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Do Suppliers Value TCFD? An Empirical Investigation of TCFD Reporting, Trade Credit and Financial Constraints

Siwen Liu[1,a,*], Thi Thuy Trang Nguyen[2,b]

[1]*School of Economics and Management, Tianjin University of Science and Technology, Tianjin, China*
[2]*University of Sussex, Falmer, Brighton, BN1 9SL, UK*
[a]*siwen.liu@tust.edu.cn*, [b]*tn296@sussex.ac.uk*
**Corresponding author*

Abstract: *This study investigates the relationship between the voluntary adoption of the Task Force on Climate-related Financial Disclosures (TCFD) and firms' access to trade credit, using a sample of FTSE 350 listed firms. Drawing on the theory of information asymmetry, we posit that firms that voluntarily release TCFD reports are more likely to receive increased trade credit from suppliers, as these disclosures provide suppliers with better insights into the financial implications of firms' climate-related risks and opportunities. Consistent with our hypothesis, we find a positive association between the voluntary adoption of TCFD reporting and trade credit. Furthermore, this effect is more pronounced for firms that are financially constrained in terms of profitability, operating cash flows, growth opportunities,and market share. This suggests that TCFD reporting is especially valuable for firms with a greater need for access to trade credit. Overall, our findings provide supporting evidence for the positive impact of TCFD reporting.*

Keywords: *TCFD Reporting, Trade Credit, Financial Constraints, Climate Change, Suppliers*

1. Introduction

There is growing recognition that climate change poses significant risks to businesses and the financial stability of the economy. Established in 2015 by the Financial Stability Board, the Task Force on Climate-related Financial Disclosures (TCFD) aims to provide investors and lenders with material financial information to help them develop strategies to mitigate firms' climate risks and capitalize on climate-related opportunities.

Focusing on financial implications rather than general environmental impacts, TCFD reporting is distinctive and has attracted considerable attention from policymakers. In the UK, TCFD disclosures became mandatory for premium-listed companies starting in 2021 (FCA, 2020), and a roadmap has been outlined for mandatory adoption across the entire economy by 2025 (FSB, 2021).

However, despite these policy advances, TCFD reporting has received limited attention from accounting and finance scholars. O'Dwyer and Unerman (2020) have called for more academic research and scrutiny, especially to explore the potential positive impacts of TCFD disclosures. Drawing on economic theories of information asymmetry, this study examines whether firms that voluntarily adopt TCFD reporting are more likely to receive increased trade credit from suppliers. We also investigate whether the impact of TCFD reporting on trade credit varies with the level of firms' financial constraints.

Trade credit—defined as financing extended by a seller to a buyer—has long been a significant and functionally important source of funding in the business world (Petersen and Rajan, 1997). It helps companies manage and reduce their capital requirements. Compared to banks, suppliers possess information advantages about their customers through ongoing business interactions, enabling them to extend trade credit to buyers who may face difficulties accessing bank loans (Biais and Gollier, 2015; Gofman and Wu, 2022).

According to voluntary disclosure theory, firms voluntarily provide information to reduce information asymmetry between corporate insiders and external stakeholders (Al-Tuwaijri et al., 2004). TCFD reports offer suppliers additional financial information, allowing them to better assess or verify the financial health of their customers. With increased transparency regarding the financial implications of climate

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change, suppliers can better understand how climate-related risks and opportunities affect customer firms and how those firms plan to respond.

Moreover, prior research shows that firms with strong corporate social responsibility (CSR) performance tend to receive more trade credit, as suppliers interpret CSR engagement as a signal of trustworthiness and a commitment to fulfilling financial obligations (Xu et al., 2019; Zhang et al., 2020). Therefore, our first hypothesis (H1) predicts a positive relationship between the voluntary adoption of TCFD reporting and trade credit.

Furthermore, the information-asymmetry-reducing effect of TCFD reporting is likely to be more pronounced for firms facing greater financial constraints. Financially constrained firms often have limited access to external finance, such as bank loans, and thus rely more heavily on suppliers' trade credit to support their operations. Previous studies have shown that firms affected by financial market imperfections actively seek alternative financing sources, including trade credit, as a form of short-term borrowing (Mateut et al., 2006; Ferrando and Mulier, 2013; Casey and O'Toole, 2014). In such contexts, TCFD disclosures may serve as a key communication tool to reassure suppliers about a firm's ability to meet its financial obligations. Thus, our second hypothesis (H2) posits that the positive association between voluntary TCFD disclosures and trade credit is stronger for financially constrained firms.

