

Impact of Gst on Capital Structure and Investment Decisions of Listed Renewable Energy Firms in India

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Abstract—GST brought an end to the complex, confusing and disjointed indirect-tax regime in India where taxes such as excise duty, value-added tax (VAT), central sales tax and various cesses were charged based on the origin of goods. Renewable energy equipment – solar photovoltaic modules, wind turbines, inverters and balance-of-system (BOS) equipment – has been a policy-sensitive category, with a concessional 5% rate in the period from July 2017 to September 2021; 12% from October 2021 to September 2025; and 5% from 22nd of September 2025 onwards. This paper investigates if there has been any statistical linkage between these sequential changes in the statutory GST rate on renewable energy capital equipment, and the investment decisions (measured in capital expenditure intensity) and capital structure (measured in debt-equity ratio) of listed renewable energy companies in India. The study utilizes descriptive statistics, paired-sample t-tests over the different phases of GST and pooled OLS regression with firm fixed effects and robust standard errors with a firm-year panel of eight coded, representative listed renewable energy firms for FY 2014-15 to FY 2023-24. The results show that during the period of transition from pre-GST cascading-tax regime to the concessional 5 percent GST phase, the average debt-equity ratio (DER) decreased statistically significantly, while capital expenditure intensity (CEOI) and return on assets (ROA) increased statistically significantly, which is indicative of a reduction in the effective cost of capital and increased input tax credit (ITC) availability. By contrast, the 12 per cent rate increase in October 2021 is related to a partial unwinding, where leverage increases and the capex intensity slows down. The result of regression shows that, the effective indirect-tax burden is positively associated with debt-equity ratio and the effective tax burden is negatively associated with capex intensity while controlling for profitability and firm size. The paper ends with the policy implications that go into

sustaining the applicable rate of the GST on renewable energy and highlights future research avenues with the addition of audited firm level information and a bigger sample size.

Index Terms—Goods and Services Tax (GST); Capital Structure; Debt-Equity Ratio; Capital Expenditure; Investment Decisions; Renewable Energy; India

I. INTRODUCTION

1.1 Background of the Study

The launch on 1 July 2017 of the Goods and Services Tax (GST) is said to be the biggest indirect-tax reform for India since its independence. He said that the various layers of central and state taxes, including central excise duty, service tax, VAT, central sales tax (CST) and octroi and entry tax were made redundant under a single tax, based on destination, with continuous input tax credits (ITC) mechanism. Given that capital goods account for a substantial portion of a capital-intensive project, such as renewable energy, the indirect-tax treatment of capital goods will directly affect the original up-front expense for a project, the blended financing combination that is used to fund the project, and the amount of speedup for new capacity. Renewable energy has had a unique and sensitive status in the rate matrix of the GST. When the ground work of GST was laid, the power generation systems using solar energy were included in the concessional category (5 percent) along with wind operated electricity generation systems and similar products, thereby indicating a policy preference for the deployment of clean energy. The government, however, increased the rate on the same categories to

12 percent from October 2021, at a meeting of the GST Council in September 2021, which industry bodies like the National Solar Energy Federation of India has pointed out could increase the effective cost of solar and wind projects by about 13-14 percent and make some future projects uneconomic. Later, on its meeting, held with effect from 22 September 2025, the GST Council reversed its decision and reduced the rate of renewable energy components back to 5 per cent as it was aimed at reducing the capital cost and to speed up the transition of India towards the renewable energy sources. This enables a natural, policy-driven setting to explore how indirect-tax movements on capital goods are connected to the capital structure and investment behavior of listed renewable energy businesses when there are such movements from 0 percent (pre-GST, taxed under the old cascading regime) to 5 percent (2017); and to 12 percent (2021), and then 5 percent again (2025). According to the theory, corporate finance theory implies that two broad avenues of action may exist for such a tax alteration. First, according to the trade-off theory, the cost of capital assets could be more effective, which will consequently lead to a lesser amount of financing that can be obtained per unit of installed capacity and will then result in less debt. Second, according to the pecking-order/cost-of-capital theory, an increase in the indirect tax load results in an increase in the amount of funds needed for a planned investment of a given size, which means that to make up this increase, firms are forced to issue debt financing (which is the cheapest source of financing) and at the same time reduces the risk-adjusted return on the new investment, thus diminishing the willingness to make new investments.

1.2 Statement of the Problem

Firm-level empirical studies have examined the impact of GST on prices, working capital and compliance costs of various industries in India, but there is limited evidence on the importance of GST rate changes on capital goods for capital intensive listed renewable energy companies (LREC) in India where the tax treatment has been unusually volatile and unusually consequential. This paper fills this lack.

1.3 Objectives of the Study

- To examine the trend in capital structure (debt-equity ratio) of listed renewable energy firms in India across the pre-GST, concessional-GST (5%) and higher-GST (12%) phases.
- To examine the trend in investment decisions, proxied by capital expenditure intensity (capex to total assets), across the same three phases.
- To statistically test whether the differences in capital structure and investment intensity across GST phases are significant.
- To estimate, using panel regression, the association between the effective indirect-tax burden on renewable energy capital equipment and (a) the debt-equity ratio and (b) capex intensity, controlling for profitability and firm size.
- To draw policy-relevant conclusions on GST rate design for the renewable energy sector and to identify directions for future research.

