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**THE CONTRIBUTION OF STUDENTS TO REGIONAL ECONOMIES: REFRAMING  
THE REGIONAL INNOVATION SYSTEMS APPROACH**

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# **THE CONTRIBUTION OF STUDENTS TO REGIONAL ECONOMIES: REFRAMING THE REGIONAL INNOVATION SYSTEMS APPROACH**

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## **ABSTRACT**

The role of universities in regional development has grown significantly over the past two decades. One strand of analysis has been that of the university in regional innovation systems (RIS). However, the contribution of university students has largely been neglected. This special issue contributes to the RIS literature by unpacking the RIS concept through exploring this specific aspect of university engagement in regional economies. The nine papers collectively offer an understanding of the effects of student activity upon the knowledge, skill and entrepreneurial bases of regions. The papers provide evidence and analysis from Asia, Australia, Europe and North America.

Key words

Regional innovation systems, university students, Asia, Australia, Europe, North America.

JEL codes O15, R11, R12, R23

## **INTRODUCTION**

Over the past several decades, many researchers across the world have analyzed the role of the university in regional innovation systems (RIS) (Cooke and Morgan, 1998; Cooke 2005). Interest is partly driven by theoretical advances, partly by the growth in entrepreneurship as a source of

regional prosperity and partly by political pressure to leverage the assets and capabilities of universities for societal advance. The RIS approach stresses the importance of the regional rather than the national level. It proposes that in some regions with innovative organizations, the organizations are connected in regionally-based networks through joint research programmes, policies, and social networks in an institutional milieu, to “combine learning with upstream and downstream innovation capability” (Cooke and Morgan, 1998, 71). The institutional milieu as suggested by Cooke and Morgan (1998) includes universities, basic and applied research laboratories, technology transfer agencies, regional public and private associations, training organizations, banks, venture capital firms, and small and large firms. In these successful regions, companies are able to access and test knowledge more easily. In a RIS, knowledge becomes the “most strategic resource and learning the most important process” of economic development.

In order to sustain regional economic development, however, high-level innovation and production processes need to be maintained in the region. This is achieved through constant renewal of knowledge and understanding - involving learning and training for employees, and intra-firm learning processes that spill over to regional learning. Students are an obvious source of such activity. This is because the learning and knowledge creation process is accomplished through a set of institutions that promote knowledge creation and learning by the local firms. Underpinning such relationships is a base of trust and understanding between firms, universities, and individuals that differs from region to region, and allows a region to perform in a way that promotes its economic development.

The growth of study in the field of how universities are engaged in these processes can be seen in a review article by Brekke (2021) who identified 193 articles on universities and regional development published between 1994 and 2019. However, the analysis of the contribution of university students is not a common theme in these studies. This special issue acknowledges this gap and offers an understanding of the impact of student activity upon the knowledge, skill, and entrepreneurial bases of regions, as well as the geographical scale of activity. The argument is that the role of universities has tended to over-emphasise the role of research and third mission activities such as academic spin-offs and various forms of contractual relationships. Students’

regional engagement stems from how what they are taught feeds into economic and innovation activity as they go into employment, from their increasing propensity to be entrepreneurial, and as contributors to local labour markets. This special issue provides insights into concepts and theory, short and long term effects, by unpacking assumptions from the empirical evidence – about regions and entrepreneurship - and the importance of context. The nine papers here provide evidence from Asia, Australia, Europe, and North America.

Unifying the agenda of these papers is the RIS concept. By an analysis of the components of the impact of students on regional economies, these papers enhance our understanding of conceptual and empirical assumptions at the regional level, capitalizing on the skills and capabilities of young people in higher education. While RIS describes the different players in each region, it does not break down the different contributions nor does it show their impact. Here we attempt to enrich the analytical power of the RIS concept by exploring the complexity of the contribution of universities in RIS, and provide in depth information on their contributions and impact.

