Entrepreneurial ecosystems in conflict regions: evidence from Ukraine

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Entrepreneurial ecosystems in conflict regions: evidence from Ukraine

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Abstract

Entrepreneurship is a productive force of innovation and economic development. However, in post-conflict regions, there is a greater challenge in allocating entrepreneurial talent to productive entrepreneurship. In this study, we examine the entrepreneurship ecosystem, which is built on the "bottom-up" principles to understand whether its pillars can facilitate productive entrepreneurship in two Ukrainian regions shaken by multiple revolutions and regime change. We introduce a model that puts entrepreneurial conditions in cities and formal institutional changes to a competitive test. Building on the regional entrepreneurship literature, we perform an empirical study in a developing country to reveal what drives productive entrepreneurship in post-conflict regions with entrepreneurship culture, formal networks, debt and equity financing emerging as important determinants of productive entrepreneurship. The effect of formal institutions is significant but highly correlated with rent-seeking behavior of government and corruption. Our analysis suggests that the entrepreneurial conditions in regions focusing on the bottom-up processes of supporting entrepreneurship should work better to enhance productive entrepreneurship activity in a post-conflict region.

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1 Introduction

Entrepreneurship is recognized as a productive force of job creation (Haltiwanger et al. 2013) as well as innovation and economic development (Desai and Acs 2007; Sanders and Weitzel 2013). The idea of a productive entrepreneur (Baumol 1990, 1993) holds much promise for developing and post-conflict regions (Desai 2008; Desai and Acs 2007), building on Adam Smith's argument regarding the self-interest of entrepreneurs. If Smith is correct, these regions will benefit from entrepreneurship activity and will develop new knowledge, increase welfare, create jobs, and reduce inequality (Acs et al. 2018).

However, in post-conflict regions that experience high levels of regulatory uncertainty (Hoffmann et al. 2008, 2009) and many informal institutions (Desai et al. 2013), entrepreneurial effort can be allocated to unproductive ends (Murphy et al. 1991; Mehlum et al. 2003). This means that entrepreneurs choose between productive and unproductive business practices (Baumol 1990; Acemoglu 1995), in environments that often turn a blind eye to rent-seeking activities (Aidis et al. 2008; Estrin et al. 2013; Belitski et al. 2016). The rent-seeking behavior of these entrepreneurs may reduce the incentive to engage in productive activity (Sobel 2008), and the set of institutions and infrastructure aiming to support entrepreneurs could become less efficient.

Traditionally, top-down changes in formal institutions are pursued to facilitate productive entrepreneurship (Sanders and Weitzel 2013). However, along with the changes in the regulatory framework and the components of formal institutions (e.g., constitution, laws, policies, rights and regulations) (North 1990) that may change overnight, entrepreneurial conditions in a region and culture are difficult to change (Fritsch et al. 2019).

Strong informal institutions that reward rent-seeking may persist in post-conflict regions as institutions do not change overnight and are largely historically determined (Acemoglu et al. 2001; Fritsch and Wyrwich 2018). While there is a model that explains the persistence of bad institutions and challenges the rationale of top-down intervention for productive entrepreneurship (Acemoglu and Robinson 2008), a different approach was recently proposed. In a seminal study, Isenberg (2010) argues that policies and initiatives need to respect the entrepreneurial conditions of cities and regions as there is no exact formula for how entrepreneurial ecosystems in cities /regions/countries can be created.

Isenberg (2010), when introducing the entrepreneurial ecosystem concept as the author suggests that public policies/initiatives should follow nine principles when building, emphasizing the role of local conditions and bottom-up processes (e.g., shape the ecosystem around local conditions; engage the private sector from the start; stress the roots of new ventures, etc.). Isenberg's (2010) and later Stam (2015, 2018) and Spigel (2017) emphasize the role of local conditions and bottom-up processes. The idea is also line with regional innovation and growth literature (Cooke et al. 2011).

This study follows prior research on regional entrepreneurship (Desai and Acs 2007; Bosma et al. 2018), entrepreneurship ecosystems (Stam 2018; Stam and

Van de Ven 2020; Cantner et al. 2020) and institutional literature (Baumol 1993; Sobel 2008) to develop an entrepreneurial ecosystem toolbox to better understand how to make individuals allocate their talent for productive entrepreneurship. We adopted a quantitate approach to our analysis, using an online survey of entrepreneurial ecosystem stakeholders located in two post-conflict regions of Western and Central Ukraine during 2018–2019. Although the academic literature on entrepreneurial ecosystems has been developing recently (Spigel and Harrison 2018; Szerb et al. 2019), it does not yet robustly check for policy effort in inducing productive entrepreneurial activity.

The EE framework can be applied in both democratic and undemocratic regimes, as well as in regions with and without conflict. However, this study departs from the assumption that entrepreneurial ecosystems (EE) are represented by four pillars: entrepreneurial actors, financial resource providers, networks and entrepreneurial culture (Brown and Mason 2017). EE can reduce policy failures, providing effective policy support by building on the "bottom-up" processes that lead to productive entrepreneurship. Understanding how stakeholders perceive the role that EE elements play in productive entrepreneurship is important, as entrepreneurial talent has a high risk of allocation to business activities that maximize private but not social gains.

The literature that studies conflict regions has not applied the EE lens to understand how entrepreneurship activity can be supported in this specific context (Desai and Acs 2007; Bruton et al 2008; Kiss et al 2012; Boso et al. 2013). Particularly scarce is research into EEs in countries that have emerged from the post-communist block but aim to change their institutions to adopt the values of market and democracy (Audretsch and Moog 2022). In fact, only a limited number of reports address these issues explicitly for entrepreneurship in transition economies, without researching the conflict regions (Aidis 2003; Manolova et al 2008; Korosteleva and Belitski 2017). Almost no evidence exists in the most politically and economically turbulent country in Europe–Ukraine, which experienced three revolutions in 2004, 2008 and 2014. Different regions of the country follow different paths of economic development, as some are closely aligned with European Union while others are still looking for integration with other post-communist economies. Our study does not directly link to research on the determinants of conflict, such as predator–prey models that study the emergence of conflicts. However, we suggest EE can be used as a tool to enhance productive entrepreneurship in a post-conflict region (Desai 2008).

