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The Impact of Higher Education Institutions in Low-Density Territories

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Abstract: This article highlights the relevance of the location of HEIs in low-density territories in Portugal, using the Polytechnic Institute of Portalegre as a case study. Based on the American Council Education model and following a surveying approach to faculty, staff, and students, this research accounts for the total spending of incoming academics, other nonlocal university members and their visitors, that positively impacts regional development. A demand-side approach was followed so that indirect and induced effects could also be estimated. The main aim of this research paper is to quantify the total impact arising from the location of the Polytechnic in a given region, measured by economic and social indicators such as the financial return from public funds invested in the region, the number of jobs created, and the impact on the local gross domestic product. The results show an impact of more than EUR 17 million in the territory where the Polytechnic operates, representing 3.68% of the local GDP. The institution was also found to be the third major employer in the region, responsible for the creation of 471 jobs that account for 2.25% of the local economically active population.

Keywords: higher education institutions; economic impact; regional development; low-density regions

JEL Classification: I23; I25; O10

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1. Introduction

The impact of higher education institutions (HEIs), regarding academic performance and teaching quality, has been a central point of public discussion over the last 20 years. Several rankings have been developed to rank HEIs (Berrell et al. 2015), while an increasing number of quality indicators have been introduced. Such quality measures include the growth of scientific research output, the development of entrepreneurial universities, the rising use of technology and knowledge transfer activities (Stankevičienė et al. 2019), an increase in academic success, and the continuous promotion of qualified pedagogical methods (Guerrero and Urbano 2010; Kot and Ślusarczyk 2014).

Nevertheless, the role of HEIs on local development is also a present concern (Blume et al. 2017). It is currently and widely assumed that HEIs represent important regional development mechanisms (Arbo and Benneworth 2007; Hermannsson and Swales 2010; Smith 2006) by promoting educational, economic, and cultural opportunities that otherwise would not exist (Charney and Pavlakovich-Kochi 2003).

Considering this reality, this study intends to evaluate the economic impact generated by an HEI located in a peripheral territory, far from the main urban centers of Portugal.

According to Alves et al. (2015), HEIs are 'regional development agents', whose mission concerns the applied research impacting the economic and social context, which is particularly important for inner regions presenting lower development levels. Hence, this paper addresses the relevance of HEIs in lower-density areas, focusing on the case of Polytechnic Institute of Portalegre (IPP), a Portuguese HEI operating since 1989, located in the municipalities of Portalegre and Elvas (Alentejo region, Portugal). IPP is in a small-density inner region, characterized by an aging population, high illiteracy, and a low population density, but an average purchasing power above the national mean. Consequently, our main aim is to quantify the IPP's total impact, providing accurate information on its impact on the number of jobs created in the region, which results from its location, the impact on local GDP, and the return on the public investment made by the Portuguese government in this HEI. In other words, we intend to answer four research questions: (1) What is the economic impact of the IPP in the municipalities of Portalegre and Elvas?; (2) Does IPP impact local GDP?; (3) How many jobs result from the location of the IPP in the region?; and (4) What is IPP's return on the public investment? The paper is organized into six sections, as follows. Section 1 introduces the research topic and provides a brief state-of-the-art of the previous contributions on economic impact. Section 2 refers to the main contributions of previous literature related to the impact of HEIs in the regions where they are located. Section 3 presents the adopted model to determine HEIs' economic impact and describes the sample. Section 4 details the results, and in Section 5, the main findings are discussed. The last section, Section 6, concludes the paper, highlighting its main contributions and the practical implications of the observed results. Some opportunities for further research are also mentioned in this section.

2. Literature Review

The previous literature on the socioeconomic impact of HEIs has shown how those institutions foster regional development and their relevance in terms of creating both direct and indirect employment in their local areas (e.g., Caffrey and Isaacs 1971; Fernandes 2009; Yserte and Gallo-Rivera 2010; Pereira et al. 2013).

In the last few decades, the literature has stressed that HEIs' responsibilities go far beyond their traditional impact on the qualification levels of the population. In fact, when analyzing the economic impact of an HEI in a given region, the main aim is to measure the increase in the level of economic activity of the region caused by the presence of this HEI (Peer and Penker 2014). In addition, it is widely recognized (see Yserte and Gallo-Rivera 2010; Alves et al. 2015, inter alia) that a significant portion of the economic benefits generated in the local economy result from sources that, even though external to the HEIs, are directly associated with them. Student spending, particularly of those who have moved from other territories to study in the region where the HEI is located, is one of those examples. This economic impact estimation is, according to Drucker and Goldstein (2007) and Siegfried et al. (2007), one of the most suitable methodologies to assess regional impact, given that it impacts economic activity, the creation of jobs, and income levels, as well as the qualifications of the economically active population, work productivity (Becker 1994; Bluestone 1993), research and development activities, and technology transfer (Rephann et al. 2009).

