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# Finance Research Letters

journal homepage: [www.elsevier.com/locate/frl](http://www.elsevier.com/locate/frl)

## Competition and ESG practices in emerging markets: Evidence from a difference-in-differences model

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### ARTICLE INFO

#### Keywords:

ESG  
Product market competition  
Difference-in-differences  
Emerging markets

### ABSTRACT

This paper investigates how competition affects firms' environmental, social, and governance (ESG) practices in 22 emerging markets, using a sample of 6,906 firm-year observations from 2011 to 2019. Using a difference-in-differences technique and matched samples with a treated and a control group, I explore exogenous variation in the competitive environment of one country, Brazil, to assess the competition's causal effect on ESG. The results suggest that firms adjust ESG practices negatively after a shock in competition, contrasting with previous results from developed economies.

### 1. Introduction

Over the last decade, environmental, social, and governance (ESG) practices have become central corporate decisions. Firms are facing pressure to implement ESG practices into their business from investors (Matos, 2020), public opinion (Baldini et al., 2018), and peers (Cao et al., 2019). Although ESG practices, in the short term, can increase financial and nonfinancial costs (Barnea and Rubin, 2010; Pava and Krausz, 1997) and use resources that could otherwise be used to increase shareholder value (Borghesi et al., 2014), they are increasingly perceived as critical to the economic growth of the next decades. Firms are thus investing more in ESG, and the mainstream response is to incorporate ESG into a more comprehensive strategy in hopes of “doing well by doing good” (Falck and Heblich, 2007).

One important strand of the ESG literature is the investigation of how product market competition affects firm ESG practices. Previous literature suggests that managers invest in ESG for either altruist reasons (Bagnoli and Watts, 2004; Borghesi et al., 2014; Pava and Krausz, 1997) or strategic reasons (Baldini et al., 2018; Benlemlih and Bitar, 2018; Gupta et al., 2018; Matos, 2020; Schaltegger and Hörisch, 2017). In addition, previous literature suggests that, if managers invest in ESG altruistically, competition is expected to decrease investments in ESG practices, whereas, if managers see ESG practices as profit maximization strategies, then they are expected to invest more in ESG when competition increases (Fernández-Kranz and Santaló, 2010). The literature so far suggests that competition is positively associated with socially responsible practices (Fernández-Kranz and Santaló, 2010) and causes them (Flammer, 2015; Leong and Yang, 2020). Nevertheless, this evidence is restricted to the United States.

Exploring evidence on emerging markets is crucial to understanding how ESG can shape future economic growth. Emerging markets such as Brazil, China, and India are responsible for a considerable amount of developed economies' imports of goods and services, and emerging market firms are investing at an increasing pace to keep up with the competition of developed economies. These markets are therefore likely to have a significant influence on the global outcomes of ESG practices over the following years. Moreover, firms from emerging markets are expected to have different reasons to invest in ESG. First, previous literature shows that the level of

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<https://doi.org/10.1016/j.frl.2021.102371>

Received 7 January 2021; Received in revised form 2 August 2021; Accepted 8 August 2021

Available online 12 August 2021

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**Table 1**  
Summary statistics and t-tests.