This study makes a number of contributions to the regional entrepreneurship literature. Firstly, this study introduces the EE literature in the post-conflict regional economic discourse and puts the bottom-up principles of acknowledging the local entrepreneurial conditions in cities in a competitive test with top-down principles of formal institutions, related to changes in regulation. In doing so we offer a pathway for regional science on the value of entrepreneurial actors and culture (Stam et al. 2011; Sanders and Weitzel 2013). Secondly, this study expands the discussion on the productive vs. destructive entrepreneurship literature proposed by Desai (2008), Desai and Acs (2007) and Desai et al. (2011) and applies econometric techniques by

focusing on strategies intended to improve EE conditions as a mechanism to facilitate entrepreneurship in a post-conflict region.

In answering why we chose Ukraine as a testing ground for our research, we contend that Ukrainian regions have experienced increasing political tensions since 2004, with three revolutions following. The revolution has led to a regime change but also created instability and conflict in the society which is torn between the European Union and Russia (Williams et al. 2012). Our results have demonstrated that coordination activities between economic actors, formal and informal networks, venture and debt financing as well as entrepreneurship culture (Stenholm et al. 2013; Stuetzer et al. 2016; Audretsch and Belitski 2017) emerged as four pillars of productive entrepreneurship in Ukrainian region. Our findings can help scholars and policymakers to better understand and predict the combination of factors that may be used in other post-conflict regions in Europe (e.g., Kazakhstan, Belarus, Kosovo, Serbia, etc.) that aim to change their institutions and promote productive entrepreneurship in the short- and medium-term.

The study is organized as follows. The next section presents the theoretical framework that relates EEs with networks and the quality of institutions. Section 3 presents our data and methodology. Section 4 discusses the results, while Sect. 5 discusses our main findings and concludes.

2 Conceptual framework

Productive entrepreneurship is a desirable outcome of EE (Baumol 1990; Stam 2018; Cantner et al. 2020) as it generates taxable revenues and profits, creates jobs, builds new business networks (Colombo et al 2019), develops infrastructure (Singh et al 2019), facilitates economic development (Carree and Thurik 2010; Belitski and Desai 2016) and brings wealth (Desai and Acs 2007; Neumeyer et al. 2019). However, entrepreneurship is different across regions and countries (Autio et al. 2014; Szerb et al. 2019; Audretsch et al. 2019).

"You can never have enough entrepreneurship," wrote David J. Isenberg (2010) in *How to Start an Entrepreneurial Revolution.* This view is at the heart of current EE research and is confirmed by mounting evidence. As many entrepreneurs in post-conflict areas have seen their productive assets liquidated, increasing insolvency (Desai et al. 2013), they have turned to ecosystem structures for business support (Audretsch and Belitski 2017). While culture and institutions are important, the main focus of entrepreneurs is on the systemic elements of EE (Stam 2015; Brown and Mason 2017), such as entrepreneurial actors, culture, leadership, capital markets and networks that interact in complex ways (Godley et al. 2021). As entrepreneurs attempt to make both private and social gains from their activities, their sustainable growth may also bring important local social and economic development in post-conflict regions (Lyons et al 2012).

Improving the quality of institutions helps improve entrepreneurship quality (Stenholm et al. 2013; Chowdhury et al. 2019). This is because honest, noncorrupt local authorities who respect property rights and the rule of law (Estrin et al. 2013) can reduce the payoffs to unproductive entrepreneurial activity and hence the

probability of being affected by unproductive or destructive entrepreneurship (Sobel 2008). This is known to improve regions and help them to move to a more productive entrepreneurship equilibrium (Sanders and Weitzel 2013).

Governments in post-conflict regions may not have sufficient financial resources to support the institutional reforms, instead the public policy could focus on local entrepreneurial conditions, searching for the complementarity of EE factors (Godley et al. 2021). Public incentives that are grounded in a local interdependencies within the entrepreneurship context (Stam 2015) may use a bottom-up process without fixating on a specific individual entrepreneurs or specific laws. The bottom-up processes feed the shift in entrepreneurship policy from regional "entrepreneurship policy" to policy for an "entrepreneurial regional economy" (Thurik et al. 2013).

One of the most important assumptions when drawing of the local entrepreneurial conditions is that entrepreneurial culture, specialization and networks may relocate by means of market mechanisms and entrepreneurial incentives toward more productive activities. As such, our conceptual framework draws on Mason and Brown (2014) and Stam (2018) to show that entrepreneurial strategies can be implemented quickly in regard to entrepreneurial talent, finance and networks and that genuinely productive entrepreneurial activity may start developing from the "bottom-up."

While the geography of the entrepreneurship literature has provided a number of insights into the role of drivers of regional entrepreneurship (Erina et al. 2017; Spigel 2017; Stam and Van de Ven 2020), all these elements may be viewed as the fundamental preconditions for economic resources to be used for growth by productivity-oriented entrepreneurs (Baumol 1990; Murphy et al. 1991; Acemoglu 1995; Mehlum et al. 2003; Desai et al. 2013).

Formal institutions affect the way entrepreneurs make their choices regarding productive vs. unproductive or destructive entrepreneurship (Baumol 1990; Desai 2008). Meanwhile, other factors reflect the degree to which entrepreneurship is valued in society, including the prevalence of entrepreneurship culture, networks, dealmakers and the availability of financial resources (Fritsch and Wyrwich 2018; Fritsch et al. 2019) that support productive goals.