Henceforth, to estimate the influence of an HEI in a given region, it is necessary to undertake an impact analysis. The literature distinguishes two approaches to measure the economic impact of HEIs: the demand-side and the supply-side approaches (Pastor et al. 2013; Yserte and Gallo-Rivera 2010; Rephann et al. 2009). On the one hand, the demand-side approach estimates, in a short-term perspective, the effects on individuals in the region, on companies, and on the government, resulting from the institution's spending, alongside the expenses of the individuals related to the institution, namely students, faculty, staff, and visitors. On the other hand, the supply-side approach refers to the long-term impact that has a greater effect on the local, regional, and national economy. This effect regards technology transfer, lifelong learning, and social involvement, and such

activities are categorized in the third mission of the HEIs (Yserte and Gallo-Rivera 2010). Considering both perspectives and assuming that this paper's main concerns are related to the assessment of the economic impact provided by an HEI in the region in which it is located, we followed a demand-side approach.

In addition to such relevant inputs, recent contributions in this field (Kotosz et al. 2016, inter alia) still question the methodological options available to measure the direct and indirect effects resulting from the presence of HEI's in a given territory and still adjusting those alternatives to the specifications of each region. However, the American Council of Education (ACE) model remains as the basis of most methods. The ACE model (Caffrey and Isaacs 1971) is a direct estimation model focused on collecting primary information, used to determine the local economic impact. Some adjustments to the original approach were proposed in the studies of Elliot et al. (1988) and Fernandes (2009) on how to differentiate between effects of local and nonlocal students, as well as in the research of D'Allegro and Paff (2010) on how to make the calculations to obtain the total impact of an HEI. Other methods, such as the Ryan and Malgieri (1992) adjustment to the ACE model, adopted secondary sources of data (instead of questionnaires) maintaining, however, the goal of assessing HEIs' impact on local economies.

Despite the lack of hypothetical situations in comparing the existence of HEIs (Agiomirgianakis et al. 2017), it is urgent and appropriate to quantify the socioeconomic impact of HEIs. Aware of such need, the main contributions of this research include the application of the Fernandes' (2009) simplified economic impact model to a low-development region—following a demand-side approach—and the estimation of direct, indirect, and induced effects of the location of the IPP in such rural a region.

3. Methodology and Sample

3.1. Impact Model

The economic impact of the IPP in the municipalities of Portalegre and Elvas was obtained using the American Council on Education model (known as the ACE model) by Caffrey and Isaacs (1971), previously applied in the research of Fernandes (2009), Pereira et al. (2013), and Alves et al. (2015). To collect data required for the impact model, three online questionnaires based on the work of such authors were conducted between April and May 2018, using the online application LimeSurvey. Students answered anonymously on computers available in preselected classes after a brief explanation of the aim of the study and how they were selected. The names of the individuals attending such classes were neither collected nor recorded. Staff and faculty members received an email invitation to answer anonymously within a limited time frame.

The questionnaires consisted of four sections, social profile, economic conditions, personal characterization, and professional condition, and the collected data were analyzed using the IBM SPSS statistics 25 software.

As a demand-side approach, the applied model addresses three types of effects, direct, indirect, and induced (Yserte and Gallo-Rivera 2010), which were obtained following the stages described in Figure 1. According to this representation, first, in Steps 1 to 3, we estimated the annual spending (including visitors) of faculty members, staff, and students, respectively. In these calculations, we followed the conservative approach of Alves et al. (2015), adjusting the ACE model to the Portuguese context. Thus, instead of accounting for the spending of all students (as in the original model), only the expenses of those who had moved to Portalegre and Elvas specifically to study at the IPP (export effect) were included, along with the spending of local students who would be studying elsewhere if this Polytechnic was not located in the region (import substitution effect). For faculty and staff members, the criteria were the same in what concerns the export effect, and, in addition, we considered the spending of those faculty and staff members that did not move to Portalegre or Elvas but commuted every day, remaining nonlocal. A probability is that such expenditure would not occur if they did not work at the IPP. Hence, it must also account for and correspond to Steps 1c and 2c in Figure 1. To the sum of this

amount (obtained in Step 4), we then added the institution's annual local spending (Step 5). However, and once again following a conservative approach, only the current expenses with the acquisition of goods and services were considered as the IPP's local expenditure.

