Creditor Rights and Tax Avoidance: Evidence from Quasi-natural Experiment in India

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Abstract

The Insolvency and Bankruptcy Code (IBC) of India seeks to improve the interest of all stakeholders, thereby establishing a better credit culture. Considering IBC as a source of exogenous variation, we investigate its impact on a firm's tendency to avoid taxes using firm-year observations spanning between 2010 and 2023. We find that tax avoidance activities are lower for financially distressed firms (treatment group) as compared to their financially non-distressed (control group) counterparts, in the post-IBC period. This reduction in tax avoidance results from firms use non-debt tax shields in place of debt tax shields and is evident from our channel analysis, where we find distressed firms are utilizing the benefits of tax shields from increased leverage, post-IBC.

Keywords: Bankruptcy reforms; Insolvency and Bankruptcy Code; Distressed firms; Tax Avoidance, Debt Tax Shields.

JEL classification: G3, G33, G38

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1. Introduction

"*Efficient regulation of corporate insolvency is associated with increased access to credit for firms and on better terms. Creditors are more willing to lend because they are more likely to recover their loans*"[1]

[*World Bank Group, Subnational Studies*]

The credit market scenario in India has substantially improved as even distressed firms obtain more debt at cheaper costs (Bose et al. (2021); and Ghosh (2022)). This eventually leads us to explore one of the crucial business decisions, which is the trade-off between debt-related and non-debt-related tax shields. Early contributions to the debt versus non-debt tax shield literature include the seminal work of Miller (1977), followed by the works of DeAngelo & Masulis (1980), and Bradley et al. (1984). Recent contributions include Graham & Leary (2011), Doidge & Dyck (2015), Cao & Whyte (2023), and Saba (2024). For our present study, the most important among these contributions is the work by Vito & Jacob (2023), who are the first to provide evidence of firms reducing tax avoidance by substituting debt tax shields with non-debt tax shields after Italy's pro-creditor bankruptcy reform. Again, an earlier study by Rodano et al. (2016) in the Italian context find a reduction in the cost of borrowing after the pro-creditor reform. Along similar lines, the literature on creditor rights and bank borrowings in India post-IBC finds that distressed firms tend to borrow more debt at a reduced cost. However, no notable study explores the impact of IBC on firm's tax avoidance in the Indian context, which essentially can be an outcome of the substitution between debt and non-debt tax shield. This leads us to analyze the impact of IBC on Indian firms' tendency to avoid taxes under a "creditor-friendly" regime.[2]

[1] https://subnational.doingbusiness.org/en/data/exploretopics/resolving-insolvency/reforms

[2] https://www.crisilratings.com/content/dam/crisil/our-analysis/reports/Ratings/documents/2019/april/strengthening-the-code.pdf

The introduction of IBC has successfully brought a change in the mindset of borrowers and associated stakeholders, whose primary intention is to revive or recover a firm in distress (CRISIL, 2019).[3] Such efficient restructuring mechanisms help preserve operational continuity and ensure better corporate governance (Agarwal et al., 2020). Recently, research on IBC has gained considerable momentum with studies analyzing the impact of IBC on different firm-level outcomes that include collateralized borrowings (Singh et al. 2023), corporate risk-taking (2022), dividend policy (Jadiyappa & Kakani, 2023), firm financing (Agarwal & Singhvi, 2023), cash ratio (Jadiyappa & Shrivastav, 2021), and leverage speed of adjustment (Kumar, 2024). We contribute to the literature on IBC in investigating the impact of IBC on corporate tax avoidance (CTA).

In Figure 1, we provide anecdotal evidence that corporate tax collection[4] (in absolute terms) as well as corporate tax to Gross Domestic Product[5] (GDP) ratio experienced a steep jump after FY 2016-17, with a temporary decline during COVID-19. This indicates that in the post-IBC period, the Government of India (GoI) could achieve better corporate tax collection as compared to pre-IBC period. The Ministry of Finance also considers IBC to be one of the factors contributing to an increase in tax collection, which can eventually help India achieve its long-term growth targets.[6]

< Insert Figure 1 and Figure 1.1 here >

To examine the association between IBC and firm`s tax avoidance, we put forward two contrasting hypotheses. The first strand of the hypothesis supports the idea of a decrease in tax

[3] https://www.crisilratings.com/content/dam/crisil/our-analysis/reports/Ratings/documents/2019/april/strengthening-the-code.pdf
[4] The Corporate tax data is taken from the "Income Tax Department Time Series Data: Financial Year 2000-01 to 2023-24", https://incometaxindia.gov.in/Documents/Direct%20Tax%20Data/Final-Approved-Time-Series-Data-2023-24-English.pdf
[5] The GDP data is taken from Reserve Bank of India's "Handbook of Statistics on Indian Economy", Table 4: Components of Gross Domestic Product, https://rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook+of+Statistics+on+Indian+Economy
[6] Press Information Bureau, https://pib.gov.in/Pressreleaseshare.aspx?PRID=1849975

avoidance following a pro-creditor bankruptcy reform for the following reasons. An insolvency regime that empowers creditors to enforce contracts effectively leads to an increased credit supply at lower costs (Djankov et al., 2007). Along similar lines, Bose et al. (2021) find that post-IBC distressed firms in India have been able to increase their borrowing at lower costs. In this respect, we argue that this increase in debt helps distressed firms in India to rely on debt-related tax shields, wherein their dependence on non-debt-related tax shields can be reduced, thereby reducing tax avoidance. Corroborating evidence is provided by Vito & Jacob (2023), who show that Italy's pro-creditor bankruptcy reform led to decrease in tax avoidance activities for Italian firms.

Our second hypothesis highlights few reasons as to why IBC can increase firm's tendency to avoid taxes. Insolvency regimes empower creditors to enforce their contracts, often lead lenders to dictate their supremacy, which affects the borrower's decision-making power, thereby leading to deadweight costs (Thapa et al., 2020). Consequently, the borrowers reduce their borrowing (Vig, 2013; Closset & Urban, 2019). Acharya et al. (2011) provide corroborating evidence that stronger creditor rights reduce leverage. Reduction in borrowing might eventually lead firms to depend more on non-debt tax shields, thereby increasing tax avoidance.

To empirically investigate the association between IBC on firm`s tax avoidance, we use a sample of 16,313 firm-year observations spanning between 2010 and 2023. Following Dyreng et al. (2010), we "keep our measures of tax avoidance broad and easy to understand," and we do not attempt to measure tax aggressiveness, tax risk, tax evasion, or tax sheltering. Our dependent variable, *Tax Avoidance,* is measured in two ways. First, we use the measure used by Vito and Jacob (2023), that is, *Income taxes scaled by the book value of assets.* Second, we use another measure proposed by Henry and Sansing (2018), which is the difference between n*et taxes paid and the product of statutory tax rate and profit before taxes, scaled by book value of total assets*. Our sample constitutes a considerable percentage of firms with negative pre-tax

income. Therefore, by using total assets in the denominator, we try to overcome some of the limitations of scaling by PBT.[7] We exclude firms with negative PBT from the sample, which is in line with Lee et al., (2021). Eventually, by including firms with negative PBT, we maximise the generalizability of our results (De Simone et al.,2020; Menicacci & Simoni, 2024). Prior studies that use assets as the denominator in tax avoidance measures are Kabir & Rashid (2024); Hu et al**. (**2023); Lee et al. (2021); Atwood & Lewellen, (2019). To establish a causal inference between IBC and tax avoidance, we employ a propensity-score matched DID technique, where we match our firms based on observable firm-level characteristics. In addressing endogeneity-related concerns, we follow two approaches. First, we control for time-invariant unobserved firm characteristics by employing firm-fixed effects in the DiD specification. Second, we employ PSM to take care of selection bias that arises due to observable firm-level characteristics, which can affect our findings. The key variable of our study is the interaction term of $Post \times Treatment$, of DiD on matched sample. This coefficient captures the impact of IBC on distressed firm's tax avoidance in the post-IBC period. *Post*, is a dummy variable indicating 1 for years between 2017 and 2023 and 0 for years between 2010 and 2016. *Treatment* is a dummy variable indicating 1 if the firm`s interest coverage ratio (ICR) is less than one in the pre-IBC period and 0 otherwise.

We find that after IBC, distressed firms have reduced their tax avoidance activities by around one percentage point as compared to their non-distressed counterparts. Also, we observe distressed firms to increase their leverage by six percentage points during the same time period. These findings are qualitatively similar to Vito & Jacob (2023) and provide evidence of distressed Indian firms taking advantage of debt tax shields after a pro-creditor bankruptcy reform.

[7] We discuss these limitations in Section 4.2 of this paper

We contribute to the literature in the following ways. First, the literature on creditor rights and tax avoidance is nascent, with recent contributions from Vito and Jacob (2023). Our study, though similar to Vito & Jacob (2023), can be differentiated in three ways. First, our choice of treatment firms, that is, firms who are distressed. Second, our selection of a country that is an emerging economy as opposed to a developed country like Italy.[8] Third, we include governance measures like board size and board independence in our augmented model. This is justified on the arguments proposed by Armstrong et al. (2015), who argue that including corporate governance measures are crucial to account for agency problems that often determine a firm's tax avoidance outcomes.