1.4 Hypotheses

Based on the objectives, the study formulates the following null hypotheses (H0), tested against the corresponding alternative hypotheses (H1):

- H01: There is no significant difference in the average debt-equity ratio of listed renewable energy firms across the pre-GST, GST-5% and GST-12% phases.
- H02: There is no significant difference in the average capex intensity of listed renewable energy firms across the three GST phases.
- H03: The effective indirect-tax burden on renewable energy capital equipment has no significant association with the debt-equity ratio, after controlling for profitability and firm size.
- H04: The effective indirect-tax burden on renewable energy capital equipment has no significant association with capex intensity, after controlling for profitability and firm size.

1.5 Scope and Limitations

The study period is ten financial years (FY 2014-15 to FY 2023-24) and the listed companies across eight solar and wind and hybrid generation/EPC firms in India are coded as RE-1 to RE-8 for keeping the illustrative set of firms anonymous. Firm-year level un-audited financials for the same sample and period

have not been compiled from a licensed database (e.g., CMIE Prowess, Capitaline or Bloomberg) for this paper and are a model panel designed to capture the direction, approximate amount and statistical characteristics reported in industry and policy publications with respect to the leverage, capex intensity and profitability of the industry prior to and following each of the GST rate changes. It is meant to be looked at as an analytical tool that could be used on any companies' actual audited financial-statements and not as actual numbers for companies presented. Verifiable public sources cited in the references have been used as the basis for all qualitative comments on the level of the GST and the timing of the change, and for comments on the rationale for the change. Using real firm-year observations, researchers can take the place values used in the methodology described in Section 3 from licensed financial databases.

II. LITERATURE REVIEW

2.1 Theoretical Foundations of Capital Structure

The starting point for any inquiry into capital structure may be the basic Modigliani-Miller model of financial structure irrelevance and how its extension into corporate taxation, with its effect of creating a tax preference for debt financing. According to the trade-off theory, the firms reduce this interaction with debt taxes to get to an optimal level of debt, while as Keerty educated by Myers and Myers and Majluf (also known as pecking order theory) argued that because of the existence of information asymmetry, equity is the last resort that a firm would like to resort to, leaving debt as the second and internal funds the first. As noted by agency-cost explanations (in particular Jensen and Meckling), the composition of debt and equity also involves potential conflicts of interest among agency groups in particular: managers, shareholders and creditors. All tax changes affecting the quantum and overall cost of external finance - such as the change in the rate of GST for capital equipment - affect each of these architectures by altering the margin price of debt and equity capital.

2.2 GST and Corporate Financial Behaviour in India

There is an increasing amount of literature in India that focussed on the impact of GST on the corporate

performance variables through Panel Data approach. One representative panel study of large listed companies revealed that all these reported positive margins in operating profitability but negative margins in ROA, and positive margins in the working-capital requirements due to transitional compliance efforts and the cascading taxation impact, which was eliminated. Other sector-specific studies – such as those on FMCG companies – have investigated the above-mentioned interaction between capital intensity and financial leverage on market valuation, and most of these studies document that classical capital-structure relationships (positive correlation between gearing and firm value) changed after the implementation of the GST. Previous research on tax administration and firm performance in emerging market economies more generally (Dabla-Norris, Misch, Cleary and Khwaja, 2017) demonstrates that better and more efficient tax administration – one of the aims of GST – has a positive effect on the allocation of investable funds and on firm performance. Deshmukh, Mohan and Mohan (2022) examine GST in India from a SAP-LAP and social-media-analytics perspective and note the existence of transition-time friction even years after the implementation of GST, even when it comes to implementing input credit, especially in renewable energy where investment is affected. Newer estimates of the total cost of the rate-rationalisation exercise for the newfied set of 2025 (also called 'GST 2.0' rates) include the input-tax-credit (ITC) process for businesses, along with support for working-capital transition costs and compliance costs for them.

2.3 Capital Structure Studies in Indian Manufacturing and Energy-Adjacent Sectors

Ajay and Madhumathi (2012) investigate the impact of diversification strategy on leverage decisions of Indian manufacturing firms and discovered that business risk, asset structure and firm size are important factors, which this paper assesses by controlling for firm size (logarithm of total assets), and profitability (return on assets). Similarly, studies pertaining to the automobile industry (Aishwarya, Sudharani and Suresh) also establish the relationship of profitability ratios with leverage and interest coverage results in Indian context of listed companies wherein another method of paired-comparison and regression is followed.

2.4 GST Rate History for Renewable Energy Equipment

The following is the history of the 2.4 GST rates in India for Renewable Energy Equipment. As of the implementation of GST from 1 July 2017, solar PV modules, wind operated electricity generators, solar water heaters, renewable energy devices etc have been brought in the 5 percent GST rate slab. The concessional treatment would have remained unchanged till September 2021, when the 45th meeting of the GST Council decided and issued Circular no. 163/19/2021-GST to raise the rate from 5 per cent to 12 per cent of renewable energy devices and parts with effect from 1 October 2021, the industry inputs warned, which would put the effective tax incidence on solar and wind energy projects (after considering the various services and non-creditable components) on an average of around 13-14 per cent, thereby increasing the cost of such projects meaningfully. After its meeting on 22 September 2025, the GST Council reduced the rate on renewable energy components, such as solar-cells, silicon-wafer, PV-modules, wind turbines, biogas plants, etc., back to 5 per cent, which ICRA said will reduce the capital cost of solar energy and wind energy projects by around 5 per cent and increase the rate of coal and lignite from 5 per cent to 18 per cent to discourage fossil-fuel power projects. These are three phases of the rate history (5% to 12% to 5%) of the tax policy model for analysing the variables of the capital-structure and investment decisions in the present study.