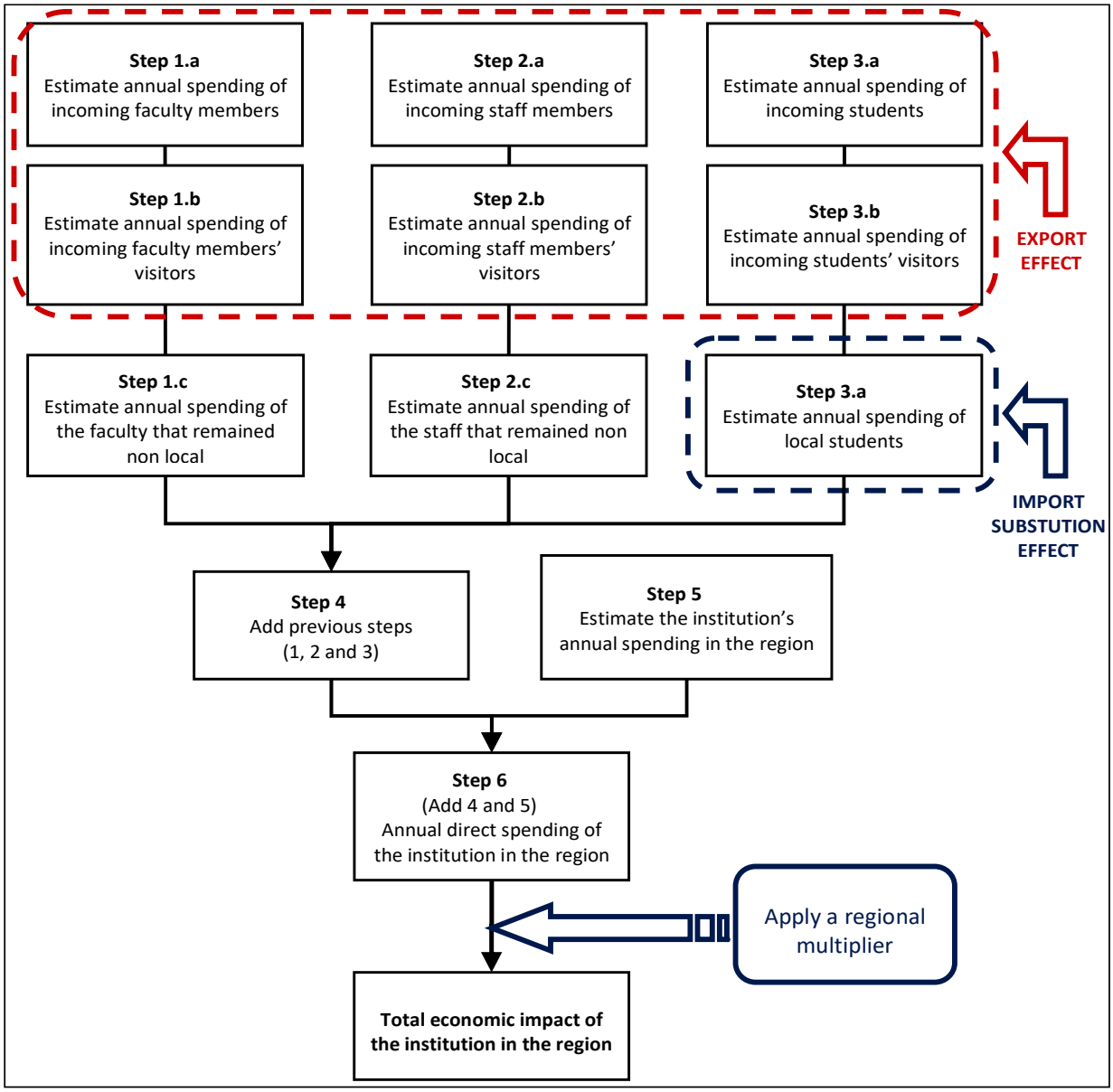

Figure 1. Simplified economic impact model. Source: Fernandes (2009). For further details on the ACE model, please see (Caffrey and Isaacs 1971; Elliot et al. 1988; Fernandes 2009; and Alves et al. 2015).

