Our conceptual framework for the relationship between ADP and corporate sustainability is based on resource-based view [18], stakeholder theory [19; 20], and legitimacy theory [21]. We view the ADP effect as consisting of three complementary mechanisms: increased total factor productivity (TFP), an upgrade in workforce skill structure, and a rise in short-term leverage, as documented in prior ADP literature in China [22–26]. We build upon this research by exploring the link between these ADP consequences and corporate sustainability.

We construct a comprehensive panel dataset of Chinese A-share non-financial listed firms from 2012 to 2017 and estimate the ADP effect on corporate sustainability using the multiple period difference-in-differences (DID) approach [27]. Our results indicate that ADP positively impacts the sustainability performance of Chinese firms in terms of employment, remuneration, and sharing with shareholders, debtholders, and distributors, contributing to at least 4 of the 17 SDGs. Robustness checks strengthen our baseline results. Our investigation into TFP channels, short-term leverage, and skill structure upgrades reveals that all three significantly mediate the relationship between ADP and corporate sustainability, with TFP and short-term leverage having the highest mediation power.

Further analyses examine the heterogeneity of the ADP effect, the value relevance of corporate sustainability, and ADP's effect on environmental engagement. Cross-sectional analyses indicate that the ADP effect is more prevalent in labor-intensive firms with higher visibility, a lower probability of obtaining long-term bank loans, and firms that are not state-controlled or politically connected.

Our investigation into value relevance reveals that corporate sustainability in China contributes to a favorable corporate profile, higher Economic Value Added (EVA) per share, and higher stock liquidity. Finally, we extend our baseline results in the environmental direction, revealing that ADP has a significant positive effect on environmental performance and environmental disclosure of eligible firms.

Our research makes significant contributions to multiple strands of literature. First, we expand the existing knowledge on investment incentives and sustainability-related engagement [12–15, 28]. Unlike Tang and Wang [14] and Zhao and Peng [28], who focus on ADP's effect on CSR performance in China, our study investigates corporate sustainability using the more comprehensive Common Prosperity Index, which is less skewed towards corporate governance quality. We also develop innovative channels and connect the results to SDGs. Second, we contribute to research on corporate sustainability drivers [29–32] by demonstrating that corporate tax policy can effectively influence corporate sustainability in its holistic definition. Third, our work adds to studies on corporate tax policy efficacy [33–35], showing that tax policy can have effects beyond its intended target.

The paper is structured as follows. Second section reviews the literature and formulates the research hypothesis. Third section presents the data and empirical strategy. Fourth section provided an analysis of ADP's effect on corporate sustainability, examining its impact on specific indicators and potential mediating roles of TFP, short-term leverage, and workforce skill structure. Fifth section displays the results of performed robustness checks. Six section offers a deeper exploration of heterogeneous effects, value-related consequences, and environmental engagement. Finally, seven section concludes this study.

Literature Review and Hypotheses Development

Tax Incentives in China

Policymakers worldwide implement corporate tax incentives to stimulate economic growth, as neoclassical investment models suggest firms adjust investments in response to fiscal instruments [36]. Accelerated depreciation, by permitting greater tax savings at earlier stages of a company's life cycle, creates cash inflows and alleviates financial constraints [37]. Previous research focused on its impact on fixed asset investments [1–3], productivity [7], and R&D [4].

China's government uses tax incentives to drive innovation and growth, including R&D [38] and FDI [39]. Key permanent reforms include the 2004 VAT reform, the 2012 business tax (BT)-to-VAT reform, and the 2014 ADP. The 2004 VAT reform allowed VAT taxpayers to deduct fixed asset costs, increasing investment, capital intensity, free cash flow, and productivity [7; 40; 41]. It also increased exporting likelihood [10] and skilled labor share, while decreasing employment and average wages [41]. The 2012 BT-to-VAT reform targeted the service industry, reducing tax burdens and positively impacting free cash flow, capital investment, R&D, specialization, and productivity in services [42–44]. It also improved manufacturing firm productivity via value chain linkages [45].

In October 2014, ADP was introduced in China to stimulate manufacturing equipment expansion and innovation by reducing the industrial sector's tax burden. Initially, six industries were eligible for accelerated depreciation rules starting on January 1st, 2014¹.

In September 2015, four more industries were added². Eligible firms could reduce the useful life of new assets by 60% or use methods like double-declining balance to accrue higher depreciation earlier. Small firms in targeted industries could immediately expense capital expenditures for R&D. These changes were permanent for all fixed asset purchases. Additional incentives, regardless of industry, included immediate expensing for assets under RMB 5,000 or RMB 1 million for R&D, and accelerated depreciation for innovation assets over RMB 1 million [46]. In April 2019, ADP expanded to the entire manufacturing sector.³ Research demonstrates that ADP positively affects investments, productivity, skilled labor demand, free cash flow, employment, and internationalization [22; 23; 26; 47; 48].

Another strand of literature on Chinese ADP is related to its impact on firm financial leverage, financialization, and cash holdings. ADP-induced investments are largely financed by short-term debt, increasing short-term leverage and creating a mismatch between investment and financing [26; 25]. ADP also lowers corporate financialization by incentivizing fixed asset investments over financial assets [49; 50]. Consequently, reduced financial constraints and financialization lead firms to decrease cash holdings [48].

Hypothesis Development

Empirical research shows China's ADP pilots (2014-2015) positively affected firm-level investment, productivity, and demand for skilled labor. Fan and Liu [47] found ADP sig-

nificantly impacted firm investment, especially in equipment, more so for firms with higher tax compliance and fewer financial constraints. Zhao and Fang [23]; Zhao et al. [24] also showed ADP boosted cash flow, investment, and demand for skilled labor, with a stronger effect under higher tax compliance. However, Zhao and Fang [23] also found the sensitivity of skilled labor demand to ADP was more pronounced for financially constrained firms, aligning with prior research on investment and productivity elasticity to tax changes [7; 44]. Increased investments, R&D, and alleviated financial constraints from ADP favorably impact firm TFP and employment [22; 51]. Furthermore, market expansion post-ADP favors corporate internationalization [52].

Based on this evidence, we consider three mechanisms through which ADP can stimulate corporate sustainability: increased TFP, a boost in short-term leverage, and an upgrade in skill structure. Theoretically, ADP increases TFP by boosting investments and R&D [53; 54]. The rise in short-term leverage is due to the banking system's inability to meet industry-wide demand for long-term loans and banks' preference for short-term loans to manage risk and information asymmetry [55–58]. Finally, ADP can upgrade skill structure due to capital-skill complementarity: fixed investments boost demand for skilled labor [59; 60]. Our theoretical framework is outlined in Figure 1.

Various theories explain how changes in productivity, debt maturity, and labor skill structure affect corporate sustainability. The resource-based view [18] posits that firms with superior resources (e.g., higher TFP, skilled labor) can allocate available to sustainability initiatives, gaining competitive advantage [61–64]. Stakeholder theory [19; 20] suggests that short-term lenders, as key stakeholders, demand transparency and responsible behavior [65, 66]. Qualified employees, as vital internal stakeholders, also have higher sustainability expectations [67]. Firms with higher TFP often experience positive stakeholder perceptions and greater returns from sustainability [68; 69].

Legitimacy theory [21] argues that prominent, highly productive firms are pressured to legitimize their market position through sustainability initiatives, ensuring societal acceptance and avoiding backlash [70]. Firms increasing the amount of short-term loans may also use sustainability to enhance societal legitimacy and long-term viability [71; 72].

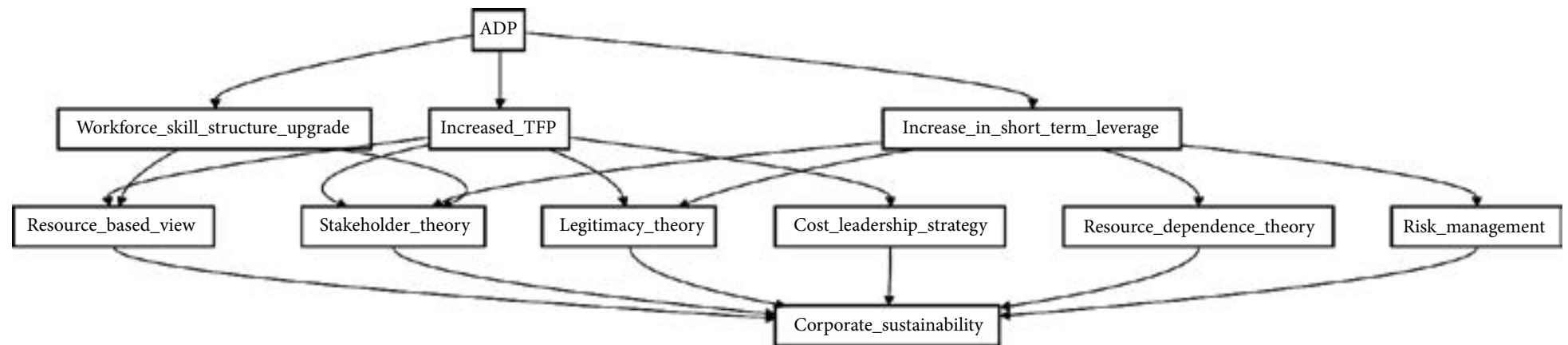
Based on this, we expect ADP's effects on firm productivity, labor, and capital structures to improve sustainability performance. This aligns with prior evidence from China

¹ Notice of the Ministry of Finance and the State Administration of Taxation on Improving the Enterprise Income Tax Policy for Accelerated Depreciation of Fixed Assets (Finance and Taxation [2014] No. 75) is available at <https://www.shui5.cn/article/d6/74674.html>.