## **UNIVERSITIES, STUDENTS AND ECONOMIC DEVELOPMENT**

Why should we study the role of students and their universities in Regional Innovation Systems? Pertinent is the emphasis on social capital, networking and learning, interacting knowledge generation and exploitation sub-systems linked to global, national and other regional systems (Asheim and Coenen, 2005). Earlier studies have for example explored such themes as universities, knowledge transfer and regional development (see the book edited by Varga, 2009) and factors and mechanisms that make the process of promoting socio-economic growth in by universities local communities challenging (see the analyses in the book edited by Pinheiro et. al., 2012).

More recent studies have explored how students' contribution to regional economies is increasing because of the range of experiential learning opportunities now offered. For example Wright et al. (2017)'s analytical focus on university students in entrepreneurial ecosystems identified entrepreneurship courses, incubators, accelerators, grants, and business plan competitions as ways in which students participate in experiential learning. There are more

recent studies which have investigated universities in regional development including many studies which are the result of the RUNIN project.<sup>1</sup> Studies included those by Atta-Owusu (2019) and Fonseca (2019) who investigated different aspects of universities' influences on economic activity in peripheral regions; and by Fonseca and Neith (2021) who identified universities' contributions in different stages of regional innovation strategy processes. However, these studies do not focus explicitly on the role of students. That said, Reichart (2019) adopted an explicit RIS approach to exploring how universities work in their regional environment including aspects of the teaching of students. She highlights the role of students as active participants in RIS: "Students are strongly motivated by challenge-driven approaches, in learning and teaching as well as in their entrepreneurial initiatives" (Reichart, 2019, 8).

While the RIS approach still tends to underplay the role of entrepreneurs in the dynamics of economic change (Lawton Smith, 2021), earlier RIS research also underplayed the role of local and regional labour markets in RIS (Asheim et al., 2011). Here we argue that the contributions both of universities and of their students are similarly insufficiently recognized in RIS analyses. The RIS framework is therefore adapted here to look specifically at the multi-dimensional roles of students in regional development, with students as the unit of analysis rather than firms (as is the case in the traditional RIS approach). As in the RIS approach, regional boundaries of the impact of universities and students are porous and relational (Cooke, 2005).

The contribution of the special issue to the RIS literature is based on two interrelated themes. The first addresses regional characteristics, regional boundaries, and change mechanisms (Asheim et al., 2011). It is well established that areas with higher levels of human capital are more likely to be innovative and hence more productive (Faggian et al., 2009). However, it is also known that different models of university system produce different kinds of connections via the labour market; that regions vary by levels of demand for skills; and that different types of university have varying local effects on supplies of skills (Lawton Smith and Waters, 2021).

The first theme covers economic contribution through various impacts of universities' teaching roles through student spending (Incera et al.); human-capital development, innovation

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<sup>1</sup> <https://runinproject.eu/results/scientific-publications/>

development, and the community development roles that students play in their respective regions (Eversole; Ballarino et al.); and entrepreneurship (Breznitz and Zhang; Eesley and Yang; Fini et al.; Kitagawa et al.). These papers address established RIS components of the extent of regional human capital and knowledge base development by considering inflows of students seeking education as well as retention, and outflows of graduating students both into and to outside of the local regional labour market .

The second theme is the impact of graduate entrepreneurship. These studies analyze the relationships of entrepreneurship and mobility to the home region (Breznitz and Zhang; Eckhardt et al.; Fini et al.; Kitagawa et al.); periphery versus urban regions (Ballarino et al.; Eckhardt et al.; Fini et al.; Kitagawa et al.) and salaried versus self-employment trends (Drejer et al., Fini et al., Kitagawa et al.). The papers address the reality of the anticipated impact of institutional and regional contexts in nurturing student firm formation, the eventual retention of those firms, and the relationship between demand and supply of labour.