The last stage (Step 6 in Figure 1) corresponds to the estimates of the indirect and induced economic impact related to the IPP's supply chain and the changes in consumption patterns, resulting from the variation in the number of jobs that directly and indirectly depend on the Polytechnic. Hence, as in Alves et al. (2015), an economic multiplier of 1.7 was used to predict such effects (for a detailed discussion on this multiplier, please see Alves et al. 2015). Stage 6 provides the answer to the first research question (what is the economic impact of the IPP in the municipalities of Portalegre and Elvas?).

The calculations made in each step of Figure 1 corresponds to the application of Equation (1).

$$I_{IPP} = (AS_F + AS_S + AS_{ST} + AS_{IGS}) \times M \quad (1)$$

in which the I_{IPP} is the total impact of the IPP, AS_F is the annual spending of faculty, AS_S is the annual spending of staff members, AS_{ST} is the annual spending of students, AS_{IGS} represent the local annual spending of the institution on goods and services, and M is a Keynesian multiplier. To obtain AS_F, AS_S, and AS_{ST}, Equations (2) to (13) were solved as follows.

The annual spending of faculty members in the municipalities of Portalegre and Elvas was obtained from Equations (2) to (5).

$$AS_F = SI_F + SFV + SNL_{\mathbf{F}} \quad (2)$$

where:

AS_F: Annual $Spending_{Faculty}$ = annual spending of faculty members in the municipalities of Portalegre and Elvas.

And

SI_F: Spending of incoming faculty = (monthly spending of faculty members that moved to Portalegre or Elvas to work at the IPP × N. º of faculty that moved to Portalegre or Elvas) × 12 months (3)

And

SFV: Spending of faculty's visitors = annual spending of the visitors of the faculty members that moved to Portalegre or Elvas to work at the IPP × N. º of faculty that moved to Portalegre or Elvas. (4)

And

SNL_F: Sending of nonlocal faculty = [monthly spending (in food and transportation in Portalegre or Elvas) of faculty members that had not moved to the region but who commute to work at the IPP × average monthly time spent at the IPP × N. º of faculty commuters] × 12 months. (5)

The annual spending of staff members in the municipalities of Portalegre and Elvas was obtained as follows (see Equations (6) to (9)).

$$AS_S = SI_{\mathbf{S}} + SSV + SNL_{\mathbf{S}} \quad (6)$$

where:

AS_S Annual Spending of Staff = annual spending of staff members in the municipalities of Portalegre and Elvas

And

SI_S: Spending of incoming staff = (monthly spending of staff members that moved to Portalegre or Elvas to work at the IPP × N. º of staff members that moved to Portalegre or Elvas) × 12 months (7)

And

SSV: Spending of staff's visitors = annual spending of the visitors of the staff members thatmoved to Portalegre or Elvas to work at the IPP × N. º of staff members that moved to Portalegre or Elvas. (8)

And

$$\text{SNL}_S\text{: Spending of nonlocal staff = [monthly spending (in food and transportation in Portalegre or Elvas) of staff members that had not moved to the region but who commute to work at the IPP } \times \text{ N. º of staff commuters]} \times 12 \text{ months.} \quad (9)$$

Finally, calculations on the annual spending of students result from Equations (10) to (13).

$$\text{AS}_{\text{ST}} = \text{SI}_{\mathbf{ST}} + \text{SV} + \text{SL}_{\mathbf{ST}} \quad (10)$$

where:

AS_{ST}: Annual Spending of students = annual spending of students in the municipalities of Portalegre and Elvas

And

$$\text{SI}_{\text{ST}}\text{: Spending of incoming students = (monthly spending of students that moved to Portalegre or Elvas to study at the IPP } \times \text{ N. º of students that moved to Portalegre or Elvas)} \times 12 \text{ months} \quad (11)$$

And

$$\text{SV: Spending of students' visitors = annual spending of the visitors of the students that moved to Portalegre or Elvas to study at the IPP } \times \text{ N. º of students that moved to Portalegre or Elvas.} \quad (12)$$

And

$$\text{SL}_{\text{ST}}\text{: Spending of local students = (monthly spending of local students who had moved to another region to study if the IPP was not located in the region where they live } \times \text{ N. º of local students in such position)} \times 12 \text{ months.} \quad (13)$$

The direct and indirect impact of the IPP in the region, resulting from the application of Equation (1), is then used to obtain the impact of the IPP on local GDP (Research Question 2. Does the IPP impact local GDP?), as follows:

$$\text{W}_{\text{GDP}} = \text{TI}_{\text{IPP}}/\text{L}_{\text{GDP}} \quad (14)$$

where:

W_{GDP}: Weight of the IPP's total impact on local GDP;
TI_{IPP}: IPP's Total Impact;
L_{GDP}: estimated Local GDP.

