Environmental awareness and firm creation

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Abstract

Purpose – This study tests whether environmental awareness affects firm creation by using Google Trends data and a novel region-level data set from Italy.

Design/methodology/approach – Forward-looking entrepreneurs drive firm creation. The authors hypothesize that more environmentally conscious entrepreneurs will emerge as environmental awareness rises, increasing the number of green and energy firms. The authors test the prediction using Google Trends data and a novel region-level data set from Italy.

Findings – The authors find that not only the number of green and energy-innovative firms but also that of all innovative start-ups increases with rising environmental consciousness. The results imply some "innovation spillover" effects from green sectors to other industries with rising environmental awareness.

Originality/value – The paper hypothesizes that as environmental awareness rises, more environmental-conscious entrepreneurs will emerge, which would increase the number of green and energy firms. Robustness and falsification tests are also offered.

Keywords Environmental awareness, Google trends, Innovative start-ups

Paper type Research paper

1. Introduction

In the Dynamic Stochastic General Equilibrium (DSGE) framework, firm creation decisions are made by forward-looking entrepreneurs who compare anticipated profits against the costs of entry (Ghironi and Melitz, 2005). The wider ecosystem may influence revenues and costs, which are heavily dependent on general behavioral patterns like attitudes, traditions and culture (Hofstede, 2001).

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Growing concerns about climate change and global warming have increased the value of research on social and behavioral aspects of environmental problems (Cruz and Manata, 2020). Several studies showed that familiarity with environmental facts could shape socioeconomic outcomes. For instance, Barrage and Furst (2019) show how climate change beliefs shape housing construction in sea level rise exposed areas. However, Austmann and Vigne (2021) argue that environmental awareness does not affect electrical vehicle sales.

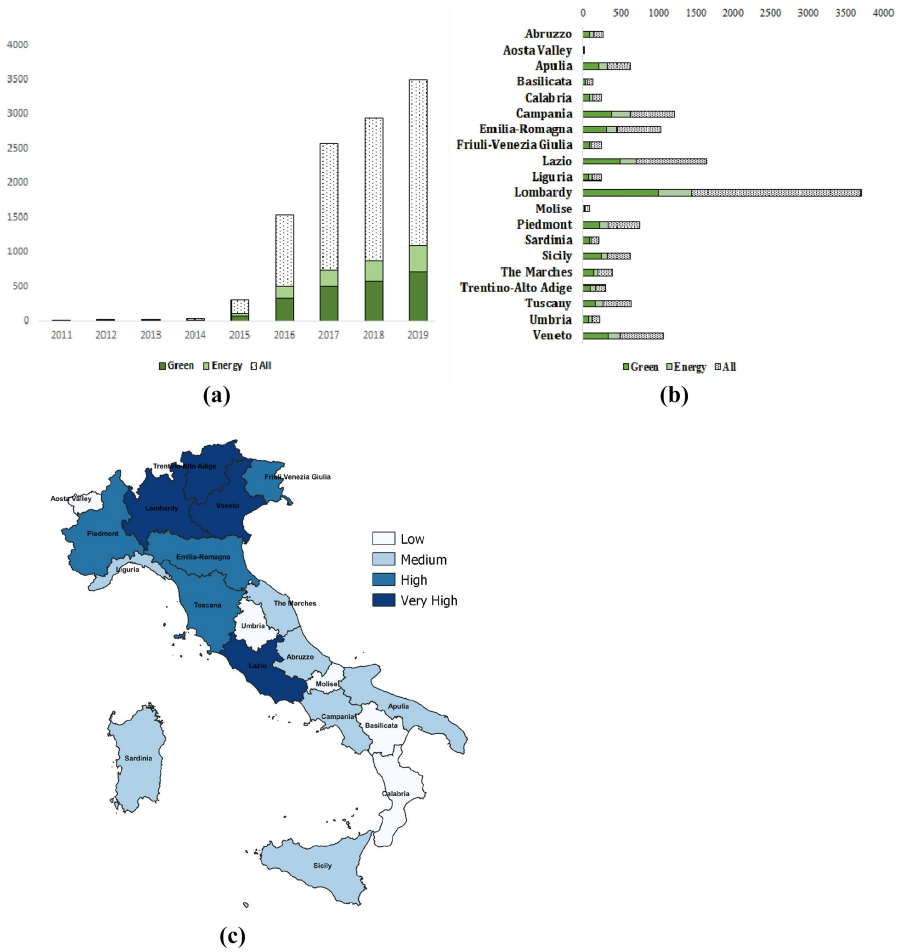
In this paper, we investigate whether environmental awareness increases the number of green and energy firms by increasing the number of environment conscious entrepreneurs. The relation between awareness and firm creation has been studied in Cojoianu *et al.* (2020), which shows that regional environmental knowledge positively impacts new venture creation in green technologies. However, while Cojoianu *et al.* (2020) use fractional green patent count per region per year as a measure of environmental awareness, and thus control for the supply side only, we proxy environmental awareness with relevant Google searches and therefore provide a more general and inclusive (of the consumer side) measure of environmental awareness.

