4 Supporting the future development of the higher education system

This chapter focuses on resourcing and governance policies to support higher education in Portugal respond effectively and efficiently to changing knowledge and skills needs in Portuguese society. In the coming decade, demand for higher education graduates – and their skills - will remain strong. Public universities and polytechnics will need to make even greater contributions to upskilling and reskilling, and to innovation in Portugal's regional economies. However, demographic change will inevitably lead to a fall in local student demand in interior and island regions. The analysis and recommendations in this chapter highlight how carefully calibrated public policies can support HEIs to make strategic choices and adapt their profiles to changing circumstances, while ensuring an accessible, relevant and high-quality public higher education system.

Supporting the future development of the public higher education system

Governments in OECD countries play an important role in steering higher education systems

Over time, governments in OECD countries have adopted differing approaches to the strategic steering of the public and government-dependent higher education institutions falling under their responsibility. From the 1980s onwards, in many OECD countries where the higher education system had been characterised by a high degree of state control, higher education institutions were granted increasing levels of autonomy over their financial affairs, staffing and strategic direction. Influenced by the theories of New Public Management (Broucker, De Wit and Verhoeven, 2017[1]), particularly from the 1990s onwards, public authorities in many OECD jurisdictions started to adopt mechanisms aimed at promoting efficient and effective use of resources in publicly funded higher education institutions, ensure the accountability of these institutions for the public funds they received and provide students with stronger guarantees about the quality of the education they received. These mechanisms have included external accreditation and quality assurance systems, peer-led research evaluation exercises, output-linked institutional funding, indicator-based monitoring and, in more recent years, the conclusion of performance agreements between government and individual institutions.

National contexts and the political convictions of governing parties have influenced the approaches to higher-education steering adopted in different OECD countries, with varying degrees of emphasis on higher education as a marketable service or as a public good. In countries where the concept of higher education as a public good – or public service – has remained prominent in policymaking, governments have often sought to promote and shape the development and enhancement of individual public or government-dependent higher education institutions and, to an arguably more limited extent, the emergence of higher education "systems", which place individual institutions in a coherent whole.

Policies exist to promote the strategic development of individual institutions and of higher education systems as a whole

In the last three decades at least, government intervention to support the development of individual higher education institutions has been conditioned by institutional autonomy, which, in OECD jurisdictions, is nearly always stronger in higher education than at other levels of education and training. Performance-oriented mechanisms – whether performance-linked funding or more recent institutional assessment mechanisms, such as England's Teaching Excellence Framework (Office for Students, 2020[2]) – have generally been presented by policymakers as mechanisms to strengthen higher education institutions, as well as tools for public accountability. In some jurisdictions, including the Netherlands, Finland and Ireland, public policies have placed considerable emphasis on institutional specialisation and profiling, whereby policies seek to encourage institutions, as part of their institutional development strategies, to develop their individual areas of strength and differentiate themselves from their counterparts.

Government efforts to encourage institutional profiling and differentiation by facilitating bottom-up choices by institutional leadership and staff have often been accompanied by top-down policies that – more or less explicitly – seek to structure higher education systems as a whole. The most immediately apparent and widespread example of this is the legal categorisation of higher education providers into different institutional types, most often on binary lines, as in Portugal, the United States, Germany, the Netherlands, Ireland or Finland. The distinction between academically oriented universities and professionally oriented polytechnics, university colleges, community colleges or universities of applied science is not always straightforward, given the presence of many professionally oriented disciplines in universities (medicine, engineering, architecture, etc.) and the increasing role of (some) non-university institutions in practice-oriented research and innovation. Nevertheless, governments in many OECD jurisdictions, particularly in Europe and North America have sought to preserve institutional categorisations and divisions of labour as

part of their higher education strategies. The Dutch Government's latest policy statement, for example, calls for discussion of the development of the binary system in higher education, but does not call the existence of this system fundamentally into question (Government of the Netherlands, 2022[3]).

Some OECD jurisdictions go further than defining distinct legal categories of higher education institution and structure all or parts of their networks of public higher education institutions into clearly defined and deliberately co-ordinated "systems". The State University of New York (SUNY), for example, groups together public universities, colleges and community colleges in New York state under a single governing and co-ordinating structure in one of the most integrated systems in the United States. Many states, including Massachusetts, Ohio and Texas have co-ordinating boards overseeing public universities and community colleges, while others, such as California and Virginia, have state-level governing boards for their networks of public community colleges (OECD, 2020[4]; Hammond, Baser and Cassell, 2020[5]). In all these public networks, the state-level boards set the strategic direction of the system and work to ensure complementarity and transfer pathways between different institutions and sites.

In Europe, no equivalent "systems" of higher education governance exist. However, several governments have used regulation to reorganise the institutional landscape – through mergers in Denmark and Finland or re-organisation of universities and university colleges in the Flemish Community of Belgium, for example – or to steer institutional strategy. Dutch higher education policy in the last decade has sought to create "centres of gravity" (*zwaartepunten*) in the higher education system, whereby universities and universities of applied science focus on specific areas of specialisation and, in some cases at least, reduce or drop others. In Denmark, the current government (2022) is seeking to promote development of regional branch and satellite campuses by existing higher education institutions to promote access to professionally oriented education in regional towns outside the country's four main metropolitan areas (OECD, 2021[6]).

Government intervention seems to be making a return in some more market-driven higher education systems

Even in the United Kingdom, one of the OECD higher education systems where policy in recent decades has most consistently emphasised the role of market forces and light-touch regulation (Carpentier, 2021[7]), policymakers are increasingly advocating a greater steering role for government. For example, the 2019 review of post-18 education and funding in England led by Philip Augar argued:

> *The idea of a market in tertiary education has been a defining characteristic of English policy since 1998. We believe that competition between providers has an important role to play in creating choice for students but that on its own it cannot deliver a full spectrum of social, economic and cultural benefits. With no steer from government, the outcome is likely to be haphazard. (Augar, 2019[8])*

Since the Augar review, the UK Government has announced additional public funding to support provision of high-cost subjects aligned with national skills priorities (an increase in the Strategic Priorities Grant), additional capital funding to support provision in sciences, medicine, and engineering, and changes to the student-financing system to increase its coverage. The changes to student support will provide loans to students in professional Higher Technical Qualifications and, from 2025, establish a "lifelong loan entitlement", which will guarantee four years of student support for post-secondary education for all citizens over their lifetime (i.e. not only directly after completing secondary school). At the time of writing (June 2022), consultations are ongoing about the reintroduction of student-number controls (a form of *numerus clausus*), the use of minimum thresholds for graduate employment outcomes for individual programmes as part of quality assurance and minimum eligibility requirements for students to fulfil in higher education entry examinations to allow them to access student loans. Alongside these regulatory measures, another consultation, also responding to a recommendation from the Augar review, will focus on options for re-introducing student grants, to complement the current loans-based system (Government of the United Kingdom, 2022[9]).

Key priorities for the sustainable development of higher education in Portugal

Portugal's higher education system needs to adapt to widen participation, better align provision with demand and contribute more effectively to regional innovation

The priorities that governments seek to pursue through policy intervention in the higher education sector – and the challenges they seek to address – naturally differ between OECD jurisdictions, despite many commonalities between systems. In the case of Portugal, the analysis presented in Chapter 2, as well as the extensive discussions with representatives of the higher education sector, experts and policymakers in Portugal held during this review, have highlighted three main priorities for future-oriented higher education policy in the country:

1. Ensuring the higher education system provides a **diverse range of high-quality educational offerings** to support a wider section of the population to acquire advanced knowledge and skills and meet growing skills demands. This priority responds to a range of challenges related to access to educational opportunities for currently under-served young people and adults and the relevance of higher education provision to future skills requirements.
2. Reconfiguring the public higher education system so that the scale and nature of **educational provision is better aligned to future student demand** across the national territory. The widening access and skills agendas highlighted in the first priority, along with the potential to attract more international students, provide opportunities to expand provision in certain types of programme and in certain fields, including in interior and island locations. However, the broader demographic picture discussed in Chapter 2 – notably the 14% decline in the number of 20–29-year-olds by 2035 – will inevitably require down-scaling and consolidation in some areas of existing provision.
3. Further strengthening the contribution of higher education institutions to **research excellence, regional innovation and economic development.** This topic has not been a primary focus of this review, but was examined in more depth in the last OECD review of higher education, research and innovation (OECD, 2019[10]) and, in respect of regional innovation, recent work on higher education and smart specialisation in Portugal (Pinto, Nogueira and Edwards, 2021[11]). The discussion in this chapter focuses on the relationship between institutional strengths in research and innovation and the attractiveness and relevance of educational offerings.

Further widening participation in higher education would contribute to social inclusion and help meet Portugal's future skills needs

While a highly skilled population does not guarantee a strong economy and public services, it is an indispensable foundation on which to build them. As noted in Chapter 2, Portugal's economy is currently less skills-intensive than the economies of some of its OECD partners. However, particularly as automation alters the task composition of many professions, demand for advanced skills is likely to increase, to meet the needs of established economic activities and drive the creation of new ones. Despite the impressive increase in higher education attainment rates in the last decade across all regions of the country, Chapter 2 also highlighted two main populations that are under-served by higher education in Portugal: young people following vocational tracks in secondary education and adults wishing to upskill and reskill.

Overall, one-third of upper secondary students in Portugal complete vocational tracks rather than the academically oriented scientific-humanistic track that has been the traditional pathway to higher education. The proportion of upper-secondary students graduating from vocational tracks varies from 27% in the Évora school district to around 40% in Viseu, Castelo Branco, Aveiro, Leiria and Beja (districts distributed between interior and littoral regions).

While, on average, 81% of students graduating from the scientific-humanistic track enter higher education within one year of completing secondary education, this proportion is only 24% for students completing the

vocational track. As shown in Table 4.1, while 41% of vocational graduates from 2019/20 in the Bragança school district entered higher education, this proportion was only 16% in Évora and just over 20% in Lisbon and Porto. In absolute terms, the largest numbers of vocational-secondary completers not progressing to higher education (40% of all such completers in Portugal) were located in Lisbon and Porto. Among all students completing the scientific-humanistic track in 2019/20 in Portugal, 46% of those who did not progress to higher education were also located in the two largest cities (DGEEC, 2022[12]). As discussed in Chapter 2, the proportion of adults in Portugal – with or without an existing higher education qualification – who enter higher education later in life to upskill or reskill is low, in absolute terms and relative to some other OECD jurisdictions. This means there is – in the current configuration of the higher education system – little likelihood of those who do not transition directly to higher education from secondary school of ever doing so.

Table 4.1. Progression from vocational secondary education to higher education

Proportions of students graduating from vocational upper secondary tracks in 2019/20 transitioning to higher education by secondary school district.

