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# Does Greening Differentially Impact Firms Across Growth Trajectories?

## **Abstract**

Sustainability efforts of the firms and subsequent firm performance have been a topic of great interest for academic scholars and practitioners alike. The ever increasing social and consumer emphasis on sustainability is making firms increasingly likely to engage in green activities. While a vast research links sustainability and firm performance, it is predominantly the extant literature has not examined the impact of different types of greening for the performance of firms on different growth trajectories. We contribute by examining the impact of greening activities on firms following different growth trajectories and demonstrate that greening differentially impacts start-ups, high-growth firms, steady growers and lifestyler firms.

# 1 Introduction

The growing emphasis on sustainability across the world have prompted firms to work for their “green image”. This has led to various types of green initiatives by firms in the form of new green products, services, and greening initiatives within the firm. As firms are perceived as profit maximisation entities, numerous studies have explored whether green initiatives have an impact on the performance of the firm. This stream of literature famously called the debate on “whether it pays to be green” mainly suggests that green initiatives have a positive impact on the firm performance (Ambec and Lanoie, 2008; Flammer, 2015). A complementing body of literature investigates when it pays to be green (King and Lenox, 2001), and the impact of green initiatives on performance of firms across the size and age distributions (Shrivastava and Tamvada, 2017).

However, the impact of greening on firms that are in different growth trajectories has rarely received attention in extant scholarship. Furthermore, greening itself can be of multiple types (Shrivastava and Tamvada, 2017), and different types of greening may differ in their impacts on firm performance. While it may be costly for firms to sustain current growth trajectories while addressing major environmental issues such as climate change (OECD 2018), some types of greening can positively contribute to firm performance irrespective of the growth trajectory a firm is following.

Following the framework developed in (Shrivastava and Tamvada, 2017), we classify greening activities of firms based on their tangibility and visibility. While some greening initiatives like offering green products or services and employing individuals for green initiatives are tangible, going beyond compliance requirements and incorporating more green processes can be viewed as intangible green activities. Similarly, while some greening activities are visible externally, others are visible internally to the firm. We use this tangibility-visibility classification to examine the impact of different types of greening on the performance of firms in different growth trajectories using a large scale database of

firms from around the world. In the process, we make several compelling contributions to the literature. Most importantly, we demonstrate that the impact of greening on firm performance is not uniform across firm growth trajectories. While greening has a positive impact on firms following certain trajectories, it has the opposite effect on some others.

The remaining paper is organised as follows. In the following section, we present the theoretical background. The third section discusses the database and the empirical methods. The fourth section presents the empirical results on the impact of greening along growth trajectories. The final section presents the conclusions.

## 2 Theoretical Background

Firm growth classically have been described as linear and predictable process by firm growth models (Deakins and Freel, 1998). However, this has been debated by a huge literature which suggests that rather than a linear approach, firms might undergo phases of growth similar to the humans and firms walk on various trajectories based on ambitions of the entrepreneur. Lee (2016) examines three types of ambitions: substantive, moderate and low. These ambitions result into various growth modes firms tend to follow. BIS (2015) suggests that majority of the entrepreneurs exhibit moderate ambition.

Firms with diverse growth trajectories will have different purpose and expected outcomes from their green initiatives. Colombelli et al. (2013) examine if gazelles who are involved in green initiatives run faster. Lifestyle and value driven firms report the greater number of environmental, social and economic activities (Font et al., 2016). In line with these studies, it is compelling to investigate whether green initiatives boost firms across different growth trajectories and if certain types of green initiatives are more conducive for performance for firms on specific trajectories.

Figure 1 shows the different growth trajectories of firms. These include start-ups, firms on a high growth trajectory, firms on a steady-growth trajectory and firms on a

slow growth trajectory.

## 3 Methods

### 3.1 Data and variables

We use a large-scale database commissioned by the European Commission, the Eurobarometer survey, for testing the hypotheses developed in Section ???. The data were collected through telephonic interviews from an international business register. Firms from 38 different countries were selected using a stratified sampling procedure.<sup>1</sup> Although the original size of the sample is 13167 firms, data of the dependent variable are available for 12,272 observations. Introducing the four greening strategies variables in the regression reduces the sample size to 9606 observations. Adding the firm size variables and the sampling weights brings the final sample size to 9236 observations.<sup>2</sup>

#### 3.1.1 Dependent variable

##### *Change in turnover*

The dependent variable is derived from a question in the database that asks if the firm's turnover has decreased, remained same or increased in the last two years. This is the only measure of firm performance available in the database. As Table 1 shows, 33.1% of the firms in the sample have experienced a decrease in turnover, while turnover has remained same for 26.6% of the firms and turnover has increased for 40% of the firms in the database.

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<sup>1</sup>The list of countries included in the data collection process is given in the Appendix in Table A5.