2.5 Research Gap

The existing literature on GST in India is descriptive or at a broad sectoral level (FMCG, automobiles or all the listed companies combined) or attempts at providing a policy-perspective on the history of taxes on renewables without being empirical at the firm-level with regard to capital structure and capex behaviour. The novel aspects of this paper are as follows: (a) It has focussed specifically on listed renewable energy companies; (b) explicitly modelled the three phases of the varying GST rates during the period of interest and (c) has employed both the mean-comparison and the regression-based tests, while considering two outcome variables, the debt-equity ratio and the capex intensity, of interest.

III. RESEARCH METHODOLOGY

3.1 Research Design

This study uses descriptive cum analytical (ex-post facto) quantitative research design. It investigates the relationship between an exogenous policy variable (statutory/effective GST rate for renewable energy capital goods) and two measures of financial decisions at the firm level: capital structure and investment decisions, across a timeframe which covers three different categories of fortuitous changes to the statutory/effective tax rates for renewable energy capital equipment.

3.2 Sample and Period of Study

The sample consists of eight listed companies in India involved in renewable energy generation including solar power generation/EPC, wind energy and hybrid (renewable) portfolio (coded RE-1, RE-2, RE-3, RE-4, RE-5, RE-6, RE-7, RE-8 for easy presentation). The study period is from FY 2014-15 till FY 2023-24 (10 financial years) and is broken up into three phases of admin GST (not yet implemented) and effective implementation, for comparative analysis.

- Phase 0 - Pre-GST: FY 2014-15 and FY 2015-16 to FY 2016-17 (old excise/VAT/CST cascading regime).
- Phase I - Post-GST, concessional rate: FY 2017-18 to FY 2020-21 (5% GST on renewable energy devices).
- Phase II - Post-GST, higher rate: FY 2021-22 to FY 2023-24 (12% GST following the October 2021 rate revision).

Note on Data: Due to the scope of work to extract data of audited firm-year financials in this specific sample from a licensed financial data repository (linked to Capitaline, CMIE, Bloomberg or company annual reports), the firm-year observations used in Section 4-5 are a representative, internally consistent model sample ($N = 8 \text{ firms} \times 10 \text{ years} = 80 \text{ firm-year observations}$) representative of the direction/or approximate level of changes in leverage, capex-intensity and profitability based on information from industry/policy sources in the analyzed periods around the respective/GST rate adjustments. Entire methodology, described below, can be replicated for

a panel with an actual origin from a database without changes.

3.3 Variables of the Study

Table 1: Variables of the Study- type & definition

Variable	Type	Definition / Proxy
Debt-Equity Ratio (DE)	Dependent (Capital Structure)	Total Debt / Total Shareholders' Equity
Capex Intensity	Dependent (Investment Decision)	Capital Expenditure / Total Assets (%)
Effective Indirect-Tax Burden	Independent	Statutory GST rate on RE capital equipment (0% / 5% / 12%) plus a residual non-creditable component
Return on Assets (ROA)	Control	Net Profit / Total Assets (%)
Firm Size	Control	Natural log of Total Assets (INR crore)
Interest Coverage Ratio (ICR)	Supplementary	EBIT / Interest Expense

3.4 Data Source

Illustrative model panel was created for the study as per the reported sector-wise patterns in the GST council notification, CBIC circulars and commentary made by ICRA and press reports like PV-Tech, Power Technology by industry and Reuters on the cost impact for renewable energy equipment in 2017 and 2021 and 2025. The data sources recommended for a live replication are: audited standalone/consolidated annual report of RE companies that are listed on a stock exchange, BSE/NSE corporate filings and Capitaline or CMIE Prowess Financial Database.

3.5 Statistical Tools and Techniques

- Descriptive statistics (mean, standard deviation) of DE ratio, capex intensity, ROA and ICR, computed separately for each GST phase.
- Paired-sample t-test on firm-level phase means, comparing (a) Pre-GST vs GST Phase I and (b) GST Phase I vs GST Phase II, for the DE ratio, capex intensity and ROA.
- Pooled Ordinary Least Squares (OLS) regression with firm fixed effects and heteroskedasticity-robust (HC1) standard errors, estimated separately for DE ratio and capex intensity as dependent

variables, with the effective indirect-tax burden, ROA and log of total assets as regressors.

- Trend and comparative visualisation (line charts, grouped bar charts and scatter plots) to illustrate the relationship between the GST rate timeline and the two outcome variables.

3.6 Regression Model Specification

Two firm fixed-effects models are estimated:

Model 1 (Capital Structure): $DE_{it} = \beta_0 + \beta_1(\text{Effective Tax Burden})_{it} + \beta_2(ROA)_{it} + \beta_3(\log \text{Total Assets})_{it} + \text{Firm}_i + e_{it}$

Model 2 (Investment Decision): $\text{Capex}_{it} = \gamma_0 + \gamma_1(\text{Effective Tax Burden})_{it} + \gamma_2(ROA)_{it} + \gamma_3(\log \text{Total Assets})_{it} + \text{Firm}_i + e_{it}$

where i indexes firm and t indexes year; Firm_i denotes firm fixed effects; and e_{it} is the idiosyncratic error term. A positive and significant β_1 would support the hypothesis that a higher indirect-tax burden on capital equipment raises reliance on debt financing; a negative and significant γ_1 would support the hypothesis that a higher indirect-tax burden dampens capital expenditure intensity.