Secondary school of origin		Situation after one year		
District	Number of students completing vocational upper-secondary education in 2019/20	Degree-conferring programmes (e.g., bachelor's programme)	TeSP (short-cycle programmes)	Not enrolled in higher education
Évora	336	8%	8%	84%
Porto	5 133	11%	10%	79%
Vila Real	433	8%	14%	78%
Lisboa	5 143	14%	8%	78%
Viseu	1 149	11%	10%	78%
Braga	3 000	8%	15%	77%
Aveiro	2 379	13%	10%	77%
Portalegre	259	7%	17%	76%
Faro	1 039	13%	11%	76%
Coimbra	1 114	15%	9%	76%
Beja	427	7%	18%	76%
Continental Portugal	27 205	12%	12%	76%
Setúbal	1 840	10%	15%	75%
Viana do Castelo	789	12%	16%	72%
Santarém	1 363	12%	19%	69%
Castelo Branco	569	17%	15%	68%
Guarda	397	19%	14%	67%
Leiria	1 554	17%	21%	62%
Bragança	281	16%	25%	59%

Note: Based on data from DGEEC data sheet "Transição entre o ensino secundário (2019/2020) e o ensino superior (2020/2021)" (Transition between secondary education (2019/20) and higher education (2020/21)).
Source: DGEEC (2022[12]) *Estatísticas - Ensino Superior (Statistics - Higher Education)*, https://www.dgeec.mec.pt/np4/18/ (accessed on 8 July 2022).

Increasing participation in higher education among young people and adults who do not currently enter higher education to further social equity and help address skills gaps in technical and ICT-related fields, will require a combination of measures. On the supply side, appropriate access routes and programmes tailored to the specific needs of populations that are less well prepared for higher education and may need to study part-time will be required. Portugal's access routes for those over 23 and the new competitions for secondary-vocational graduates provide a good starting point. As shown in Table 4.1, a significant

share of secondary-vocational graduates are already entering short-cycle TeSP programmes, particularly in Bragança and Leiria. Further development of the offer of TeSP places in fields closely aligned with national skills needs could be a promising way to expand higher education participation to under-served parts of the youth population and fill skills gaps. As demonstrated in discussions with higher education stakeholders in this review, if adapted to be sufficiently flexible for adult learners, TeSP provision can also form part of an attractive package of options for advanced upskilling and reskilling. As discussed in Chapter 5, these supply-side developments may need to be accompanied by further measures to inform and financially support students. In all cases, a strong professional orientation, good links with employers and careful monitoring of student completion and graduate employment outcomes will be needed to inform fine-tuning of institutional and national strategies.

Efforts are required to align higher education provision to future student demand across Portugal's national territory

Widening access to currently under-served population groups will require changes in higher education institutions, particularly in the polytechnic sector that is best equipped to serve students transitioning from vocational pathways and, in many cases, adult learners looking to improve their career prospects. Across the country, there is scope to expand relevant provision closely aligned to the labour market, initially at TeSP level and in carefully selected, professionally oriented bachelor's programmes. There is scope for the whole public polytechnic sector to learn from the experience of leading institutions, such as the IP Bragança and IP Leiria. The greatest needs to expand opportunities for secondary-vocational graduates are in the Lisbon and Porto metropolitan areas, where transition rates are currently particularly low and potential student numbers the greatest (see Table 4.1).

Public higher education institutions across Portugal will also need to respond to the falling numbers of young students transitioning from the scientific-humanistic tracks of upper-secondary education. In the short term, the need for change will be greatest in institutions and programmes in interior and island regions that have already seen enrolment decline and struggle to recruit students through the National Access Competition (see Chapters 2 and 3). Consolidation of programmes that are primarily tailored to the needs of graduates from the scientific-humanistic track will be required in many cases. This might occur through merging programmes within a single institution or creating joint programmes shared across institutions, allowing academic staff to co-operate and, where appropriate, teach in multiple campus locations. The increased acceptance of online learning for certain types of higher-education instruction, such as lectures, will facilitate some of these transitions.

From the perspective of the higher education system as a whole – and to ensure the best interests of students are protected – priority in reshaping of provision will need to be given to quality and relevance. Higher education institutions will need to develop evidence-based strategies that identify their key areas of strength, the types of programmes they can offer at high levels of quality and where sufficient student demand exists or could exist in future under reasonable assumptions. As discussed below, existing centres of excellence in research, innovation support or other forms of co-operation between HEIs and external partners, which, in turn, interact with and strengthen educational offerings, are an obvious basis for solid institutional strategies. A degree of specialisation and institutional profiling will be needed, with, to borrow from the Dutch policy vocabulary highlighted above, the identification and strengthening of "centres of gravity" (*zwaartepunten*) in different locations. While there is a strong case and need to maintain provision of certain programmes – in many TeSP fields and sectors such as nursing, teacher education or ICT – in a wide range of locations, there are more specialised and advanced programmes where provision in multiple locations will become harder to justify. This was also the conclusion of the Ministry of Science, Technology and Higher Education working group on access to higher education (MCTES Working Group, 2019[13]).

Such changes will naturally have significant implications for the academic workforce (teaching staff) across Portugal. While staff who are able to develop and deliver flexible, professionally oriented programmes in fields closely linked to regional economies and skills needs will remain in high demand, the consolidation and closure of programmes will inevitably displace other academics. There are no easy solutions to this problem. Some staff members will find themselves in high-demand fields or easily adapt to new configurations. However, as subject specialists, academic staff are not easily fungible units of labour, and other staff members will face more difficulties as institutional profiles evolve. Co-operation between institutions in programme delivery is a possible solution, while Portugal's networked system of research units already provides a useful framework for inter-institutional collaboration. In some respects, the ageing of the academic workforce noted in Chapter 2, may facilitate change at institutional level, as posts are renewed to align with evolving institutional strategies.

Two further issues arise frequently in Portugal in discussions about re-aligning provision to student demand. The first is the use of the *numerus clausus* system to allocate additional study places (*vagas*) to institutions in regions with limited local study demand and restrict the expansion of institutions in metropolitan areas. In the academic year 2018/19, Portugal's government reduced study places (outside certain protected fields) in public institutions in Lisbon and Porto by 5% in an effort to encourage more students to move to institutions in interior regions to study. The policy was not effective, as students were largely unwilling to change their study location and, in many cases, entered private HEIs in Lisbon and Porto (Edulog, 2019[14]; Biscaia, Sá and Teixeira, 2021[15]). Moreover, the general presumption against study-place increases in Lisbon and Porto further reduces the accessibility of higher education for secondary students from these metropolitan areas, who tend to study locally and – as discussed above – include a large proportion the young people in Portugal who do not currently enter higher education.

The second issue is the potential for international students to compensate for declining enrolment by domestic students. As noted in Chapter 2, in 2019/20, international students account for 15.2% of total enrolment in public universities and 10.9% in public polytechnics. Across public HEIs, the largest international student cohorts came from four Portuguese-speaking countries: Brazil, Cape Verde, Guinea-Bissau and Angola (DGEEC, 2022[12]). The key question is whether there is alignment between the programmes international students seek and the established offering in public institutions that face enrolment decline. Leaving aside the question of whether programmes should be offered in English to attract a more diverse set of international students, the attractiveness of programmes for international students is likely to be determined by the same basic factors as for domestic students – the quality of the offering and the reputation of the institution in teaching, research and relevant innovation activities. Here again, strong institutional profiles come into play.

Strong profiles in research and innovation can support differentiated educational offerings and economic development

Research and innovation activities are intricately inter-linked with teaching in high-quality higher education. Research-informed teaching is important across fields and programme types. Opportunities to engage in practice-oriented research, alongside practical work-based learning, can greatly strengthen education in professional fields. And direct engagement in research and experimentation are at the core of advanced higher education programmes. In a context where public higher education institutions in Portugal will need to refine their institutional profiles, as they adjust to demographic change, strengths in research and innovation will have a central place in institutional strategies.

Portugal's network of publicly supported research units brings together researchers from different institutions in a unique and flexible model of co-operation. A managing organisation exists for each research unit, the majority of which are HEIs. Units that wish to receive funding from the Foundation for Science and Technology (FCT) are subjected to periodic evaluation by external peer-review panels, with the results influencing eligibility for – and the level of – FCT core grants. The peer-review process, which

includes thematic, as well as discipline-specific, panels, is designed to assess applied and practice-oriented, as well as academic, research and thus be capable of rewarding research activity in the polytechnic sector. All units classified as "good" or above in the periodic evaluations (the most recent of which at the time of writing was in 2017/18) receive FCT funding (FCT, 2017[16]). At the time of writing, only universities are entitled to award doctoral degrees, although the first joint doctoral programmes involving polytechnics have been established (Politécnico de Leiria, 2020[17]). As a result, research units co-ordinated by polytechnics have a smaller role in doctoral training than units co-ordinated by universities (FCT, 2021[18]).

As shown in Table 4.2, even within the public university sector, there is considerable variation in the intensity of doctoral training, with over 70% of doctoral degrees awarded by just five universities.

Table 4.2. Doctoral graduates by public university in 2020/21

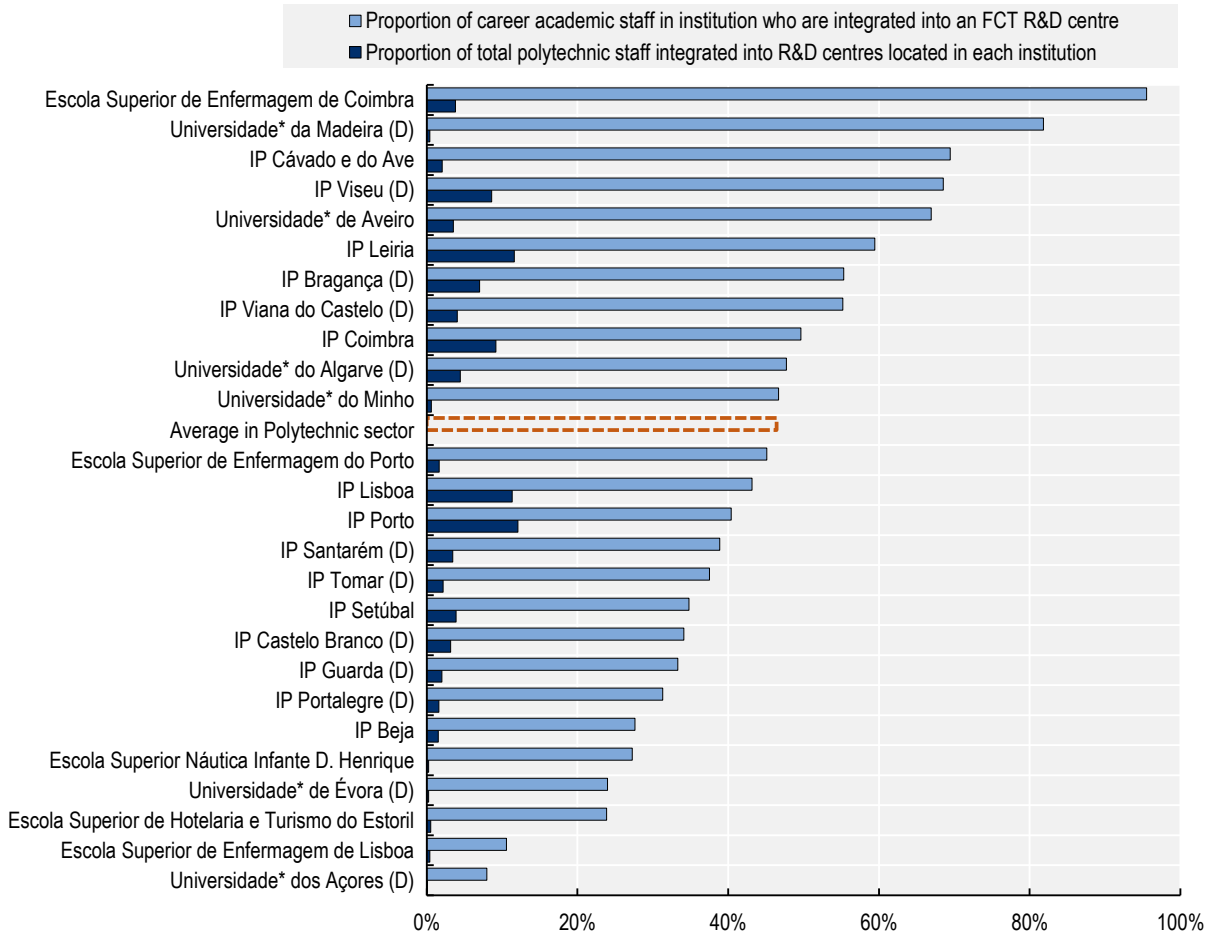
	Number of doctoral graduates in 2020/21	Share of all doctoral graduates in Portugal in 2020/21	Total graduates in 2020/21	Doctoral graduates as a share of total graduates
Universidade Nova de Lisboa	245	12.6%	4 757	5.2%
Universidade do Porto	384	19.8%	7 557	5.1%
Universidade de Aveiro	132	6.8%	2 670	4.9%
Universidade de Évora	63	3.2%	1 335	4.7%
Universidade Aberta	27	1.4%	597	4.5%
Universidade do Minho	207	10.7%	4 639	4.5%
ISCTE - Instituto Universitário de Lisboa	98	5.1%	2 311	4.2%
Universidade de Coimbra	215	11.1%	5 624	3.8%
Universidade de Lisboa	432	22.3%	11 557	3.7%
Universidade da Beira Interior	56	2.9%	1 812	3.1%
Universidade da Madeira	15	0.8%	570	2.6%
Universidade do Algarve	24	1.2%	938	2.6%
Universidade de Trás-os-Montes e Alto Douro	36	1.9%	1 452	2.5%
Universidade dos Açores	6	0.3%	538	1.1%