Second, we add to the growing literature on IBC that includes existing studies viz., Bose et al., (2021); Ghosh (2023); Singh et al., (2022); Agarwal & Singhvi (2023). These studies have analyzed the impact of IBC on different firm-level outcomes but remained silent on the impact of IBC on firm's tax-related decisions. Again, globally, recent studies have analyzed the impact of different independent factors on tax avoidance. These factors include executive's equity incentive (Kara et al.,2023), managerial ownership (Wongsinhiru et al., 2024), family ownership (Chalevas et al., 2024), and creative corporate culture (Hasan et al., 2024). Our research extends to the aforementioned areas on examining the association between creditor rights or bankruptcy reform and tax avoidance.

Third, we examine the potential channel that might govern the decrease in tax avoidance. Our analysis shows that distressed firms have increased their leverage in years after the introduction of IBC. This finding corroborates with the supply-side view which advocates that if creditors can better enforce repayment or take possession of the defaulter`s assets, then the likelihood of extending more credit increases to borrowers (Beck et al., 2003). Giannetti (2003)

[8] According to a 2013 estimate while India lost 2.34% of its revenue due to tax avoidance, Italy lost only 0.26%. Therefore, the extent of tax avoidance behaviour across the two countries varies. Source: "Global distribution of revenue loss from tax avoidance", UNU-WIDER, Table A2, https://www.wider.unu.edu/sites/default/files/wp2017-55.pdf

and Vito and Jacob (2023) provide empirical support for this line of thought and find debt ratios or leverage to increase in countries with stronger creditor rights. Therefore, our findings indicate that in the post-IBC period, distressed firms in India are now relying more on debt financing, thereby reducing their tendency to avoid taxes.

The remainder of the paper is organised as follows. Section 2 focuses on the literature and hypothesis development. Section 3 explains institutional settings. Data and methodology are explained in section 4. Section 5 describes empirical results. Analysis of potential channels is presented in Section 6. Section 7 presents the robustness checks, and finally section 8 concludes.

2. Literature & hypotheses development

Insolvency regimes that allow lenders to dissolve management boards and appoint an external administrator, in termed as creditor-friendly regime (Franken, 2004). Under IBC, the Insolvency Resolution Professional (IRP) has the right to take control and custody of any asset of the defaulter, once the CIRP process starts.[9] Thus, IBC is considered a "creditor-friendly" regime (Baxi,2023). Against this backdrop, we provide two opposing views in finding out the impact of IBC on corporate`s tax avoidance activities.

First, we focus on the literature documenting a positive association between creditor rights and tax avoidance. This argument is based on the demand-side view, which posits that liquidity risk increases when creditor rights are stronger, which forces firms to borrow less. Corroborating evidence can be found in the works of Acharya and Subramanian (2009), Acharya et al. (2011), and Vig (2013). Again, when a firm is distressed, the benefits of tax avoidance outweigh the cost (Richardson et al., 2015). Therefore, the dual effect of increased liquidation risk under stronger creditor rights and the benefits of tax avoidance, in a situation

[9] "https://ibbi.gov.in/uploads/whatsnew/e42fddce80e99d28b683a7e21c81110e.pdf"

of distress, can lead to firms relying less on debt financing and consequently avoiding more taxes. This leads us to propose our first hypothesis, which is mentioned below.

H1a: Tax avoidance among distressed firms has increased compared to their non-distressed counterparts after implementing IBC.

Second, we examine the literature documenting a negative association between creditor rights and CTA activities. This argument is based on the supply-side view, where lenders extend credit at lower costs. In the Brazilian context, Araujo et al. (2012) find that lenders are more confident to lend at cheaper costs because of the pro-creditor environment. In similar lines, Bose et al. (2021) show that distressed firms in India are borrowing more at a cheaper cost of debt in the post-IBC period. Therefore, when borrowers can increase their debt financing their incentive to avoid taxes will be lesser. This leads us to propose our second hypothesis as mentioned below.

H1b: Tax avoidance among distressed firms has reduced compared to their non-distressed counterparts after implementing IBC.

3. Institutional Settings

In the mid-2000s, the growth of Indian firms relied on bank credit and overseas inflow of funds.[10] The expectation of continued growth allows banks to lend generously to firms. But, as the Global Financial Crisis (GFC) emerged and the Reserve Bank of India (RBI) raised interest rates to address increasing inflation, firms found it hard to borrow from both domestic and overseas sources. Though India was able to manage the adverse effects of GFC, the transactions that took place during that time were considered as Non-Performing Assets (NPAs).

The frameworks that existed before IBC often allowed the defaulting company's managers to stay in charge, who unnecessarily delayed the insolvency process and caused the assets to

[10] https://www.indiabudget.gov.in/budget2017-2018/es2016-17/echap04.pdf

deplete over the course of time. Four out of every ten firms in India, whose ICR was below one, owed forty percent of India's company`s debt in 2015 (Indian Economic Survey 2016-17). Also, the recovery rate in India was one of the poorest in the world, which is estimated to be twenty percent of debt value on present value terms.[11] The Indian government realized that these problems can be addressed with an efficient Insolvency Law as the existing bankruptcy and insolvency frameworks proved inefficient. Eventually, the parliament approved the IBC on 11th May 2016 and became operational in December 2016.[12]

4.Data sources, sample selection, and empirical strategy

4.1 Data sources

We glean the data of NSE-listed non-financial firms from the CMIE ProwessDx database.[13] Prior studies that use ProwessDx database in the context of India are Vig (2013); Singh et al. (2022). The sample period is spread across 14 years spanning from 2010 to 2023. To address the issue of outliers, we winsorize accounting ratios at the 1st and 99th percentiles, respectively.

4.2. Dependent variable

We use two measures of Tax Avoidance. The first measure is similar to that used in Vito & Jacob (2023) and is defined as below.

$$Taxes\ Paid_{it} = \frac{Tax\ Expense_{it}}{Total\ Assets_{it}} \quad (1)$$

[11] https://ibbi.gov.in/BLRCReportVol1_04112015.pdf

[12] "https://www.mca.gov.in/Ministry/pdf/TheInsolvencyandBankruptcyofIndia.pdf"

[13] We exclude financial firms from our analysis as the balance sheet reporting format is different.Financial firms are those that have National Industrial Classification (NIC) product codes, which begins with 641, 642, 643, 649, 651, 652, 653, 661, 662, and 663 as per NIC (2008), section K, p.no 20, "https://www.ncs.gov.in/Documents/NIC_Sector.pdf"

The second measure, *H&S Measure,* is developed following Henry and Sansing (2018). To construct the second measure, we follow the below mentioned steps.

In the first step, we compute the change in tax refund the difference between current year`s tax refund and previous year`s tax refund and the same is mentioned in equation (2).

$$Change\ in\ tax\ refund_{it} = Tax\ Refund_{it} - Tax\ Refund_{it-1} \quad (2)$$

In the second step, we compute net taxes paid as the difference between tax expense and change in tax refund as it is shown in equation (3).

$$Net\ Taxes\ Paid_{it} = Tax\ Expense_{it} - Change\ in\ Tax\ Refund_{it} \quad (3)$$

In step 3, we compute H&S measure as it is mentioned in equation (4).

$$H\&S\ Measure_{it} = \frac{Net\ Taxes\ Paid_{it} - (Statutory\ Tax\ Rate_{it} \times Profit\ before\ Taxes_{it})}{Total\ Assets_{it}} \quad (4)$$

We make a small modification to the original measure proposed by Henry and Sansing, wherein we use total taxes paid instead of cash taxes paid.[14] We do not expect our decision to replace cash taxes with total taxes paid to cause any bias in our findings. Markel & Shackelford (2011) use cash tax, current tax, and total taxes as numerators in the ETR measure and find that no matter what their choice of numerator is the results remain qualitatively similar. Additionally, one drawback of cash taxes paid is that they can include taxes related to income from years other than the current year (Markel & Shackelford,2011).

Our decision to use total assets as the denominator addresses the following limitations of using PBT: First, our dataset constitutes a considerable proportion of firms with negative PBT. Most studies in the tax avoidance literature remove firms with negative PBTs. Inferences from studies where ETR is scaled by PBT are sensitive to eliminating observations where PBT is negative (Henry & Sansing, 2016; Koester et al., 2017). Therefore, by not eliminating these

[14] The Henry and Sansing (2019) measure has also undergone modification in the study by Menicacci and Simoni (2024), who removed changes in tax refund receivables from the calculation.

firms, we seek to maximize the generalizability of our results (Menicacci & Simoni,2024; De Simone et al.,2020). Like ours, Kabir & Rashid (2024) also encounter a considerable number of loss-making firms in their dataset, so they scale their ETR measure by total assets. Second, as pointed out in Atwood & Lewellen (2017) that "scaling by pre-tax income increases (decreases) the effects of low (high) profitability firms and creates issues with large outliers and small denominators." Third, Henry & Sansing (2014) consider book value or market value of assets as a more reasonable indicator of firm's economic magnitude than net income.