Building on the prior EE literature, Brown and Mason (2017) recently proposed aggregating four components—the pillars of EE, which if taken together, can be used as a toolbox for EE. Firstly, the role of infrastructure and connectivity in collaboration between various economic agents is essential for EEs (Audretsch et al. 2015; Godley et al 2021). The infrastructure means the availability of physical objects and existing possibilities such as transportation, communication and financial services, and also the presence of specific needs, for example consulting, accounting, patent and layers services. Finally, the availability of incubators and accelerators (Fritsch and Wyrwich 2017). Physical and digital infrastructure is the key to enabling economic interaction between economic agents (Audretsch et al. 2015).

Secondly, entrepreneurial culture includes attempts to support individuals attempting to start their own business. Regional culture should promote the willingness of people to take a risk and tolerate failure (Singh et al 2019). In this case, historical factors, traditions and available role models—including peers—may play a significant role (Stuetzer et al. 2016). Local media could also contribute to the development of a

supportive entrepreneurship culture by highlighting actual initiatives, existing networks and support programs encouraging productive entrepreneurship (Motoyama 2019).

Thirdly, the concept of the EE itself includes the coexistence of different interacting actors; thus, connectivity within the EE is of high importance (Stam 2015; Malecki 1997). A variety of economic actors are needed to supply services to entrepreneurs and reduce potential market entry barriers for new entrepreneurial ventures (Howells 2006). Interactions between economic agents on the demand side are important to create a market big enough for entrepreneurship. Networks of entrepreneurs provide an information flow via numerous channels, enabling the effective distribution of knowledge, labor and capital (Malecki 2018) with network leaders providing direction for the EE (Feldman and Zoller 2012; Stam 2015). While mature EEs may have all agents internally, in post-conflict regions and in times of economic turbulence, EEs may require external players to actively join formal and informal networks (Sadeghi et al. 2019). Informal connections may be affected as trust in previous systems may dissipate (Collier et al 2003).

Fourthly, equity and debt capital are required to start and grow a business (Samila and Sorenson 2010). The availability of venture capital and the availability of bank loans for capital investments has changed the EE's landscape. Access to financing—preferably provided by investors with entrepreneurial knowledge—is crucial for investment during times of regulatory uncertainty (Hoffmann et al. 2009) and may work better than formal regulation in supporting entrepreneurial projects with high levels of risk and uncertainty.

Finally, the border between models of institutional change with top-down formal regulation changes and bottom-up EE capacity building is blurred. The prior literature on entrepreneurship and institutions (Baumol 1990, 1993) has focused on the most productive entrepreneurs. Prior research on EE (Isenberg 2010; Stam 2015) has argued that the bottom-up principles of EE creation should be used for policies/initiatives that respect the entrepreneurial conditions of cities/regions/countries (Cantner et al. 2020). Changes in formal regulation are limited in the short term and in conflict regions as they can be changed overnight (as a result of institutional reform), but may not be enforced or accepted by economic agents overnight (Aidis et al. 2008; Desai et al. 2013). The latter creates more regulatory uncertainty (Hoffmann et al. 2009) than security and stability. While rent-seeking activities can also reduce EE endowments, albeit indirectly, we do not consider endogeneity between EE pillars and the growth-oriented perception of entrepreneurial activity. We hypothesize:

Hypothesis 1 In post-conflict regions, the entrepreneurial ecosystem approach based on bottom-up principles has a greater effect on the productive entrepreneurship than changes in formal institutions based on top-down principles.

3 Data and methodology

3.1 Survey data and sample

To test our hypotheses, we developed a new survey to apply the entrepreneurial ecosystem approach to productive entrepreneurship in post-conflict regions. We collected data from 216 economic agents across two Ukrainian cities: Kyiv (130 agents) and Lviv (86 agents). As the capital, Kyiv is by far most populous city in Ukraine while Lviv is the largest regional market center in Western Ukraine. Both cities have gone through three revolutions in 2004, 2008 and 2014, undergoing significant institutional reforms every time.

Our approach suggests that cities are the most appropriate spatial units for this analysis of EEs with entrepreneurial conditions that are spatially bounded (Audretsch and Belitski 2021). Thus, our data collection strategy was to limit the study to certain administrative units, like cities.

The sample of respondents—at least eight different types of EE stakeholders—were selected from the register compiled by the Chamber of commerce, which lists every active EE stakeholder that has satisfied the requirements of living and working in a city for over 5 years. These were professors at university who started a business, non-for-profits, entrepreneurs, managers of technopark or incubators, venture investors, representatives of a bank or trust, and multinational company C-level managers. In addition to access researchers and university professors we requested a list of faculty emails from the Ministry of Science and Education of Ukraine. The email list included all available email addresses of Ukrainian university scientists in business schools and faculties of economics.

The survey was pretested in two phases prior to data collection. Firstly, in April 2019, the survey was submitted to a panel of 4 entrepreneurship ecosystem stakeholders (VC, entrepreneur, lawyer and university professor) and the questions were then adjusted for clarity. Secondly, in September 2019, the survey was pilot-tested online with a sample of 15 stakeholders in Kyiv and Lviv to ensure that the questions were understood by the respondents, to check the feasibility and content validity empirical data would satisfy the research objectives.

In selecting questions, we draw on prior research on the role of stakeholders in the ecosystem (Autio and Levie 2017; Brown and Mason 2017; Belitski and Büyükbalci 2020), hence selecting at least eight types of representative EE stakeholders.

