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Targeted poverty alleviation disclosure and analyst forecast accuracy: Evidence from a quasi-natural experiment

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ABSTRACT

Using the Targeted Poverty Alleviation (TPA) disclosure policy in China as a quasi-natural experiment, this paper analyzes the impact of firm TPA disclosure on analyst forecast accuracy based on a staggered difference-in-differences model. The results show a significant increase in the accuracy of analysts' forecasts after firms' disclosure of TPA information, and this effect is more pronounced for firms with greater information processing cost and firms with fewer covering analysts. Our study provides empirical evidence for regulators concerned with the information environment of capital market.

1. Introduction

Investors have increasingly incorporated Environmental, Social and Governance (ESG), or Corporate Social Responsibility (CSR) issues into investment decisions (Elliott et al., 2014).[1] In response, considerable firms devote to tackling societal challenges—from fighting climate crisis to eliminating poverty—with an aim to respond to Sustainable Development Goals and satisfy the expectations of various stakeholders. The adoption of innovative ESG activities, as well as the implementation of related disclosure policies, have generated a growing interest by financial markets in general, and analysts in particular (Dhaliwal et al., 2012). In light of the crucial role of analysts in promoting firms' information environment by alleviating information asymmetry and reducing agency problems (Malik, 2015), it is essential to understand whether and how financial analysts evaluate ESG /CSR engagements (Chen and Gavious, 2015).

Though literature regarding the nexus between CSR engagement and financial analysts is emerging, it is far from conclusive and well-established. The seminal work by Dhaliwal et al. (2012) showed that firms that compiles CSR reports improve the accuracy of analysts' earnings forecast. Casey and Grenier (2015) further revealed that CSR assurance is associated with lower analyst forecast errors and dispersion. However, the results of this strand of studies may not be immune from endogeneity concerns, given that the samples of CSR reports and assurance may be biased.[2] Recent calls in finance literature suggest that utilizing a quasi-natural experiment or exogenous shock is more likely to reveal causality, rather than merely association.

China provides a unique setting to investigate the causal influence of CSR information disclosure on analysts' forecast. Echoing on the Sustainable Development Goals, Chinese government has initiated targeted poverty alleviation (TPA) policy. In order to encourage

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[1] Following Gillan et al. (2021), we treat the terminologies ESG and CSR as interchangeable terms given that targeted poverty alleviation (TPA) activities have been made integral to firms' corporate social responsibility (CSR) policies and "S" part of ESG.

[2] Their conclusions may suffer from omitted variables bias and sample selection bias.

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listed firms to participate in poverty alleviation activities, Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE) has required firms to disclose their TPA activities since 2016. The mandatory TPA disclosure implementation provides a quasi-natural experiment setting that allows us to investigate the impact of firms' TPA engagement. The rapid development of this emerging CSR practice has sparked a surge of research on TPA activities. The novel research by Chang et al. (2021) presents a discovery towards understanding what drives firms' TPA engagement. However, work in this area is still in its infancy. Moreover, the economic consequence of TPA is yet unclear, and this paper aims to fill the gap.

Analysts are responsible to convey incremental information to the market (Lang and Lundholm, 1996). Since analysts have limited attention and resources (Choi and Gupta-Mukherjee, 2022; Liu et al., 2022), they are inclined to regard firm disclosure as indispensable sources of public information, especially in the absence of sufficient private information (Harford et al., 2019; Datta et al., 2022). Firm's TPA disclosure serves as a useful piece of public information in analysts' forecasting process when faced with uncertainty about firms' current situation and ambiguity about the future development (Driskill et al., 2020). TPA information disclosure facilitates transparent information flow for analysts in that such all-around and systematic non-financial reports can provide incremental information. Analysts can therefore acquire a comprehensive understanding of the focal firm. Anecdotal evidence published by analyst also suggests that they do utilize TPA-related information (Cheng et al., 2016; Chang et al., 2021) .[3] Hence, we expect that TPA information can enable analysts to better understand focal firm's future prospects in earnings, thereby improving the accuracy of earnings forecasts (Lang and Lundholm, 1996; Choi and Gupta-Mukherjee, 2022).