4.3 Main variable of interest

The coefficient of the interaction term between the *Treatment* variable (equals 1 for firms with ICR below 1 with the *Post* variable captures IBC's impact on distressed firms' tax avoidance activities). *Post*, is an indicator variable equal to 1 for years 2017 to 2023 and 0 for years 2010 to 2016. We consider 2017 as the year of intervention (Jose et al., 2020; Singh et al. 2022).

4.4. Empirical strategy

The impact of IBC on firm`s tax avoidance activities is analysed using a propensity score matched difference-in-differences (DiD) methodology. Our findings can be influenced by differences in firm-level observable characteristics between the treatment and control groups. We address this issue by first matching the sample firms based on propensity scores and then applying the DiD technique to the matched sample. This way, we improve the balance across covariates and ensure a near-random assignment. We follow Singh et al. (2023) and use *Size*, *Leverage*, *Tangibility, Liquidity,* and *Growth* to get PSM-matched control firm for each treatment firm in our sample.

We employ Logit regression to generate propensity scores using the propensity score matching (PSM), and the regression below is used.

$$Distress_i = \alpha + \beta X_i + \delta_i + \tau_t + \epsilon_i \quad (1)$$

where, *Distress* is a binary variable which is equal to 1 for distressed firms and zero for non-distressed firms. *Size*, *Leverage*, *Tangibility, Liquidity*, and *Growth* form the vector X_i. We take into consideration of firm (δ_i) and year (τ_t) fixed effects as well in equation (1). ϵ_i is the error term of logit regression. The impact of *Size,* on firm's distress can be mixed. Larger firms might have complex operations which can be difficult to maintain (Parker et al., 2002). Under such circumstances, the author finds distress to increase as firm size increases. On the contrary, Agarwal and Taffler (2008) posit that for small firms the value of the assets might fall short of the face value of liabilities, in which case the likelihood of bankruptcy increases. Therefore, the probability of financial distress is higher among smaller firms. When debt levels rise firms find themselves stranded in an excessive leverage zone. Therefore, the relation between leverage and distress is inconclusive. On the one hand, Isayas (2021) finds firm's distress to increase as leverage increases, while on the other hand Kristanti et al. (2016) find that distress reduces as leverage increases. In Kristanti's study, the firms that have high leverage also performs well, therefore they may be better positioned to meet all their fixed liabilities and the distressed status is not influenced by higher leverage. Bhagat et al. (2005) show that firms with lesser tangibility do not communicate about their value with investors. This might cause the firm to be financially stressed. In a similar vein, John (1993) posits that the association between tangibility and firm`s distress is negative. Lastly, falling sales can lead to fall in growth rates for firms, which eventually can lead to distress (Laitinen, 2005).

The assignment (equally likely) to two groups i.e., the treatment vs control is done based on the propensity scores generated using logit regression.[15] The validity of the PSM estimates depend on the "conditional independence" and "common support" assumptions. Conditional independence ensures that observed firm-level characteristics forms the sole criteria for

[15] We use a caliper distance of 0.03 with no replacement.

allotment into treatment group. Common support, on the other hand, ensures that the observed firm-level characteristics significantly do not differ across the two groups. We present the support graph in Figure 2. Panel A of Table 6 shows the mean tests across the treatment and control groups, to validate the assumption of common support of PSM.

The PSM technique is widely used technique in IBC literature in the context of India, which include Bose et al. (2021), Srivastava et al. (2022), and Singh et al. (2023). This technique helps to keep our treatment and control groups identical w.r.t observable firm-level covariates. By using PSM-DiD technique, we can also compare the changes in CTA activities of treatment and control group firms.

The following regression equation is estimated

$$Tax\ Avoidance_{it} = \alpha + \beta_1 Post_t + \beta_2 Treatment_i + \beta_3 Post_t \times Treatment_i + \beta_4 X_{it} + \delta_i + \tau_t + \epsilon_{it} \quad (2)$$

where, $Tax\ Avoidance_{it}$, is measured using the *Taxes Paid* and the *H&S Measure*. Our variable of interest is the interaction term of DiD specification ($Post_t \times Treatment_i$). $Post_t$ is a binary variable that equals 1 for years 2017 to 2023 and 0 for years 2010 to 2016. $Treatment_i$ equals 1 if the i^{th} firm belongs to the treatment group and 0 otherwise. Vector X_{it} consists of control variables viz, *Size, Intangibles, Income, PPE, Sales Growth, Investment, Cash Ratio, PB Ratio, R&D, Board Size, Board Independence* and *Leverage*. The choice of control variables is done following extant literature (Vito and Jacob, 2023; Lee et al., 2021; Armstrong et al., 2015). Additionally, firm and year-fixed effects with standard errors clustered at the firm level are employed in equation (2).

The presence of a parallel trend is necessary for the identification strategy in DiD specification. To test this assumption, we limit our sample period to 2010-2015 and presume 2013 as the pseudo year of adoption. We observe that the co-efficient β_3 in equation (2) is

insignificant, which supports our claim that the treatment and control group exhibit similar trends in the absence of IBC.

4.5. Control variables used in DiD specification

We control for *Size, Intangibles, Income, PPE, Sales Growth, Investment, Cash Ratio, PB Ratio, R&D, Board Size, Board Independence* and *Leverage*. Two contrasting theories explain the relationship between firm size and tax avoidance. First, according to the political cost theory there exists a positive relation between firm size and effective tax rates as larger firms are – a) subject to stringent public policy and action by the state (Aichian & Kessel, 1962), b) expose themselves to public and social pressure due to their higher public visibility as compared to smaller firms (Jensen & Meckling, 1967), c) are monitored more closely by the financial markets (Boyton et al., 1992). Under such circumstances larger firms tend to avoid more taxes. Second, according to the political power theory, large firms use their power and resources to negotiate tax burdens and can drive legislation in their favor (Gupta & Newberry, 1997). Therefore, the relation between firm size and tax avoidance can be negative. Next, firms that possess more intangibles shift income from high-tax jurisdictions to low-tax jurisdictions and thus have higher opportunities to avoid taxes (Hanlon et al., 2007). Again, Cheng et al. (2012) find a negative relationship between intangible assets and ETR measures. Companies that invest in property, plant, and equipment (PPE) to obtain tax benefits show a negative relation with ETR measures (Liu et al., 2022). Again, while on the one hand, high capital intensity firms can lower tax avoidance due to depreciation expense and tax exemption, they can also increase depreciation expense by manipulating the useful life of the asset and increasing the possibility of tax avoidance (Kim & Im, 2017). Wahyuni et al. (2019) state that when sales of a firm increase, it leads to higher profit, and the firm then faces higher taxes. Under such circumstances, a firm can adopt tax avoidance strategies.

5. Empirical Results

We have 16,313 firm-year observations, of which the treatment group and control group consist of 3,152 and 13,161 observations, respectively as it is reported in Table 1. Our sample is well distributed, in which firm-year observations range between 5.28% and 7.53% in each year in our sample.

< Insert Table 1 >

The descriptive statistics of variables used in the study for full sample between 2010-2023 is presented in Table 2. The mean value of *Taxes Paid* is close to that reported by Vito & Jacob (2023). For all other variables, the mean values are comparable with Athira & Lukose (2023) and Vito & Jacob (2023).

< Insert Table 2>

We check multicollinearity across our independent variables using the correlation matrix. Two variables are expected to suffer from multicollinearity problem if the correlation coefficient between these two variables is greater than 0.5 (Dormann et al., 2013). We find our variables do not suffer from multicollinearity problem.

<Insert Table 3>

Table 4 shows the results of impact of IBC on firm`s tax avoidance using propensity score matched DiD specification. In columns (1) to (4), the dependent variable is *Taxes Paid,* which is *measured as Income Taxes scaled by Book Value of Assets*. In columns (5) to (8), the dependent variable is *H&S Measure,* which is measured as the *difference between the firms' income taxes and the product of Statutory Tax Rate and Proft Before Tax, scaled by Book Value of Assets*. Columns (3) & (7) report the results of the model we developed following Vito & Jacob (2023). Columns (4) & (8) report the results of the augmented model where we added few more controls viz., price-to-book (P/B) ratio, Research and Development (R&D) intensity, Board Size, Board Independence and Leverage. We find the coefficient of the interaction term

(Post ×Treatment) in DiD specification is positive and statistically significant at one percent in columns (1) to (4). It is positive and significant at five percent in models (5), (7) and (8). Finally, in column (6) it is positive and significant at ten percent. Our findings suggest that distressed firms have reduced their tax avoidance post-IBC as compared to non-distressed firms. This reduction can be attributed to the increase in leverage and firms eventually replace non-debt tax shields with debt tax shields. The increase in leverage for distressed firms indicate that after IBC, creditors have greater confidence in lending to distressed borrowers. This increased borrowing has led the borrowers to utilize debt tax shields and resulting in a reduced tendency to avoid taxes.

