



Assessing the influence of institutions on students' entrepreneurial dynamics: evidence from European post-socialist and market-oriented economies

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Accepted: 10 January 2022
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Abstract This paper theorizes how institutional conditions influence students' entrepreneurship dynamics (e.g., nascent and active), especially these institutional conditions related to environments where students are mostly exposed (e.g., university and country), as well as the moderation effect of the type of economy (e.g., post-socialist and market-oriented). We tested our proposed theoretical model in a sample of 91,105 students from 557 European universities located in nine post-socialist economies and nine market-oriented economies. The results show the important role of informal institutions in the country (societal perceptions) and university (students' perception) on students' entrepreneurial dynamics, especially the moderation of post-socialist and market-oriented economies on the informal institutions that influence nascent entrepreneurs. Several implications for policymakers and university managers emerge from this study.

Plain English Summary This paper extends the university entrepreneurship research by theorizing the influence of institutional conditions (environments where students are mostly exposed at university and country-level) on students' entrepreneurship dynamics (e.g., nascent and active), as well as the moderation effect of the type of economy (e.g., post-socialist and market-oriented). This study shows the crucial role of informal institutions in the country (societal perceptions) and university (students' perception) on students' entrepreneurial dynamics. Several implications emerge from this study. First, policymakers should realize that students' entrepreneurship is a multi-level phenomenon affected by individual- university- and country-level factors in implementing policy frameworks that cultivate pro-entrepreneurial values in post-socialist economies. Second, for university managers, results open a window for the reconsideration of university budgets and performance indicators in the configuration of entrepreneurial education programs with more action-oriented approaches to stimulate students' interest and perceived self-efficacy to pursue this career path.

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Keywords Entrepreneurial process · Institutional Economic Theory · Post-socialist economies · Market-oriented economies · European Universities, · Student entrepreneurship

JEL Classification L26 · I25 · P3

1 Introduction

Previous empirical studies have explored how institutional conditions are drivers or barriers to each stage of entrepreneurial initiatives across countries (Guerrero et al., 2021; Urbano et al., 2017). Policymakers, researchers, and business leaders have debated the interplay between context, entrepreneurship, and socio-economic impacts (Guerrero et al., 2021; Van Stel et al., 2007; Welter et al., 2016). In this vein, diverse worldwide projects have focused on measuring entrepreneurial dynamics, as well as capturing the institutional conditions that foster entrepreneurship per country (see *Doing Business*, Global Entrepreneurship Monitor, Kaufman Foundation, Panel Study of Entrepreneurial Dynamics, and Global University Entrepreneurial Spirit Students Survey).

Although relevant insights can be gained, it is unclear which institutional conditions influence the entrepreneurial process per type of economy (Guerrero et al., 2021) because there is no ideal context, no single type of entrepreneurship, and no ideal type of entrepreneurship (Welter et al., 2017: p. 318). While market-oriented economies have promoted entrepreneurship for the capacity to innovate and generate wealth (Manolova et al., 2008; Wennekers & Thurik, 1999), post-socialist economies have promoted entrepreneurship for transitioning into market-oriented economies by absorbing talent and attracting foreign investments (Estrin et al., 2006; Welter & Smallbone, 2011). In this process, empirical studies have shown that certain institutional factors take multiple generations to change because these factors are less susceptible to transformation (e.g., culture, traditions, values, and attitudes) by the government intervention (McKeever et al., 2015; North, 1990). It explains why a multi-level analysis is required to understand how institutional differences matter in the interplay between institutional context, entrepreneurial diversity, and type of economy (Guerrero et al., 2021; Hayton et al., 2002; Li, 2020; Weiss et al., 2019).

We understand entrepreneurship as a multi-level dimensional phenomenon embedded in particular places, communities, and organizations (including universities) with specific institutional factors (Liao & Welsch, 2005; McKeever et al., 2015; Suddle et al., 2010). We particularly focused on entrepreneurial dynamics developed by university students (Guerrero et al., 2018), where these dynamics are related to

the exploration (nascent entrepreneur) and exploitation (active entrepreneur) of business initiatives. We assume that the university context influence students' entrepreneurial values, attitudes, and self-confidence (Guerrero et al., 2014; Bergmann et al., 2018; Guerrero & Urbano, 2019). Likewise, country institutional conditions influence students' entrepreneurial behaviors (Manolova et al., 2008; Guerrero et al., 2018). Despite the institutional transformation towards a market-oriented economy in post-socialist economies, generational values have persisted in society and universities (Bogatyreva et al., 2019; Marozau et al., 2019, 2021; McKiernan & Purg, 2013; Weiss et al., 2019).

Motivated by these antecedents, this paper theorizes how institutional conditions influence students' entrepreneurship dynamics (e.g., nascent and active), especially these institutional conditions related to environments where students are mostly exposed (e.g., university and country), as well as the moderation role of the type of economy (e.g., post-socialist and market-oriented). By adopting the institutional economic and entrepreneurial process approaches, we tested a proposed model with a sample of 557 European universities allocated in nine post-socialist economies and nine market-oriented economies. The results show that informal conditions (national culture and university values) explain students' entrepreneurial dynamics. Indeed, results show that universities created in the post-socialist era are less supportive of students' entrepreneurial behavior than universities created in the socialist era.

The paper is structured as follows: Section 2 proposes the theoretical foundations and hypotheses. Section 3 describes the methodological design to test the hypotheses. Section 4 shows the results and discussion. Section 5 describes the conclusions, implications, and future research avenues.