Note: Universities are listed in descending order of the share of doctoral graduates in total graduate numbers in 2020/21.
Source: DGEEC (2022[12]) *Estatísticas - Ensino Superior (Statistics - Higher Education)*, https://www.dgeec.mec.pt/np4/18/ (Accessed on 8 July 2022).

In the public polytechnic sector, it is possible to gain a partial picture of the research intensity of institutions by considering the engagement of their academic staff with formal research units. Figure 4.1, which includes organic units with polytechnic status that are integrated into public universities, shows the proportion of academic staff that were associated with (integrated in) an FCT-supported research unit in 2018. While around 70% of academic staff at the Instituto Politécnico do Cávado e do Ave (IPCA) were integrated into a research unit, this was the case for less than 35% of staff in the Polytechnic Institutes of Guarda, Portalegre and Beja – all comparatively small institutions in Portugal's interior.

Figure 4.1. Research capacity in polytechnics

Proportion of career academic staff in each public polytechnic integrated into an FCT-recognised R&D unit and distribution of these academic staff between public polytechnics, 2018.



Note: Data are based on academic staff reported by polytechnic units in the categories of "Principal Coordinating Professor", "Coordinating Professor" or "Assistant Professor". * In universities with organic units with polytechnic status, these data include only staff employed in the organic units with polytechnic status. D: institutions in regions experiencing demographic decline.
Source: DGEEC (2019[19]) Docentes do ensino superior integrados em unidades de I&D financiadas pela FCT (Academic staff integrated in R&D units funded by the FCT), https://www.dgeec.mec.pt/np4/381/ (accessed on 12 July 2022)

StatLink https://stat.link/dujptz

Another indicator of research capacity is the number and quality rating of research units co-ordinated by institutions. In the 2017/18 research evaluation exercise, 312 of the 348 units entering the evaluation were rated as “good”, “very good” or “excellent”, and thus received FCT funding. As summarised in Table 4.3, large public polytechnic institutions in Porto, Leiria and Bragança co-ordinate the largest numbers of research units, with Bragança the only one of these institutions in an interior region. There are also high-quality research units co-ordinated by IPCA, IP Tomar, IP Viana do Castelo, IP Viseu and IP Portalegre. In contrast, IP Beja, IP Castelo Branco and IP Guarda co-ordinate no research units. It is possible that the IP Lisboa and IP Setúbal (the latter also having no FCT-funded research units) suffer from their location in the Lisbon Metropolitan Area, home to a high concentration of research-intensive institutions.

Table 4.3. FCT-funded R&D units co-ordinated by public polytechnic institutes

Ratings received by R&D units co-ordinated by public polytechnic institutes (IP) in the 2017/18 FCT evaluation exercise and number of units (rated "good" and above) in receipt of FCT funding for the period 2020-23

Institution	Enrolment index 2020/21*	Insufficient	Weak	Good	Very good	Excellent	Total submitted	Total FCT funded
IP Porto **	100%		3	6		2	11**	**8**
IP Leiria	59%				5	1	6	**6**
IP Bragança (D)	44%			2		2	4	**4**
IP Cávado e do Ave (IPCA)	28%				2		2	**2**
IP Tomar (D)	12%			1	1		2	**2**
IP Viana do Castelo (D)	24%		1	2			3	**2**
IP Viseu (D)	29%			2			2	**2**
IP Coimbra	55%				1		1	**1**
IP Portalegre (D)	11%				1		1	**1**
IP Lisboa	69%			1			1	**1**
IP Santarém (D)	20%			1			1	**1**
IP Beja (D)	16%						0	**0**
IP Castelo Branco (D)	22%	1	3				4	**0**
IP Guarda (D)	17%						0	**0**
IP Setúbal	35%	1	1				2	**0**
Total for public polytechnic institutes		**2**	**8**	**18**	**5**	**5**	**40**	**30**

Note: * Total enrolment in 2020/21 as a proportion of total enrolment at IP Porto. Public polytechnic institutes are presented in descending order of the number of R&D units receiving FCT funding and the rating received in the 2017/18 evaluation exercise. D: institutions in regions experiencing demographic decline. ** The data for the IP Porto include five R&D centres in the Instituto Superior de Engenharia do Porto (ISEP), which is an integral part of the IP Porto.
Source: FCT (2021[18]) *Financiamento Plurianual de Unidades de I&D para o periodo 2020-2023 (Multi-annual funding for R&D units for the period 2020-2023)*, https://www.fct.pt/apoios/unidades/unidadesid.phtml.pt (accessed on 12 July 2022).

Box 4.1 illustrates the diversity of research centres rated as "excellent" or "very good" in the most recent FCT research evaluation exercise that are co-ordinated by public higher education institutions located in Portugal's interior and island regions. These centres of excellence could provide part of the basis for strengthened institutional profiles, with strong links to educational activities.

Nevertheless, polytechnics, in particular, face challenges in defining and realising research strategies. One of the most fundamental is the risk of academic drift in institutions for which the primary missions are to provide professionally oriented education, co-operate with the private and public sectors in developing professional practice and to deliver practice-oriented and applied research to support regional innovation. Research policy in Portugal has tended to favour academically oriented research and researchers are not always equipped to engage in co-operative research and innovation activities with business and the public sector (Nazaré et al., 2020[20]). Moreover, recent analysis of the contribution of the higher education system to regional innovation and "smart specialisation" has highlighted a "disconnect" between higher education institutions and regional economic and innovation systems, despite multiple examples of promising practice (Pinto, Nogueira and Edwards, 2021[11]).

Successful profiling in regional higher education institutions will require efforts to guide research and innovation activity into areas that can support local businesses and public-sector organisations and help develop regional economies, while maintaining and expanding centres of excellence of national significance, which can also help to attract domestic and international students.

Box 4.1. Leading FCT-funding R&D units hosted by HEIs in interior and island regions

Units hosted by public universities rated as "excellent" by FCT panels

- Universidade de Évora: Mediterranean Institute for Agriculture, Environment and Development. (MED) and HERCULES Lab devoted to the study and valorisation of cultural heritage, focusing on the integration of physical and material sciences methodologies and tools in interdisciplinary approaches.
- Universidade dos Açores: Okeanos Marine research group and Institute for Research in Volcanology and Risk Assessment (IVAR).
- Universidade da Madeira: Madeira Chemistry Research Centre (CQM).
- Universidade do Algarve: Interdisciplinary Centre for Archaeology and Evolution of Human Behaviour (IHC).
- Universidade de Trás-os-Montes e Alto Douro (UTAD): Centre for the Research and Technology of Agro-Environmental and Biological Sciences (CITAB) and Veterinary and Animal Research Centre (CECAV).

Units hosted by public polytechnics rated as "very good" or "excellent" by FCT panels

- IP Bragança: Mountain Research Centre (CIMO) and Research Centre in Digitalisation and Intelligent Robotics (CeDRI), both rated as excellent.
- IP Portalegre: the VALORIZA research group, focusing on energy and waste valorisation, sustainable production and maximising the potential of sparsely populated territories, rated as very good.
- IP Tomar: Centre for Technology, Restoration and Art Enhancement (TECH&ART), rated as very good.

Note: Highest ranked research centres classified by the FCT evaluation panels as excellent (for universities) or excellent and very good (polytechnics).
Source: Based on FCT (2021[18]) Financiamento Plurianual de Unidades de I&D para o periodo 2020-2023 (Multi-annual funding for R&D units for the period 2020-2023) https://www.fct.pt/apoios/unidades/unidadesid.phtml.pt (accessed on 12 July 2022).

Policy tools to support institutional profiling, performance and "systemness"

If key priorities for Portugal's public higher education system are the provision of a diverse range of high-quality educational offerings responding to wider range of learning needs and a differentiated institutional network better aligned to future student demand, the question is how government can support achievement of these objectives. The introduction to this chapter highlighted how governments across the OECD seek to steer the development of higher education systems, through a combination of incentives, accountability mechanisms and regulation. This section briefly examines recent attempts to shape the development of the public higher education system in Portugal before discussing in more depth some of the approaches to governance, steering and strategic funding used in other OECD jurisdictions that may be instructive for future policy in Portugal.

In recent years, Portugal has increased the strategic steering of the public higher education system, through sector-level "contracts"

Since the return of democracy in 1974, Portugal has periodically implemented bold reforms in its higher education system. These have included establishing new universities, creating a polytechnic sector largely from scratch, giving institutions greater operational autonomy, reforming the legal regime that governs them, introducing a robust external quality assurance system and promoting the development of a network of publicly supported R&D units across the country. While structural reforms in the last decade have arguably been more limited – notwithstanding the major expansion of short-cycle programmes in polytechnics – recent governments have still sought to influence the direction of the established network of institutions.

As noted earlier in this report, in 2015, Portugal's government started taking steps to restore public investment in higher education following the cuts made in the wake of the post-2008 financial and economic crisis. The government concluded separate "contracts for the legislative term" (*Contratos de Legislatura*) with public universities and public polytechnics for the period 2016-19, providing additional core funding in return for commitments from the respective sectors. This approach was repeated for 2020-23, but with a single agreement between government and the entire public higher education sector (see Box 4.2).

Box 4.2. The Contrato de Legislatura 2020-23 – a system-level "performance agreement"?

