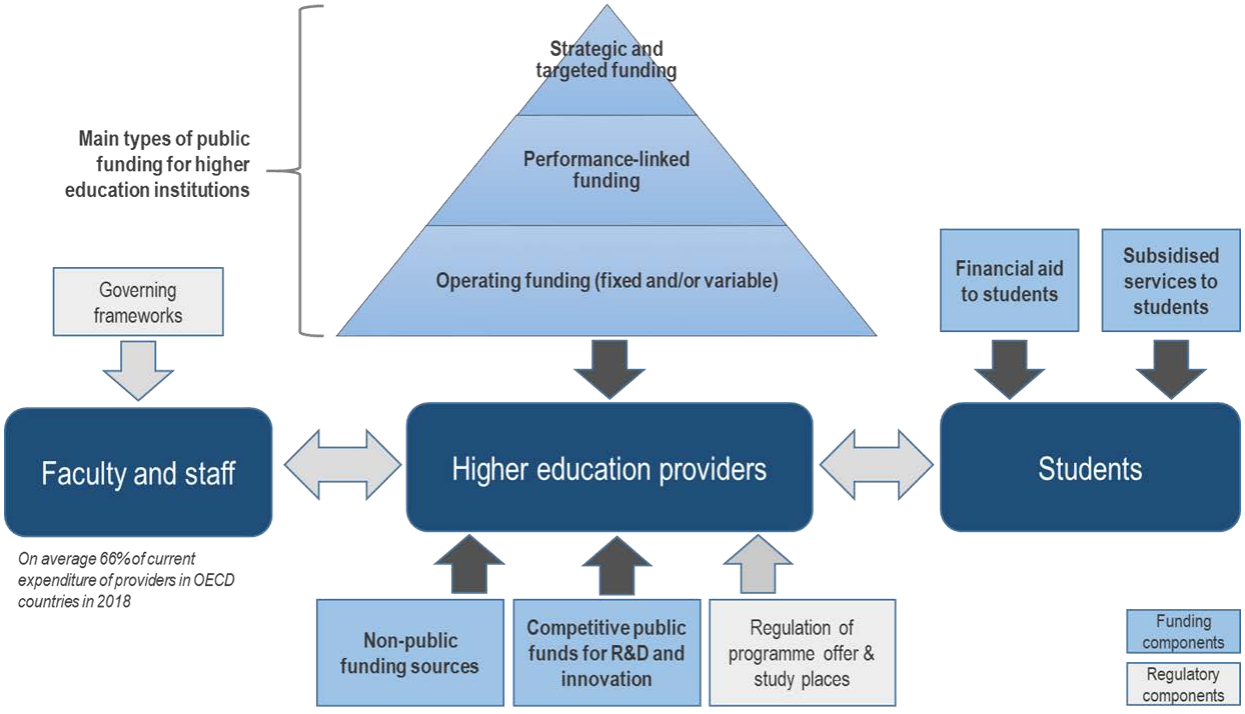
3 Core funding for higher education institutions

This chapter focuses the question of how best to allocate public funds to higher education institutions to support their day-to-day operations and the delivery of their fundamental educational mission. It examines the current approach to allocating funds to public universities and polytechnics in Portugal before analysing different design components of allocation models used in comparator OECD jurisdictions. The chapter concludes with recommendations for promising policy options for Portugal as it seeks to establish a transparent and equitable funding model, which pays adequate attention to the diversity of institutions and territorial operating contexts in the country.

Elements in higher education funding systems and focus of this chapter

Governments across the OECD allocate public funds to public or government-dependent higher education institutions (HEIs) to support their day-to-day operations and the fulfilment of their basic public service missions. Sometimes, as in most states of the United States, such "core" funding is provided – nominally at least – to support instruction (education) only. In other OECD jurisdictions, including many in Europe, institutions with university status also receive – sometimes substantial – core funding allocations explicitly to support research. In most OECD systems, core funding for operations, instruction and research is allocated to institutions as lump-sum payments (Golden, Troy and Weko, 2021[1]), which the institutions are then free to allocate internally to different departments and areas of activity. In some cases, the funding allocations are made on an incremental, historical basis, without direct reference to real levels of activity in individual institutions. In other cases, public authorities use formulas that link payments to inputs, such as the number of enrolled students; outputs, such as the number of degrees awarded or research publications produced, or – more rarely – outcomes, such as graduate employment rates.

Figure 3.1. Elements in higher education funding systems



As illustrated in Figure 3.1, core public funding to support the basic operations of higher education institutions, whether allocated using a fixed or variable (formula-based) model, is only one element in a wider higher education funding landscape. Governments may link a proportion of public funding for institutions to specific outputs and outcomes in an effort to steer and incentivise – rather than simply support financially – behaviour within the funded institutions. Public authorities may also provide financial support to institutions that is earmarked for specific purposes linked to the future development of the higher education system, whether in the form of grants for capital investment or other types of targeted funding.

Higher education institutions in most OECD countries receive additional revenue from non-public sources, including fees paid by students, as well as from public bodies the award funding on a competitive basis, such as national research and innovation councils. The relative weight of public funding compared to non-

public sources – which varies considerably across the OECD (see Figure 3.2 below) – determines to a large extent the influence public funding and funding models exert over institutional priorities and behaviour. However, public authorities influence institutional activities through other policy instruments, including programme approval, external quality assurance and regulation of study places. Some jurisdictions also exert a strong influence over the way HEIs deploy their resources, notably, as in Portugal, by establishing rules governing the employment of academic and non-academic staff. As wage costs account, on average, for around two-thirds of expenditure in higher education institutions in the OECD (OECD, 2022[2]), specific public policies related to human resources can have significant implications for financial management in HEIs. In other higher education systems, frameworks governing employment of staff may be established through collective bargaining or in other sector-level agreements.

In addition to funding institutions, public authorities in most OECD member countries provide financial aid to support students to pay for living costs and (where they exist) tuition fees, through systems of student grants or publicly regulated and subsidised loan programmes. In OECD systems with comparatively high tuition fees, such as the United States, the United Kingdom, Australia or Japan, public student aid systems are, in part, an indirect manner of financing institutions, as the public resources "received" by students – or at least a proportion of these resources – are used to pay fees to institutions. Finally, public authorities may directly finance other forms of support to students, such as subsidised housing, catering and sports facilities, medical support or transport, either through targeted grants to higher education institutions to provide these services or through subsidies to external service providers.

This report examines, from an international comparative perspective, how important elements of this higher education funding landscape operate in Portugal. It does so in the following order:

1. This chapter examines the allocation of *core public funding for operations and instruction* to higher education institutions, focusing, in the Portuguese context, on the operating grants funded from annual state budget (*Orçamento do Estado* – OE). Given the distinct questions at play, it was agreed from the outset that this review will not examine the operation of Portugal's national research council, the Foundation for Science and Technology (FCT), or have an explicit focus on research funding as such. The FCT is responsible for providing most of the dedicated public financial support to the legally independent research units in which most research in Portuguese higher education occurs. However, as academic staff, whose posts are funded from the state budget, are also active in research, the discussion and recommendations in this chapter will consider the extent to which the core operating grant should also be explicitly regarded as a tool for supporting the research mission of higher education and whether research-related parameters might influence funding allocation.
2. Chapter 4 focuses on the way governments can use funding, dialogue and regulation to help steer the future development of national higher education systems. It examines the use of *performance- or mission-linked and strategic funding* for higher education institutions, institutional *performance agreements* and *associated steering mechanisms*, such as the regulation of study places. While Chapter 3 (see below) takes up the question of the relative merits of including output and outcome parameters in formulas for allocating core funding, Chapter 4 will take a more comprehensive look at the range of policies available to governments to steer resource use in higher education over the medium to long term.
3. Chapter 5 examines, again from an international perspective, the *direct and indirect material support for students* in Portugal that is funded from public sources. It starts by considering the fundamental question of the physical accessibility of higher education institutions across the Portuguese territory, before examining the public student aid programmes and support government provides for student services.

Core funding for higher education institutions: design considerations

Governments allocate core funding to higher education institutions to allow them to operate on a day-to-day basis, to undertake their central missions in (undergraduate) instruction and to create a framework within which academic staff can pursue research and societal engagement activities, often using resources from other funding streams (such as competitive research funding). Public authorities designing systems for providing such core funding to higher education institutions need to consider four main questions:

1. Is the overall budget envelope available to provide core public funding **adequate** to allow institutions to cover the costs associated with providing good quality higher education? The specific contribution required from core public funding will depend on the other income streams available to higher education institutions and, in the case of education activities, particularly the level of tuition fees paid by students. Reaching judgements about the "reasonable" cost of providing different forms of higher education (programmes at different levels in different fields of study) – and this the level of public subsidy required – has proved extremely challenging in systems where this has been attempted. Not only is it difficult to establish objective measures of the quality level at which education should be provided, but it is notoriously difficult to infer "reasonable" costs from real costs observed in higher education institutions. In largely non-profit institutions, operating in imperfect market conditions, higher education institutions tend to spend, or make do with, the level of funding they actually have, without this necessarily corresponding to the level required to provide education efficiently and at high quality (Deloitte Access Economics, 2016[3]; Hemelt et al., 2018[4]). As such, policymakers and analysts are forced to use a range of proxy measures – including international comparisons – when assessing the "adequacy" of funding levels (PwC Strategy&, 2021[5]).
2. How can the available resources be allocated to higher education institutions in way that is **equitable (fair), predictable and transparent**? To promote quality and efficient allocation of limited funds, governments and society have an interest in ensuring that public funds are distributed to higher education providers in a way that takes account of differences in the cost of provision (recognising that education in some subjects costs more to deliver than in others) and real levels of activity and effort (notably – in the area of education – the numbers of students educated in different institutions). It is equally important, as a matter of good governance and to facilitate planning, that the public, politicians and institutions themselves can easily understand the basis and rationale for the way funds are distributed to institutions.
3. How can the funding allocation system ensure sufficient year-on-year **stability** in funding levels to avoid institutions experiencing harmful financial shocks? If the allocation model ties funding to the level of inputs (e.g. enrolled students) or outputs (e.g. degrees awarded), significant changes in the number of inputs or outputs can result in significant changes in funding allocations. However, higher education institutions have high fixed costs (staff and infrastructure) which cannot be modified rapidly. To avoid placing institutions in untenable financial situations in systems with dynamic patterns of enrolment, public funding allocation systems can use different mechanisms to reduce the scale of change in institutional allocations from one financial year to the next.
4. Finally, how, if at all, should funding allocation models be used to **incentivise and reward good institutional performance**? In recent decades, an increasing number of OECD jurisdictions have experimented with including output or outcome parameters in the formulas they use to allocated core public funding for instruction and research. For teaching grants, by far the most common approach has been to link funding to credits passed or degrees awarded, sometimes with the explicit intention of promoting faster progression and higher levels of successful course completion. The main questions policymakers when considering the use of performance-linked parameters in allocation models are the extent to which (and how) higher education institutions can influence the selected variables and whether such similar approaches have worked in practice in other settings.

This remainder of this chapter examines these four questions in relation to Portugal's model for allocating core funding from the state budget to public universities and polytechnics. It first considers the question of the adequacy of current core funding levels in Portugal. Then, given the trade-offs at play, the chapter examines policy options to balance equity of treatment of institutions, predictability, transparency, stability and performance orientation. After considering the approaches adopted in comparator OECD jurisdictions and, where possible, available evidence on the effectiveness of different policies, the chapter concludes with recommendations to Portugal.

The adequacy of core public funding to higher education institutions in Portugal

Public higher education institutions in Portugal rely on multiple income streams

Public higher education institutions in Portugal, like their counterparts in other OECD jurisdictions, rely on a combination of income sources to fund their activities. Table 3.1 summarises the share of institutional revenue in the public university and polytechnic sectors from different income streams, based on averages for the financial years 2019 to 2021 drawn from accounting data collated by Portugal's Institute for Financial Management of Education (IGeFE). The table shows that – on average – public institutions received around 56% of their total income from the core operating grant from the state budget, allocated by IGeFE on behalf of the government (see discussion below on the design of the current allocation model). This operating grant accounts for a higher average share of total income in public polytechnics (64%) than in public universities (53%), reflecting the higher relative weight of competitive and targeted public funding, as well as third-party private funding, in the public university sector.

In both the public university and polytechnic sectors, tuition fees paid by students account for the next largest share of institutional income, accounting for around 16% of total revenues across the two sub-sectors (on average 15% in public universities and 17% in public polytechnics). As detailed in Box 3.1, tuition fees for short-cycle, first-cycle and some second-cycle qualifications in public higher education institutions in Portugal are regulated by law. Following a period of regular fee increases, between 2019 and 2021, the then government implemented a policy of fee reductions, most recently in the 2021 state budget, which introduced a 20% reduction in the maximum regulated fees public institutions can charge for bachelor's programmes. Fees for other programmes were frozen. The government has accompanied these cuts with increases in the core operating grant, designed to compensate institutions for lost income (Government of Portugal, 2020[6]; Government of Portugal, 2021[7]).

Table 3.1. Income of public HEIs by income source

Average annual shares of income by revenue source over the three financial years 2019-2021

Sector/sub-sector	Core operating grant (revenue from taxes)	Other national public funding	Private third-party funding	Third-party funding from abroad	Student fees funding	Other	Total
All public HEIs	55.9%	8.3%	1.4%	11.1%	15.7%	7.6%	100%
Public universities	52.5%	10.2%	1.7%	11.3%	15.7%	8.6%	100%
Public Polytechnics	64.2%	2.7%	0.5%	9.7%	17.4%	5.4%	100%

Source: IGeFE (2022[8]) Data on institutional income and expenditure 2012-2021 (unpublished – supplied directly to the OECD).

Box 3.1. Tuition fees in higher education in Portugal

In the academic year 2021/22, regulated annual tuition fees in public higher education institutions were capped at EUR 697. This maximum rate applies for Professional Higher Technical Programmes (TeSP), bachelor's degrees, integrated master's degrees and second-cycle master's degrees required to access regulated professions. Institutions are free to establish fees for other second-cycle master's degrees, doctoral degrees, post-doctoral certificates and other forms of continuous education not leading to a degree. International students pay substantially higher fees than domestic and European Economic Area (EEA) students, although some institutions offer fee reductions for students from certain (generally Portuguese-speaking) countries. Private higher education institutions are free to set their fees at all levels of education.

Source: DGES (2022[9]) *Propinas (Tuition fees)*, https://www.dges.gov.pt/pt/pagina/propinas (accessed on 11 May 2022)

The third-largest source of income in public higher education institutions is classified as "third-party funding from abroad", which accounted for an average of 11% of total income in institutions in the years 2019 to 2021. The vast majority of these funds come from European Union (EU) structural and investment funds (notably the European Social Fund), which are managed in Portugal, and, to a lesser extent, centrally managed European Union programmes such as Erasmus+ (for education) and Horizon Europe (for research and innovation). In recent years, European Social Fund resources have, for example, been used to support the development and implementation of short-cycle Professional Higher Technical Programmes (TeSP) in institutions in eligible regions[1] across Portugal.