2 Theory development

2.1 Theoretical foundations

By adopting the institutional economic theory (North, 1990), the institutional conditions are understood as “the rules of the game” that shape interactions among individuals, groups, and organizations. Based on this assumption, the institutional conditions enhance or inhibit entrepreneurial behaviors/actions (Aidis et al., 2008; Guerrero et al., 2021; Welter & Smallbone,

2011). Specifically, North (1990) classifies institutions into formal conditions (property rights and legal procedures) and informal conditions (culture, values, beliefs, and norms). Each of these institutional conditions is present along several stages an entrepreneur faces since the conception of an entrepreneurial idea, the creation of a new venture, and the adolescence of new ventures (Davis & Williamson, 2016; Reynolds & White, 1997; Stenholm et al., 2013; Suddle et al., 2010). While informal conditions like culture and values are difficult to change, public intervention could foster entrepreneurship via formal conditions such as regulations, support programs, procedures, and taxation (Ani, 2015; De Clercq et al., 2010; Guerrero et al., 2021).

In the university context, students' entrepreneurial dynamics commonly refer to two entrepreneurial process stages: (a) when students are exploring opportunities during their university studies (nascent entrepreneur), and (b) when students are exploiting the entrepreneurial opportunity via a start-up (active entrepreneur). Previous empirical studies have found the significant influence of societal perceptions of entrepreneurship (Fayolle et al., 2014; Liñán & Chen, 2009) as well as the university community's attitudes towards entrepreneurship (Guerrero et al., 2018, 2021) on students' entrepreneurial dynamics. It explains why university managers have configured entrepreneurship educational programs, supportive infrastructure, and entrepreneurial culture within universities (Guerrero & Urbano, 2012). Therefore, the involvement of students in the entrepreneurial process demands multi-level analysis in multiple contexts: the individual, the university, and the country (Busenitz et al., 2000; Benitez-Amado et al., 2010; Liñán et al., 2011; Bergmann et al., 2018; Weiss et al., 2019).

The country's economic orientation could moderate the relationship between institutions and students' entrepreneurial dynamics (De Clercq et al., 2010). For example, during the turbulent transition period of the early 1990s, several universities were founded by proactive and entrepreneurial leaders (Varblane & Mets, 2010) based on the fundamental principles transferred from the US and Western European contexts. In this regard, post-1991 universities implemented new organizational structures and incentive systems and fostered a culture of consumption teaching services in business management, economics, and social sciences (Kwiek, 2012). As a result, an entrepreneurial orientation emerged in Western universities and business-oriented

public schools that were separated from public universities in the 1990s (Marozau et al., 2019; Varblane & Mets, 2010). In this regard, we proposed a theory development that focuses on the institutional conditions (e.g., university and country) that influence students' entrepreneurship dynamics (e.g., nascent and active), as well as the moderation role of the type of economy (e.g., post-socialist and market-oriented).

2.2 Hypotheses

2.2.1 *Institutional environmental conditions and students' entrepreneurship dynamics*

Regarding the country's institutional conditions, the vast accumulated literature has revealed the relevant influence of institutional conditions on entrepreneurship at the country level (Urbano et al., 2017). Although some studies have not found significant effects (Van Stel et al., 2007), the number of procedures required to start a venture represents a formal institution that evidence how entrepreneurs overcome and avoid bureaucratic burdens. Intuitively, fewer procedures represent a reduction of time/money that strengthens the entry of new active/nascent entrepreneurs. Likewise, the formal institution related to the possibility of getting access to public/private credits reduces the burdens of students' entrepreneurs already operating a venture (active entrepreneurs). Obtaining access to credit satisfies the required capital as well as covers the need for liquidity of both nascent and active entrepreneurs (Guerrero et al., 2021). Similarly, the formal institution related to the influence of the tax system could be considered marginal if the country has implemented a robust bankruptcy regulation (Van Stel et al., 2007). Indeed, a severe tax system will be an entry/scaling-up barrier to students' entrepreneurial dynamics. In terms of informal conditions, students' entrepreneurial dynamic is also influenced by societal perceptions (Liñán et al., 2011). Henrekson and Roine (2007) discussed the lack of consensus about equalization of incomes on entrepreneurship. For example, Minniti and Nardone (2007) found that this variable has a crucial role in minorities. In this vein, a similar effect could apply to students' entrepreneurial dynamics based on the restringed perception of labor market opportunities or taking advantage of opportunities. Based on these assumptions, formal institutional conditions enhance

students' entrepreneurial dynamics by reducing bureaucratic burdens related to the time/costs of procedures to create a venture, as well as tax and credit systems. Likewise, informal institutional conditions via societal perceptions enhance students' entrepreneurial dynamics. In this regard, we hypothesize that:

H1. Favorable country institutional conditions towards entrepreneurship increase students' entrepreneurial dynamics

Regarding the university institutional conditions, the configuration of universities' institutional conditions has been strongly related to visions, missions, core activities, and stakeholders' needs (Liñán et al., 2011; Lüthje & Franke, 2003). An entrepreneurial orientation strategy provides an adequate environment that supports the development of students' and academics' entrepreneurial initiatives. In particular, Guerrero and Urbano (2012) identified that certain formal institutional conditions (entrepreneurship education courses) and informal institutional conditions (perceptions and attitudes towards entrepreneurship) influenced students' entrepreneurial behaviors. A plausible explanation is that university institutional conditions are more influential for students than country institutions because they spend several years with the university (Varblane & Mets, 2010; Bergmann et al., 2018). Given the data restrictions, most empirical studies have focused on exploring the influence of university institutional conditions on nascent entrepreneurs by paying attention to identifying opportunities and the initial stages of the business project's development (Guerrero & Urbano, 2019). Although several universities do not explicitly support entrepreneurship, empirical studies have shown that informal university conditions such as culture, values, and role models have been quite supportive for students running a new venture (Bergmann et al., 2018). Also, large and reputable universities with thousands of alumni can successfully create the social capital needed for new venture creation (Weiss et al., 2019). Based on these assumptions, formal institutional conditions towards entrepreneurship enhance students' entrepreneurial dynamics via entrepreneurship education by providing the skills/abilities required to create/manage a new venture, as well as reduce individual cognitive barriers (Urbano et al., 2017). Likewise, informal institutional conditions towards entrepreneurship via students' perceptions enhance

students' entrepreneurial dynamics by reinforcing an entrepreneurial culture, as well as role models. In this regard, we hypothesize that:

