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Teresa Sequeira [a], *Francisco Diniz* [b]
[a, b] Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal
[a] https://orcid.org/0000-0003-3238-0354
[b] https://orcid.org/0000-0001-6770-430X, e-mail: fdiniz@utad.pt

Portuguese Public Higher Education Institutions Investment in Low Density Regions — Case Study[1]

Human capital and knowledge have been recognised as important elements in fostering territorial cohesion and sustainable economic development for a long time. In European Union (EU), this recognition was so significant that the European Social Fund was created in the founding Treaty of Rome in 1957, and this support was reinforced in 1972 with the European Regional Development Fund. For their intrinsic nature and mission, Higher Education Institutions (HEIs) not only play an undisputed role in promoting these factors, but also and simultaneously are recognised by their huge spillover effects on the economy of the geographic spaces in which they are included. Since Portugal has become a UE member, these HEIs have benefited from a significant support to investment. The main purpose of this article is to analyse Higher Education Institutions investment between 2000 and 2018, especially focusing on the status of the University of Trás-os-Montes and Alto Douro, both regarding northern institutions, more recent ones and other located in low-density territories. After difficult data collection and subsequent construction of absolute and relative investment indicators, results show that the institutions located in disadvantaged regions had less access to community funds, which can compromise the process of training human capital and knowledge and therefore, the processes of regional convergence and national territorial cohesion. These values are of vital importance for the discussion of ways to enhance the dynamism of these institutions, namely through positive discrimination in access to community funds and ways of facilitating the necessary institutional counterpart in investment financing.

Keywords: human capital, regional development, investment, Portugal, Higher Education, territorial cohesion, European cohesion policy, low density regions, community funds, public policies

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ОРИГИНАЛЬНАЯ СТАТЬЯ
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Т. Секейра [а], Ф. Динис [б]
[а, б] Университет Трас-о-Монтес и Альто-Дору, Вила-Реал, Португалия
[а] https://orcid.org/0000-0003-3238-0354
[б] https://orcid.org/0000-0001-6770-430X, e-mail: fdiniz@utad.pt

Инвестиции в развитие государственных вузов в регионах Португалии с низкой плотностью населения

Человеческий капитал и знания долгое время считались важными элементами для укрепления единства территорий и устойчивого экономического развития. В Европейском союзе (ЕС) они имели настолько большое значение, что в 1957 г. в соответствии с Римским учредительным договором был создан Европейский социальный фонд, а в 1972 г. — Европейский фонд регионального развития. По своему определению и назначению высшие учебные заведения не только играют важную роль в продвижении этих факторов, но и оказывают существенные спилловер-эффекты на экономику географических пространств, в которые они входят. С тех пор, как Португалия вошла в ЕС, вузы получили значительную поддержку. Основная цель этой статьи — проанализировать инвестиции в высшие учебные заведения в период с 2000 по 2018 гг., обращая особое внимание на расположенные на севере страны университеты Трас-ос-Монтес и Альто-Дору, а также на вузы в других малообеспеченных районах. Анализ собранных данных с помощью абсолютных и относительных индикаторов инвестиций показал, что учреждения, расположенные в неблагополучных регионах, получали меньше средств, что может поставить под угрозу процесс формирования человеческого капитала и получения знаний, следовательно, процессы региональной конвергенции и национально-территориального единства. Эти процессы крайне важны для повышения динамики развития вузов путем облегчения доступа к средствам фондов ЕС и содействия в получении инвестиционного финансирования.

Ключевые слова: человеческий капитал, региональное развитие, инвестиции, Португалия, высшее образование, территориальное единство, Европейская политика единства, регионы с низкой плотностью населения, общественные фонды, государственная политика

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1. Introduction

Both knowledge and human capital play a major role in promoting sustainable development. Likewise, several international bodies, namely the United Nations Organisation (UN), the European Union (EU), the Organisation for Economic Development Co-operation (OECD), and the World Bank pay special attention to it in their agendas.

Regarding the UN, there has been an undeniable effort to ensure that the aspects on this matter and included in the Millennium Development Goals that have been set at the turn of the century are also part of the new Sustainable Development Goals in place since 2016 as part of the 2030 Agenda[1].

The European Union's great strategic options reflect the importance of investing in human capital formation by making "Europe 2020 Strategy" focus on intelligent, sustainable and inclusive growth[2]. These strategic options are at the heart of financial support policies, which translate to making substantial amounts of money available to member states through EU funds.

Despite being an EU member state since 1986, Portugal displays several weaknesses, namely in terms of both human capital formation and Research and Development (R&D); considering the role Higher Education Institutions (HEIs) are expected to play in promoting human capital to help regions experience harmonious development in a territorial cohesion perspective, it is important to verify to what extent they have been at the receiving end of this funding.