In the "Contract for the Legislative Term" for the period 2020-23, Portugal's government committed to:

- Increase the core budget envelope by 5% in 2020 (compared to 2019) and subsequently by at least 2% annually in 2021, 2022 and 2023. Part of the increase was intended to provide full replacement of income lost through a reduction in maximum tuition fees for undergraduate programmes from 2019 onwards (a 35% reduction between 2019/20 and 2021/22).
- Not subject the budgets of public higher education institutions to annual clawbacks (*cativações*) or other reductions from public funding sources.
- Increase appropriations from the State Budget for social support to students and Foundation for Science and Technology (FCT) funding for R&D in support of research targets.
- Make available European Union Structural Funds through competitive calls to support R&D and innovation, infrastructure and Professional Higher Technical Programmes (TeSP).

In return, public higher education institutions committed to:

- Increase revenue from alternative sources, through co-operation with private and public-sector bodies and increased success in obtaining competitive EU research funding.
- Increase participation in post-graduate programmes and adult learning.
- Make the most efficient use of existing human and physical resources, notably though co-operation between institutions.
- Reduce student drop-out by the end of the legislative period and promote and monitor the employability of graduates.

Source: Government of Portugal (2019[21]), Contrato de Legislatura entre o Governo e as Instituições de Ensino Superior Públicas, 2020-2023 (Contract for the Legislative Term between the Government and Public Higher Education Institutions, 2020-2023), https://www.igefe.mec.pt/Files/DownloadDocument/72?csrt=6785169830679341608 (Accessed on 17 May 2022).

Portugal's Court of Auditors criticised the first generation of system-level contracts (for 2016-19) for failing to respect the legally enshrined principle that core operating funding should be allocated to institutions

based on a rational formula and omitting to establish objective performance measures to allow the monitoring of progress and assessment of results (Tribunal de Contas, 2020[22]). While, as discussed in Chapter 3, the subsequent Contract for the Legislative Term, for 2020-23 did not address the question of the allocation formula (allocating pro-rata funding increases to all institutions), it did include more precise targets and related monitoring indicators.

The six goals of the 2020-23 agreement include targets to widen participation in higher education, with 55% of 20-year-olds participating in higher education by 2023 and 60% by 2030, and an attainment rate among 30–34-year-olds of 40% by 2023 (already met in 2021), rising to 50% by 2030. The *Contrato* also seeks to increase the diversity of programmes on offer, with additional non-degree programmes (such as post-graduate diplomas) and encourage institutional specialisation and co-operation between higher education institutions and between HEIs and the productive sector. Goals four and five of the agreement focus on improving academic careers and creating additional researcher posts, while the final main area of focus (goal six) seeks to increase internationalisation in education and research (in the latter case, notably, through greater participation in European Union research programmes). The goals are monitored annually and reiterated in annual State Budget laws (Government of Portugal, 2021[23]).

Another criticism of 2016-19 *contratos*, made by the Court of Auditors in 2020 and not resolved through the subsequent iteration of the agreement for 2020-23, was that they contained a single set of objectives for whole sub-sectors of the public higher education system, without taking into account the differing operating contexts and specific strengths and weakness of individual institutions (Tribunal de Contas, 2020[22]).

Like other OECD jurisdictions, Portugal also uses targeted funding to support national goals

Alongside the core funding provided from the State Budget, Portugal's government also intervenes in the higher education sector by providing targeted, earmarked funding to support specific nationally established priorities. Portugal has been able to draw heavily on European Union Structural and Investment Funds as a source of targeted investment in higher education, including to support the expansion of short-cycle TeSP programmes and, as discussed in Chapter 5, to fund the national student grants programme. More recently, the European Union Recovery and Resilience Facility, launched to support member states to rebuild their economies after the COVID-19 pandemic, has provided another source of European funding for targeted initiatives in higher education. Under the Facility, Portugal has received EUR 16.6 billion of European financial support, with EUR 13.9 billion in grants and EUR 2.7 billion in loans, which must be invested in the period 2021 to 2026.

Portugal's national plan for using Recovery and Resilience funding (the *Plano de Recuperação e Resiliência* – PRR), identifies investments in the areas of "resilience", climate transition and digital transition. Under the "resilience" strand, the national plan identified priorities for strengthening core areas of the economy and public services and identifies improvements to vocational education, adult skills and higher education as investment priorities in the area of qualifications and skills (Government of Portugal, 2022[24]). As summarised in Box 4.3, the plan provides EUR 252 million to support consortia of higher education institutions to develop short courses for adults and improve undergraduate education in science, technology, engineering, arts and maths (STEAM), working in co-operation with employers.

Box 4.3. Higher education in Portugal's Recovery and Resilience Plan

Portugal's Recovery and Resilience Plan (PRR) for 2021-26 includes an initiative to support the development of the educational programmes higher education sector with two strands, one focused on adults, the other on younger students. A total of 33 projects, most co-ordinated by public HEIs, were selected through a call for proposals, completed in January 2022:

- The *Impulso Adultos* ("Impetus [for] adults") strand has provided EUR 130 million in competitive grant funding for networks of institutions working in co-operation with employers to develop short higher education programmes (for entry to post-graduate level) aimed at adults wishing to update and enhance existing skills (upskill) or acquire skills in a new area (reskill).
- The *Impulso Jovens STEAM* ("Impetus [for] young people in STEAM") strand follows the same co-operative approach, but focuses on developing new, inter-disciplinary and innovative programmes at TeSP and bachelor's levels to increase the number of graduates in the areas of science, technology, engineering, arts and maths (STEAM). The budget awarded was EUR 122 million.

In addition, Portugal's PRR will contribute and initial sum of EUR 375 million for the construction and renovation of student accommodation in the period up to 2026, as part of the National Plan for Housing in Higher Education (PNAES) – see Chapter 5.

Source: DGES (2021[25]) Programas "Impulso Jovens STEAM" e "Impulso Adultos" (Impetus programme for young people in STEAM and Impetus programme for adults), https://www.dges.gov.pt/pt/pagina/candidatura_IMPULSO (accessed on 18 July 2022).

System-level contracts and targeted funding have promoted co-operation between HEIs, but created weak incentives for institutional profiling and restructuring

The Contract for the Legislative Term of 2020-23 and targeted funding to higher education institutions have been strongly focused on increasing, enhancing and diversifying the educational offering in the higher education system to serve new student populations. The focus on widening access and provision for adults is clearly aligned with the first priority identified earlier in this chapter, related to meeting future skills needs. Moreover, accompanying investments in doctoral training and R&D will undoubtedly strengthen aspects of Portugal's research base and innovation capacity. The system-level contract and targeted funding have also encouraged co-operation between higher education institutions, as in the case of the consortia supported by the Impulso Adultos and Impulso Jovens STEAM initiatives.

However, although the third goal of the Contract for the Legislative Term explicitly aims to "guarantee institutional specialisation and diversification" (Government of Portugal, 2019[21]), it is not clear how the related objectives and activities – or indeed other system-level policies – will lead to this. Objectives and actions support increased diversity of activities in the system as a whole (e.g. more non-degree post-graduate diplomas), but do not provide strong incentives for individual institutions to develop clear profiles, make strategic choices and prioritise certain areas of activity over others. The lack of institutional profiling was already highlighted in the 2019 OECD review of higher education, research and innovation as a weakness of Portugal's higher education system. That review noted a tendency for institutions to seek to cover as wide a range of disciplines as possible and expand into new areas – through the creation of new doctoral programmes in universities, for example – without necessarily having the underlying critical mass and institutional strengths to deliver these activities at high quality. In line with the points made earlier in this chapter, the 2019 review argued that a clearer division of labour across the higher education network would improve efficiency and effectiveness (OECD, 2019[10]).

The requirement for academic staff in polytechnics to hold PhDs, introduced as part of earlier efforts in Portugal to strengthen the polytechnic sector, has increased the capacity of these professionally oriented institutions to deliver high-quality education and innovation-related activities. However, as doctoral training and the bulk of academic research in Portugal occur in universities, there is a risk that this requirement – which is not replicated in policy governing non-university institutions in other European binary systems – has driven polytechnics, and a proportion of their academic staff, to emulate, and converge towards, universities, rather than systematically focusing on the specific strengths and missions of polytechnic institutions. As discussed above, polytechnics have an important role to play in practice-oriented and applied research in close co-operation with professions and sectors, and centres of applied research excellence already exist in Portugal's public polytechnics. However, the results of FCT research evaluations (see above) clearly illustrate the limits of academic research capacity in the polytechnic sector in comparison to universities.

Portugal's system of peer-review in research evaluation creates greater freedom to acknowledge and reward the kinds of practice-oriented research that are at the heart of polytechnics' mission than systems where funding is driven primarily by bibliometric measures of published research output and citations. Given the objective of institutional diversification, it is important that public research evaluation funding instruments adequately differentiate between different types of research activity and value a variety of types of research output and impact. This is a challenge faced in public research funding systems in other OECD jurisdictions. In the Netherlands, for example, a recent report noted the structural underfunding of practice-oriented research for Dutch universities of applied science (PwC Strategy&, 2021[26]), while a recent OECD review of resourcing higher education in the Flemish Community of Belgium reached a similar conclusion for university colleges in that system (OECD, 2021[27]).

While research policies may have created pressures for polytechnics to emulate universities, the expansion – and apparent success – of short-cycle TeSP programmes, offering forms of education highly adapted to the needs of currently under-served populations, has allowed polytechnics to develop a distinctive value proposition in an area with growing demand. As discussed above, in a context where overall demand for higher education among traditional student populations is declining, TeSP programmes, along with short courses packaged as micro-credentials, have the potential to attract increasing numbers of students from vocational pathways and the working-age population.

Beyond the binary distinction, greater institutional specialisation and diversification in higher education implies that institutions within each sector make clearer and distinctive choices about where to focus their efforts. While, as noted, multiple (or all) institutions in a given sub-sector will need to provide certain entry-level programmes to ensure accessibility of these programmes across the national territory, in other fields and at more advanced levels of education, there is a clear rational for a division of labour between institutions, particularly in a small and consolidating higher education system such as Portugal's. Focusing efforts to create real centres of excellence linked to regional contexts or established research capacity (or both, as in IP Bragança's Mountain Research Centre) is particularly important for HEIs located in interior and island regions, where mainstream student demand is declining. Only through creating such distinctive centres of excellence in education, regional engagement and specialised research and exploit their locations can institutions hope to attract students from other regions and internationally.

OECD jurisdictions are increasingly using institutional agreements to promote institutional profiling and increase accountability

In a growing number of OECD jurisdictions, efforts to promote institutional profiling and differentiated approaches to the definition and assessment of institutional performance have led to the introduction of institution-specific agreements between government and individual HEIs. These agreements typically set institutions' specific profile and missions and establish objectives and targets. In many cases, public funding is provided to support delivery of the objectives set out in the agreements, which may or may not

be partially conditional on achievement of the objectives in question. Despite the links to funding in many cases, the level of funding directly linked to institutional agreements is nearly always modest in comparison to total core funding for HEIs. Institutional performance agreements, performance compacts or quality agreements are thus better viewed as steering, governance and accountability mechanisms, rather than funding instruments as such.

