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'Governments base performance-based funding on global rankings indicators': A global trend in higher education finance or a global rankings literature fiction? A comparative analysis of four performance-based funding programs

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ABSTRACT

For nearly two decades now, the rankings literature has continued to suggest that governments are adopting performance-based funding models which prioritize criteria favored by global rankings. This study examines this assertion by analyzing the performance-based funding programs of Austria, Denmark, Finland, and Sweden. The study finds that the orientation of performance-based funding on global rankings is weaker than it is commonly assumed. Except for Finland, the funding volume universities raise from this orientation is not substantial to influence the institutional performance. The study also analyzes the recent structural changes to performance-based funding in each jurisdiction. Policy implications are provided in the conclusion for higher education systems revising their performance-based funding or considering a shift to performance-based accountability.

1. Introduction

There exists today a large body of social science literature which suggests that global rankings are reshaping the finance of higher education (HE) such that governments are increasingly using competitive distribution mechanisms which underwrite the research aspirations of higher education institutions (HEIs) (Douglass, 2016). This finds its strongest expression in the work of rankings scholars who see the process as an epiphenomenon of a larger trend in financing HE wherein governments are adopting performance-based funding (PBF) which ties funding to institutional performance on indicators which mimic those found on global rankings (Hazelkorn, 2011; Tierney and Landford, 2017; Tsikliras et al., 2014). The rationale frequently adduced for this behaviour is that governments seek to favorably influence HEIs performance in rankings by means of fiscal incentives, and the signal this sends globally about the economic and human capital potential of their countries (van der Wende, 2014).

Presupposed in the foregoing account is a perception that governments enlist the power of public funding in the cause of enhancing the international visibility of their universities in rankings. On purely logical grounds, the idea appears rather axiomatic, and becomes even more so when contextualized within the politics of global rankings and PBF writ large. To illustrate, the former has recently risen to the forefront of the policy agenda in many national contexts. Pusser and Marginson (2012) show that governments are particularly interested in elements of global rankings relating to state priorities for HE. Numerous accounts underscore this policy orientation by suggesting that policymakers are disposed to applaud a favorable position in global rankings by their national universities, viewing it as grafts onto the capacity of the entire HE system to sustain economic competitiveness and geopolitical goals (Hazelkorn, 2018; Kehm, 2016; Sadlak, 2014). Thus, the appeal of rankings investments lays in their imagined ability to

pay dividends in the current international political economy. This is critically important for understanding the allure rankings might hold for governments, and why this phenomenon translates to HE in both developed and developing countries, leading to efforts to create ‘world-class’ universities (Salmi, 2009). This could also make the idea of incorporating rankings indicators into national PBF programs attractive and even rational.

Similarly, PBF is nowadays a major practice in resource allocation in HE. In recent decades, a constellation of social, economic, and political factors have led many governments to deploy performance measurements. Foremost among these is the double bind many HE systems face in which the cost of HE has continued to rise in the face of strained public finances, while at the same time raising outcome expectations: a financial outlook, in many instances, deemed unsustainable in the long run (Jacob *et al.*, 2018). These projections coincided with the emerging recognition that HE had become crucial to a country’s success in an increasingly competitive global economy driven by knowledge and innovation. Within the climate clouded by this dilemma, many countries launched structural reforms aimed at improving the performance of their HE systems through the introduction of business-like management practices that stress the decentralization of responsibility as well as requiring HEIs to offer a more nuanced version of quality assurance, cost-effectiveness, and productivity than has been heretofore offered (OECD, 2003). Lucianelli and Citro (2017) demonstrate that these reforms have altered the notion of accountability in HE from accounting for expenditure to accounting for results with central governments declaring that the future funds supplied out of the public purse are going to use performance assessments.