Next, to answer Research Questions 3 (how many jobs result from the location of the IPP in the region?) and 4 (what is the IPP's return on the public investment?), we applied Equations (14) and (15), respectively.

$$\text{TJ} = \text{TI}_{\text{IPP}}/\text{APL} \quad (15)$$

where:

TJ: Total (direct and indirect) Jobs created in the region due to the IPP location;
APL: Apparent Productivity of Labor indicator.

$$\text{ROPI} = \text{TI}_{\text{IPP}}/\text{GB}_{\text{i}} \quad (16)$$

where:

ROPI: Return on Public Investment;

GB_i: Government Budget on year i.

3.2. Sample

On 31 December 2017, the IPP had 207 faculty members, 141 staff members, and 2005 students (attending classes in 3 schools in Portalegre and 1 school in Elvas). For students, a simple random sample without repetition of 419 students was selected, including 329 students attending courses in Portalegre's schools and 90 at the school located in Elvas. This sample extraction selected students from all the Polytechnic's courses, listed by class in alphabetic order, using the Microsoft Excel 365 random selection procedure. Following Fernandes (2009) and Alves et al. (2015) and considering that there are more students in Portalegre than in Elvas, the selection accounted for such a proportion, applying a random selection for Portalegre and another for Elvas separately. Table 1 details the students' sample.

Table 1. Random sample of students.

Class	Nr. of Students	Municipality
Advertising and marketing administration (2nd year)	40	Portalegre
Tourism (3rd year)	23	Portalegre
Nursing (1st year)	114	Portalegre
Communication design (1st year)	20	Portalegre
Computer engineering (1st year)	42	Portalegre
Advertising and marketing administration (1st year)	30	Portalegre
Communication design (3rd year)	27	Portalegre
Journalism and communication (1st year)	33	Portalegre
Higher professional technical course—sports and equestrian training (1st year)	9	Elvas
Veterinary nursing (1st year)	50	Elvas
Horse production (2nd year)	7	Elvas
Professional higher technical course—agricultural production (1st year)	24	Elvas
Total	419	

Source: Authors' calculations.

For faculty and staff, the entire population was surveyed, and the final sample (excluding outliers and containing only valid responses) accounted for 67 faculty members (out of 207), 46 staff members (out of 141), and 277 students (out of a sample of 419), representing a response rate of 32%, 33%, and 66%, respectively. Results for students were deduced from the observed sample of 277 to a population of 2005 individuals.

4. Results

A preliminary data analysis showed that around 30% of faculty, 14% of staff, and 68% of students changed their residence to work or study at the IPP. Furthermore, around 25% of students would otherwise move to study in another region if the IPP was not located in Portalegre and Elvas.

Results of each dimension of the simplified economic model were individually analyzed as follows and extended to the population of faculty, staff, and students.

4.1. Annual Spending of Faculty Members

Results for faculty members showed (see Table 2) that out of the 207 IPP faculties, 63 (30.43%) moved to Portalegre or Elvas on purpose to work at this institution. Their spending plus their visitors' expenses represents a direct impact of the Polytechnic's location in such municipalities. On average, the household of these faculties spent more than EUR 1 million in the municipalities of Portalegre and Elvas in 2018, while their visitors spent EUR 11,883.94 per year in the same region. In individual terms, according to Table 2, each faculty household spends on average monthly terms, EUR 1402.10 and their visitors an average amount of EUR 188.63/month.

Table 2. Annual spending of faculty members.

Annual Total Spending of Faculty Members		Results
		EUR 1,366,015.86
Spending of incoming faculties *	Total spending of incoming faculties × 12	EUR 1,059,987.60
	Monthly spending	EUR 1402.10
	N. º of faculty that moved to Portalegre or Elvas	63
Spending of incoming faculties' visitors *	Total spending of visitors	EUR 11,883.90
	Annual spending of visitors	EUR 188.63
	N. º of faculty that moved to Portalegre or Elvas	63
Spending of nonlocal faculties	Total spending of nonlocal faculties × 12	EUR 294,144.36
	Monthly spending on food	EUR 318.45
	Average monthly time spent in Portalegre or Elvas	0.5
	Monthly spending on transportation	EUR 206.63
	N. º of faculty commuters	67

* Export effect (please see Figure 1). Source: Authors' calculations.