<sup>2</sup>The mean values of the variables in the full sample and the final sample are not statistically different suggesting that exclusion is mostly random and not systematic.

### 3.1.2 Independent variables

The four different greening processes identified in the theory section are the main independent variables.

*GS1. Green Product or Service (Tangible-External Greening:)* This variable takes value 1 if the firm offers a green product or service to its customers. As Table 1 suggests, 30.3% of the firms in the database offer a green product or service.

*GS2. Environmental Management System (Intangible-External Greening:)* If a firm has one of the formalised environmental management systems such as ISO14001, ISO14064, ISO16000 or others, the variable takes value 1 and 0 otherwise. Although the processes underlying these certifications may not be clear, firms declare these certifications to potential consumers and they are known externally. As Table 1 suggests 38.6% of firms in the database have environmental management systems in place.

*GS3. Green Jobs Prop. (Tangible-Internal Greening:)* This variable is derived from a question in the survey that asks how many of the full-time employees of the firm work in green jobs some or all the time. According to the questionnaire, a ‘green job is one that directly works with information, technologies, or materials that preserves or restores environmental quality. This requires specialised skills, knowledge, training, or experience.’ As the number of green jobs cannot be viewed independently of the firm size, a new variable on the proportion of green jobs is constructed.<sup>3</sup> The mean of this variable is 0.16 suggesting that on an average around 16% of full-time employees are engaged in green activities.

*GS4. Beyond Compliance (Intangible-Internal Greening:)* The variable takes value 1 if a firm goes beyond complying with environmental legislations. As Table 1 suggests, 26.1% of the firms in the database proactively go beyond complying with environmental

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<sup>3</sup>The exact number of employees is unavailable, and the employee sizes are coded in intervals such as 0 to 10 employees, 11-50 employees, 50-250 employees, 250-750 employees. We divide the number of green jobs by the midpoint of these intervals to derive the proportions.

legislations.

### 3.1.3 Control variables

*External Support:* We control for the impact of external support as firms that receive external support are more likely to have an increased turnover. While half of the firms in the sample have received no external support, 9.15% have received financial support and 40.50% have received non-financial support.<sup>4</sup>

*Market Type:* The market type is controlled in the estimation as the market segment that firms supply to has an impact on their turnover. While 60.7% of the firm supply to consumers, 70.2% supply to other firms and 30.3% supply to public bodies. Thus, firms in the sample supply to more than one market segment.

*Age, Size and Sector:* Following a large body of literature that suggests that age, size and industrial sector have an impact on firm growth (Coad 2008), we control for these effects. The average age of firms in the database is 24.20 years. The standard deviation of the age variable is 23.59 suggesting that there are several young as well as mature firms in the database. While 42.5% of the firms have less than 10 employees, 32.4% of the firms have more than equal to 10 and less than 50 employees, 18.1% of the firms have more than equal to 50 and less than 250 employees, and 6.95% of firms have more than 250 employees. The four main industry sectors of manufacturing, retail, services, and mining with other related industries are almost equally represented in the database.

Table 2 presents the correlations between the four greening variables. Although the correlations are significant suggesting that firms are engaged in multiple greening strate-

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<sup>4</sup>The question asked in the questionnaire is as follows: ‘Which type of external support does your company get in relation to its environmental actions?’. The answers to this question are from the following a. Public funding (grants or guarantees) b. Private funding from bank or investment companies c. Venture capital fund d. Advice or other non-financial assistance from public administration e. Advice or other non-financial assistance from private consulting and audit companies. f. Advice or other non-financial assistance from business associations. Firms that selected any one of the a. b. or c. options are classified as having received external financial support, and firms that selected any one of d. e. or f. are classified as having received external non-financial support.

gies, the correlations are small in magnitude. ?? summarises the adoption of the greening strategies across the age and size distribution of firms. In particular, the table suggests that the proportion of firms engaging in greening strategies increases along the age distribution and size distribution of firms. As the first row suggests, while 28.30% of firms that are less than or equal 10 years old have introduced a green product or service (GS1), 37.2% of firms that are older than 50 years have introduced a green product or service. Similarly, while 28.8% of firms that are less than 50 employees have introduced a green product or service (GS1), 39.3% of firms that have more than 250 employees have introduced a green product or service. This pattern exists for all the greening strategies.