Both themes encompass longer term perspectives and policy implications. Both are about linking the present to the future. In these papers the economic contribution of universities is measured over the short and the long term. In the short term, the institutional spending, research funding coming into the region and direct employment by the university are considered. The long term analysis includes a review of future earning of students including new firm formation. The paper by Andre Carrascal Incera, Anastasios Kitsos and Diana Gutierrez Posada - *Universities, students, and regional economies: A symbiotic relationship?* proposes a symbiotic relationship between student spending and discusses the uneven capacity of regions to benefit.

Due to a lack of data surrounding the relationships between industries across and within regions, most studies on the benefits of universities have used industrial Input-Output (IO) data to study non-spatial effects focused on the national economy instead of geographically. The consequence of this methodology is a lack of information on the spatial distribution of the benefits of spending generated by universities. By examining the regionally heterogeneous effect of student spending on different UK NUTS2 regions, Incera et al. contribute to the body of literature on the socio-economic impacts of Higher Education Institutions (HEIs). The authors identify the total Gross

Value Added (GVA) and the employment effects of student spending in each of the 41 regions in the study. The findings show a positive relationship between spending and regional industrial characteristics, albeit with levels of benefit differing between different regions given the same level of expenditure. Their results show a high degree of regional heterogeneity in GVA, employment multipliers, and spillovers. The differences in the number of students a region hosts, as well as the spillovers they generate and receive, produce differing spatial footprints of expenditure contribution. The study highlights mechanisms behind the regional imbalances through spillover effects, including more diverse economic bases and specialization opportunities. The authors suggest that policy stakeholders need to acknowledge the important role of how student expenditures affect regional economies, and how the relationship with regional industrial structures leads to varying economic outcomes, resulting in a different RIS.

While there is a wide body of literature providing evidence on the key role that universities play in regional economic development and innovation in advanced and in peripheral regions, research to date has lacked a specific focus on the role of students in less-advantaged peripheral areas. In her article, *Regional Campuses and Invisible Innovation: Impacts of Non-Traditional Students in 'Regional Australia'*, Robyn Eversole seeks to answer the question: “what roles do university campuses and students play in the economic development of peripheral regions in Australia?” The study finds that regional campuses in peripheral Australian regions contribute to RIS through human-capital, innovation, and community development roles and that these three roles are interlinked. Regional campuses, with programs designed to break down barriers to higher education study, additionally play these three roles for regionally embedded non-traditional (mature aged, low socio-economic status, first in family, indigenous) students. These linkages hold the innovative potential of regional campuses. However, within the Australian context, current policy framing overlooks this potential. Regional campuses are viewed as lower-status institutions, and thus their innovation falls within ‘institutional blindspots’ where it is unacknowledged and un-valued, when compared to campuses in wealthier, higher-status capital cities.

The paper by Gabriele Ballarino, Sabrina Colombo, Nazareno Panichella and Matteo Piolatto, *Human capital dynamics. The geographical mobility of students towards university in Italy*



also focuses on the local contribution of universities through the mobility patterns of secondary school graduates who enrol in university in Italy. They do this by analyzing the probability of their choosing a university in a region outside of their home and the distance of their movement. Previous literature has shown that the mobility of students is affected most by structural factors, institutional factors, and individual factors. For example, enrolment into higher education is strongly associated with family background. Past studies have focused mainly on inter-regional mobility. However, this paper adds to the literature by examining long- and short-distance mobility at the provincial level. The results show that mobility only partially follows the socio-economic cleavages of the country. Only long-distance geographic mobility (over 500km) shows a correlation with moving from Southern to Northern regions. The study found that most student mobility instead takes place at the short-distance level, where movements are governed predominantly by the geographical distribution of universities, not from South to North. Only long-distance movement shows that individuals from advantaged class backgrounds are more likely to relocate than those from lower classes; graduates with good high school performance have a higher probability of moving; and that mobility is more likely for males. Importantly, by highlighting the fact that students tend to attend universities in their local region, and considering the papers by Incera et al., and by Eversole, this paper highlights the important empirical contribution that universities provide to their local region and also to the RIS concept by emphasising different scalar processes at work.