< Insert Table 4 >

It is important to make sure that the observable firm-level characteristics between the treatment and control group are not statistically significant, before the PSM matched DiD analysis. Therefore, we check the test of effectiveness using mean test between treatment and control groups in our sample and report the results in panel A1 (for ETR) and panel A2 of Table 5 (for H&S Measure). In columns (1) and (2), we report the mean values of observable firm-level characteristics for both treatment and control groups. In column (3), we report the values of t-test and find that there is no significant (statistically) between treatment and control groups at the conventional levels. These results imply that our covariates satisfy the test of balance of matching during pre-treatment period.

<Insert Panel A1 of Table 5>

<Insert Panel A2 of Table 5>

We also validate the "common support assumption" of matching by comparing the distribution of propensity scores of both treatment and control groups in order to check whether there is sufficient overlap between the two groups. We test and show the results of common

support of matching in figure 2 in our paper. As there is sufficient overlap across treatment and control groups, we conclude that common support of PSM is validated.

< Insert Figure 2 & Figure 2.1 here>

The existence of a parallel trend in our propensity score matched sample is tested in Panel B of Table 6. We randomly select 2013 as the pseudo intervention year and restrict the sample between 2010 and 2015. The insignificant interaction term (Post × Treatment) in our PSM-DiD regression validates that similar trend existed between the treatment and control group before the implementation of IBC.

< Insert Panel B of Table 5>

6. Channel analysis

Our findings suggest that IBC has helped distressed firms reduce their tax avoidance than non-distressed firms post-IBC period. This section examines the possible channels through which the aforementioned relation works. Previous studies show that stronger creditor rights give lenders more confidence to lend at cheaper costs (Ponticelli & Alencar, 2016; Haselmann et al., 2010). Studies related to IBC also document an increase in leverage in the post-IBC period (Bose et al., 2021, Singh et al., 2023). Moreover, Lin et al. (2014) show debt and tax avoidance as substitutes. Therefore, creditor rights can increase (decrease) debt financing, which eventually decreases (increases) tax avoidance activities (Vito & Jacob,2023). We find that post-IBC distressed firms' leverage has increased by six percentage points as compared to non-distressed firms.

< Insert Table 6 >

7. Robustness check

We undertake a plethora of robustness tests to support our main results.

7.1 Randomisation Inference Test

First, we use the randomization inference test to be more certain about our propensity score-matched DiD result. In this test, 1000 replications of the coefficient generate a statistical distribution. We perform this in three steps. First, for each replication of the placebo experiment, we randomly consider treatment group firms into control group and vice-versa. Second, the propensity score matched DiD equation is estimated using this newly assigned treatment. Finally, we obtain distribution of coefficients and identify the estimated coefficients in this empirical distribution, in which we hypothesize no treatment effect under the null hypothesis.

A coefficient is statistically significant when we have a low *p-value* or the PSM-DiD coefficient is located in the tail of the distribution. In Figure 3 and Figure 3.1, the estimated coefficient is statistically significant as it lies towards the tail. Therefore, the randomization inference test's results provide further credence to our results.

<Insert Figure 3 & Figure 3.1 here >

7.1 Lagged intangibles

We have developed our main analysis following Vito & Jacob (2023), who scaled intangibles with total assets. However, other studies use lagged assets as the denominator (Athira & Lukose,2023). So, we rerun our PSM+DiD model using the lagged intangibles and show our findings are qualitatively similar.[16]

< Insert Table A1 >

7.2 Alternative measures of STR

We find three sources w.r.t STR measures such as, OECD, Tax Foundation and Trading Economics. We employ the OECD data in our baseline regression analysis. However, to make

[16] The parallel trend assumptions also remain qualitatively similar, while using lagged intangibles.

sure that our choice of source of STR does not govern our results, we rerun our baseline PSM+DID analysis and show that our findings are qualitatively similar.[17]

< Insert Table A2>

7.3 Removing COVID-19 years

In 2021, the government suspended IBC for one year because of COVID-19. We rerun our baseline PSM-DiD specification using three combinations. First, we excluded years 2020 & 2021. Second, we excluded year 2020, and lastly, we excluded only year 2021. Our findings are qualitatively similar in all three cases as compared to baseline analysis.

< Insert Table A3>

8. Conclusion and Policy Implications

Paying taxes forms one of the key components of "Ease of Doing Business" in a country.[18] Government of India data shows that the corporate tax as a percentage of GDP (measures in constant 2011-12 prices) has increased from 3.94 in the FY 2016-17 (pre-IBC period) to 4.74 in FY 2021-22 (post-IBC period). India's rank in the Ease of Doing business has also improved considerably from 130 to 63 between the 2017 and 2020. The IBC introduced by the Government of India has played a crucial role in improving India's ease of doing business rankings. Since its introduction, IBC has received interest among researchers. Prior studies show that post-IBC distressed firms have borrowed more from lenders at cheaper costs (Ghosh. 2023). As Lin et al. (2014) argue that debt and tax avoidance are substitutes, we conjecture the increased borrowing tend to have an impact on firms' tax avoidance decisions. Using IBC as an exogenous shock, we find that tax avoidance of distressed firms has reduced as compared to their non-distressed counterparts in years after the implementation of IBC. We identify the

[17] While using different STR measures we also test with lagged intangibles and check for the existence of parallel trends.
[18] https://indianembassynetherlands.gov.in/page/ease-of-doing-business-in-india/

increase in leverage as one of the channels that have helped distressed firms to switch non-debt tax shields with debt tax shields. Our findings are similar to Vito & Jacob (2023), which also finds a reduction in tax avoidance among Italian firms and an increase in leverage after a pro-creditor insolvency regime. We thus add to the literature on creditor rights and tax avoidance in an emerging economy context like India. The reduction in tax avoidance has important implications for government policies as tax collections are vital to a country's growth. Additionally, reduction in tax avoidance is also indicative of a better credit culture that the country has achieved.

References

Acharya, V. V. and Subramanian, K. V. 2009. Bankruptcy codes and innovation. The Review of Financial Studies, 22(12), 4949–4988.

Acharya, V. V., Amihud, Y., & Litov, L. (2011). Creditor rights and corporate risk-taking. Journal of financial Economics, 102(1), 150-166.

Agarwal, A. K., Das, A., Jacob, J., & Mohapatra, S. (2020). Introduction to the Special Issue on 'Financial Distress, Bankruptcy, and Corporate Finance'. Vikalpa, 45(2), 61-68. https://doi.org/10.1177/0256090920953995

Agarwal, S., & Singhvi, B. (2023). Creditor-controlled insolvency and firm financing–Evidence from India. Finance Research Letters, 54, 103813.

Agarwal, V., & Taffler, R. (2008). Comparing the performance of market-based and accounting-based bankruptcy prediction models. Journal of Banking & Finance, 32(8), 1541-1551.

Aghion, P., Hart, O. D., & Moore, J. (1992). The economics of bankruptcy reform, Journal of Law, Economics , and Organizations 8, 523

Araujo, A. P., Ferreira, R. V., & Funchal, B. (2012). The Brazilian bankruptcy law experience. Journal of Corporate Finance, 18(4), 994-1004.

Atwood, T. J., & Lewellen, C. (2019). The complementarity between tax avoidance and manager diversion: Evidence from tax haven firms. Contemporary Accounting Research, 36(1), 259-294.

Baxi, A. (2023). Interim Finance in Creditor-Oriented Bankruptcy Codes: A Study in the Context of Insolvency & Bankruptcy Code, India. Vikalpa, 48(3), 189–205.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2003). Law, endowments, and finance. Journal of financial Economics, 70(2), 137-181.

Bhagat, S., Moyen, N., & Suh, I. (2005). Investment and internal funds of distressed firms. Journal of Corporate Finance, 11(3), 449-472.

Bose, U., Filomeni, S., & Mallick, S. (2021). Does bankruptcy law improve the fate of distressed firms? The role of credit channels. Journal of Corporate Finance, 68, 101836.

Bradley, M., Jarrell, G. A., & Kim, E. H. (1984). On the existence of an optimal capital structure: Theory and evidence. The journal of Finance, 39(3), 857-878.

Cao, Y., & Whyte, K. (2023). Corporate tax-shields and capital structure: leveling the playing field in debt vs equity finance. The European Journal of Finance, 29(15), 1716-1735.

Closset, F., & Urban, D. (2019). The balance of power between creditors and the firm: Evidence from German insolvency law. Journal of Corporate Finance, 58, 454-477.

De Vito, A., & Jacob, M. (2023). The role of creditor protection in lending and tax avoidance. Journal of Financial and Quantitative Analysis, 58(5), 2096-2130.