H2. Favorable university institutional conditions towards entrepreneurship increase students' entrepreneurial dynamics

2.2.2 The moderation effect of the economic orientation

Regarding country institutions, within the socialist orientation that dominated in eastern and central European countries for more than four or seven decades, institutions have constrained entrepreneurship (Alas & Rees, 2006). A socialist ideology considered entrepreneurship as something extraneous and illegal, and this ideology has left an imprint on the transition period (Aidis et al., 2008). While socialist economies have suppressed risk-taking behaviors (Ellman, 2014), market-oriented economies have promoted entrepreneurship, market competition, and well-developed legislation (Manolova et al., 2008). Some post-socialist studies have documented the gradual change in culture, values, and attitudes towards free-market entrepreneurship, especially during their incorporation into the European Union (Kshetri, 2009; Welter & Smallbone, 2011). However, the transition to market-oriented economies required the substantial adjustment rather than transplantation of Western best practices (Kshetri, 2009). Pre-matured formal institutions and their weak enforcement alongside entrepreneurship-unfriendly culture and norms created an unsupportive environment for new venture creation, especially at the beginning of the transition period (Estrin et al., 2006). Indeed, during the transition stage towards a market-oriented economy, entrepreneurs often operated in the black or illegal markets in the face of institutional uncertainty (Aidis et al., 2008). Likewise, the younger generations mostly supported individualist values and a low uncertainty avoidance behavior (Aidis et al., 2008; Ellman, 2014; Stenholm et al., 2013). Previous studies found the negative effect of socialist institutions as strict economic planning (Carbonara et al., 2016) and collectivism (Bogatyрева et al., 2019; Pinillos & Reyes, 2011) on entrepreneurial dynamics. The plausible explanation has been the pre-existence of informal institutions (negative values) and incomplete regulations that suppressed any

entrepreneurial activity (Aidis et al., 2008; Stenholm et al., 2013; Welter & Smallbone, 2011). Based on this assumption, the pre-existence of informal conditions (social values, corruption, and regulations still under development) observed in post-socialist economies represents critical constraints for the current young generations of students interested in becoming entrepreneurs. In this regard, we hypothesize that:

H3a. *The effect of favorable country institutional conditions towards entrepreneurship on students' entrepreneurial dynamics is lower in post-socialist economies than in market-oriented economies.*

Regarding university institutions, in post-socialist economies, universities belong to higher education systems that have undergone an institutional transformation of values, missions, and regulations that went against the backdrop of state inaction (Marozau et al., 2019; Shattock, 2004). These universities have transformed themselves to meet demands from the local private sector through entrepreneurship and business education (Saginova & Belyansky, 2008). However, institutional conditions at the country-level have negatively influenced universities' discovery and exploitation processes (De Clercq et al., 2010) by only focusing on teaching activities (Marozau & Guerrero, 2016). Several international projects funded by USAID and EU programs (e.g., Alfa, Edu-link, Tempus, Erasmus) have supported the modernization of universities by following the Western role models (Ellermann, 2017; Froumin & Smolentseva, 2014). In this vein, some universities started to transfer knowledge, best practices, and teaching approaches to cultivate a positive image of entrepreneurs (Korosteleva & Belitski, 2017). Therefore, universities in post-socialist contexts have impacted entrepreneurial government frameworks through human capital development, cultivating entrepreneurial values, and disseminating relevant knowledge for starting and running a venture (Manev et al., 2005; De Clercq et al., 2010; Korosteleva and Belitski, 2017; Marozau et al., 2019). Based on these assumptions, universities in post-socialist economies reduce the institutional constraints on students' entrepreneurial dynamics. Indeed, we assume that this effect could be higher when the university was established in the post-Soviet era started in 1991 (Kwiek, 2012; Marozau & Guerrero, 2016; Varblane & Mets, 2010). In this regard, we hypothesize that:

H3b. *The effect of favorable university institutional conditions towards entrepreneurship on students' entrepreneurial dynamics is higher in post-socialist economies than in market-oriented economies.*

Figure 1 shows our proposed theoretical model where favorable institutional conditions (e.g., country and university) increase students' entrepreneurship dynamics (e.g., nascent and active) that will be moderated by the economy type (e.g., post-socialist and market-oriented).

3 Methodology

3.1 Data

We constructed a dataset using four sources of information. *First*, we collected university and student data from the 2016 and 2018 Global University Entrepreneurial Spirit Students' Surveys (GUESSSS).¹ The GUESSSS survey provides students' socio-economic, and several questions captured data about the students' entrepreneurial dynamics and perceptions of university support towards entrepreneurship. Likewise, the GUESSSS survey provides information about the university. The selection criteria were university students who integrated our sample who were undergraduates enrolled in European universities and natives of the country where the university is allocated. In this regard, the sample included 91,105 students enrolled in 557 universities distributed across eighteen European countries. *Second*, we complemented general university characteristics using the QS World University Rankings. *Third*, we collected secondary country-level data on institutional conditions across the eighteen countries using the European Values Study (EVS) and the Doing Business. *Finally*, following the IMF (2000) and the World Bank (2002), the countries were classified into post-socialist economies (in transition and complete transition) and market-oriented economies (the rest of European countries) (see Table 4 in the Appendix). We decided to do this classification because these European economies differ in terms of the historical backgrounds

¹ GUESSSS is a large and global research project about student entrepreneurship. The main project goal is to generate unique and novel insights into student entrepreneurship in the form of academic and practitioner-oriented output. For further details about this project, please visit [<https://www.guesssurvey.org/>].