Due to the deep asymmetries that still prevail within the Portuguese territory — with inland regions, commonly referred to as low-density regions, having a scarce, ageing, not much educated population and a weak social business

[1] United Nations Retrieved from: https://sustainabledevelopment.un.org/ (Date of access: 20.05.2019).

[2] Retrieved from: https://eur-lex.europa.eu/legal-content/PT/TXT/PDF/?uri=CELEX:32015H1184&from=EN (Date of access: 15.05.2019).

fabric, along with low levels of per capita purchasing power and competitiveness — the Higher Education Institutions that are located in these areas deserve special attention.

The main purpose of this article is, therefore, to analyze and compare, in absolute and relative terms, the investment done in all three Higher Education Institutions located in low-density Portuguese regions, namely the University of Trás-os-Montes e Alto Douro (UTAD), University of Beira Interior (UBI) and University of Évora (UÉ), to justify the possible claim of new and more effective measures to support these territories.

This analysis will be compared to more recent universities, such as the University of Algarve (UALG), University of Aveiro (UA)) and University of Minho (UM) and bearing in mind the specific case of the University of Porto (UP) for its importance in the context of the Northern region.

This investigation will focus on investment that is supported by EU funds, which, from 2000 to 2018, covered three Community Support Frameworks: the Third Community Support Framework (CSF III) regarding the 2000–2006 period; the National Strategic Reference Framework (NSRF), in place from 2007 to 2013; and the present Portugal 2020 Framework that has been in place since 2014.

Data regarding investment supported by the European Regional Development Fund (ERDF) and the Cohesion Fund were first[1] obtained from the Instituto Financeiro para o Desenvolvimento Regional (IFDR[2]); as to data on investment supported by the European Social Fund, they were supplied by the Instituto de Gestão do Fundo Social Europeu, I.P. (IGFSE[3]). Data from the Third Community Support Framework were complemented with other data from the NSRF, which were supplied by the Agência para o Desenvolvimento e Coesão, I.P (AD&C[4]) in 2018.

Finally, data regarding the current Framework are available at "Portugal 2020"[5].

The various institutions will be compared both in absolute and relative terms, using a set of per capita indicators regarding the number of students, teachers and co-workers. Based on the aims that were set and the methodology chosen, besides the presentation, the structure of the present article also includes a theoretical and political framework of the problem, the analysis of the information that has been gathered, and some final considerations.

2. Framework

Due to the spillover effects it causes, investment in human capital is considered to be crucial for the growth of economies and the development of societies. Human capital refers to any activity, which increases the workers' current or future marginal productivity [2], namely, education, training, and other elements that can influence people's well-being.

According to Sequeira Ramos [3], although human capital had been ignored by earlier classical theories, ever since growth theories have highlighted the importance of technological progress and the role of knowledge in growth processes, it cannot be considered as a function of human capital. In fact, after Romer's [4] and Lucas's [5] endogenous growth theories, the accumulation of human capital arose and gained a whole new status, contradicting the interpretation of diminishing returns on which classic theories are based when discussing convergence. Along these lines, current literature on growth advocates the relevance of human capital in determining the pace and/or nature of economic growth; besides, empirical evidence shows how important it is to explain differences in terms of growth, whether at cross-border or interregional level (see Barro [6]; Barro & Lee [7] [8]; Wang & Yao [9]; Self & Grabowski [10]; Lin [11]; Petrakis & Stamatakis [12]; Lopes [13]; Teixeira & Fortuna [14]; Barro & Sala-i-Martin [15]).

In short, when looking into investment in human capital[6], one can address the issue according

[1] This research has been done following the coordination of a previous report done in April 2013 by Pinto [1].

[2] Portuguese correspondent to a Regional Development Bank. IFDR provided the authors directly, in April 2013, with statistical data on investment projects co-financed by the ERDF and the Cohesion Fund.

[3] Managing Board of the European Social Fund, Public Institution. This institution made statistical data on investment projects co-financed by the ESF available directly to the authors, in May 2013.

[4] Portuguese Cohesion and Development Agency (AD&C) provided statistical data relating to investment projects co-financed by the ERDF, Cohesion Fund and European Social Fund, in October and December 2018.

[5] Statistical data of investment projects Portugal 2020. Retrieved from: https://www.portugal2020.pt (Date of access: 16.04.2019).

