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# Does Bank Transparency and Disclosure with ESG and Financial Distress Impact Its Valuation? Perspectives from Indian Banks

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## Abstract

The primary objective of the current study is to ascertain the effect of transparency and disclosure (T&D) on the value of banks operating in the Indian banking sector. It also includes finding the moderating impact of financial distress (FD) and environmental, social, and governance (ESG) on the association between T&D and the valuation of banks. The study employs Panel data analysis (PDA) to analyze data and produce novel results thereafter. The authors of the study have considered using data of secondary nature which is sourced from banks operating in the Indian banking industry. Data in the current study has been considered for ten financial years, i.e., 2010 to 2019. The results reveal that T&D positively impacts a firm's valuation. We have also found evidence that financial distress and ESG (Environmental, Social, and Governance) significantly impact the value of firms under the influence of T&D. As far as we are aware, no study of this kind has been done yet in any developing nation to determine the effect that T&D, FD, and ESG have on the value of Indian banks. This paper can help future researchers in their respective studies that will involve the study variables (FD, T&D, and ESG).

**Keywords:** Transparency, Disclosure, Financial Distress, ESG, Banks

**JEL Classification Code:** G21, C23, C1

## 1. Introduction

Transparency and Disclosure (T&D) for banks (Baumann & Central Bank, 2004; Jones et al., 2012; Lawrence, 2013) is widely used by investors and stakeholders as a piece of important information for decision making, and theories such as stakeholder and agency theory argue that banks should use disclosures to communicate with external stakeholders. Various studies indicate that T&D can affect operating performance and valuation (Azrak et al., 2020; Jiao, 2011). Banking is an important feature of the country's economy and with the increasing complexity of banks, it is vital to investigate the effect of T&D, ESG practices, and corporate governance on the valuation or share price performance of Indian banks. There hasn't been enough study done on the influence of T&D in Indian banking and the bank's performance is evaluated from both an operational and a market perspective. This research will be useful for investors, stakeholders, and regulators focusing primarily on T&D and governance.

The relevance of governance factors has been well researched and it has been well-established that banks'

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creditworthiness has been affected due to this (Azrak et al., 2020; Baumann & Nier Erland, 2004). Because of changes in government policies, rules, changing markets, and expectations of stakeholders, ESG evaluation has become more crucial. There is a gap in the literature that examines the relationship between T&D along with ESG and banks' valuation, in particular, the extent of the interplay between these parameters on firms' valuation.

Additionally, banks also face the concern of high NPA (Roy, 2015; Singh & Sharma, 2016) which results in financial distress, and issues with NPA in banks indicate that mandatory disclosures are inadequate. Many models have been established till now by scholars in different sectors, such as Farajnejad and Lau (2017) develops an early warning system in the banking sector to predict as well as prevent banking distress or crisis-like situations but quite a few studies focused on associating FD with NPA issue in the banking sector. Whereas, Tunio et al. (2021) focused on corporate distress prediction by employing multi-stage classifiers for Pakistani firms. But still, no system has been developed that can accurately predict the distressing situation and save firms from getting bankrupt.

The contribution of the research in this paper is to understand the role of ESG disclosure, financial distress, and the valuation of banks. This research's contributions are twofold. Firstly, (Wang et al., 2016) in their analysis, explained the lack of studies in emerging countries such as India. Secondly, it provides evidence of how the ESG and T&D disclosures along with financial distress, impact banking valuation in India which has received limited research attention. By taking a sample of banks in India, we also analyze how ESG reporting is important to stakeholders and regulators not only in developed nations but also in India that may encounter similar challenges related to the economy and sustainable practices.

Further, if we deep dive into the valuation aspect. Depending on the objective, application, and techniques, various valuation methods are used. For example, for accountants, valuation is taken as book value, while for economists, valuation is the intrinsic value of the business. While for stakeholders, valuation is based on the utility and the market value resulting from the sale of instruments or financial transformation. The increased competition that banks or financial institutions have been recently facing has led to overcapacity in their conventional business segments. This has also prompted them to become more market-oriented in their approach. With this transition being conventional intermediaries to market-oriented organizations, offering a greater range of non-bank services, the degree of bank complexity has increased even more.