DeAngelo, H., & Masulis, R. W. (1980). Optimal capital structure under corporate and personal taxation. Journal of financial economics, 8(1), 3-29.

Djankov, S., McLiesh, C., & Shleifer, A. (2007). Private credit in 129 countries. Journal of financial Economics, 84(2), 299-329.

Doidge, C., & Dyck, A. (2015). Taxes and corporate policies: Evidence from a quasi natural experiment. The Journal of Finance, 70(1), 45-89.

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2010). The effects of executives on corporate tax avoidance. The accounting review, 85(4), 1163-1189.

Franken, S. (2004). Creditor-and debtor-oriented corporate bankruptcy regimes revisited. European Business Organization Law Review (EBOR), 5(4), 645-676.

Ghosh, S. (2023). Creditor rights and lending relationships. Applied Economics Letters, 30(9), 1194-1198.

Giannetti, M. (2003). Do better institutions mitigate agency problems? Evidence from corporate finance choices. Journal of financial and quantitative analysis, 38(1), 185-212.

Graham, J. R., & Leary, M. T. (2011). A review of empirical capital structure research and directions for the future. Annual Review Financial Economics., 3(1), 309-345.

Haselmann, R., Pistor, K., & Vig, V. (2010). How law affects lending. The Review of Financial Studies, 23(2), 549-580.

Henry, E., & Sansing, R. (2018). Corporate tax avoidance: Data truncation and loss firms. Review of Accounting Studies, 23, 1042-1070.

Houston, J. F., Lin, C., Lin, P., & Ma, Y. (2010). Creditor rights, information sharing, and bank risk taking. Journal of financial Economics, 96(3), 485-512.

Hu, Z., Yang, H., Zhang, Y., & Wang, J. J. (2023). Does common auditor have an impact on corporate tax avoidance? An investigation from the supply chain perspective. Accounting & Finance, 63(1), 575-629.

Isayas, Y. N. (2021). Financial distress and its determinants: Evidence from insurance companies in Ethiopia. Cogent Business & Management, 8(1), 1951110.

Jadiyappa, N., & Kakani, R. K. (2023). Bankruptcy law, creditors' rights and dividend policy:evidence from a quasi-natural experiment. International Journal of Managerial Finance, 19(5), 1178–1202

Jadiyappa, N., & Shrivastav, S. (2022). Bankruptcy law, creditors' rights, and cash holdings:Evidence from a quasi-natural experiment in India. Finance Research Letters, 46, 102261.

John, T. A. (1993). Accounting measures of corporate liquidity, leverage, and costs of financial distress. Financial Management, 22(3), 91

Jose, J., Herwadkar, S. S., Bilantu, P., & Razak, S. A. (2020). Does greater creditor protection affect firm borrowings? Evidence from IBC. Margin: The Journal of Applied Economic Research, 14(2), 212-225.

Kabir, M., & Rashid, H. (2024). Do generalist CEOs engage in more tax avoidance than specialist CEOs?. Accounting and Business Research, 54(5), 525-551.

Koester, A., Shevlin, T., & Wangerin, D. (2017). The role of managerial ability in corporate tax avoidance. Management science, 63(10), 3285-3310.

Kristanti, F. T., Rahayu, S., & Huda, A. N. (2016). The determinant of financial distress on Indonesian family firm. Procedia-Social and Behavioral Sciences, 219, 440-447.

Kumar, S. (2024). Bankruptcy law and the leverage speed of adjustment. Finance Research Letters, 105673.

Laitinen, E. K. (2005). Survival analysis and financial distress prediction: Finnish evidence. Review of Accounting and Finance, 4(4), 76-90.

Lee, Y. J. (2021). The effects of analysts' tax expense forecast accuracy on corporate tax avoidance: An international analysis. Journal of Contemporary Accounting & Economics, 17(2), 100243.

Lin, S., Tong, N., & Tucker, A. L. (2014). Corporate tax aggression and debt. Journal of Banking & Finance, 40, 227-241.

Markle, K. S., & Shackelford, D. A. (2012). Cross-country comparisons of corporate income taxes. National Tax Journal, 65(3), 493-527.

Menicacci, L., & Simoni, L. (2024). Negative media coverage of ESG issues and corporate tax avoidance. Sustainability Accounting, Management and Policy Journal, 15(7), 1-33.

Miller, M. H. (1977). Debt and taxes. the Journal of Finance, 32(2), 261-275.

Parker, S., Peters, G. F., & Turetsky, H. F. (2002). Corporate governance and corporate failure: a survival analysis. Corporate Governance: The International Journal of Business in Society, 2(2), 4-12.

Rodano, G., Serrano-Velarde, N., & Tarantino, E. (2016). Bankruptcy law and bank financing. Journal of Financial Economics, 120(2), 363-382.

Saba, Z. (2024). Climate risks and corporate tax shields. Journal of Sustainable Finance & Investment, 1-28.

Singh, R., Chauhan, Y., & Jadiyappa, N. (2022). Bankruptcy reform and corporate risk-taking: Evidence from a quasi-natural experiment. Finance Research Letters, 47, 102679.

Singh, R., Chauhan, Y., & Jadiyappa, N. (2023). Does an effective bankruptcy reform increases collateralized borrowing? Evidence from a quasi-natural experiment in India. Journal of Regulatory Economics, 63(1-2), 74-86.

Singh, R., Jadiyappa, N., & Sisodia, G. (2021). Bankruptcy law, creditors' rights and financing choices: Evidence from a quasi-natural experiment in India. Applied Economics, 53(52), 6036-6042.

Thapa, C., Rao, S., Farag, H., & Koirala, S. (2020). Access to internal capital, creditor rights and corporate borrowing: does group affiliation matter?. Journal of Corporate Finance, 62, 101585.

Vig, V. (2013). Access to collateral and corporate debt structure: Evidence from a natural experiment. The Journal of Finance, 68(3), 881-928

Tables

Table 1: Sample distribution of firm-year observations across years

	Total		Distressed firms` category		Non-distressed firms` category	
Year	**N**	**%**	**N**	**%**	**N**	**%**
2010	1,072	6.57	210	6.66	862	6.55
2011	1,124	6.89	228	7.23	896	6.81
2012	1,155	7.08	235	7.46	920	6.99
2013	1,167	7.15	233	7.39	934	7.10
2014	1,174	7.20	236	7.49	938	7.13
2015	1,201	7.36	243	7.71	958	7.28
2016	1,261	7.73	254	8.06	1,007	7.65
2017	1,258	7.71	251	7.96	1,007	7.65
2018	1,239	7.60	241	7.65	998	7.58
2019	1,228	7.53	233	7.39	995	7.56
2020	1,211	7.42	225	7.14	986	7.49
2021	1,194	7.32	217	6.88	977	7.42
2022	1,167	7.15	211	6.69	956	7.26
2023	862	5.28	135	4.28	727	5.52
Total	16,313	100	3,152	100	13,161	100

Note: This table reports the distribution of firm-year observations across years. Distressed firms' group are those companies whose ICR was less than unity in the pre-IBC period and non-distressed firms` group comprises companies that have an ICR of greater than unity in the pre-IBC period.

Table2: Descriptive statistics of key variables across firm-year observations from 2010 and 2023

Variables	Obs	Mean	Std. Dev.	P25	Median	P75
Taxes Paid	16,044	0.053	0.071	0.008	0.028	0.068
H&S Measure	15,730	0.031	0.068	-0.004	0.006	0.044
Size	16,238	8.678	1.906	7.612	8.726	9.835
Intangibles	12,808	0.028	0.072	0.001	0.005	0.017
Income	15,993	0.135	0.108	0.068	0.122	0.186
PPE	15,953	0.495	0.330	0.233	0.463	0.703
Sales Growth	15,897	0.113	0.385	-0.051	0.083	0.220
Investment	15,945	0.035	0.103	0.002	0.019	0.059
Cash Ratio	14,428	0.001	0.004	0	0	0.001
PB Ratio	14,596	2.555	3.569	0.627	1.395	3.067
R&D	15,993	0.004	0.010	0	0	0.002
Board Size	16,313	2.347	0.292	2.197	2.398	2.565
Board Independence	16,313	0.431	0.106	0.375	0.438	0.500
Leverage	15,465	0.293	0.248	0.108	0.255	0.408

Note: This table presents summary statistics of key variables used in the regression models. The sample constitutes 16,313 firm-year observations from 2010 to 2023. Variable definitions are outlined in Appendix B.