[6] It should be noted that investing in human capital does present some features that make it different from physical capital. Burda and Wyplosz [16] draw the attention to the fact that individuals acquire technical skills through investing in education and training and that this human capital is specific to an individual and dies with him/her. Knowledge, on the other hand, is produced by individuals, but later becomes available to all. Human capital has two characteristics which result in a

to two different but complementary perspectives: human capital as an economic growth factor and as an income redistribution factor following the logics of social convergence.

The European Union has long recognised the importance of investing in human capital; in fact, the Social European Fund was the first structural fund to be created, as early as 1958, to support policies to fight social exclusion, create better jobs, and increase job opportunities and productivity by promoting education and training. Human capital is referred to in all documents produced in the European Union in this century, but in 2000, particular emphasis was placed on it by the Lisbon Strategy. Among other things, the Lisbon Strategy aimed at fostering economic growth and job creation through a set of measures to support knowledge and innovation. Due to troubled times in the world economy and crises within the European space, this strategy was later reviewed and the member-states made the commitment of implementing national reform programmes. From 2007 to 2013, it was decided to strengthen the link between the Lisbon Strategy and the cohesion policy, increasing financial support to those activities, which contribute to achieving the former's goals.

The European Union strategy for economic growth and employment, known as "Europe 2020"[1], clearly acknowledges the importance of investing in human capital by placing emphasis, as it has already been mentioned, on intelligent, sustainable and inclusive growth as a means to overcome the structural shortcomings of the European Economy, improve its competitiveness and productivity and ensure a sustainable social market economy. More precisely, regarding Research and Development, the goals of this strategy were to reach 3 % of the European Union's GDP, and, in terms of education, to reduce the school dropout rates to less than 10 %, while increasing the number of people aged between 30 and 34 who obtained a university degree to 40 %.

The 2014–2020 cohesion policy, supported by the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund provides the necessary investment framework and the right implementation system to fulfil the goals of the Europe 2020 strategy. It also establishes that a new strategic approach must be put into practice and that member states and regions must offer a set of strategies, referred to as smart specialisation, in order to access funding. These strategies seek to take competitive advantage of each region's know-how, assets, strong points and strengths. This clearly represents a new way of acting, following an integrated logic of territorial competitiveness, as referred to by Lopes [17], resorting not only to new technologies, but also making the most of all characteristics that are specific to a region, involving all stakeholders in creating synergies and exploring endogeneity.

Clearly, the focus is on knowledge and innovation in a territorial perspective; in other words, besides having the necessary financial resources, more and more one has to know the territory in all its complexity so that a strategy may be attained that leads to a balanced and sustainable development and meats the goals of the 2030 Agenda. Human capital and knowledge, when part of an evolving and interacting territory, are key elements to competitiveness and economic and social cohesion.

In this context, the policies endorsed by the European Union to support human capital formation and knowledge production in recent decades have begun showing positive results in the form of a more educated population, with significantly more years of schooling, the building of infrastructure and an increase in scientific production, a situation to which Higher Education Institutions have largely contributed.

3. Data Analysis

3.1. Higher Education Institutions' ERDF- and Cohesion Fund- supported investment

3.1.1. Higher Education Institutions' investment between 2000 and 2018

From 2000 to 2018, Portuguese public and private Higher Education Institutions invested around 1,860 euros in over 6,000 projects; 76 % of that amount was financed by the ERDF and the Cohesion Fund.[2] According to Table 1, regard-

problematic accumulation: it is an intangible active and creates spillover effects (those who have a better education can share their knowledge with others, but if they get no reward for these positive externalities, they may not feel motivated enough to do what is socially desirable). As regards knowledge, it is a public asset although not pure, that is, it may dispute the non-rivalry characteristic and not obey the non-excludability one for example when protected by patents. However, this may also generate externalities when that knowledge (which is non-rival) is disseminated and made available, namely through R & D activities provided by public or private bodies.

[1] Retrieved from: https://eur-lex.europa.eu/legal-content/PT/TXT/PDF/?uri=CELEX:32015H1184&from=EN (Date of access: 15.05.2019).