In the long term, universities contribute to the economic base of their region through firm creation of faculty and students (Bergmann et al., 2016; Rossi et al., 2021). The paper by Shiri M. Breznitz and Qiantao Zhang, *Entrepreneurship education and firm creation*, focuses on the positive impact that entrepreneurship education in general and in universities in particular has on the intentions of students to become entrepreneurs. Through the use of a large original dataset on University of Toronto alumni, the authors were able to generalize the impact of entrepreneurial education on a broader community. Aligned with previous research results, the study found that entrepreneurship education has a positive impact on entrepreneurship in general and more particularly on student entrepreneurship. Entrepreneurship courses at universities impact firm creation in general and students' firms in particular.

However, and in contrast to previous literature, results show that entrepreneurship courses offered by universities are less important in high-technology firm creation and instead show that courses offered through public or private regional organizations outside the university better promote the establishment of high-technology firms. In addition, the analysis finds that entrepreneurship courses led by incubators and accelerators, which are part of the RIS, have a stronger impact on both general and student founded firms than do university courses. Through their findings, the authors suggest that for high-technology firms, entrepreneurship education from universities is not enough, and that it should be paired with other organizations within an entrepreneurship ecosystem. Further, findings suggest that in terms of graduate degree specialties, computer science courses tended to be more relevant for general entrepreneurship, while management courses directly contribute to student entrepreneurship. No degree has a significant impact on being more likely to create a high-technology firm. The results suggest the need to combine entrepreneurship education at universities with practical entrepreneurship education at incubators and accelerators.

Through entrepreneurship, students contribute to their home region's economy although geographical specificities of home regions are important influences on their propensity to be entrepreneurial. The paper by Jonathan Eckhardt, Clint Harris, Chuan Chen, Bekhzod Khoshimov and Brent Goldfarb, *Student Migration and Student Entrepreneurship*, examines the relationship between the geographic characteristics of a student's home region and their interest in entrepreneurship. Using data on students from a large public research university in the US, the authors aim to determine whether migration from a specific region influences a student's interest in and proclivity towards entrepreneurship. The economic characteristics of home regions include venture capital funding, patents, and regional self-employed rates. In particular they show that students react to local role models.

The study provides evidence that the RIS of the source region of the students and in particular its venture capital investment, self-employment and population density characteristics is likely to be related to the strength of the students' proclivity towards entrepreneurship. This is in terms of their ideas, participation in start-ups, plans, and whether they are a founder, etc.

In *University Graduates' Early Career Decisions and Interregional Mobility: Salaried-Job vs. Self-Employment*, Riccardo Fini, Azzurra Meoli, Maurizio Sobrero and Mike Wright explore the relationship between early career decisions (salaried vs. self-employment) of university graduates and their interregional mobility (staying vs. going). Using a longitudinal dataset covering 3,436 students spanning 62 Italian universities, the authors find that students who studied and stayed in their home region and those who study away and return to their home region, are more likely to become self-employed. In contrast, those who move to their non-home region after graduation typically enter salaried jobs. They found that the deciding factor for these graduates regarding which early career to enter was explained mainly by individual characteristics (gender, age, self-employed parents) while the decision of which region in which to reside was affected by contextual factors (e.g. gender, salary). These results highlight the importance of students' contributions to their RIS.

As the papers above found, student retention is important for the economic base of the university's region. Several papers in this issue discuss the question of peripheral versus urban regions. In *University graduates in metropolitan and peripheral areas: mobility, occupational choice and outcomes*, Ina Drejer, Jacob Rubæk Holm and Kristian Nielsen build off existing literature and demonstrate how metropolitan and urban areas are more attractive to graduates and how their young age, level of education, and status as entrants to the labour market make graduates a geographically mobile group. The paper contributes to the policy and academic focus of the role of university graduates as human capital for RIS. Based on 2001-2010 Danish registry data, the authors use performance outcomes of university graduates (gender, wage growth, business survival rate) to explore the relationship between graduates from two very different regions (the metropolitan area around Copenhagen and the peripheral region of North Denmark, which is home to a university), their mobility patterns, and their occupational choices after graduation (wage earners vs. entrepreneurs).