Table 3: Correlation Matrix

Variables	Size	Intangibles	Income	PPE	Sales Growth	Investment	Cash Ratio	PB Ratio	R&D	Board Size	Board Independence	Leverage
Size	1.000											
Intangibles	-0.072*	1.000										
Income	0.278*	-0.003	1.000									
PPE	0.054*	-0.129*	0.127*	1.000								
Sales Growth	0.081*	-0.007	0.255*	0.047*	1.000							
Investment	0.104*	0.079*	0.194*	0.324*	0.170*	1.000						
Cash Ratio	-0.036*	-0.001	0.073*	-0.025*	0.051*	0.039*	1.000					
PB Ratio	0.202*	0.036*	0.379*	-0.102*	0.107*	0.052*	0.052*	1.000				
R&D	0.147*	0.084*	0.136*	0.007	0.010	0.066*	-0.029*	0.132*	1.000			
Board Size	0.504*	-0.045*	0.110*	0.025*	-0.007	0.040*	-0.067*	0.136*	0.101*	1.000		
Board Independence	0.020*	0.020*	0.036*	0.074*	0.007	0.036*	0.003	-0.058*	0.072*	-0.048*	1.000	
Leverage	-0.100*	-0.011	-0.301*	0.263*	-0.079*	-0.015*	-0.051*	-0.214*	-0.149*	-0.130*	0.016*	1.000

Note: Table 3 presents the correlation coefficients among our firm-level independent covariates. *** denote significance 1% level, ** denote significant at 5% level and *denote significance at 10% level.

Table 4: Impact of creditor`s rights on firm`s CTA activities using PSM-DiD technique

	Taxes Paid				H&S Measure			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	-0.033***				-0.001			
	(0.005)				(0.005)			
Post	-0.034***	-0.038***	-0.039***	-0.038***	-0.026***	-0.020***	-0.029***	-0.025***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.004)
Treatment x Post	0.012***	0.010***	0.012***	0.013***	0.009**	0.008*	0.010**	0.009**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)
Size			0.002	0.002			0.001	0.003
			(0.009)	(0.002)			(0.002)	(0.002)
Intangibles			-0.015	0.005			0.034*	0.037*
			(0.019)	(0.017)			(0.021)	(0.019)
Income			0.165***	0.152***			-0.174***	-0.162***
			(0.011)	(0.012)			(0.013)	(0.012)
PPE			0.015**	0.019***			0.035***	0.029***
			(0.006)	(0.006)			(0.007)	(0.007)
Sales Growth			-0.0002	0.0001			-0.001	-0.002
			(0.002)	(0.002)			(0.002)	(0.002)
Investment			-0.051***	-0.051***			-0.046***	-0.045***
			(0.007)	(0.007)			(0.007)	(0.007)
Cash Ratio			0.243	0.362*			0.088	0.361*
			(0.246)	(0.205)			(0.248)	(0.209)
PB Ratio				-0.0003				-0.0006
				(0.0004)				(0.0004)
R&D				-0.017				-0.076
				(0.124)				(0.132)
Board Size				-0.004				0.004
				(0.004)				(0.005)
Board Independence				-0.002				0.0005
				(0.007)				(0.007)
Leverage				-0.011				0.052***
				(0.007)				(0.010)
Constant	0.073***	0.064***	0.0220	0.034*	0.041***	0.031***	0.034*	-0.006
	(0.002)	(0.001)	(0.016)	(0.019)	(0.002)	(0.001)	(0.019)	(0.019)
Observations	12,953	12,953	9,348	8,307	12,757	12,757	9,348	8,307
R-squared	0.074	0.209	0.319	0.319	0.035	0.103	0.206	0.229
Firm FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Note: Table 4 presents the results of PSM-DiD technique for firm's tax avoidance. In columns (1) to (4), the dependent variable is *Taxes Paid*, which is measured as *Income Taxes scaled by Book Value of Total Assets*. In columns (5) to (8), the dependent variable is *H&S Measure* is measured as *the difference between firms' income taxes and the product of statutory tax rate and profit before tax, scaled by Book Value of Total Assets.* Table B1 of Appendix B provides variable definition. Columns (1) & (5) report the results of PSM-DiD and without controls, without firm and year fixed effects. Columns 2 & 6 present the results of PSM-DiD estimation with matching and without controls, with firm and year fixed effects. Columns 3 & 7 report the results of PSM-DiD estimation, which is similar to Vito & Jacob (2023). Columns 4 & 8 report the results of PSM-DiD estimation with augmented model with additional variables viz., PB Ratio, R&D, board size and board independence. We cluster standard errors at the firm level and report the same within parentheses. *** denote significance at 1% level, ** denote significant at 5% level and *denote significance at 10% level.

Table 5: Test of balance results for matching and parallel trend for PSM-DiD technique

Panel A1: Test of balance results for matching when Dependent Variable is Taxes Paid

Covariates	1. Treatment	2. Control	3. t-Stat
Size	8.318	8.241	0.35
Leverage	0.408	0.390	0.64
Firm Age	3.367	3.289	1.08
Tangibility	0.283	0.291	-0.35
Liquidity	-0.008	-0.014	0.24
Sales Growth	0.005	0.043	-0.77

Note: We measure all variables using the pre-IBC period. We report difference in means using t-Stat are in column (3). We generate results using caliper (0.03) with no replacement.

Panel A2: Test of balance results for matching when Dependent Variable is H&S Measure

Covariates	1. Treatment	2. Control	3. t-Stat
Size	8.318	8.241	0.35
Leverage	0.408	0.390	0.64
Firm Age	3.367	3.289	1.08
Tangibility	0.283	0.291	-0.35
Liquidity	-0.008	-0.014	0.24
Sales Growth	0.005	0.043	-0.77

Note: We measure all variables using the pre-IBC period. We report difference in means using t-Stat in column (3). We generate results using caliper (0.03) with no replacement.

Panel B: Tests of parallel trend

	(1) Taxes Paid	(2) H&S Measure
Treatment	-	-
Post	0.002	7.92e-06
	(0.003)	(0.004)
Treatment x Post	-0.004	0.001
	(0.002)	(0.003)
Size	0.011***	0.011**
	(0.003)	(0.005)
Intangibles	0.009	0.095***
	(0.016)	(0.027)
Income	0.173***	-0.177***
	(0.018)	(0.017)
PPE	-0.008	0.024*
	(0.008)	(0.013)
Sales Growth	-0.003	-0.003
	(0.002)	(0.003)
Investment	-0.029***	-0.040***
	(0.008)	(0.013)
Cash Ratio	0.240	0.301*
	(0.149)	(0.167)
PB Ratio	0.0003	2.71e-05
	(0.0003)	(0.0006)
R&D	0.086	0.033
	(0.131)	(0.163)
Board Size	-0.0004	0.007
	(0.004)	(0.005)
Board Independence	0.0104*	0.001
	(0.006)	(0.007)
Leverage	-0.023**	0.058***
	(0.010)	(0.020)
Constant	-0.053*	-0.079
	(0.029)	(0.052)
Observations	3,261	3,261
R-squared	0.298	0.275
Firm FE	Yes	Yes
Year FE	Yes	Yes

Note: Panel A1 of this table reports the results of test of balance for matching, when the dependent variable is Taxes Paid. Panel A2 of table 5 reports the results of test of balance for PSM, when the dependent variable is H&S Measure. The covariates are measured in the pre-IBC period. The statistical significance of the difference between means across the treatment (Distressed) and control (Non-distressed) groups is presented in column 3. Panel B of table 5 reports the results of parallel trend assumption of PSM-DiD (using caliper distance of 0.03 with no replacement). In column (1), the dependent variable is Taxes Paid, which is calculated as Income Taxes scaled by the *Book Value of Total Assets.* In column (2), the dependent variable is *H&S Measure,* which is calculated as *the difference between the firms' income taxes and the product of statutory tax rate and profit before tax.* Columns (1) & (2) report the results of parallel trend with pseudo year of adoption presumed to be 2013,,being pre-treatment period to be between 2010 and 2012, and post-treatment period to be between 2013 and 2015. We winsorize all the variables (except *size & board size*) at the 1% and 99% levels. We control for firm and year fixed effects. We cluster standard errors at the firm level and report the same within parentheses. *** denote significance at 1% level, ** denote significant at 5% level and *denote significance at 10% level.

Table 6: Channel Analysis

	(1) Leverage
Treatment	-
Post	-0.078***
	(0.016)
Treatment x Post	0.044*
	(0.025)
Size	-0.019*
	(0.010)
Intangibles	0.194*
	(0.108)
Income	-0.424***
	(0.038)
PPE	0.145***
	(0.034)
Sales Growth	0.004
	(0.006)
Investment	-0.050
	(0.032)
Cash Ratio	-1.649**
	(0.658)
PB Ratio	0.001
	(0.001)
R&D	-0.696
	(0.511)
Board Size	-0.031*
	(0.017)
Board Independence	0.009
	(0.028)
Constant	0.528***
	(0.095)
Observations	8,388
R-squared	0.154
Firm FE	Yes
Year FE	Yes

Note: This table reports the results of PSM-DiD estimation for the channels affecting *Tax Avoidance*. In column (1), the dependent variable is *Leverage,* which is measured as *Debt scaled by Total Assets.* We winsorize all the variables (except *size & board size*) at the 1% and 99% levels. We cluster standard errors at the firm level and report the same within parentheses. *** denote significance at 1% level, ** denote significant at 5% level and *denote significance at 10% level.