To empirically test this hypothesis, we use a sample of publicly listed firms in China. The results strongly support our predictions. Our study contributes to two aspects of the literature. First, we enrich the scant research on the economic consequences of the TPA engagement and shift the focus from personal incentives in driving TPA engagement to understand economic consequences (Chang et al., 2021). Second, our study contributes to the literature on the determinants of analyst forecast (Dhaliwal et al., 2012; Casey and Grenier, 2015). We supplement this line of research by trying to uncover the causal relationship between TPA and analysts' forecasts.

The rest of the paper is organized as follows. Section 2 provides data description. Section 3 presents empirical specification and results. Section 4 concludes.

2. Data description and empirical model

2.1. Data and sample

We manually collect textual and numeric information of firms' targeted poverty alleviation engagement from their annual reports or CSR reports. We obtain analyst information as well as firm basic financial data from the China Stock Market and Accounting Research (CSMAR). Our initial sample includes all Chinese A-share firms and we exclude firms in financial industry, firms with asset-liability ratio more than one and firms with missing data. Our final sample consists of 5789 firm-year observations over the period of 2014–2018.[4]

2.2. Model and variables

We construct the following staggered DID model to test the effect of TPA disclosure on analyst forecast accuracy[5]:

$$Accuracy_{i,t+1} = \alpha + \beta \times TPA_{i,t} + \gamma \times Coutrol_{i,t} + \delta_t + \tau_i + \varepsilon_{i,t} \quad (1)$$

where i and t denote firm and year respectively. The dependent variable, *Accuracy*, is the adjusted difference between analyst forecast earnings and actual earnings. We first calculate the average of the absolute value of the difference between forecast and actual earnings per share (EPS) by all analysts covering the focal firm, and then divided it by the closing stock price at the end of previous year (Yu et al., 2020). The independent variable, *TPA*, includes two indicators. The first is *TPA_Dummy*, equaled to one when a firm discloses TPA information in its annual reports or CSR reports; otherwise, it is zero. The second is *TPA_Amount*, measured by the logarithm of the total amount of TPA expense. Consistent with previous studies (Liu et al., 2022), *Control* denotes a vector of control variables, including firm size (*Size*), firm leverage (*LEV*), firm age (*LnAge*), market-to-book ratio (*MB*), return of asset (*ROA*), nature of ownership (*SOE*), Big 4 auditors (*Big4*), CEO duality (*Duality*), board size (*Bsize*), director independence (*Indirector*), institutional investor ownership (*Inshare*), shareholding ratio of top three shareholders (*ShHHI3*), the number of analyst following (*Lnanalyst*), and the average horizon of analyst forecast (*Horizon*). τ_i and δ_t represent firm and year fixed effects respectively. In all regressions, we cluster standard errors at the firm level. To mitigate the influence of outliers, we trim off the top and bottom 1% of all continuous variables. Table 1 summarizes

[3] According to Wind Database, at least 4554 analyst reports have mentioned TPA-related information after 2016.

[4] We use 2014-2018 as the time period of the study, where the interval of key independent and control variables is from 2014 to 2017, while the interval of analysts' prediction accuracy is from 2015 to 2018. The reason for this is that firms only started to disclose information about targeted poverty alleviation activities in their annual report since 2016, so we set 2014 and 2015 as the pre-policy time interval, and 2016 and 2017 as the post-policy time interval.

[5] China enacted a policy in 2016 on corporate disclosure of information related to targeted poverty alleviation. By observing the data structure, we find that nearly half of the treatment firms started to participate and disclose information on targeted poverty alleviation in 2017 instead of 2016.Therefore, the firms in the treatment group were affected by the policy at different points in time, so we used a staggered DID in our specification.

the descriptive statistics.

3. Empirical results

3.1. TPA disclosure and analysts' forecast accuracy

Table 2 presents the results of baseline model. The coefficient of TPA_Dummy in column (1) is -0.0036 and is significant at the 1% level, indicating that the disclosure of poverty alleviation information can significantly improve the analyst's prediction accuracy. The coefficient of TPA_Amount in column (2) is -0.0007, and is significant at the 1% level, indicating that the information about the total amount of money invested by firms in the process of TPA and how it is used can supplement the financial information. As for the economic significance, TPA engagement leads to 30% (i.e., 0.0036/0.012) increase in the accuracy of analyst forecasts relative to the mean respectively. Analysts acquire better understanding of the use of funds in poverty alleviation, so as to make more accurate predictions. In terms of control variables, analysts' forecasts are more accurate when firms are audited by big four accounting firms.