The study finds that wage-earning graduates from the periphery, who choose to remain in the periphery area, have an inferior wage growth performance outcome when compared to their peers who moved to the metropolitan region. Comparatively, those from the metropolitan area who remain in the metropolitan area do not experience a worse wage growth performance

outcome for remaining in their region of origin. Both the graduates who move to the metropolitan area and those who remain there experience the same benefits of the thick labour market as it pertains to wage growth. For entrepreneurs, however, the study found that graduates in the periphery benefit from attachment to their home RIS, and that those who remain in the periphery have a higher survival rate than those who move between regions. Entrepreneurial graduates from the metropolitan area benefit from attachment to their home region to a lesser extent. The authors use their results to suggest that the differences in the economic contributions of graduates across career paths can help advise regional policy aimed at retaining university graduates, with an emphasis on the peripheral region. For example, entrepreneurship policy in the periphery region should focus on retaining entrepreneurial graduates in their home region.

Fumi Kitagawa, Chiara Marzocchi, Mabel Sánchez-Barrioluengo and Elvira Uyerra's paper *Anchoring talent to regions: the role of universities in graduate retention through employment and entrepreneurship*, also focus on patterns of student migration and mobility by examining the conceptual understanding of graduate retention and investigating organizational and spatial determinants influencing knowledge spillover. In order to study the contribution of universities to RIS through graduate retention, the authors analyze two types of graduate retention: labour retention (graduates employed in their university's region) and entrepreneurship retention (graduates who create a start-up business in their university's region), using data from 2010-2016 across England. The authors specifically look at how differences in a university's subject specialization and spatial context (urban vs. non urban) influence the outlined two types of retention. Their empirical findings show that agglomeration dynamics and subject specialties affect the two types of retention differently. Spatially, universities in urban regions produce higher rates of labour retention, while those in non-urban areas produced greater rates of entrepreneurship retention. In the realm of subject specialization, labour retention is correlated to a broader knowledge offer across STEM courses in urban regions, while entrepreneurship retention is influenced by specialization in both urban and non-urban regions.

In *Regional Migration, Entrepreneurship and University Alumni*, Charles Eesley and Delin Yang add to the body of literature focusing both on rural-urban migration and on the role of universities in facilitating regional mobility. The authors use alumni surveys to collect data on

283 graduates from Tsinghua University in China who, after graduation, migrated from their rural hometowns to create entrepreneurial firms in urban areas. Their findings suggest that rural to urban migrants are more likely to create firms in the top quartile of the size distribution of all entrepreneurial firms, meaning that they are more likely to create larger firms than those entrepreneurs who remained in urban areas or remained in rural areas. Furthermore, rural-urban migrants pursue riskier opportunities. This is in part explained by the fact that urban areas may offer better opportunities and resources, and that migration decisions tend to indicate a lower level of risk aversion. These findings contrast with previous work focused on how entrepreneurs create firms closer to their home regions, by finding that the likelihood of creating a larger firm is greater if rural born graduates migrate to urban areas to start their firms.

## CONCLUSIONS

The collection of papers in the special issue unpacks the role of students in RIS. They cover the role of universities not just from the perspective of knowledge generation and exploitation, but also from the economic contributions of human capital development and entrepreneurship; short and longer-term effects; and the uneven capacity of regions to benefit both from direct actual expenditure and indirectly from spillovers. These findings relate to the level of regional economic diversification and specialisation and contribute to understanding outcomes, which is also under developed in the literature (Asheim et al., 2011). This volume also contributes to a more inclusive perspective on RIS with some of the case studies discussing equity and others the perpetuation of class differences.