Appendix A: Robustness test

Table A1: Lagged Intangibles

VARIABLES	(1) Taxes Paid	(2) H&S Measure
Treatment	-	-
Post	-0.038***	-0.025***
	(0.004)	(0.004)
Treatment x Post	0.012***	0.009**
	(0.004)	(0.005)
Size	0.002	0.003
	(0.002)	(0.002)
Intangibles	-0.013	0.017
	(0.016)	(0.016)
Income	0.152***	-0.163***
	(0.012)	(0.012)
PPE	0.019***	0.029***
	(0.006)	(0.007)
Sales Growth	0.0001	-0.002
	(0.002)	(0.002)
Investment	-0.050***	-0.045***
	(0.007)	(0.007)
Cash Ratio	0.364*	0.364*
	(0.205)	(0.210)
PB Ratio	-0.0003	-0.0006
	(0.0004)	(0.0004)
R&D	-0.016	-0.080
	(0.124)	(0.132)
Board Size	-0.004	0.004
	(0.004)	(0.005)
Board Independence	-0.002	0.0006
	(0.007)	(0.007)
Leverage	-0.010	0.053***
	(0.007)	(0.010)
Constant	0.034*	-0.006
	(0.019)	(0.019)
Observations	8,307	8,307
R-squared	0.319	0.229
Firm FE	Yes	Yes
Year FE	Yes	Yes

Note: This table reports the results of PSM-DiD estimation for alternative definition of *Intangibles*. In column (1), the dependent variable is Taxes Paid, which is calculated as Income Taxes scaled by the *Book Value of Total Assets.* In column (2), the dependent variable is *H&S Measure,* which is measured as *the difference between the firms' income taxes and the product of statutory tax rate and proft before tax*. The covariate *intangibles is scaled by lagged total assets*. We winsorize all the variables (except *size & board size*) at the 1% and 99% levels. We control for firm and year fixed effects in both columns. We cluster standard errors at the firm level and report the same within parentheses. *** denote significance at 1% level, ** denote significant at 5% level and *denote significance at 10% level.

Table A2: Different STR Sources for H&S Measure

VARIABLES	(1) H&S Measure 1	(2) H&S Measure 2
Treatment		
Post	-0.034***	-0.038***
	(0.004)	(0.004)
Treatment x Post	0.013***	0.011***
	(0.004)	(0.004)
Size	0.0007	0.0003
	(0.002)	(0.002)
Intangibles	0.028	0.028
	(0.019)	(0.018)
Income	-0.110***	-0.102***
	(0.012)	(0.011)
PPE	0.030***	0.029***
	(0.007)	(0.007)
Sales Growth	-0.001	-0.0005
	(0.002)	(0.002)
Investment	-0.051***	-0.049***
	(0.007)	(0.007)
Cash Ratio	0.391*	0.382*
	(0.208)	(0.212)
PB Ratio	-0.0005	-0.0005
	(0.0003)	(0.0004)
R&D	0.029	0.008
	(0.133)	(0.129)
Board Size	0.005	0.003
	(0.005)	(0.005)
Board Independence	-0.0006	-0.001
	(0.007)	(0.007)
Leverage	0.052***	0.047***
	(0.010)	(0.010)
Constant	0.014	0.022
	(0.020)	(0.019)
Observations	7,818	8,307
R-squared	0.248	0.253
Firm FE	Yes	Yes
Year FE	Yes	Yes

Note: This table reports the results of PSM-DiD estimation for different sources of STR. In columns (1) & (2), the dependent variable is *H&S Measure,* which is *measured as the difference between the firms' income taxes and the product of statutory tax rate and profit before tax* and the source of STR value is tax foundation and trading Economicsm, respectively. We control for firm and year fixed effects. We winsorize all the variables (except *size & board size*) at the 1% and 99% levels. We control for firm and year fixed effects in both columns. We cluster standard errors at the firm level and report the same within parentheses. *** denote significance at 1% level, ** denote significant at 5% level and *denote significance at 10% level.

Table A3: Removing COVID-19 years from the sample

VARIABLES	(1) Taxes Paid	(2) Taxes Paid	(3) Taxes Paid	(4) H&S Measure	(5) H&S Measure	(6) H&S Measure
Treatment						
Post	-0.0376***	-0.0379***	-0.0471***	-0.0230***	-0.0240***	-0.0240***
	(0.00347)	(0.00360)	(0.00416)	(0.00415)	(0.00421)	(0.00410)
Treatment x Post	0.0104***	0.0115***	0.0109***	0.00941**	0.00909**	0.00938**
	(0.00372)	(0.00399)	(0.00401)	(0.00427)	(0.00438)	(0.00436)
Size	0.00182	0.00196	0.00156	0.00231	0.00301	0.00236
	(0.00160)	(0.00190)	(0.00158)	(0.00199)	(0.00214)	(0.00187)
Intangibles	0.00205	0.00305	0.00690	0.0394**	0.0323*	0.0435**
	(0.0170)	(0.0173)	(0.0172)	(0.0177)	(0.0185)	(0.0181)
Income	0.158***	0.156***	0.156***	-0.170***	-0.165***	-0.166***
	(0.0125)	(0.0122)	(0.0113)	(0.0123)	(0.0119)	(0.0123)
PPE	0.0188***	0.0185***	0.0185***	0.0287***	0.0278***	0.0302***
	(0.00631)	(0.00642)	(0.00618)	(0.00692)	(0.00686)	(0.00684)
Sales Growth	-0.000249	-0.000736	0.000296	-0.00332	-0.00305*	-0.00203
	(0.00194)	(0.00168)	(0.00177)	(0.00207)	(0.00180)	(0.00194)
Investment	-0.0454***	-0.0477***	-0.0501***	-0.0414***	-0.0430***	-0.0442***
	(0.00669)	(0.00675)	(0.00646)	(0.00746)	(0.00736)	(0.00748)
Cash Ratio	0.286	0.322	0.347*	0.327	0.347	0.344*
	(0.204)	(0.210)	(0.188)	(0.212)	(0.214)	(0.205)
PB Ratio	-0.000148	-0.000329	-8.79e-05	-0.000423	-0.000546	-0.000501
	(0.000359)	(0.000353)	(0.000359)	(0.000372)	(0.000367)	(0.000370)
R&D	-0.00753	0.0307	-0.0530	-0.0483	-0.0575	-0.0741
	(0.114)	(0.120)	(0.121)	(0.120)	(0.131)	(0.123)
Board Size	-0.00397	-0.00426	-0.00296	0.00318	0.00327	0.00478
	(0.00392)	(0.00414)	(0.00395)	(0.00463)	(0.00470)	(0.00462)
Board Independence	0.00277	-0.00203	0.00447	0.00190	0.000147	0.00264
	(0.00665)	(0.00693)	(0.00672)	(0.00732)	(0.00760)	(0.00726)
Leverage	-0.00951	-0.00856	-0.0106	0.0599***	0.0562***	0.0541***
	(0.00692)	(0.00702)	(0.00696)	(0.0111)	(0.0105)	(0.0107)
Constant	0.0288*	0.0313*	0.0380**	0.00220	-0.00205	-0.00165
	(0.0165)	(0.0183)	(0.0164)	(0.0185)	(0.0196)	(0.0178)
Observations	7,007	7,651	8,022	7,007	7,651	7,663
R-squared	0.299	0.312	0.310	0.247	0.238	0.234
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Excluded year	2020 & 2021	2020	2021	2020 & 2021	2020	2021

Note: Table A3 presents the results of PSM-DiD estimation for firm's tax avoidance when COVID-19 years are removed from the sample. In columns (1) to (3), the dependent variable is *Taxes Paid,* which is measured as *Income Taxes scaled by book value of total assets*. In columns (4) to (6), the dependent variable is *H&S Measure,* which is measured as *the difference between the firms' income taxes and the product of statutory tax rate and profit before tax scaled by book value of total assets.* Table B1 of Appendix B provides variable definition.. Columns (1) & (4) report the results of DiD estimation when years 2020 & 2021 are removed. Columns (2) & (5) present the results of DiD estimation when year 2020 is removed. Columns (3) & (6) report the results of PSM-DiD estimation when year 2021 is removed. We cluster standard errors at the firm level and report the same within parentheses. *** denote significance at 1% level, ** denote significant at 5% level and *denote significance at 10% level.