Panel A								
	Min.	p25	Mean	p50	p75	Max.	S.d.	N
ESG	0.11	24.64	41.89	41.24	58.46	92.84	21.42	6906
ESG - Rank	0.00	0.25	0.50	0.51	0.75	1.00	0.29	6906
ESG Env.	0.00	12.07	36.03	33.61	57.99	97.49	26.83	6906
ESG Env. - Rank	0.00	0.16	0.45	0.44	0.72	1.00	0.31	6906
ESG Soc.	0.15	17.56	40.79	39.49	61.72	97.47	25.87	6906
ESG Soc. - Rank	0.00	0.25	0.50	0.50	0.75	1.00	0.29	6906
ESG Gov.	0.14	30.31	48.69	49.05	67.45	98.70	22.79	6906
ESG Gov. - Rank	0.00	0.25	0.50	0.50	0.75	1.00	0.29	6906
BI	0.07	0.20	0.27	0.30	0.32	0.40	0.08	6906
LI	-0.18	-0.04	-0.01	-0.01	0.01	0.24	0.06	6906
Subst.	-1.56	-1.13	-1.11	-1.08	-1.07	-1.03	0.07	6906
Size (lagged)	11.80	20.68	21.52	21.60	22.63	23.09	1.29	6906
MtB (lagged)	0.03	0.39	1.31	0.74	1.52	10.08	1.59	6906
Leverage (lagged)	0.00	0.12	0.26	0.25	0.37	0.92	0.17	6906
Capex + RD (lagged)	0.00	0.03	0.06	0.05	0.09	0.35	0.05	6906
ROA (lagged)	-0.55	0.02	0.06	0.05	0.09	0.31	0.07	6906
Cash (lagged)	0.00	0.06	0.20	0.13	0.24	2.69	0.24	6906
Panel B								
	Obs. Control	Obs. Brazil	Control Mean	Brazil Mean	Difference	Difference p-value		
<b>Matching by Industry and Year, without replacement</b>								
Size TA (lagged)	387	387	21.706	21.694	0.013	0.886		
MtB (lagged)	387	387	0.898	0.825	0.073	0.325		
Leverage (lagged)	387	387	0.326	0.337	-0.010	0.399		
Capex + RD (lagged)	387	387	0.050	0.048	0.002	0.478		
ROA (lagged)	387	387	0.044	0.038	0.006	0.148		
Cash (lagged)	387	387	0.160	0.159	0.001	0.954		
<b>Matching by Industry and Year, with replacement</b>								
Size TA (lagged)	303	387	21.786	21.694	0.092	0.318		
MtB (lagged)	303	387	0.962	0.825	0.137	0.094		
Leverage (lagged)	303	387	0.316	0.337	-0.021	0.096		
Capex + RD (lagged)	303	387	0.055	0.048	0.008	0.020		
ROA (lagged)	303	387	0.044	0.038	0.006	0.199		
Cash (lagged)	303	387	0.157	0.159	-0.002	0.861		

**Observations:** The variable *BI* is the Boone Indicator (Boone, 2008) measured as the coefficient of a regression estimated for each industry-year of firm profit (revenue minus operating expenses over total assets) against the natural logarithm of marginal cost (operating expenses over revenue), following Fosu (2013). The variable *LI* is the Lerner index, measured as the rolling three-year average of revenue minus operating expenses over revenue, following Datta et al. (2011) and Sharma (2011). The variable *Subst.* is an alternative proxy for the price-cost margin, measured as the rolling three-year average of revenue over operating expenses, following Karuna (2007). The variables *BI*, *LI*, and *Subst.* are negatively related to competition; therefore, to facilitate interpretation, I multiply them by  $-1$ , so that higher values indicate greater competition. The variable *Size* is the natural logarithm of total revenues, *MtB* is market capitalization over total assets, *Leverage* is total debt over total assets, *Capex + RD* is the sum of capital and research and development expenditures over total assets, *ROA* is net income over total assets, and *Cash* is cash and short-term investments over net total assets. All financial variables are winsorized at 1% in both tails.

investor protection is lower in emerging markets (La Porta et al., 1998), allowing managers to more frequently pursue pet projects, such as ESG-related projects (Bagnoli and Watts, 2004; Fernández-Kranz and Santaló, 2010). Second, institutions and rules about environmental and social investments are weaker and less developed, corporate practices are more opaque, markets are less efficient, and relationships are perceived as more corrupt (Kaufmann et al., 2011; Witt et al., 2016). Thus, stakeholders are less likely to correctly evaluate the returns of ESG-based strategies, even profitable ones. Consequently, firms are less likely to benefit from such strategies and thus less likely to escape the competition by investing in ESG.

Using a sample of firms from emerging market countries, this research investigates how competition shapes ESG practices. The results suggest that firms' ESG practices decrease in response to increased competition, which contrasts with the results of Fernández-Kranz and Santaló (2010), Flammer (2015), and Leong and Yang (2020). This study's contrasting results contribute to the literature in several ways. First, the analysis of a sample of firm from emerging market countries provides evidence that complements the literature. Second, I explore exogenous variation in a country's competitive environment, contributing to the literature by providing a causal estimate of the effect of competition on ESG. Finally, the findings suggest that managers from emerging and developed countries invest in ESG for different reasons, highlighting how ESG decisions depend on the context of the firms' environments.