Cojoianu *et al.* (2020) also contend that environmental knowledge creation yields positive externalities beyond the green sector. Gray industries also benefit from enhanced start-up financing in regions where new environmental knowledge is created. Baki and Marrouch (2022) argue that environmental awareness can be a cheaper anti-pollution instrument than emission taxes. Moreover, using multi-level ordered logit regressions with 2,945 start-up entrepreneurs in 31 countries (Global Entrepreneurship Monitor data), Hoogendoorn *et al.* (2020) find that "greener start-ups" are more likely to engage in product and process innovations. Therefore, we also take our investigation one step further and test if there are any spillover effects to other industries by studying the effect of environmental awareness on the number of innovative start-ups. Our results show that not only green and energy firms but also innovative start-ups increase with society-wide environmental knowledge creation.

The remainder of the paper is organized as follows. Section 2 describes the data. Section 3 outlines the econometric models and discusses the empirical results. Sections 4 and 5 present robustness and falsification analyses, respectively. Finally, Section 6 offers some concluding remarks.

2. Data

In this paper, we are interested in the different types of innovative start-ups, defined as companies, newly incorporated or operational for less than five years, whose prevalent objective is the production, development and commercialization of innovative goods or services of high-technological value. Italy provides an ideal setting since the Italian Ministry of Economic Development introduced a new set of policy measures in 2012 (Italian Start-ups Act), aimed at promoting sustainable growth and technological advancement and creating favorable conditions for developing a new business culture inclined toward innovation [1]. The introduction and legal recognition of innovative start-ups have brought a surge in the number of such firms in Italy, as shown in Figure 1, Panel A. We use two data sets to collect quarterly data from 2011 to 2019 for the twenty Italian regions: [2] (1) the special section dedicated to innovative start-ups in the Chamber of Commerce Register to collect the number of registered innovative start-ups, and (2) the Aida database (Bureau Van Dijk) to collect the innovative start-ups missions and sectors. We also use Eurostat to collect the following regional control variables: GDP per capita, population, number of employed workers, investment in research and innovation, number of employed in research and innovation, and the number of university and research center employees. Our control variables are standard in this vein of research. For instance, Arin *et al.* (2015), by using a Bayesian approach that solves model uncertainty, conclude that GDP per capita and unemployment are the two most



Note(s): Innovative start-ups data is sourced by the Italian Chamber of Commerce Register. (a) Distribution of Green, Energy and All Innovative Start-ups by year (2011-2019). (b) Distribution of total Green, Energy and All Innovative Start-ups, per region, over the period 2011:I-2019:IV. (c) Geographical distribution of Global Warming as the environmental awareness measure. Darker shades indicate higher intensity
Source(s): Authors own creation

Figure 1.
Distributions of innovative start-ups and environmental consciousness intensity

important explanatory variables that explain cross-country levels of entrepreneurship. Including research and development investment, the number of employed in research and innovation, and the number of university and research center employees, as control variables is crucial because it allows us to capture the significant role of knowledge creation in start-up development, highlighting the positive impact of investing in research and development activities on the growth and success of new ventures (Giudici *et al.*, 2019). Panel A of Table 1 reports the descriptive statistics for the control variables. In the following subsections, we describe the variables used in our analysis.