Remaining institutional income (on average around 17% across all public HEIs) came primarily from a combination of targeted government funding from specific programmes or transfers within the public administration, income generated by institutions from fees and charges for service provision and a modest level of income from private sector sources, such as companies or foundations.

Two factors are important in interpreting these average shares of institutional income from different sources. First, the average figures mask significant variation between public higher education institutions. Whereas the core public operating grant accounted for around 40% of total income in 2021 at the Universidade Nova de Lisboa and the Instituto Politécnico do Cávado e do Ave (IPCA), this proportion was over 75% in the three public, non-integrated nursing schools (in Coimbra, Lisbon and Porto), the Instituto Politécnico de Tomar (central Portugal), and the Universidade dos Açores (which serves the islands making up the autonomous region of the Azores). Similarly, while international (mostly EU) funds accounted for less than 10% of total revenue in 2021 in 18 of the 34 public higher education institutions, it accounted for more than 20% of total income in five institutions, including the Instituto Politécnico de Bragança, IPCA and the universities of Minho and Aveiro. These differences have implications for financial management within the institutions and the weight of the core operating grant in institutional finances.

Second, the data underlying the income shares presented above encompass only the revenue generated by public higher education institutions as legal entities and exclude the revenue of research and development (R&D) units associated to institutions. As noted above, Portugal has a distinctive institutional arrangement in its public research and higher education system, whereby R&D units are established as legally distinct public or private entities, either inside or outside the legal structure of universities or polytechnics. Almost three-quarters of R&D units are established as entities within higher education institutions. Many academic staff from universities and polytechnics – whose salaries are paid from the budgets of their home institutions – are associated to one or more R&D units. However, core operating grants and research grants awarded by the Foundation for Science and Technology (FCT), as well as most international and private funding for research projects accrue as revenue to the R&D units, not to the

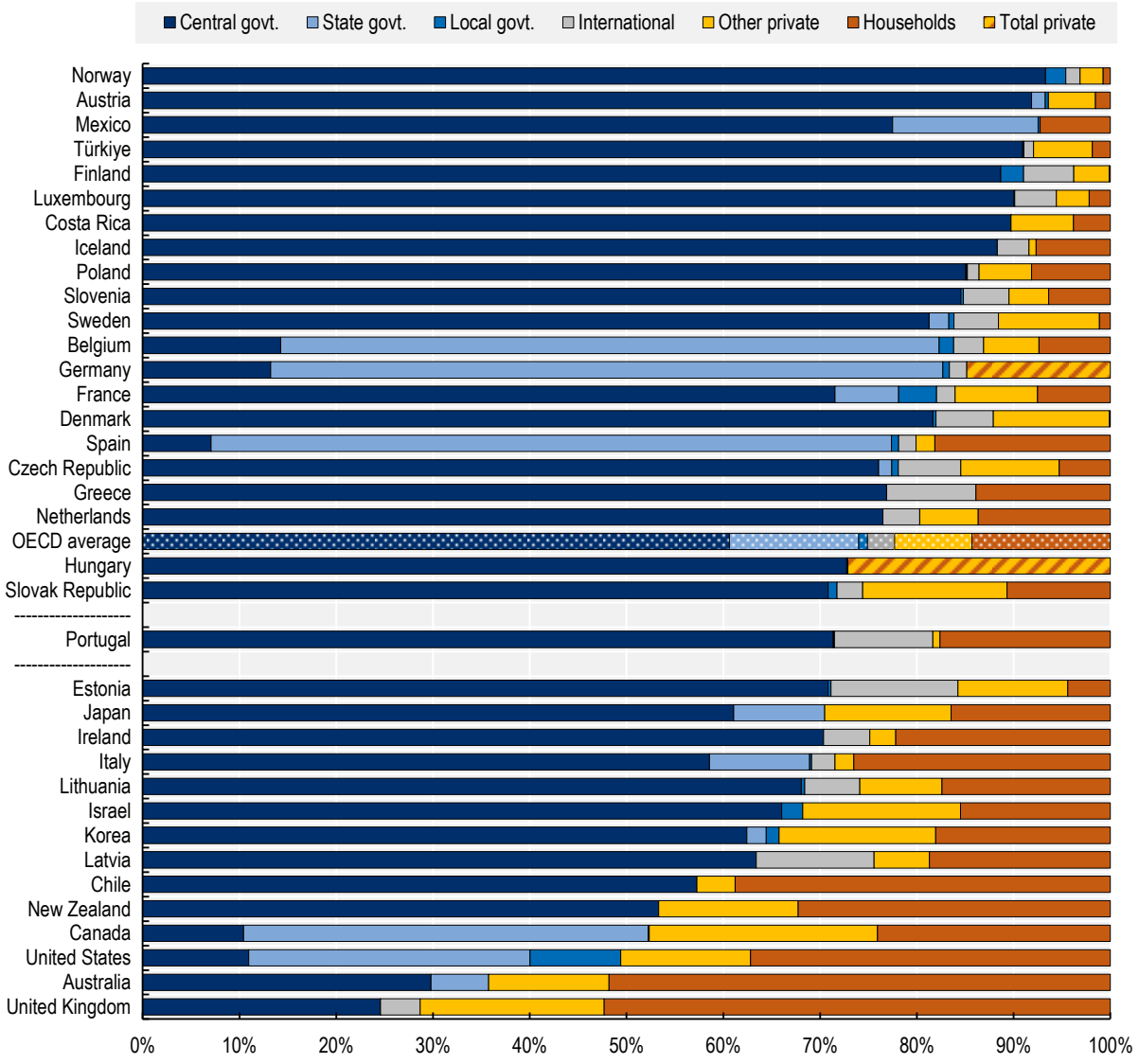
central budgets of higher education institutions. This situation differs from that in most other OECD countries, where research income accounts for a substantial share of institutional revenue, particularly in universities. As a result, international comparisons of funding levels must be interpreted with care.

Public HEIs in Portugal are less dependent on core public funds than their counterparts in major comparator systems

The time taken to collate and validate international data on the funding of education systems means that the most recent comparable data on expenditure on higher education institutions, at the time of writing, is for the financial year 2018. As illustrated in Figure 3.2, international data show that around 71% of total spending on public higher education institutions in 2018 came from public sources, 10% from international sources, 18% from households (primarily tuition fees and rent) and remainder from other private sources. These data include public spending on public R&D units associated to higher education institutions, meaning they are not directly comparable with the national data on institutional revenues in Table 3.1.

Figure 3.2. Expenditure on higher education institutions by source

Share of expenditure on public and government-dependent HEIs by source, 2018



Note: Countries are ranked in descending order by the proportion of expenditure from public sources. Disaggregated data on private expenditure are not available for Germany and Hungary (presented as "total private" expenditure). "Other private" expenditure refers to expenditure from private sources, other than household expenditure on fees. It includes expenditure by businesses and non-profit organisations. "Govt" = government. Missing data for Switzerland.

Source: OECD (2022[2]), Educational expenditure by source and destination, https://stats.oecd.org/ (Accessed on 6 July 2022).

StatLink https://stat.link/1rvz93

In 2018, the share of public spending within overall expenditure on public higher education institutions in Portugal (at 71%) was below the average for public and government-dependent private higher education institutions in OECD countries (75%) and for the 22 European Union (EU-22) countries that are also OECD members (79%). The corollary to this was that the relative contribution of households to public higher education institution in Portugal, at 18%, was above the OECD average for public and government-dependent institutions (14%) and substantially above the average for the EU-22 (9%). As a result of the

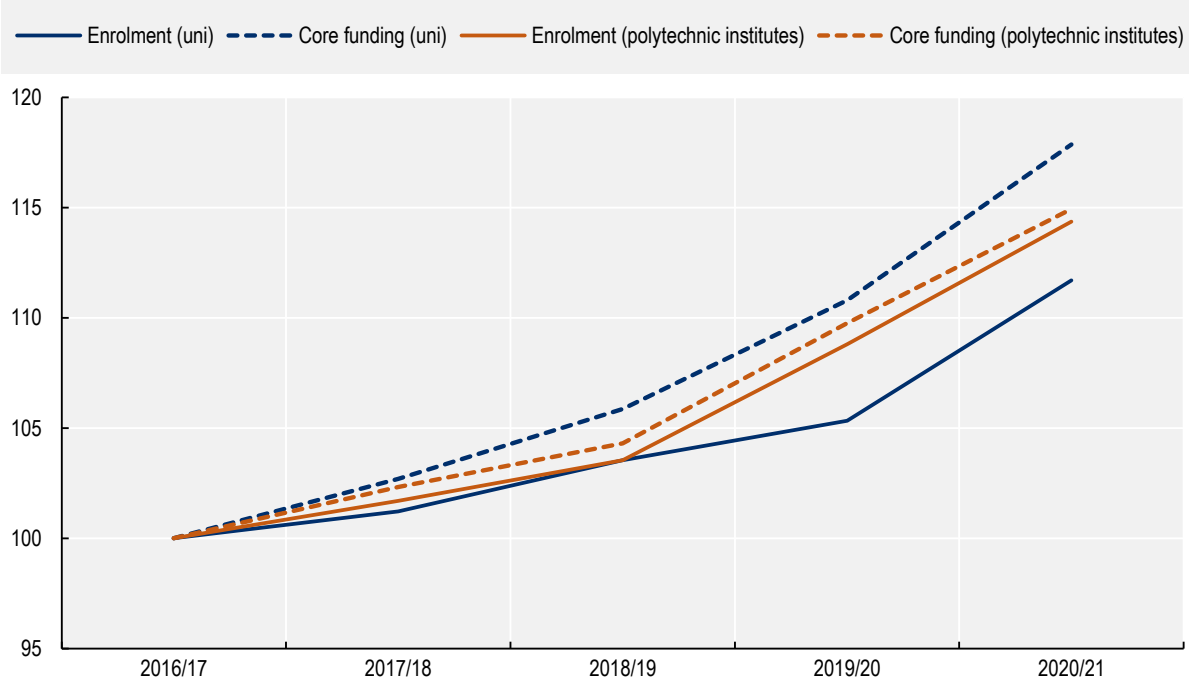
policy of tuition-fee reductions in recent years (see Box 3.1), this share will have declined since 2018. Also of note is that the share of spending from international sources (in Portugal's case, mostly EU funds) was substantially higher in Portugal (10%) than on average in public and government-dependent HEIs in the OECD (3%) or the EU-22 (5%), while the share of income from "other private" sources was considerably lower, at 1% of total spending, compared to 8% in the OECD and 7% in the EU-22.

Total investment in public HEIs in Portugal is low, but has increased in recent years

In 2018, total spending on public higher education institutions in Portugal was the equivalent of 0.9% of Portugal's Gross Domestic Product (GDP), and public expenditure around 0.7% of GDP. This compares with OECD averages of 1.1% of GDP for total spending and 0.9% for public expenditure. The highest levels of total investment in public or government-dependent higher education institutions relative to national income were in Canada (2.3% of GDP), the United Kingdom (2%), Australia (1.9%) and Norway (1.8%) (OECD, 2022[2]).

Figure 3.3. Recent changes in enrolment and total core funding in Portugal

Change in enrolment (FTE students) in public universities (uni) and polytechnic institutes between 2016/17 to 2020/21 and in core funding between 2017 and 2021. Index: 2016/17 (enrolment) and 2017 (core funding) = 100



Note: To allow inclusion of budget data for 2021, the chart plots FTE student enrolment in the academic years shown and core funding in the financial year covering the spring and summer terms of that academic year (i.e. 2020/21 enrolment with core funding for 2021). Ideally, enrolment data should be adjusted to align with the financial year, but this is not possible at the time of writing because enrolment data for the academic year 2021/22 had not been finalised.
Source: Core funding: IGeFE (2022[8]) Data on institutional income and expenditure 2012-2021 (unpublished – supplied directly to OECD). Enrolment: DGEEC (2022[10]) *Estatísticas – Ensino Superior (Statistics – Higher Education)*, https://www.dgeec.mec.pt/np4/18/ (Accessed on 8 July 2022).

StatLink https://stat.link/q3ke45

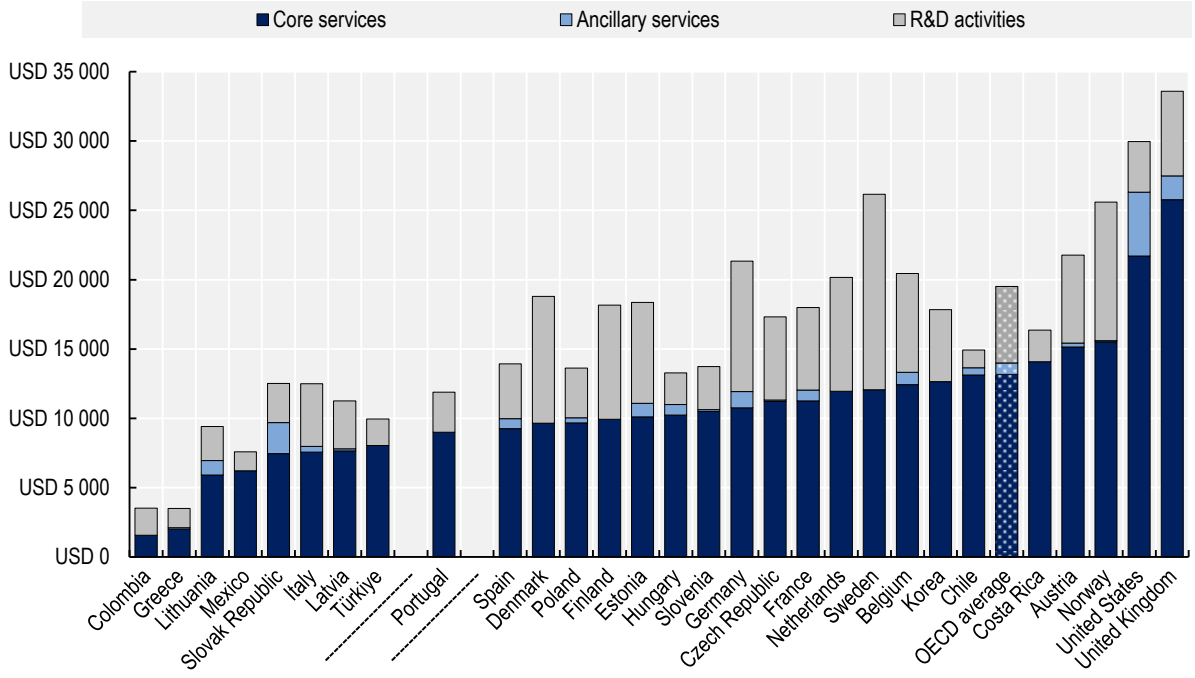
As shown in Figure 3.3, between 2017 and 2021 (in other words in the period since the last international data were collated), total core public funding for public higher education institutions in Portugal increased by 15% in nominal euros, reflecting government commitments. Since 2020, funding increases have been part of the latest "Contract for the Legislative Term" (covering 2020-23), in which Portugal's government committed to increase the budget envelope for core public funding by 5% in 2020 (compared to 2019) and subsequently by 2% annually between 2021 and 2023 (Government of Portugal, 2019[11]). As a result of the recent increases, nominal total investment – not taking into account inflation – has broadly kept pace with changes in total enrolment (total enrolment in full-time-equivalent (FTE) students increased by 13% in the period), but not with faster enrolment growth in the polytechnic sub-sector.