In Europe, Denmark was one of the first higher education institutions to introduce performance agreements as a profiling and steering tool and retains "strategic framework contracts", with achievement of goals linked to a small proportion of total funding, in its current governance and funding model (OECD, 2021[6]). Its Nordic neighbour, Norway, has experimented with institutional agreements, but now looks likely to make "development agreements" (*utviklingsavtalene*) the primary steering and performance-related component in its future funding model for the period after 2023 (Norwegian Ministry of Education and Research, 2022[28]). As discussed in Chapter 3, a Norwegian expert commission concluded that development agreements would allow a more differentiated approach to goal-setting and performance measures than including performance indicators in the core-funding formula, while emphasising the role of the motivation and responsibility of individual institutions and staff in delivering system objectives.

The institutional-agreement systems in Finland, Ireland and the Netherlands are particularly noteworthy as they are among the longest-established in Europe and have undergone multiple iterations, with revisions over time. As illustrated in Table 4.4, the institutional agreements in place in 2022 in all three of these systems require a self-assessment of institutional strengths and the formulation of a clear profile, goals and measurable targets. The Dutch "quality agreements" in place until 2024, in contrast to the country's previous system of "performance agreements", focus exclusively on actions to improve the quality of education and thus have a more targeted scope than agreements in Finland and Ireland.

Table 4.4. Key design features of institutional-agreement systems

	Finland	Ireland	The Netherlands
Name	"Performance Agreements"	Mission-based performance compacts	"Quality agreements"
Duration of agreements	4 years 2021-24	3 years September 2018 to September 2021*	6 years 2019-24
Coverage of institutional activities	All missions	All missions	Specific to the education mission (6 education quality themes)
Self-assessment, profile and specialisation	Yes	Yes	Yes
Targets and indicators	Institution-specific - Agreed in negotiation with government	Institution-specific – Validated when compact initially approved	Institution-specific – Validated when agreement initially approved
Initial evaluation and approval of agreements	By Ministry of Education and Culture	By Higher Education Authority with input from international experts	By the Accreditation Organisation of the Netherlands and Flanders (NVAO)
Annual monitoring?	Yes – report and dialogue with Ministry of Education and Culture	Yes – report and dialogue with Higher Education Authority	Annual reports submitted by institutions to Ministry
Evaluation of final results	Through institutional reports and dialogue with Ministry of Education and Culture	Through institutional reports, performance case studies and evaluation by Higher Education Authority and international experts	By the Accreditation Organisation of the Netherlands and Flanders (NVAO)
Link to funding	Funding allocations from formula and specific allocations are included in the agreement, but there are no direct financial consequences of non-achievement of goals in the agreements	Between 3% and 5% of institutional core funding can theoretically be withheld in cases of (very) poor performance Modest additional payments for good performance case studies	An additional EUR 2.37 billion for the six financial years 2019-24 for the university and university of applied science sectors (= around 3% of HE education budget). Possibility for Minister to withhold payment if progress considered (very) unsatisfactory

Note: * The implementation period has been extended owing to the COVID-19 pandemic.

The relationship between the institutional agreements and funding also varies between Finland, Ireland and the Netherlands. In Finland, performance agreements accompany the allocation of core funding to higher education institutions using a formula model, with distinct components for education and research and slightly different formula parameters for universities and universities of applied science. In addition, the Finnish government allocates strategic funding to institutions, part of which is awarded directly to institutions as part of their core grant. Projected funding allocations are recorded in performance agreements, but this funding is not conditional on achieving goals in the agreements, which serve primarily to increase transparency and accountability.

In both Ireland and the Netherlands, a proportion of public funding allocated to institutions is theoretically at risk if institutions do not meet goals in their institutional agreements. In Ireland this is up to 5% of core funding (allocated through a voucher-like fee subsidy and a formula), while in the Netherlands the minister may withhold a proportion of the additional quality funding linked to the quality agreements at the end of the six-year implementation period, if the national accreditation body considers progress towards goals has been insufficient. In Ireland, funding has never been withheld under the agreement system, although remediation plans have been agreed in a limited number of cases. Moreover, the Irish Higher Education Authority has more recently introduced additional "bonus" payments (i.e. additional funds, rather than core funding) which are awarded on a competitive basis to institutions that demonstrate, through case studies, that they have made particularly good progress in an area covered by their mission-based performance compact (HEA, 2019[29]).

Evidence from different higher education systems suggests that institutional agreements are an effective policy tool

In contrast to research into the effects of output-based formula funding systems, which has tended to find only limited positive impact on outputs and risks of intended consequences, studies of institutional performance agreements are generally positive in their assessment of these instruments. Dohmen (2016[30]) found that "target agreements" (*Zielvereinbarungen*) implemented in certain German federal states were associated with more positive effects. Although it was not possible to establish causality, the study found anecdotal evidence of positive impacts on graduation rates and research funding, while, perhaps more significantly, also noted the development of more strategic, evidence-based decision-making in higher education institutions. This is consistent with analysis of the introduction of performance agreements in Finland, which is reported to have increased understanding and management of costs and the focus on performance within universities. A similar pattern was found in Ireland, in relation to the institutional compacts, which appear to have improved institutional strategy and dialogue between the institutions and public authorities (O Shea and O Hara, 2020[31]).

A systematic evaluation of the first generation of Dutch performance agreements concluded that the process of developing, negotiating and monitoring the agreements had helped higher education institutions to refine their institutional strategies, tailor their educational offerings and, in universities, sharpen their research profiles. The evaluation also noted that pass rates and on-time completion rates in universities increased during the implementation period for the performance agreements, but that on-time completion rates in bachelor's programmes in universities of applied science actually decreased (from 70% to 67% overall), particularly in the large institutions in the Randstad. The review team acknowledged that the inherently challenging (or impossible) task of establishing causal relationships (either positive or negative) between the performance agreement system and outputs (such as pass rates) was made even harder by an accumulation of other policy changes that were implemented in parallel. The Dutch review – much like the more recent expert panel in Norway – concluded that the use of a single set of education-related output and performance indicators for all institutions was inappropriate, as the indicators did not capture all elements of performance and failed to account sufficiently for contextual factors, such as the socio-economic profile of the student population served (Reviewcommissie Hoger Onderwijs en Onderzoek, 2017[32]).

The balance of evidence internationally suggests that specifying a single set of indicators for all HEIs to use in their institutional agreements is ineffective. Rather, more recent experience suggests it is more appropriate to allow institutions to propose a limited number of verifiable objectives, aligned with national strategy and which can be assessed through a combination of quantitative and quality methods on a periodic basis by an external review panel. Experience from other OECD jurisdictions also suggests that attaching a compatively modest amount of money to institutional agreements – or using agreements primarily as a accountability tool – can be sufficient to incentivise institutions to take the agreements and the process seriously, while avoiding perverse effects that might arise from a process with higher stakes in financial terms (de Boer et al., 2015[33]; Reviewcommissie Hoger Onderwijs en Onderzoek, 2017[32]). As with most public policies, introducing systems of performance agreements is best implemented with the addition of at least some new funds to the overall funding envelope for higher education institutions, rather than purely through the reallocation of existing funds.

System-level approaches, such as sector plans, can also facilitate co-operation and division of labour in higher education systems

As noted earlier, the Netherlands is one of the OECD jurisdictions that has placed greatest emphasis on institutional profiling and specialisation in its higher education system. A perceived need to increase the degree of institutional specialisation has been a strong theme in policy since at least 2010. In 2019, the country's advisory council for science, technology and innovation (AWTI) argued that higher education

institutions had, in reality, tended to become more similar over time and there was a need to focus more systematically on creating distinctive profiles with greater co-ordination at system level (AWTI, 2019[34]).

In 2018, the institution-specific performance discussed above were complemented by "sector plans" in the field of research. Sector plans seek to increase co-ordination within the Dutch university research system, encourage institutions to define clear and complementary profiles in research at disciplinary level and to promote the emergence of strong centres of excellence with the critical mass to compete internationally (UNL, 2018[35]). The Dutch Ministry of Education, Culture and Science initially budgeted EUR 60 million for the period 2018-2025 for the development and implementation of sector plans in the fields of science ("bèta") and technology and a further EUR 10 million for the social sciences and humanities plan.

The ministry required the universities – through their sector association – to designate co-ordinators for the three broad fields and to review the existing strengths and weakness of the research landscape in the country's universities, as a basis for future profiling activities. The sector overviews (*sectorbeelden*) produced were reviewed by sector committees and approved by the minister. After this, the 11 participating universities developed profiling plans, with priorities for their institutions, linked to the national picture and with a clear indication of how their profiles were complementary to those of other universities. The objective of the profiling plans is to make clear choices about the division of labour between different universities and identify specific investment needs (notably in terms of additional research posts) that were needed to strengthen research in their chosen areas of focus. On the basis of the profiling plans, the sector committees advised the minister on an appropriation allocation of the funds available in each field (Commission for Science and Technology Sector Plan, 2022[36]). In all, 80% of available funds were allocated directly to universities to fund new posts or relevant investments, while the remaining 20% will be awarded through calls by the Dutch Research Council (NWO).

This combination of top-down and bottom-up profiling in a national university research system appears to be specific to the Dutch higher education system. However, irrespective of differences in context, the experience gained will almost certainly hold lessons for other OECD higher education systems seeking to boost research performance and promote a rational division of efforts in the national research system.

Programme and study-place regulation can also play a role in strategic steering of the system

Many OECD jurisdictions – notably in Europe and the United States – require public higher education institutions to gain approval for the establishment of new study programmes, often taking into account the potential demand for graduates in the disciplinary field concerned (OECD, 2020[4]). Such programme approval is typically in addition to external accreditation and quality assurance requirements, which may also involve programme-level review, as in the case of the Agency for Evaluation and Accreditation of Higher Education (A3ES) in Portugal.

A similarly large number of OECD governments impose caps (*numerus clausus*) on the number of students that may be enrolled in certain costly study fields in regulated professions, such as medicine and dentistry, either to control costs in higher education or to avoid an over-supply of professionals in the fields in question. In systems such as Australia, Finland or Scotland (United Kingdom), governments effectively impose limits on the number of domestic students in all fields of study by establishing enrolment caps or targets related to the overall pot of public money available to fund study places. Other systems, such as those in Belgium or the Netherlands, impose no limits, while central and eastern European systems often allow public institutions to enrol additional students – beyond the number of state-funded places – if these students cover their own costs through fees.

Portugal is one of relatively few OECD systems to implement a national system of *numerus clausus* covering all fields of study at bachelor's level. The number of study places available in each programme at bachelor's level in public HEIs is determined initially by the limits set when the programme is accredited

by A3ES, with these limits taking into account factors such as available teaching staff and physical infrastructure. HEIs then propose the number of study places (*vagas*) available each year for new students entering higher education, with the final numbers agreed by the Directorate-General for Higher Education (DGES) and published annually in an official circular (*despacho orientador de fixação de vagas*), by which public HEIs must abide. Through establishing criteria for the final allocation of study places, the government can use the allocation of study places to steer the development of the system.

In the official circular for 2022, the government maintain its general policy of restricting increases in study places in Lisbon and Porto, but allowed expansion in areas of national strategic importance, including digital skills, data science and advanced information systems, space technologies and aerospace engineering. Equally, the 2022 circular permitted increased provision for teacher education and allowed increases in study places for programmes linked to the *Impulso Joven STEAM* programme highlighted above and for "excellence programmes", where the number of candidates applying through the first phase of the National Access Competition with an entry examination (high-school leaving) grade of 17/20 or more has historically exceeded the number of places available (Government of Portugal, 2022[37]).