A statistically random sample was created in which a key respondent (Singh and Kumar 2012). The survey included questions to verify that the respondent was the key decision-maker in the organization. We received a list of 2023 addresses from the Chamber of commerce in every city. One in four of the addresses, plus 100 respondents, were randomly selected. Five hundred and eighty invitations to complete the survey were sent to EE stakeholders in October 2018 and followed up with three reminders over a one-month period. A further 475 EE stakeholders were sent invitations in January 2019, again with three reminders following. Two hundred and thirty-four had outdated contact information and could not be

contacted. Two hundred and thirty-three EE stakeholders completed the questionnaire, but part of the questionnaires were unusable, leading to an initial sample of 221. A 10.9% response rate was achieved, which compares well with other innovation and social enterprise surveys of 19% (Weber et al. 2015).

Considering the few missing observations, researchers often use averaged indicators to predict the role of institutions in an entrepreneurial activity, which is incorrect as it may produce different results, and causality could not be claimed. This is not the approach we followed, as we excluded all missing data ending u0p with 216 observations.

Our four major groups of stakeholders are entrepreneurs (25.1%), university professors (18.1% of a sample), policymakers (5.4% of a sample), as well as respondents of multiple affiliations (33.9% of a sample). Other stakeholders include investors, a representative from the Chamber of commerce, managers in multinational firms, and technology transfer office (TTO) managers.

Summary statistics of the variables used in our study are presented in Table 1, representing a list of questions used in the construction of the variables. The age of 62% of respondents was between 30 and 49 years old, with 96 percent of respondents having a university degree or above. Correlations between variables included in this study are less than 0.70, which demonstrates no multicollinearity issue.

3.2 Variables and method

3.2.1 Dependent variable

We used productive entrepreneurship as a dependent variable, which is measured via "There is a strong and productive (growth-oriented) entrepreneurship ecosystem (EE) in my city", reflected on the Likert scale in the range from 1—not at all to 7—very strong. Recent empirical findings underline the importance of EE quality for regional performance (Szerb et al 2019; Stam 2018). The mean of productive entrepreneurship is 4.96 and the standard deviation is 1.31. While we expect that entrepreneurship cases substantially deviate from the productivity model, as the reality in post-conflict regions is always much more chaotic and diverse than any framework could represent, we believe that our question focuses on the extent to which experts believe entrepreneurship activity is productive and growth-oriented.

The perception question helps us to understand the extent to which EE agents perceive entrepreneurship in a region to be associated with a growth orientation.

3.2.2 Independent variables

Our independent variables define respondents' attitudes toward four pillars of EE, as well as their perceptions regarding institutional quality, which adds to a complex system of interactions between various elements of entrepreneurial economies in a region (Roundy et al. 2018; Stam and Van de Ven 2020). All the independent variables that constitute the four pillars of Brown and Mason (2017) (entrepreneurial actors, culture, financial resource providers and networks connectors) include both

Table 1 Descriptive statistics

Variables	Description of variables	Mean	St. dev	Min	Max
Productive	There is a strong and productive (growth-oriented) entrepreneurship ecosystem (EE) in my region (city) (1—do not agree, 7—fully agree) (Sobel 2008)	4.96	1.31	1.00	7.00
Entrepreneurial actors	There is a sufficient stakeholder collaboration for entrepreneurship in my region (1–do not agree, 7—fully agree)	3.91	1.45	1.00	7.00
Financial equity resource	There is a sufficient private equity capital (angels, venture capital, crowdfunding) in my region (1—do not agree, 7—fully agree)	3.86	1.54	1.00	7.00
Financial debt resource	There is a sufficient availability of debt capital like banks or other debt credit in my region (1—do not agree, 7—fully agree)	4.58	1.74	1.00	7.00
Formal networks	There is a sufficient formal network to support entrepreneurship EE in my region (city) (1—do not agree, 7—fully agree)	3.90	1.41	1.00	7.00
Informal networks	There is a sufficient informal network to entrepreneurship in my region (city) (1—do not agree, 7—fully agree)	4.51	1.41	1.00	7.00
Entrepreneurship culture	There is a strong entrepreneurship culture and orientation in my region (city) (1—do not agree, 7—fully agree)	4.34	1.56	1.00	7.00
Formal institutions support	Formal rules, regulations and government institutions support growth-oriented entrepreneurship in my region (city) (1—do not agree, 7—fully agree)	3.92	1.37	1.00	7.00
Entrepreneur	Area of activity (entrepreneur = 1, otherwise = 0)	0.17	0.38	0.00	1.00
Professor	Area of activity (professor = 1, otherwise = 0)	0.15	0.36	0.00	1.00
Policymaker	Area of activity (policymaker = 1, otherwise = 0)	0.07	0.26	0.00	1.00
Multiple	Multiple occupations: any combination of entrepreneur, professor, policymaker, investor, director/manager in a multinational company, manager of TTO, manager in techno park (accelerator); lawyer, other) = 1, zero otherwise	0.29	0.45	0.00	1.00
Gender	Gender (male = 1, female = 0)	0.50	0.50	0.00	1.00
University degree	Have you got a university degree or higher? (1—yes; 0—no)	0.92	0.27	0.00	1.00
Age range	Age group (less than 29 years old = 1; 30–39 = 2; 40–49 = 3; 50–59 = 4; 60–69 = 5; more than 70 = 6)	2.36	1.09	1.00	6.00
Corruption	There is a strong political entrepreneurship in my city (economic activity in a strong formal and informal cooperation with local/national government to access resources in a privileged way compared to other entrepreneurs) (1—not likely, 7—very likely)	4.91	1.49	1.00	7.00
Capital city	Binary variable = 1 if capital city Kyiv, zero otherwise	0.60	0.49	0.00	1.00

Source: Authors, based on online survey and National Statistics Committee of Ukraine

institutional arrangements and resource combinations. Four elements of complex EEs have distinct properties that arise from interdependencies, such as co-location between actors, formal and informal networks, financial resource movements and availability, dealmakers, economic agents and the connectedness between them. Networks can be described as a form of collaborative relationship that entrepreneurs and firms enter into with their competitors and other stakeholders (de Wit and Meyer 1998). We draw on previous studies of EEs (Roundy et al. 2018; Stam and Van de Ven 2020) to bring all factors in one model and understand the dynamics of EE toward productive entrepreneurship. The interdependencies between the elements of EE require joint inclusion of all elements (Stenholm et al. 2013; Stam 2018) that potentially affect productive entrepreneurship.