Variable	Mean	Std. Dev	Min	Max
Panel A: control variables				
GDP per Capita	28,375.62	7,713.64	16,373.32	43,943.07
Population	3,003,613	2,445,544	125,034	10,027,602
Employed	1,242,510	1,099,075	60,400	4,910,400
Investment in Research and Innovation	1,128,162	1,273,601	0	5,316,684
Employed in Research and Innovation	38,953.90	51,715,87	900	227,800
Employees in Universities and Research Centers	9,080.20	9,247.83	235	45,764
Panel B: dependent variables				
Green	3.059722	6.223741	0	46
Energy	1.563889	3.296026	0	25
Innovative Start-ups	10.49583	22.50508	0	179

Table 1.
Control variables descriptive statistics

Note(s): The sample size covers the period 2011–2019. GDP per capita and investment in research and innovation are reported in Euros. All other variables are count variables
Source(s): Authors' own creation

2.1 Innovative start-ups

According to the relevant legislation (DL 179/2012, art. 25, paragraph 2), an innovative start-up is defined as a company established in the form of a joint-stock company, including a cooperative form, and must be based in Italy or any other European Union (EU) member state, provided it has a production site or branch in Italy. The company's primary purpose is expected to be the development, production and marketing of innovative products or services with high technological value. We consider the following three dependent variables: green, energy and innovative start-ups. Green refers to the number of innovative start-ups operating in the "green" sector. There is no precise classification of green innovative companies; therefore, we follow a popular approach proposed in the recent literature by means of textual analysis (Colombelli, 2016; Giudici *et al.*, 2019) [3]. The sample comprises 2,203 companies. Energy refers to the number of innovative start-ups with a high technological value in the energy sector. Upon registration with the Chamber of Commerce, start-ups declare whether their activity has a high technological value in the energy sector, supported by certified evidence. The sample comprises 1,126 companies. The number of all registered innovative start-ups is 7,557. Descriptive statistics for the dependent variables are provided in Table 1, Panel B.

2.2 Environmental awareness indicators

We use Google Trends, a publicly available platform by Google, to collect Internet searches on the topics "Global Warming" and "Climate Change," which we use as two different measures of environmental awareness. Google Trends has been used in various research areas, including IT, communications, medicine, health, business and economics (Seung-Pyo *et al.*, 2018). We download weekly data on each topic for the twenty Italian regions from 2011 until 2019. Google Trends provides a scaled measure of the search volume of a topic over a time period in a specific region. Specifically, Google Trends draws a random sample of searches over the specified period and region. Then, for each week, it divides the number of topic searches by the total number of Google searches for that week in the specified region. This ratio is then scaled to 100 for the week with the highest ratio and 0 for the week without sufficient topic searches. Thus, Google Trends does not provide the absolute number of searches but rather the intensity of searches. In our case, it provides the salience of environmental awareness. The distribution of intensities across Italian regions is presented in Figure 1, Panel C.

For additional robustness, we also conduct comparative searches which provide the relative interest in our environmental awareness proxies relative to other public-interest topics (Siliverstovs and Wochner, 2018). We follow Jetter and Molina (2022) and compare our two topics of interest to the topics "Health," "Job" and "Education." The topic comparison provides the value of searches of the specific topic relative to the highest search popularity across all compared topics. Thus, taking the ratio of the topic search indices mitigates the highest search volume, which is the common scaling factor, and provides the ratio of the absolute search volumes of the two topics. Along with providing additional measures of environmental awareness, comparative searches help us deal with low search intensities in some regions, which might lead to high fluctuations in the index that are not necessarily meaningful. Since firms' data are available quarterly, we construct quarterly search intensities by averaging the weekly intensities over each quarter.