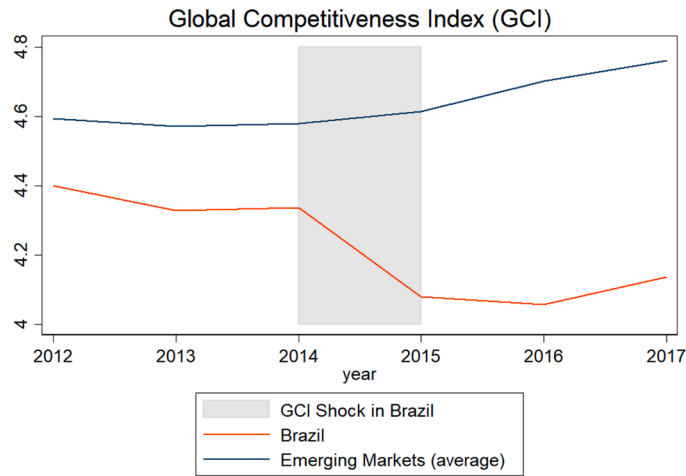


Fig. 1. Global competitiveness index Brazil versus the world.

## 2. Empirical design

### 2.1. Sample and variables

The initial sample comprises the 27 emerging market countries covered by [Kearney \(2012\)](#). I collected the ESG scores (the aggregated and the three pillars) and financial variables<sup>1</sup> from Refinitiv Eikon. After the exclusion of missing data, the final sample comprises 6906 firm–year observations from 22 countries.<sup>2</sup> Data since 2011 were available, but, because the financial variables are lagged, the final sample period covers 2012 to 2019. Panel A of [Table 1](#) presents the aggregated statistics for the full sample. On average, firms score around 42 points in ESG, with average scores of 36, 41, and 49, respectively, for the E, S, and G pillars. These figures are considerably lower than those of [Vural-Yavas \(2021\)](#), who studies a sample of European countries (developed and emerging).

### 2.2. Models

I estimate two types of equations. The first equation is:

$$ESG Rank_{i,t} = \beta_1 + \beta_2 \times Competition_{i,t-1} + \beta_3 \times Size_{i,t-1} + \beta_4 \times MtB_{t-1} + \beta_5 \times Leverage_{t-1} + \beta_6 \times (Capex + R\&D)_{t-1} + \beta_7 \times ROA_{t-1} + \beta_8 \times Cash_{t-1} + \phi_{time} + \epsilon_{i,t} \tag{1}$$

where *Competition* is one of three variables *BI*, *LI*, and *Subst.*, whose measurement is detailed in [Table 1](#). All these variables are negatively related to competition; therefore, to facilitate interpretation, I multiply them by  $-1$ , so that higher values indicate greater competition. The dependent variable is either the ESG score or the three pillars. Following recent literature, the ESG scores are ranked by year (for details, see [Baldini et al. 2018](#)).<sup>3</sup>

I also estimate a difference-in-differences model ([Schiozer et al., 2021](#)), using the following equation:

$$ESG Rank_{i,t} = \beta_1 + \beta_2 \times Treated (Brazil) + \beta_3 \times After (2015) + \beta_4 \times Treated (Brazil) \times After (2015) + \gamma X_{i,t-1} + \phi_{time} + \epsilon_{i,t} \tag{2}$$

where *Treated* is a dummy denoting Brazilian firms, *After* is a dummy indicating the years 2015 to 2019, and *X* is a vector containing all the control variables of [Eq. \(1\)](#). The coefficient of interest in [Eq. \(2\)](#) is  $\beta_4$ , which is expected to be negative, suggesting that Brazilian firms reacted to the competition shock of 2015 by decreasing ESG practices more than their emerging market counterparts. In other words, Brazilian firms' average ESG ranks are expected to deviate negatively from the ranks of the control group formed by the firms of the remaining 21 countries.

<sup>1</sup> Related literature suggests that ESG scores can vary across databases ([Dorfleitner et al., 2015](#)). Thus, one limitation of this study is that the results are subject to the use of Refinitiv's scores.

<sup>2</sup> These countries and the respective numbers of firm–year observations are Argentina (101), Brazil (524), Chile (186), China (1,280), Colombia (61), Egypt (43), Hungary (26), India (564), Indonesia (241), Israel (108), Malaysia (324), Mexico (218), Peru (71), the Philippines (151), Poland (126), Russia (236), South Africa (662), South Korea (759), Taiwan (790), Thailand (241), Turkey (162), and the United Arab Emirates (32).

<sup>3</sup> In untabulated results, I use the original ESG scores (i.e., not ranked) and find similar results. Due to space constraints, I report only the former.