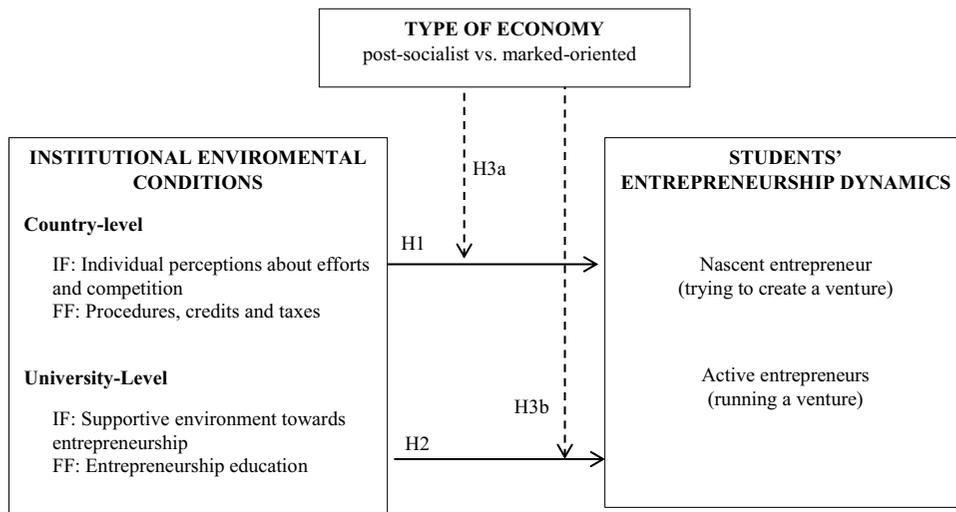


Fig. 1 Proposed conceptual model

of the twentieth century and, consequently, their institutional environment for entrepreneurship. At the same time, there are strong economic and social ties between countries representing two groups.

3.2 Measures

Table 1 shows the description of variables.

Regarding dependent variables, students' entrepreneurial dynamics were measured using two binary variables from the GUESSS survey (Shirokova et al., 2016; Weiss et al., 2019). First, the *nascent entrepreneurs* variable takes value 1 if the student was trying to start a business at the survey time, 0 otherwise. This variable captures the first stage of an entrepreneurial process when the student explores an initial business idea and how to create value (Guerrero et al., 2021). Second, the *active entrepreneurs* variable takes value 1 if the student is running a business at the survey time, 0 otherwise. This variable captures the second stage of an entrepreneurial process when the student exploits the resources and capabilities to develop the business idea and capture economic value (Guerrero et al., 2021).

Regarding the independent variables at the country level, we measured formal and institutional conditions related to the country level. Using the European Values Survey, the informal institutions were measured using two Likert scale variables related to equalizing incomes and competition (Autio et al., 2013). First, the *equalizing of incomes perception* variable takes the

value 10 where the population's perception was that income should be made equal or value 1 when popular perception was that greater incentives based on individual efforts should be in place. Second, the *competition perception* variable takes the value 10 when the population's perception was that competition is harmful because it brings out the worst in people, or value one when the competition is perceived as good because it stimulates new ideas and value. Using the Doing Business, formal country institutions were measured using three variables (Van Stel et al., 2007). First, the *procedures* variable captures the number of procedures necessary to start a business in the country. Second, the *credits* variable captures the score for getting credit in the country. Third, the *taxes* variable captures the score of paying taxes in the country.

Regarding the independent variables at the university level, using the GUESSS survey, the informal university conditions were captured by the *supportive environment* variable representing a factor analysis of the 7 Likert scale students' perceptions about how the university atmosphere influences the development of new business ideas, becoming an entrepreneur, and engaging in entrepreneurial initiatives (Sieger et al., 2014). Likewise, the entrepreneurship education variable captured the formal university conditions that take value 1 if the student enrolled in one entrepreneurship course (Marazou et al., 2021).

Regarding the moderation variable, following the IMF (2000) and the World Bank (2002), we used a

Table 1 Description of variables and descriptive statistics

Variable	Description	Source	N	Mean	S.D	
Dependent binary variables	Nascent entrepreneurs	Take value 1 when the student is currently trying to start his/her own business, 0 otherwise	The GUESSS survey	91,105	0.150	0.352
	Active entrepreneurs	Take value 1 when the student is already running his/her own business, 0 otherwise		91,105	0.040	0.189
Independent (country-level)	Equalizing of incomes perception	Incentives for individual efforts vs. equalize incomes in the country	The European Values Survey	91,105	4.483	0.517
	Competition perception	Competition good-harmful for people in the country		91,105	3.918	0.366
	Procedures	Number of procedures that are required to start a business in the country	Doing Business	91,105	6.770	1.442
Independent (university-level)	Credits	The score for getting credit in the country		91,105	64.430	8.449
	Taxes	The score for paying taxes in the country		91,105	81.123	5.834
	Supportive environment	Factor obtained from the students' perception of the university environment towards entrepreneurship	The GUESSS survey	91,105	0.000	1.000
Controls	Entrepreneurship education (FF)	Takes value 1 if the student at least attend one entrepreneurship course, 0 otherwise		91,105	0.337	0.473
	lnGDP	Natural logarithm of the GDP per country	World Bank	91,105	10.543	0.287
Controls	University quality	QS ranking score per university	The QS Ranking	91,105	5.006	13.135
	IT studies	Take value 1 when the student is enrolled in engineering and IT specializations, 0 otherwise	The GUESSS survey	91,105	0.236	0.425
	Business studies	Take value 1 when the student is enrolled in business and economics specializations, 0 otherwise		91,105	0.387	0.487
	Entrepreneurial parents	Take value 1 when the student mentioned that at least one of his/her parents are self-employed, 0 otherwise		91,105	0.310	0.463
	Students' age	Age of the respondent in the year of survey expressed in years		91,105	21.700	2.436
	Gender_female	Take value one when the student selected female gender, zero male		91,105	0.610	0.488
	Survey year_2018	Take value one when the student responded to the survey in 2018, zero if responded to the survey in 2016		91,105	0.620	0.486

binary variable *type of economy* that takes value 1 when the countries where the university was located was post-socialist economies (in transition and complete transition) and 0 market-oriented economies (the rest of European countries) (see Table 4 in the Appendix).