3. Methodology and empirical results

We investigate the effect of environmental awareness on innovative start-ups using the following regression:

$$Y_{it} = \exp(\gamma + \beta G_{i,t-4} + \theta X_{it} + \delta Year_t + \rho Region_i + u_{it}), \quad (1)$$

where Y_{it} is one of our three dependent variables of interest, the number of green, energy, and all innovative start-ups in region i and quarter t. $G_{i,t-4}$ is one of the Google Trends measures of environmental awareness. GW is the Google Trends index when the topic "Global Warming" is specified. Ln_GW_Health, Ln_GW_Job and Ln_GW_Educ are the logarithmic transformation of the ratio of GW to health, jobs and education in the comparative Google Trends searches, respectively, and are used for additional robustness test. We construct similar variables using Google searches for "Climate Change" as the proxy for environmental awareness. We use a 4-quarter (yearly) lagged Google search value to control for simultaneity and reverse causality as more green/energy/innovative start-ups might increase environmental awareness. Moreover, the effect of environmental awareness on start-ups might take some time to materialize. X_{it} is the set of regional control variables specified in Section 2. Year_t is a year fixed effect and Region_i is a region fixed effect. u_{it} is the error term. We estimate the above regression using a negative binomial model, given that all our dependent variables are count variables suffering from over-dispersion (Giudici *et al.*, 2019) [4]. To deal with the issue of serial correlation, we cluster the standard errors at the regional level (Cameron and Miller, 2015; Abadie *et al.*, 2023).

Given that, in our robustness tests, we use three measures of environmental awareness and test its effects on several dependent variables, our results might suffer from false discoveries or Type 1 errors. This occurs when some hypotheses are rejected due to testing multiple outcomes and thus out of pure chance. Indeed, when testing only five outcomes, the probability of finding at least one significant result at the 5% level is 22.6% (Sayour, 2019). We correct for the false discovery rate using a two-stage linear step-up model (Benjamini *et al.*, 2006). We also follow Anderson (2008) and calculate q-values which are p-values corrected for the false discovery rate. Correcting for multiple outcomes is common in psychology and biostatistics (Hochberg, 1988; Benjamini and Yekutieli, 2001) but is much less used in business related disciplines (Milligan and Stabile, 2011; He and Sayour, 2020; Djoundourian *et al.*, 2022).

Table 2 reports our estimation results with environmental awareness being proxied by Google Trends searches for "Global Warming." The results for the green firms without any controls and with the complete set of controls (X) are reported in columns (1) and (2),

	(1)	(2)	(3)	(4)	(5)	(6)
	Green		Energy		Innovative start-ups	
Global warming	0.010**	0.008*	0.011**	0.010**	0.012***	0.011***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.002)
GDP per capita		5.88e-05		0.0001**		7.08e-05*
		(3.95e-05)		(4.63e-05)		(3.73e-05)
Population		7.34e-06		6.65e-06		5.92e-06
		(4.96e-06)		(5.49e-06)		(4.87e-06)
Nbr employed		−0.012**		−0.018***		−0.011*
		(0.006)		(0.007)		(0.006)
Investment in research and innovation		5.45e-07		5.51e-08		3.82e-07
		(9.29e-07)		(7.02e-07)		(8.66e-07)
Nbr employed in research and innovation		−0.019		−0.001		−0.016
		(0.016)		(0.017)		(0.015)
Nbr of employed in universities and research centers		0.0001		0.0001		0.0001
		(0.0001)		(8.97e-05)		(7.61e-05)
Constant	−4.478***	−23.65	−16.73***	−29.96	−4.484***	−20.03
	(1.027)	(16.22)	(0.330)	(18.52)	(1.040)	(15.14)
Alpha	0.054**	0.043**	0.037***	0.019***	0.067**	0.053**
	(0.029)	(0.024)	(0.054)	(0.046)	(0.033)	(0.023)

Note(s): The table reports the estimates of the negative binomial regression with environmental awareness proxied by "Global Warming." Standard errors clustered at the region level are reported in parentheses. ***, ** and * correspond to significance at the 1%, 5 and 10%, respectively. Alpha is the over-dispersion parameter; $N = 648$