² Notice of the Ministry of Finance and the State Administration of Taxation on Further Improving the Enterprise Income Tax Policy for Accelerated Depreciation of Fixed Assets (Finance and Taxation [2015] No. 106) is available at <https://www.shui5.cn/article/d1/82145.html>.

³ Announcement No. 66 of 2019 by the Ministry of Finance and the State Administration of Taxation on Expanding the Scope of Application of the Accelerated Depreciation Preferential Policy for Fixed Assets is available at <https://www.shui5.cn/article/5d/126952.html>.

Figure 1. Theoretical Framework



showing that investment incentives foster CSR engagement [13; 14; 28]. Given that ADP affects long-term firm strategy, our main hypothesis is:

H1: ADP significantly promotes corporate sustainability.

Data and Methodology

Data and Sample

Our sample comprises Chinese A-share non-financial listed firms from 2012 to 2017, covering two years before the 2014 ADP pilot and two years after the 2015 pilot. We obtain general, financial, governance, and ownership data from the China Stock Market and Accounting Research (CSMAR) database. Corporate sustainability data come from the "Enterprises' Contribution to Common Prosperity Research" database, contributing to the Common Prosperity Index.

We exclude firms with special treatment (ST) status⁴ and observations with missing data. The final sample contains 2,665 firms and 13,386 firm-year observations. We winsorize continuous variables at their 1st and 99th percentiles to mitigate outliers.

Corporate Sustainability Measurement

Originating from the Brundtland Report [16], sustainable development balances current needs with future generations' well-being. In a corporate context, the Triple Bottom Line framework [73] holistically merges economic, societal, and environmental perspectives, a cornerstone in sustainability studies [17; 74; 75].

We use the Common Prosperity Index to measure corporate sustainability due to its comprehensive nature within the Chinese business landscape. Table A3 details this index and its relationship to SDGs. It covers economic and institutional sustainability (shareholder returns, tax contribution, healthy competition, public welfare), social sustainability (employment, wages, employee safety, customer/partner engagement), and environmental sustainability (environmental violations as part of Other Partner Sharing sub-score) [76], consistent with the Triple Bottom Line [73].

The Common Prosperity Index serves as a strong measure of corporate sustainability, meeting criteria for long-term orientation and holistic definition [74; 77; 78]. It emphasizes stakeholder engagement, delves into employment dynamics and compensation, and covers a broad spectrum of societal challenges like social inclusion, disability rights, poverty, and healthy competition. Its balanced methodology, which grants equal weight to all components, ensures a holistic sustainability capture.

Empirical Strategy

We investigate ADP's influence on corporate sustainability using a staggered DID approach [27]:

$$CS_{i,t} = \beta ADP_{i,t} + \gamma Controls_{i,t} + \delta_i + \theta_{j,t} + \epsilon_{i,t}, \quad (1)$$

where i , j , and t denote firm, industry, and year, respectively. $CS_{i,t}$ is corporate sustainability (Common Prosperity Index transformed to a score). $ADP_{i,t}$ is an interaction between $TREAT_{i,t}$ (dummy for eligible primary industry) and $POST_{i,t}$ (dummy for post-eligibility year). $Controls_{i,t}$ are control variables, δ_i is a firm fixed effect, $\theta_{j,t}$ is an industry-year fixed effect, and $\epsilon_{i,t}$ is white noise. Industry-year fixed effects account for varying sustainability norms across industries, as the index is not industry-adjusted.

Our analysis includes the Common Prosperity Index and its individual sub-scores: firm-level employment (*HIRE*), remuneration (*PAY*), employee protection (*SAFE*), customer sharing (*QUAL*), other partner sharing (*OBLIG*), shareholder sharing (*SHARE*), contribution to healthy competition (*COMP*), tax contribution (*TAX*), and contribution to public welfare and charity (*CHAR*).

Following prior literature on sustainability drivers, we include firm-level controls: profitability (*ROA*), valuation (*TQ*), size (*SIZE*), cash holdings (*CASH*), leverage (*LEV*), capital expenditures (*CAPEX*), firm age (*AGE*), sales growth (*GR*), and R&D expenses (*RD*) [79–83]. To account for managerial long-termism, we include institutional ownership (*INST*) and insider ownership (*MGT*) [84; 85]. Detailed variable measurements are in Table A2.

Summary Statistics

Panel A of Table 1 presents summary statistics. The mean CS is 5.3, reflecting the balanced nature of the Common Prosperity index compared to other China-based CSR indices (e.g., Zhong et al. [86]; Li et al. [87]). The treatment group (TREAT) accounts for 53.4% of observations, and the post-intervention period (POST) for 32.4%. Average firm size is 22.1, ROA is 3.6%, leverage is 43.0%, Tobin's Q is 2.3, and sales growth is 19.6%. Cash balance averages 18.1% of total assets, capital investments 4.8%, and R&D 3.3% of sales. Institutional and managerial ownership average 6.5% and 9.5%, respectively. These statistics align with prior literature. Panel B of Table 1 shows the Spearman correlation matrix. ADP positively correlates with CS, supporting H1. Firm size, profitability, sales growth, age, institutional ownership, cash ratio, and R&D correlate positively with CS. Managerial ownership and firm valuation correlate negatively. Most correlation coefficients are below 0.3, indicating minimal multicollinearity.

⁴ In China, ST status is used to refer to firms that are experiencing financial distress.

Table 1. Descriptive Statistics

This table presents the descriptive statistics and Spearman correlation matrix for a sample of Chinese A-share listed firms from 2012 to 2017. Variable definitions are shown in Table A2. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Summary Statistics

	Mean	S.D.	Min	Q25	Median	Q75	Max	N
CS	5.329	2.410	1.000	4.000	5.000	7.000	9.000	13.386
ADP	0.324	0.468	0.000	0.000	0.000	1.000	1.000	13.386
TREAT	0.534	0.499	0.000	0.000	1.000	1.000	1.000	13.386
POST	0.324	0.468	0.000	0.000	0.000	1.000	1.000	13.386
SIZE	22.137	1.246	19.593	21.260	21.989	22.857	25.847	13.386
ROA	0.036	0.051	-0.164	0.012	0.033	0.061	0.187	13.386
AGE	2.272	0.688	0.693	1.792	2.398	2.890	3.219	13.386
LEV	0.430	0.210	0.050	0.257	0.421	0.593	0.840	13.386
TQ	2.256	1.527	0.936	1.319	1.753	2.587	9.748	13.386
CASH	0.181	0.128	0.017	0.091	0.146	0.236	0.650	13.386
CAPEX	0.048	0.046	0.000	0.014	0.034	0.067	0.222	13.386
RD	0.033	0.041	0.000	0.001	0.027	0.044	0.237	13.386
GR	0.196	0.502	-0.575	-0.030	0.102	0.273	3.348	13.386
INST	0.065	0.068	0.000	0.013	0.044	0.096	0.313	13.386
MGT	0.095	0.165	0.000	0.000	0.000	0.131	0.672	13.386

Panel B. Spearman Correlation Matrix

	CS	ADP	SIZE	ROA	AGE	LEV	TQ	CASH	CAPEX	RD	GR	INST	MGT
CS	1.00												
ADP	0.07***	1.00											
SIZE	0.46***	-0.08***	1.00										
ROA	0.26***	0.06***	-0.00	1.00									
AGE	0.08***	-0.08***	0.34***	-0.20***	1.00								
LEV	0.15***	-0.18***	0.52***	-0.39***	0.39***	1.00							
TQ	-0.14***	0.24***	-0.47***	0.06***	0.02**	-0.26***	1.00						
CASH	0.04***	0.02**	-0.21***	0.25***	-0.23***	-0.36***	0.13***	1.00					
CAPEX	-0.01	-0.06***	-0.06***	0.12***	-0.26***	-0.10***	-0.06***	-0.04***	1.00				
RD	0.02**	0.35***	-0.25***	0.06***	-0.32***	-0.35***	0.20***	0.25***	0.08***	1.00			
GR	0.09***	0.04***	0.05***	0.17***	-0.02**	0.02**	-0.01	-0.01	0.00	-0.02**	1.00		
INST	0.23***	0.06***	0.18***	0.21***	0.04***	0.02**	0.11***	0.06***	0.08***	0.07***	0.08***	1.00	
MGT	-0.06***	0.10***	-0.32***	0.17***	-0.59***	-0.33***	-0.01	0.21***	0.13***	0.30***	0.04***	-0.03***	1.00

Empirical Results

Accelerated Depreciation and Corporate Sustainability

Before presenting baseline results, we evaluate alternative model specifications. Table 2 shows OLS without fixed effects (Column (1)) had the strongest ADP effect but lowest adjusted R^2 . Including firm-level fixed effects (Column (2)) significantly improved R^2 but halved the ADP effect. ADP's positive effect on CS remained significant with firm and industry-year effects (Column (3)), though smaller than the full baseline model (Column (4)).