While the policy of permitting expansion of study places in strategically important and excellence programmes promotes alignment of the higher education system to skills needs to some extent, it is notable that Portugal's government uses the *numerus clausus* to restrict the autonomy of institutions in Porto and Lisbon to increase study places, but not to encourage – or impose – restructuring or reorientation on HEIs in interior and island regions.

Although interventionist study-place regulation outside regulated professions such as medicine is uncommon in OECD higher education systems, a noteworthy exception is Denmark. Like authorities in other OECD jurisdictions, Denmark's government imposes limits on study places in programmes that train students for the professions of doctor, dentist, veterinarian and chiropractor. More recently, restrictions have been introduced for architecture programmes. Since 2014, however, the government has imposed national limits on student recruitment in study fields where graduates experience significant and systematic unemployment – see Box 4.4.

Box 4.4. Adjusting study places in light of employment outcomes in Denmark

Denmark's policy of "unemployment-based dimensioning" (*Ledighedsbaseret dimensionering*) involves imposing recruitment ceilings for study programmes in higher education with "significant and systematic" graduate unemployment. The first recruitment ceilings were introduced in 2015/16. The unemployment rate of graduates is calculated every year for study fields or groups of programmes - not at level of individual programmes. "Significant" unemployment means that a graduate cohort has an average unemployment rate at least two percentage points higher than the average for higher education graduates as a whole. "Systematic" unemployment means that at least 70% of the last (up to) 10 graduate cohorts have significant unemployment.

For study fields with significant and systematic unemployment, a ceiling on admission is calculated based on the historical admission levels. The ceiling is calculated based on the average admissions over the past five years, with average intake reduced by 10%, 20% or 30% depending on how high the unemployment rate has been in the last five years. Institutions can, in dialogue with the Ministry of Higher Education and Research, decide how the reduction of enrolment is distributed between affected programmes. With approval from the ministry, institutions can also move up to 15% of the total reduction in study place to programmes that have not been selected for "dimensioning", if this can be justified on the basis of the labour market needs.

Source: UFM (2022[38]) *Dimensionering af de videregående uddannelser (Sizing of higher education)*, https://ufm.dk/uddannelse/videregaende-uddannelse/dimensionering (accessed on 21 July 2022).

Frameworks governing human resources in higher education need to facilitate differentiation in institutional missions and profiles

A final, and more indirect, policy area with an impact on higher education institutions' ability to define their own strategies and profiles is the regulation of employment of academic staff. In many OECD jurisdictions, higher education legislation establishes only very general – if any – rules regarding employment of academic staff. In many jurisdictions, while fundamental employment law (covering aspects ranging from maximum working hours and minimum wages and paid leave allowances to health and safety and anti-discrimination rules) applies to academic staff, like other workers, specific conditions affecting the terms and conditions of their employment are set either in sector agreements or at the level of individual institutions. This is the case in English-speaking higher education systems, the Nordic countries and the Netherlands, for example. In some systems, like the higher education systems of French and Dutch-speaking Belgium, academic staff are employed on broadly the same rules as other public-service employees, with tenure linked to the public-servant status of academics as opposed to sector-specific rules.

The situation in Portugal is different in that the employment of academic staff in public higher education institutions without foundation is subject to public-service employment rules (as in Belgium), but additionally to a set of sector-specific rules enshrined in separate legal regimes for academic staff in universities and polytechnics (see Box 3.2 in Chapter 3). While many of the aspects of these legal statutes are unremarkable by international standards – except, perhaps, that they are enshrined in law – they do include minimum weekly teaching requirements for academic staff. Although the principle of combining teaching and research is fundamental in higher education, the imposition of standard minimum teaching loads restricts institutions in their ability to offer academic staff differentiated careers (e.g. with greater research or regional engagement or with greater teaching orientations). Ireland is currently seeking to reform the workload model for staff in its former Institute of Technology sector to allow greater flexibility as

staff contribute to new “universities of technology”. Finland, as shown in Box 4.5, has already adopted a comparatively flexible sector-wide model for academic employment in universities (established in the national collective agreement for universities), which allows differentiated workload models for staff and differentiated criteria for performance evaluation.

Box 4.5. Job profiles and performance evaluation in Finnish universities

Salaries for academic staff in Finnish universities comprise a job-related element that reflects the level of the tasks and responsibilities involved and a personal salary element based on personal performance. The requirement level for each post is assessed by an internal assessment group composed of human resources staff and staff representatives, based on a taxonomy of job responsibilities and skills requirements for 11 levels that is established in the General Collective Agreement. Separate job requirement taxonomies exist for academic staff in artistic fields and for non-academic university staff (i.e. those in support and professional roles). Salary scales fixed in the General Collective Agreement for Universities specify (in 2021) a base salary for each of the 11 levels (currently from EUR 1 869.13 to EUR 7 108.72 a month).

The personal salary element is determined based on performance as a percentage of the basic salary (between 6% and 50%). The minimum and maximum percentages for each of four performance categories (where staff in category I require improvement and those in IV exceed expectations) are established in the General Collective Agreement. The personal salary on appointment to a given academic post is initially fixed by the employer (typically in the category corresponding to successful performance). Staff performance is assessed through a personal staff appraisal, which, since 2019, must occur at least every five years. Employees have the right to request an appraisal every two years or after six months in a new post. Academic staff are appraised in relation to their job requirements and specific objectives, under three main criteria specified in the General Collective Agreement: “pedagogical merit”; “research merit” and “university community and social merit”. Teaching-only or research only staff are evaluated according to the relevant criteria.

If the appraisal identifies a decline in personal performance that would lead to a reduction in an academic’s performance category and related personal salary element, measures for improvement in work performance must be mutually agreed and a new appraisal must be undertaken with 12 months. If the new appraisal indicates that the previous performance level has not been restored, then the personal salary element is revised to correspond to the new performance category.

Source: Sivista (2021[39]) *Yliopistojen yleinen työehtosopimus (General Collective Agreement for Universities)* https://www.sivista.fi/tyosuhdeasiat/tyoehtosopimukset-ja-palkkataulukot/yliopistot-ja-harjoittelukoulut/yliopistojen-yleinen-tyoehtosopimus/ (accessed on 21 July 2021); Tieteentekijät (2021[40]) *Salaries*, https://tieteentekijat.fi/en/support-of-working-life/salaries/ (accessed on 21 July 2021).

Policy issues and recommendations to Portugal

Taking into account the analysis above and the findings from the interviews conducted with representatives of higher education institutions and public authorities, this section identifies the main policy issues for reforming the way Portugal steers and funds the strategic development of its public higher education system. Drawing on the international experience discussed above, the analysis also proposes recommendations for the future configuration of strategic steering and funding policies.

Update the country's vision for the higher education system, recognising more explicitly the need for restructuring

With the *Contrato de Legislatura* for 2020-23, Portugal established a series of clear targets for the future development of the public higher education system. The strategy seeks to widen access to higher education, diversify and enhance the educational offering, including through provision of more flexible programmes for adults, and strengthen the country's research base through the creation of additional researcher posts. This strategy has been helpful in informing institutional strategies and in guiding the direction of the system and targeted funding that has been allocated to initiatives such as Impulso Adultos and Impulso Joven STEAM. However, the strategy embodied in the *Contrato de Legislatura* and the approach taken to accompanying policies, such as the regulation of study places, fail to address in an effective and sustainable manner the fundamental challenges brought by demographic change.

Attempts to "protect" public higher education institutions in interior and island regions by allocating them additional study places and not adjusting core funding to real student numbers are doomed to fail in the medium term. There is no reason to believe the demographic decline of interior regions can be fully stopped – let alone reversed – even with successful economic policies. The number of local students in traditional cohorts will inevitably decrease further. Students from other parts of Portugal or abroad can be attracted to institutions if these institutions are able to offer programmes and a learning experience that is sufficiently distinct and of sufficiently high quality. It is unlikely such student flows can fully compensate for a decline in local students in a country where such a large proportion of students go to nearby institutions to attend higher education.

Equally, new student populations, from vocational secondary tracks and the adult population, can be attracted to well-designed, high-quality programmes, such as TeSPs or other types of short course. But developing new offerings and building quality in specialised areas linked to strong institutional profiles requires significant changes to institutional structures and staffing profiles. In the area of innovation, the only chance HEIs have of supporting the development of their regional economies – and this potential must not be over-stated – is by ensuring high-quality staff and applied and practice-oriented research linked to regional needs. The need for adaptation and restructuring must be acknowledged explicitly in national higher education strategy and supported appropriately with targeted resources.

Not only are past and current policies to protect interior and island institutions likely to be ineffective, but, as noted earlier, they harm institutions and students elsewhere in Portugal, which receive fewer resources than they should. There is an urgent need to create additional, relevant capacity in higher education to cater to currently under-served populations in vocational-secondary tracks and the workforce in the metropolitan areas of Lisbon and Porto.

More generally, there is a need to build on existing efforts to encourage and support institutions to make clear strategic choices about the areas in which they wish to focus and those that are best left to other institutions. In a small country such as Portugal, it is particularly important for institutions to situate their own strategies in relation to those of other institutions, so that they contribute to building a coherent and efficient higher education system. This requires a guiding framework at national level, in the form of a national strategy, which identifies priorities and provides mechanisms for institutions to profile and co-ordinate themselves.

Recommendations

1. In preparation for the period after 2023, when the current *Contrato de Legislatura* ends, prepare and adopt a new national strategy for the sustainable development of the public higher education system, which identifies clear priorities for the future development of the system.
2. Alongside existing targets for widening access, diversifying provision and priority fields in education and research, include a greater focus on the need for individual HEIs to develop distinct profiles and centres of excellence. There might be scope for the higher education sector to map potential centres of excellence and specialist areas in different HEIs as a complement to the strategy itself and thus provide another reference point for the institutional profiling plans suggested below. The Dutch experience with sector plans (see Chapter 4) might be instructive in this regard.
3. Ensure that the strategy adopts an explicit and realistic approach to adapting the public higher education system to demographic change and acknowledges the need for consolidation in parts of the system and expansion in others, in the best interests of students. As part of this, ensure that the distinct and specific missions of universities and polytechnics are maintained and sharpened, as the binary structure will support institutional profiling.

Require HEIs to develop clear profiles and realistic development strategies in institutional agreements

The diversity of local and regional contexts in which public higher education institutions operate, as well as their specific subject mixes and strengths and weaknesses, are already reason enough to favour a differentiated, institution-by-institution approach to allocating strategic funding and assessing institutional performance. Increasing institutional specialisation and profiling will further strengthen the case for such an approach.

The experience of other OECD jurisdictions suggests that a system of institutional strategic development agreements would be an appropriate policy tool to adopt in Portugal, to support increased profiling, help target strategic investment and monitor institutional performance. Institutional agreements should link to the national strategy and policy framework described in the previous recommendation and include a self-assessment of the challenges and opportunities faced by the institution, definition of a profile based on strategic choices and priorities, definition of specific goals and specification of measures needed to reach these goals. To ensure institutional profiles and strategies contribute to a coherent system, careful co-ordination at sector level and between institutions will be required. As part of their profile development, institutions should identify their contribution to skills development and innovation at national and regional level and, as appropriate, their contribution to the economic development and attractiveness of their home regions or of Portugal as a player in European and global networks.