Source(s): Authors' own creation

Table 2.
Negative binomial regression estimates-global warming

respectively. We find that environmental awareness significantly increases the number of green firms. Columns (3) and (4) report the results for the effect of environmental awareness on the number of energy firms which we also find to be positive and significant. To study whether there is a spillover effect on other industries, we re-run regression (1) using the total number of innovative start-up firms as the dependent variable. Results, reported in columns (5) and (6), show a positive and significant relationship between environmental awareness and the number of innovative start-ups when using "Global Warming" as a proxy for environmental awareness. Interestingly, we also find a positive and significant effect of GDP per capita and a negative and significant effect of the number of employed on the number of green, energy and all innovative start-ups. These results align with those found in Arin *et al.* (2015), who show, using a Bayesian model, that GDP per capita and unemployment are the main drivers of cross-country levels of entrepreneurship. Our population results align with Giudici *et al.* (2019) who find a positive but not significant effect of population density on the creation of cleantech start-ups. Lastly, although we find an expected positive effect of investment in research and innovation and the number of employed in universities and research centers, those effects are insignificant. Table 2 also reports the over-dispersion "alpha" coefficient. Throughout all specifications, alfa is always positive and significant, suggesting that the data are over-dispersed, and hence justifying the use of the negative binomial model [5].

To ensure that our results are not driven by the choice of the environmental awareness proxy, we re-estimate the negative binomial model using "Climate Change" Google Trends searches instead of "Global Warming." The results reported in Table 3 align with the ones in

	(1)	(2)	(3)	(4)	(5)	(6)
	Green		Energy		Innovative start-ups	
Climate change	0.020***	0.019***	0.015***	0.014**	0.019***	0.018***
	(0.007)	(0.007)	(0.006)	(0.006)	(0.003)	(0.003)
GDP per capita		6.03e-05		0.0001***		7.44e-05*
		(3.93e-05)		(4.46e-05)		(3.84e-05)
Population		7.80e-06		7.04e-06		6.39e-06
		(4.98e-06)		(5.43e-06)		(4.83e-06)
Nbr employed		−0.013**		−0.019***		−0.012*
		(0.006)		(0.007)		(0.006)
Investment in research and innovation		6.04e-07		1.07e-07		4.10e-07
		(9.78e-07)		(7.10e-07)		(8.74e-07)
Nbr employed in research and innovation		−0.017		−0.001		−0.016
		(0.016)		(0.017)		(0.015)
Nbr of employed in universities and research centers		0.0001		0.0001		0.0001
		(0.0001)		(9.12e-05)		(8.00e-05)
Constant	−4.634***	−25.02	−16.62***	−29.98	−4.595***	−21.29
	(1.023)	(16.25)	(0.033)	(18.30)	(1.049)	(14.92)
Alpha	0.056**	0.044**	0.042***	0.021***	0.064**	0.049**
	(0.021)	(0.023)	(0.052)	(0.044)	(0.033)	(0.022)

Note(s): The table reports the estimates of the negative binomial regression with environmental awareness proxied by "Climate Change." Standard errors clustered at the region level are reported in parentheses. ***, ** and * correspond to significance at the 1%, 5 and 10%, respectively. Alpha is the over-dispersion parameter; $N = 720$

Source(s): Authors' own creation

Table 3. Negative binomial regression estimates-climate change

Table 2, showing that environmental awareness significantly increases the number of green, energy and innovative start-ups.

4. Robustness checks

As additional robustness checks, we construct different proxies of environmental awareness using comparative searches for the terms "Global Warming" and "Climate Change" with widely searched topics such as "Health," "Job" and "Education." Table 4 reports the results of this exercise with the different measures of "Global Warming" in Panel A and the ones for "Climate Change" in Panel B. We only report the estimates of β, the coefficient of the Google Trends index from Equation (1), which measures the effect of environmental awareness on start-ups. The standard errors, clustered at the regional level, are reported in parentheses. Since we estimate the effects for multiple outcomes, we correct for the false discovery rate following Anderson (2008). The q-values, which are p-values adjusted for the false discovery rate, are reported in brackets under the standard errors. The results for the green firms without any controls and with the complete set of controls (X) are reported in columns (1) and (2), respectively. We find that environmental awareness significantly increases the number of green firms, in both specifications and across all the six Google Trends measures that we use as proxies for environmental awareness. Columns (3) and (4) report the results for the effect of environmental awareness on the number of energy firms which we also find to be positive and significant. Lastly, columns (5) and (6) show a positive and significant relationship between environmental awareness and the number of innovative start-ups across all specifications and Google Trends measures. The q-values show that all our results hold even after correcting for the false discovery rate.