Our baseline results show that ADP has a statistically and economically significant positive effect on corporate sustainability, increasing firm-level sustainability performance by 0.23 points (4% of its mean value). This supports Hypothesis H1.

These results align with the resource-based view [18] (increased sustainability capability from resource allocation

efficiency); stakeholder theory [19] (boost in sustainability efforts from increased stakeholder awareness); legitimacy theory and risk management [21; 88] ((sustainability as a tool for legitimacy or risk hedging); and cost leadership [89] (sustainability boosted by cost advantages). Our findings expand the findings of Tang and Wang [14] and Zhao and Peng [28], showing that Chinese ADP drives contributions to overall sustainability, a broader definition than short-term CSR.

Controls, size, profitability, sales growth, and institutional ownership showed a significant positive effect, while capital expenditures had a negative effect, consistent with prior literature. Age's negative effect may stem from larger firms' greater exposure to societal issues [80]. The positive impact of leverage could be due to increased pressure on debtors. The loss of significance for cash holdings, Tobin's Q, and insider shareholding with fixed effects may be due to their correlation with time-invariant firm characteristics or industry characteristics.

Table 2. Accelerated Depreciation Policy and Corporate Sustainability

This table presents the effect of ADP on corporate sustainability for a sample of Chinese A-share firms from 2012 to 2017. The dependent variable is CS in year t . Variable definitions are shown in Table A2. The robust t -statistics clustered by the industry are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

	(1) CS	(2) CS	(3) CS	(4) CS
ADP	0.2965*** (4.61)	0.1581** (2.17)	0.1756** (2.56)	0.2268*** (2.98)
SIZE	0.9113*** (15.67)	0.9156*** (11.41)		0.6665*** (11.48)
ROA	11.6958*** (10.02)	3.3924*** (9.16)		3.9056*** (8.97)
AGE	-0.0433 (-0.64)	-0.1416 (-1.37)		-0.7368*** (-7.17)
LEV	1.0853*** (4.08)	0.6202*** (4.51)		1.1810*** (10.53)
TQ	0.0616*** (2.88)	0.1010*** (5.03)		0.0111 (0.70)
CASH	1.3210*** (3.02)	0.3848 (1.68)		0.3292 (1.71)
CAPEX	-0.8513 (-0.89)	-1.4662*** (-2.93)		-0.6100* (-1.74)
RD	5.4768*** (3.70)	2.0092** (2.49)		1.4292 (1.61)
GR	0.0662 (0.95)	0.2702*** (4.40)		0.2954*** (4.70)
INST	2.5342*** (7.70)	0.9568*** (4.05)		0.6531** (2.38)
MGT	0.4639*** (3.86)	0.8420* (1.88)		0.2377 (0.72)

	(1) CS	(2) CS	(3) CS	(4) CS
Firm FE	No	Yes	Yes	Yes
Industry-Year FE	No	No	Yes	Yes
Observations	13.386	13.386	13.386	13.386
Adjusted R²	0.31	0.74	0.74	0.76

Performance of Corporate Sustainability Indicators

We investigate the sustainability components prioritized by firms. Given ADP's effect through TFP, skilled employees, and short-term debt, we expect a significant impact on stakeholders directly affected by these mechanisms. Employees and debtholders are prime examples. Investments may also benefit customers, shareholders, and the environment. We hypothesize that Healthy Competition, Public Welfare and Charity sub-scores are unaffected due to their irrelevance to ADP's orientation, and Tax Contribution is ambiguous.

Table 3 shows that ADP significantly affects employment, remuneration, shareholder sharing, and other partner sharing (Columns (1)–(2) and (5)–(6)). Table A1 further reveals that among “other partners”, ADP favors distributors and debtholders, leading to a decreased turnover of accounts receivable, reduced debt violations, and increased interest on debt per share. This suggests that investment incentives promote SDG 8 “Decent Work and Economic Growth”, SDG 10 “Reduced Inequalities”, SDG 5 “Gender Equality”, and SDG 16 “Peace, Justice and Strong Institutions” (Table A3).

The positive impact on Employment and Remuneration sub-scores (employee number, diversity, training, compensation) aligns with ADP's effect on workforce skill structure upgrades [23; 24]. Skilled employees command higher wages and higher demands for employee responsibility [90]. However, ADP does not affect Employee Protection (safety, security, rights) (Column (3)), suggesting firms prioritize workforce structure and competitiveness over working conditions.

The rise in the Shareholder Sharing sub-index, driven by profitability and dividends, is consistent with evidence of reduced financial constraints, increased investment, innovation, and TFP [22; 47]. The Other Partner Sharing sub-score also rises, largely due to Debtholder Sharing (Columns (3)–(4) of Table A1), aligning with increased short-term debt post-ADP [25; 26] and pressure from short-term lenders [58]. Increased distributor sharing (lower accounts receivable turnover) suggests firms, with added cash flow from accelerated depreciation, offer more

relaxed credit terms. The insignificant effect on Supplier Sharing is likely due to ADP's irrelevance to supplier interests.

The lack of significant effect on Healthy Competition, Tax Contribution, and Public Welfare and Charity (Columns (7)–(9) of Table 3) aligns with our prediction. The policy's capital investment focus provides no direct incentive for competitive or philanthropic changes. Ambiguous tax base effects (depreciation allowances vs. increased profitability) may explain the lack of impact on tax contribution. The absence of ADP's effect on Customer Sharing (product quality, Column (4)) may be due to a focus on process rather than product innovation, and no direct customer pressure from ADP.

Plausible Channels

Our baseline analysis suggests ADP incentivizes sustainability in employment, remuneration, shareholder, and debtholder sharing. We formally analyze TFP, short-term financial leverage, and employee skill structure as potential mediators.

Firm Productivity

Rising firm TFP naturally results from ADP, driven by innovation and resource allocation efficiency [53; 54]. ADP effectively stimulated TFP growth in China [22]. TFP's positive impact on sustainability is explained by stakeholder theory (positive stakeholder perceptions, higher returns from initiatives for high-TFP firms) [68; 69], legitimacy theory (need to legitimize market position) [21; 70; 90], resource-based view (efficient resource allocation to sustainability) [63], and cost leadership (sustainability effect of cost advantages) [89]. ADP encourages long-term investment, leading to reinvestment of cost savings into sustainability [92]. Sustainability also boosts corporate reputation, competitiveness, sales, market value, and lowers capital cost [93–99].

To test TFP's mediation, we estimate:

$$TFP_{i,t} = \beta ADP_{i,t} + \gamma Controls_{i,t} + \delta_i + \theta_{j,t} + \epsilon_{i,t} \quad (2)$$

$$CS_{i,t} = \beta TFP_{i,t} + \gamma Controls_{i,t} + \delta_i + \theta_{j,t} + \epsilon_{i,p} \quad (3)$$

where TFP is measured using the LP method [100].

Table 3. Accelerated Depreciation Policy and Performance of Corporate Sustainability Indicators