Small changes in any of the four pillars of EE (actors, finance, networks and culture) can significantly impact the allocation of entrepreneurial talent and societal vs. private gains. The use of all elements that predict productive entrepreneurship in the context of post-conflict economies. Such analyses also provide novel insights into the entrepreneurship ecosystem literature by visualizing how powerful interconnections can be developed building on the bottom-up and top-down principles of ecosystem creation.

3.2.3 Control variables

Our control variables include the demographic characteristics of respondents (stakeholder occupation, age, gender and education level) which can be used to measure the quality and distribution of EE stakeholders in each region. We proxy corruption level by applying it to business directly and asking a question: Please define from 1—no—to 7—very strong—whether economic activity in your city is associated with strong formal and informal cooperation with authorities to access resources in a privileged way (De Soto 2020; Belitski et al. 2016). City controls include city population in logarithm and a binary variable for the capital city (Fritsch and Wyrwich 2017, 2018).

Survey analysis based on perception variables has been widely used to study entrepreneurship (Estrin et al. 2013), particularly studies that used individual GEM data aggregated at country and regional levels (Autio et al. 2014). In particular, when studying the role of informal institutions, such as institutional culture, norms and values, attitudes to corruption, risk—these indicators are based on a perception of economic agents related to informal institutions and risk-taken behavior and the value of these indicators will be lost if aggregated. Perception variables demonstrate what people do and think rather than what is declared formally.

Entrepreneurship interacts with broader social and economic entrepreneurs' activities (Estrin et al. 2013). Existing frameworks are not capturing these norms and how people perceive the ecosystem conditions in a city well, because unlike declared explicit support to the ecosystem, regulation changes or public policy, informal institutions are revealed through active and innovative entrepreneurial behavior (Autio et al. 2013). In Stephan and Uhlaner's (2010) terminology, authors discuss declared norms, those that we need to identify through actual behavior and descriptive norms that is what economic agents pursue. Instead of declaring "observed support" for the

entrepreneurial ecosystem, the use of perception questions enables to better capture the value economic agents assign to formal and informal networks, entrepreneurial culture, and access to capital when they are faced with VC and banks. The perception indicators are based on the experience of economic agents who live and work in the ecosystem and are able to observe and perceive the entrepreneurial conditions in a city. Therefore in this study, we use perception data to contract the EE conditions as (Should Be) vs. practices and behavior of economic agents (As Is).

3.3 Model

To test our research hypotheses, we employ ordinary least squares (OLS) regression models controlling for heteroscedasticity in standard errors. The following model was estimated:

$$y_i = f(\beta x_{i,} \theta z_{i,}, \mu_i) \quad i = 1 \ldots, N; \tag{1}$$

where y_i is productive entrepreneurship activity that varies from 1 (low) to 7 (very high). β and Θ are parameters to be estimated, x_i is a vector of independent explanatory variables including elements of EE and formal institutional proxies z_i is a vector of control variables such as the individual characteristics of respondents; u_{it} is then the error term. To address concerns of multicollinearity, we used variance inflation factor (VIF) in all models.

4 Results

4.1 Post-conflict region of contemporary Ukraine

A lack of strong institutions is often observed in post-communist countries, for which there are a number of reasons. In this study, we follow Gerber and Wichardt (2009) defining strong institutions as institutions that have a power to implement transfers between economic agents (e.g., monetary rewards or penalties) or produce the public goods to create or raise funds. The collapse of the Communist system that rejected the market economy created regulatory gaps, loosened the rules of law and collapsed many industries that were unable to adapt quickly to the shift to a market economy. Established production networks and value chains broke down very swiftly and the population was not ready for the opportunities that suddenly became available (Williams, et al 2012). Some industries that retained high technical capabilities and/or were able to sell their products on the world market survived and eventually thrived in the next period (Manolova et al 2008). In more centralized economies formal networks became the main way to increase productive entrepreneurship and to search for opportunities outside relatively isolated ecosystems (Ciszewska-Mlinarič et al 2020). Excessive bureaucracy, unnecessary procedures and unreasonable regulations may become a significant burden for entrepreneurs and the general public, leading to corruption and a reduction in productive activities (Riaz et al. 2018).

The case of Ukraine in creating support mechanisms for entrepreneurship is somewhat exceptional (Williams et al 2012). Since the transition period started in 1991, it balanced itself between the Western (European Union—EU) and Russian models of economic development, having experienced three revolutions (regime changes) with continuously unsuccessful economic and political systems (Shutyak and Van Caillie 2015). While failing to integrate into EU, Ukraine was exposed to economic, military and political pressure due to the annexation of Crimea by Russia in 2014 and its military conflict in the East of Ukraine (Davis 2016) which still affects the region. The transition period created a unique EE which possessed the features of both a market economy driven by demand and supply and the "old-fashioned" post-Soviet bureaucracy with high levels of corruption and strong informal networks (Smallbone et al 2010; Shutyak and Van Caillie 2015).

Understanding the way Ukraine's EE works can provide important insights for the bottom-up principles that guide productive entrepreneurship and the pillars of entrepreneurship activity in post-conflict regions in many transitioning countries. When approaching the method to study EE in Ukraine, our main concern was a common source method bias (Podsakoff et al. 2003). To address this, we decided to use a mixed methods approach consisting of both a statistical analysis of EE stakeholder perceptions and a qualitative narrative: In this case regression analysis combined with face-to-face interviews with EE stakeholders.