Regarding control variables, we first controlled using the natural logarithm of GDP per capita PPP in 2018 (lnGDP) at the country level, which has a U-shape relationship with entrepreneurial activity (Wennekers et al., 2005). Then, we controlled the university quality measured from the QS World University Rankings at the country university level. Finally, at

the individual level, we controlled using the student's demographic characteristics available in the GUESSS survey, such as family entrepreneurial background, gender, and age (Walter & Dohse, 2012), as well as the fields of study from the fields of study Business, Economics, Engineering and IT (Marozou et al., 2021).

3.3 Model

A multi-level logistic regression model was estimated to predict the probability of students' entrepreneurial dynamics based on the decision to

become a nascent entrepreneur (trying to start a business) depending on the institutional conditions, as well as the decision to become an active entrepreneur (run a business) depending on the institutional conditions. The adequacy of using multi-level models was confirmed by calculating the intraclass correlation coefficient (ICC) for a two-level nested model. While ranging from 0 to 1, ICC equal to 0 indicates that observations do not depend on a country and university they are nested in. One-level regression analysis can be used if the ICC is not different from 0 or negligible. Based on this criterion, the application of multi-level

analysis was justified instead of an ordinary single-level regression.

Two multi-level logistic regression models were estimated: (1) predicting the probability of being a nascent entrepreneur that represents exploring business ideas and undertaking activities to start a business soon; (2) predicting the probability of being an active entrepreneur that represents the exploitation of resources related to a business idea for capturing economic value. The models have a hierarchical structure with three levels: i individuals are nested in j universities that are nested in k countries (c). Similarly to Bergmann et al. (2016), the formal model appears as follows:

$$\ln \frac{P(Y_{ijk} = 1)}{1 - P(Y_{ijk} = 1)} = (B^{000} + B^{100} + S_{ijk} + B^{010}U_{jk} + B^{001}C_k) + (e_{ijk} + u_{jk} + r_k);$$

where

$\ln \frac{P(Y_{ijk}=1)}{1-P(Y_{ijk}=1)}$ is a likelihood ratio of being nascent/active student entrepreneur;
 B^{000} is the intercept;
 S_{ijk} is the student-level independent and control variables;
 U_{jk} is the university-level independent and control variables;
 C_k is the country-level independent and control variables;
 $e_{ijk}, u_{jk},$ and r_k are the error terms of the individual-, university-, and country-level respectively

was estimated on (1) the entire sample, (2) a sub-sample comprising transition economies, (3) a sub-sample comprising developed economies, (4) a sub-sample comprising universities from post-socialist economies established before 1991, and (5) a sub-sample comprising universities from post-socialist economies established after 1991 (see Table 5 in the Appendix).

4 Results and discussion

Tables 2 and 3 show the results of our multi-level logistic regression analysis for nascent entrepreneurs and active entrepreneurs, respectively.

4.1 Institutional conditions and students' entrepreneurial dynamic

Regarding country institutional conditions, results show that equalizing income perception negatively influences nascent entrepreneurs (−0.528, see M1b). In contrast, where the population's perception favors equalizing incomes, this positively influences the likelihood of students becoming active entrepreneurs (0.150, see M2b). A plausible explanation is that the differences in incomes directly influence active entrepreneurs operating a business in the market, while nascent entrepreneurs are involved in the exploration or definition of the business project. Therefore, this informal condition matters in students' entrepreneurial dynamics. Likewise,

Models were compared using AIC and BIC information criteria—models for which AIC and BIC are smaller better fit the data. Multicollinearity issues can be ruled out because the highest value of the correlation coefficients is −0.578 (observed between the country-level variables *Competition* and *Credits*), while institutional environment factors are usually highly correlated with each other (Krasniqi & Desai, 2016). Given the number of variables included in the model and degree of freedom, we decided to split the sample to test the moderation effect of type of economy (post-socialist or market orientation) instead of using interaction terms—this helps to solve estimate models that generate confusing results and unaccepted levels of multicollinearity. Therefore, the multi-level model

Table 2 Multi-level analysis for nascent entrepreneurs

Nascent entrepreneurs	H1 and H2		H3			
	All economies	Post-socialist economies	Market-oriented economies		Post-socialist economies	
	M1a	M1b	M1c	M1d	M1e Pre-1991	M1d Post-1991
Country-level institutions						
Equalizing of incomes perception (IF)		-0.528***	-0.460**	-0.398	-0.437***	-0.503***
Competition perception (IF)		0.141	0.162	-0.322	-0.101	0.150
Procedures (FF)		-0.007	0.015***	-0.0140	0.017**	0.017*
Credits (FF)		0.064	0.071**	-0.132***	0.087**	-0.019
Taxes (FF)		0.028**	-0.011	0.018	-0.003	-0.037*
University-level institutions						
Supportive environment (IF)		0.071***	0.117***	0.030	0.120***	0.106***
Entrepreneurship education (FF)		0.506***	0.339***	0.627***	0.351***	0.302***
Control variables						
lnGDP	-1.579***	-1.429***	-0.671*	-1.532***	-0.907**	-0.653
University quality		0.001	-0.001	0.002	-0.000	-0.006
IT studies	-0.116***	-0.169***	-0.173***	-0.158***	-0.226***	-0.085
Business studies	0.089***	-0.036	-0.010	-0.067	-0.086	0.235**
Entrepreneurial parents		0.407***	0.469***	0.362***	0.445***	0.540***
Student's age	0.041***	0.040***	0.027**	0.043***	0.033**	0.009
Gender (female)	-0.768***	-0.776***	-0.732***	-0.814***	-0.771***	-0.643***
Year of survey (2018)	0.399***	0.371***	0.180***	0.552***	0.136***	0.344***
Specifications						
Country-level variance	0.040	0.025	0.001	0.001	0.001	0.001
University-level variance	0.073	0.048	0.015	0.028	0.016	0.007
<i>N</i>	87,717	87,717	26,433	61,284	19,597	6836
Wald χ^2	1458.03	2736.64	1298.44	1834.03	921.02	410.43
Prob > χ^2	***	***	***	***	***	***
LR test vs. logistic model:						
$\chi^2(2)$	1128.74	324.58	59.67	118.42	44.63	2.78
Prob > χ^2	***	***	***	***	***	**
BIC	61,259.30	59,992.47	25,265.39	34,746.09	18,191.11	7187.64