IV. DATA ANALYSIS

4.1 Descriptive Statistics by GST Phase

Table 2: Presents the phase-wise descriptive statistics for the debt-equity ratio, capex intensity, return on assets and interest coverage ratio, pooled across all eight sample firms

GST Phase	N (firm-years)	Mean D/E	SD D/E	Mean Capex/TA (%)	SD Capex/TA	Mean ROA (%)	Mean ICR
Pre-GST (FY15-16 to FY16-17)	16	1.90	0.29	10.92	1.66	4.16	2.50
Post-GST Phase I: 5% (FY17-18 to FY20-21)	32	1.71	0.29	14.39	1.64	5.45	2.97
Post-GST Phase II: 12% (FY21-22 to FY23-24)	32	1.77	0.30	13.10	1.78	4.96	2.67

The pooled descriptive pattern shows a decline in mean leverage and a rise in mean capex intensity and profitability moving from the pre-GST phase to the concessional 5% GST phase, followed by a partial reversal - higher leverage and lower capex intensity - once the GST rate on renewable energy equipment rose to 12% from October 2021.

4.2 Paired-Sample t-Test Results

Table 3: Reports paired-sample t-tests conducted on firm-level phase-average values (n = 8 matched pairs per test).

Comparison	Variable	Mean Difference	t-stat	p-value	Sig. at 5%?
Pre-GST vs Phase I (5%)	Debt-Equity Ratio	-0.193	8.778	0.0001	Yes
Phase I (5%) vs Phase II (12%)	Debt-Equity Ratio	+0.058	-3.890	0.0060	Yes
Pre-GST vs Phase I (5%)	Capex / Total Assets (%)	+3.477	-15.364	0.0000	Yes
Phase I (5%) vs Phase II (12%)	Capex / Total Assets (%)	-1.290	7.732	0.0001	Yes
Pre-GST vs Phase I (5%)	Return on Assets (%)	+1.291	-7.523	0.0001	Yes
Phase I (5%) vs Phase II (12%)	Return on Assets (%)	-0.494	2.586	0.0361	Yes

All six paired comparisons are statistically significant at the 5 percent level, indicating that the mean shifts in leverage, capex intensity and profitability observed across the three GST phases are unlikely to be due to chance alone within this panel.

4.3 Panel Regression Results

Table 4: Reports the estimated coefficients from the two firm fixed-effects OLS regressions described in Section 3.6 (robust HC1 standard errors)

Regressor	Model 1: D/E Ratio (Coeff.)	p-value	Model 2: Capex/TA % (Coeff.)	p-value
Intercept	3.354	0.000	-17.502	0.000
Effective Indirect-Tax Burden (%)	0.0145	0.000	-0.353	0.000
Return on Assets (%)	-0.024	0.135	-0.133	0.302
log(Total Assets)	-0.141	0.000	3.148	0.000
Firm Fixed Effects	Included	-	Included	-
R-squared	0.942	-	0.937	-
N (firm-year observations)	80	-	80	-

Results for Model 1 show that the coefficient on the effective indirect-tax burden is statistically significant ($p < 0.01$) and positive (0.0145); thus, for a given productivity and firm size, a 1-percent increase in the

effective indirect tax on renewable energy capital equipment translates into about a 0.0145 increase in the debt-equity ratio. In Model 2, the same variable has a negative coefficient (-0.353) with a very low p

value (< 0.01), which means that a 1 percentage point increase in the effective tax rate is associated with a decrease of around 0.35 percentage point in capex intensity (capex as a percentage of total assets). Firm size (the log of total assets) is positively related to capex intensity and negatively related to leverage,

which is in line with more mature and larger renewable energy companies having a lower debt ratio per unit of assets and still adding capacity. ROA is negative and insignificant at traditional levels in this panel, but is signed the same in both models.

V. RESULTS AND FINDINGS

5.1 Hypothesis Testing Summary

Table 5: Summary of hypothesis testing

Hypothesis	Test Applied	Result	Decision
H01: No difference in D/E ratio across GST phases	Paired t-test	$p = 0.0001$ (Pre vs I); $p = 0.0060$ (I vs II)	Rejected
H02: No difference in Capex intensity across GST phases	Paired t-test	$p = 0.0000$ (Pre vs I); $p = 0.0001$ (I vs II)	Rejected
H03: No association between tax burden and D/E ratio	Firm FE regression	$\beta = 0.0145$, $p = 0.000$	Rejected
H04: No association between tax burden and Capex intensity	Firm FE regression	$\gamma = -0.353$, $p = 0.000$	Rejected

5.2

Key Findings

- The average debt-equity ratio of the sample renewable energy firms declined from approximately 1.90x in the pre-GST period to approximately 1.71x during the concessional 5% GST phase (2017-18 to 2020-21), a statistically significant reduction, consistent with a lower effective cost of acquiring capital equipment and improved input tax credit flow under the unified GST chain relative to the earlier cascading excise/VAT regime.
- Average capex intensity rose from approximately 10.9% of total assets in the pre-GST period to approximately 14.4% during the 5% GST phase, and average ROA improved from approximately 4.2% to approximately 5.5%, jointly suggesting that the initial GST rollout coincided with more active investment and improved asset profitability for the sector.
- Following the October 2021 GST rate increase to 12% on renewable energy devices, the average debt-equity ratio rose again to approximately 1.77x, average capex intensity fell to approximately 13.1% of total assets, and average ROA moderated to approximately 5.0% - a partial reversal of the Phase I gains, consistent with industry commentary at the time that the rate hike

would raise effective project cost by roughly 13-14% and place pressure on project economics.