Per-student spending in Portugal is below the average of OECD countries

Portugal's comparatively low level of investment in higher education as a proportion of national wealth is reflected in the level of spending per student. As shown in Figure 3.4, total expenditure per FTE student in 2018 in public HEIs, after adjusting for purchasing power parity, was around 65% of the OECD average, although spending on core services (excluding spending attributed to ancillary services and R&D) was 68% of the average in the OECD.

Figure 3.4. Expenditure per student by destination of funds in the OECD

Expenditure per FTE student in United States Dollars (USD) expressed in Purchasing Power Parity (PPP) in public and government-dependent HEIs, 2018



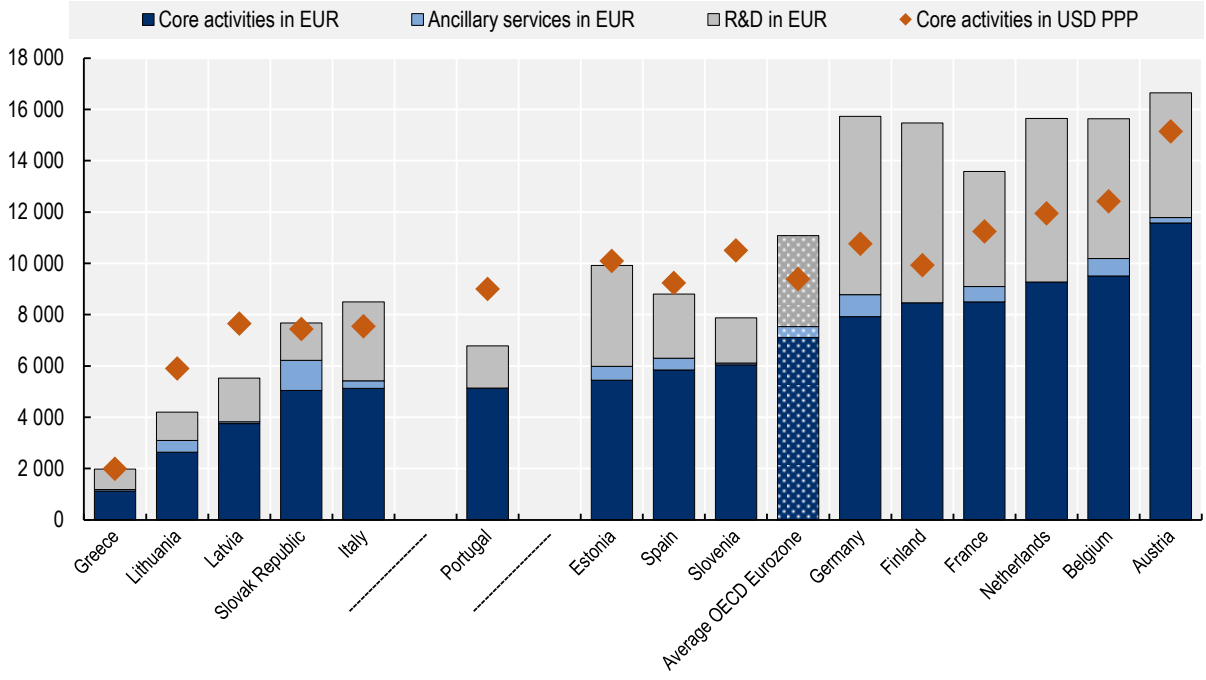
Note: Countries are ranked in ascending order by the level of spending per FTE student on core services. Data for Australia, Canada, Iceland, Ireland, Israel, Japan, New Zealand are not included as they have no disaggregation of R&D expenditure. Total spending per FTE student excludes adjustments for changes in fund balances. The term "Ancillary services" refers to services provided to students, such as housing, catering or sports facilities, although expenditure on such services is not systematically disaggregated in international statistics.
Source: OECD (2022[2]), Educational expenditure by source and destination, https://stats.oecd.org/ (Accessed on 6 July 2022).

StatLink https://stat.link/mvd5li

The OECD averages are somewhat distorted by the particularly high spending levels in public and government-dependent HEIs in the United States and the United Kingdom. The differences between expenditure levels in European states other than the United Kingdom were more modest. In purchasing power parity terms, per-student spending on core services in public HEIs in Portugal in 2018 was around 20% higher than in Italy, around the same level as in Spain and around three-quarters of the level in public HEIs in the Netherlands. In absolute terms, not taking into account differences in purchasing power between countries, per-student spending in Portugal (in euros) was around 80% of the average of OECD Eurozone member countries in 2018. Figure 3.5 also illustrates the effect of adjustments for purchasing power parity on spending levels. Whereas Italy, Portugal and Estonia all spend roughly the same amount in euros per FTE student on core services in public HEIs, PPP-adjusted spending in Italy is lower than in Portugal (owing to higher costs in Italy) and higher in Estonia (owing to lower costs in Estonia, compared to Portugal).

Figure 3.5. Expenditure per student by destination of funds in the Eurozone

Spending per FTE student in euros by type of expenditure in public and government-dependent private higher education institutions, 2018. Values for core activities converted into USD PPP shown on the same scale.



Note: Countries are ranked in ascending order by the level of spending per FTE student on core services. Total spending per FTE student excludes adjustments for changes in fund balances.
Source: OECD (2022[2]), Educational expenditure by source and destination, https://stats.oecd.org/ (Accessed on 6 July 2022).

StatLink https://stat.link/o0qjgb

The discussion hitherto has focused on average per-student funding levels. As discussed in more depth in the section below exploring funding allocation models, average spending figures for Portugal mask considerable variation between individual institutions in the level of total and public funding per student. Although some of this variation results from differences in institutional profiles and disciplinary mixes, disparities have increased in recent years as a result of the approach adopted to allocating public funding (see discuss in the next section).

Staff costs absorb a majority of institutional expenditure and academic employment is strongly regulated

A substantial majority of the resources entering higher education institutions in Portugal – as in other OECD jurisdictions – is used to cover the costs of employing academic and non-academic staff. In the financial year 2021, expenditure on personnel costs (essentially salaries, pensions and social security) accounted for an average of almost 74% of total expenditure in public higher education institutions in Portugal. This proportion was almost 80% in polytechnics, but only 71% in universities, where rates of capital and other expenditure are higher than in the polytechnic sector. These figures compare with an average rate of expenditure on personnel costs in public and government-dependent higher education institutions in the OECD of 68% (OECD, 2022[2]). As shown in Table 3.2, the proportion of expenditure devoted to personnel costs in Portugal was higher in 2020 and 2021 in comparison to 2019, reflecting lower operating expenditure on other cost items during the COVID-19 pandemic.

Table 3.2. Expenditure by type in public higher education institutions

Average proportion of total expenditure by type by sub-sector for financial years 2019-2021

Financial year	Sub-sector	Expenditure on personnel costs	Operating expenditure other than personnel costs	Capital expenditure	Other expenditure	Total
2021	Universities	71.4%	14.5%	6.6%	7.4%	100%
	Polytechnics	79.7%	11.7%	4.1%	4.5%	100%
	Total	73.6%	13.8%	5.9%	6.7%	100%
2020	Universities	72.5%	14.2%	5.5%	7.9%	100%
	Polytechnics	78.7%	11.0%	4.8%	5.5%	100%
	Total	74.1%	13.3%	5.3%	7.3%	100%
2019	Universities	69.2%	16.8%	4.9%	9.0%	100%
	Polytechnics	75.4%	12.4%	6.7%	5.5%	100%
	Total	70.9%	15.6%	5.4%	8.1%	100%

Source: IGeFE (2022[8]) Data on institutional income and expenditure 2012-2021 (unpublished – supplied directly to the OECD).

Given that core public funding from the state budget represents only around 56% of institutional income on average (see Table 3.1), most public higher education institutions in Portugal pay for a proportion of staff costs with other revenue. In 2021, core budget allocations covered around 78% of personnel costs in public universities and 86% in polytechnics. The proportion of staff costs covered by the state budget varied between 63% (Universidade Nova de Lisboa) to just over 100% in the three non-integrated public nursing schools (IGeFE, 2022[8]).

As in public higher education institutions in many other OECD jurisdictions, a high proportion of staff costs in public universities and polytechnics in Portugal can be considered as (largely) fixed costs, as, in most institutions, academic staff in career positions and non-academic staff with indefinite contracts are employed under comparatively protective public law employment rules, which permit dismissal of staff only in very specific circumstances. Even in the six public institutions that have transitioned to foundation status[2] and can thus employ staff on private-law contracts, a proportion of staff are still employed under public-law rules and institutions have tended to model conditions for staff employed on private-law contracts on those specified in public law (OECD, 2019[12]). The strong job security offered to permanent academic staff in Portugal's public higher education institutions is not particularly unusual. Similarly strong protections exist in many OECD higher education systems, particularly in Europe, but also, traditionally, in North America, where the tradition of academic tenure continues in public universities, even if the COVID-19 pandemic exposed the limits of the protection that tenure offers (Zahneis, 2022[13]).

As will be discussed in more depth in Chapter 4, a more notable feature of the framework for employment of academic staff in Portugal's public higher education institutions is the comparatively detailed set of rules set forth in legislation (see Box 3.2). In many OECD higher education systems, issues such as the balance of academic staff in different ranks or workload models governing the way staff allocate their time are left to individual institutions or, in some cases, specified in sector-level collective agreements concluded between staff unions and higher education employers. In Portugal, these are among the issues specified in the legislation governing academic careers in universities and polytechnics.

Box 3.2. The legal frameworks for employment of academic staff in Portugal

Academic careers in public higher education institutions are structured to a large extent by national legal frameworks, set out in separate decree-laws for university and polytechnic academic staff (*docentes*). As well as defining staff ranks and selection requirements, the specific legislation dealing with careers for university and polytechnic academic staff also specifies maximum and minimum ratios for particular ranks of staff (between 50% and 70% of permanent academic staff in universities should be full or associated professors, for example), imposes minimum and maximum teaching hours and contains general guidelines relating to staff evaluation, promotion and pay.

The legal frameworks specify that academic staff in universities are to have a teaching load of between six and nine hours teaching per week, with an equivalent requirement for polytechnic academic staff of between six and 12 hours per week. Among the recommendations of the last OECD review of the higher education and research system in Portugal (OECD, 2019[12]) was that the legal frameworks be amended to remove such uniform teaching requirements in order to facilitate the introduction of differentiated workload and career models in higher education institutions.

Source: Government of Portugal (1979[14]) Decreto-Lei n.º 448/79 Estatuto da Carreira Docente Universitária (Decree-Law 448/79 Statute of University Teaching Staff), https://dre.pt/dre/legislacao-consolidada/decreto-lei/1979-72873110 (Accessed on 22 July 2021); Government of Portugal (2009[15]) Decreto-Lei n.º 207/2009 Estatuto da Carreira do Pessoal Docente do Ensino Superior Politécnico (Decree-Law 207/2009 Statute of Polytechnic Teaching Staff) https://dre.pt/dre/detalhe/decreto-lei/207-2009-488490 (Accessed on 22 July 2021).

In addition to the existing legal framework, recent governments in Portugal have intervened in the higher education sector to promote the creation of more permanent positions for researchers and academic staff. Since 2018, the Stimulus Programme for Scientific Employment (*Programa de Estímulo ao Emprego Científico*) has been used to fund the creation of research positions for doctorate holders in research units, based on institutional employment and career development plans. The positions supported by the programme are initially funded for up to six years with recurring grants from the FCT, after which time there is an expectation that the individuals concerned will be able to apply for permanent career positions through competitions opened by host institutions.

However, a review of the programme noted that institutions have so far resisted opening competitions for permanent positions because funding from the state budget has been unpredictable in recent years, does not include a component for research and such recruitments mean that the institution will ultimately have to assume all employment-related costs under the rigid legal framework noted above (Nazaré et al., 2020[16]).

Allocating core funding: balancing equal treatment, stability and performance

This section of the report briefly examines the approach currently used to allocate core operating funding to public higher education institutions in Portugal, before considering how other OECD jurisdictions have calibrated different aspects of their core funding allocation models. It is clear from the interviews with higher education institutions and other stakeholders undertaken for this review, as well as the position of Portugal's government in mid-2022, that there is both a need and a political will to reform the current allocation approach used in Portugal. It is equally clear that an immediate application of the allocation formula adopted in 2006 would lead to significant funding cuts for institutions where the share of national enrolment has declined since application of the formula was suspended in 2008. Against this backdrop, this section explores in some detail the main policy-design options available to the Portuguese authorities and public higher education sector as they design a new allocation model that is fit for the future.

As highlighted in the introduction to this chapter, the allocation of core operating funds to public higher education institutions, to allow them to function on a day-to-day basis, is only one – albeit the most fundamental – aspect of the broader system of public funding for higher education institutions. Performance-linked, mission-linked or strategic funding, designed to support the future development, orientation and profiling of higher education institutions, and awarded in addition to core operating funds, also has an important role to play. Policy options for structuring such funding, as well as designing accompanying governance and accountability arrangements, are discussed in Chapter 4.

The previous OECD review of higher education, research and innovation in Portugal adopted a comparatively broad-brush approach to the question of funding (OECD, 2019[12]). It recommended a model where around 80% of direct-grant funding to institutions (as opposed to competitive funds) would be allocated based on real activity levels (inputs, such as enrolled students); 15% based on performance (measured by output or outcome indicators); and 5% would be allocated for institutional profiling and linked to multi-year institutional agreements. The concept of allocating a majority of funds based on a combination of input and output variables and creating a separate pot of mission-linked or strategic funding still appears eminently reasonable. However, this more detailed review will revisit some of the more specific elements proposed in the 2019 recommendations – particularly those related to performance funding – taking into account the experience of OECD jurisdictions in recent years and findings from the broader OECD Resourcing Higher Education Project, of which this current review is a part.

Portugal has used an historical approach to allocating core funding in recent years

Portugal adopted a new formula-based method for allocating core operating funds from the state budget to public higher education institutions in 2006. As explained in Box 3.3, this was primarily driven by student numbers weighted using "cost factors" to align payments for students in different subject fields with the notional costs of delivery. In addition, the formula included a compound parameter designed to measure efficiency (undergraduate graduation rates and a ratio of post-graduates obtaining degrees to academic staff) and the proportion of career academic staff holding a PhD.