Various studies on valuation have found that, in certain situations, earnings levels and volatility in share price returns

were not sufficient to fully explain variance in valuation and seen its explanatory power dramatically diminished over time (Kothari et al., 2001) or that volatility in share prices does not indicate the difference in operating performance (Francis & Schipper, 1999).

While ESG disclosures remain voluntary, it has received increasing importance to users in addition to financial statements when arriving at a valuation. ESG is the fundamental philosophy of sustainability and is also popular in financial institutions (McDonald & Sharyn Rundle-Thiele, 2008). A healthy financial position and sound customer loyalty is the function of the ability to raise resources and infuse capital while remaining committed to ESG as discussed by (Buallay et al., 2020). Any deterioration of ESG can harm the brand equity of the bank resulting in structural damage. As a result, banks must be prudent while lending to projects which impact the environment or society adversely. ESG controversies prioritizing business goals may impact banks' operating performance, and negatively impact the brand equity on a sustained basis for the long term (Flood, 2019). It may take years for a bank to recoup post an ESG controversy. With ESG controversies emerging in the US banks, such as Goldman Sachs, Citi bank, and Wells Fargo, which paid huge penalties after the financial distress. ESG risks have an impact on the analysis of asset quality, capital adequacy, liquidity, earnings, and capital structure, resultantly affecting banks' credit quality (Buallay et al., 2020). For instance, climate change may impact borrowers' cash flows and their ability to repay debt in weather-dependent sectors, which has an impact on both operating performance and asset quality. Poor performance on ESG factors will result in a moderation in a bank's liquidity, funding sources, and earnings. Also, for banks depending on certain economic sectors, their performance may be vulnerable to environmental issues.

Key components to assess the credit quality of the bank include governance and risk management practices. While governance factors are mostly internal, what drives the social and environmental factors are external factors like population change or regulation. Due to governance issues such as laundering, compliance violations, etc., banks must pay significant financial penalties. Environmental, social, and governance goals have been key focus areas of the impact investment. Currently, the ability of banks to adhere to sustainability practices has become the key differentiating factor, making the discussion of sustainability in banks and performance important.

Most banks have increased their focus on ESG activities to improve the trust of their stakeholders and investors after the global financial crisis, which resulted in major destruction in the banking industry. The research on how ESG factors affect the performance of banks is now highly important given this environment. Few research studies have been carried out in

the past on the importance of sustainability in the banking industry. We believe it is important to analyze the effect of ESG factors on the valuation of banks given how important is banking sector to the economy and the function of ESG.

## 2. Literature Review

Corporate governance is a critical source of information for investors and stakeholders for evaluation. Agency and stakeholder theory believe that companies should connect with investors through high-quality corporate transparency and disclosures. Previous studies indicate that corporate transparency has an impact on operating performance and valuation. However, not all disclosures are valued at the same level by investors. The research on the relation between mandatory and voluntary disclosures, their varying adherence, and their impact on performance, is lacking. Transparency and disclosure (T&D) have an advantage in the banking sector since it is one of the key pillars of the BASEL agreement from 2004 (disclosures are included in Pillar III of Basel II, which was announced in 2004). (Rochet et al., 2002) Many people interpret T&D in banks differently (Baumann & Nier Erland, 2004).

“The availability to outside stakeholders of meaningful, trustworthy information on the periodic performance, financial position, business model, governance, and hazards of banks,” is what disclosure in banking means according to Bushman’s (2016) research. As per this article, external stakeholders include lenders, investors, borrowers, peers, and regulators (Bushman, 2016). That is adequate levels of disclosure should facilitate the company’s comprehensive and true financial performance, allowing all stakeholders to make an informed decision. Furthermore, reducing uncertainty arising due to news or events with high T&D may lessen stock price volatility (Bushee & Noe, 2000).