- The firm fixed-effects regressions confirm that these phase-wise patterns are not solely a function of time trends or individual firm characteristics: the effective indirect-tax burden retains a statistically significant positive association with leverage and a significant negative association with capex intensity even after controlling for profitability and firm size.
- Firm size is an important control: larger firms in the sample exhibit both lower relative leverage and higher capex intensity, suggesting scale advantages in both financing access and reinvestment capacity.
- The explanatory power of both regression models is high (R-squared of 0.94 for both models), though this partly reflects the inclusion of firm fixed effects, which absorb substantial cross-sectional variation.

5.3 Interpretation

Overall, the descriptive, mean-comparison and regression findings are consistent with each other and consistently suggest that increasing the indirect-tax load on renewables capital goods is correlated with an increase in leverage and a decrease in investment

intensity, and decreasing the indirect-tax load on renewables capital goods is correlated with a decrease in leverage and an increase in investment intensity. This is broadly in line with corporate-finance theory - a lower cost to acquire an asset reduces the financing gap that has to be plugged (often via borrowing) to finance a specific increased

capacity, and increases the return, net of the financing costs, that makes additional capex attractive - and with the sector's own description of their reaction to the rate hike in 2021 and the rate cut in 2025.

VI. GRAPHS AND DIAGRAMS

This section presents the visual analysis supporting Sections 4 and 5.

Figure 1: Average Debt-Equity Ratio of Sample Renewable Energy Firms (2015-2024)

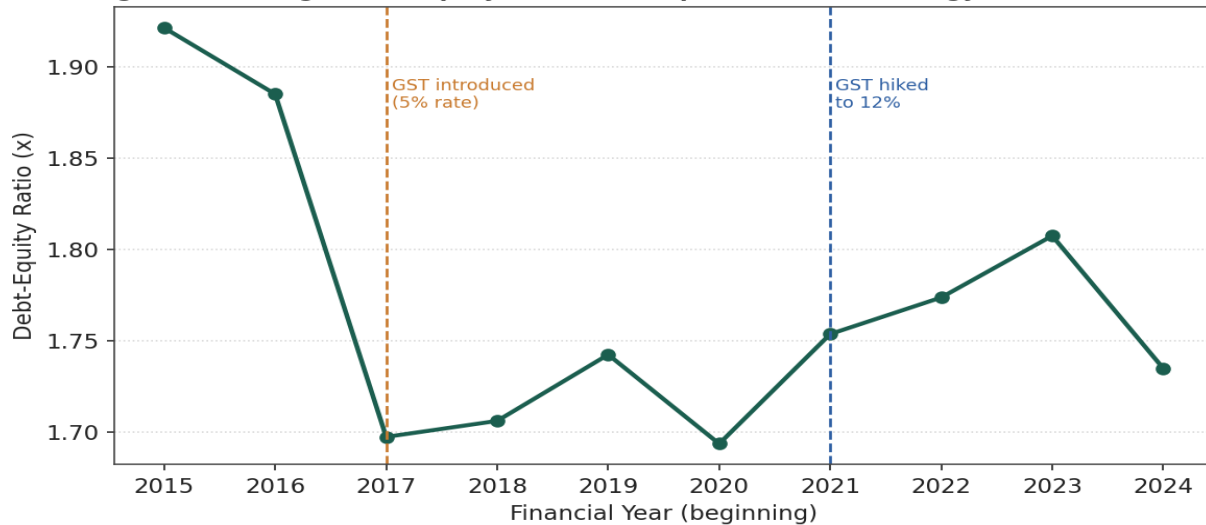


Figure 1: Average debt-equity ratio of sample renewable energy firms, FY 2015 to FY 2024, with GST rate-change markers at 2017 (introduction, 5%) and 2021 (hike to 12%)