Then there is the technical dimension. Rankings and PBF both use purpose-built metrics: performance indicators. These can be at cross-purposes. They can also be functionally

interconnected insofar as the institutional performance they reward can also be the same. This arguably attaches funding indirectly to global rankings indicators, assuming that all the performance indicators established by national performance assessment schemes are tied to funding, which is not always the case. There also exists another significant parallel between rankings and PBF. Both are transformative in nature. Rankings create incentives for campus leaders to modify institutional behavior – sometimes to the detriment of both sound administration and democratic accountability (Bastedo and Bowman, 2011). Comparably, PBF is a steering mechanism which can influence the organizational settings and considerations of individual HEIs (Lang, 2014). Therefore, it should be unsurprising that governments might be tempted to use purposive funding methods as PBF to advance particular policy objectives. This is not a new idea. It is prioritizing criteria favored by rankings that is new. The question is to what extent this happens in practice.

This paper examines this lingering question by analyzing the PBF programs in four national contexts: Austria, Denmark, Finland, and Sweden. Finance of HE is complex and diffuse as governments employ multiple approaches to distribute the public budget for HE. Thus, it is wiser to selectively craft a reasonably discrete take on a massive topic. Toward that end, analysis is restricted to public universities.

The four jurisdictions under study present a useful lens to examine this question. They all have large public university sectors where a substantial proportion of annual revenue earned by universities comes from public funds. They all integrate a version of PBF into their national accountability frameworks. The time is also ripe for such inquiry. In 2019, Austria, Denmark, Finland, and Sweden introduced significant changes to the funding models of their HE systems. This provides an opportunity to examine the question of whether governments actually base

performance-based funding on the metrics of global rankings. These changes are the latest episode which have a longer provenance. The policy setting in these countries has been adjusted toward broader emphasis on performance-based accountability in the past decade. Following the financial crisis of 2008, European HE authorities faced growing pressure to explore funding methods that support policy goals in a cost-effective way amidst increasing competition for resources from other sectors (Estermann et al., 2015).

The purpose of this paper is threefold: to estimate the proportion of BPF of the public budget for universities, to analyze the PBF programs to identify any designated indicators that mimic those used in global rankings, and to estimate the relative volume of funding tied to these indicators. The study offers a cross-national comparative perspective on PBF and the links thereof to rankings. The analysis also takes account of the recent changes in each PBF program and addresses their short-term implications. The study thereby lays the groundwork for future research on how these developments interface with issues and circumstances they tackle. PBF is not merely a budgeting process. It is entwined with how governments signal the jurisdictional priorities and define success. With this in scope, Section 2 sets the stage for the subsequent sections by discussing the nature and forms of PBF. Section 3 discusses the nature of global rankings. Section 4 explains the research method. Section 5 contains the four country studies. In the conclusion, Section 6, the paper offers an assessment of global of the assertion that governments base PBF on global rankings indicators. It also discusses some implications which can be particularly useful for policymakers and governments planners revising their PBF or considering a shift to PBF.

2. Performance-based funding: Varying forms and origins

PBF links a portion of the public budget for HE to performance on specific quantifiable measures, thus making funding contingent on accomplishments (Dougherty et al., 2013). It is an accountability-driven system which uses the power of the public purse to prompt HEIs to become more efficient, delivering more value for money in addressing public policy objectives (Burke, 2002). This rationale espouses resource dependence theory (Pfeffer and Salancik, 1978) which basically frames organizations as capable of rationality and purposive action. Hence, the assumption is that resources determine much of institutional behavior, because organizations would naturally enhance their performance to acquire resources necessary for organizational autonomy and survival.

On closer examination, however, we can see another organizational concept which has gained currency over the past three decades. It is encapsulated in what multiple World Bank reports around the turn of the century defined as *'hard budget constraints'* (World Bank, 1996, 1999, 2002). The term is the antonym of *'soft budget constraint'* which was originally formulated by the Hungarian economist Jonas Kornoï to illuminate the economic behavior of public organizations in the absence of incentives to economize on inputs and produce in quantity. While studying the economic reforms Hungary undertook in the 1970s, Kornoï identified a dynamic that he thought would derail efforts to reinvigorate socialist economies like Hungary at that time. Kornoï (1980) observed that although state-owned enterprises had vested interests in improving performance and maximizing profits, those of them which continually sustain losses were not allowed to fail. Firms always relied on government subsidies to save failing enterprises. This weakened their incentive to use resources efficiently, be productive, and generate revenue to cover costs. The concept is thought to be well pertinent even to economies based on private ownership to ensure that public enterprises produce efficiently (Maskin, 1999; Mitchell, 2000).