2. Hypothesis development

2.1 The relationship between voluntary TCFD adoption and trade credit

The voluntary disclosure theory suggests that the market value of companies may be affected by the amount of information they make available about their carbon emissions and environmental performance (Clarkson et al., 2015; Hummel and Schlick, 2016). Good environmental performance is positively related to increased profits and reporting transparency of environmental impacts (Al-Tuwaijri et al., 2004; Clarkson et al., 2015; Qian and Schaltegger, 2017). Also, Zhang et al. (2020) argue that sellers treat their buyers' CSR activities as an indication of trustworthiness and commitment to fulfilling financial obligations; thus, they extend trade credit to buyers that are more socially responsible. Similarly, Xu et al. (2019) also find a positive relationship between firms' CSR rating score and trade credit.

By analogy with the above evidence, in this study, we argue that firms that voluntarily adopt TCFD's recommendations on climate-related financial disclosures enjoy increased trade credit from suppliers. This is because firms that voluntarily provide TCFD reports have less information asymmetry problems than non-adopters. The four main areas of disclosures covered by TCFD reports provide suppliers with information about climate change risks and opportunities. Customers' TCFD reports give suppliers information about how they reform corporate governance to deal with climate change issues, how risk is managed, what their business strategies are, and what are targets for future. Because suppliers have an equity stake in their buyer companies (Petersen and Rajan, 2017; Zhang et al., 2020), they can offer more trade credit to their buyer companies to better assist them in tackling climate change and transitioning to low-carbon activities. Supporting customers to transform their activities into greener businesses is also helpful for suppliers' business strategies to reduce carbon emissions. In other words, customers' TCFD reports help suppliers better understand their business partners' financial health, future profitability, and cash flows in which they share a stake. Therefore, we estimate that voluntary disclosure of TCFD reports is positively related to trade credit. The hypothesis is stated as follows:

H1: There is a positive relationship between voluntary adoption of TCFD disclosures and trade credit.

2.2 The moderating effect of financial constraints

The literature shows sellers tend to provide trade credit to financially constrained companies (Petersen and Rajan, 2017; Gofman and Wu, 2022). For example, Petersen and Rajan (2017) find that sellers tend to lend to constrained buyers because they can efficiently liquidate assets and have a greater implicit equity stake in these companies. Firms with financial constraints use more trade credit provided by suppliers as a source of short-term borrowing. This leads to the second hypothesis that the relationship between voluntary adoption of TCFD disclosures and trade credit is stronger for companies with more financial constraints. The second hypothesis is stated as follows.

H2: The positive relationship between voluntary adoption of TCFD disclosures and trade credit is stronger for companies with more financial constraints.

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3. Research methods

3.1 Sample and data

We use a sample of FTSE 350 companies from 2017 to 2020. We select the voluntary period of TCFD as our empirical setting.(TCFD recommendations were published in 2017 and it became mandatory for premium-listed companies in the UK from January 2021). We first obtain the list of FTSE350 companies from the London Stock Exchange's website as at 1 January 2017. The top 350 companies are most likely premium-listed companies, which are first firms subject to mandatory TCFD disclosure, and their business operations have a high impact on the environment and climate change. Therefore, the research findings will be more relevant to the policy-making process in UK, which owns the ambition to be a leader in green energy and is one of the first countries where TCFD is mandatory. Firms' TCFD reports manual collected from their websites (e.g. a separate TCFD report or a separate section within annual reports), if any. Using the FAME database, we match companies' names and identifiers (ticker symbols) to financial and stock price data. Observations without sufficient data for the main regression are removed. Financial firms and observations without sufficient data for the main regression are excluded. We obtained a final sample of 666 firm-year observations.

3.2 Variable measurements

Trade credit

Trade credit is the dependent variable. Following previous studies (El and Zheng, 2016; Xu et al., 2019; Zhang et al., 2020), we calculate trade credit (TC) as the ratio of accounts payable to total sales.

Voluntary adoption of TCFD

Voluntary adoption of TCFD is measured by a dichotomous variable ADOPTER. ADOPTER, takes the value of one if a firm provides a TCFD report or has a separate TCFD section in annual report in a fiscal year following TCFD's recommendations; and zero otherwise.

Financial constraints

We use four proxies to measure firm's financial constraints. Firms are viewed as facing greater financial constraints if they have lower profitability (ROA), lower operating cash flows (CFO), or lower Tobin's Q (TOBINQ).

Control variables

Table 1: Descriptive statistics.

	Observations	Mean	Std. Dev.	Min	Max
TC	666	0.084	0.081	0.000	0.698
ADOPTER	666	0.080	0.271	0.000	1.000
SIZE	666	15.006	1.446	11.010	18.984
LEV	666	0.224	0.155	0.000	0.701
ROA	666	0.072	0.078	-0.208	0.428
CASH	666	0.090	0.093	0.001	0.572
PPE	666	0.645	0.240	0.023	0.989
MKS	666	0.083	0.059	0.000	0.238
XINT	666	0.063	0.152	0.000	1.290
SGROWTH	666	0.108	0.261	-0.551	1.832
TOBINQ	666	2.008	1.499	0.709	11.602
DISTRESS	666	0.090	0.287	0.000	1.000

We include firm size, financial leverage, profitability, cash holdings, asset tangibility, financial distress, cost of debts, sales growth, Tobin's Q ratio and market share as controls. Descriptive statistics for key variables are presented in Table 1. Variable definitions are summarised in Table 2.