Moreover, we further examine the impact of textual characteristics of TPA disclosure (Dhaliwal et al., 2012). Specifically, we calculate the frequency of key words "*targeted poverty alleviation*" (*Annual_Number* or *CSR_Number*) and the textual length of content related to TPA (*Annual_Word* or *CSR_Word*) in annual report or CSR report. These variables indicate how detailed the firm TPA information would be in reports and how willing it would be to discuss its TPA engagement. The regression results are shown in column 3–6 in Table 2. The coefficients are all significantly negative,[6] indicating that the more frequent the terms "*targeted poverty alleviation*" and the more detailed the content of TPA are, the more significant the improvement of analyst forecast accuracy would be.

3.2. Heterogenous analyses

In this section, we test the heterogeneous promotion effects of TPA disclosure by considering two important factors: firm information environment and analyst following.

(1) Firm information environment. We argue that the effect of TPA disclosure on analyst accuracy will be contingent on firm information environment. When a firm's information processing cost is high, it is more difficult for analysts to obtain valuable information. The voluntarily disclosed TPA information is low-cost and accessible to analysts, and this incremental information brings more value. Following Duchin et al. (2010) and Armstrong et al. (2014), we use principal component analysis to synthesize four indicators to measure information processing cost: (1) the logarithm of total assets, (2) the ratio of R&D expenditure over total revenue, (3) the logarithm of firm age, and (4) the book-to-market ratio. The variable equals to one when the firm's information processing cost is higher than the industry median value, and zero otherwise. Results shown in column 1–4 in Table 3 indicate that the effect of TPA disclosure is prominent only for firms with higher information processing cost. Specifically, in the sample firm with high information cost, the coefficients of TPA_Dummy in column 3 is -0.0045 and that of TPA_Amount is -0.0008 in column 4. Moreover, the group difference tests are also significant,[7] which verifies the heterogeneous promotion effects of TPA disclosure.

(2) Analyst following. We argue that the effect of TPA disclosure on analyst accuracy will also be contingent on the number of covering analysts. Firms will be grouped into the sample with more covering analysts when the value is higher than the industry median value and sample with less covering analysts otherwise. Results shown in column 5–8 in Table 3 indicates that the effect of TPA disclosure is significant only for firms with less number of covering analysts. Specifically, the coefficients of TPA_Dummy in column 7 is -0.0053 and that of TPA_Amount is -0.0012 in column 8.

3.3. Endogeneity concerns

In this part, we conduct several tests to address the endogeneity concerns. Firstly, we include the interactive fixed effects of province-year and industry-year to mitigate the influence of time-variant omitted variables (Wu et al., 2022). The coefficients in column 1 and 2 in Table 4 remain significantly negative. Secondly, we adopt the instrumental variable method to alleviate the reverse causality. We use the number of peer firms in the same industry disclosing TPA information within a year (IndIV) as the instrumental variable. The regression results of the first stage show that IndIV is significantly positive at 1% level (see column 3 and 5), which is in line with expectation.[8] The results of the second stage show that the coefficient of TPA is still significantly negative (see column 4 and 6), further verifying the robustness of results. Finally, we also conduct propensity score matching method to deal with the sample selection issue. The results remain the same.

[6] −0.0005, −0.0008, −0.0003, and −0.0004 respectively.
[7] p-value=0.0272 for difference test on TPA_Dummy, p-value=0.0869 for difference test on TPA_Amount
[8] The Cragg-Donald Wald F-value statistics of the weak instrumental variables test are all greater than 10.

Table 1
Descriptive statistics.