In addition, 67 faculties (32.84%) had not moved from their residential regions but commuted to Portalegre or Elvas to work at the IPP. Thus, given that their working day takes place in Portalegre or Elvas (municipalities where they do not live), their local expenses on food and transportation were also considered as local spending resulting from the IPP's location. This spending accounted for EUR 294,000 in 2018. It was observed that, on average, one faculty member spends EUR 318.45/month on food in the municipality where he teaches and EUR 206.63/month on transportation (own vehicle and other means of transportation).

The expenditure of the remaining faculty members that had not moved to the region to work at the IPP, due to residing there, were not considered in the calculations according to the ACE model. Considering all these assumptions, an annual direct spending of faculty members (resulting from the location of the IPP in the region) of EUR 1,366,015.86 was observed in the municipalities of Portalegre and Elvas.

These results are strongly influenced by the small size of the institution, as well as its recent entry into the HEIs sector (when compared to other Portuguese HEIs). The institution recruited many faculty members from other regions who maintained their original residency. We believe that this reality will change in the near future, with more faculties moving to Portalegre and Elvas to work at the IPP and, consequently, increasing this impact.

4.2. Annual Spending of Staff Members

Staff spending of those who moved to Portalegre or Elvas to work at the IPP are also a direct impact of the Polytechnic's location in the region. Thus, such amounts are added to faculty spending. Results in Table 3 show that 20 out of 141 staff members (representing 14.18% of the sample) moved to such municipalities due to their contract as IPP workers. In 2018, those staff members spent more than EUR 292,000 in the municipalities of Portalegre and Elvas, corresponding to an average monthly expenditure of EUR 1216.75 per household in the municipality where they live. Their visitors, with an average monthly spending of EUR 200.63, represent an annual spending of more than EUR 4000, verified in the same municipalities.

Regarding staff members who had not changed their residence, but do not live in the municipality where they work (7.09% of sampled staff), Table 3 shows an approximate spending of EUR 31,000, resulting from an average monthly expenditure of EUR 194.44 on food and EUR 63 on transport (own vehicle and other means of transport).

In accordance with the assumptions for faculty, the remaining staff members of the institution were not included in the calculations because they have not moved from another region. The direct annual spending of the IPP's staff members in the municipalities of Portalegre and Elvas is therefore EUR 326,925.83.

Table 3. Annual spending of staff members.

Annual Total Spending of Staff Members		Results
		EUR 326,925.83
Spending of incoming staff *	Total spending of incoming staff × 12	EUR 292,020.00
	Monthly spending	EUR 1216.75
	N. º of staff members that moved to Portalegre or Elvas	20
Spending of incoming staff's visitors *	Total spending of visitors	EUR 4012.50
	Annual spending of visitors	EUR 200.63
	N. º of staff members that moved to Portalegre or Elvas	20
Spending of nonlocal staff	Total spending of nonlocal staff × 12	EUR 30,893.33
	Monthly spending on food	EUR 194.44
	Monthly spending on transportation	EUR 63.00
	N. º of staff commuters	10

* Export effect (please see Figure 1). Source: Authors' calculations.

4.3. Annual Spending of Students

The direct impact of the students on the local economy consists of the export effect (direct spending of the students who had moved to Portalegre or Elvas to study at the IPP) and the import substitution effect (spending of students from these municipalities who would have moved to another region to study if the IPP was not located there). Results demonstrated that 67.87% (corresponding to 1361 students out of a total population of 2005) moved to the observed region to study at the IPP. A smaller percentage of 24.91% (499 students of the referred total) was residents that would be studying in another institution should the IPP not exist in Portalegre or Elvas.

The direct annual impact of students is substantially greater than that observed for faculty and staff, given that the students' universe is higher than the other two groups. Table 4 places this value at EUR 8,338,395.09, resulting mostly from incoming students.

Table 4. Annual spending of staff students.

Annual Total Spending of Students		Results
		EUR 8,338,395.09
Spending of incoming students *	Total spending of incoming students × 12	EUR 6,441,674.13
	Monthly spending	EUR 394.48
	N. º of students that moved to Portalegre or Elvas	1361
Spending of incoming students' visitors *	Total spending of visitors	EUR 191,674.74
	Annual spending of visitors	EUR 140.86
	N. º of students that moved to Portalegre or Elvas	1361
Spending of local students (not moving due to the IPP location in the region) **	Total spending of local students *** × 12	EUR 1,705,046.21
	Monthly spending	EUR 284.49
	N. º of local students ***	499

* Export effect. ** Import substitution effect (please see Figure 1). *** That would be studying in another region if the IPP was not located in Portalegre or Elvas. Source: Authors' calculations.