**Table 2**  
Competition and ESG.

	ESGRank	ESGEnv. Rank	ESGSoc. Rank	ESGGov. Rank	ESGRank	ESGEnv. Rank	ESGSoc. Rank	ESGGov. Rank	ESGRank	ESGEnv. Rank	ESGSoc. Rank	ESGGov. Rank
	<i>Panel A</i>				<i>Panel B</i>				<i>Panel C</i>			
<b>BI</b>	-0.10	0.00	-0.18 <sup>+</sup>	-0.04								
	[-0.98]	[0.03]	[-1.71]	[-0.31]								
<b>LI</b>					-0.30**	-0.30*	-0.16 <sup>+</sup>	-0.44***				
					[-2.95]	[-2.54]	[-1.72]	[-3.58]				
<b>Subst.</b>									-0.29*	-0.38**	-0.16	-0.35*
									[-2.23]	[-2.64]	[-1.34]	[-2.17]
<b>Size TA (lagged)</b>	0.05***	0.05***	0.04***	0.03***	0.05***	0.05***	0.04***	0.03**	0.05***	0.05***	0.04***	0.03**
	[5.24]	[5.02]	[5.09]	[3.40]	[4.95]	[4.74]	[4.96]	[2.94]	[5.08]	[4.83]	[5.03]	[3.19]
<b>MtB (lagged)</b>	0.00	-0.00	0.00	-0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00
	[0.29]	[-0.51]	[0.98]	[-0.40]	[-0.01]	[-0.77]	[0.85]	[-0.71]	[0.09]	[-0.75]	[0.89]	[-0.58]
<b>Leverage (lagged)</b>	0.05	0.08 <sup>+</sup>	0.02	0.03	0.06	0.09 <sup>+</sup>	0.02	0.05	0.06	0.09 <sup>+</sup>	0.02	0.04
	[1.18]	[1.69]	[0.47]	[0.70]	[1.38]	[1.90]	[0.57]	[0.98]	[1.32]	[1.88]	[0.54]	[0.86]
<b>Capex + RD (lagged)</b>	0.07	0.09	0.08	-0.03	0.06	0.08	0.08	-0.04	0.06	0.08	0.08	-0.04
	[1.01]	[1.18]	[1.14]	[-0.37]	[0.90]	[1.06]	[1.10]	[-0.54]	[0.92]	[1.04]	[1.11]	[-0.48]
<b>ROA (lagged)</b>	0.06	0.05	0.06	0.03	0.04	0.03	0.05	0.00	0.04	0.03	0.05	0.01
	[1.27]	[1.01]	[1.47]	[0.47]	[0.86]	[0.65]	[1.18]	[0.02]	[0.96]	[0.67]	[1.23]	[0.20]
<b>Cash (lagged)</b>	0.02	0.01	0.01	0.03	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.02
	[1.13]	[0.45]	[0.41]	[1.06]	[1.12]	[0.39]	[0.42]	[1.01]	[1.12]	[0.39]	[0.43]	[1.02]
<b>Constant</b>	-0.60**	-0.79***	-0.47*	-0.19	-0.60**	-0.76***	-0.50**	-0.15	-0.93***	-1.18***	-0.70**	-0.57*
	[-3.03]	[-3.49]	[-2.52]	[-0.95]	[-3.01]	[-3.33]	[-2.76]	[-0.75]	[-3.82]	[-4.27]	[-3.14]	[-2.10]
<b>R2</b>	0.227	0.222	0.214	0.030	0.231	0.225	0.215	0.036	0.228	0.225	0.214	0.032
<b>R2-adj</b>	0.225	0.221	0.213	0.028	0.229	0.224	0.213	0.034	0.227	0.223	0.213	0.030
<b>N</b>	6906	6906	6906	6906	6906	6906	6906	6906	6906	6906	6906	6906
<b>Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Firm FE</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**Observations:** The dependent variables are *ESG Rank*, *ESG Environmental Rank*, *ESG Social Rank*, and *ESG Governance Rank*. For variables formulas, see [Table 1](#). <sup>+</sup>  $p < 0.1$ .

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ , t-stats between brackets.