[2] By "Investment" it is meant the "Approved Total Eligible Cost" (3rd CSF and NSRF) as well as the "Total Eligible Expenditures Allocated to the Operation" (PT2020). The "Subsidy", is the

Table 1

Higher Education Institutions' overall investment in the 2000–2018 period (In 1,000 euros)

Programme	No of projects	Investment (1)	% of overall investment, %	Subsidies (2)	% of Investment Subsidies, %
CSF III (2000-2006)					
PO Economia (PRIME) (Eeconomy Operational Programme)	96	3.482	0.2	2.290	66
PO Ciência e Inovação 2010 (Science and Innovation Operational Programme)	2.122	394.012	21.2	235.223	60
PO Norte (Operational Programme for the Northern Region)	16	10.057	0.5	6.440	64
PO Centro (Operational Programme for the Centro Region)	19	19.921	1.1	13.728	69
PO Alentejo (Operational Programme for Alentejo)	4	6.832	0.4	4.642	68
OP Algarve (Operational Programme for the Algarve)	2	2.288	0.1	1.366	60
PRODEP III (Education Operational Programme)	89	243.040	13.1	182.280	75
POSC (Knowledge Society Operational Programme	243	43.689	2.3	20.218	46
PO Cultura (Culture Operational Programme	13	5.517	0.3	3.140	57
POEFDS (Employment, Training and Social Development OP)	1	578	0.0	347	60
PO Pesca (Fisheries Operational Programme)	11	2.064	0.1	1.530	74
PO Saúde (Health Operational Programme)	42	31.171	1.7	23.378	75
PO Des. Econ. e Social dos Açores (Azores' Economic and Social Development Operational Programme)	15	2.777	0.1	2.360	85
Lisbon and Vale do Tejo's Operational Programme	7	4.923	0.3	2.501	51
POADR (Agriculture and Rural Development O. P.)	2	383	0.0	215	56
Total 3rd CSF Operational Programmes (2000-2006)	2.682	770.733	41.5	499.657	65
NSRF (2007–2013)					
POFC (Competitive Factors Operational Programme	1.770	228.135	12.3	204.415	90
PO Norte (Operational Programme for the Northern Region)	86	58.095	3.1	47.875	82
PO Centro (Operational Programme for the Centro Region)	83	102.490	5.5	87.116	85
OP Algarve (Operational Programme for the Algarve)	8	8.389	0.5	6.354	76
PO Alentejo (Operational Programme for Alentejo)	8	3.233	0.2	2.748	85
POVT (Territorial Enhancement Operational Programme	21	89.279	4.8	75.887	85
P O Valor do Pot. Econ. e Coesão Terr. da RAM (Economic Potential Enhancement and Territorial Cohesion in Madeira Autonomous Region)	3	586	0.0	498	85
Assistência Técnica FEDER (ERDF Technical Assistance)	1	102	0.0	87	85
Açores — Convergência (Azores — Convergence)	6	13.437	0.7	11.422	85
Total NSRF Operational Programmes (2007–2013)	1.986	503.746	27.1	436.402	87
Portugal 2020 (from 2014to 2018)					
COMPETE 2020 (Competitiveness and Internationalisation OP)	904	309.935	16.7	262.912	85
PO SEUR (Sustainability and Efficient Use of Resources OP)	54	17.635	0.9	16.245	92
PO Regional da Madeira (Madeira's Regional OP)	3	2.374	0.1	2.018	85
PO Regional de Lisboa (Lisbon's Regional OP)	174	53.785	2.9	22.304	41
PO Regional do Alentejo (Alentejo's Regional OP)	43	17.391	0.9	14.782	85
PO Regional do Algarve (Algarve's Regional OP	37	9.839	0.5	6.094	62
PO Regional do Centro (Regional OP for the Centro Region)	107	55.860	3.0	47.427	85
PO Regional do Norte (Regional OP for the Northern Region)	98	118.099	6.4	100.032	85
Total Portugal 2020 OPs (from 2014 to 2018)	1.420	584.918	31.5	471.816	81
Total (2000–2018)	6.088	1.859.397	100.0	1.407.875	76

Source: constructed by the authors, based on the data indicated in the footnotes 4; 6 and 7.

Table 2

UTAD's investment for Community Support Framework 2000–2018 (In 1,000 euros)

Programme	No of projects	Investment (1)	%of overall investment, %	Subsidies (2)	% of Investment subsidies, %	UTAD's % of Investment in HEIs, %
CSF III (2000–2006)						
PO Economia (PRIME) (Eeconomy OP)	1	6	0.0	5	75	0.18
PO Ciência e Inovação 2010 (Science and Innovation Operational Programme)	84	12,220	15.5	7,257	59	3.10
PO Norte (Operational Programme for the Northern Region)	1	1,098	1.4	673	61	10.92
PRODEP III (Education O P)	4	12,.263	15.5	9,197	75	5.05
POSC (Knowledge Society OP	6	5,971	7.6	2,.968	50	13.67
Total CSF III Ops (2000–2006)	96	31,558	39.9	20,100	64	4.09
NSRF (2007–2013)						
POFC (Competitive Factors OP)	46	6,281	8.0	5.574	89	2.75
PO Regional do Norte (Regional OP for the Northern Region)	11	5,669	7.2	4,723	83	9.76
POVT (Territorial Enhancement OP)	2	11,442	14.5	9,726	85	12.82
Total NSRF Ops (2007–2013)	59	23,392	29.6	20,022	86	4.64
Portugal 2020 (from 2014 to 2018)						
COMPETE 2020 (Competitiveness and Internationalisation OP)	23	5,060	6.4	4,297	85	1.63
POSEUR (Sustainability & Efficient Use of Resources OP)	13	3,465	4.4	3,247	94	19.65
PO Regional de Lisboa (Lisbon's Regional OP)	1	93	0.1	37	40	0.17
PO Regional do Norte (Regional PO for the Northern Region)	14	15,436	19.5	13,118	85	13.07
Total Portugal 2020 Ops (from 2014 to 2018)	51	24,054	30.4	20,699	86	4.11
Total (2000–2018)	206	79,003	100.0	60,822	77	4.25