In accordance with that observed for faculty and staff, students who had not moved to study at the IPP (local students) and who would not be studying elsewhere were not considered in the estimation of the economic impact. According to the adjusted version of the ACE model, applied in this study, only the students who changed their residence after entering the Polytechnic (export effect) and those who had not moved, but would be studying elsewhere (effect import substitution), should be considered for calculation. The students excluded from these dimensions would be in the region anyway.

This impact might be explained by the 'age' and location of the IPP, an HEI approximately three decades old and located in the interior of the country. In Portugal, these

characteristics often lead to lower demand from students. Hence, the higher the development and affirmation of the institution, the higher the expected increase in such demand. Additionally, more students are expected to represent a consequent increase in the annual spending.

Findings described in Table 4 reveal that more than EUR 6 million of the Polytechnic's direct annual impact in the municipalities of Portalegre and Elvas results from incoming students. This amount results from an average monthly expenditure of EUR 394.48 estimated for 1361 students in 2018. The visitors of these students spent an average of EUR 140.86/month in those municipalities, which translates into a total annual spending of approximately EUR 192,000.

Lastly, local students (that would be studying somewhere else if the IPP was not located in the region) spent over EUR 1 million and 700 thousand euros in the municipalities of Portalegre and Elvas. This amount corresponds to an average monthly spending of EUR 284.49.

4.4. Institution's Annual Spending and Overall Results

The IPP's institutional spending in the region refers to current expenses with the acquisition of goods and services from suppliers in the municipalities of Portalegre and Elvas. The amount provided by the financial services is estimated at EUR 131,475.50/year. This amount excludes investment expenses, in accordance with the conservative perspective on which the entire study is based, which implies, given that according to the economic impact model, only the regular expenses observed during the Polytechnic's annual activity should be considered for calculation.

Faculty, staff, and students' expenses, plus the IPP annual expenditure in goods and services, are presented in Table 5. The total of all expenditures corresponds to the direct economic impact of the IPP in Portalegre and Elvas.

Table 5. Annual direct spending of faculty, staff, and students.

	Amount
IPP annual total direct spending in Portalegre and Elvas (1 + 2 + 3 + 4)	EUR 10,162,812.28
(1) Faculty annual expenses	EUR 1,366,015.86
(2) Staff annual expenses	EUR 326,925.83
(3) Students' annual expenses	EUR 8,338,395.09
(4) IPP annual direct spending in the region	EUR 131,475.50

Source: Authors' calculations.

5. Discussion

Considering that the initial economic effect tends to spread to other sectors, amplifying its influence, two more effects are perceived: the indirect and the induced economic effect. While the former refers to the changes in the supply chain of all sectors associated with the goods and services consumed by the IPP, the latter corresponds to the observed increase in consumers' spending that results from the variation in the income and number of jobs generated by this HEI in the local economy that occur at direct and indirect levels.

A multiplier of 1.7 (corresponding to the mean and median of previous work in this field) was adopted to calculate the indirect impact of the HEI, which accounts for 17 million (see Table 6). The relative weight of the IPP total impact on the gross domestic product (GDP) of Portalegre e Elvas is 3.68% (assuming an estimated GDP of EUR 470,036,531.30 for the municipalities of Portalegre and Elvas, extrapolated from GDP growth rates of regions (NUT III) in the period 2000–2016). Thus, it can be said that the IPP shifts the economic performance of such municipalities by almost 4%.

Table 6. Socioeconomic impact.

Indicator	Results
Total impact (multiplier = 1.7)	EUR 17,276,780.87
Economic activity	EUR 1.85
Weight on Portalegre and Elvas GDP	3.68%
Number of jobs created	471
Percentage of active population	2.25%
Jobs' multiplier	1.35
Employer ranking	3.º

Source: Authors' calculations.

Results also show the economic activity measured by the return of every euro of public funding invested in the HEI. Considering a public investment (2017 government budget) of EUR 9,356,110, for every euro unit, the IPP returned EUR 1.85.