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Table 2: Variable Definitions.

Variable	Definition	Sources of data
TC	the ratio of accounts payable to sale revenues, measured in year t.	FAME
TC_P	the ratio of account payables to purchase, which is the cost of goods sold plus changes in inventory, measured in year t.	FAME
ADOPTER	an indicator equal to one if a firm provides a voluntary TCFD report, and zero otherwise, measured in year t-1.	Annual reports
SIZE	firm size, which is the natural log of total assets, measured in year t-1.	FAME
LEV	Financial leverage, which is equal to the sum of short-term and long-term debts scaled by total assets, measured in year t-1.	FAME
ROA	Returns on assets, which is equal to net income divided by total assets, measured in year t-1.	FAME
CASH	The ratio of cash and cash equivalent divided by total assets, measured in year t-1.	FAME
PPE	The ratio of gross property, plant, and equipment divided by total assets, measured in year t-1.	FAME
DISTRESS	Financial distress, which is an indicator with a value of one if ZSCORE is less than 0, and zero otherwise; where ZSCORE is measured UK version of zscore, measured in year t-1.	FAME
XINT	The ratio of interest expense divided by total debts, measure in year t-1.	FAME
SGROWTH	Which is the ratio of changes in sales divided by lagged sales, measured in year t-1	FAME
TOBINQ	Tobin's Q ratio, which is equal to total assets plus market value of equity minus book value of equity all divided by total assets, measured in year t-1.	FAME
MKS	Market share, which is equal to the ratio of a firm's sales to total sales of the (two-digit UK SIC codes) industry that the firm belongs to, measured in year t-1.	FAME
CFO	The ratio of operating cash flows to total assets, measured in year t-1	FAME

4. Results

Table 3: Voluntary TCFD reporting and trade credit.

Variable	TC
	[1]
ADOPTER	0.030***
	(2.87)
SIZE	0.015***
	(5.14)
LEV	0.015
	(0.66)
ROA	-0.073
	(-1.40)
CASH	-0.149***
	(-3.69)
PPE	-0.138***
	(-8.58)
MKS	-0.115
	(-1.63)
XINT	0.008
	(0.47)
SGROWTH	0.008
	(0.79)
TOBINQ	-0.004
	(-1.36)
DISTRESS	-0.039***
	(-3.77)
Constant	-0.085
	(-1.55)
Industry FE	Yes
Year FE	Yes
Observations	666
Adjusted R^2	0.37

Note: This table reports the association between voluntary TCFD adoption in year t-1 and trade credit in year t. The figures in parentheses are t-statistics. ***, **, and * refers to significance at the 1%, 5%, and 10% levels respectively. Variable definitions are in Table 2.

Table 3 reports the regression results for H1. The results show that the coefficient on ADOPTERt-1 is positive and statistically significant at 1% level. In terms of economic significance, the results indicate that voluntary TCFD adoption in year t-1 is related to an increase of trade credit in year t by 2.9%(2.9% = 0.030*0.080/0.084, given the means of TCt and TCFDt-1 reported in Table 1), which is non-trivial.

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Thus, H1 is supported. We find that voluntary TCFD adoption is positively associated with trade credit.

Table 4 summarises the impact of voluntary TCFD adoption on trade credit based on financial constraints. H2 predicts that the relationship between voluntary TCFD adoption and trade credit is stronger for financially constrained companies. It can be seen in Table 4 that the coefficients of ADOPTER are only positive and statistically significant for subsamples of firms with low returns on assets ($p<0.01$), low operating cash flow ($p<0.05$), low Tobin's q ($p<0.01$) respectively. The F-statistics indicate that the coefficient differences between two subsamples are also statistically significant. Thus, H2 is supported.

We perform several robustness checks. First, we calculate trade credit in a different way. TC_P equals to accounts payable divided by purchases (costs of goods sold plus changes in inventories). We then rerun equation (1) using TC_P as the dependent variable. Second, the year 2017 is from the sample due to the lack of variation in TCFD adoption in 2017. Overall, unreported results are in line with the main results.

Table 4: TCFD reporting and trade credit based on financial constraints.