Following the global financial crisis of 2008, there has been increased importance for the necessity of heightened disclosure and compliance in the banking sector. Banks and financial institutions benefit from transparency in terms of efficiency and stability (Allenspach, 2009a). On the other hand, (Allenspach, 2009b) mentions that increase in transparency beyond a certain threshold may not be beneficial and also comment on the problem of knowledge asymmetry between borrowers and banks. Although transparency is needed, Allenspach mentions that disclosing thorough information is not ideal since it differs from other financial sectors for different reasons (2009). To begin with, banks have a far larger proportion of debt financing and debt holders have a different objective than equity holders. Finally, in relation to other sectors of the economy, the banking industry is highly regulated. As a result, the observations from the broader literature on T&D may not apply to banks.

There are several techniques for analyzing the performance of banks, which may be classified as conventional or non-traditional.

DEA technique is one technique that many studies in India have used to evaluate the efficiency of the bank (Baidya & Mitra, 2012) use two separate DEA approaches—super-efficiency DEA and CCR-DEA to demonstrate that the government banks in India are inefficient in the labor utilization. According to a study (Das & Kumbhakar, 2012), the efficiency of government banks improved when compared to private banks between 1996 and 2005. Jayaraman et al. (2013) employed the classic DEA model with a non-radial distance-based model in their analysis, demonstrating that the outcomes of both methodological techniques are often similar.

### 2.1. Gaps of Literature

Das and Ghosh (2006) discovered that the efficiency of mid-sized Indian banks in their DEA model was when intermediation, operational, and value-added strategies were used. Another study highlights that there is also a high impact of NPAs on efficiency. Another research by the same authors suggests that banks in India may not be very profitable. Many other scholars have expressed concern about the problem of excessive nonperforming assets in the Indian banking system (Nidugala & Pant, 2017). NPAs are a cost to the banks that have been accounted for as an unfavorable result in the DEA models used to analyze Indian banks (Jayaraman & Bhuyan, 2020). However, limited research on how financial distress impacts valuation also considers disclosure levels.

Because NPAs have an increasing influence on Indian bank profitability, we have also included NPA as one of the inputs in the DEA in this study. The non-radial DEA approach has also been used in some studies. Non-radial methods offer an advantage over radial models in that they accommodate for excess input and deficit output (Tone, 2001). According to Sahoo and Tone (2009a), radial DEA methods do not account for various opportunity costs of creating distinct outputs.

Sahoo and Tone (2009b) examined 71 banks in India using non-radial D, discovered completely different results from both methods, and encouraged the non-radial method. Despite being larger, and possessing far more resources than both private banks, their findings show that the Public Sector Banks in India have inefficient resource allocation.

While many studies have examined bank efficiency from production and intermediate perspective, limited research has been carried out to study how Indian banks’ valuations differ based on T&D. There have been only a few studies that have investigated the influence of a bank’s performance or governance disclosures on its stock market performance or valuation.

Hadad et al. (2011) investigated the operating efficiency of banks in Indonesia from January 2003 to July 2007 and found a relationship between the efficiency of banks and the share prices. One more finding was that there was less efficiency in international banks than in their domestic banks (Srairi & Kouki, 2012) investigated 25 Islamic banks about the relationship between the operating efficiency of the banks and their respective share price performance from 2003 to 2009. The researchers observed that whereas operating efficiency is positively associated with share price performance, the scale has no effect on stock returns.

Liao (2019) investigated the relationship between the efficiency of a bank and the stock returns in Taiwan and China. In describing fluctuations in share prices, he observed that the x-efficiency approach is more effective than the financial analysis. As a consequence, this study contributes by investigating the relationship between the operating performance of Saudi Arabian banks' and their share price performance utilizing six performance variables (three pricing efficiency and three operational efficiencies) using a current large volume of data.

The extent of banking complexity has increased as banks have developed from just being financial intermediaries to become more market-oriented firms that provide many non-banking goods and services and now rely increasingly on intangible assets in the business. As a result, the widely held idea that the valuations of banks should match their book values, as proposed by (Ang & Clark, 1997) is becoming increasingly incorrect.

As a consequence, market valuations and the book value will diverge, with the latter failing to appropriately represent the internal value of the company. The difference between the current valuation, current share price, and intrinsic valuation is a measure of an investment's expected returns (Kothari et al., 2001b). Current shareholders may want to sell their stock shares if the valuation does not improve in line with their expectations, and the bank in this case may find difficulty in raising additional funds to drive growth in the future. Because profits are the most significant determinant of success, capital market academics have tried developing and testing several methods to explain the observed link between the fundamentals of the firm, earnings performance, other accounting data, and valuation. They investigate the use of financial information, particularly profits, to explain the difference between book valuations and market valuations.