Source: constructed by the authors, based on the data indicated in the footnotes 4; 6 and 7.

ing Higher Education Institutions' global investment at a national level for the 2000–2018 period, most of that investment occurred while the Third Community Support Framework was in place. During that period, Higher Education Institutions invested more than 40 % of the money. The NSRF (2007–2013) showed a strong decline of the rate of investment (27 %), although within the Portugal 2020 there have been signs of recovery (31.5 % of the overall investment during these almost two decades so far, although there are still two years left for the said framework to be completed).

As far as the programmes are concerned, the Programa Operacional Ciência e Inovação 2010 (Science and Innovation Operational Programme) and the Programa Operacional Educação (PRODEP III) (Education Operational Programme) included in the Third Community Support Framework stand out, representing 21.2 % and 13.1 % of the overall investment for the 2000–2018 period, respectively. Within the NSRF, there is the Programa Operacional Factores de Competitividade (POFC) (Competitiveness Factors Operational Programme) (12.3 %) and included in the Portugal 2020, the Programa Operacional Competitividade e Internacionalização (COMPETE 2020) (Competitiveness and Internationalisation Operational Programme) (16.7 % of the total).

3.1.2. UTAD's relative stand

In the 2000–2018 period, UTAD performed 206 projects, which corresponded to an overall investment of 79 million euros, 77 % of which (60.8 million) were financed by the ERDF and the Cohesion Fund. This investment represented on average 4.25 % of all public and private Higher Education Institutions' investment, as illustrated in Table 2.

The relative dynamism of UTAD's participation in all Higher Education Institutions' investment stands out not only for its expected relevance regarding regional operational programmes for the Northern Region but also regarding the implementation of such programmes as the Knowledge Society Operational Programme within the Third Community Support Framework (13.7 % of Higher

"Approved Community Fund" (3rd CSF and NSRF) and the "Approved Total Fund" (PT2020).

Table 3

Investment in and subsidies for HEIs from 2000 to 2018

		UTAD	UP	UM	UA	UBI	UÉ	UALG	North	National
CSF III (2000–06)	Investment	31,558	119,264	101,947	68,771	41,325	22,900	38,253	287,889	770,733
	Subsidies	20,100	73,169	64,377	42,168	28,070	15,023	25,440	183,405	499.657
NSRF (2007–13)	Investment	23,392	153,420	67,914	115,708	27,805	15,742	8,389	250,355	503.746
	Subsidies	20,022	132,040	60,230	101,027	23,945	13,735	6,354	216,450	436.402
Portugal 2020 (from 2014 to 2018)	Investment	24,054	154,350	101,059	85,089	14,339	23,206	11,105	309,411	584.918
	Subsidies	20,699	128,058	85,201	71,082	11,827	18,979	7,373	259,189	471.816
Total investment (1,000€)		79,003	427,034	270,920	269,568	83,469	61,848	57,747	847,655	1.859.397
Total subsidies (1,000€)		60,822	333,266	209,808	214,277	63,842	47,737	39,166	659,044	1.407.875
HEIs' Investment /HEIs' total investment (%)		4.25 %	22.97 %	14.57 %	14.50 %	4.49 %	3.33 %	3.11 %	45.59 %	100 %

Source: constructed by the authors, based on the data indicated in the footnotes 4; 6 and 7.

Education Institutions' overall investment for the period); the Territorial Enhancement Operational Programme within the NSRF (12.8 %); and, in particular, within the current Portugal 2020, the Sustainability and Efficient Use of Resources Operational Programme (being responsible for approximately 20 % of all Higher Education Institutions' overall investment).

Table 3 allows one to compare the investment made by the Higher Education Institutions selected during the period in question. It follows that UTAD's investment and support are 25 % higher than those registered by UÉ[1] and UALG[2] in absolute terms and only slightly lower, 5 %, than those of UBI's[3] .