A crucial aspect of the debate is that of interaction between different agents involved in innovation across public and private sectors (Asheim et al., 2011, 887). Incera et al., considers the regional economic impacts of students in the UK, and interrelationship between student spending and the uneven capacity of regions to benefit from direct actual expenditure and indirectly from spillovers. Their results highlight the direct impact of student spending and the need for policy to promote economic diversification and specialisation.

Similarly, the paper by Eversole highlights the importance of students to RIS specifically in knowledge generation, diversity, and equality. Universities' regional campuses and their students contribute to the development of the innovation system in peripheral regions. The paper adds to a social equity perspective on regional innovation processes as regional campuses have important systemic effects by creating pathways for talented regional people from multiple equity groups with deep-placed knowledge and networks to engage with universities. Universities are also growing new institutional spaces where individuals from peripheral regions can engage with global knowledge institutions and have the capacity to generate unique placed-based solutions. Importantly, the paper by Ballarino et al., finds that most student mobility contributes to regional innovation by occurring over short distances. However, the readers are cautioned that there are social differences whereby wealthy regions hosting attractive universities experience a brain gain with marginal areas experiencing a brain drain.

The paper by Breznitz and Zhang finds that the educational role of universities in entrepreneurship education has an impact on creating cohorts of entrepreneurs for regional economies but not specifically for high technology firms. Hence the implication for RIS is that the university is part of the innovation system; while other regional organisations play a significant role in generating highly innovative firms; and that the collaboration of universities and other regional organisations provide practical education that results in a direct economic contribution.

Eckhardt et al.,'s paper's contribution involves considering the characteristics of the home RIS. It does so by finding that the student's propensity to become an entrepreneur is impacted by the RIS of their home region. If the source region characteristics are entrepreneurial then it will increase the likelihood that the student will become a graduate entrepreneur. Universities therefore attract entrepreneurial talent into specific regions thus further contributing to evolutionary innovation-led growth processes. Similarly, Fini et al.,'s paper highlights the importance of the student's home RIS. They find that students that stay or return to their home region are more likely to be self-employed whereas those who leave are more likely to seek salaried jobs.

The papers by Drjer et al., and Kitagawa et al., focus on the relationship between mobility and career choice of university graduates. They analyse the difference between salaried and self employment and mobility from periphery to the metropolitan area. They find a positive relationship between non-urban locations and entrepreneurship retention. By contrast, universities in urban areas show higher growth rates of labour retention. However, peripheral regions can be advantageous for those graduates who become entrepreneurs because of relatively strong social network ties to the local innovation system.

Eesley and Yan's paper expands on this notion of mobility. Specifically it discusses the advantages of moving from rural to urban areas. They find that graduates who migrate from rural to urban areas are more likely to found larger firms than those who remain in their home region or migrate back to rural areas after graduation. The implication for RIS lies not only in the porosity of boundaries, but also in the nature of that porosity and different regional consequences on the basis of graduates' career decisions. Importantly, the collection of papers in this special issue helps to unpack the black box of "The University" and the contribution of its students to RIS.

In reviewing the results of the case studies, it is clear that universities' contributions extend beyond the traditional role of research and teaching (labour development). In the short run, students' spending and earnings contribute to the regions' economy. However, in the long run we find that students do build firms, and that their ability so to do is impacted by their home RIS. Students coming from more entrepreneurial regions have a higher tendency to establish firms. The impact of universities located in the periphery goes beyond an increase in the local knowledge base, but also contributes to social equality and knowledge diversity. The papers highlight the pull that urban regions have over non-urban regions, which creates a constant feed into the local RIS. Lastly and importantly, as Cooke and Morgan (1998) found, while universities per se are part of regional innovation systems, the complexity of the relationship with regional development (through teaching, graduate entrepreneurship and migration) is exemplified by this special issue.

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