**Table 3**  
Difference-in-Differences models - full sample.

	Panel A				Panel B			
	ESGRank	ESGEnv. Rank	ESGSoc. Rank	ESGGov. Rank	ESGRank	ESGEnv. Rank	ESGSoc. Rank	ESGGov. Rank
Treated (Brazil)	0.25*** [8.91]	0.22*** [5.51]	0.32*** [7.33]	0.03 [0.53]	0.00 [.]	0.00 [.]	0.00 [.]	0.00 [.]
After (2015)	0.14*** [19.80]	0.15*** [15.43]	0.15*** [16.19]	0.04*** [4.86]	0.04*** [5.75]	0.05*** [7.26]	0.03*** [4.78]	0.02* [2.43]
Treated (Brazil) X After (2015)	-0.08*** [-4.27]	-0.05* [-2.64]	-0.11*** [-5.69]	-0.02 [-1.01]	-0.08*** [-5.09]	-0.08*** [-3.92]	-0.11*** [-7.39]	0.01 [0.27]
Size (lagged)	0.10*** [14.08]	0.12*** [16.92]	0.09*** [15.33]	0.06*** [8.82]	0.04*** [5.12]	0.05*** [4.87]	0.04*** [4.94]	0.03*** [3.41]
MtB (lagged)	0.01*** [5.19]	0.00 [1.00]	0.01*** [4.90]	0.00 [0.93]	0.00 [0.23]	-0.00 [-0.56]	0.00 [0.91]	-0.00 [-0.39]
Leverage (lagged)	-0.02 [-0.41]	0.01 [0.17]	-0.06 [-1.45]	0.03 [0.80]	0.05 [1.24]	0.08 <sup>+</sup> [1.75]	0.02 [0.54]	0.03 [0.69]
Capex + RD (lagged)	0.40* [2.57]	0.40* [2.43]	0.41 <sup>+</sup> [2.02]	0.30*** [5.25]	0.07 [1.03]	0.09 [1.19]	0.08 [1.19]	-0.03 [-0.36]
ROA (lagged)	-0.02 [-0.21]	-0.11 [-1.12]	0.06 [0.78]	-0.01 [-0.14]	0.06 [1.26]	0.05 [1.01]	0.06 [1.45]	0.03 [0.46]
Cash (lagged)	-0.03 [-1.65]	-0.04 [-1.71]	-0.05 <sup>+</sup> [-2.02]	0.02 [0.59]	0.02 [1.16]	0.01 [0.45]	0.01 [0.46]	0.03 [1.06]
Constant	-1.94*** [-12.26]	-2.22*** [-16.60]	-1.74*** [-12.90]	-0.94*** [-5.85]	-0.56** [-2.98]	-0.72*** [-3.32]	-0.42* [-2.49]	-0.21 [-1.06]
R2	0.336	0.354	0.372	0.095	0.235	0.228	0.229	0.030
R2-adj	0.331	0.349	0.368	0.088	0.234	0.226	0.227	0.028
N	6906	6906	6906	6906	6906	6906	6906	6906
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	No	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	No	No	No	No
Country FE	Yes	Yes	Yes	Yes	No	No	No	No

**Observations:** The dependent variables are *ESG Rank*, *ESG Environmental Rank*, *ESG Social Rank*, and *ESG Governance Rank*. *Treated* is a dummy marking Brazilian firms, *Time* is a dummy marking the years after 2015. For variables formulas, see Table 1. <sup>+</sup>  $p < 0.1$ .

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ , t-stats between brackets.

### 2.3. Shock in the competitiveness of Brazilian firms

The assumption behind Eq. (2) is that Brazilian firms suffered an exogenous shock in 2015 in the competitiveness against other countries. Fig. 1 presents the Global Competitive Index (GCI) of Brazil and the other countries' average. Both groups follow similar trends before 2015. In 2015, Brazil's GCI decreased significantly, leading the country to become less competitive globally. This study assumes this drop represents a shock in Brazilian firms' power to compete in international markets, leading them to focus more on the internal market, thus increasing competition. The decrease in the GCI in 2015 is the outcome of internal turmoil in Brazil, including the beginning of a presidential impeachment, currency depreciation of around 60%, negative GDP growth of about 3.5%, skyrocketing inflation around 10.5%, and a drop in exports and imports of goods and services of around 14% and 24%, respectively (sourced from the World Bank). Thus, 2015 is a year in which Brazilian economic fundamentals significantly depreciated, putting pressure on firms to compete more in the local economy, thus creating an excellent setting for learning more about how competition shapes firm's ESG practices.

Using 2015 as the year of an exogenous shock in Brazil, the next step is to pair firms from Brazil with firms from the other 21 emerging markets. I use a propensity score matching technique using all financial control variables as covariates (e.g., *Size*, *MtB*, *Leverage*, *Capex + RD*, *ROA*, and *Cash*, which are described in Table 1). The matching is by industry and year, following Greenaway et al. (2005) and Martins et al. (2020). I match firms either with or without replacement. Panel B of Table 1 reports the results of average *t*-tests between the treatment and control groups for the six covariates and the two matching criteria. None of the differences are significant when the matching is executed without replacement, suggesting paired firms are not dissimilar in terms of the control variables. Although some differences are significant at conventional levels when matching is executed with replacement, most are not significant.