The level of investment of UP[4], UA[5] and UM[6] is clearly higher than that of UTAD's, which reflects a significantly different reality in terms of geographic context namely the fact that these universities are situated in high population density territories. Worth noticing is the fact that the Higher Education Institutions in the Northern Region represent more than 45 % of the total national investment.

3.1.3. Per capita investment indicators

To better ascertain each university's relative stand, the annual average per capita investment was estimated for both students and teachers.

Table 4 presents the average number of students and teachers for the 2000–2018 period, according to three distinct moments that either correspond to the end of the support frameworks (CSF III and NSRF) or depend on the available data (in the case of Portugal 2020, which is still in place). Thus, data regarding the 2005/6; 2012/13 and 2016/17 school years were used[7].

Table 4

The average number of students and teachers by institution for the period under analysis

Higher Education Institutions	Students		Teachers	
	Average number	% in all HEIs, %	Average number	% in all HEIs, %
UTAD	6,924	1.9	556	1.6
UP	29,610	8.0	2,516	7.1
UM	17,049	4.6	1,251	3.5
UA	12,967	3.5	1,092	3.1
UBI	6,357	1.7	686	1.9
UÉ	7,033	1.9	638	1.8
UALG	8,279	2.2	846	2.4
Higher Education Institutions national total	369,656	100.0	35.359	100.0

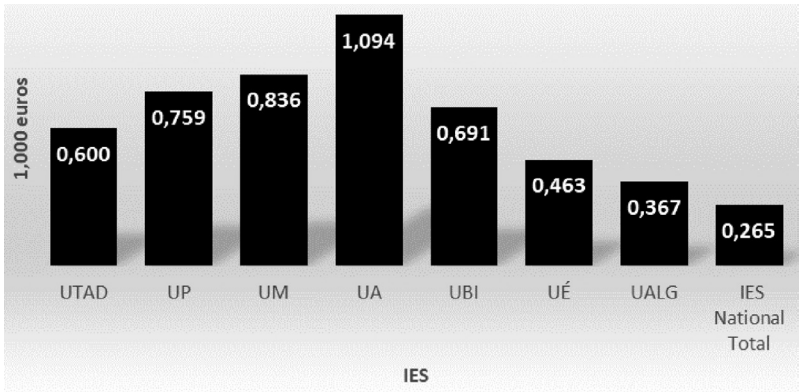
Source: constructed by the authors based on the data indicated in the footnote 17.

In what concerns the average number of students, UTAD, UBI, UÉ and UALG had roughly 2 % of the national total, UA and UM between 3.5–4.6 %, and UP is on top, with about 8 % of the total number of students at the national level. As for teachers, the distribution is similar, although the percentages are lower, but for UALG, which presents a higher percentage average for teachers than for students.

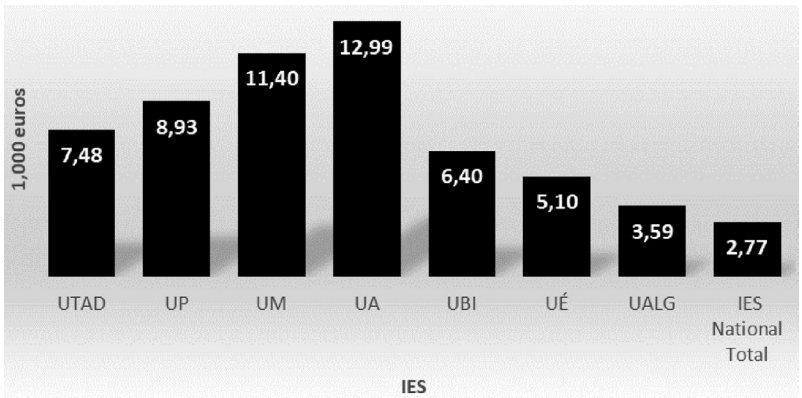
After values by a student had been calculated, the annual average values for the Higher Education Institutions under analysis that were

[1] University of Évora.
[2] University of Algarve.
[3] University of Beira Interior.
[4] University of Porto.
[5] University of Aveiro.
[6] University of Minho.

[7] The Directorate-General for Education and Science Statistics (DGEEC) provided Statistics for teachers and students. Retrieved from: http://www.dgeec.mec.pt (Date of access: 23.05.2019).