This table presents the effect of ADP on corporate sustainability indicators' performance for a sample of Chinese A-share firms from 2012 to 2017. The dependent variables are HIRE, PAY, SAFE, QUAL, SHARE, OBLIG, COMP, TAX, and CHAR in year t . Variable definitions are shown in Table A2. The robust t -statistics clustered by the firm are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	HIRE	PAY	SAFE	QUAL	SHARE	OBLIG	COMP	TAX	CHAR
ADP	0.7430** (2.14)	0.4382* (1.81)	-0.0753 (-0.80)	-0.2241 (-1.20)	1.7256** (2.22)	0.5377** (2.82)	-0.1315 (-0.56)	-0.5613 (-0.66)	-0.0377 (-0.21)
SIZE	3.4921*** (10.59)	0.3885 (1.29)	-0.1632 (-1.63)	-0.0910* (-1.98)	0.2056 (0.53)	0.0713 (0.48)	-0.4803*** (-3.22)	4.5368*** (10.21)	0.2036 (1.37)
ROA	-4.0790** (-2.32)	1.6178 (0.71)	0.6913* (2.00)	0.2594 (0.74)	28.2018*** (18.58)	-0.1800 (-0.14)	1.4478 (0.90)	70.5550*** (14.78)	-0.9816 (-1.02)
AGE	-0.1297 (-0.23)	-2.5198*** (-3.35)	-0.1398 (-0.57)	0.2205 (1.63)	-1.9242 (-1.64)	-0.5144 (-1.26)	0.4839 (0.64)	-8.3581*** (-7.31)	-0.2452 (-0.61)
LEV	1.5919 (1.61)	4.2872*** (4.93)	0.0262 (0.11)	0.0663 (0.41)	-5.3673*** (-3.62)	4.1162*** (4.76)	0.8089* (1.84)	13.4721*** (9.88)	-1.1503*** (-2.89)
TQ	0.1285 (1.71)	-0.0476 (-0.55)	-0.0329 (-1.28)	-0.0063 (-0.40)	-0.0191 (-0.12)	-0.1035 (-1.11)	-0.0443 (-0.77)	-0.2611 (-1.44)	0.0415 (0.47)
CASH	-1.5037* (-1.76)	1.4573 (1.32)	-0.0012 (-0.01)	0.0911 (0.42)	6.2391*** (5.37)	1.2431** (2.09)	-0.3824 (-0.73)	1.1953 (1.02)	0.1060 (0.41)
CAPEX	5.2167** (2.26)	-1.8855 (-1.27)	-0.1590 (-0.35)	-0.1709 (-0.50)	-3.3535 (-0.92)	-4.6834*** (-3.30)	-0.5802 (-0.27)	-17.8898*** (-5.31)	3.8532** (2.83)
RD	7.7256*** (2.94)	12.2727*** (4.54)	0.4388 (0.58)	0.9900 (1.57)	-6.5918*** (-3.05)	-7.6433** (-2.22)	0.2162 (0.09)	-19.2450* (-2.07)	7.0780*** (6.17)
GR	0.9973*** (5.13)	1.0730*** (3.91)	-0.0581 (-1.67)	0.0095 (0.47)	-0.9022*** (-4.64)	0.6784*** (4.22)	0.1924* (1.86)	1.3789*** (4.54)	-0.1871*** (-4.29)
INST	1.0940 (0.89)	1.0797 (1.41)	-0.7938 (-1.32)	0.1819 (0.74)	-2.3605 (-1.58)	-0.0272 (-0.03)	-0.1953 (-0.26)	8.3712*** (3.36)	-0.9815* (-2.05)
MGT	0.2126 (0.20)	1.2326 (0.97)	-0.3266 (-1.42)	0.2218 (1.52)	2.6801* (1.87)	0.9131 (1.14)	-1.0220 (-0.51)	-1.7875 (-1.05)	1.5342*** (3.63)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13.386	13.386	13.386	13.386	13.386	13.386	13.386	13.386	13.386
Adjusted R ²	0.77	0.68	0.61	0.92	0.55	0.67	0.32	0.68	0.98

Columns (1) and (4) of Table 4 confirm ADP positively affects TFP at 1% significance [22], and TFP is positively associated with CS. Thus, TFP mediates the relationship, increasing firms' productivity and sustainability. Share-

holder Sharing and Distributor Sharing are TFP-mediated sustainability indicators (Section "Performance of Corporate Sustainability Indicators").

Table 4. Plausible Channels

This table presents the potential mediation of TFP, short-term leverage, and skill structure in the effect of ADP on corporate sustainability for a sample of Chinese A-share firms from 2012 to 2017. The dependent variables are CS, TFP, STDEBT, and SKILL in year t . Variable definitions are shown in Table A2. The robust t -statistics clustered by the firm are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	TFP	STLEV	SKILL	CS	CS	CS
ADP	0.0512*** (4.71)	0.0117** (2.19)	0.0124*** (2.72)			
TFP				0.2498*** (4.83)		
STLEV					1.2478*** (8.95)	
SKILL						0.4010** (2.23)
SIZE	0.4079*** (16.26)	0.0537*** (13.83)	0.0048 (1.48)	0.5617*** (10.66)	0.6662*** (10.85)	0.6626*** (13.67)
ROA	1.9638*** (13.33)	-1.1411*** (-21.39)	0.0548** (2.35)	3.4417*** (8.27)	3.8453*** (8.65)	3.8839*** (9.49)
AGE	-0.0359 (-1.05)	0.0255*** (6.17)	-0.0313*** (-4.34)	-0.7186*** (-6.40)	-0.7255*** (-5.67)	-0.7190*** (-6.39)
LEV	0.3226*** (5.31)		-0.0139 (-1.26)	1.0933*** (6.73)		1.1816*** (7.25)
LTLEV		-0.4488*** (-7.11)			0.6840* (1.89)	
TQ	0.0172*** (3.85)	0.0050** (2.80)	-0.0008 (-0.67)	0.0058 (0.35)	0.0059 (0.36)	0.0110 (0.68)
CASH	0.1223*** (3.22)	-0.1797*** (-8.02)	0.0067 (0.63)	0.3079* (1.83)	0.2399 (1.19)	0.3301* (1.96)
CAPEX	-0.3663* (-1.78)	-0.1241*** (-3.50)	0.0387 (1.55)	-0.5117 (-1.32)	-0.6806* (-1.97)	-0.6368 (-1.64)
RD	-2.9293*** (-26.47)	-0.8921*** (-12.22)	0.3905*** (5.25)	2.0768*** (2.60)	1.7348* (1.85)	1.2520 (1.54)
GR	0.1901*** (13.15)	0.0186*** (2.92)	0.0034 (1.50)	0.2485*** (7.48)	0.2784*** (4.58)	0.2942*** (9.33)
INST	-0.0949* (-1.77)	0.0408 (1.51)	0.0204 (1.31)	0.6975*** (2.78)	0.6497** (2.58)	0.6515*** (2.60)
MGT	-0.0632 (-0.96)	-0.0210 (-1.46)	-0.0179 (-1.06)	0.2717 (1.16)	0.0773 (0.22)	0.2521 (1.07)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13.060	12.530	13.386	13.380	12.581	13.386
Adjusted R ²	0.93	0.43	0.84	0.77	0.77	0.76

Short-Term Leverage

Short-term leverage is another mediator positively affected by ADP [25; 26]. ADP incentivizes fixed asset investment, increasing demand for long-term loans. With underdeveloped bond/equity markets in China [101] and limited bank supply, firms turn to short-term debt. Banks also prefer short-term loans to manage risk and moral hazard due to information asymmetry [56–58].

The effect of short-term leverage on sustainability stems from stakeholder theory [19; 20], where increased short-term debt leads to greater lender pressure [65; 66], motivating firms to engage with debtholders. Legitimacy theory [21] suggests firms with large short-term debt use sustainability to address lender pressure [71]. Risk management and resource dependence perspectives [88; 102; 103] imply frequent short-term debt needs prompt sustainability practices to secure favorable funding terms and potentially lower loan costs [104].

We test short-term leverage (STLEV, current liabilities to total assets) mediation using a model analogous to Eqs. 2 and 3, replacing total leverage (LEV) with long-term leverage (LTLEV) in controls to avoid multicollinearity.

Columns (2) and (5) of Table 4 show that ADP leads to increased short-term leverage, consistent with Feng et al. [26] and Du et al. [25]. Short-term leverage, in turn, positively affects CS. This, combined with ADP's favorable effect on debtholder interests (Table A1), suggests that short-term debt financing strongly mediates ADP's effect on sustainability. The mediation effect of short-term leverage (0.015) is slightly higher than that of TFP (0.013).

Workforce Skill Structure

The third mediator is workforce skill structure upgrade. China's ADP led to increased demand for skilled labor and corresponding skill structure upgrades [23; 24] due to capital-skill complementarity [59; 60]. Stakeholder theory suggests that this amplifies sustainability pressure from skilled employees, who are more aware and have greater bargaining power [67; 105]. Resource-based view supporters [64] suggest skilled workers' efficiency and strategic insights improve sustainability.

To assess the mediating role of workforce skill composition, we use a model similar to Eqs. 2 and 3, with skilled labor proportion (SKILL, ratio of technician employees to total workforce, as per Zhao and Fang [23]) as the mediator. Our results confirm the capital-skill complementarity hypothesis [23; 24]: ADP significantly influences the proportion of skilled employees (Column (3) of Table 4). An elevated share of skilled employees positively affects CS (Column (6) of Table 4). This mediating role aligns with ADP's significant effect on Employment and Remuneration sub-scores. However, its magnitude (0.005) is weaker than short-term leverage and TFP.

Robustness Checks

We conduct multiple robustness checks to assess potential selection and omitted-variable biases.