The principle of institutional agreements is that institutions commit to efforts to sharpen and develop their profiles, strategies and activities in pursuit of clear objectives and that, in return, public authorities – in this case the Government of Portugal – commit to providing strategic funding to support change, in addition to the core operating funding discussed in Chapter 3. The scale of this funding, discussed in the next recommendation, will naturally influence the ambition of institutional development plans, although it is likely to represent a relatively modest proportion of total public funding to each institution.

It is crucial that higher education institutions undertake a realistic assessment of future student demand. Assessments should identify existing programmes – or new programmes – that will be able to attract new student groups in currently under-served local populations and high-quality specialist programmes linked

to institutional profiles that will be capable of attracting students from elsewhere in Portugal and abroad. In light of Portugal's low numbers of graduates in ICT fields (see above), there is certainly scope for institutions to explore how the offer of ICT-related programmes can be increased. Equally, the assessments must identify programmes that will see student numbers decline and identify options for consolidating these within the institution, through co-operation with other institutions or simply through programme closure. As part of this, a clear staffing policy will be required, identifying where new staff posts are required and identifying options for staff displaced by programme restructuring. Although such restructuring is likely to be challenging, options might include transfer to other programmes, sharing of posts in co-operative programmes between institutions or, for suitably qualified staff, specialisation in research, innovation or service activities, rather than teaching.

For public authorities – in this case the Directorate-General for Higher Education (DGES) – institutional-agreement systems require sufficient internal capacity to prepare the process and organise the evaluation, approval and monitoring of the institutional agreements themselves. At least one additional full-time-equivalent post is likely to be required to form the core of a secretariat for the institutional agreements system in the DGES. The process for approval, monitoring and final evaluation of the institutional agreements will require careful specification. Experience from other OECD systems, notably Ireland, suggests the involvement of international experts as peers in the review and evaluation of institutional plans can be very productive and greatly increase the credibility of the process.

Recommendations

4. Introduce a system of institutional agreements for public higher education institutions, with an agreement concluded between government and each public HEI, indicatively for a four-year period. The agreements should contain: a) a self-assessment of challenges and opportunities for the institution, including a realistic assessment of future student demand; b) an institutional profile based on strategic choices; c) a set of clearly formulated development objectives, including the future programmatic offer; d) planned activities to achieve the objectives, using available strategic funds and own resources; and e) well-defined (quantitative or qualitative) indicators of success. Institutions will require an indication of the level of available additional funding to inform the formulation of planned activities.
5. Take necessary steps to strengthen human resources in the public administration to allow a small secretariat to be formed to organise the institutional-agreement system and monitor progress on an annual basis.
6. Involve international experts as peer reviewers in the initial assessment of institutional plans, prior to government approval, and in the final assessment of implementation after the four-year period. Ireland's experience in this regard may be particularly instructive for Portugal.
7. Conduct light-touch monitoring on an annual basis, using existing data collection processes, wherever possible – and recognising some goals can only be monitored through qualitative assessment and will not be assessed on an annual basis. The Directorate-General for Education and Science Statistics (DGEEC) has particularly strong expertise in the development, collection and processing of higher education indicators and will be a significant asset to Portugal in implementing an agreement system.
8. At the end of the (indicatively) four-year implementation period, conduct a thorough review of process, involving the same international peers, if possible. Consider asking institutions to provide case studies of particularly successful initiatives as the basis for awarding modest competitive bonus payments to institutions. In cases of significant under-performance by institutions, require institutions to prepare remediation plans, but avoid budget reductions, which risk being counterproductive.

Allocate strategic funding to all public HEIs and provide adjustment funds to institutions with the greatest need to adapt

The achievement of the objectives in institutional strategic development agreements will require investments, which, in turn, will require some additional public funding. Given that the reform of the system of core funding discussed above will also require some additional public funding throughout the transition phase, the level of funds available for the strategic development agreements is likely to be limited. Nevertheless, particularly in light of the role of skills in shaping Portugal's future development trajectory, investing in activities that improve the effectiveness and efficiency of the public higher education system represents a sound policy choice.

Experience from other OECD jurisdictions suggests that investments of 3% to 5% of core institutional funding can be effective in supporting change in higher education institutions. However, as investment needs for upgrading and restructuring higher education in Portugal are considerable, a budget envelope equivalent to at least 5% of total core funding would be appropriate. In addition, institutions in interior and island locations, which have greater adaptation needs and stand to lose out from a more rational core-funding allocation system will ultimately require a greater level of assistance, at least during the

restructuring phases. These institutions could be allocated additional "adjustment funding", potentially from European Union Structural and Investment Funds.

The scope to use EU funds for adjustment funding for HEIs in eligible regions will need to be explored further. Of the three regions in continental Portugal that are classified as less developed under EU cohesion policy, the North Region has the highest number of HEIs, meaning there is generally competition for Structural Funds, while Alentejo has only one university and two polytechnics, leading to reported difficulties in absorbing funds (Pinto, Nogueira and Edwards, 2021[11]). The Central Region, like the North Region, has large and attractive HEIs, but also a range of institutions in interior locations that face greater challenges. Even if EU funds can be mobilised to support adjustment funding, these disparities between the number of HEIs to support and regional funds available mean that additional national funding is likely to be required to ensure equitable treatment of institutions with greater adjustment needs.

Once funding allocations are calculated in a transparent way – indicatively a percentage of core funding for all institutions and with an additional percentage allocation for HEIs requiring adjustment – funds can be allocated to institutions as a lump sum payment, over which they have discretion for internal allocation. This would allow flexibility and avoid additional administrative burden. Accountability for the funds would be ensured by the strategic development agreements and accompanying monitoring processes. It may be appropriate to hold back a proportion of the budget envelope available for strategic development funds and allocate it to institutions on a competitive basis through targeted calls for proposals. Allocation of contributions for large infrastructure projects could be a candidate for such an approach. In all cases, the benefits, in terms of targeting, of a call for proposals should be weighed against the administrative burden for institutions and the central administration.

Recommendations

9. Provide multi-annual allocations of strategic development funding to all public higher education institutions to support achievement of the goals in their strategic development agreements. As funds permit, the level of funding could initially be around 5% of the total state-budget funding envelope for public higher education institutions.
10. Allocate the majority of strategic development funding to institutions as a lump sum payment on a pro-rata basis, as a proportion of their core funding allocation (in the first year of allocation, with subsequent years in the indicatively four-year period maintained at this level, even if core funding falls as a result of declining enrolment). Accountability can be ensured through the strategic development agreement. Where appropriate, a minority of the available budget envelope could be awarded through competitive calls for proposals.
11. In addition to the strategic development funds, provide adjustment funding to institutions with greatest restructuring needs. These are the institutions that face the greatest level of enrolment decline and which will lose out most from a formula-based core-funding allocation model. Explore the feasibility of using European Structural and Investment Funds for this purpose, but ensure additional national funding is available to permit equitable allocations to all institutions in similar circumstances, irrespective of their region.

Ensure other policy tools support institutional profiling and system coherence

Many institutions in interior and island regions already have difficulty filling their allocation of study places (*vagas*) through the National Access Competition (and certainly through the first phase of the competition, when students select their first choice of study location). This problem will only become worse, as the youth cohort declines further. Attempts to persuade students to relocate to interior regions through restricting

study places in Lisbon and Porto have failed because many students simply do not wish to move to these regions, including because of the additional costs they would incur. Limiting study-place in certain fields in the country's two largest cities also restricts access to higher education for the large populations of under-served young people in these metropolitan areas.

There is thus a clear rationale for revisiting current criteria used in the *numerus clausus* system to ensure they allow greater expansion of study places designed to serve currently under-served student populations in metropolitan areas, while encouraging reduction of study places in locations where student numbers are declining and there is little hope of attracting students from elsewhere in Portugal based on the uniqueness and quality of the educational offering. The *numerus clausus* system can also be used as a tool to incentivise expansion of the educational offering in ICT-related fields, where Portugal is likely to face growing skills shortages. Consideration should also be given to introducing caps on study places for programmes that have significant and persistently poor graduate employment outcomes.

In contrast, where institutions in interior and island regions do offer programmes with strong potential to become excellence programmes – those linked to strong research centres or local industries, for example – there is a case to support the development of these programmes by restricting expansion of study places (or even cutting existing study places) in other locations that offer the programmes in question at equivalent or lower quality. Ideally, such intervention should be avoided by encouraging HEIs to co-ordinate their profiles and avoid direct competition in strategic fields for institutions in interior and island regions.

Another complementary measure, already recommended in the 2019 OECD review of higher education, research and innovation in Portugal is to remove the minimum teaching-load requirements from the legislation governing academic careers, to allow staff and institutions greater flexibility to define variable workload models. Two further policy areas, not directly covered by this review, could support the profiling and strategic development of the public higher education network discussed above. First, institutional evaluations by the Agency for Assessment and Accreditation of Higher Education (A3ES) could explicitly consider the institutional profile as part of their quality assessment. Second, FCT funding should clearly support the profiling process in a complementary manner. An evaluation of the FCT and its funding instruments would be welcome.

Recommendations

12. Revisit the criteria used to allocate study places through the *numerus clausus* system, removing the wide-ranging presumption against increasing study places in Lisbon and Porto and introducing restrictions on study places for programmes that stand little chance of attracting additional students or which have persistently poor graduate employment outcomes. In parallel, use the *numerus clausus* system strategically to restrict study places in programmes of equivalent or lower quality to excellent programmes located in interior and island regions.
13. Amend the decree-laws governing employment of academic staff to remove restrictive requirements regarding teaching load and facilitate more flexible workload models.
14. Ensure complementarity with institutional profiles and strategic development agreements is part of the evaluation criteria used by A3ES for institutional evaluations.
15. Ensure FCT research funding allocation criteria are supportive of the broader profiling and restructuring agenda, while analysing the need for a stronger focus on applied and practice-oriented research in polytechnics. Commission an external evaluation of FCT funding to ensure a critical reflection is held on the orientation of the investments made by this strategic agency and its complementarity with overall system goals.