IF informal factors, FF formal factors

*** Significant at the .001 level

** Significant at the .01 level

* Significant at the .05 level

the influence of formal conditions on students' entrepreneurial behavior differs according to the entrepreneurial stage. Concretely, the tax system positively influences the student's likelihood of being a nascent entrepreneur (0.028, see M1b). These results support H1.

Regarding country institutional conditions, results show that a favorable perception of a supportive

university environment positively influences the emergence of nascent entrepreneurs (0.071, see M1b). A plausible explanation could be that most university support fosters nascent entrepreneurs and a few supports for active entrepreneurs (Guerrero & Urbano, 2012). Concerning entrepreneurship education, results show a positive effect on nascent (0.071, see M1b)

Table 3 Multi-level analysis for active entrepreneurs

Active entrepreneurs	H1 and H2		H3			
	All economies	Post-socialist economies	Market-oriented economies		Post-socialist economies	
	M2a	M2b	M2c	M2d	M2e Pre-1991	M2d Post-1991
Country-level institutions						
Equalizing of incomes perception (IF)		0.150*	0.461**	-0.387	0.523**	0.538***
Competition perception (IF)		-0.398	-0.398	-1.116***	-0.300	-0.490
Procedures (FF)		-0.013	0.011	-0.021	0.010	0.032*
Credits (FF)		-0.050	-0.026	-0.165***	-0.010	-0.173
Taxes (FF)		0.018	0.058**	-0.006	0.071**	0.044
University-level institutions						
Supportive environment (IF)		-0.033	-0.095**	-0.002	-0.123***	-0.030
Entrepreneurship education (FF)		0.453***	0.357***	0.506***	0.406***	0.182
Control variables						
lnGDP	-1.070**	-1.360**	-1.578	-2.270***	-3.093***	-2.429*
University quality		-0.003	-0.011*	-0.001	-0.015**	0.009
IT studies	-0.161**	-0.183***	-0.226*	-0.155*	-0.198	-0.312
Business studies	0.071	-0.014	0.147	-0.081	0.186*	0.102
Entrepreneurial parents		0.829***	0.926***	0.775***	0.917***	0.957***
Student's age	0.145***	0.141***	0.184***	0.126***	0.196***	0.145***
Gender (female)	0.794***	-0.770***	-0.944***	-0.668***	-0.947***	-0.934***
Year of survey (2018)	0.232***	0.242***	-0.090	0.395***	-0.065	-0.213
Specifications						
Country-level variance	0.057	0.064	0.025	0.001	0.029	0.001
University-level variance	0.080	0.092	0.048	0.015	0.052	0.022
<i>N</i>	91,105	91,105	27,729	63,376	20,537	7192
Wald χ^2	919.24	1563.22	725.41	1017.59	553.25	200.95
Prob > χ^2	***	***	***	***	***	***
LR test vs. logistic model:						
$\chi^2(2)$	437.42	426.09	78.69	30.43	60.70	0.99
Prob > χ^2	***	***	***	***	***	*
BIC	27,600.22	27,028.62	9689.84	17,417.17	7075.22	2751.22

IF informal factors, FF formal factors

*** Significant at the .001 level

** Significant at the .01 level

* Significant at the .05 level

and active (0.453, see M2b) entrepreneurs. Most universities have a tradition of implementing (compulsory/transversal) entrepreneurial education programs (Shirokova et al., 2016; Urbano et al., 2017; Guerrero et al., 2018). Interestingly, we observe a higher effect of entrepreneurship education on active entrepreneurs who adopt the acquired skills/knowledge running their new venture. These results support H2.

4.2 Moderation effect

Regarding country institutional conditions, the influence of institutions on students' entrepreneurial diversity differs according to the type of economy. First, in post-socialist economies, results show a negative perception of equalizing incomes on nascent entrepreneurs (-0.460, see M1c), as well as a positive influence on

active entrepreneurs (0.461, see M2c). Indeed, the population's negative perception of competition negatively influences students becoming active entrepreneurs in market-oriented economies (-1.116 , see M2d) but is nonsignificant in post-socialist countries (M2c). Intuitively, this issue should demand reinforcement of the pro-entrepreneurial culture and values in young generations in post-socialist economies. Second, the student's likelihood of becoming a nascent or active entrepreneur is negatively influenced by access to credits in market-oriented economies (-0.132 , see M1d and -0.165 , see M2d). Indeed, the student's likelihood of being an active entrepreneur is positively influenced by a better taxation system in post-socialist economies (0.058, see M2c). These results support H3a.

Regarding university institutional conditions, in post-socialist economies, the perception of a supportive university environment positively influenced the students' likelihood of being nascent entrepreneurs in post-socialist economies (0.177, see M1c), while this effect is negative for active entrepreneurs (-0.095 , see M2c). A plausible explanation is that a positive perception reinforces students' entrepreneurial intentions. Then it changes to a negative one when they become active entrepreneurs because of their critical perception or identification of weaknesses in the university environment during their entrepreneurial activities. For instance, the origins of an idea and the resources to start a business might not be related in any way to a university. Concerning the formal conditions, entrepreneurship education is positively related to the students' likelihood of being both nascent and active entrepreneurs in both post-socialist (M1c, M2c) and market-oriented economies (M1d, M2d). These results support H3b.