Propensity Score Matching

To address potential sample selection bias from observable pre-intervention differences, we use propensity score

Table 5. Propensity Score Matching

This table presents the effect of ADP on corporate sustainability for a matched sample of Chinese A-share firms from 2012 to 2017. The dependent variable is CS in year t . Variable definitions are shown in Table A2. The robust t -statistics clustered by the firm are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Matched Sample

	(1)	(2)	(3)	(4)
	CS	CS	CS	CS
ADP	0.1736*** (5.96)	0.3312*** (7.88)	0.2216** (2.88)	0.2237** (3.04)
SIZE	0.8986*** (13.26)	0.7817*** (15.29)		0.6735*** (12.94)
ROA	12.3777*** (34.45)	3.5450*** (7.92)		4.0368*** (7.42)
AGE	0.0215 (0.12)	-0.4368*** (-7.88)		-0.9804*** (-7.88)
LEV	1.6863*** (8.14)	0.7421*** (3.30)		1.1085*** (5.25)
TQ	0.0384** (2.55)	0.0401*** (6.08)		-0.0137 (-1.11)

	(1)	(2)	(3)	(4)
	CS	CS	CS	CS
CASH	1.2622** (2.69)	0.2023 (1.50)		0.2929* (1.94)
CAPEX	-2.2261*** (-5.94)	-1.6567** (-3.05)		-0.9479** (-3.03)
RD	6.4366*** (3.54)	1.5762 (1.60)		1.4929 (1.10)
GR	0.0486 (0.43)	0.3750*** (5.85)		0.3623*** (6.92)
INST	3.3301*** (26.15)	1.1821** (2.77)		0.7083 (1.65)
MGT	0.6348** (2.62)	-0.2336 (-0.82)		-0.6210* (-2.25)
Firm FE	No	Yes	Yes	Yes
Industry-Year FE	No	No	Yes	Yes
Observations	5.785	5.785	5.785	5.785
Adjusted R ²	0.33	0.74	0.74	0.77

Panel B. Covariate Balance

Sample	Control	Treatment	Diff	T-stats
SIZE	22.37 21.99	21.75 21.98	0.62 0.01	30.82 0.01
ROA	0.03 0.03	0.05 0.04	-0.01 -0.00	-16.46 -0.17
AGE	2.33 2.44	1.92 2.25	0.41 0.19	30.29 0.51
LEV	0.48 0.42	0.37 0.39	0.11 0.03	34.27 0.28
TQ	2.01 1.96	2.41 2.38	-0.39 -0.42	-16.39 -0.69
CASH	0.17 0.18	0.20 0.19	-0.04 -0.01	-18.11 -0.12
CAPEX	0.05 0.04	0.05 0.05	-0.01 -0.01	-7.09 -0.24
RD	0.02 0.02	0.05 0.05	-0.03 -0.03	-59.94 -1.72
GR	0.20 0.20	0.19 0.18	0.00 0.02	0.28 0.06
INST	0.06 0.06	0.06 0.07	-0.00 -0.01	-2.96 -0.22
MGT	0.07 0.07	0.15 0.11	-0.07 -0.04	-25.73 -0.49

matching (PSM) [106]. After excluding observations that did not meet the common support condition for 1:1 nearest-neighbor PSM, we obtained 2,893 matched pairs. Panel A of Table 5 presents PSM-DID estimation results, which largely replicate baseline findings.

Parallel Trend Test

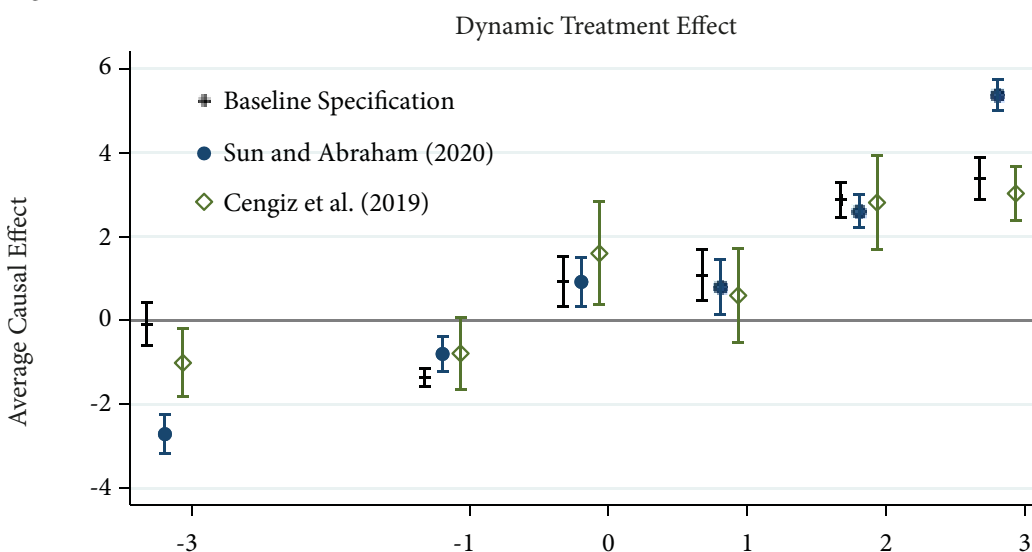
A key DID assumption is parallel trends in the pre-intervention period. We assess this by estimating dynamic treatment effects, replacing ADP with interactions be-

tween TREAT and period dummies for three years before and after ADP.

Given the staggered treatment, standard DID results could be biased [107]. Solutions include interaction-weighted estimation [108] and “stacked” regression [109].

Figure 2 shows pre-intervention interactions are non-positive and insignificant. Post- ADP, the effect becomes significantly positive and increases, satisfying the parallel trend assumption. Results remain consistent with alternative DID specifications.

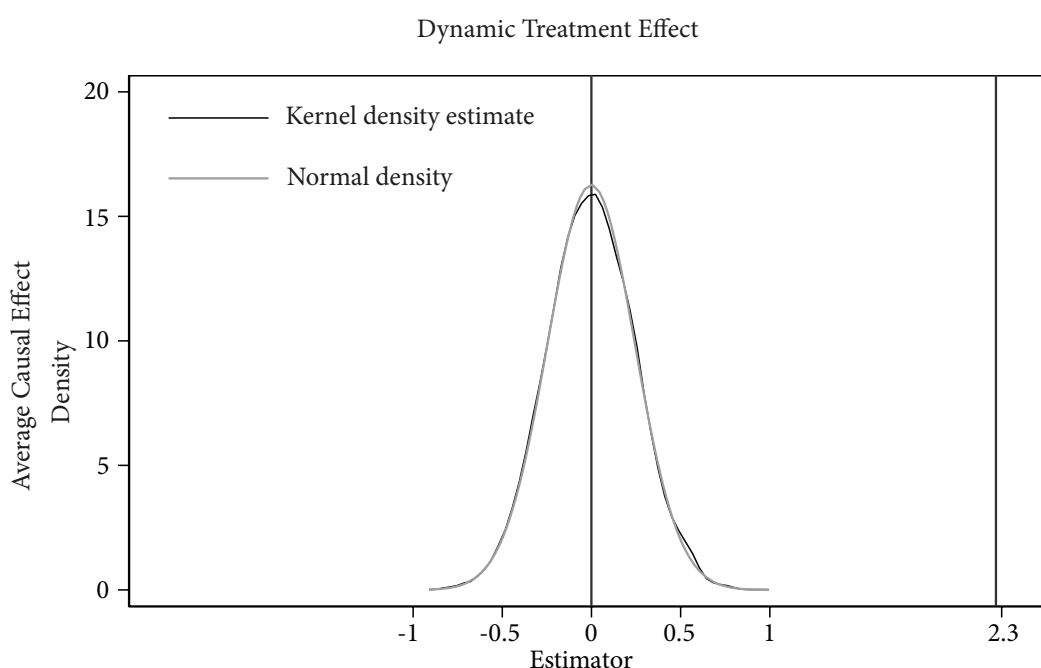
Figure 2. Parallel Trend Test



Placebo Test

We conduct a placebo test to rule out other events or shocks. We randomly assign ADP values via 5,000 Monte Carlo permutations [110] and re-estimate pseudo- intervention effects. Figure 3 shows the baseline estimate is outside the random distribution, suggesting that our effect is unlikely to be driven by other factors.

Figure 3: Placebo Test



Additional Robustness Checks

We conduct additional robustness checks for omitted-variable, functional-form, and sample-selection biases. We control for the 2012–016 BT-to-VAT reform [45], corporate effective tax rate, and depreciation expense scaled to fixed assets [41].

Panel A of Table 6 shows that accounting for BT-to-VAT reform does not materially alter the ADP effect. Controlling for effective tax rate and depreciation leads to a minor decrease in magnitude but remains significant at the 5% level.

We then test alternative model specifications: ordered regression (as CS is an ordinal score), dynamic panel models (for pre-ADP sustainability), and instrumental variable regression (for unobservable factors). We also add

province-level fixed effects for provincial differences. For instrumental variable regression, we use the province's dependence on secondary industry (manufacturing sector's GDP share) as an instrument, assuming higher manufacturing concentration encourages ADP participation but industry composition doesn't directly impact sustainability. Panel B of Table 6 shows baseline statistical significance is unaffected by model specification changes.