Figures

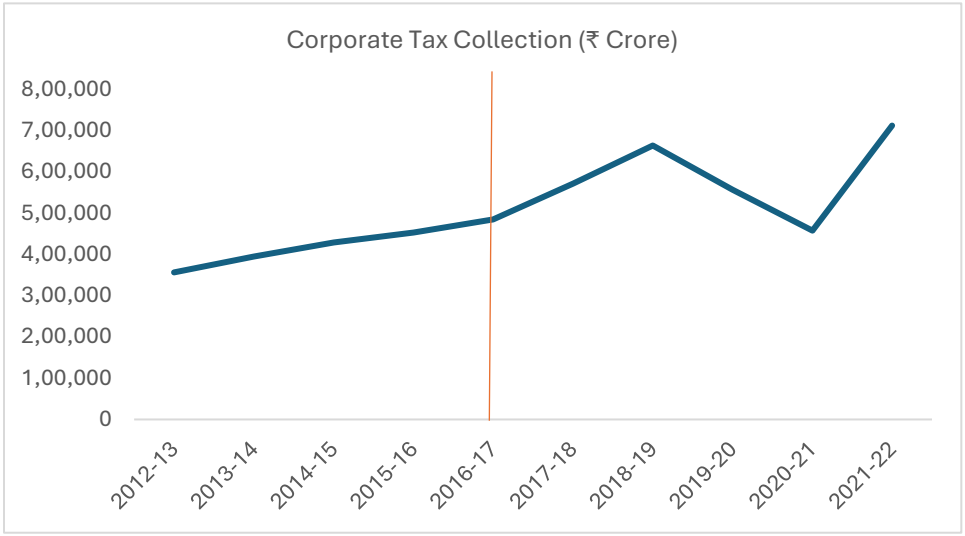

Figure 1: Corporate Tax Collection

Figure 1.1:Corporate Tax Collection

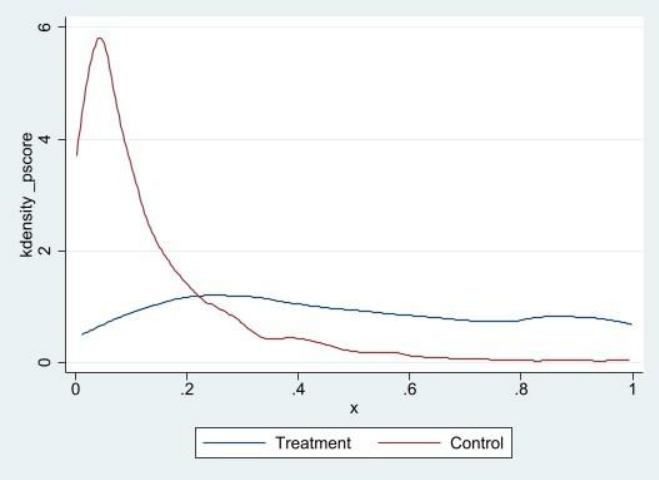

Figure 2: Common Support Graph for Taxes Paid

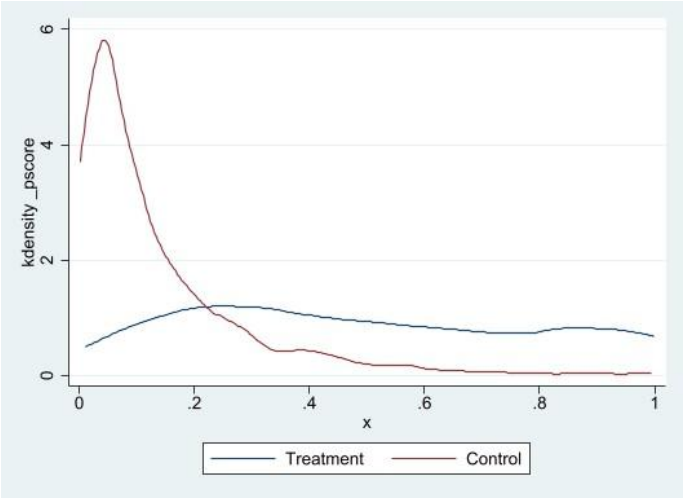

Figure 2.1: Common Support Graph for H&S Measure

Randomised Inference Test (RIT)

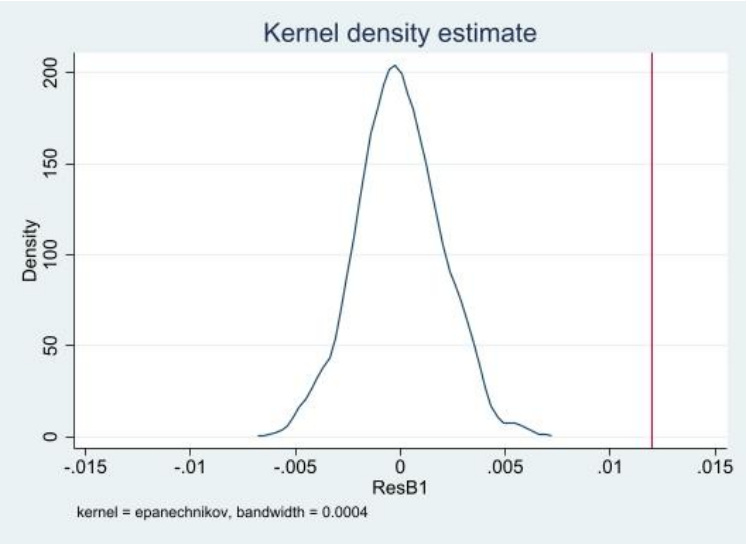

Figure 3: RIT for Taxes Paid

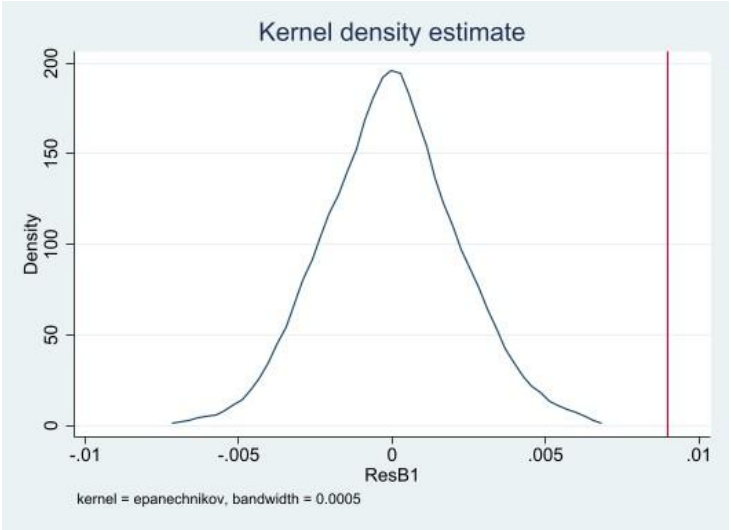

Figure 3.1: RIT for H&S Measure

Appendix B

Table B1: Variable definitions

Variables	Definition
Taxes Paid	Incomes Taxes scaled by firm's total assets (Vito & Jacob, 2023)
H&S Measure	It is an excess of net taxes paid over the product of STR and PBT scaled by BVA, where net taxes paid = total tax expense - change in tax refund; change in tax refund = tax refund in period (t) - tax refund in period (t-1). BVA= book value of total assets (Henry & Sansing, 2018)
IBC	Indicator variable indicating 1 for years between 2017 and 2023, and 0 otherwise (Singh et al., 2022).
Treatment	Indicator variable indicating 1 for firms whose ICR is less than unity before 2017, and 0 otherwise (Bhagat et al. 2005, Bruyland & Maeseneire, 2016)
Treatment × *IBC*	Indicator variable equals to 1 if the firm is distressed (i.e., ICR is lower than unity) and the year is on or after 2017.
Size	Sales in natural logarithm (Drake et al.,2017)
Intangibles	Proportion of intangible assets to total assets (Vito & Jacob, 2023)
Income	Proportion of earnings before interest, taxes, depreciation, and amortization to lagged total assets (Vito & Jacob, 2023).
PPE	Ratio of PPE relative to lagged total assets (Vito & Jacob, 2023)
Growth	Percentage change in Sales (Dyreng et al. 2010, Singh et al., 2023)

Investments	Capital expenditure in period *t* for firm *i* scaled by lagged total assets (Athira & Lukose, 2023). We define capital expenditure as the change in gross fixed assets.
Cash Ratio	Cash divided by lagged assets (Col & Patel, 2019)
PB RATIO	Ratio of market value of equity to book value of equity for firm i in year t (Athira & Lukose, 2023)
R&D	Research and development expense in period t for firm i scaled by lagged total assets. We replace missing observations with zero (Athira & Lukose, 2023)
Board Size	Natural logarithm of Total Board of Directors (Chauhan 2018; Bansal 2020; Kushwaha 2024)
Board Independence	Number of Independent Directors divided by Number of Directors in the board (Bansal 2020; Kumari 2022; Col & Sen 2017)
Leverage	Ratio of Total Debt to Total Assets (Singh et al. 2022)
Tangibility	Ratio of Net Fixed Assets to Total Assets (Singh et al., 2021; Jadiyappa & Srivastav, 2021; Singh et al., 2022; Singh et al. 2023)
Liquidity	Current Assets minus Current Liabilities scaled by total assets (Bose et al.,2021)

Note: Table B1 provides definition of variables used in our paper.