To grow and exist, banks must be able to effectively generate throughput from inputs. Higher throughput from the same inputs as competitors, or utilizing fewer inputs for the same level of throughput, is a measure of relative efficiency (Adenso-Díaz & Gascón, 1997). As a result, the operating efficiency of banks may be used as a proxy for a firm's competitive edge which affects the present and future performance. We believe that a bank's relative efficacy in

properly using inputs relatively has significant importance as it also indicates the bank's competitive edge.

Companies that can operate well can use their competitive edge to generate sustained earnings for a longer duration, increasing their share in the market (McWilliams & Smart, 1993). Although there is a substantial body of research on bank's operating performance and efficiency, it has hardly been studied from the standpoint of shareholders, and just a few studies (Eisenbeis et al., 1993; Fiordelisi, 2007)) have sought to relate the concerns of bank's performance that is financial distress and share price performance or valuation.

Moreover, the study on the effects of sustainability on the operating performance of banks is limited and contradictory. Impact investing has prioritized environmental, social, and governance factors. The issue of sustainability in the bank's business and its operating performance has revived in recent few years, as the ability to adhere to sustainability has emerged as a critical distinction. Following the global financial crisis, which destroyed the financial industry, banks have increasingly focused on their ESG efforts to regain investors' trust. In this context, analyzing the impact of ESG activities on banks' performance is becoming critical. The studies done before this on the influence of sustainable practices in banks on their valuation have been limited.

Miralles-Quirós et al., 2019 try to analyze if there is any significant impact of the ESG performance of the banks on share prices from the year 2002 to 2015. The three factors in ESG assessment are valued differently by different stakeholders in the stock market according to this research study (Bătae et al., 2020) uses a segmentation by the currency, geographical area in Europe, and population of countries to analyze the ESG and operating performance of banks in Europe (Aras et al., 2018) examined in a similar study that there is a statistically significant direct relationship between sustainability performance and market valuation of banks in Turkey over the long term. Additionally, this research study proposes a corporate sustainability model based on environmental, governance, social, and financial disclosures. The study for Islamic banks, (Jan et al., 2019) indicates that a direct positive association exists between financial success and sustainability factors. However, most of the research does not study the interplay between T&D, ESG disclosures, financial distress, and banks' valuation.

## **2.2. Hypothesis Formulation**

Banks and financial institutions benefit from transparency in terms of efficiency and stability (Allenspach, 2009a). On the other hand, Allenspach (2009b) mentions that increase in transparency beyond a certain threshold may not be beneficial and also comment on the problem of knowledge asymmetry between borrowers and banks. Although transparency is needed, Allenspach mentions that disclosing

thorough information is not ideal since it differs from other financial sectors for different reasons (2009). To begin with, banks have a far larger proportion of debt financing, and debt holders have a different objective than equity holders. Finally, the banking industry is highly regulated in relation to other sectors of the economy. As a result, the observations from the broader literature on T&D may not apply to banks. Hence, we evaluate whether T&D impacts banks positively or negatively.

*H1: Transparency and Disclosures positively impact the valuation of banks.*

Miralles-Quirós et al. (2019) try to find if there is any significant impact of the ESG performance of the banks on share prices from the year 2002 to 2015. The three factors in ESG assessment are valued differently by different stakeholders in the stock market, according to this research study (Bătae et al., 2020) uses a segmentation by the currency, geographical area in Europe, and population of countries to analyze the ESG and financial performance of banks in Europe (Aras et al., 2018) examines in a similar study that there is a statistically significant direct relationship between sustainability performance and market valuation of banks in Turkey over the long term. With this background, we examine the positive (or negative) impact of ESG on bank valuation.