Regarding alternative sampling criteria, we consider the factors influencing CSR investment after tax incentives [23; 41; 47]. First, we exclude treatment group observations during ADP's first year, as implementation occurred in the second half, limiting immediate firm response. Second, we remove firms in western provinces due to the additional tax benefits available there.⁵ Third, we ex-

Table 6. Additional Robustness Checks

This table presents additional robustness checks for the ADP effect on corporate sustainability for a sample of Chinese A-share firms from 2012 to 2017. The dependent variable is CS in year t . Variable definitions are shown in Table A2. The robust t -statistics clustered by the firm are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Additional controls

	(1)	(2)
	Incl. BT-to-VAT reform	Incl. tax rate and depreciation
ADP	0.2298*** (3.02)	0.2209** (2.70)
Firm FE	Yes	Yes
Industry-Year FE	Yes	Yes
Observations	13.386	13.352
Adjusted R ²	0.76	0.76

Panel B. Alternative model specifications

	(1)	(2)	(3)	(4)
	Ordered Logit	Ordered Probit	Dynamic Panel	Static Panel
ADP	0.2624*** (4.27)	0.1562*** (4.27)	0.2610*** (3.51)	0.2311*** (2.92)
L1.CS		0.1578*** (15.03)		
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Province FE	No	No	No	Yes
Observations	13.740	13.740	13.334	13.386
Adjusted R ² / Pseudo R ²	0.09	0.09	0.77	0.76

⁵ Western provinces of China include Chongqing, Gansu, Guangxi, Guizhou, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Sichuan, Tibet, Xinjiang, and Yunnan.

Instrumental variable regression		
	(5)	(6)
	ADP	CS
SECONDRATIO	0.9670** (2.43)	
ADP		0.8811** (3.58)
Firm FE	Yes	Yes
Industry-Year FE	Yes	Yes
Observations	13.386	13.386
Adjusted R ²	0.66	0.05

Panel C. Alternative sampling criteria

	(1)	(2)	(3)	(4)
	Excl. policy starting year	Excl. western provinces	Excl. exporting firms	Excl. high-tech firms
ADP	0.2454*** (3.19)	0.2353*** (3.15)	0.4694** (2.42)	0.2094** (2.36)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	12.223	11.467	5.804	11.329
Adjusted R ²	0.76	0.76	0.77	0.76

clude exporting firms due to export-specific tax benefits. Finally, we exclude high-tech firms, which have an *ex-ante* lower tax rate (15% vs. standard 25%) [47]. Panel C of Table 6 shows the ADP effect magnitude slightly decreases only when high-tech firms are excluded. For other subsamples, the effect magnitude increases at the 5% significance level.

Further Discussion

Firm Heterogeneity

We hypothesize that the sustainability response to ADP depends on labor intensity, firm visibility, likelihood of long-term bank credit, and ownership structure.

Corporate labor intensity is a key moderator. Labor-intensive firms have a lower initial capital-to-labor ratio. When ADP is introduced, marginal returns on new capital investments might be higher for these firms, making ADP more attractive [111]. They can also adjust production processes more easily [112]. Evidence from China shows ADP's TFP effect is stronger for labor-intensive firms [22]. We divide the sample by labor intensity (and indirectly, capital intensity) to differentiate.

Firm visibility is another strong moderator. Highly visible firms face greater stakeholder pressure, motivating sustainability initiatives to enhance legitimacy and reputation [70; 90].

Increased visibility also heightens the risk of negative attention during failures, necessitating legitimacy maintenance [113; 114]. We hypothesize ADP's positive effect is stronger in firms with greater visibility, measured by media and analyst coverage [115; 116].

The probability of obtaining long-term bank credit moderates short-term leverage. Smaller firms with fewer financial guarantees typically face disadvantages in obtaining long-term credit [117; 118]. Chinese evidence shows ADP's increasing effect on short-term debt is more pronounced in firms with weak long-term financing capacity [26], smaller size, and lower asset tangibility [25]. Thus, we hypothesize ADP's sustainability effect concentrates in smaller firms and those with lower asset tangibility.

Finally, state control and political connections are crucial in China. State-controlled firms often have soft budget constraints [119], potentially leading to weaker ADP responses. Politically connected firms receive preferential external financing, reducing financial constraints [120; 121].

Stronger financial constraints lead to a stronger response to tax savings from ADP and thus greater fixed investment [3]. Literature on Chinese ADP confirms this [22; 26]. State-owned enterprises (SOEs) also prioritize public welfare [122], making their sustainability efforts less ADP-dependent. We hypothesize ADP's positive effect is significant only among non-state-controlled or politically connected firms. SOEs are firms with significant state control, while political connections are indicated by a firm-level China Communist Party branch (Party branch), which exists in both SOEs and non-SOEs to communicate Party agenda and monitor compliance [123].

We test moderating roles by forming subsamples based on median moderator proxies and comparing baseline estimates, as well as performing coefficient equality tests. Panel A of Table 7 shows ADP's effect is positive and significant only in firms with higher labor and lower capital intensity (p-value of equality test near zero), confirming labor intensity is critical. This aligns with theory: flexible, labor-intensive firms benefit more from new capital investments.

Panel B of Table 7 reveals ADP's positive effect on CSR performance is significant only among firms with higher visibility (media and analyst coverage). The coefficient equality hypothesis is rejected at 1% significance. This supports our prediction that more visible firms have a greater need to meet stakeholder demands and boost legitimacy/rep-

utation, lending credibility to our conceptual framework based on stakeholder and legitimacy theories.

The sensitivity of the ADP effect to long-term bank loan probability is in Panel C of Table 7. As predicted, only firms with relatively lower asset tangibility and size show a significant sustainability response. ADP coefficients differ at 5% significance. This confirms the short-term leverage channel (Section 4.3): firms less likely to obtain long-term debt rely on short-term debt, facing increased lender pressure, which benefits debtholders and other stakeholders.

Panel D of Table 7 highlights the difference in ADP response based on state control or political connections. Only firms without state control and political connections, facing greater financial constraints, increase corporate sustainability in response to ADP. This aligns with Zhao and Fang [23] and Zeng and Chan [48], emphasizing financial constraints in ADP response.

Value Relevance behind Corporate Sustainability

Our framework suggests that sustainability initiatives confer competitive advantage, positive image, and recognition. To support this, we posit that increased sustainability performance has value-relevant consequences: corporate profile, economic value added (EVA), and stock liquidity.

Table 7. Cross-Sectional Heterogeneity

This table presents the heterogeneity of the ADP effect on the corporate sustainability for a sample of Chinese A-share firms from 2012 to 2017. The sample is divided into two parts based on the median value of moderators in year t . Labor intensity is workforce headcount over total assets. Capital intensity is the natural logarithm of fixed assets over workforce headcount. Media coverage is the number of web articles whose titles mention the firm. Analyst coverage is the number of analysts following a firm. Tangibility is the ratio of fixed assets to total assets. Size is the natural logarithm of total assets. SOE is a dummy indicator of significant state control. Political connections is a dummy indicator of whether a firm has established a Party branch. The dependent variable is CS in year t . Variable definitions are shown in Table A2. The robust t -statistics clustered by the firm are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Labor intensity

	Labor intensity		Capital intensity	
	(1)	(2)	(3)	(4)
	Low	High	Low	High
ADP	-0.0863 (-0.28)	0.1669*** (2.98)	0.3675** (2.61)	-0.3138 (-1.03)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	6.143	6.159	5.792	6.424
Adjusted R ²	0.75	0.80	0.78	0.76
Coefficient equality	0.00		0.01	

Panel B. Firm visibility

	Media coverage		Analyst coverage	
	(1)	(2)	(3)	(4)
	Low	High	Low	High
ADP	0.1780 (1.15)	0.3440** (2.35)	0.1211 (1.13)	0.2510* (1.69)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	5.772	6.600	6.345	6.260
Adjusted R²	0.76	0.77	0.72	0.76
Coefficient equality	0.00		0.00	

Panel C. Probability of long-term bank credit

	Tangibility		Size	
	(1)	(2)	(3)	(4)
	Low	High	Low	High
ADP	0.4803*** (4.99)	0.0903 (0.60)	0.2733** (2.85)	0.1037 (0.77)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	6.159	6.696	6.058	6.958
Adjusted R²	0.77	0.78	0.71	0.77
Coefficient equality	0.03		0.04	

Panel D. State control and political connections

	State control		Political connections	
	(1)	(2)	(3)	(4)
	SOE	Non-SOE	Yes	No
ADP	-0.0724 (-0.42)	0.2952** (2.42)	0.1140 (0.86)	0.3016** (2.28)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	4.965	8.290	7.638	5.309
Adjusted R²	0.79	0.74	0.78	0.75
Coefficient equality	0.01		0.03	

Sustainable practices positively affect corporate legitimacy, attracting consumers, investors, and employees, leading to a favorable corporate profile. They can also reduce costs, mitigate risks, and identify new revenue streams, increasing EVA. Firms engaged in sustainability may be perceived as less risky and more transparent, boosting investor confidence, trading volumes, and stock liquidity [124–126].