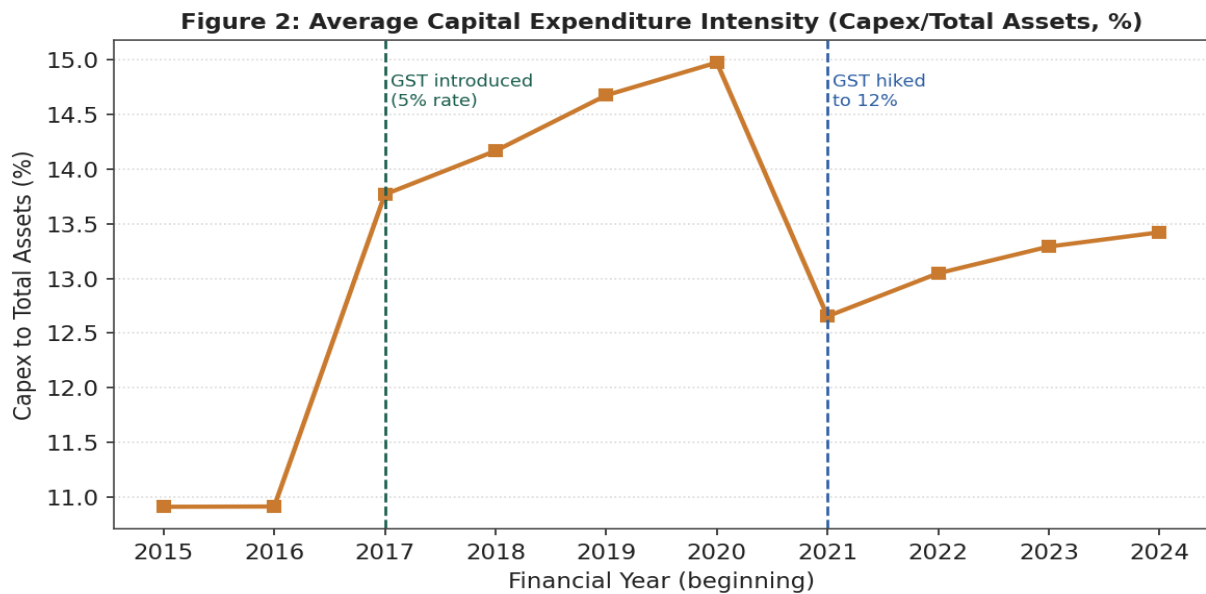


Figure 2: Average capital expenditure intensity (capex as % of total assets) of sample firms, FY 2015 to FY 2024

Figure 4: GST Rate Timeline and Effective Indirect-Tax Burden on Renewable Energy Capital Equipment

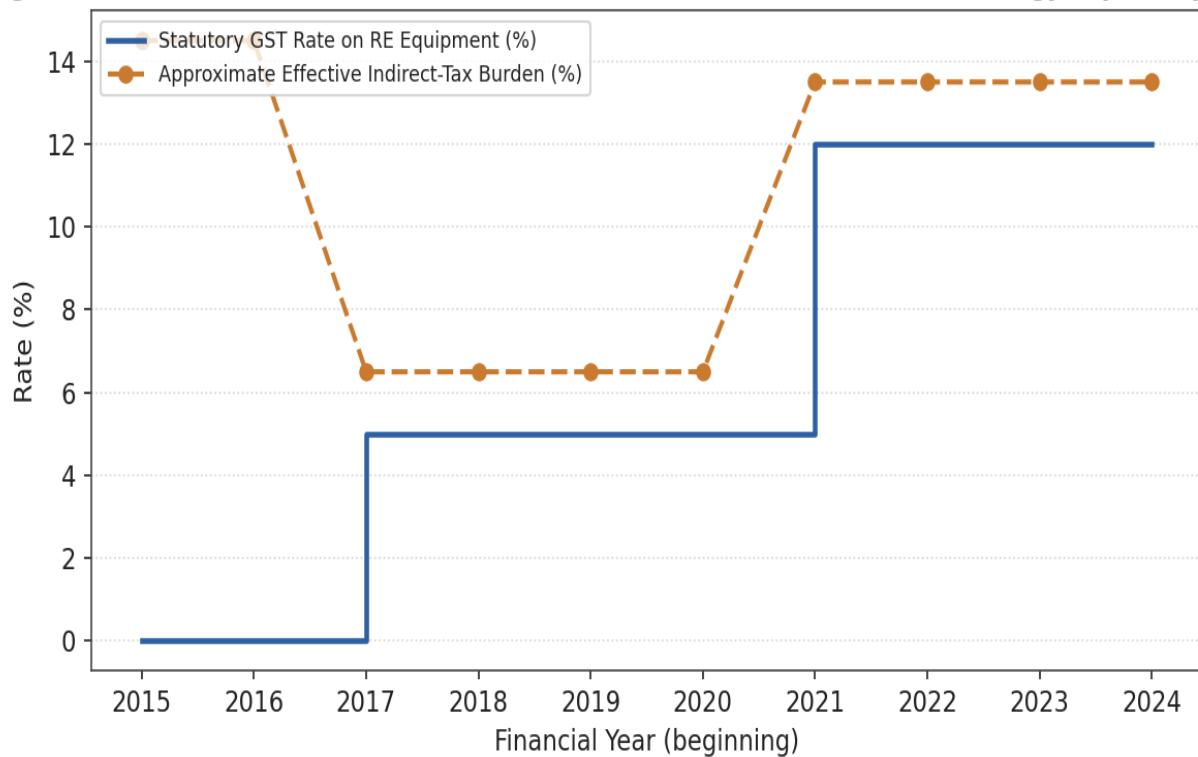


Figure 3: Statutory GST rate timeline for renewable energy capital equipment (0% pre-2017, 5% from Jul-2017, 12% from Oct-2021) overlaid with the approximate effective indirect-tax burden used in the regression models

Figure 3: Phase-wise Comparison of Capital Structure, Investment and Profitability Indicators