Box 3.3. The 2006 funding formula

A 2006 ordinance (*portaria*) sets out a model for allocating core operating funding (*orçamento de funcionamento base*) to public higher education institutions each year. It calculates the share of the available state budget for each higher education institution using the following formula:

$$OTj = \sum_{i} [Iij * Fij * Ej * Qj] * D$$

Where:

- *OTj* is the share of the state-budget envelope for institution *j*;
- *Iij* is the number of students in a field of study *i* in institution *j* for the previous year (t-1);
- *Fij* is a cost factor for field of study *i* in institution *j*, based on average staff costs of all institutions, in turn calculated with reference to nationally fixed student-staff ratios, ratios of non-teaching staff to teaching staff and ratios of central administrative staff per student;
- *Ej* is a compound indicator of efficiency combining a measure of graduation rates for undergraduate students (*taxa de eficiência de graduação*) and a measure of graduation at master's and doctoral in relation to academic staff holding PhDs employed by the institution (*taxa de eficiência científica*);
- *Qj* is a measure of the proportion of academic staff holding a PhD in each institution;
- *D* is a unit payment (national base allocation per student), calculated by dividing the total budget to be transferred by the total number of students in the system, weighted by the cost factors, efficiency indicator and staff qualification factors associated with each institution's fields of study.

The ordinance provides for the application of a "cohesion factor" designed to limit year-on-year variation in the level of state-budget allocations to individual institutions. The adjustment mechanism limits budget reductions to 3% and budget increases to 5%.

Note: Note in the Ordinance text, the "=" sign in the formula was incorrectly represented as a "+" sign.
Source: Government of Portugal (2006[17]) *Portaria no 231/2006 (Ordinance 231/2006)* https://files.dre.pt/2s/2006/01/013000000/0080300807.pdf (accessed on 11 May 2022)

The 2006 formula was applied for the state budget allocations to public higher education institutions in the financial years 2006, 2007 and 2008. The application of the formula proved to be administratively burdensome owing to the data reporting and handling requirements for institutions, the Directorate-General for Education and Science Statistics (DGEEC) and the Institute for the Financial Management of Education (IGeFE). Moreover, disagreements between institutions and the authorities arose around the measurement of enrolment following the Bologna reforms to degree structures (IGeFE, 2022[18]). These challenges led to first to a simplification of the formula in the year 2009 and then to a suspension of the direct application of the formula from 2010 onwards. The underlying data driving the formula was not updated after 2009. Instead, annual budget adjustments were allocated between institutions using the reference data from 2008 until the financial year 2012, when the fiscal retrenchment caused by the financial crisis required significant budget cuts in higher education and rendered the use of an allocation formula redundant.

A detailed proposal for a revised formula was developed in 2015 by an expert committee appointed by the Minister of Science, Technology and Higher Education (MCTES, 2015[19]), but a change of government and a challenging fiscal context meant that this was never taken forward. The period 2016-19 was, instead, marked by attempts to restore a degree of stability and confidence in the higher education funding system,

through an agreement concluded between government and the public higher education sector and annual increases in the higher education budget distributed to institutions on a pro-rata basis. After the 2019 general election, the new government concluded a "Contract for the Legislative Term" (*Contrato de Legislatura*) mentioned above (see also Chapter 4), with an initial increase of 5% in the budget envelope for core funding to higher education institutions in 2020, followed by guaranteed increases in the envelope of 2% annually (Government of Portugal, 2019[11]).

In 2020, the IGeFE and DGEEC updated the data required to implement the 2006 formula and in 2021 used these data to calculate the allocation of a 0.5% increase in the total budget envelope. The total increase in the budget envelope was 2%, but the remaining 1.5% increase was distributed to institutions on a pro-rata basis (a 1.5% increase for each institution). The formula was thus not applied to re-calibrate the total allocations to each institution. As discussed below, this would have resulted in a significant redistribution of resources between institutions with "winners" in fast-growing institutions and "losers" in institutions with declining enrolment in interior and island regions.

The absence of a formula has led to significant divergence in per-student core funding levels between institutions in recent years

The use of an incremental, historical approach to allocating core funding to public higher education institutions over the last decade has led to a significant divergence in the level of core funding institutions receive per enrolled student. As noted, the legally adopted allocation formula in Portugal, in common with allocation models in other OECD jurisdictions, uses cost factors to provide differentiated payments for students in different subject fields. As higher education institutions have differing subject mixes within their educational offering – and thus differing cost structures – it is helpful to consider the amount of core funding allocated per "weighted" student, rather than simply per enrolled student, to account for this variation.

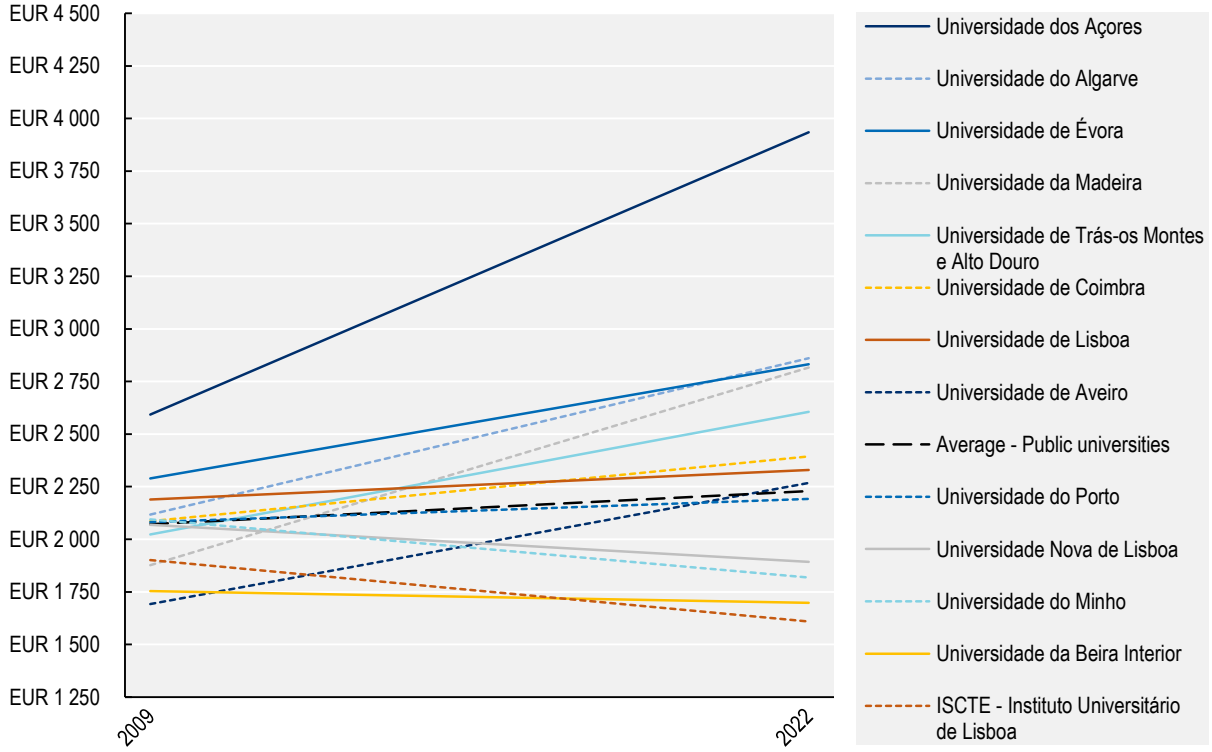
The number of "weighted" students in a given institution is calculated by allocating enrolled students to a cost category depending on their field of study (according to the classification used for the 2006 formula – see Table 3.6), multiplying the number of students in each cost category by the relevant cost factor and adding the numbers of weighted students from each category. Using this method, each student in medicine (in universities) counts, for example, for four "weighted students" (as the cost factor for medicine is four), while each student in classroom-based programmes in polytechnics counts for one weighted student (as the cost factor for such programmes is one).

Figure 3.6 shows the evolution of core funding from the state budget per weighted student in each of Portugal's 13 public universities between in 2009 (the year that the application of the formula was effectively suspended) and 2022 (the financial year at the time of writing). The chart shows that the level of core funding per weighted student in 2009 was comparatively consistent across public universities in mainland Portugal, ranging from EUR 1 691 for the Universidade de Aveiro to EUR 2 289 for the Universidade dos Açores – meaning that the Universidade dos Açores received 1.53 times more funding per weighted student than the Universidade de Aveiro.

However, as also shown in Figure 3.6, during the period of incremental increases in funding based on historical allocations after 2009, the levels of funding per weighted student diverged between universities. In 2022, the Universidade dos Açores received almost 2.5 times the level of funding per weighted student of the university with the lowest rate of funding (ISCTE – Instituto Universitário de Lisboa). In euro terms, this is a difference between EUR 3 934 and EUR 1 609 per weighted student. The five universities with the highest rates of funding per weighted student in 2022 are all in regions experiencing demographic decline, although the Universidade da Beira Interior, which is also in such a region, has the second-lowest rate of funding.

Figure 3.6. Core funding per weighted student in 2009 and 2022 – Universities

Core funding (from state budget – OE) per "weighted student" in first and second cycle in euros (nominal)



Note: The chart plots state-budget allocations (OE) per weighted student, obtained by dividing the total OE budget envelope for higher education institutions in 2009 and 2022 by the number of weighted students in 2007 and 2019, respectively. The weighting uses the cost factors specified for application of the 2006 formula.
Source: IGeFE analysis of funding for public HEIs per weighted student in 2009 and 2022 (Unpublished).

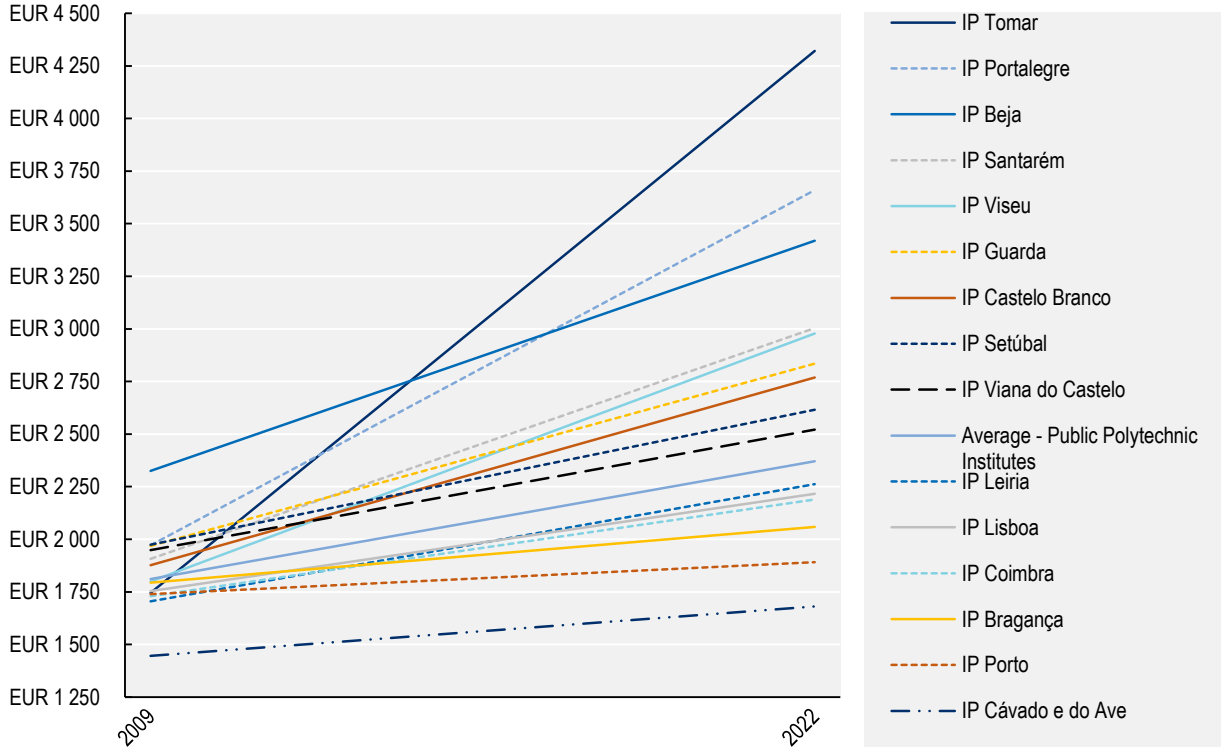
StatLink https://stat.link/do13xy

Figure 3.7 overleaf shows the equivalent data for the 15 public polytechnic institutes (IPs). The pattern is very similar to the situation in public universities, with a significant divergence in the level of core funding per weighted student in the period after 2009. By 2022, the polytechnic institute with the highest rate of funding (IP Tomar) received 2.6 times the level of core funding per weighted student as the institute with the lowest rate of funding (Instituto Politécnico do Cávado e do Ave – IPCA). In euros, this translated into a difference between EUR 4 321 per weighted student and EUR 1 681. Specific historical factors have affected the level of core funding in IPCA, which is also the only polytechnic to have transitioned to foundation status. Nevertheless, the rate of funding per weighted student in the IP Porto – the country's largest polytechnic – was less than half the rate in IP Tomar.

The five polytechnic institutes with the highest rates of core funding per weighted student in 2022 are all located in regions with declining populations in Portugal's interior. The IP Bragança is the only polytechnic located in an interior region with below-average core funding in 2022: a situation that reflects the comparatively high enrolment growth in this institution in the period between 2007/08 and 2020/21 (see below).

Figure 3.7. Core funding per weighted student in 2009 and 2022 – Polytechnic institutes

Core funding (from state budget – OE) per weighted student in first and second cycle in euros (nominal)



Note: The chart plots state-budget allocations (OE) per weighted student, obtained by dividing the total OE budget envelope for higher education institutions in 2009 and 2022 by the number of weighted students in 2007 and 2019, respectively. The weighting uses the cost factors specified for application of the 2006 formula.
Source: IGeFE analysis of funding for public HEIs per weighted student in 2009 and 2022 (Unpublished).