### 3.2 Estimation models

For estimating the impact of the different types of greening processes on firm performance along different growth trajectories, ordered probit models are estimated in Table 3, as the dependent variable is in an ordered form with firms experiencing a decrease in turnover, having the same turnover as in the previous period, or having an increased turnover. The core estimated equation is given as

$$y = \alpha + \beta_1(gs_1) + \beta_2(gs_2) + \beta_3(gs_3) + \beta_4(gs_4) + \beta_5(numgreen) + \beta_6(externalsupport) + \beta_7(marketttype) + \beta_8(firmage) + \beta_9(firmsize) + \beta_{10}(sector) + \beta_{11}(location) + \epsilon$$

where  $gs_1$ - $gs_4$  are the four greening strategies (tangible-external, intangible-external, tangible-internal and intangible-internal). In addition to these core independent variables and firm age and size controls, *numgreen* controls for the number of green strategies adopted a firm, *externalsupport* for financial and non-financial external support received by a firm, *marketttype* for the different types of markets a firm caters to, *sector* for the the industrial sector and *location* for the country of a firm's geographic location.



## 4 Empirical results

The empirical results linking the four greening strategies with firm performance are presented in [Table 3](#). As the positive and significant coefficient of the ‘Green Product or Service’ variable in column (1) suggests, tangible-external greening strategy has a positive impact on firm performance for startups. However, the coefficient of ‘Env. Mang. Sys.’ is insignificant suggesting that an intangible-external greening strategy has no impact on the performance of start-ups. The coefficients of the internal greening variables suggest that both forms of internal greening have a positive impact on startup firm performance. Thus, most types of greening help start-up firm performance. In column (2), the impact of different types of greening on firms on a high-growth trajectory is estimated. The results suggest that external greening has a negative impact on the growth of firms on a high-growth trajectory. However, going beyond compliance requirements has a positive impact on these firms.

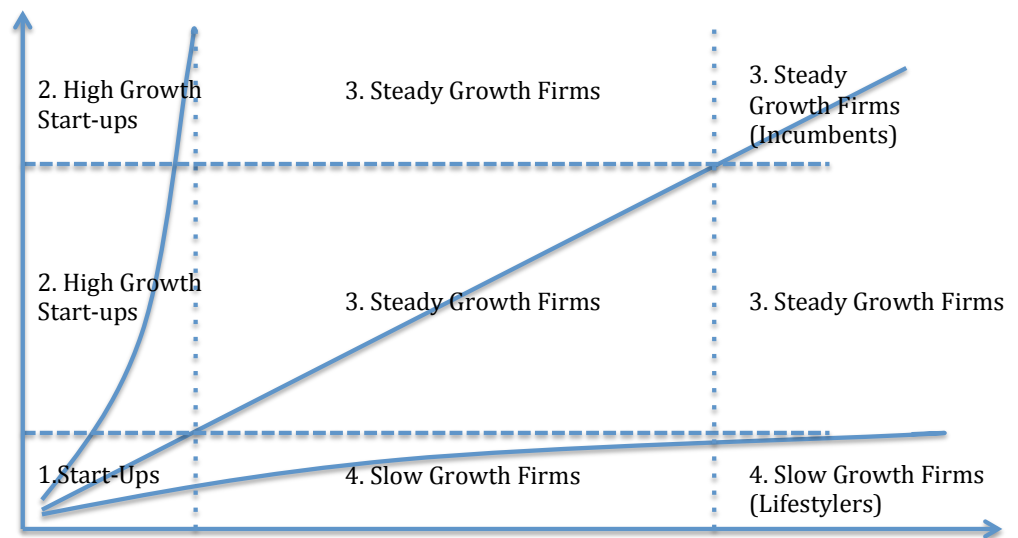
In column (3), the impact of different types of greening on firms on a steady-growth trajectory is estimated. The results demonstrate that having environmental management systems and green employees has a positive impact on the performance of firms on a steady growth trajectory. In column (4), the impact of different types of greening on firms on firms on a slow-growth trajectory is estimated. Most forms of greening have no impact on the performance of firms on a slow growth trajectory although having green employees has a significantly positive impact.

The estimated effects of the control variables suggest that while financial support helps firms on a slow growth trajectory, it has not impact on firms on high-growth trajectory and have a negative impact on firms in steady growth trajectory. Furthermore, offering products and services to companies has significantly positive effects for startups and firms on slow growth trajectory while offering products to public administration bodies has a positive impact on the performance of firms in the high-growth trajectory.

## 5 Conclusions

The paper examines if different types of greening have an impact on the performance of firms along different growth trajectories. Using the lens of tangibility-visibility classification, examine the impact of different types of greening on the performance of firms in different growth trajectories using a large scale database of firms from around the world. The novel first results presented here suggest that while greening helps startups and steady growth firms, it has an adverse impact on high growth firms. Thus, while greening has a positive impact on firms following certain trajectories, it has the opposite effect on some others.