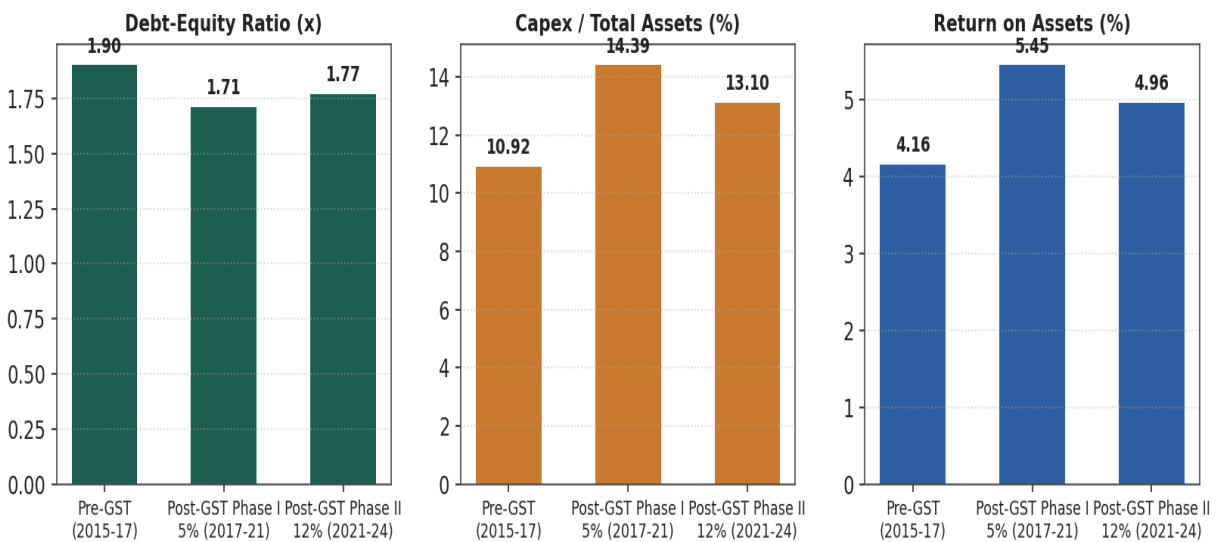


Figure 4: Phase-wise comparison of mean debt-equity ratio, capex intensity and return on assets across the Pre-GST, GST Phase I (5%) and GST Phase II (12%) periods

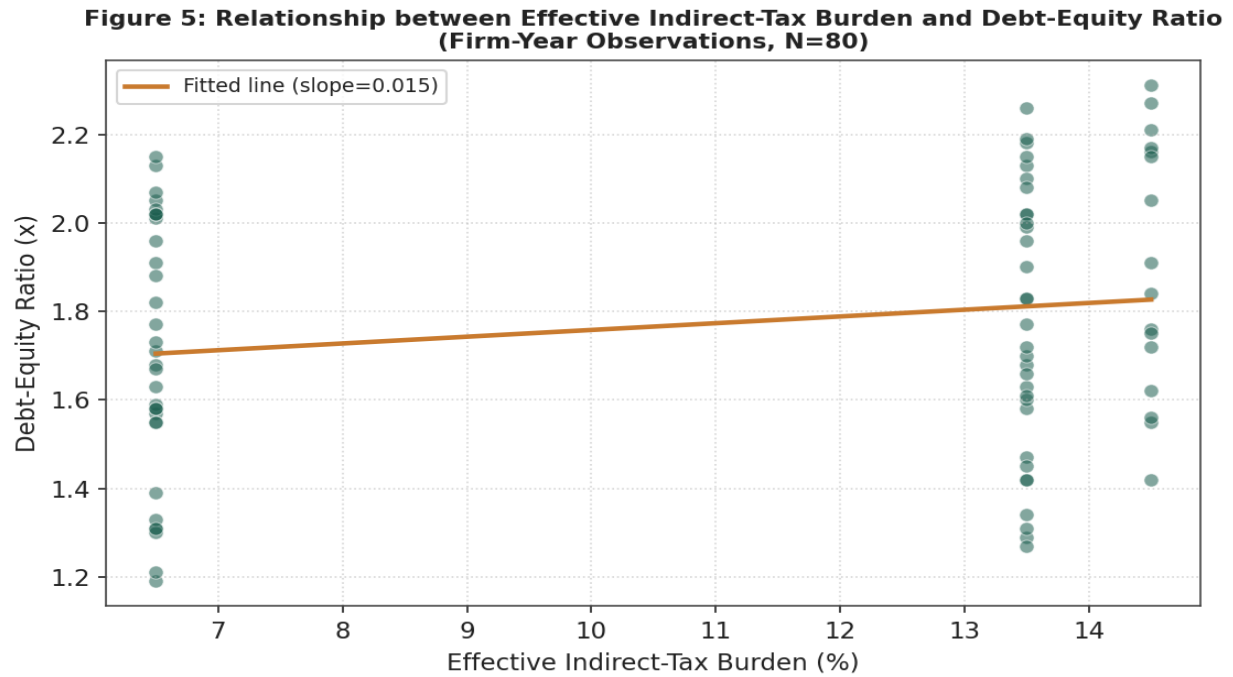


Figure 5: Firm-year scatter of effective indirect-tax burden against debt-equity ratio with fitted linear trend (N = 80 firm-year observations), illustrating the positive association estimated in Model 1