## 3. Results

### 3.1. Competition and ESG

Table 2 contains the main results for Eq. (1). Each column covers a model where the dependent variable is either the ESG score rank

**Table 4**  
Difference-in-Differences models - matched samples.

	Panel A - Without replacement				Panel B - With replacement			
	ESGRank	ESGEnv. Rank	ESGSoc. Rank	ESGGov. Rank	ESGRank	ESGEnv. Rank	ESGSoc. Rank	ESGGov. Rank
<b>Treated (Brazil)</b>	0.25**	0.24**	0.36***	-0.06	0.26**	0.26***	0.34**	-0.01
	[5.34]	[4.97]	[6.07]	[-0.67]	[4.70]	[6.23]	[4.67]	[-0.06]
<b>After (2015)</b>	0.14*	0.13*	0.14**	0.07	0.16**	0.15**	0.16***	0.06
	[3.02]	[3.00]	[5.36]	[0.73]	[4.69]	[5.30]	[5.80]	[0.61]
<b>Treated (Brazil) X After (2015)</b>	-0.14*	-0.10 <sup>+</sup>	-0.15**	-0.08	-0.14**	-0.09*	-0.14***	-0.08
	[-3.32]	[-2.19]	[-5.14]	[-1.62]	[-4.36]	[-2.74]	[-8.67]	[-1.51]
<b>Size (lagged)</b>	0.10***	0.12***	0.09***	0.04**	0.10***	0.12***	0.09***	0.03*
	[8.72]	[7.96]	[9.14]	[4.04]	[11.51]	[11.48]	[10.92]	[2.62]
<b>MtB (lagged)</b>	-0.00	-0.00	-0.02	0.01	-0.00	-0.00	-0.02	0.01
	[-0.23]	[-0.07]	[-0.99]	[0.57]	[-0.27]	[-0.00]	[-0.96]	[0.45]
<b>Leverage (lagged)</b>	0.00	0.00	-0.04	0.08	-0.04	-0.06	-0.08	0.08
	[0.05]	[0.01]	[-0.46]	[0.79]	[-0.42]	[-0.52]	[-0.74]	[0.84]
<b>Capex + RD (lagged)</b>	0.95*	0.84*	0.80	0.94*	1.00*	0.92*	0.85	0.88*
	[2.41]	[2.43]	[1.39]	[3.06]	[2.42]	[2.49]	[1.52]	[3.34]
<b>ROA (lagged)</b>	0.15	-0.03	0.44	-0.13	0.10	-0.09	0.41	-0.18
	[0.51]	[-0.08]	[1.38]	[-0.64]	[0.29]	[-0.20]	[1.05]	[-0.97]
<b>Cash (lagged)</b>	0.01	-0.04	0.01	0.04	-0.00	-0.08	0.01	0.04
	[0.18]	[-0.59]	[0.21]	[0.55]	[-0.04]	[-0.76]	[0.14]	[0.47]
<b>Constant</b>	-1.90***	-2.37***	-1.56***	-0.38	-1.90***	-2.44***	-1.58***	-0.25
	[-7.33]	[-8.47]	[-9.20]	[-1.42]	[-9.32]	[-13.10]	[-11.89]	[-0.84]
<b>R2</b>	0.379	0.365	0.424	0.130	0.394	0.393	0.439	0.125
<b>R2-adj</b>	0.344	0.328	0.391	0.080	0.358	0.356	0.405	0.073
<b>N</b>	774	774	774	774	728	728	728	728
<b>Year FE</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Industry FE</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Country FE</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

**Observations:** The dependent variables are *ESG Rank*, *ESG Environmental Rank*, *ESG Social Rank*, and *ESG Governance Rank*. *Treated* is a dummy marking Brazilian firms, *Time* is a dummy marking the years after 2015. For variables formulas, see Table 1. <sup>+</sup>  $p < 0.1$ .