References

Augar, P. (2019), *Independent panel report to the review of post-18 education and funding ("Augar review")*, https://www.gov.uk/government/publications/post-18-review-of-education-and-funding-independent-panel-report (accessed on 14 July 2022). [8]

AWTI (2019), *Het stelsel op scherp gezet - Naar toekomstbestendig hoger onderwijs en onderzoeek (A sharpened system - towards futureproof higher education and research)*, Adviesraad voor wetenschap, technologie en innovatie, https://www.awti.nl/documenten/adviezen/2019/06/12/advies-het-stelsel-op-scherp-gezet (accessed on 9 July 2022). [34]

Biscaia, R., C. Sá and P. Teixeira (2021), "The (In)effectiveness of regulatory policies in higher education—The case of access policy in Portugal", *Economic Analysis and Policy*, Vol. 72, pp. 176-185, https://doi.org/10.1016/j.eap.2021.08.006. [15]

Broucker, B., K. De Wit and J. Verhoeven (2017), "Higher education for public value: taking the debate beyond New Public Management", *Higher Education Research & Development*, Vol. 37/2, pp. 227-240, https://doi.org/10.1080/07294360.2017.1370441. [1]

Carpentier, V. (2021), "Three stories of institutional differentiation: resource, mission and social inequalities in higher education", *Policy Reviews in Higher Education*, Vol. 5/2, pp. 197-241, https://doi.org/10.1080/23322969.2021.1896376. [7]

Commission for Science and Technology Sector Plan (2022), *Tussenevaluatie Sectorplancommissie Bèta en Techniek inzake Implementatie sectorplan Bèta en Techniek (Interim evaluation by the sector plan commission of the sector plan for science and technology)*, Sectorplancommissie Bèta en Techniek, https://www.sectorplan-betatechniek.nl/ (accessed on 9 July 2022). [36]

de Boer, H. et al. (2015), *Performance-based Funding and Performance Agreements in Fourteen Higher Education Systems: Report for the Ministry of Education, Culture and Science*, Center for Higher Education Policy Studies (CHEPS), Enschede, https://research.utwente.nl/en/publications/performance-based-funding-and-performance-agreements-in-fourteen- (accessed on 4 January 2021). [33]

DGEEC (2022), *Estatísticas - Ensino Superior (Statistics - Higher Education)*, Direção-Geral de Estatísticas da Educação e Ciência, https://www.dgeec.mec.pt/np4/18/ (accessed on 8 July 2022). [12]

DGEEC (2019), *Docentes do ensino superior integrados em unidades de I&D financiadas pela FCT (Academic staff integrated in research units funded by the FCT)*, Direção-Geral de Estatísticas da Educação e Ciência, https://www.dgeec.mec.pt/np4/381/ (accessed on 12 July 2022). [19]

DGES (2021), *Programas "Impulso Jovens STEAM" e "Impulso Adultos" (Impetus programme for young people in STEAM and Impetus programme for adults)*, Direção-Geral do Ensino Superior (DGES), https://www.dges.gov.pt/pt/pagina/candidatura_IMPULSO (accessed on 18 July 2022). [25]

Dohmen, D. (2016), "Performance-based funding of universities in Germany: An empirical analysis", *Investigaciones de Economía de la Educación*, Vol. 11, pp. 111-132, https://econpapers.repec.org/bookchap/aecieed11/11-05.htm (accessed on 4 February 2021). [30]

Edulog (2019), *O impacto da redução de vagas em instituições de ensino superior na mobilidade dos alunos (The impact of the reduction in study places in HEIs on student mobility)*, EDULOG - Fundação Belmiro de Azevedo, https://www.edulog.pt/estudos?categoriaChoosed=todos (accessed on 19 July 2022). [14]

FCT (2021), *Financiamento Plurianual de Unidades de I&D para o periodo 2020-2023 (Multi-annual funding for R&D units for the period 2020-2023)*, Foundation for Science and Technology, https://www.fct.pt/apoios/unidades/unidadesid.phtml.pt (accessed on 12 July 2022). [18]

FCT (2017), *Regulamento de avaliação e financiamento plurianual de unidades de I&D (Regulation on evaluation and multi-annual funding of R&D units)*, FCT - Fundação para a Ciência e a Tecnologia, Lisbon, https://www.fct.pt/apoios/unidades/avaliacoes/2017/docs/RegulamentoAvaliacaoUID20172018.pdf (accessed on 8 June 2022). [16]

Government of Portugal (2022), *Despacho n.º 8022-A/2022 (Circular n.º 8022-A/2022)*, Ministry of Science, Technology and Higher Education (MCTES), https://dre.pt/dre/detalhe/doc/8022-a-2022-185452440 (accessed on 21 July 2022). [37]

Government of Portugal (2022), *Plano de Recuperação e Resiliência (Recovery and Resilience Plan)*, Recuperar Portugal, https://recuperarportugal.gov.pt/ (accessed on 24 July 2022). [24]

Government of Portugal (2021), *OE2022 Orçamento do Estado - Nota Explicativa Ciência, Tecnologia e Ensino Superior - PO13 (State Budget 2022 - Explanatory Note Science, Technology and Higher Education - PO13)*, Ministry of Science, Technology and Higher Education, https://www.igefe.mec.pt/Files/DownloadDocument/91?csrt=16066835027607696980 (accessed on 8 June 2022). [23]

Government of Portugal (2019), *Contrato de Legislatura entre o Governo e as Instituições de Ensino Superior Públicas 2020-2023 (Contract for the Legislative Term between the Government and Public Higher Education Institutions 2020-2023)*, https://www.igefe.mec.pt/Files/DownloadDocument/72?csrt=6785169830679341608 (accessed on 28 May 2020). [21]

Government of the Netherlands (2022), *Beleidsbrief Hoger Onderwijs en Wetenschap – Tweede Kamer (Policy letter on higher education and science to the House of Representatives)*, https://www.rijksoverheid.nl/documenten/kamerstukken/2022/06/17/aan-de-tweede-kamer-beleidsbrief-hoger-onderwijs-en-wetenschap (accessed on 9 July 2022). [3]

Government of the United Kingdom (2022), *Higher education policy statement and reform consultation*, Department for Education, London, https://www.gov.uk/government/consultations/higher-education-policy-statement-and-reform (accessed on 14 July 2022). [9]

Hammond, L., S. Baser and A. Cassell (2020), "The Relationships Between State Community College Governance Centralization and Local Appropriations", *Higher Education Politics and Economics*, Vol. 6/1, pp. 20-38, https://doi.org/10.32674/HEPE.V6I1.1734. [5]

HEA (2019), *Performance Funding Allocations 2019*, Higher Education Authority, https://hea.ie/assets/uploads/2017/04/Performance-Funding-Allocations-2019.pdf (accessed on 9 August 2021). [29]

MCTES Working Group (2019), *Relatório sobre o acesso ao ensino superior (Report on access to higher education)*, Ministro da Ciência, Tecnologia e Ensino Superior (MCTES), https://www.dges.gov.pt/pt/noticia/relatorio-sobre-o-acesso-ao-ensino-superior (accessed on 12 June 2022). [13]

Nazaré, M. et al. (2020), *Relatório de avaliação da implementação do Programa de Estímulo ao Emprego Científico (Report on the evaluation of the Stimulus Programme for Scientific Employment)*, Comissão de avaliação constituída pelo Despacho n.º 349/2020, publicado em Diário da República, 2.ª série, de 10 de janeiro de 2020, https://www.fct.pt/apoios/contratacaodoutorados/empregocientifico/docs/RelatorioProgramaEstimuloEmpregoCientifico.pdf (accessed on 7 July 2022). [20]

Norwegian Ministry of Education and Research (2022), *Finansiering av universiteter og høyskoler (Funding of universities and university colleges)*, Ministry of Education and Research, Oslo, https://www.regjeringen.no/contentassets/6c4c7be66d5c4a028d86686d701a3a96/f-4475-finansiering-av-universiteter-og-hoyskoler.pdf (accessed on 13 May 2022). [28]

O Shea, S. and J. O Hara (2020), "The impact of Ireland's new higher education system performance framework on institutional planning towards the related policy objectives", *Higher Education*, Vol. 80/2, pp. 335-351, https://doi.org/10.1007/s10734-019-00482-5. [31]

OECD (2021), "Resourcing higher education in Denmark: Thematic policy brief", *OECD Education Policy Perspectives*, No. 49, OECD Publishing, Paris, https://doi.org/10.1787/5cc2d673-en. [6]

OECD (2021), *Resourcing Higher Education in the Flemish Community of Belgium*, Higher Education, OECD Publishing, Paris, https://doi.org/10.1787/3f0248ad-en. [27]

OECD (2020), *Labour Market Relevance and Outcomes of Higher Education in Four US States: Ohio, Texas, Virginia and Washington*, Higher Education, OECD Publishing, Paris, https://doi.org/10.1787/38361454-en. [4]

OECD (2019), *OECD Review of Higher Education, Research and Innovation: Portugal*, OECD Publishing, Paris, https://doi.org/10.1787/9789264308138-en. [10]

Office for Students (2020), *About the TEF*, Office for Students (OfS), https://www.officeforstudents.org.uk/advice-and-guidance/teaching/about-the-tef/ (accessed on 7 June 2021). [2]

Pinto, H., C. Nogueira and J. Edwards (2021), *Higher Education and Smart Specialisation in Portugal*, Publications Office of the European Union, Luexmbourg, https://doi.org/10.2760/21040. [11]

Politécnico de Leiria (2020), *Primeiro Doutoramento do Politécnico de Leiria arranca em 2020/2021 (First PhD at the Polytechnic of Leiria starts in 2020/2021)*, https://www.ipleiria.pt/arquivo/primeiro-doutoramento-do-politecnico-de-leiria-arranca-em-2020-2021/ (accessed on 14 February 2022). [17]

PwC Strategy& (2021), *Toereikendheid, doelmatigheid en kostentoerekening in het mbo, hbo en wo&o (Accessibility, efficiency and cost allocation in higher vocational education and higher education)*, https://www.rijksoverheid.nl/documenten/rapporten/2021/02/15/bijlage-3-rapport-toereikendheid-doelmatigheid-en-kostentoerekening-in-het-mbo-hbo-en-wo-o (accessed on 6 July 2022). [26]

Reviewcommissie Hoger Onderwijs en Onderzoek (2017), *Prestatieafspraken: het vervolgproces na 2016 - Advies en zelfevaluatie (Performance Agreements: follow up after 2016 - Recommendations and self-evaluation)*, Reviewcommissie Hoger Onderwijs en Onderzoek, Den Haag, https://www.eerstekamer.nl/overig/20170321/rapport_review_commissie_met_het/document (accessed on 1 February 2021). [32]

Sivista - Finnish Education Employers (FEE) (2021), *Yliopistojen yleinen työehtosopimus (General Collective Agreement for Universities)*, Sivista - Finnish Education Employers (FEE), https://www.sivista.fi/tyosuhdeasiat/tyoehtosopimukset-ja-palkkataulukot/yliopistot-ja-harjoittelukoulut/yliopistojen-yleinen-tyoehtosopimus/ (accessed on 21 July 2021). [39]

Tieteentekijät (2021), *Salaries*, Tieteentekijät (Finnish Union of University Researchers and Teachers - FUURT), https://tieteentekijat.fi/en/support-of-working-life/salaries/ (accessed on 21 July 2021). [40]

Tribunal de Contas (2020), *Auditoria ao Modelo de Financiamento do Ensino Superior: Contratos de Legislatura 2016-2019 (Audit of the funding models for higher education: Contracts for the legislative period 2016-2019)*, Tribunal de Contas, Lisbon, https://www.tcontas.pt/pt-pt/ProdutosTC/Relatorios/RelatoriosAuditoria/Documents/2020/rel06-2020-2s.pdf (accessed on 6 June 2022). [22]

UFM (2022), *Dimensionering af de videregående uddannelser (Sizing of higher education)*, Ministry of Higher Education and Research, https://ufm.dk/uddannelse/videregaende-uddannelse/dimensionering (accessed on 21 July 2022). [38]

UNL (2018), *Sectorplannen (Sector Plans)*, Universiteiten van Nederland (UNL), https://www.universiteitenvannederland.nl/sectorplannen.html (accessed on 21 July 2022). [35]