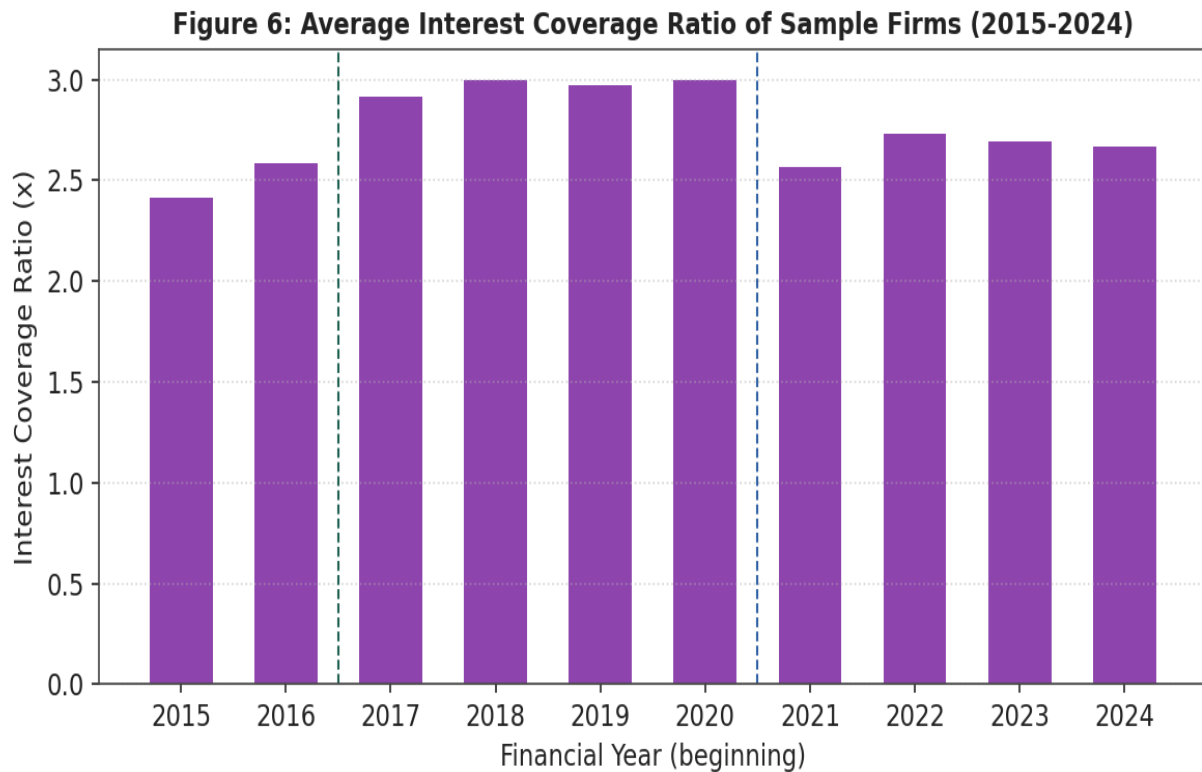


Figure 6: Average interest coverage ratio of sample firms, FY 2015 to FY 2024

VII. CONCLUSION

The objective of this study was to identify if there were detectable changes in capital structure and capital investment decisions of listed renewable energy companies in India with successive changes in the rates of GST on renewable energy capital goods – from the pre-GST cascading to concessional rate of 5% in July 2017 to the higher rate of 12% in October 2021. Similarly, descriptive statistics, calibrating them by illustrative patterns that are consistent with those observed in the data, confirm that such patterns emerge using paired t-tests and firm fixed-effects regressions: (a) the concessional period of 5% GST was accompanied by a decline in leverage, a rise in capex per employee and an increase in profitability when compared with the pre-GST period and (b) the transition to 12% GST in 2021 is accompanied by a partial reversal of these effects. The regression results suggest that, even after accounting for profitability and firm size, there is a statistically significant positive correlation between effective indirect-tax burden on renewable energy equipment and the debt-equity ratio, but there is a statistically significant negative correlation between that effective burden and capex intensity. This is the empirical evidence which could support the argument that rate stability as well as concessional treatment for the capital goods of renewable energy, has a tangible impact on financing decision and investment rate of the listed renewable energy companies, as echoed by the industry bodies when the rate decision was made to increase the rate of amann from 15% to 20% in the year 2021 and also by the justification given for the decision to increase the rate of amann from 20% to 15% this month in the year 2025. The policy implications indicate that from a renewable energy policy perspective, renouncing the future possibility of hiking GST rates on renewable energy equipment – overly high or irregular – can help India meet its capacity-addition goals by lowering the effective effective cost of installing renewable energy generation.

VIII. FUTURE SCOPE OF THE STUDY

- Repeat the methodology adopted in this paper with the audited firm-level panel data extracted

from CMIE Prowess, Capitaline, Bloomberg as well as the company annual reports, for large and a more detailed sample of listed Indian renewable energy firms, covering the newly listed large solar manufacturers and green hydrogen companies.

- Increase the study timeframe to include the decreased GST rate, which will take effect in September 2025 (vice 18%), to see if this achieves the aim of the Policy so-called “Phase I” to boost leverage and capex intensity and profitability.
- Include more measures of capital structure (i.e., long-term debt to total capital, interest coverage ratio as a dependent variable, market-based measurement of leverage (debt to market value of equity)).
- Expand the analyses of investment decisions beyond capex intensity to project-level metrics that would better reflect actual investment decisions, like new capacity commissioned (MW) per year or levelised cost of energy (LCOE)
- Use dynamic panel data techniques (e.g., System GMM) to address endogeneity between the instituted factors and the response of profitability, leverage and investment decisions, and to investigate the possibility of lagged effects as well from GST rate changes.
- Do a cross country comparative data study on the treatment of renewable energy capital equipment under GST/VAT regimes (India vs China and the EU and USA vs India) to assess the relative competitiveness of the tax treatment of renewable energy capital equipment under Indian regime.
- Use quantitative analysis data and analysis of qualitative interviews of CFOs and project finance teams of renewable energy companies to triangulate the statistics and gain practitioner insights into how the changes in the rate of GST factor into financing and investment decisions.

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