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ , t-stats between brackets.

or the pillar ranks. Each panel shows the results of one competition proxy. I include firm fixed effects, with robust standard errors.<sup>4</sup> Table 2 shows competition to be negatively associated with ESG, but the results are not consistent across proxies. While *LI* is negatively related to ESG and the three pillars, *Subst.* is negatively related only with *ESG*, *ESG - Env.*, and *ESG - Gov.*, and *BI* is negatively related with *ESG Soc.* Although this table does not provide causal estimates, the takeaway is that competition seems to make firms' ESG scores decrease. Nevertheless, the coefficients of competition have a small marginal effect: increasing *BI*, *LI*, and *Subst.* from the 25th to the 75th percentile while keeping all remaining covariates at their means makes firms decrease their *ESG Rank* by around only one percentile rank.

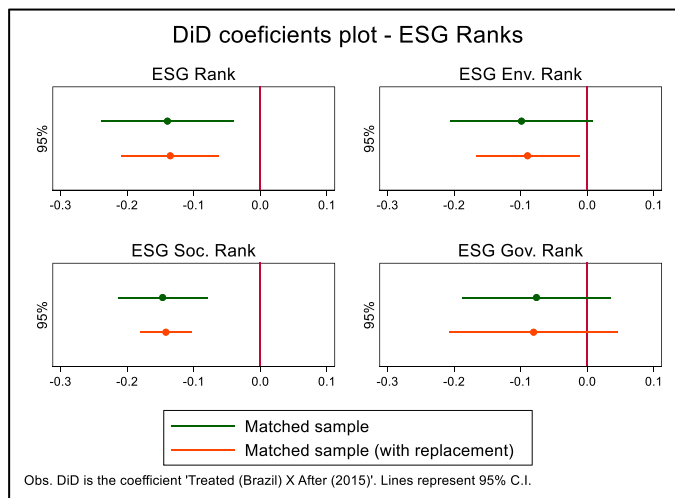
### 3.2. Difference-in-differences

Before covering the matched samples, in Table 3 I show the results of a difference-in-differences model using the full sample of 6906 firm-year observations. Brazilian firms have higher *ESG Rank*, *ESG Env. Rank*, and *ESG Soc. Rank* than their counterparts. On the flip side, the difference-in-differences coefficient (i.e., the interaction of *Treated (Brazil) × Time (2015)*) shows negative and significant coefficients in all the models except those with *ESG Gov. Rank*. This suggests Brazilian firms' ESG ranks decreased after the shock of 2015.

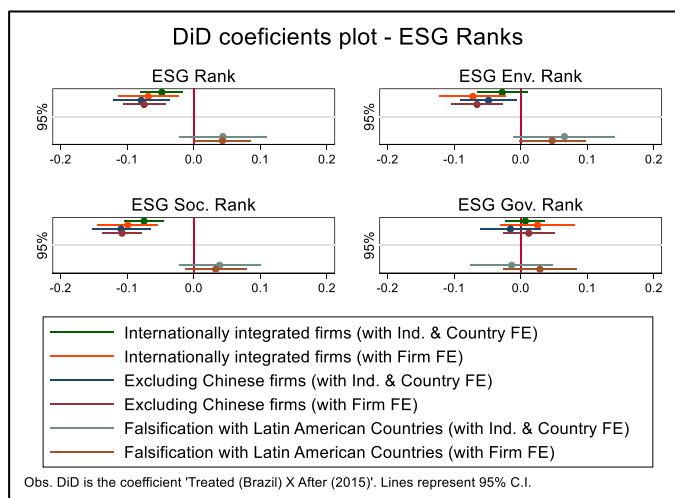
Table 4 presents the results of the matched samples described earlier. The two panels show the results of matching with and without replacement and both panels include industry, country, and year fixed effects. Standard errors are clustered by industry. The results of Table 4 corroborate the main findings of Table 3. On average, Brazilian firms have higher ESG scores and environmental and social pillars than firms in other emerging economies. Moreover, the results corroborate the finding that Brazilian firms decreased ESG practices after 2015. Collectively, the coefficients of *Treated (Brazil) × After (2015)* in Tables 3 and 4 suggest marginal effects of around 0.10. This finding indicates that, after the shock, Brazilian firms' average percentile rank was about 10% lower than before.

To facilitate the visualization of the main results, Fig. 2 shows the plot of the difference-in-differences coefficients of the two panels, with a 95% confidence interval. The two horizontal lines in each quadrant clearly show that most of the effects are negative and

<sup>4</sup> In untabulated results, I used industry and country fixed effects with standard errors clustered by industry. I found no qualitative differences with Table 2.



**Fig. 2.** Matched sample combined results.



**Fig. 3.** Robustness and falsification tests.

significant at 5%. There is no qualitative difference between the results of Table 4 and Fig. 2.