4.2 Empirical analysis

Our main results are presented in Table 2.

The first specification includes only control variables at the individual (age, occupation, university degree) and city (population size, capital city, perceived level of corruption). Starting from specification 2 we added elements that represent each of four EE pillars, one at a time. Table 2 (specification 2) shows the positive and significant effects of entrepreneurship actors on productive entrepreneurship ($\beta = 0.37$, $p < 0.01$). Specification 3 demonstrates that entrepreneurial finance is conducive to productive entrepreneurship. A one-unit increase in perception of financial equity availability (venture capital, business, angels, crowdfunding) increases the perception of productive entrepreneurship in a city by 0.24 units ($\beta = 0.24$, $p < 0.01$). The effect of debt financing is smaller and accounts for a 0.13-unit increase in productive entrepreneurship for every unit increase in debt finance ($\beta = 0.13$, $p < 0.05$).

Specification 4 additionally controls for the effects of formal ($\beta = 0.22$, $p < 0.05$) and informal networks. The joint inclusion of two types of networks (formal and informal) demonstrates that connectivity through formal channels plays a positive role for productive entrepreneurship, while informal is not significant. Once we control for the effect of networks, the coefficient of "entrepreneurial actors" becomes not statistically significant. These findings provide empirical evidence that the concentration of ecosystem actors and the mechanism by which they link to productive entrepreneurship is likely to take place via formal networks.

In post-conflict regions with volatile environments where social capital and trust are weak, it is widely accepted that informal support networks are no longer inclusive after

Table 2 OLS regression analysis: Dependent variable—productive entrepreneurship

Models	Controls	+ Actors	+ Finance	+ Networks	+ Culture	+ Formal
Specification	(1)	(2)	(3)	(4)	(5)	(6)
Entrepreneur	−0.15	0.01	0.16	0.12	0.09	0.11
	(0.26)	(0.24)	(0.23)	(0.22)	(0.21)	(0.21)
Professor	0.02	0.02	0.02	0.03	−0.01	−0.02
	(0.30)	(0.27)	(0.24)	(0.24)	(0.25)	(0.25)
Policymaker	−0.06	0.03	0.21	0.19	0.18	0.12
	(0.25)	(0.22)	(0.23)	(0.21)	(0.21)	(0.20)
Multiple	−0.33	−0.12	0.08	0.08	0.07	0.02
	(0.24)	(0.22)	(0.21)	(0.21)	(0.21)	(0.21)
Gender	−0.02	0.10	0.18	0.15	0.15	0.18
	(0.18)	(0.17)	(0.16)	(0.15)	(0.15)	(0.15)
University degree	0.48	0.99***	1.27***	1.28***	1.27***	1.08***
	(0.36)	(0.31)	(0.31)	(0.31)	(0.30)	(0.31)
Age	−0.18**	−0.09	−0.06	−0.03	−0.02	−0.01
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
Corruption	0.12**	0.09*	0.09**	0.08*	0.08*	***0.07***
	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	***(0.05)***
Capital city	0.11	0.12	0.06	0.08	0.12	0.14
	(0.08)	(0.11)	(0.05)	(0.07)	(0.08)	(0.10)
Entrepreneurial actors (H1)		0.37***	0.18**	0.08	0.02	−0.01
		(0.06)	(0.08)	(0.08)	(0.10)	(0.09)
Financial equity resource (H1)			0.24***	0.18***	0.17***	0.11*
			(0.06)	(0.06)	(0.06)	(0.06)
Financial debt resource (H1)			0.13**	0.08	0.08	0.07
			(0.06)	(0.06)	(0.06)	(0.06)
Formal networks (H1)				0.22***	0.20***	0.17**
				(0.08)	(0.08)	(0.08)
Informal networks (H1)				0.06	0.05	0.05
				(0.08)	(0.08)	(0.08)
Entrepreneurship culture					0.13*	0.13*
					(0.07)	(0.07)
Formal institutions support						***0.18****
						(0.07)
Constant	2.74	0.06	0.08	−0.35	−1.02	−1.30
	(1.87)	(1.87)	(1.77)	(1.69)	(1.71)	(1.69)
Number of obs	216	216	216	216	216	216
R^2	.06	.22	.31	.35	.37	.39
RMSE	1.25	1.14	1.07	1.05	1.04	1.02
F-stat	1.70	6.11	8.13	9.50	9.52	8.86
Log-likelihood	−350.37	−329.84	−315.94	−309.38	−307.44	−303.77

F-test for β Formal institutions support = β Entrepreneurial actors ($p = 1.98$)

F-test for β Formal institutions support = β Financial equity resource ($p = 0.42$)

Table 2 (continued)

Models	Controls	+ Actors	+ Finance	+ Networks	+ Culture	+ Formal
Specification	(1)	(2)	(3)	(4)	(5)	(6)
F-test for β Formal institutions support = β Financial debt resource ($p = 1.47$)						
F-test for β Formal institutions support = β Formal networks ($p = 0.03$)						
F-test for β Formal institutions support = β Informal networks ($p = 1.56$)						
F-test for β Formal institutions support = β Entrepreneurship culture ($p = 0.29$)						

*0.01, **0.05, ***0.001 significance level. Standard errors clustered by city. *Source*: Authors, based on online survey and National Statistics Committee of Ukraine

conflicts end (Collier et al. 2003). Specification 5 controls for the role of entrepreneurial culture, which positively affects productive entrepreneurship ($\beta = 0.13$, $p < 0.05$).