To investigate value-relevant consequences, we employ:

$$VAL_{i,t} = \beta CS_{i,t} + \gamma Controls_{i,t} + \delta_i + \theta_{j,t} + \epsilon_{i,t}, \quad (4)$$

where $VAL_{i,t}$ denotes PROFILE (difference in positive/negative web media news scaled by total news), EVA (per-share net operating after-tax profit adjusted by capital and WACC), and LIQUID (negative logarithm of Amihud ratio).

Table 8 shows corporate sustainability has a highly significant positive effect on corporate profile, EVA per share, and stock liquidity, confirming our conceptual arguments regarding its value-relevant nature.

ADP and Environmental Engagement

The Common Prosperity Index, our primary sustainability proxy, has limited environmental coverage, mainly through environmental violations in the Other Partner Sharing sub-score. Given the importance of environmental protection, and the lack of variance in the Ecosystem Conservation and Environmental Protection sub-score (Section “Performance of Corporate Sustainability Indica-

Table 8. Value Relevance of Corporate Sustainability

This table illustrates the effect of corporate sustainability on value-relevant outcomes for a sample of Chinese A-share firms from 2012 to 2017. The dependent variables are PROFILE, EVA, and LIQUID in year t . Variable definitions are shown in Table A2. The robust t -statistics clustered by the firm are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

	(1) PROFILE	(2) EVA	(3) LIQUID
CS	0.0065*** (4.71)	0.0040*** (4.33)	0.0108** (2.27)
SIZE	0.0148** (2.51)	0.0021 (0.36)	0.3998*** (16.81)
ROA	1.0967*** (7.75)	1.4596*** (38.25)	1.4416*** (7.64)
AGE	-0.0644*** (-5.02)	-0.0363*** (-3.34)	0.3060*** (5.49)
LEV	0.0434** (2.49)	0.0931*** (6.30)	-0.2933*** (-3.53)
TQ	0.0016 (0.57)	0.0005 (0.69)	0.0829*** (8.22)
CASH	0.0038 (0.12)	-0.0634*** (-3.04)	0.0882 (1.10)
CAPEX	0.1569*** (3.57)	-0.0775** (-2.18)	0.7441*** (4.34)
RD	0.0198 (0.15)	0.2248*** (6.36)	0.7380* (1.91)
GR	0.0156* (1.78)	0.0188*** (3.73)	-0.0580*** (-3.80)
INST	0.3496*** (7.72)	0.0888*** (3.38)	-0.7431*** (-6.38)
MGT	0.1191*** (4.84)	-0.0174 (-0.80)	0.0202 (0.19)
Firm FE	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes
Observations	13.375	11.335	13.386
Adjusted R ²	0.42	0.58	0.71

tors”), we explore ADP’s effect on environmental engagement using other data.

We evaluate equation 1 with environmental engagement proxies as the dependent variable. We use environmental sub-scores from the Sino-Securities ESG Index (SSI) and the Hexun CSR score (HEXUN) for environmental performance. For environmental disclosure, we use CSMAR (environmental protection and sustainable development disclosure indicator) and BLOOMBERG (environmental sub-score of Bloomberg ESG disclosure), recognized sources for corporate data [127; 128].

Columns (1) and (2) of Table 9 show ADP’s positive and significant effect on environmental performance, consistent with Tang and Wang [14] and Zhao and Peng [28]. Columns (3) and (4) provide evidence that ADP implementation increases environmental disclosure, aligning with signaling theory.

Conclusion

Investment incentives are crucial for global economic growth, but sustainable development demands balancing

Table 9. Accelerated Depreciation Policy and Environmental Engagement

This table presents the effect of ADP on environmental performance and disclosure for a sample of Chinese A-share firms from 2012 to 2017. The dependent variables are SSI, HEXUN, CSMAR, and BLOOMBERG in year t . Variable definitions are shown in Table A2. The robust t -statistics clustered by the firm are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

	Environmental performance		Environmental disclosure	
	(1) SSI	(2) HEXUN	(3) CSMAR	(4) BLOOMBERG
ADP	0.0320* (2.32)	0.0585** (2.77)	0.0318** (2.42)	0.0673*** (3.70)
SIZE	0.2472*** (8.56)	0.0826*** (6.15)	0.0773*** (12.15)	0.0316 (1.37)
ROA	0.7283** (3.10)	0.2084** (2.51)	0.3741*** (3.44)	0.4496*** (2.88)
AGE	-0.0389 (-1.52)	0.1541 (1.73)	0.0219** (2.03)	0.1497 (1.27)
LEV	-0.0551 (-0.81)	-0.0778 (-1.69)	-0.0646* (-1.70)	0.1716** (2.59)
TQ	-0.0045 (-0.62)	0.0096** (2.70)	-0.0035 (-0.81)	-0.0036 (-0.41)
CASH	-0.2189** (-2.80)	-0.1057** (-2.78)	-0.2415*** (-5.21)	0.2407*** (2.96)
CAPEX	0.0549 (0.40)	0.0751 (0.71)	0.2215** (1.97)	-0.0860 (-0.44)
RD	-1.1609 (-1.96)	0.1494 (1.04)	-0.6234*** (-3.38)	-0.0279 (-0.13)
GR	-0.0997** (-4.26)	-0.0011 (-0.17)	-0.0584*** (-7.35)	-0.0117 (-0.70)
INST	0.1748 (0.95)	0.2155*** (3.09)	-0.1391* (-1.84)	0.0821 (0.58)
MGT	0.0960** (2.80)	-0.1492** (-2.41)	-0.0916** (-2.14)	0.5377* (2.00)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	13.448	13.369	13.717	4.301
Adjusted R ²	0.16	0.46	0.14	0.73

economic objectives with social and environmental issues. This study investigates the impact of China's Accelerated Depreciation Policy (ADP), implemented from 2014-2015, on corporate sustainability using a DID approach.

Our research finds that investment incentives promote corporate sustainability, particularly in employment, remuneration, and sharing with shareholders, debtholders, and distributors. The DID model is validated by various robustness checks. This effect is primarily channeled through increased total factor productivity (TFP) and short-term leverage, with a lesser role for workforce skill structure upgrades. Heterogeneity analysis confirms this mechanism, showing the effect is concentrated in labor-intensive firms with a lower probability of obtaining long-term bank credit. It also reveals a prevalence of effects among more visible, non-state-controlled, and non-politically connected firms, aligning with our conceptual framework. Corporate sustainability performance also has value-relevant effects, leading to a more favorable corporate profile, higher Economic Value Added (EVA), and higher stock liquidity. Finally, we demonstrate ADP's positive effect on environmental performance and disclosure.

Our findings have important implications for sustainable development in emerging markets. ADP is ineffective in capital-intensive, state-controlled firms, suggesting investment incentives need tailoring for these entities. Fostering public visibility for firms is crucial for successful government interventions in sustainability. Banks' monitoring role should also be leveraged by incorporating social and environmental indicators, which could significantly impact sustainable development in developing countries.

A limitation of our research is the lack of firm-level responsiveness data for ADP, and its focus on the Chinese market and listed firms. We call for further research comparing sustainability outcomes across developed and developing countries to inform policy recommendations in diverse institutional contexts. Future research should also explore ADP's sustainability outcomes in unlisted small and medium enterprises, which constitute a large market segment and are often government tax incentive targets. Their tight financial constraints, profit-driven mentality, and low visibility create an environment distinct from listed firms, warranting specific investigation.

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Investment Incentives and Corporate Sustainability: Evidence from China

Online Appendix

Table A1. Accelerated Depreciation Policy and Other Partner Sharing

This table presents the effect of ADP on other partner sharing sub-score constituents for a sample of Chinese A-share firms from 2012 to 2017. SUPPLIER is a standardized Protection of Supplier's Rights and Interests score. DISTRIBUTOR is a reversed standardized Distributor's Rights and Interests score. DEBTINTEREST is a standardized Contribution of Interest on Debt per Share score, DEBTDEFAULT is a reversed standardized Protection of Debtor's Rights and Interests score. The results on the ADP effect on Ecosystem Conservation and Environmental Protection score are skipped due to the lack of variation in this score value. All dependent variables are measured in year t . Details on corresponding scores' measurements are presented in Table A3. Control variable definitions are shown in Table A2. The robust t -statistics clustered by the industry are reported in parentheses. ***, **, and * denote the significance at the 1%, 5%, and 10% levels, respectively.