StatLink https://stat.link/vm0k49

Weighted funding per student has declined most in the institutions that have grown most

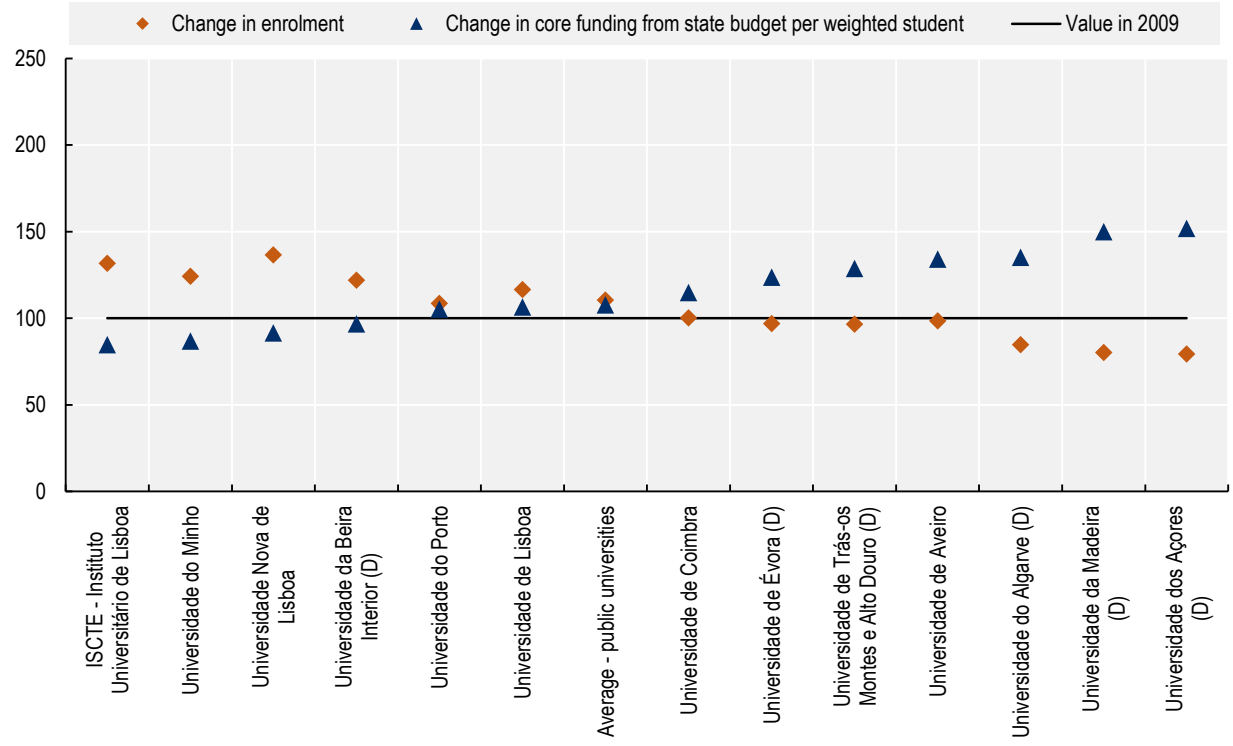
The divergence in core funding allocations per weighted student is the consequence of using an incremental, historical funding approach that takes no account of changes in the numbers of enrolled students in each institution. As illustrated in Figure 3.8, on average in the public university sector, core funding per weighted student in 2022 was around 8% higher in nominal euros than in 2009, despite growth in first and second-cycle enrolment in the sector of 10% of the same period. This is consistent with the general trend for the total budget envelope for core funding in recent years, already illustrated in Figure 3.3. However, given the impact of inflation over the 13-year period, this apparent increase represents a substantial real-terms reduction in funding. Unpublished analysis by IGeFE, based on public data on enrolment (DGEEC, 2022[10]) and annual initial budget allocation for each public university (DGO, 2022[20]), shows that the value of core funding per weighted student for public universities declined by around 7% in real terms between 2009 and 2022.

In euro terms, as shown in Figure 3.8, the level of core funding per weighted students has declined most in public universities that have experienced the highest rates of enrolment growth. In ISCTE, the Universidade do Minho and the Universidade Nova de Lisboa, first and second-cycle enrolment increased

by, respectively, 32%, 24% and 37% between 2007/08 and 2019/20, but core funding per weighted student decreased between the 2009 and 2022 by, respectively, 15.4%, 13.3% and 8.5%. Core funding payments per weighted student to several major universities, including Universidade de Lisboa, Universidade do Porto and Universidade de Coimbra increased in nominal terms by between 5% and 15% between 2009 and 2022, although this represents a real-terms reduction in funding per weighted student in all cases. In contrast, the Universidade do Algarve saw a 35% nominal-terms increase in funding per weighted student between 2009 and 2022, while core funding weighted student to the Universidade da Madeira and the Universidade dos Açores increased by over 50% in the same period.

Figure 3.8. Change in enrolment and core funding per weighted student – Universities

Index of change in core funding per weighted student in nominal euros between 2009 and 2022 (2009 = 100) and in enrolment (headcount) in first and second cycles between 2007/08 and 2019/20 (2007/08 = 100).



Note: The weighting uses the cost factors specified for application of the 2006 formula. D = institution located in a region experiencing demographic decline.
Source: IGeFE analysis of funding for public HEIs per weighted student in 2009 and 2022 (Unpublished).

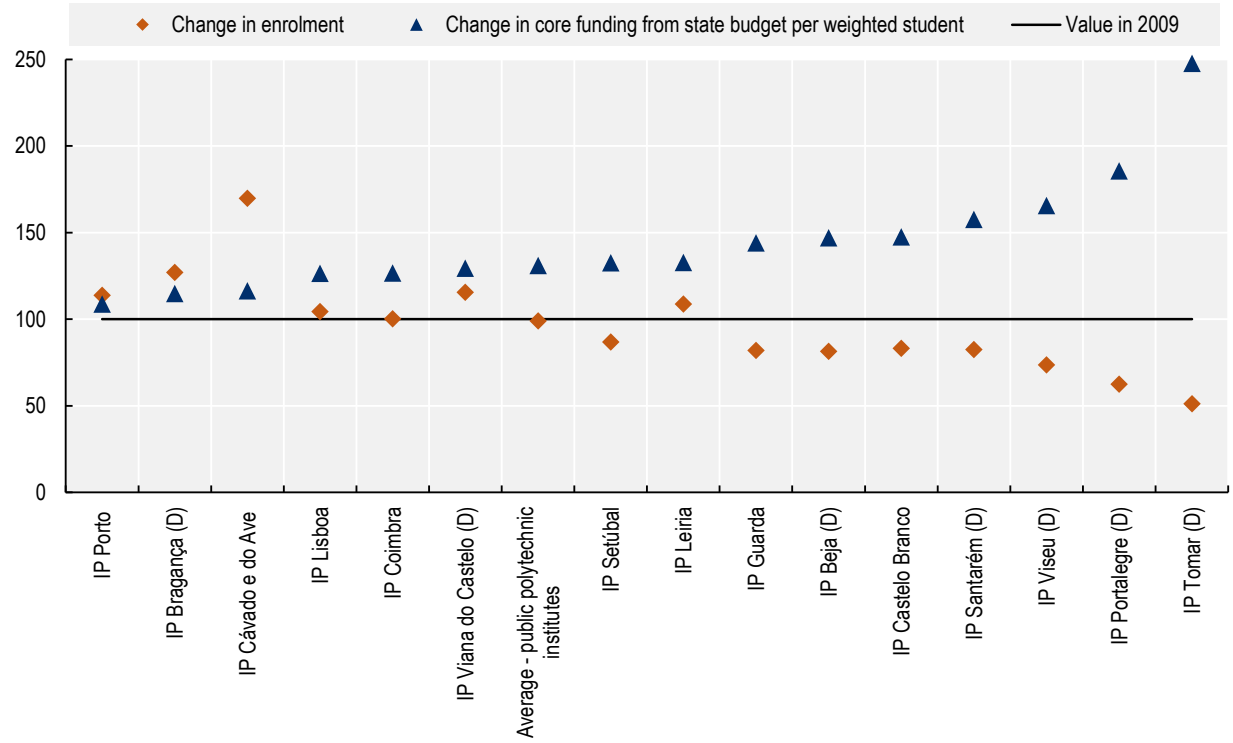
StatLink https://stat.link/p6rlbd

Again, the pattern is broadly similar in the public polytechnic sector, although a larger proportion of polytechnic institutes experienced enrolment decline between 2007/08 and 2019/20 than in the public university sector. Overall enrolment in public polytechnics declined by 1% between 2007/08 and 2019/20, while overall enrolment in public universities increased by over 10%. Moreover, average core funding per weighted student for the polytechnic sector increased by 31% in nominal terms (13% after adjusting for inflation) between 2009 and 2022, compared to the real-terms decline seen in the public university sector. All public polytechnic institutes had higher nominal core funding rates in 2022 than in 2009. Four polytechnic institutes – all located in regions with declining populations – experienced an increase in

nominal core funding per weighted student of over 50%: IP Santarém, IP Viseu, IP Portalegre and IP Tomar.

Figure 3.9. Change in enrolment and core funding per weighted student – Polytechnics

Index of change in core funding per weighted student in euros between 2009 and 2022 (2009 = 100) and in enrolment (headcount) in first and second cycles between 2007/08 and 2019/20 (2007/08 = 100).



Note: The weighting uses the cost factors specified for application of the 2006 formula. D = institution located in a region experiencing demographic decline.
Source: IGeFE analysis of funding for public HEIs per weighted student in 2009 and 2022 (Unpublished).

StatLink https://stat.link/es5rfb

Other OECD countries combine fixed and variable components in their models for allocating core funding to higher education institutions

As noted, since the effective suspension of the application of an allocation formula in 2009, Portugal has used an incremental, historical allocation model. It is not alone among OECD jurisdictions in doing so. Most US states, for example, owing in part to the constrained fiscal environment in which they operate and the significant role of tuition fees in institutional funding (at least for four-year colleges), fund their public higher education systems on the basis of historically determined annual state-budget appropriations. However, in recent decades an increasing number of OECD jurisdictions – like Portugal – have adopted allocation models which award all or a proportion of core funding to higher education institutions based on some form of variable-driven formula.

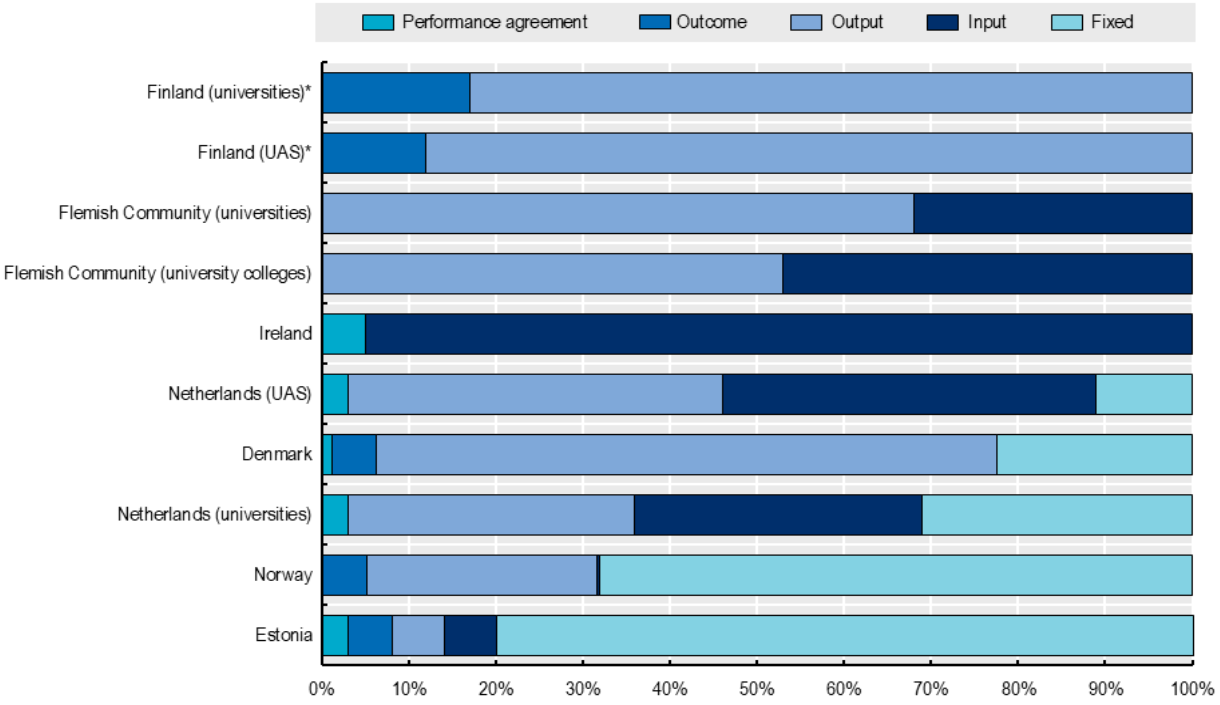
Figure 3.10 illustrates the proportion of core funding for education and operations in public and government-dependent higher education institutions (i.e. excluding specific allocations for research, where these exist) that is allocated based on different variables in selected European comparator jurisdictions.

The jurisdictions were selected as they are, like Portugal, small to medium-sized higher education systems with binary structures and they represent different – and often innovative – approaches to core funding allocation.

The first key distinction shown by Figure 3.10 is between jurisdictions that allocate a proportion of core funding as a fixed payment, unrelated to specific input, output or outcome variables, and those that use purely formula-driven allocation models to provide variable payments. The choice of whether or not to include a fixed component in allocation models – and the relative weight of this fixed component – is a fundamental question for those designing higher education funding systems. Estonia and Norway both distribute over 60% of the core funding between public higher education institutions as fixed payments, which are usually adjusted annually to take into account inflation, but which otherwise remain constant over time. In both systems, the remaining core funding is allocated to institutions based on a combination of input, output and outcome-driven formulas (see below) and, in the case of Estonia, funds linked to institutional performance agreements. Italy uses a similar approach. The Dutch and Danish allocation models use a mixed approach, combining fixed and variable components, while Ireland, the Flemish Community of Belgium and Finland use purely formula-driven approaches to allocate core funding for education and operations to public HEIs (this, by definition, excludes strategic and competitive targeted funding that may be in addition to core funding).

Figure 3.10. Allocation of core funding for education and operations

Share of core public funding for education and operations allocated using different allocation criteria



Note: * In Finland, projected core funding is set out in four-year institutional performance agreements with every public or government-dependent HEI. However, a majority of this funding allocation is calculated using a formula and funding is not made dependent on achievement of objectives in the performance agreements, as in other jurisdictions with performance agreements included here. The Flemish Community of Belgium also uses a base component (*sokkel*) and a variable component in its allocation model, but the base component is also driven by student numbers, so is not strictly a "fixed" component.

The appropriate balance between fixed and variable funding has been a subject of discussion in funding policy design in several OECD jurisdictions. In broad terms, variable – typically student-related – funding

makes it possible to link funding to real levels of activity and outputs in a transparent and equitable manner, which is widely acknowledged as a crucial characteristic for sound allocation models. Nevertheless, variable funding linked to enrolment or graduation can also create incentives for institutions to maximise enrolment and or graduation rates, potentially to the detriment of quality standards, if other safeguards are not effective. Although efforts by institutions to increase enrolment and graduation contribute positively to the societal objectives of widening access and increasing higher education attainment, care is required to avoid situations where the funding system drives a culture of "quantity" is over "quality". Risks in this respect may include increased class sizes and reduced student-staff interaction, if academic staff numbers do not keep pace with enrolment growth, or pressure on staff to ensure students pass exams to maximise graduation rates, rather than maintain rigorous academic standards. The extent to which such risks translate into reality naturally depends on a range of factors outside the design of the funding model, including the external and internal quality assurance systems and institutional strategy.