Indeed, the observed effects of the university institutional conditions are consistent in students enrolled in universities established pre/post-1991. A more favorable entrepreneurial environment at such universities may provide multiple opportunities for generating and testing ideas, networking, and trying one's hand in business. In contrast, it does not necessarily promote immediate willingness to run a real business (Weiss et al., 2019). The parameter differences between groups demonstrate that students from post-1991 universities are more likely to start a business than their peers from pre-1991 universities. We also observe a negative influence on nascent students' entrepreneurial behavior when they are enrolled in Engineering and IT at pre-1991 universities (M1e), while a positive influence on nascent students'

entrepreneurial behavior when they are enrolled in business/economics/management at post-1991 universities (M1f) (see Varblane & Mets, 2010). The exposure to entrepreneurship education rather than business-related study fields is a significant predictor regardless of the university and country context, confirming its role in developing the entrepreneurship capital (Audretsch & Keilbach, 2004).

4.3 Robustness check

We tested our results for robustness by running one-level logistic regression models (M1b and M2b) and by calculating post-estimated predictive margins with 95% confidence intervals for both dependent and independent variables (see Fig. 2 in the Appendix). The predictive margins enabled us to visualize and confirm the differences between post-socialist and market-oriented economies as well as between pre-1991 and post-1991 universities in terms of students' nascent and active entrepreneurship. First, in post-socialist economies, we may observe a higher probability of being a nascent entrepreneur but a lower probability of being an active entrepreneur. Additionally, the results illustrate that institutional factors influence students' entrepreneurial dynamics (nascent/active) and how these results are moderated per the type of economy.

5 Conclusions

This study contributes to the entrepreneurship literature by extending two academic debates. First, we consider the interplay of country and university context (informal and formal conditions) on students' entrepreneurial dynamics (nascent and active entrepreneurs). According to Welter et al., (2016, 2017), it is crucial to understand the relevance of contextualizing contexts to understand entrepreneurial diversity better. This academic debate has also demanded the analysis of the influence of environmental conditions across the entrepreneurial process (Guerrero et al., 2021). In this regard, this study provides insight into the impact of institutions in different contexts (countries and universities) and different stages of the entrepreneurial process (nascent/active). Second, we emphasize the crucial role of universities as a catalyst of entrepreneurship in economies where the institutional conditions are still under development (post-socialist economies). According to Guerrero and Urbano (2019),

universities must play a crucial role in fostering entrepreneurship and innovation in transition and emerging economies to respond to institutional voids and societal needs. The new orientation of universities is relevant regardless of their age, profile, reputation, and traditions and may increase attractiveness to new talent (students, faculty members, managers, and entrepreneurs) (Wong et al., 2007). Third, the study contributes to the moderation role of economic models on students' entrepreneurial dynamics, specifically how economic models have redefining university missions in society (Audretsch, 2014). Our results provide insights in the European context into post-socialist and market-oriented countries.

We acknowledge some limitations that suggest avenues for future research. The key one is related to our metrics of institutional conditions. Although several studies have implemented similar metrics at the country level (Krasniqi & Desai, 2016), the university level proxies of culture, values, and norms could be improved (Li, 2020; McKeever et al., 2015). The lack of open-access information about universities' institutional conditions in post-socialist economies has limited the analysis and relied on proxies such as pre-1991 vs. post-1991. Second, we provided theory-based proxies for country institutional environment relevant for comparisons of post-socialist and developed economies, acknowledging other possible operationalizations of formal and, especially, informal factors (Bogatyeva et al., 2019; Busenitz et al., 2000). Future research might explore other combinations of country-level institutional factors considering endogeneity and reverse causality issues (Carbonara et al., 2016). Third, our analysis employed individual-level variables based on self-reported measures. This gives rise to the self-selection bias inherent in most studies on entrepreneurial behavior, particularly among not randomly selected students (Bogatyeva et al., 2019). The research would benefit from measures of students' prior professional and entrepreneurial experience, increasing their ability to explore and exploit viable business ideas and start a venture (Morris et al., 2017). Finally, formal and informal factors may vary across regions (Liñán et al., 2011; Weiss et al., 2019). In this regard, the World Values Survey and European Values Study should be considered by scholars as data sources for future research on the topic. In the same vein, assessing multi-level interaction effects among formal and informal institutional factors could be a promising research opportunity. Another possible research line

could explore factors influencing students' impactful, research-based, and opportunity-driven entrepreneurial activities that contribute to economic growth (Hechavarría & Reynolds, 2009; Urbano et al., 2017).

Our study provides relevant insights and implications. *For policymakers*, policymakers should realize that students' entrepreneurship is a multi-level phenomenon affected by individual-, university-, and country-level factors. Likewise, entrepreneurship development policy should go far beyond formal measures assessed and encompass culture, values, and norms endemic to a country as a whole and particular places and organizations such as universities (Li, 2020; Liao & Welsch, 2005; McKeever et al., 2015). For example, cultivating pro-entrepreneurial values such as supporting individual stimuli and facilitating access to credit resources are important for stimulating youth to start a business (nascent entrepreneurs), particularly in post-socialist economies. Concerning active entrepreneurs, their share among students in post-socialist economies is dependent on the ease of a taxation system. Our results call for particular policy agendas to promote entrepreneurship at universities, which might be hotbeds of Schumpeterian entrepreneurs (Guerrero et al., 2021). They, therefore, facilitate economic growth through high-impact entrepreneurship (Henrekson & Sanandaji, 2020). *For university managers*, while most university efforts are concentrated on measures (such as educational programs, support infrastructure, and incentive systems), the crucial role of creating a favorable informal environment (such as university culture, support for leadership and risk-taking behavior, and role models) that foster students' entrepreneurial behavior should be legitimized (Guerrero & Urbano, 2012). This requires re-considering university budgets and performance indicators in the configuration of entrepreneurial education programs. *For entrepreneurship educators*, even though students may not start a business immediately after completing their studies, entrepreneurial competencies and experiences acquired during their studies may lead to start-up creation at a later stage in their careers (Bergmann et al., 2018). The context-specific entrepreneurship courses (rather than programs) with more enterprising and action-oriented approaches and activities could stimulate students' interest and perceived self-efficacy to pursue this career path.