	(1) SUPPLIER	(2) DISTRIBUTOR	(3) DEBTINTEREST	(4) DEBTDEFAULT
ADP	0.1858 (0.26)	-0.5312*** (-2.84)	1.5647** (2.22)	-0.0920* (-2.02)
SIZE	-3.2427*** (-5.08)	-0.1501 (-0.74)	3.8426*** (10.09)	-0.0070 (-0.30)
ROA	3.8866 (0.95)	0.0076 (0.00)	-8.0993*** (-4.18)	-0.1246 (-1.08)
AGE	1.4060* (1.99)	-0.7340** (-1.97)	-1.5140 (-1.30)	-0.0331 (-0.44)
LEV	-8.2809*** (-4.13)	-0.6137 (-0.88)	31.6616*** (13.86)	0.1323* (2.07)
TQ	-0.1574 (-1.10)	-0.1395** (-2.12)	-0.1764 (-1.48)	0.0216** (3.51)
CASH	5.3448** (2.57)	-1.8863*** (-2.66)	2.3670*** (4.42)	-0.0859* (-2.47)
CAPEX	-14.9331*** (-2.97)	-3.1569** (-2.36)	1.8259 (0.65)	0.0881 (0.36)
RD	-47.7716*** (-5.53)	4.785*** (2.84)	7.2770** (2.84)	-1.2217** (-3.61)
GR	3.5135*** (10.01)	-0.4402*** (-2.99)	-0.2462 (-0.83)	-0.0073 (-0.48)
INST	0.6567 (0.26)	-0.0016 (-0.00)	0.9832 (0.42)	0.0473 (0.36)
MGT	2.6696 (1.61)	1.2610** (2.37)	0.6501 (0.16)	-0.0778 (-0.63)
Firm FE	Yes	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes	Yes
Observations	13.386	13.386	13.065	13.386
Adjusted R ²	0.82	0.74	0.73	0.34

Table A2. Variable Definitions

Variable	Definitions				
CS	Corporate Sustainability Performance: Common Prosperity rating from Enterprises' Contribution to Common Prosperity Research Database. This rating is a weighted average of HIRE, PAY, SAFE, QUAL, SHARE, OBLIG, COMP, TAX, and CHAR. The Common Prosperity rating is transformed into a score from 9 (AAA rating, the highest) to 1 (C rating, the lowest).				
HIRE	Standardized Employment sub-score (out of 10).				
PAY	Standardized Remuneration sub-score (out of 10).				
SAFE	Standardized Employee Protection sub-score (out of 10).				
QUAL	Standardized Customer Sharing sub-score (out of 10). SHARE	Standardized Shareholder Sharing sub-score (out of 10). OBLIG	Standardized Other Partner Sharing sub-score (out of 10). COMP	Standardized Healthy Competition sub-score (out of 10). TAX	Standardized Tax Contribution sub-score (out of 10).
CHAR	Standardized Public Welfare and Charity sub-score (out of 10).				
TREAT	A dummy variable that equals one for firms operating in industries subject to ADP rules.				
POST	A dummy variable that equals one from the year of firm industry eligibility to the ADP rules (2014 or 2015).				
ADP	TREAT × POST.				
SIZE	Firm Size: The natural logarithm of total assets.				
ROA	Return on Assets: Net income divided by total assets.				
AGE	Firm Age: The natural logarithm of listed years plus one.				
LEV	Leverage: Total liabilities divided by total assets.				
LTLEV	Long-Term Leverage: Long-term liabilities divided by total assets.				
TQ	Tobin's Q: the sum of equity market value and liabilities book value over total assets CASH Cash Ratio: The sum of cash and cash equivalents divided by total assets.				
CAPEX	Capital Expenditures Ratio: Capital expenditures over the total assets. RD	R&D Expenditures Ratio: R&D expenditures over sales.			
GR	Growth Rate: The growth rate of sales from year t-1 to year t.				
INST	Institutional Shareholding: The proportion of shares held by institutional investors. MGT	Managerial Shareholding: The proportion of shares held by the management team. TFP	TFP: LP method (Levinsohn and Petrin, 2003).		
STLEV	Short-Term Leverage: current liabilities over total assets.				
SKILL	Skilled Labor: number of technician employees over total workforce count.				
SECONDRATIO	Province Dependence on Secondary Industry: the share of province GDP contributed by secondary industry.				
PROFILE	Corporate Profile: The difference in the number of positive and negative web media news about a firm, scaled by the total number of firm-related web news.				
EVA	EVA per Share: EVA is calculated as after-tax net operating profit less the product of total capital and weighted average cost of capital.				
LIQUID	Stock Liquidity: the negative logarithm of Amihud illiquidity measure (Amihud, 2002).				
SSI	Environmental Sub-score of Sino-Securities ESG Index: a rank is transformed to a score from 9 for AAA level (the highest) to 1 for C level (the lowest).				
HEXUN	Environmental Sub-score of Hexun CSR Score: the total score is 10; a higher score corresponds to a higher environmental performance.				
CSMAR	Environment and Sustainable Development Disclosure Indicator from CSMAR: equals 1 in case of sufficient disclosure, 0 otherwise.				
BLOOMBERG	Environmental Sub-score of Bloomberg ESG Disclosure Score: the total score is 10; a higher score corresponds to a higher environmental disclosure.				

Table A3. Common Prosperity Index Methodology

Sub-Score / Determinant	Definition	Related SDG
Employment sub-score		
Number of Employees	n/a	
New Positions	Employment growth	
Gender Diversity of the Management Team	Percentage of women in management personnel	SDG 8 “Decent Work and Economic Growth”; SDG 10 “Reduced inequalities”;
Career Competitiveness and Career Management	Labor union and employee education expenses scaled by operating revenue	SDG 5 “Gender Equality”
Vulnerable Groups Care	Hiring the disabled (yes/no)	
Remuneration sub-score		
Remuneration Contribution per Share	Total employee remuneration over total number of shares	
Profit Sharing with Employees	Employee shareholding proportion	
Average Remuneration	n/a	SDG 8 “Decent Work and Economic Growth”; SDG 10 “Reduced Inequalities”
Remuneration Growth	n/a	
Average Remuneration Ratio	Senior management remuneration over remuneration of other employees	
Employee Protection sub-score		
Legal Employment	Policy or published promise preventing child labor (yes/no)	
Investment in Safe Production	Safe production investment over operating revenue	
Safe Production Level	Production accidents number	
Occupational Health Protection	Offering occupational health examination, occupational disease fund, conducting occupational health investments, or occupational safety training (yes/no)	SDG 3 “Good Health and Well-Being”; SDG 8 “Decent Work and Economic Growth”; SDG 11 “Sustainable Cities and Communities”
Social Security Payment Proportion	Social Security payments over total employee remuneration	
Commercial Insurance	Commercial insurance investments over operating revenue	
Protection of Employee Rights and Interests	Number of disputes over employee’ rights and interests over total number of employees	

Sub-Score / Determinant	Definition	Related SDG
Customer Sharing Sub-Score		
Product and Service Quality	Qualified products ratio	
Product Recall	Product recalls number	SDG 12 “Responsible Consumption and Production”
Protection of Consumer Rights and Interests	Customer complaints number	
Shareholder Sharing Sub-Score		
Return on Equity	Net profit over net assets	
Cash Dividend per Share	Total cash dividends over the total number of shares	SDG 16 “Peace, Justice and Strong Institutions”
Independent Director System	Proportion of independent directors in the Board	
Other Partner Sharing Sub-Score		
Protection of Supplier’s Rights and Interests	Accounts payable turnover ratio	SDG 16 “Peace, Justice and Strong Institutions”;
Protection of Distributor’s Rights and Interests	Accounts receivable turnover ratio	SDG 3 “Good Health and Well-Being”;
Contribution of Interests on Debts per Share	Interests on debt scaled by total number of shares	SDG 6 “Clean Water and Sanitation”;
Protection of Debtor’s Rights and Interests	Number of debt violations for which the company is accountable	SDG 7 “Affordable and Clean Energy”;
Ecosystem Conservation and Environmental Protection	Number of environmental violations for which the company has been sanctioned	SDG 8 “Decent Work and Economic Growth”;
		SDG 9 “Industry, Innovation, and Infrastructure”;
		SDG 11 “Sustainable Cities and Communities”;
		SDG 13 “Climate Action”;
		SDG 14 “Life Below Water”;
		SDG 15 “Life on Land”
Healthy Competition sub-score		
Competitor Cooperation or Alliance	Number of lawsuits among competitors over unfair competition, dumping, and anti-dumping	
Fair Competition	Involved in disputes over unfair competition, dumping, and anti-dumping (yes/no)	SDG 16 “Peace, Justice and Strong Institutions”
Tax Contribution sub-score		
Tax Contribution per Share	Annual taxes and surcharges scaled by the total number of shares	Goal 17 ”Partnership for the Goals”

Sub-Score / Determinant	Definition	Related SDG
Public Welfare and Charity sub-score		
Donation	The total amount of public and private welfare donations over operating revenue.	SDG 1 “No Poverty”; SDG 2 “No Hunger”;
Investment in Poverty Alleviation	Poverty alleviation investments scaled by operating revenue	SDG 4 “Quality Education”;
Number of Disadvantaged Students Funded by the Company	n/a	SDG 6 “Clean Water and Sanitation”; SDG 7 “Affordable and Clean Energy”;
Investment in Poverty Alleviation and Rural Revitalization	Poverty alleviation and rural revitalization investments scaled by operating revenue	SDG 11 “Sustainable Cities and Communities”

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