Variable	Obs	Mean	SD	P25	P50	P75	Max
Accuracy	5789	0.012	0.018	0.002	0.006	0.013	0.117
TPA_Dummy	5789	0.119	0.324	0	0	0	1
TPA_Amount	5789	0.562	1.657	0	0	0	7.949
Size	5789	22.292	1.333	21.353	22.091	23.055	28.509
LEV	5789	0.421	0.198	0.263	0.413	0.568	0.940
LnAge	5789	2.770	0.341	2.565	2.833	3.045	4.762
MB	5789	0.543	0.228	0.367	0.521	0.706	1.051
ROA	5789	0.053	0.054	0.021	0.046	0.077	0.669
SOE	5789	0.336	0.472	0	0	1	1
Big4	5789	0.068	0.252	0	0	0	1
Duality	5789	0.274	0.446	0	0	1	1
Bsize	5789	2.135	0.197	1.946	2.197	2.197	2.890
Indirector	5789	0.375	0.056	0.333	0.333	0.429	0.800
InShare	5789	0.067	0.079	0.014	0.038	0.091	0.917
ShHHI3	5789	0.161	0.113	0.075	0.134	0.217	0.549
Lnanalyst	5789	2.085	0.837	1.386	2.197	2.708	3.689
Horizon	5789	5.289	0.422	5.142	5.373	5.541	5.971

3.4. Robustness checks

(1) Excluding alternative explanation. The annual report inquiry launched in 2013 would strengthen the attention of external stakeholders on corporate information disclosure (Bozanic et al., al.,2017; Bens et al., al.,2016). Therefore, the improvement of analyst forecast accuracy may be due to the reason that the firms receiving the inquiry letter. In order to more accurately identify the role of firm TPA information disclosure on analysts, we consider the role of the inquiry letter in the regression. In addition, firms have disclosed information of site visit since 2013. Analysts can obtain soft information in site visits through face-to-face communication with executives (Wu et al., 2022). Therefore, the improvement of analysts' forecast accuracy may arise from site visits. In order to more accurately identify the role of information disclosure of TPA on analysts, we controlled for two variables in our model: *InquiryNum*, measured by the number of inquiries received by a firm and *VisitNum*, measured by the number of visitors to a firm. Results remain the same.

(2) Placebo test. We also conduct a placebo test with random assignment (Lai et al., 2019). According to the TPA disclosure in the sample, random experimental dummy variables are generated by software, and the regression is repeated 1000 times with analyst forecast accuracy as the dependent variable. The unreported results show that the coefficient values of the placebo test are distributed around 0. Therefore, the results of baseline regression have been further verified. We do not report the results of robustness checks due to the space limitation and it will be made available on request.

4. Conclusion

This paper reveals the causality between analyst forecast and firms' CSR information disclosure using mandate TPA information disclosure policy as an exogenous shock. Our staggered DID estimation documents that the TPA disclosure policy significantly improves the accuracy of analyst' forecasts. This result remains robust under a series of tests. Our study firstly finds that TPA disclosure can complement financial information, which is conducive to improving the information environment and enhancing the accuracy of analysts' forecasts. Moreover, our findings also provide implication for the regulators to encourage listed firms to improve social responsibility awareness.

CRediT authorship contribution statement

The authors have contributed equally to this paper and are listed alphabetically.

Wenxin Wu: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Software, Writing - original draft. **Minya Xu:** Data curation, Investigation, Methodology, Project administration, Resources, Supervision. **Zixun Zhou:** Conceptualization, Data curation, Formal analysis, Methodology, Software, Supervision, Writing - original draft.

Data availability

Data will be made available on request.

Table 2
Panel data analyses based on 2190 firms over year 2014–2018.

	(1) *Accuracy*	(2) *Accuracy*	(3) *Accuracy*	(4) *Accuracy*	(5) *Accuracy*	(6) *Accuracy*
TPA_Dummy	-0.0036***					
	(0.001)					
TPA_Amount		-0.0007***				
		(0.000)				
Annual_Words			-0.0005***			
			(0.000)			
CSR_Words				-0.0008***		
				(0.000)		
Annual_Number					-0.0003*	
					(0.000)	
CSR_Number						-0.0004*
						(0.000)
Size	0.0079***	0.0079***	0.0079***	0.0078***	0.0080***	0.0080***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LEV	-0.0011	-0.0010	-0.0010	-0.0008	-0.0009	-0.0006
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
LnAge	0.0066	0.0070	0.0068	0.0072	0.0073	0.0078
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
MB	0.0480***	0.0479***	0.0479***	0.0479***	0.0477***	0.0477***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
ROA	-0.0071	-0.0071	-0.0071	-0.0075	-0.0073	-0.0075
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
SOE	0.0240***	0.0241***	0.0240***	0.0240***	0.0241***	0.0240***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Big4	-0.0061*	-0.0060*	-0.0061**	-0.0062*	-0.0060*	-0.0059
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Duality	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Bsize	0.0022	0.0023	0.0022	0.0024	0.0021	0.0022
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Indirector	-0.0086	-0.0085	-0.0085	-0.0092	-0.0089	-0.0095
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
InShare	-0.0055	-0.0054	-0.0055	-0.0056	-0.0057	-0.0057
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
ShHHI3	-0.0092	-0.0095	-0.0091	-0.0094	-0.0091	-0.0094
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Lnanalyst	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Horizon	-0.0024***	-0.0024***	-0.0024***	-0.0024***	-0.0023***	-0.0023***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	5789	5789	5789	5789	5789	5789
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
R^2	0.143	0.143	0.142	0.143	0.141	0.141