	(1)	(2)	(3)	(4)	(5)	(6)
	Green		Energy		Innovative start-ups	
Panel A: global warming (GW)						
ln_GW_Health	5.020	4.600	5.586	4.638	4.778	4.358
	(2.111)**	(2.134)**	(2.199)**	(2.188)**	(1.422)***	(1.295)***
	[0.030]**	[0.044]**	[0.023]**	[0.046]**	[0.003]***	[0.003]***
ln_GW_Job	2.434	2.546	4.205	4.053	2.726	2.790
	(1.236)**	(1.283)**	(1.322)***	(1.375)***	(0.673)***	(0.721)***
	[0.056]*	[0.056]**	[0.004]***	[0.008]***	[0.001]***	[0.001]***
ln_GW_Edu	4.447	3.953	7.141	6.317	6.315	5.836
	(2.651)*	(2.581)	(2.835)**	(2.768)**	(1.529)***	(1.474)***
	[0.098]*	[0.126]	[0.023]**	[0.034]**	[0.001]***	[0.001]***
Panel B: climate change (CC)						
ln_CC_Health	3.723	3.604	3.048	2.733	3.290	3.253
	(1.322)***	(1.540)**	(1.527)**	(1.635)*	(0.502)***	(0.609)***
	[0.007]***	[0.022]**	[0.048]**	[0.095]*	[0.001]***	[0.001]***
ln_CC_Job	2.500	2.791	2.187	2.461	2.138	2.394
	(0.829)***	(0.852)***	(0.571)***	(0.609)***	(0.297)***	(0.320)***
	[0.005]***	[0.003]***	[0.001]***	[0.001]***	[0.001]***	[0.001]***
ln_CC_Edu	4.643	4.338	3.981	3.743	4.703	4.462
	(1.481)***	(1.519)***	(1.374)***	(1.333)***	(0.640)***	(0.608)***
	[0.004]***	[0.007]***	[0.007]***	[0.007]***	[0.001]***	[0.001]***

Note(s): Each cell corresponds to the estimate of the coefficient of the Google Trends variable in the negative binomial regression. Panel A reports the results when using Global Warming as the environmental awareness measure, Panel B when using Climate Change. Columns (1) and (2) report the results for the number of green innovative start-ups without and with controls (not reported for lack of space and available upon request), respectively. The following set of regional control variables has been considered: GDP per capita, population, number of employed workers, investment in research and innovation, number of employed in research and innovation, number of universities and research centers employees. Similar results are reported for the number of innovative energy firms in columns (3) and (4), and the number of all innovative start-ups in columns (5) and (6). Standard errors, clustered at the region level, are reported in parentheses. The corresponding *p*-values corrected for the false discovery rate, [*q*-values], are reported in brackets. ***, ** and * correspond to significance at the 1%, 5 and 10%, respectively

Source(s): Authors' own creation

Table 4.
Negative binomial regression estimates - robustness checks

5. Falsification test

We next conduct a falsification test to study whether the effects that we estimate reflect the impact of environmental awareness on the creation of green firms or a mere artifact of the Google Trends data. To do so, we consider Google Trends on a topic that is not related to environmental awareness. Specifically, we choose the topic "UEFA Championship League" (hereafter, Champ). Since this is not related to environmental awareness or innovative start-ups, we should not find an effect of these searches on the creation of different types of innovative firms. Table 5 reports the results of the negative binomial model described in equation (1) using Google Trends for the topic Champ. In line with our expectations, we find no significant effect of the Champ Google Trends on the number of green start-ups (columns 1 and 2) or on the number of energy start-ups (columns 3 and 4) for all Google Trends proxies and in all specifications, without and with controls. We also find no significant effect on the number of all innovative start-ups except for a couple of exceptions when we use the log ratio of Champ to health as the environmental awareness proxy; however, this effect is negative and thus opposite to what we find in our environmental awareness results. Moreover, this significant effect disappears when we correct for the false discovery rate as can be seen from the large *q*-values. Thus, this falsification test provides support that our earlier results are