**3.3. Robustness tests**

In this section, I describe robustness tests. In the interest of space, I omit the tables. However, Figs. 3 and 4 consolidate the results of the tests, just as Fig. 2 consolidates the results of Table 4.

First, I execute two robustness tests. One potential caveat of Tables 3 and 4 is that perhaps more internationally integrated Brazilian firms suffered less of a shock in 2015 than the others. To investigate this, I rerun Eq. (2) for only those Brazilian firms that are internationally integrated. The proxy for international integration is the beta of a regression of *free cash flow* against the *real effective exchange rate*, which is expected to be negative if the firm is internationally integrated, since these firms are expected to have increased free cash flow when the local currency value drops (i.e., the real effective exchange rate decreases). The results of this test do not differ from the main results. Additionally, most of the firm-year observations are from China, but their exclusion does not change the main results. The top four lines of each quadrant in Fig. 3 represent these results.

Inspired by the reviews of Atanasov and Black (2016) and Roberts and Whited (2013), I also conduct falsification and placebo tests. First, I run a falsification test using all the firms in Latin America except for Brazil. Specifically, I assume for a moment that a competitive shock occurred in Argentina, Chile, Colombia, Mexico, and Peru and I use firms from these countries as the treated group. I am not aware of any competitive shock in these countries in 2015; thus, I expect such a difference-in-differences model to yield nonsignificant coefficients. The bottom two lines of the four quadrants in Fig. 3 show mainly nonsignificant coefficients at the 5% level.

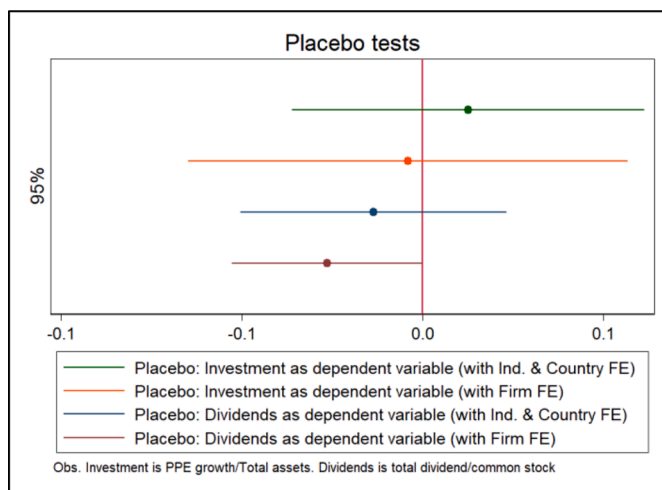


Fig. 4. Placebo tests.

These findings make me more comfortable that the assumption of variation in Brazilian competitiveness is plausibly exogenous, and the results of Tables 3 and 4 are unlikely to be a Latin American trend.

Finally, I run a placebo test using as dependent variables in Eq. (1) firm's a) *investment* (i.e., change in plant, property, and equipment over total assets) and b) *dividends* (i.e., total dividends paid to common stock over total common equity capital). A firm's investment and dividend policies are both expected to be less opaque than its ESG, and investors can evaluate them more correctly. Thus, I expect firms to be unwilling to change them in response to competitive shocks. Again, I expect the nonsignificant coefficients. Fig. 4 shows the coefficients of this placebo test. They are not significant at the 5% level, supporting the claim that the shock mainly affected the ESG of Brazilian firms.

#### 4. Concluding remarks

This study has two main takeaways. First, firms' ESG policies in emerging market countries differ from those of firms in developed countries, since the results contradict those of Fernández-Kranz and Santaló (2010), Flammer (2015) and Leong and Yang (2020), who find that competition leads to better ESG practices in U.S. firms. Future research could look more closely at the competition–ESG relation to understand the source of these differences. Additionally, this study calls investor attention to the undesired effects of competition on firms' ESG practices in emerging market countries. Since firms from these countries are expected to invest significantly over the following years to fuel growing economies, the results of this study direct stakeholder and regulatory attention to the way competition can shape these investments.

#### Declarations of Competing Interest

None.

#### Acknowledgment

The author is grateful to the financial support from the *Pontifical Catholic University* of Rio de Janeiro (PUC-Rio), the Brazilian research council (Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq), the Brazilian Research Commission (CAPES) and *Fundação de Amparo à pesquisa do Rio de Janeiro* (FAPERJ). All remaining errors are author's only.

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