*H2: ESG positively impacts the valuation of banks.*

To grow and exist, banks must be able to effectively generate throughput from inputs. Higher throughput from the same inputs as competitors, or utilizing fewer inputs from the same throughput, is a measure of relative efficiency (Adenso-Díaz & Gascón, 1997). As a result, the operating efficiency of banks may be used as a proxy for a firm's competitive edge, which affects the present and future performance. We believe that a bank's relative efficacy in properly using inputs relatively has significant importance as it also indicates the bank's competitive edge. With this in mind, we scrutinize the impact of financial distress on banks' performance.

*H3: Financial Distress impacts the valuation of banks.*

The research on how sustainability affects bank operating performance is sparse and inconsistent. Impact investing has prioritized environmental, social, and governance factors. The ability to adhere to sustainability has emerged as a crucial differentiator, which has resurrected the problem of sustainability in the business of the bank and its operating performance in recent years. To earn back investors' trust

after the global financial crisis, which destroyed the financial sector, banks have increased their focus on ESG initiatives. We investigate the moderating impact of ESG on T&D in this setting.

*H4: ESG positively moderates the Transparency and Disclosures.*

While many studies have examined bank efficiency from production and intermediate perspective, limited research has been carried out to study how Indian banks' valuations differ based on T&D. There have been only a few studies that have investigated the influence of a bank's performance or governance disclosures on its stock market performance or valuation. Hence, we try to study the interaction effect of financial distress on T&D.

*H5: Financial Distress positively moderates the Transparency and Disclosures.*

### 3. Data and Methodology

#### 3.1. Data

The current work has examined a sample of annual data from 34 Indian banks operating over ten years (2010–2019). For recent bank performance, the designated time range is essential. The CMIE Prowess database and the bank's annual reports were used to collect secondary data for these companies. Table 1 provides a description of the variables for which data is being gathered.

#### 3.2. Methodology

Data analysis has been conducted with the help of a panel data model (PDM). Hsiao (2007) and Baltagi (2008) claim that the PDM is capable of attributing both cross-sectional and time-series features. According to a number of academics, PDM offers more information than cross-section analysis or using only one time series in the study. A total of four models are developed in the study. Among the models, the first model examines the linear association (Baltagi & Li, 2002; Baltagi, 2015), the second model examines the non-linear association (Arellano & Bonhomme, 2009; Baltagi, 2015), and the third, as well as fourth model, investigates the interaction effect (Baltagi, 2015) of the explanatory variables on each dependent variable. The model specifications are given as:

$$Y_{it} = \alpha + \beta_1 TD_{it} + \beta_2 ESG_{it} + \beta_3 FD1_{it} + \beta_4 I_{asset_{it}} + \beta_5 I_{sales_{it}} + \mu_{it} \quad (1)$$

**Table 1:** List of Variables

S.No.	Variable	Type	Code	Definition	Citations
1	Bank’s valuation as Market Capitalization	DV	mcap	Multiplying the current market price of a firm’s share to the total no. of outstanding shares.	Kumar and Shah, (2009)
2	Financial distress (Altman Zscore)	IV	FD1	It is the financial distress assessment of a firm based on multivariate discriminant analysis. Altman (1968) developed the model to compute Zscore.	Altman (1968)
3	Transparency and disclosure (T&D)	IV	TD	It indicates the level of T&D of information disclosed by banks.	Kumar and Kidwai (2018)
4	Bank size	CV	l_assets	It is the representation of bank size in terms of asset value. The natural log value is taken.	Almaqтари et al. (2019)
5	Sales	CV	l_sales	Represents the amount of money the firm receives in exchange for goods sold.	Brush et al., (2000)

Note: DV and IV represent the dependent variables and independent variables, respectively and CV represents control variables.