Variable	Tade Credit					
	(1)	(2)	(3)	(4)	(5)	(6)
	ROA		CFO		TOBINQ	
	High	Low	High	Low	High	Low
ADOPTER	-0.013	0.052***	0.007	0.039**	-0.011	0.054***
	(-0.78)	-3.42	-0.5	-2.28	(-0.85)	-3.12
SIZE	0.019***	0.012**	0.018***	0.009*	0.022***	0.008
	-4.38	-2.2	-4.28	-1.82	-4.72	-1.43
LEV	-0.016	0.044	0.029	0.039	0.003	0.041
	(-0.48)	-1.13	-0.99	-0.88	-0.1	-0.87
ROA	-0.069	-0.204*	-0.027	-0.144	-0.031	-0.129
	(-0.93)	(-1.74)	(-0.41)	(-1.49)	(-0.51)	(-1.43)
CASH	-0.171***	-0.125	-0.137***	-0.160*	-0.131***	-0.197**
	(-3.46)	(-1.49)	(-3.15)	(-1.96)	(-3.03)	(-2.40)
PPE	-0.167***	-0.092***	-0.169***	-0.107***	-0.167***	-0.131***
	(-7.79)	(-3.12)	(-8.05)	(-3.46)	(-7.46)	(-4.07)
MKS	-0.018	-0.224*	-0.137	-0.057	-0.205**	-0.068
	(-0.20)	(-1.78)	(-1.62)	(-0.44)	(-2.41)	(-0.53)
XINT	0.017	-0.002	0.018	0.017	0.017	0
	-0.87	(-0.06)	-0.77	-0.6	-0.92	(-0.00)
SGROWTH	0.005	0.004	-0.015	0.01	0.013	0.011
	-0.31	-0.27	(-0.67)	-0.65	-0.82	-0.71
TOBINQ	-0.002	-0.018**	-0.005	-0.016	-0.002	-0.002
	(-0.73)	(-2.17)	(-1.45)	(-1.54)	(-0.51)	(-0.08)
DISTRESS	-0.169***	-0.029**	-0.047***	-0.029*	-0.035**	-0.033**
	(-6.30)	(-2.00)	(-3.35)	(-1.77)	(-2.31)	(-2.04)
Constant	-0.096	-0.051	-0.093	-0.005	-0.189**	0.032
	(-1.16)	(-0.55)	(-1.22)	(-0.05)	(-2.33)	-0.29
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	328	338	328	338	328	338
Adjusted R2	0.53	0.26	0.45	0.34	0.46	0.38
F-test for the difference in β1 between	(1) vs (2)		(3) vs (4)		(5) vs (6)	
F-statistics	4.118		4.562		15.230	
P-values	0.043		0.033		0.000	

Note: This table reports the relations between voluntary TCFD adoption in year t-1 and trade credit in year t based on financial constraints measured by four proxies. High and low subsamples are defined based on the median of each primary SIC industry (High is above median and low is below median). Variables definitions are in the Table 2. The figures in parentheses are t-statistics. ***, **, and * refers to statistically significant at the 1%, 5%, and 10% levels of significance, respectively.

5. Conclusions

We find that firms that voluntarily adopt TCFD disclosures are more likely to enjoy increased trade credit from suppliers. The findings are in line with information asymmetry reduction arguments as TCFD disclosures allow suppliers to access customer firms' financial health with additional financial information about climate-related risks and opportunities, thus they are more likely to extend trade credit because of increased transparency. In addition, we also find that the relation between the two is stronger for financially constrained firms, e.g. firms that have lower ROA, operating cash flows, growth opportunity, and market share. The results suggest that TCFD reporting has greater value for firms that

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are in greater need of access to trade credit. This study contributes to voluntary disclosure theory literature by providing supporting evidence on TCFD's role in reducing information asymmetry for suppliers. Furthermore, the findings of this study could provide the UK government and the SEC with evidence-based academic support and scrutiny.

Future research could be built on the findings of this study in the following ways. First, future research could use a larger sample size and could use more robust research methodologies, e.g. difference-in-difference analysis, to establish the causal effect driving from TCFD disclosures to trade credit. Second, future research may explore the legitimacy theory to see whether it can explain the association between TCFD disclosures and trade credit. Third, future research may explore other channels for the relationship between TCFD adoption and trade credit. For example, there is research evidence that banks are providing more finance for low-carbon emission industries and limiting finance for high-carbon emission industries (Nguyen, 2022). It could be the case that because firms operating in intensive-carbon industries may have limited access to bank loans and other external sources of finance, these firms need to rely more on trade credit from suppliers. As a result, the relationship between TCFD adoption and trade credit could be more pronounced for high-carbon emitters. Fourth, future studies could explore other benefits and costs related to voluntarily or mandatory adoption (from 2021) of TCFD reports. Fifth, future studies can apply the findings of this study to different contexts using data from the US or other international markets. Global governments are interested in understanding more about both benefits and costs of TCFD reports because they need evidence to support the policy-making process.

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