* $p < .1$.
** $p < .05$.
*** $p < .01$, two-tailed.
Note. Robust standard errors in parentheses.

Table 3
Heterogeneous analyses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Low information processing cost		*High information processing cost*		*More analyst following*		*Less analyst following*	
TPA_Dummy	0.0001		-0.0045***		-0.0016		-0.0053**	
	(0.002)		(0.002)		(0.001)		(0.002)	
TPA_Amount		0.0001		-0.0008***		-0.0003		-0.0012***
		(0.000)		(0.000)		(0.000)		(0.000)
Control	YES	YES	YES	YES	YES	YES	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
R^2	0.178	0.178	0.125	0.126	0.135	0.135	0.178	0.179
Observations	2850	2850	2939	2939	2677	2677	3112	3112

Table 4
Endogeneity analyses.

	(1) *Control for interactive fixed effects*	(2)	(3) *First stage: TPA_Dummy*	(4) *Second stage: Accuracy*	(5) *First stage: TPA_Amount*	(6) *Second stage: Accuracy*	(7) *PSM: Accuracy*	(8) *PSM: Accuracy*
TPA_Dummy	-0.0033**			-0.0140*			-0.0036***	
	(0.001)			(0.007)			(0.001)	
TPA_Amount		-0.0006***				-0.0025**		-0.0007***
		(0.000)				(0.001)		(0.001)
IndIV			0.6224***		3.4909***			
			(0.086)		(0.471)			
Control	YES	YES	YES	YES	YES	YES	YES	YES
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Province-Year FE	YES	YES	NO	NO	NO	NO	NO	NO
Industry-Year FE	YES	YES	NO	NO	NO	NO	NO	NO
R^2	0.251	0.251	0.254	0.119	0.235	0.125	0.140	0.140
Observations	5789	5789	5786	5786	5786	5786	5672	5672

Appendix A. Variables definition

Variables	Definitions
Accuracy	Analyst forecast accuracy, measured by the ratio of the average of the absolute value of the difference between forecast and actual earnings per share (EPS) by all following analysts over the closing stock price at the end of previous year.
TPA_Dummy	Dummy variable, equal to one when a firm participates in TPA and discloses TPA information in its annual or CSR reports.
TPA_Amount	The logarithm of the total amount of TPA disclosed in the reports.
Annual_Number	The frequency of key word 'targeted poverty alleviation' in annual report.
CSR_Number	The frequency of key word 'targeted poverty alleviation' in CSR report.
Annual_Word	The text length of content related to TPA in annual report.
CSR_Word	The text length of content related to TPA in CSR report.
Size	The natural logarithm of the book value of total assets.
LEV	The book value of total debts divided by the book value of total assets.
LnAge	The natural logarithm of firm i's age, which equals to the difference of fiscal year minus the year the firm was established.
MB	The ratio of market value to book value.
ROA	Return on assets, which equals to net income divided by total assets.
SOE	Dummy variable which equals 1 if firm i is state-owned and 0 otherwise
Big4	The biggest four audit institution.
Duality	Dummy variable, equals to one if chair and manager are the same person and zero otherwise.
Bsize	The natural logarithm of number of directors in the board.
Indirector	The natural logarithm of number of independent directors in the board.
InShare	The ratio of institutional investors' ownership.
ShHHI3	The shareholding ratio of the top three shareholder in firm i
Lnanalyst	The natural logarithm of number of following analysts.
Horizon	The logarithm of the average number of days between an analyst's forecast release date and a firm' financial disclosure date.

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