**Table 2:** Descriptive Statistics and Correlation Matrix

	mcap	TD	ESG	FD1	l_assets	l_sales	Mean	SD
mcap	1						9.475	1.897
TD	0.447*	1					0.502	0.094
ESG	0.291*	0.316*	1				0.269	0.068
FD1	-0.030	0.036	0.036	1			2.619	12.30
l_asset	0.795*	0.426*	0.126*	-0.144	1		11.75	1.41
l_sales	0.808*	0.466*	0.160*	0.066	0.843*	1	8.745	1.68

Note: \* represents a significant correlation coefficient at 0.05.

$$Y_{it} = \alpha + \beta_1 TD_{it} + \beta_2 ESG_{it} + \beta_3 FD1_{it} + \beta_4 TD^2_{it} + \beta_5 l\_asset + \beta_6 l\_sales_{it} + \mu_{it} \tag{2}$$

$$Y_{it} = \alpha + \beta_1 TD_{it} + \beta_2 ESG_{it} + \beta_3 TD\_ESG_{it} + \beta_4 FD1_{it} + \beta_5 l\_asset + \beta_6 l\_sales_{it} + \mu_{it} \tag{3}$$

$$Y_{it} = \alpha + \beta_1 TD_{it} + \beta_2 ESG_{it} + \beta_3 FD1_{it} + \beta_4 TD\_FD1_{it} + \beta_5 l\_asset + \beta_6 l\_sales_{it} + \mu_{it} \tag{4}$$

Where Eq.1, Eq.2, and Eq.3 present the PDA models for linear, non-linear, and interaction effects, respectively.  $Y_{it}$  is the dependent variable representing valuation, i.e., (ln\_mcap) of banks I at time t. TD is used as the primary explanatory variable. FD1 and ESG are also taken as explanatory variables. Two variables (i.e., l\_sales and l\_assets) are also included as control variables in the model. TD<sup>2</sup> is the square of TD1 (i.e., quadratic term) to test non-linear association. TD\_ESG and TD\_FD1 represent interaction terms in the

model to test the interaction effect.  $\alpha$  is the constant term and  $\mu_{it}$  is the error term in the models.

## 4. Results

### 4.1. Descriptive Analysis and Correlation

Table 2 demonstrates the correlation between the variables and their descriptive statistics. The mcap, which is considered for bank valuation, has a mean value of 9.475, indicating a large amount of market capitalization (bank value). The mean value of TD, i.e., 0.502, shows a moderate level of transparency and disclosure of information from the firms listed in India. The average value of ESG is 0.269, which indicates that a reasonable amount of awareness is present about the environment, and social or governance-related matters among the banks working in India. The FD1 has an average of 2.61, showing banks in India are facing financial distress (FD).

In the correlation matrix, FD1 is positively correlated with TD and ESG (see Table 2). ESG positively and significantly correlates to ln\_mcap and TD (Table 2). Ln\_mcap and TD are significantly and positively correlated with the highest value. However, the value of these significant correlations is less than 0.80. In light of this, the multicollinearity problem is restricted (Wooldridge, 2006; Baltagi, 2008).

## 4.2. Regression Estimation

### 4.2.1. Base Model

Model 1 shows the linear association between TD and bank valuation (see Table 3). For fixed and random effects, *F*-test and BP test have been applied, respectively. Both of them are significant in nature as values are less than 0.05, resulting in the application of the Hausman test. The model

shows compatibility with FE. Furthermore, the wald test has *p*-values of more than 0.05, resulting in estimating the robust results in the models (Baltagi, 2008; Wooldridge, 2015). In Table 2, TD and the control variables (Sales and assets) show positive coefficient values, 1.1186, 0.4856, and 0.5245, with *p*-values less than 0.05. All the values show that a positive and significant relationship exists between the variables included in model 1.

### 4.2.2. Square Model

Model 2 is concerned with the non-linear association. The Hausman test finds FE suitable for ascertaining the association in this model. Because the Wald test's *p*-values in the model are greater than 0.05, the results are estimated using robust estimates. In Table 3, TD2 is found to have a coefficient value of 1.3457 and a *p*-value of 0.000, which is