	(1)	(2)	(3)	(4)	(5)	(6)
	Green		Energy		All innovative start-ups	
UEFA champions league (Champ)						
Champ	0.0002	−0.0002	−0.007	−0.006	−0.004	−0.004
	(0.004)	(0.003)	(0.005)	(0.005)	(0.003)	(0.003)
	[0.980]	[0.980]	[0.574]	[0.622]	[0.574]	[0.574]
ln_Champ_Health	−0.464	−0.577	−2.346	−2.323	−1.257	−1.328
	(1.061)	(1.034)	(2.011)	(1.989)	(0.631)**	(0.622)**
	[0.883]	[0.883]	[0.574]	[0.574]	[0.558]	[0.558]
ln_Champ_Job	−0.457	−0.339	−1.097	−0.951	−0.494	−0.546
	(0.543)	(0.533)	(0.768)	(0.792)	(0.351)	(0.335)
	[0.741]	[0.883]	[0.574]	[0.574]	[0.574]	[0.574]
ln_Champ_Edu	0.020	0.026	−0.054	−0.025	−0.008	0.015
	(0.098)	(0.084)	(0.099)	(0.094)	(0.084)	(0.058)
	[0.980]	[0.980]	[0.883]	[0.883]	[0.980]	[0.980]

Note(s): Each cell corresponds to the estimate of the coefficient of the Google Trends for "UEFA Champions League" in the negative binomial regression. Columns (1) and (2) report the results for number of green firms without and with controls, respectively. Similar results are reported for the number of firms in the energy sectors in columns (3) and (4), and the number of all innovative start-ups in columns (5) and (6). Standard errors, clustered at the region level, are reported in parentheses. The corresponding *p*-values corrected for the false discovery rate, [*q*-values], are reported in brackets. ***, ** and * correspond to significance at the 1%, 5 and 10%, respectively

Source(s): Authors' own creation

Table 5.
Falsification test

capturing the effect of an increase in environmental awareness on the number of green, energy and innovative start-ups rather than some other confounding factors.

6. Conclusion

This paper studies the effect of environmental awareness on the creation of innovative firms. Proxying environmental awareness by Google Trends searches on the topics "Global Warming" and "Climate Change" and using a negative binomial regression, we show that environmental awareness significantly increases the number of green firms and energy firms. We also document a spillover effect on the number of all innovative start-ups. Our results are robust to different constructs of the environmental awareness proxies. Moreover, we show that the results are not due to some mere artifact of the Google Trends data.

Our investigation documents that environmental awareness substantially affects the type of start-ups emerging within the region's ecosystem. Given the importance of the global fight against climate change, our results imply that effective awareness campaigns may contribute to the broader efforts of sustainability by transforming the business environment. Our measure of environmental awareness can also be utilized to investigate the effects of environmental awareness on other variables of interest.

Notes

1. Decree Law 179, turned into Law No. 221/2012 on December 2012, established a special section of the Italian Chamber of Commerce Business Register for "Innovative start-ups."
2. Although data is available up to 2022:II, we opted to stop in 2019:IV before the start of the coronavirus disease 2019 (COVID-19) pandemic. The distribution of green, energy and the total number of Innovative Start-up firms across Italian regions is presented in Figure 1, Panel B.
3. In order to identify companies with "green" characteristics, we have used a list of keywords, proposed in a recent study published by Infocamere (https://www.infocamere.it/ghezzi–green). We

considered 24 keywords and verified whether any of those were present in the company's mission statement. A mission statement is a description of an organization's purpose, values, and overall goals. If at least one of the keywords was present in the mission statement, the firm would be classified as green. The list of keywords is the following: Circular Economy, Bio, Waste Sorting, Waste, Reforestation, Waste Water, Renewable Energies, Renewable Energy, Renewable, Wind Power, Hydrogen, Energy Saving, Pollution, Clean Energy, Agritech, Depuration, Purify, Aquaponic, Hydroponics, Plastic Free, Energy Efficiency, Energy, Efficiency and Energy Savings.

4. Panel B of Table 1 shows that, for all three dependent variables, the variance/standard deviation is much larger than the mean suggesting the presence of over-dispersion.

5. Using a Poisson model yields qualitatively similar results, available from the authors upon request.

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