The question of the best balance of incentives for quantity and quality has been prominent in recent higher education funding reforms and related policy debates in Denmark and the Netherlands. The 2019 higher education funding reform in Denmark, for example, (re-)introduced a fixed component in the allocation model (the "basic grant" or *grundtilskud*) for all types of institutions, equivalent to around 25% of core funding for education, with the explicit goal of reducing institutions' focus on graduate numbers and promoting long-term planning and stability (OECD, 2021[21]). A recent government-commissioned study in the Netherlands sought to identify the optimal balance between the fixed component (*vaste voet / "fixed foot"*) and variable components in the Dutch funding allocation model for public universities and universities or applied science (de Zwart et al., 2021[22]).

Table 3.3. Variable and fixed funding: potential advantages and disadvantages

	Potential advantages	Potential disadvantages
Variable funding	• Variable funding aligns payments to institutions with real activity and output levels, facilitating an equitable and efficient allocation of resources • In contexts where enrolment is increasing, institutions receive additional funding to cover costs associated with serving additional students (and maintain quality of education) • Variable funding rewards institutions that succeed in attracting students through offering high quality, relevant and innovative programmes	• Fluctuation (instability) in funding over time as enrolment changes, reducing medium to long-term predictability of income, reducing capacity of institutions for long-term planning and investments (e.g. in infrastructure) • In contexts where enrolment is declining, income will often decline faster than largely fixed institutional costs (staff and overhead) • Variable funding can create incentives to maximise enrolment and graduation (quantity), which, in some situations, may create risks for quality • Competition for students, promoted by variable funding, may not always be desirable in higher education systems governed by public-service principles
Fixed funding	• Predictability and stability of income, creating space for innovation and long-term investments • Fixed funding facilitates investment in public-service missions that are not directly linked to student numbers, including institutional role in regional and local development	• Fully fixed funding models lead to irrational, inequitable and non-transparent differences in funding levels to individual institutions • Limited incentives for institutions to invest in new programmes or innovations to make existing programmes relevant and attractive to students • Potentially more limited incentives to invest in student support and guidance to promote timely progression and completion of students

Note: Summary developed by the OECD, drawing on de Zwart et al (2021[22]) *Verkenning naar de optimale verhouding tussen vaste en variabele onderwijsbekostiging in het hoger onderwijs (Exploration of the optimal ratio between variable and fixed funding for instruction in higher education)*, https://www.berenschot.nl/media/i0kk5fgd/berenschot-rapport-vast-variabele-onderwijsfinanciering.pdf (accessed on 6 July 2022).

The Dutch study reviewed the main arguments for and against the use of fixed and variable components in funding allocation models (developed further in Table 3.3), noting, in particular, the contribution of variable funding to transparency, equity of treatment of institutions and efficiency (and, in principle, quality)

and the role of fixed funding in guaranteeing stability and recognising that fixed costs in institutions cannot be adjusted as rapidly as student enrolment. The report notes that universities of applied sciences in Dutch regions that are beginning to experience population decline argue for an increase in the proportion of core education funding allocated as a fixed payment, but that the leaders of other HEIs consider that changes to the ratio between fixed and variable funding would have little impact on their decision-making or the operation of their institutions. The report's authors conclude that the ratio between fixed and variable funding should not be considered by government as a steering instrument (whereby changes in the ratio would lead to changes in institutional behaviour), but rather as a facilitating or contextual factor for other institutional and government policies (de Zwart et al., 2021[22]).

The analysis and debates conducted in the Netherlands occur in the specific context of that higher education system, which is characterised by a largely open admissions system and concerns among some commentators that the variable funding system has driven a focus on quantity at the expense of quality. In systems such as Finland and Ireland, which allocate all core public funding using a formula or formula-like model, the potentially negative effects of using a variable funding approach are not a significant topic of discussion in policy circles. This, in part, reflects that fact that student numbers in these systems are effectively controlled by a combination of strongly selective admission systems (in both countries) and government regulation of study places (in Finland). This, combined with high demand for higher education places, reduces the risk of significant and uncontrollable fluctuation in student numbers year-on-year, which could trigger problematic reductions in institutional income in fully formula-based funding systems, if student numbers were to fall. In both countries, policymakers tend to assume that a combination of accreditation and quality assurance policies and institutions' own interest in maintaining their reputations will also act to guarantee quality, further countering the risk that HEIs prioritise enrolment and graduation rates over quality objectives.

Different mechanisms can be used to moderate problematic year-on-year changes in funding levels

Just at OECD jurisdictions have taken different views on the relative merits of fixed and variable funding, so the interests and perspectives of higher education institutions themselves can be divergent. In crude terms, expanding institutions have a strong interest in variable funding mechanisms, as such models compensate them financially for each additional student they enrol or graduate. In contrast, as illustrated by the case of many public HEIs in interior and island regions in Portugal – and the Dutch universities of applied science in regions undergoing demographic decline mentioned in the previous discussion – institutions experiencing shrinking enrolment have an intrinsic interest in fixed or non-student-related funding streams. A key challenge posed by fully variable funding models driven by student or graduate numbers for such institutions is that funding allocations will decline each year as enrolment falls, while the institutional cost base (essentially staff and infrastructure) will be remain largely constant. Even in higher education systems with more flexible employment arrangements than in Portugal, adjusting the cost base of a large and complex organisation such as a university or polytechnic is inherently difficult and requires time.

Some OECD jurisdictions that use variable allocation models have incorporated specific design features in the models to limit the extent of year-on-year changes (and, in particular, reductions) in funding for individual institutions. Portugal's 2006 formula limits budget reductions to 3% and budget increases to 5% in a given financial year. The Danish funding model, implemented in a system where enrolment is still growing at a modest rate, also includes a mechanism whereby reductions of more than 2% in the budget for an individual institution are compensated from a contingency fund and reductions of between 1% and 2% are implemented over a period of two years (OECD, 2021[21]). The Flemish funding model, which, as shown is Figure 3.10, is largely driven by student variables, uses a different approach, whereby the distribution of the budget envelope between institutions is based on a rolling average of values for a five-year period ending two years before the financial year in question (t-7/t-6 to t-3/t-2, where t is the financial

year). This contrasts with other systems, where the previous year or previous two-year period are used as the reference period. As noted in a recent OECD review of the Flemish system, the disadvantage of this approach is that institutions that serve increasing numbers of students are only compensated with a significant delay for the additional educational activities they perform (OECD, 2021[23]).

Some systems use fixed unit payments, others use purely distributive formulas

Another difference observed between variable funding allocation models for higher education institutions in OECD jurisdictions is whether they are "additive" or "distributive". Additive models work bottom-up, fixing unit payments for specific inputs or outputs and calculating the sums to be paid to individual institutions by adding together the number of inputs or outputs observed in the reference period (multiplied by the relevant monetary values). The total envelope to be allocated is equal to the sum of all unit payments to be made. Distributive models take the available budget envelope as their starting point and divide the total budget available by the total number variable units observed in the reference period (e.g. weighted enrolled student, study credits passed, etc.). The value of these variable units will depend on the size of the budget available and the number of units observed during the reference period. If the number of units (e.g. students enrolled) increases faster than the total budget envelope in a given year, the payment for each unit will decline year-on-year.

Table 3.4. Additive and distributive formula allocation models

	Type of budget envelope	Government-imposed system of student caps (*numerus clausus*)	Formula allocation method		
			Fixed unit payments per input/output (additive formula)	Mixed (additive + distributive)	Purely distributive
Denmark	Closed	Yes – enrolment limits set with regard to employment outcomes and for medical programmes	Payments per 60 completed credits, differentiated by field		
Flemish Community or Belgium	Semi-open*	Only in medicine, dentistry and performing and visual arts			100% of budget envelope allocated using formula
Finland	Closed	Yes – enrolment limits are agreed as part of performance agreements			100% of budget envelope allocated using formula
Ireland	Closed	No – Institutions decide on student admission within quality assurance rules		Weighted fixed payments to cover fees + enrolment driven formula	
Netherlands	Closed	Institutions set admission limits (*numerus fixus*) in a limited number of (mostly medical) programmes			Variable component of core education funding allocated using formula
Norway	Open for some performance parameters	Institutions set admission limits in a limited number of (mostly medical) programmes		Weighted payments for graduate indicators + distributive for other performance criteria	
Scotland (United Kingdom)	Closed	Effectively – Government sets limits on number of state-funded places for Scottish residents (who pay no tuition fees)	Fixed payments per enrolled student differentiated by field		

Note: * The Flemish Community of Belgium uses a unique mechanism in its funding model (the "click" system) that automatically triggers a increase or decrease of up to 2% in the total budget envelope for the core public funding allocation to HEIs in a given financial year when enrolment in a given sub-sector (universities, university colleges, schools of arts) increases or decreases by more than 2% between two reference periods. In practice, in times of fiscal constraint, this rule is not always applied.

The risk – for government – of using fixed unit payments in the allocation model is that the authorities cannot control the size of budget envelope required to meeting funding obligations. This was effectively what happened during Australia's experiment with demand-driven university funding between 2012 and 2017 (Universities Australia, 2020[24]). From 2017 onwards, Australia re-introduced caps on student enrolment to bring the costs of the funding system under control. As summarised in Table 3.4, some other systems that use fixed unit payments (such as Scotland in the United Kingdom) also impose enrolment caps to maintain spending within available budget envelopes. This is also the approach used in many central and eastern European countries, where a certain number of "state-funded" study places are available each year. Denmark manages to implement a system of unit payments (per 60 study credits gained, with three cost categories depending on subject area) without a universal system of study-place regulation by using detailed projections of student numbers to calculate the annual budget envelope (OECD, 2021[21]). However, the Danish government does implement limits on study places (*numerus clausus*) in medical programmes and also restricts study places in fields from which graduates have persistently higher-than-average levels of unemployment.

In other systems, including in Finland, which does have a universal system of study-place regulation, public authorities used distributive allocation models, which allow the value of funding per student, graduate or credit to fluctuate – and often decline – over time, depending on the budget envelope and levels of study activity. When Portugal implemented an allocation formula in higher education, it, like Finland, combined a distributive allocation model with national regulation of study places. The role of study-place regulation (*numerus clausus*) as a steering tool for higher education systems is discussed in Chapter 4.

Student-related parameters dominate in the design of allocation formulas

Among OECD jurisdictions that use formula-based approaches to allocating core funding for operations and education to higher education institutions, a majority link all or most of this funding to student enrolment (an input variable), the number of degrees awarded or study credits successfully passed (output variables) or a combination of these. As summarised in Table 3.5 overleaf, systems such as the Flemish Community of Belgium and the Netherlands allocate a significant share of the education component of their core funding to enrolment (credits for which study enrol in Belgium and the number of enrolled students in the Netherlands), but also link an equivalent or greater share of funding to outputs (successfully completed credits in Belgium and degrees awarded in both countries). Finland and Denmark link a majority of core funding to student outputs (degrees and credits gained, respectively), although, as discussed, Denmark also has a fixed component in its funding model, which is not the case in Finland. Norway has chosen to link around 20% of core funding to HEIs to student credit and degree completion, maintaining a comparatively large fixed (or historical) component in its funding allocation model, like Estonia.

In addition to these core parameters, some OECD jurisdictions have linked a smaller share of total core funding to other input, output or outcome indicators, as illustrated in Table 3.5. Estonia, for example, includes financial rewards for enrolment of students in fields linked to institution's core missions (established in their profiles) and international students. Both Estonia and Denmark attach a relatively small share of funding to parameters linked to study duration (to incentivise timely progression and completion of studies) and the share of graduates in employment. Finland also attaches between 8% and 10% of the core education grant to graduate employment outcomes, focusing on the share of graduates in "graduate-level" jobs. Both Denmark and Finland a small proportion of total funding for education to the results of student feedback surveys, using these data as another proxy for educational quality. As discussed below, evidence on the effects of including output and outcome parameters in funding allocation models is mixed and inconclusive.

Table 3.5. Parameters for allocating core funding for education and operations

Parameters used in formula-based allocation for core public funding models for education

	Flemish Community of Belgium		Finland		Denmark	Netherlands		Norway**	Estonia
	Univ.	UC.	Univ.	UAS	Univ.	Univ.	UAS		
Input									
Number of credits for which students are enrolled	**32%**	**47%**							
Number of students (headcount)						**33%**	**43%**		
Share of international students									**1.7%**
Share of students enrolled in programmes related to HEI's core profile/mission									**2.6%**
Share of students spending mobility period abroad								**0.3%**	**1.7%**
Output									
Number of credits successfully completed	**68%**	**53%**			**67.5%**			**20%**	
Bachelor's and master's degrees awarded			**71%**	**76%***		**33%**	**43%**	**4.8%**	
Doctoral degrees awarded								**1.6%**	
Credits gained in continuous learning			**12%**	**12%**					
Degrees completed in nominal study duration									**6%**
Other indicator of average study duration					**3.75%**				
Outcome									
Share of graduates in employment					**3.75%**				**3.4%**
Share of graduates in "graduate" employment			**10%**	**8%**					
Scores from student feedback (survey)			**7%**	**4%**	**1.25%**				
Private funding attracted for educational activities									**1.7%**
Funding from national Research Council								**1%**	
Funding from EU research programmes								**1.6%**	
Income for research from private sources								**1%**	
Research output (publications)								**1.6%**	
Total allocated through formula	**100%**	**100%**	**100%**	**100%**	**76.25%**	**66%**	**86%**	**32%**	**17%**

Note: Percentages indicate the proportion of core public funding for education and operations allocated using the relevant parameter. Denmark, the Netherlands, Norway and Estonia allocate a proportion of funding based on historical allocations (without use of a formula) – see Figure 3.10 – meaning that the proportions indicated here do not necessarily sum to 100%. * Includes a small allocation for vocational teacher-training degrees. ** Unlike other jurisdictions include here, Norway does not have separate components for education and research in its funding model, which partly explains the inclusion of research parameters in the core funding model for education and operations. Univ. = universities; UC = university colleges; UAS = universities of applied sciences.

Cost factors are commonly used to adjust payments to the notional cost of provision in different fields

In common with funding systems elsewhere in the OECD, the allocation formula adopted in 2006 for distributing core operating funding to HEIs in Portugal uses cost factors to adjust the payments to institutions to the notional costs of delivery in different fields of study. The cost factors (see Table 3.6) were calculated based on average staff costs across all institutions, with reference to nationally fixed student-to-staff ratios, ratios of non-teaching staff to teaching staff and ratios of central administrative staff to each student.