**Table 3:** Result of Regression Analysis (Static Panel Data Analysis)

mcap	Model 1	Model 2	Model 3	Model 4
	Coefficient	Coefficient	Coefficient	Coefficient
constant	-1.5028** (0.062)	-1.2316*** (0.097)	-1.3852*** (0.032)	-2.016** (0.011)
TD	1.1186** (0.015)	–	–	–
DTD	–	–	0.5714 (0.185)	0.7723** (0.054)
DTD2	–	1.3457* (0.00)		
Desg	–		0.0221* (0.000)	
I_DTD_Desg	–		0.0009 (0.000)*	
I_DTD_DFD1	–		0.0366 (0.000)*	
I_assets	0.4856* (00.000)	0.5248* (0.000)	0.7018* (0.000)	6861* (0.000)
I_sales	0.5245* (00.00)	0.4784* (0.000)	0.2459* (0.010)	0.03416* (0.002)
R-square	0.9155	0.9184	0.8154	0.7985
S.E. of Regression	1.0009	0.9971	0.9733	0.9857
Note: No observations (n)	330	330	330	330
Degree of freedom	33	33	33	33
<i>F</i> -test Fixed Effect	92.97* (0.000)*	100.01(0.000)*	124.53 (0.00)	97.75 (0.000)*
Random Effect Test	25.39 (0.00)*	0.00 (1.00)	0.00 (1.00)	21.15 (0.000)*
Hausman Test	48.63 (0.000)*	225.62 (0.00)*	1069.94 (0.0082)*	44.96 (0.000)*
Wald test for Heteroscedasticity <sup>1</sup>	1395.25 (0.00)*	1366.38 (0.000)*	7240.66 (0.000)*	5920.94 (0.000)*
Wooldridge Autocorrelation Test <sup>2</sup> AR (1)	1.229 (0.29*)	1.168 (0.3080)*	0.007 (0.9335)	0.036 (0.8545)*

Note: <sup>1</sup>Wald test of heteroscedasticity has the null of no heteroscedasticity. <sup>2</sup>Wooldridge test of autocorrelation in the panel has the null of no autocorrelation (with one lag). SER is the standard error of the regression. Theta estimates the random effect model (higher is better). © Standard Errors are robust estimates due to significant heteroscedasticity, autocorrelation, or both. Parenthesis has a *p*-value. \*, \*\*, \*\*\* are significance at 0.01, 0.05, and 0.10, respectively.

**Table 4:** Robustness of the Result

Core Variable	Max	Min	Mean	Avg STD	Perc Signi	Perc+	Perc-	AvgT
TD	9.016152	1.43137	3.700968	0.78402	1	1	0	4.285856
DTD2	8.384923	1.617848	3.641593	0.740861	1	1	0	4.505155
ESG	0.001918	-0.00127	0.000324	0.005057	0	0.5	0.5	0.315356
I_DTD_ESG	0.001149	0.001125	0.001137	0.000337	1	1	0	3.372555
I_DTD_FD1	0.032592	-0.00264	0.014978	0.009639	0.5	0.5	0.5	1.811831

Source: Authors compilation. Note: Cor var stands for core variables. The terms Max, Min, and Mean refer to the maximum, minimum, and mean values of the coefficient across all regressions. AvgSTD is an abbreviation for average standard deviation. PerSigni denotes the proportion of regression in which the coefficient is significant. Perc+ and Perc- represent the proportion of regression where the coefficient is positive or negative, respectively. AvgT denotes the average *T*-value.

less than 0.05, indicating a positive and significant impact on the relationship between the variables. All of the estimated values in model 2 have significance.

#### 4.2.3. Interaction Models

Models 3 and 4 are shown in Tables 5 and 6. Due to the significance of the Hausman test, FE has been applied to both models to interpret the results. The robust values are considered in both models. As per model 3, a positive coefficient value of the interaction term TD\_ESG (.0009) significantly impacts the relationship among the variables (TD and valuation), as the *p*-value is calculated to be 0.012, which is less than 0.05. According to model 4, the coefficient and *p*-value of the interaction term TD\_FD1 are 0.0366 and 0.000, respectively. This finding demonstrates that the interaction term has a significant impact on the relationship between the variables.

#### 4.3. Robustness of The Results

Using STATA's CHECKROB command, the results' robustness has been examined. The calculated results are shown in Table 4. The PercSigni and Perc + of TD are 1 respectively, which means a positive and significant relationship exists between the variables. Similar results were also obtained using the square root of TD, or TD2. As far as the interaction terms are concerned, TD\_ESG's PercSigni and Perc+ values are 1 each, showing a positive and significant moderating impact on the variables (TD and valuation). The PercSigni, Perc+, and Perc-values of TD\_FD1 are 0.5 each, showing that a positive but moderately significant impact has been created on the variables.