Source: constructed by the authors, based on the data indicated in the footnotes 4; 6; 7 and 17.
Fig. 1. *ERDF + Cohesion Fund annual average investment per student I 1,000 euros (2000–2018)*



Source: constructed by the authors, based on the data indicated in the footnotes 4; 6; 7 and 17.
Fig. 2. *ERDF + Cohesion Fund annual average investment per teacher in 1,000 euros (2000 — 2018)*

obtained were rather diverse, varying in the interval between a maximum of €1,094 annual average investment per student at UA and a minimum of €367 at UALG. All these Higher Education Institutions, however, are above the national annual average of €265 investment per student. UTAD's rank is above the average values for UALG and UÉ and slightly below the average values for UBI. UM and UP do present high values but lower than those of UA's, though (Figure 1).

Using the annual average investment per teacher criterion, the values obtained are higher — a national annual average of €2.770 for all Higher Education Institutions — but the relative distribution does reveal some similarities. For the Higher Education Institutions under analysis, an interval of a minimum of € 3,590 (UALG), and a maximum of €12,990 (UA) was found. Thus, UTAD, with an annual average investment per teacher of 7,480 € surpasses not only UALG and UÉ but also UBI (Figure 2).

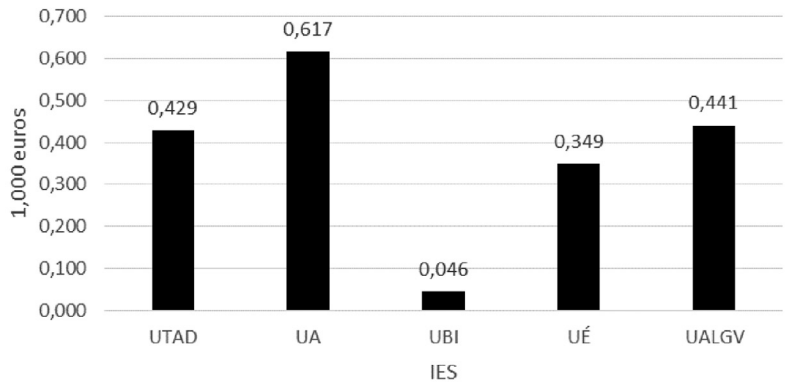
3.2. Higher Education Institutions' investment supported by the European Social Fund

This type of investment is different from the one supported by the ERDF and the Cohesion Fund; it aims at providing training and qualification for human resources. Only within "Portugal 2020" has information become available and free. In previous support frameworks, information was difficult to get, but it has changed. Now it has a different structure and that in itself justifies a closer look into this particular fund.

As shown in Table 5, in the last twenty years UTAD submitted 163 investment projects worth 8.8 million euros (about 11 % of the amount invested through other funds) to which corresponded a subsidy of approximatively 75 %, that is, 6.5 million euros. The investment through the European Social Fund was different within the various Support Frameworks; in the CSF III (2000–2006) only, more than 70 % of the investment for the 2000–2018 period was made. Particularly, relevant is the access to PRODEP III a programme meant, among other things, for teachers' in-service education.

While the NSRF was in place, investment amounted to only 3.5 % of the total for the 2000–2018 period, although there has been a recovery within the current "Portugal 2020".

In comparative terms, among the various Higher Education Institutions values vary between a minimum of 857,000 € at UBI and a maximum of 20.5 million € at UA (Table 6). The values



Source: constructed by the authors, based on the data indicated in the footnotes 4; 5; 7.and 18.

Fig. 3. *Annual average ESF-supported investment by co-worker in 1,000 euros (2000 — 2018)*

Table 5

Global ESF-supported investment made by UTAD by CSF from 2000 to 2018 (In 1,000 euros)

Programme	No of projects	Investment (1)	% Overall investment, %	Subsidies (2)	% Investment subsidies', %
CSFIII (2000–2006)					
PRODEP III (Education OP)	99	4 294	48,7	3 216	75
POEFDS (Employment, Training and Development OP)	5	115	1,3	72	63
POCI (Science and Innovation OP	11	180	2,0	135	75
POSC (Knowledge Society OP)	26	1 461	16,6	802	55
POAP (Public Administration OP)	6	186	2,1	140	75
ON-Operação Norte (Operation North)	2	83	0,9	63	75
Total CSFIII OPs (2000–2006)	149	6 319	71,7	4 427	70
NSRF (2007–2013)					
PO PH (Human Potential OP)	8	308	3,5	242	78
Total NSRF OPs (2007–2013)	8	308	3,5	242	78
Portugal 2020 (from 2014 to 2018)					
PO Comp. e Intern. (Competitiveness and Internationalisation OP)	2	956	10,8	812	85
PO Regional do Norte (Regional PO for the Northern Region)	3	1 188	13,5	1 010	85
POISE (Social Inclusion and Employment OP)	1	40	0,4	34	85
Total Portugal 2020 Ops (from 2014 to 2018)	6	2183	24,8	1856	85
Total (2000–2018)	163	8 811	100,0	6 525	74

Source: constructed by the authors, based on the data indicated in the footnotes 4; 5 and 7.

registered by UTAD have been higher than those registered by UBI and UÉ.