Table 3.6. Cost factors by field of education used in Portugal's funding formula

	University education			Polytechnic education	
U1	Medicine and dental medicine	4.00	P1	Performing arts and sign language	3.50
U2	Performing arts	3.56	P2	Nursing and dental technician	2.40
U3	Veterinary medicine	2.70	P3	Health technologies	2.00
U4	Engineering, exact and natural sciences, pharmacy, agriculture	2.50	P4	Technologies	2.00
U5	Art and design, architecture, education, psychology, physical education and sport, communication	1.90	P5	Agriculture, forestry, animal husbandry, veterinary science	1.69
U6	Mathematics, statistics and computing	1.60	P6	Nursery educators, teachers, animators, communication, art and design, sport	1.51
U7	Economics, management, tourism, geography and modern languages	1.20	P7	Information and Communication Technologies	1.30
U8	Humanities, other social sciences, law and political science	1.15	P8	Accounting, management, sales and marketing, solicitor training, secretarial training, tourism, modern languages, social work	1.00
UA1	Medicine, dental medicine and music	4.00	PA1	Nursing	2.42
UA2	Engineering, exact and natural sciences, pharmacy, agriculture	3.00	PA2	Technologies	1.40
UA3	Others	1.69	PA3	Others	1.40

Note: The cost factors shown are those calculated in 2008, the last year the formula was applied in full in Portugal, are were unchanged when the formula was applied for budget increases in 2022. The codes beginning UA and PA refer to cost factors for advanced (post-graduate) studies.
Source: IGeFE (2021[25]) *Índices de custo 2022 por áreas de formação (Cost factors 2022 by field of education)*, https://www.igefe.mec.pt/Page/Index/55?csrt=16906015704621263206 (accessed on 8 June 2022).

The approach to calculating cost factors in Portugal is, to some extent, logical as it recognises staff costs – and specifically student-to-staff ratios – as the primary driver of cost differentials between fields of study (Hemelt et al., 2018[4]; OECD, 2022[26]). Nevertheless, as discussed, existing, observed staff costs are an imperfect indicator of reasonable costs as they reflect multiple contextual factors, including the historical availability of funds to pay for posts and staff salaries. In systems and institutions where funding has historically been abundant it is likely that staff costs will be higher, as it has been possible to create more posts and promote more academic staff (or, in systems that allow such flexibility, pay staff more). The opposite in true in systems and institutions that have historically had low(er) levels of resources available. As such, while establishing average costs across a higher education system is probably the best-available approach to assessing cost levels as an input to funding formulas, it remains imperfect.

As shown in Table 3.7, the distribution of cost factors for different fields of study in Portugal's allocation formula is broadly consistent with those used in comparable OECD jurisdictions, although the two Nordic systems included here use a smaller span of values. In the case of Denmark, the low value of the weighting for medical studies is partly explained by the way funding of medical studies and university hospitals is organised in the country. Portugal has a comparatively large number of cost categories in its model,

particularly for universities (where Denmark and Finland use three categories, for example). However, it is not uncommon – albeit for reasons that are not entirely clear – for countries to use a greater number of cost categories for non-university institutions, as in the Denmark and the Flemish Community of Belgium (OECD, 2021[21]; OECD, 2021[23]).

Table 3.7. Subject-area weightings (cost factors) in selected OECD jurisdictions

Weighting factors for *undergraduate* students used in funding allocation formula in selected OECD jurisdictions

	Flemish Community		Netherlands		Ireland	Denmark (Universities)	Finland	Portugal	
	Univ.	UC	Univ.	UAS				Univ.	Poly.
Non-laboratory subjects (e.g. humanities and social sciences)	1	1	1	1	1	1	1	1.15.or 1.2	1
Subjects with fieldwork (e.g. computer science, education)	2	1.1 to 1.6	1.5	1.28	1.3	1.4	1	1.6 to 1.9	1.3 to 2
Laboratory subjects (e.g. engineering, physical sciences)	2	1.6	1.5	1.5	1.7	2.1	1.75	2.5	2.4
Clinical medicine	3.9*	-	3	-	2.3	2.1	3	4	-
Dentistry	3.9				4	2.1	3	4	
Veterinary studies	3	-	3	-	4	2.1	3	2.7	-

Notes: * Since 2017, university programmes in medicine in the Flemish Community have been funded through a ring-fenced budget with variable component of the teaching grant. Univ. = university. Poly. = polytechnic.
Source: OECD (2021[23]) Resourcing Higher Education in the Flemish Community of Belgium, https://doi.org/10.1787/26169177.

Evidence on the effectiveness of including output and outcome parameters in allocation formulas is inconclusive

Although an increasing number of OECD member countries have introduced output and outcome-related funding models, robust research into the effects of such systems has been limited. State governments in the United States were among the first in the OECD to embrace output-based funding, initially in the 1980s and 1990s and subsequently in another wave of reforms in the 2000s. As a result of this early experimentation, most available studies into the effects of performance funding are from the United States. A recent analysis of the results of these studies found only limited evidence of positive effects from output-based funding systems on target variables, such as student progression and completion rates (theoretically incentivised by linked payment to graduation rates and study duration). The analysis also found widespread examples of unintended and undesirable consequences, such as institutions becoming more selective at admission to ensure higher completion rates, but thus undermining states' broader objectives in terms of widening access (Ortagus et al., 2020[27]).

Fewer studies have investigated the impact of output and outcome funding in European higher education systems, although the evidence that does exist suggests a similarly limited impact. A study in Denmark found the completion-oriented "taximeter" system (the successor to which constitutes the variable component in the current Danish funding model) to have had a mixed influence on completion rates in Danish higher education institutions (Claeys-Kulik and Estermann, 2015[28]). Likewise, an evaluation of different performance-based funding formulas used in German federal states between 2000 and 2008 found that their introduction was rarely followed by significant changes in the outcomes they sought to influence, casting doubt on their efficacy, particularly given the cost of their implementation (Dohmen,

2016[29]). There is no evidence that the introduction of output variables in the funding allocation model using in the Flemish Community of Belgium in 2008 has had any impact on progression or completion rates in the Flemish higher education system (OECD, 2021[23]; de Zwart et al., 2021[22]). The few systems that have integrated outcome variables (such as graduate employment) in their funding allocation models, have not yet produced clear evidence of the impact of including these variables. Isolating the effect of the policies in question is inherently difficult, if not impossible, given the range of other factors, including other policies that influence outcomes.

Despite a trend to experiment with output-related funding models in the 2000s, there are signs that some OECD jurisdictions are moving away from the use of output and outcome indicators in the funding allocation policies. The review commission examining the first generation of Dutch performance agreements, which included a set of seven standardised indicators common to all institutions, concluded that the new generation of agreements should avoid centrally determined quantitative indicators and adopt a more qualitative approach to take better account of institutional contexts and a wider range of possible objectives at institutional level (Reviewcommissie Hoger Onderwijs en Onderzoek, 2017[30]).

More recently, a review by a government-appointed expert committee in Norway recommended removing most of the input, output and outcome indicators from the Norwegian core funding allocation model (see Table 3.5) on similar grounds to their Dutch counterparts some years earlier (Norwegian Ministry of Education and Research, 2022[31]). The committee argues that it was not possible to capture the range of outputs expected of higher education in a nuanced way in a funding formula and that including multiple indicators in the allocation model risked diverting the focus of institutions towards a limited number of outputs and contributing to a homogenisation of the higher education landscape. Instead, the committee recommends keeping the funding model simple – maintaining only the variables related to student credit acquisition – and channelling efforts to promote good outcomes through institutional performance agreements (see Chapter 4).

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 in Portugal, this section highlights that key issues in relation to the core funding model for public HEIs that Portuguese policymakers need to consider and provides recommendations for possible ways forward.

Ensure clarity about the purpose of the core operating grant to public higher education institutions

The core operating grant for public higher education institutions provided from the state budget in Portugal is designed to provide a “base” level of funding to permit the institutions to operate. An allocation formula adopted by ordinance in 2006 linked funding allocations to the delivery of education in the first and second cycles (bachelor’s and master’s degrees), recognising staff costs as the main cost driver in delivering this education. However, for a range of reasons, core public funding has not been fully allocated using a formula since 2009.

In contrast to some other university systems in Europe, such as Denmark, Finland or the Netherlands, Portugal does not provide a specific core grant directly to universities for research. Rather, the Foundation for Science and Technology (FCT) awards direct grants to research units associated to HEIs that are evaluated as “good” or above in the periodic research assessment exercise, in addition to competitive project-based funding. The FCT also directly funds researcher posts through the Stimulus Programme for Scientific Employment and provides grants for doctoral researchers. As academic staff who are associated

with research units are paid by their employer higher education institution, it has – more or less tacitly – been accepted that the core operating grant to HEIs also contributes to funding research activity.

During consultations undertaken for this review, leaving aside the discussion of the adequacy and transparency of the grant allocations (discussed below), three main questions arose about the expected "coverage" and purpose of the core operating grant from the state budget:

- The first was the extent to which the core operating grant should support the regional development function and public-service mission of public higher education institutions without necessarily linking funding levels to enrolment or other activity.
- The second question was whether or not the contribution of the core operating grant to research activities, including PhD training, should be more explicitly acknowledged in policy design, including through the inclusion of research parameters in a future allocation model.
- The third question stemmed from the fact that the existing (but currently unused) 2006 funding formula contains no provision for funding short-cycle TeSP programmes in polytechnics, although these programmes now make up a significant proportion of polytechnics' educational activity.

The first question touches on probably the most fundamental issue facing those designing a future higher education funding model in Portugal. Enrolment levels in institutions (particularly polytechnics) in interior regions and the islands have been declining steadily and – even with additional student recruitment among adult populations, vocational secondary graduates and internationally – this trend will inevitably continue in the coming decades. The adoption of a student-driven allocation model will, inevitably, lead to institutions with declining enrolment receiving a smaller share of overall funding compared to today.

The public-service role of higher education institutions in regional locations is clear. As discussed below, mechanisms can be built into funding allocation models to protect smaller institutions. However, to respect the criteria of transparency and equity for all institutions and to promote efficient use of resources, core funding allocations should primarily be based on real levels of activity in institutions. Failure to link funding allocations to student numbers in recent years in Portugal has created an inequitable situation whereby some institutions receive considerably lower levels of public resources than their counterparts elsewhere in the country to support the education of their students. This brings attendant risks for the quality and the support services these institutions can provide. Reform of the core funding allocation model should seek primarily to address this inequity. Beyond the stability mechanisms that can be included in the core allocation model highlighted below, the specific task of supporting institutions in regions facing demographic decline to adapt and pursue their public service mission in the face of changing circumstances is best left to other funding and steering mechanisms, outside the scope of the core funding model.

As noted, the core operating grant to public HEIs contributes to funding academic research by (partially) funding staff wage costs. This role of the grant could be made more explicit in the formulation of funding regulations and potentially through the inclusion of doctoral graduates as a funding allocation parameter in a new formula (see below). However, given the existing architecture of performance-linked funding for research in Portugal, it makes sense that primary responsibility for creating incentives for good research, for assessing the quality of research outputs and for funding research more generally should continue to rest with the FCT and the policies it implements.

Short-cycle Professional Higher Technical Programmes (TeSPs) are now well established as part of polytechnics' core business and are likely to become increasingly important as vehicles to support upskilling and reskilling among the adult population. The Flemish Community of Belgium, which recently integrated similar short-cycle programmes into its higher education system, adapted its funding formula to encompass these programmes, using standard student-related parameters, but with a distinct set of cost factors. Such an approach would make sense in Portugal in the medium term. However, it is recognised that a large proportion of funding for TeSPs until 2027 will come from EU funds and that the offer of TeSPs

is still in a development and expansion phase. It may therefore be appropriate to delay full integration of TeSPs into a new core funding model until after 2027.

Recommendations

1. Ensure that the design of a future model for allocating the core operating grant to public higher education institutions in Portugal is guided by the principles of transparency, equity of treatment between funded higher education institutions and efficiency. To promote transparency and efficiency in the higher education funding system as a whole and to create incentives for innovation and adaptation, provide support for institutions located in regions experiencing demographic decline through separate, complementary funding and steering mechanisms outside the core funding allocation model (see recommendations below).
2. In new secondary legislation or equivalent policy documents establishing a revised allocation model for the core operating grant paid to HEIs from the state budget, ensure the purpose and objectives of the grant, including its contribution to co-financing research in universities and polytechnics, are made explicit (see also recommendations concerning allocation criteria).
3. In the period up to 2027, direct European and national funding for short-cycle programmes (TeSPs) through the strategic funding routes proposed below. From 2027 onwards, aim to integrate funding of TeSPs into the core funding formula, in recognition of these programmes' status as a core component of polytechnics' educational activity.

Develop a new funding allocation model, guided by the principles of transparency, equity and efficiency

To provide an equitable distribution of scarce public resources to public higher education institutions, Portugal needs to adopt a rational funding allocation model for the core operating grant. Although opinions among higher-education-institution representatives and policy makers consulted during this review about the best future policy differ, there was a broad consensus that the formula from 2006 requires changes and cannot be re-applied in its current form. Given the multiple developments in Portugal's higher education system since 2006 and the lessons that can be drawn from the experience of other OECD higher education systems over the last decade, it makes sense to design a new allocation model from first principles, rather than attempting to adapt previous policy instruments or proposals. Equally, in order to restore the allocation of the core operating grant to a rational footing, it is appropriate to use a zero-based budgeting approach, whereby the entirety of the core operating grant allocations for each institution will ultimately – after an appropriate transition period, discussed below – be determined by the new allocation model.

The discussion above examines the main choices that can be made in designing a new allocation model and the choices made by other OECD jurisdictions. Among these, the three most important decisions for Portugal are, arguably, whether or not to include a "fixed" (invariable) component in the allocation to each institution; whether to revise or maintain the existing subject-area cost factors used in the previous allocation model; and which parameters to use in the model to drive the allocation of funds. A fourth question is whether to work with fixed unit payments or a purely distributive formula. While Portugal's system of study-place regulation (*numerus clausus*) would theoretically provide spending safeguards to permit a system that uses fixed unit payments, there is a consensus among policy makers that a distributive system is the only feasible option in the Portuguese context.

In relation to the first decision, the high proportion of fixed or semi-fixed costs in Portugal's higher education institutions, partially determined by the country's comparatively rigid rules governing employment of academic staff, could justify the use of a fixed component in the new funding model. The experience of Denmark, which moved from a mostly variable funding model (the "taximeter") to one where 25% of core funding to institutions is allocated as a fixed basic grant to ensure stability and a focus on quality, could be instructive for Portugal, particularly as Denmark also has a largely binary system of higher education with a mixture of small and large institutions (OECD, 2021[32]). Any fixed component should in any eventuality be kept to a modest share of total core funding to ensure the criteria of equity and efficiency are respected.