#### 4.4. Interaction Graphs

A graphic representation of the association between the variables is provided by an interaction graph. In Figures 1 and 2, the solid line indicates a low moderating level and

the solid dash line indicates a high moderating effect of the interaction variables. DTD serves as the moderator for all of the interaction terms, and ESG (Figure 1), and DFD1 (Figure 2) are the moderated variables respectively. As per Figure 1, a clear impact can be seen which represents that the interaction term TD\_ESG moderates the relationship that exists between TD and lnmcap. Furthermore, in graph 2, an impact of the interaction term (TD\_DFD1) is visible on the association between TD and lnmcap.

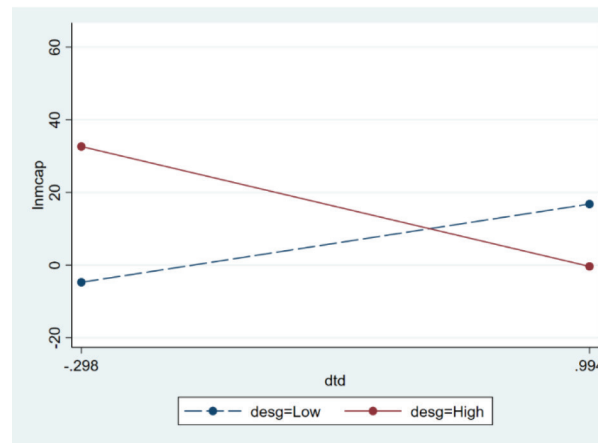
### 5. Discussion

There hasn't been enough study done on the influence of T&D in Indian banking and the bank's performance is evaluated from both an operational and a market perspective. This research focuses on analyzing the T&D and ESG for banks and their influence on valuation. Data analysis has been conducted with the help of a panel data model (PDM).

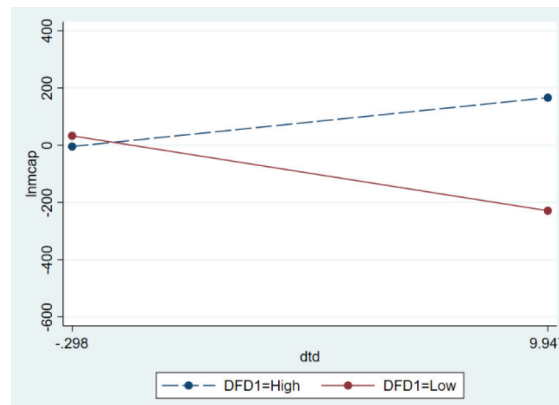
A total of four models are developed in the study. Among the models, the first model examines the linear association, the second model examines the non-linear association, and the third, as well as the fourth model, investigates the interaction effect. The mean value of TD shows a moderate level of transparency and disclosure of information. The average value of ESG indicates that a moderate amount of awareness is present about the environment and social or governance-related matters. FD is positively correlated with TD and ESG, indicating that both TD and ESG affect FD positively.

Model 1 shows the linear association between TD and bank valuation. All the results show that a positive and significant relationship exists between the variables included in model 1. Model 2 shows the non-linear association between TD and bank valuation. All the results indicate that a positive and significant relationship exists between the variables included in model 2. For Models 3 and 4 which is the interaction effect, results show that the interaction term is positive as well as significantly impacting the relationship





**Figure 1:** Interaction Graph of TD\_ESG



**Figure 2:** Interaction Graph of TD\_FD1

between variables (TD and valuation). All results have been checked and verified to be robust.

## 6. Conclusion

This study uses the data from banks operating in the Indian banking sector to investigate the effects of T&D, ESG, and FD on valuation. The contribution of this study is manifold. First, we have analyzed that T&D has a significant impact on the bank's value. In addition to this, ESG, as well as FD, is also investigated from different angles (linear, non-linear, and under interaction with T&D); hence, the next aim explained that FD and ESG both are significantly impacting the bank value under the influence of T&D. However, these effects were found to be mixed depending on the various situations. The aims established in our study have covered the significant aspects that can directly or indirectly impact the value of banks in this competitive business environment.

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