Finally, we add expert perceptions of formal institutions to support entrepreneurship. The effect is positive and significant ($\beta = 0.18$, $p < 0.05$); however, the corruption variable loses its significance. In Table 2 (specifications 1–5) an increase in corruption proxied by destructive entrepreneurship activity (Baumol 1990) and access to resources was positively associated with productive entrepreneurship ($\beta = 0.08$, $p < 0.05$). While this finding is counterintuitive, as corruption is a rent-seeking activity which is unproductive (Baumol 1990, 1993), in post-conflict regions corruption may penetrate red tape when formal institutions are weak (Aidis 2003; Estrin and Mickiewicz 2011; Belitski et al. 2016). This allows faster entry and business growth, both productive and not. This finding supports previous results on corruption greasing the wheels of business in economies with a lot of red tape (Méon and Sekkat 2005; Méon and Weill 2010; Belitski et al. 2016). Our statistical fit of model 6 drops (F-stats = 8.86) compared to specification 5 (F-stats = 9.52). Log-likelihood decreases while RMSE increases. This demonstrates that the power of government institutions is limited and it is only the strong association with corruption that makes government formal institutions work for entrepreneurship. It is likely that the access to these programs is limited by the general entrepreneur (De Soto 2020). We highlighted both coefficients in bold and italics for contrast in specification 6 (Table 2).

We wanted to test the size of the effect of EE factors (actors, finance, networks and culture) and the effect of government regulation on productive entrepreneurship. To do so we performed F-tests on equality of beta-coefficients, as reported beneath of Table 2. Our results using specification 6 demonstrate that the effects of formal institutions are the same as the effects of each individual pillar of EE, but the formal institutional effect is conditional on corrupt practices. This result demonstrates that stakeholder perceptions about the impact of each component of EE on productive entrepreneurship is positive and significant. In the Ukrainian context, reliance on government institutions risks triggering corruption effects, as our result demonstrate that formal support to entrepreneurship is highly correlated with the positive effect of corrupt practices related to politically connected firms, who benefit from the system (Belitski and Grigore 2021). This relationship with corruption makes the effect of formal institutions on entrepreneurship uncertain (Hoffmann et al. 2009). The best strategy for policymakers in post-conflict regions aiming to support productive entrepreneurship and resolve conflicts is

to apply as many as possible elements of EE, rather than focusing on changing formal regulation.

4.3 Post hoc analysis

Given the nature of our dependent variable, which varies from one to seven on a Likert scale (ordinal variable), we perform a robustness check by estimating the ordered logistic regression, in addition to our OLS analysis. This approach is also applicable if both dependent and independent variables are ordinal. We used the "ologit" command in Stata to estimate an ordered logistic regression model. The output of Table 3 does not directly support the hypothesis that, "the entrepreneurial ecosystem approach based on bottom-up principles has a greater effect on productive entrepreneurship than changes in formal institutions based on top-down principles." While formal institutional support to entrepreneurs may be important, we evidence that the coefficient for corruption loses its significance as we include formal institutional support variables in the model (spec. 6 Table 3). Our results demonstrate that formal institutions may be related to corrupt practices that may reduce trust to the government. On the contrary, supporting policies that draw on the entrepreneurial conditions of a region could be an effective strategy to enhance productive entrepreneurship but also incentivize entrepreneurship using market-based tools and regional advantages, rather than aiming to change formal institutions that are likely to be corrupt (Aidis et al. 2008). We do not use odd ratios when reporting the results of the coefficients, and hence they cannot be interpreted directly; what can be interpreted is the sign and significance level.

5 Discussion and conclusion

BAUMOL (1990) proposed a theory of the allocation of entrepreneurship in his article *Entrepreneurship: Productive, Unproductive and Destructive*. This study begins with a powerful observation: Entrepreneurship is typically associated with higher incomes, innovation and economic growth, and entrepreneurs are usually engaged in activity aimed at increasing wealth and economic efficiency (Baumol 1990). Public policy scholars such as Desai and Acs (2007), Desai (2008), Sobel (2008) and Desai et al. (2013) have demonstrated that entrepreneurship is not inherently productive, but can be split into productive, unproductive and destructive forms. In post-conflict economies the trade-off between productive and unproductive entrepreneurship activity is often blurred, while unproductive mechanisms, such as corruption, informal networks and access to resources, may be required in order to enter markets and promote growth. Strong formal institutions are often broken and are subject of change, leading to regional regulatory uncertainty (Hoffmann et al. 2009). Should this happen legal protections are challenged, and formal institutions may be either ignored or mistrusted, with other forms of entrepreneurial activity become more important (Djankov et al. 2002; Desai 2011). Firstly, a strong EE which encompasses access to equity and debt capital, the presence of informal and