As discussed above, the cost factors used until 2009 in the previous funding formula in Portugal are broadly aligned with those in other OECD jurisdictions examined for this review. In contrast to the situation in other jurisdictions, the cost factors in Portugal were – notwithstanding methodological limitations – calculated on a rational basis with reference to average staff costs. While it would be possible to use these cost factors without further amendment, there appears to be a case to review the level of the factors used for certain programme groups. Underlying staff costs in universities are higher than in polytechnics – because of lower teaching loads and higher qualification levels among staff in universities – and also higher in subjects requiring extensive access to laboratories, studios or other expensive facilities than in classroom-based subjects. Nevertheless, as student-staff interaction is a key element of educational quality and staff costs are the main cost driver in higher education, some of the lowest cost factors currently used may not be fully justified. Additionally, there may a case for reducing the number of cost categories to simplify – and thus increase the transparency of – the funding system.

In terms of the parameters to include in the model, international evidence, including recent trends, suggests that it is best to keep their number to a minimum. This is not only to ensure the funding system is easily understood and minimise administrative burden associated with data reporting, but also because the real effectiveness of including multiple parameters attached to a small proportion of funding is doubtful. Advanced OECD higher education systems tend to link a majority of core funding to simple input (enrolment) or student output parameters (credits or degrees). Portugal has previously used only enrolment parameters for first and second-cycle programmes. Given the previous recommendations on the scope and purpose of the core operating grant, TeSP students should, in the medium term, be included in the student-linked parameters, once the financing of TeSP programmes has been mainstreamed. Despite the limited evidence of the effectiveness of using educational output indicators (credits or degrees obtained) in funding models, a mix of enrolment and graduation parameters could be considered to signal the importance of study completion within the system. The effects of including output parameters (e.g. degrees awarded) on actual funding allocation would need to be modelled as part of development of the new formula.

From a logical standpoint, there may also be a case for including the number of doctoral degrees awarded in the selected reference period as a parameter in a new formula, to acknowledge the role of universities in doctoral training and the staff resources – largely paid for by the core grant – dedicated to this activity. However, those designing the new funding formula would need to reflect carefully on the appropriate cost factor (weighting) to attach to each doctoral degree awarded. Other OECD jurisdictions that use the parameter of "doctoral degrees awarded" in institutional funding (such as the Netherlands or the Flemish Community of Belgium) apply this parameter, along with others, for the allocation of separate budget envelopes for institutional research grants, not for the allocation of their respective teaching grants. Portugal does not allocate a separate budget envelope as a direct research grant to institutions. Moreover, it would be important not to give excessive weight to doctoral training in a revised formula for Portugal's core operating grant. As such, further careful modelling of the effects of different weightings for doctoral degrees would be required, if a decision was taken to include doctoral graduates as a parameter in the new formula.

In order to ensure the purpose of the core operating grant in Portugal remains clear, to ensure that the funding formula remains simple and to preserve the role of the FCT as the government body with primary

responsibility for monitoring and funding research, it would not be advisable to include research output parameters in the core funding formula.

Recommendations

4. Develop a new model to allocate the core operating grant from the state budget to public HEIs, in which a majority of core funding is allocated using a formula. Adopt a zero-based budgeting approach, starting from first principles and factoring in an appropriate transition period to allow institutions to adapt to the new system (see below).
5. To create additional stability in the system and in recognition of high fixed costs in the higher education sector, consider allocating a minority of the core operating grant to public HEIs (perhaps between 15% and 25%) as a fixed funding component, which remains stable (other than adjustments for inflation) over time. Denmark provides a helpful policy example to draw on for lessons during the detailed policy-design phase if this option is pursued.
6. As part of the detailed design phase for the new model, review the validity of the existing (2008) cost factors for the two sub-systems of the public higher education sector, assessing if the current cost differences between subject fields and between university and polytechnic programmes are justified. The review should acknowledge the higher cost of delivering subjects in laboratory and studio-based disciplines and the generally higher staff costs in universities, but equally the importance of funding adequate student-to-staff ratios across all fields of study. The review should also assess the impact on institutional funding of using a more limited set of three or four cost factors for each sub-sector of the higher education system.
7. Link all or most variable core funding in the new model to simple student-related parameters. For bachelor's and master's programmes (and, in the medium term, short-cycle programmes), the number of enrolled students is the simplest option, although additionally including a parameter for degrees awarded would send a signal about the importance of degree completion, complementing other policies to promote progression and completion. If the option is retained, the most appropriate parameter to recognise resources spent on doctoral training would be the number of doctoral degrees awarded. However, careful modelling would be required to assess the effects and appropriateness of including this parameter in the allocation model for the core grant. To reduce the impact of year-on-year fluctuations in student activity, the average values of parameters for the previous two reference years could be used in the formula calculation.

Recognise that implementation of a new funding allocation model will require a transition period and additional resources

While designing a new core funding allocation model based on the principles of transparency, equity and efficiency is an important step, it is clear that implementing such a model will additionally require both time and money.

Given the disparities in the level of core funding per weighted student between institutions analysed above, a primarily formula-driven model, if applied with immediate effect, would inevitably lead to funding increases for some institutions. More problematically, it would lead to reductions for certain institutions in interior regions and the islands that have experienced enrolment decline. As explained in Chapter 4, this review recommends channelling complementary public funding to higher education institutions, through a separate funding route, to support strategic investments and profiling, with dedicated funds to support institutions in interior regions and the islands. The latter dedicated funding will support institutions as they adapt – notably to attract students in realistic growth areas, where institutions can offer high-quality provision and to consolidate provision in fields where student numbers are projected to decline.

Notwithstanding this additional financial support, institutions with declining enrolment will need to adjust to a situation where they receive a smaller share of total core funding than they do at present and will require a transition period to allow them to prepare.

The preparations and modelling for a new formula allocation system could potentially be completed in time for its use for the 2024 state budget, presented in autumn 2023. The transition period should last no longer than strictly necessary, as a key goal of the reform should be to restore an equitable distribution of funds. There are at least two possibilities for structuring the funding system during a transition period:

- A system whereby a new formula is applied to a progressively increasing share of the total core budget envelope, with the remainder distributed on the current historical basis, perhaps over a three-year period.
- A system where the formula is not initially applied directly, but annual increases in the budget envelope for the core grant are distributed exclusively – or nearly exclusively – to the institutions that are currently under-funded in comparison to the share of funds they would receive if the formula were applied. Funding for institutions that would receive a lower share of total funding if the formula were applied would see their core funding allocation frozen or increased only modestly.

Careful modelling will be required to analyse the impact of a change to the core funding system and to determine the length of the transition period required to avoid severe financial shocks for institutions that stand to receive a reduced share of core funding. The time required will depend to a large extent on the additional resources that can be secured for the core funding envelope and notably if annual budget increases can be secured that go beyond the 2% increase currently planned. Care must be taken in designing transition arrangements to account for the funding needs of institutions that are currently under-funded, as well as those of those institutions needing to adjust their profile and activities to operate with a lower share of state-budget funds.

Portugal currently allocates a below-average proportion of national wealth to higher education institutions, compared to both the OECD and European Union averages. As discussed below, to mobilise additional resources for higher education, the government should consider a more nuanced, graduated approach to tuition-fee regulation than the blanket reductions introduced in recent years, whereby fees are differentiated progressively according to family or student income. However, there is a case for mobilising additional public funds for higher education, if it can be demonstrated that the system is being put on a more efficient and sustainable footing.

Recommendations

8. Introduce the new, formula-centred funding allocation model progressively, with a transition period to allow institutions that, under the model, will receive a lower share of the budget envelope to adapt. The new model could either be applied to a progressively larger share of the budget envelope for core funding each financial year or funding allocations could be adjusted "manually" to rebalance the allocation of funds in line with the model until it is feasible to apply the model in full. To move as swiftly as possible to an equitable funding distribution, the transition period should be as short as possible.
9. Design the introduction of the model and the transition period taking into account a) planned complementary funds for strategic investment and profiling and dedicated funds to support institutions in interior regions and the islands and b) possible adjustments to tuition-fee policy.
10. Seek to mobilise additional public funding for core funding of public higher education institutions on the grounds that this will support clearly defined quality and efficiency objectives and in light of Portugal's comparatively low levels of investment in higher education at present.

References

Claeys-Kulik, A. and T. Estermann (2015), *DEFINE Thematic Report: Performance-based Funding of Universities in Europe*, European University Association, Brussels, https://eua.eu/downloads/publications/define%20thematic%20report%20performance-based%20funding%20of%20universities%20in%20europe.pdf (accessed on 24 October 2020). [28]

de Zwart, S. et al. (2021), *Verkenning naar de optimale verhouding tussen vaste en variabele onderwijsbekostiging in het hoger onderwijs (Exploration of the optimal ratio between variable and fixed funding for instruction in higher education)*, Berenschot B.V., Utrecht, https://www.berenschot.nl/media/i0kk5fgd/berenschot-rapport-vast-variabele-onderwijsfinanciering.pdf (accessed on 6 July 2022). [22]

Deloitte Access Economics (2016), *Cost of delivery of higher education - Final Report*, Australian Government Department of Education and Training, https://docs.education.gov.au/system/files/doc/other/deloitte_access_economics_-_cost_of_delivery_of_higher_education_-_final_report.pdf (accessed on 29 January 2021). [3]

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). [10]

DGES (2022), *Propinas (Tuition fees)*, Direção-Geral de Ensino Superior (DGES), https://www.dges.gov.pt/pt/pagina/propinas (accessed on 11 May 2022). [9]

DGO (2022), *Orçamentos do Estado (State Budgets)*, Direção-Geral do Orçamento (DGO), https://www.dgo.gov.pt/politicaorcamental/Paginas/OrcamentosEstado.aspx?Ano=2022&TipoOE=Or%C3%A7amento%20Estado%20Aprovado (accessed on 27 July 2022). [20]

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). [29]

Golden, G., L. Troy and T. Weko (2021), "How are higher education systems resourced? Evidence from an OECD policy survey", *OECD Education Working Papers*, No. 259, OECD Publishing, Paris, https://doi.org/10.1787/0ac1fbad-en. [1]

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). [7]

Government of Portugal (2020), *Proposta de Orçamento de Estado para 2021 - Ciência, Tecnologia e Ensino Superior (PO13) (State Budget Proposal for 2021 - Science, Technology and Higher Education)*, https://wwwcdn.dges.gov.pt/sites/default/files/relatorio_mctes_2021_po13_comissao_educacao_ciencia_juventude_desporto_v18out2020-min.pdf (accessed on 9 November 2020). [6]

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). [11]

Government of Portugal (2009), *Decreto-Lei 207/2009 Estatuto da Carreira do Pessoal Docente do Ensino Superior Politécnico (Decree-Law 207/2009 Statute of Polytechnic Staff)*, https://dre.pt/dre/detalhe/decreto-lei/207-2009-488490 (accessed on 22 July 2021). [15]

Government of Portugal (2006), *Portaria n.o 231/2006 2.a série (Ordinance number 231/2006 Second series)*, https://files.dre.pt/2s/2006/01/013000000/0080300807.pdf (accessed on 16 May 2022). [17]

Government of Portugal (1979), *Decreto-Lei n.º 448/79 Estatuto da Carreira Docente Universitária (Decree-Law 448/79 Statute of University Staff)*, https://dre.pt/legislacao-consolidada/-/lc/72930784/201906200128/diploma?rp=indice (accessed on 22 July 2021). [14]

Hemelt, S. et al. (2018), "Why is Math Cheaper than English: Understanding Cost Differences in Higher Education", *Discussion Paper Series*, No. 11968, IZA Institute of Labor Economics, http://ftp.iza.org/dp11968.pdf. [4]

IGeFE (2022), *Data on institutional income and expenditure 2012-2021 (unpublished)*. [8]

IGeFE (2022), *Preparação da Proposta de Lei do Orçamento de Estado para 2022 - Distribuição das Dotações (Preparation of the State Budget Bill for 2022 - Distribution of budget allocations)*, Instituto de Gestão Financeira da Educação (IGEFE), https://www.igefe.mec.pt/Page/Index/55?csrt=18088972186450171227 (accessed on 9 July 2022). [18]

IGeFE (2021), *Índices de custo 2022 por áreas de formação (Cost factors 2022 by field of education)*, Instituto de Gestão Financeira da Educação (IGeFE), Lisbon, https://www.igefe.mec.pt/Page/Index/55?csrt=16906015704621263206 (accessed on 8 June 2022). [25]

MCTES (2015), *Modelo de financiamento do ensino superior: fórmulas e procedimentos (Funding model for higher education: formulas and procedures)*, Ministério da Educação e da Ciência - Secretária de Estado do Ensino Superior, Lisbon, http://id.bnportugal.gov.pt/bib/bibnacional/1915892 (accessed on 6 June 2022). [19]

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). [16]

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). [31]

OECD (2022), *OECD Statistics - Education and Training*, OECD.Stat, https://stats.oecd.org/ (accessed on 8 July 2022). [2]

OECD (2022), "Resourcing higher education in Ireland : Funding higher education institutions", *OECD Education Policy Perspectives*, No. 51, OECD Publishing, Paris. [26]

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. [21]

OECD (2021), "Resourcing higher education in Denmark: Thematic policy brief", *OECD Education Policy Perspectives*, No. 49, OECD Publishing, Paris. [32]

OECD (2021), *Resourcing Higher Education in the Flemish Community of Belgium*, Higher Education, OECD Publishing, Paris, https://doi.org/10.1787/26169177. [23]

OECD (2019), *OECD Review of Higher Education, Research and Innovation: Portugal*, OECD Publishing, Paris, https://doi.org/10.1787/9789264308138-en. [12]

Ortagus, J. et al. (2020), "Performance-Based Funding in American Higher Education: A Systematic Synthesis of the Intended and Unintended Consequences", *Educational Evaluation and Policy Analysis*, Vol. 42/4, pp. 520-550, https://doi.org/10.3102/0162373720953128. [27]

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). [5]

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). [30]

Universities Australia (2020), *The demand driven system*, Universities Australia, https://www.universitiesaustralia.edu.au/policy-submissions/diversity-equity/the-demand-driven-system/ (accessed on 10 July 2022). [24]

Zahneis, M. (2022), *These Tenured Professors Were Laid Off. Here's How They Got Their Jobs Back.*, The Chronicle of Higher Education, https://www.chronicle.com/article/these-tenured-professors-were-laid-off-heres-how-they-got-their-jobs-back (accessed on 9 July 2022). [13]

Notes

[1] In the European Union multi-annual financing periods 2014-2020 and 2021-2027, all NUTS II regions in Portugal are classified as “less developed regions”, with GDP per capita of less than 75% of the EU-27 average. Higher education institutions in these regions have access to the highest levels of structural funds support. In both periods, the Algarve has been classified as a “transition region” and the Lisbon Metropolitan Area as a more developed region, meaning institutions in these regions are either ineligible for support or have access to lower levels of European cohesion funding.

[2] The six institutions with foundation status are the following five universities: Universidade do Minho; Universidade do Porto; ISCTE – Instituto Universitário de Lisboa; Universidade de Aveiro and Universidade Nova de Lisboa and one polytechnic: Instituto Politécnico do Cávado e do Ave (IPCA).