Acknowledgements The authors are very grateful to the two peer reviewers that helped us improve our manuscript. Radzivon Marozau acknowledges the financial support by SIDA.

Appendix

Table 4 Country, sample, and type of economy

Country	Number of students	Number of universities	Type of economy ^a
Austria	2397	46	Market-oriented
England	825	18	
Finland	287	22	
France	194	7	
Germany	14,530	55	
Italy	6543	35	
Norway	35	8	
Spain	29,856	75	
Switzerland	8709	71	
Belarus	836	18	
Czech Republic	1203	10	
Estonia	1073	25	
Hungary	9146	28	
Lithuania	1017	37	
Poland	4459	49	
Russian Federation	5347	31	
Slovakia	4007	16	
Slovenia	641	6	
Total	91,105	557	

^aFollowing the IMF (2000) and the World Bank (2002), the countries were classified into nine post-socialist economies (in transition and complete transition) and nine market-oriented economies (the rest of European countries)

Table 5 Sub-samples

Dependent variable	<i>N</i>	Countries	<i>N</i>	Universities	<i>N</i>
Nascent entrepreneur	87,717 ^(a)	Post-socialist economies	26,433	Established before 1991	19,597
				Established after 1991	6836
Active entrepreneur	91,105	Market-oriented economies	61,284	n/a	n/a
				Post-socialist economies	27,729
		Market-oriented economies	63,376		
				Established after 1991	7192

^aThis number of observations does not include students who were running a business at the moment of the survey (active entrepreneurs)

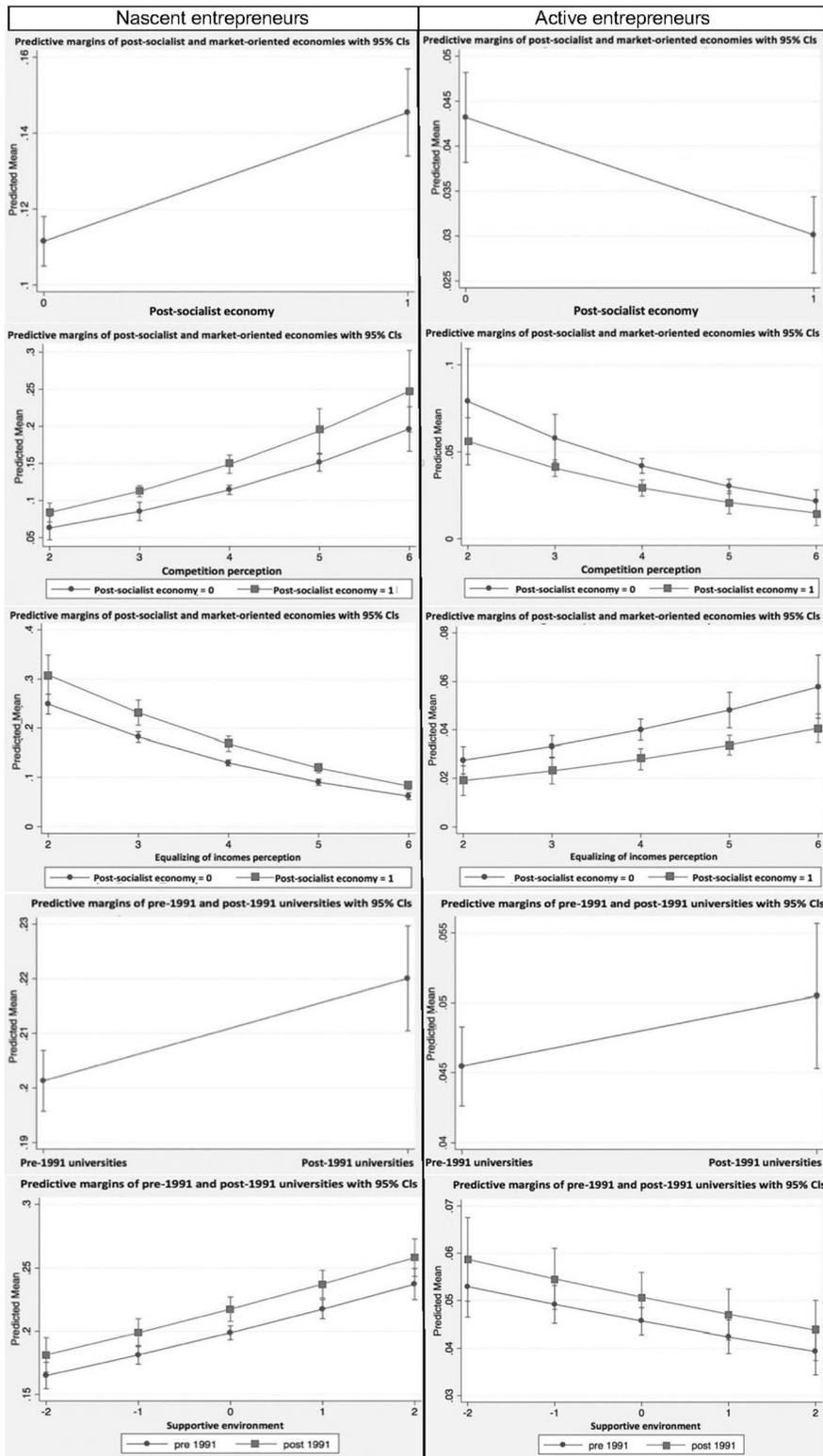


Fig. 2 Robustness tests (predictive margins)

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