The activity of the IPP in Portalegre and Elvas also creates direct and indirect jobs that were estimated at 471 through the calculation of the relative weight of the total impact of the IPP in the apparent productivity of labor indicator (assuming an *apparent productivity of labor* indicator of EUR 36,648 for NUT II—Source: (INE 2017)—given that no individual data for the Portalegre and Elvas municipalities are available). Thus, 348 jobs depend directly on the HEI (faculty and staff member on 31 December, 2017), and the remaining 123 are indirectly created due to social externalities previously explained.

Finally, the relative weight of direct jobs (348) on total jobs (471) indicates the employment multiplier of 1.35 that expresses the increase in the regional workforce promoted by the IPP. The created jobs represent 2.25% of the active population (assuming an active population of 20,907 extrapolated from the 2011 active population by municipality, based on the Portuguese active population variation from 2011 to 2017, according to the available data at Fred.StLouisfed.org) of both municipalities, and the IPP is the third major employer in the region. Table 6 summarizes the socioeconomic results.

These results are consistent with previous literature on the topic, especially those of Fernandes (2009), Pereira et al. (2013), and Alves et al. (2015), that pointed to a relative weight on the GDP ranging from 1.71% to 11.02%, observed for similar HEIs operating in Portugal. Additionally, the most relevant conclusion regards the level of economic activity (return on every euro of funding received from the national government state budget), observed as EUR 1.85 for the IPP. Such a return is higher than that observed for the University of Alcalá, Madrid (see Yserte and Gallo-Rivera 2010), e.g., showing that the impact of HEIs is higher in low-density regions. Additionally, our Keynesian and employment multipliers are within the usual range of 1.4 and 2.39 (Kotosz et al. 2016) for these types of studies. Thus, there is evidence to assume that the government investment made in HEIs operating in less-developed inner country regions is, in fact, returned and is a relevant source that such institutions apply in their effective contribution to the local economic development. This conclusion is also supported by the recent findings of Sequeira and Diniz (2020), according to whom the positive externalities induced by public investment have a strong relative impact in lower-density regions.

What is more, a robustness check predicting a pessimistic scenario was also conducted, assuming a multiplier equal to one. This case scenario generated a total impact of EUR 10,162,812.28, in which the IPP would return EUR 1.09 per euro of public funding. Hence, even assuming a more conservative assumption for the economic multiplier, results remain consistent, showing that a positive return of the public funding invested in this HEI would also occur even if the applied model had considered a more restrictive approach for indirect and induced economic effects.

In addition to this quantified impact and in line with the export effect, it is also relevant to emphasize that the IPP is responsible for the entry and stay of young people in the region, moving from all over the country. In fact, this movement of people from other regions to this low-density territory has many other externalities, namely the attraction of the young and working-age population with intentions of settling, permanently or temporarily.

6. Conclusions

The aim of this paper was to assess the economic impact of an HEI operating in a low-density territory. Adjusting the ACE model and conducting three surveys to students, staff, and faculty, we obtained the direct, indirect, and induced impact of the IPP in the municipalities of Portalegre and Elvas. Results revealed the answer to four research questions regarding the quantification of the IPP's economic impact, its weight on local GDP, the number of jobs created by the institution, and the return on public investment (resulting from the governments' budget affected to this Polytechnic institution).

As all studies, this might also present some limitations, namely those related to the assumptions of the impact model or the applied economic multiplier. However, to the best of our knowledge, these premises are supported by previous literature and adjusted to low-density territories. Moreover, we are aware of other relevant nonmonetary impacts on the local economy (such as better health and low criminality rates, or negative externalities, such as the impact of pollution and congestion) that could also be considered when assessing the impact of an HEI. All these issues represent opportunities for further research that we expect to address in the future.

In conclusion, the calculations of the socioeconomic impact of the IPP highlighted its role as an important stakeholder in the local economy of the region where it operates, indicating a relative weight of 3.68% on the GDP of Portalegre and Elvas that results from its direct and indirect impact above EUR 17 million. As a main conclusion of this research, it is important to highlight that this economic impact would not be observed in such municipalities should the IPP not exist in the region. Furthermore, it was also concluded that HEIs' impact is particularly relevant for low-density regions, given that such institutions are, generally, the major employers and responsible for substantial increases in local spending. Our conclusions are aligned with previous findings regarding the role of HEIs in low-density regions and contribute to the literature by measuring the economic impact of HEIs in several dimensions of social and economic activity. This study also describes the proper methodology to follow when dealing with an institution located in inner country regions and adjusts a worldwide recognized impact model to the specific context of small institutions, operating in less-developed rural regions, which was a previous gap found in the literature.

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