Figure 1: Growth Trajectories



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Table 1: Descriptive Statistics

<b>Dependent Variable:</b>	
Turnover Decreased	33.40%
Turnover Remained Same	26.60%
Turnover Increased	40.00%
<b>Independent Variables</b>	
GS1 Green Product or Service (Tangible-External)	30.30%
GS2 Env. Mang. Sys (Intangible-External)	38.60%
GS3 Green Employees Prop. (Tangible-Internal)	0.16 (0.46)
GS4 Beyond Compliance (Intangible-Internal)	26.10%
Number of Green Strategies	1.387 (1.169)
<b>Controls</b>	
Financial Support	9.15%
Non-financial Support	40.50%
Consumers	60.70%
Companies	70.20%
Public Admn.	30.30%
Age	24.2 (23.59)
Employees: 1 to 9	42.50%
Employees: 10-49	32.40%
Employees: 50-249	18.10%
Employees>250	6.95%
Manufacturing	27.50%
Retail	24.10%
Services	24.90%
Mining and other Industries	23.50%
N	9236
Standard deviation in parentheses	

Table 2: Correlations Between Greening Strategies

	GS1	GS2	GS3	GS4
GS1. Green Product or Service (Tangible-External)	1			
GS2. Env. Mang. Sys (Intangible-External)	0.0689***	1		
GS3. Green Employees Prop. (Tangible-Internal)	0.204***	0.0386***	1	
GS4. Beyond Compliance (Intangible-Internal)	0.149***	0.148***	0.0532***	1

Table 3: Greening and Firm Performance by Growth Trajectories

VARIABLES	(1) Start-Ups	(2) High-Growth Trajectory	(3) Steady-Growth Trajectory	(4) Slow-Growth Trajectory
Green Product or Service (Tangible-External)	0.448*** (0.141)	-0.617* (0.358)	0.365** (0.168)	0.0628 (0.103)
Env. Mang. Sys (Intangible-External)	0.149 (0.121)	-1.002** (0.394)	0.358** (0.179)	0.0345 (0.0857)
Green Employees % (Tangible-Internal)	0.334*** (0.127)	0.891 (0.568)	0.441** (0.216)	0.103** (0.0417)
Beyond Compliance (Intangible-Internal)	0.392*** (0.125)	0.918*** (0.346)	0.239 (0.164)	0.123 (0.0888)
Num. Green Strategies	-0.182* (0.0939)	0.343 (0.252)	-0.186 (0.119)	-0.0179 (0.0619)
Financial Support	0.123 (0.105)	0.0700 (0.364)	-0.532*** (0.164)	0.162* (0.0958)
Non-financial Support	-0.0289 (0.0704)	-0.350 (0.256)	-0.225** (0.108)	-0.0176 (0.0551)
Companies	0.311*** (0.0649)	-0.0543 (0.222)	0.122 (0.125)	0.212*** (0.0542)
Public Admn.	0.101 (0.0762)	0.426* (0.255)	-0.00673 (0.104)	-0.00710 (0.0561)
Employees: 10-49	0.637*** (0.0809)			0.415*** (0.0564)
Employees: 50-249		-0.170 (0.260)	-0.216* (0.128)	
Age	-0.0591*** (0.0114)	-0.0255 (0.0382)	0.00357* (0.00186)	-0.00233 (0.00151)
Manufacturing	-0.0974 (0.0949)	0.737** (0.305)	0.289** (0.124)	0.0289 (0.0736)
Retail	0.0868 (0.0822)	0.520 (0.359)	0.261 (0.166)	0.0830 (0.0668)
Services	-0.0566 (0.0767)	0.330 (0.300)	0.510*** (0.145)	0.0186 (0.0688)
Country Dummies	Yes	Yes	Yes	Yes
Constant cut1	-0.635** (0.250)	0.228 (0.840)	-1.041*** (0.362)	-0.0398 (0.211)
Constant cut2	0.207 (0.248)	0.876 (0.842)	-0.184 (0.360)	0.840*** (0.211)
Observations	2,428	331	1,987	4,490
r <sup>2</sup> _pseudo	0.107	0.319	0.133	0.0874
χ <sup>2</sup>	367.9	1205	259.0	449.0
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table A5: Countries in the sample

France	4.20%
Belgium	3.04%
The Netherlands	3.20%
Germany	4.08%
Italy	3.70%
Luxembourg	1.60%
Denmark	3.70%
Ireland	2.15%
United Kingdom	3.62%
Greece	3.56%
Spain	4.06%
Portugal	2.84%
Finland	3.63%
Sweden	3.04%
Austria	2.92%
Cyprus (Republic)	1.61%
Czech Republic	3.10%
Estonia	2.94%
Hungary	3.20%
Latvia	2.90%
Lithuania	3.04%
Malta	1.57%
Poland	4.14%
Slovakia	3.65%
Slovenia	3.84%
Bulgaria	3.09%
Romania	3.12%
Turkey	2.58%
Croatia	1.68%
Makedonia	1.52%
Montenegro	0.83%
Norway	2.70%
Iceland	1.21%
Israel	1.88%
United States of America	2.04%
N	9236