To allow a better understanding of access conditions, per capita indicators were recalculated, this time considering the usual target audience of these programmes: the co-workers of each institution. Therefore, information on the number of co-workers regarding 2017 was gathered from the activity reports of all Higher Education Institutions[1]. That information was later used to make the calculations shown in Figure 3.

[1] Annual reports of these institutions, retrieved from: https://www.ubi.pt; https://www.ua.pt; https://www.uevora.pt; https://www.utad.pt and https://www.ualg.pt (Date of access: 03.06.2019).

Table 6

Global ESF-supported investment made by Higher Education Institutions in the 2000–2018 period (In 1,000 euros)

Programme	Investment (1)	Subsidies (2)	% Investment subsidies, %
UTAD	8 811	6 525	74
UA	20 503	15 569	76
UBI	857	677	79
UÉ	6 695	5 118	76
UALGV	10 801	7 649	71

Source: constructed by the authors, based on the data indicated in the footnotes 4; 5 and 7.

Based on Figure 3, it is then possible to conclude that once again UA leads the annual average ESF-supported investment by co-worker, with €617, followed by UALG and UTAD. In this group, UÉ and UBI have the worst performance.

4. Final remarks

In almost two decades (the 2000–2018 period under survey), Higher Education Institutions had at their disposal a significant set of funds and benefited from investment, which enabled them to be prepared to meet the new economic and social challenges that lie ahead.

Regarding the distribution of funds across the territory, the main trend was to invest in the universities that are located in the more densely populated regions, rather than in those of low density, which can negatively influence the success of economic and social cohesion policies designed to promote knowledge and human capital formation.

More specifically, all these universities, namely, UTAD, UBI and UÉ, had significantly less access to either investment or community funds, whether in absolute or relative terms, based on per capita values for students, teachers, and co-workers.

Since these universities are located in low-density and economically and socially weak regions, it is natural that the positive externalities generated by public investment will have a stronger relative impact. Therefore, the importance of this type of public investment to regional development is undisputed and has already been proven by the strong economic and social impact that the creation of public Higher Education caused in the region 40 years ago.

The issue now is to determine how these universities can change the logics of low access to EU funds in the past. The future will involve the implementation and reinforcement of positive differentiation treatment for low-density territories, namely, through an increase in support and bonuses in the appraisal of applications, as well as an increase in support for the institutions' financial counterpart.

The matter is open to debate, with people supporting upgrade policies, which will allow these universities to contribute to the smart, sustainable and inclusive growth of the territories in which they are located, according to their mission and depending on their economic and financial balance, thus corresponding to EU goals.

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About the authors

Maria Teresa Couceiro da Costa Sequeira e Sousa Carvalho — PhD in Economics, Dr., Assistant Professor, Senior Researcher, Transdisciplinary Centre for Development Studies (CETRAD), University of Trás-os-Montes and Alto Douro (UTAD); Scopus Author ID: 55917290100; https://orcid.org/0000-0003-3238-0354 (Quinta de Prados, 5000-801 Vila Real, Portugal; E-mail: tsequeir@utad.pt).

Francisco Jose Lopes de Sousa Diniz — PhD in Economics, Dr., Associate Professor with Habilitation (Retired), Senior Researcher, Transdisciplinary Centre for Development Studies (CETRAD), University of Trás-os-Montes and Alto Douro; Scopus Author ID: 55881300300; https://orcid.org/0000-0001-6770-430X (Quinta de Prados, 5000-801 Vila Real, Portugal. E-mail: fdiniz@utad.pt).

Информация об авторах

Секейра Тереза — PhD (экономика), доктор, доцент, старший научный сотрудник, Университет Трас-о-Монтес и Альто-Дору; Scopus Author ID: 55917290100; https://orcid.org/0000-0003-3238-0354 (Португалия, Вила-Реал, ул. квинта де Прадос, 5000-801; e-mail: tsequeir@utad.pt).

Динис Франциско — PhD (экономика), доктор, доцент, старший научный сотрудник, Университет Трас-о-Монтес и Альто-Дору; Scopus Author ID: 55881300300; https://orcid.org/0000-0001-6770-430X (Португалия, Вила-Реал, ул. квинта де Прадос, 5000-801; e-mail: fdiniz@utad.pt).

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