Table 3 Ordinary logistic model: dependent variable—productive entrepreneurship

Models	Controls	+ Actors	+ Finance	+ Networks	+ Culture	+ Formal
Specification	(1)	(2)	(3)	(4)	(5)	(6)
Entrepreneur	− 0.307	0.015	0.155	0.064	0.038	0.087
	(0.38)	(0.40)	(0.40)	(0.39)	(0.39)	(0.38)
Professor	− 0.034	0.018	− 0.014	0.010	− 0.046	− 0.108
	(0.43)	(0.46)	(0.42)	(0.46)	(0.47)	(0.49)
Policymaker	− 0.204	− 0.024	0.278	0.256	0.244	0.121
	(0.36)	(0.35)	(0.38)	(0.37)	(0.36)	(0.38)
Multiple	− 0.510	− 0.202	0.087	0.126	0.112	− 0.001
	(0.35)	(0.36)	(0.38)	(0.37)	(0.36)	(0.38)
Gender	− 0.144	0.103	0.241	0.233	0.241	0.276
	(0.26)	(0.28)	(0.27)	(0.27)	(0.27)	(0.28)
University degree	0.691	1.659***	2.197***	2.256***	2.313***	2.007***
	(0.49)	(0.50)	(0.55)	(0.56)	(0.55)	(0.58)
Age	− 0.281**	− 0.171	− 0.123	− 0.046	− 0.012	0.013
	(0.11)	(0.12)	(0.12)	(0.14)	(0.14)	(0.14)
Corruption	0.191**	0.144*	0.142*	0.157*	0.151*	0.131
	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Capital city	0.166	0.341	0.168	0.132	0.267	0.328
	(0.26)	(0.28)	(0.28)	(0.27)	(0.28)	(0.28)
Entrepreneurial actors (H1)		0.611***	0.301**	0.127	− 0.022	− 0.067
		(0.11)	(0.14)	(0.15)	(0.17)	(0.17)
Financial equity resource (H1)			0.423***	0.341***	0.316***	0.196**
			(0.11)	(0.10)	(0.11)	(0.10)
Financial debt resource (H1)			0.228**	0.146	0.142	0.135
			(0.10)	(0.11)	(0.11)	(0.11)
Formal networks (H1)				0.438***	0.413***	0.356**
				(0.14)	(0.14)	(0.15)
Informal networks (H1)				0.093	0.061	0.070
				(0.15)	(0.15)	(0.15)
Entrepreneurship culture					0.285**	0.299**
					(0.13)	(0.12)
Formal institutions support						0.325**
						(0.15)
cut1	− 4.722***	− 1.314	0.604	1.505	1.900	1.992
	(1.29)	(1.51)	(1.58)	(1.59)	(1.63)	(1.67)
cut2	− 2.749***	0.694	2.653**	3.576***	3.965***	4.074***
	(0.83)	(1.09)	(1.19)	(1.21)	(1.26)	(1.32)
cut3	− 1.278*	2.249**	4.252***	5.194***	5.594***	5.708***
	(0.76)	(1.01)	(1.12)	(1.14)	(1.19)	(1.26)
cut4	0.0237	3.676***	5.788***	6.774***	7.214***	7.342***
	(0.73)	(1.01)	(1.12)	(1.15)	(1.21)	(1.27)

Table 3 (continued)

Models	Controls	+ Actors	+ Finance	+ Networks	+ Culture	+ Formal
cut5	1.400*	5.228***	7.490***	8.567***	9.050***	9.219***
	(0.73)	(1.03)	(1.16)	(1.20)	(1.27)	(1.32)
cut6	2.851***	6.834***	9.192***	10.34***	10.85***	11.04***
	(0.75)	(1.08)	(1.21)	(1.26)	(1.34)	(1.40)
Number of obs	216	216	216	216	216	216
Chi-squared	14.13	46.76	71.75	86.89	90.38	87.97
Log-likelihood	− 343.92	− 324.56	− 311.32	− 304.42	− 301.60	− 298.47
pseudo R2	.02	.07	.11	.13	.14	.14

*0.01, **0.05, ***0.001 significance level. Standard errors clustered by city. *Source*: Authors, based on online survey and National Statistics Committee of Ukraine

formal networks and an entrepreneurship culture (Stenholm et al. 2013; Estrin et al. 2013; Autio et al. 2014; Stuetzer et al. 2016). Secondly, social norms and attitudes to unproductive practices (e.g., corruption) reshape the direction of entrepreneurship in post-conflict economies (Belitski et al. 2016).

Prior work on allocating entrepreneurship was entirely dedicated to developed countries (Desai and Acs 2007). More research was needed to compare and contrast the most effective approaches to boosting productive entrepreneurship in developing, emerging and mid-war—post-conflict regions. These are places where formal top-down institutional mechanisms to facilitate productive entrepreneurship are weak or uncertain and where policies/initiatives that respect the entrepreneurial conditions of cities/regions/countries based on the bottom-up principles should be implemented.

While unproductive and destructive activities take place often in many developing and post-conflict regions (Desai 2008), the trade-offs between formal regulation to support the allocation of entrepreneurship and other EE mechanisms are very different. Even in rapidly developing post-conflict regions, such as those in Eastern Europe and Ukraine, opportunities for rent-seeking can overtake the growth of institutions. This mismatch widens the scope of corruption and destructive entrepreneurship, making the policymakers search for other combinations and factors that can complement each other and become a stronger alternative to formal institutions.

This study makes an important contribution to the regional entrepreneurship literature by demonstrating that the incentives related to entrepreneurial conditions of a region such as culture, networks and financing in a post-conflict region can facilitate productive entrepreneurship in a way more efficient than cresting formal institutional support which may take longer (Stam 2015, 2018; Roundy and Bayer 2019) and can be challenged by corrupt practices.

There are three limitations of this study. The first methodological weakness is its cross-sectional data. All survey responses took place in 2019—5 years after the revolution and EE stakeholders were asked to reflect on this. Investigating productive entrepreneurship just after the 2014 revolution would better highlight the post-conflict context.

The second methodological weakness is that we only performed a study in Lviv and Kyiv. The robust criteria to justify the selection of these cases is that Kyiv and Lviv are the largest cities in the country with the highest dynamics of entrepreneurship. These cities have different cultures, different venture capital activities and different economic agent combinations. At the same time, other criteria such as demographics and regional characteristics remain unexplored.

Finally, there is a lack of detail about changes in formal regulation since the revolution took place. Stakeholders may have been unable to observe all of these changes or have a complex perspective. These changes can be unexpected as this paper focuses on volatile environments. Further inclusion of policymakers in the study may shed more light on this.

Future research will provide more details about the variety of stakeholders and how they have been involved in changing institutions over time. Further studies should also address the issues of the combination of EE elements for productive entrepreneurship and also challenge the "one-size-fits-all" approach to EE policy. More specifically, we call for studies on various EEs in post-conflict regions (Szerb et al. 2019). Focusing on industrial structure, co-location with global centers, market size and other characteristics will moderate the relationship between EE elements and productive entrepreneurship.

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Conflict of interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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