Hard budget constraints exist when managers of public organizations know that the budgets set for them by governments are fixed and well-defined and that losses will not be financed out of the public purse (World Bank, 1996). The World Bank floated the idea, suggesting it can be an important ingredient for effective performance, innovation, and financial sustainability (See World Bank, 2002). PBF connects to this rhetoric by translating institutional performance into discrete amounts of funding. This represents welcome progress for governments as the cost of HE for them is usually a gray area. Clark, et al., (2009) attribute this attitude to a view held by many politicians that HEIs are the kind of institutions where it is hard to determine exactly how much it is enough for them to do their job, and this has been a long-standing bone of contention between politicians and academics. Nonetheless, it is unlikely that PBF will put this question to rest any soon.

Despite broad dissemination, PBF remains a murky term. This is partly because its main forms are separated by subtle distinctions and partly because its terminologies have both technical and common meanings that seem to conflict. Thus, notwithstanding the term has been a workhorse for scholars involved in studying and formulating HE policy, there is not as yet a common lexicon of PBF, making it rather difficult for scholars from different contexts to engage in effective policy discussions. Consensus is also lacking on its effectiveness and motives. PBF thus has continued to be a Janus-faced term, summing up the hopes of some for greater cost efficiencies and invoking for others the specters of neoliberal ideology¹. Semantics and sentiment aside, there are four main delivery models of PBF that are sufficiently similar in nature and thus could be conceptualized as PBF.

2.1. Output/Outcome-based funding formula or performance formula (also payment for results).

¹ For a review of the controversy surrounding PBF see Dougherty and Natow (2015, 2019).

This model attaches funding formulas to results on key metrics. It basically awards a portion of the funds available HEIs on the basis of quantified teaching and research output data. This model sometimes combines processes indicators (e.g., credit accumulation) and output indicators (e.g., graduation rates). Therefore, it is more descriptively accurate to refer to this model as performance formula. Performance formulas are usually used in conjunction with other types of formulas and distributive devices. South Carolina in the United States was a rare case for a HE system to be funded entirely on performance, across a long list of 37 indicators. In 2002, the program was abandoned due to complications with implementation (Burke, 2002).

This model aims to make resource allocation more transparent by linking it to a set of metrics. Most performance formulas are non-competitive, permitting HEIs to earn only up to their assigned level of performance. They rarely set targets. Rather, HEIs compete against themselves. This is predicated on the assumption that HEIs will grow in awareness of their performances. Therefore, the ultimate policy objective is to encourage HEIs to maintain a competitive mindset such that performance does not fall below a certain benchmark.

Performance formulas are also not neutral. They are the most policy-oriented type of funding formulas, as they creates an opportunity for HEIs to increase income from the funds attached to positive improvements on key metrics (Lang, 2005). Indicators can be weighted differently to reflect state priorities, difference in mission, or difference in the cost of academic programs and level of instruction.

2.2. Performance set-asides or reservation (also earmarks).

This model reserves a portion of the public budget for HEIs to be allocated on the basis of performance indicators. Funding sources are sometimes sliced off the annual grant or drawn from external sources to be provided as an additional bonus. They could also be a combination of

the two. Performance set-asides could be non-competitive. This is the most common type. The money reserved in this case is entitlement, and HEIs have a discretionary power over spending. There is also competitive subset of this model where public funding is based on closed envelope. Money is set by public budget and HEIs compete for shares of the total pot of funding in a zero-sum contest. The amount of funding earned depends not only on the ability of HEIs to meet performance goals but also on the number of institutions which meet the goals. The more institutions meet the performance measures, the smaller the share of funding.

The two subsets serve different purposes. The first seeks to engender desirable performances on objectives and causes underpinned by the public policy of HE, such as widening access to students from disadvantaged backgrounds. The competitive version offers cost advantage. Funding is a fixed sum, so HEIs are expected to be more efficient. Lang (2016) draws attention to other technical aspects that have a direct bearing on the effectiveness of this form of PBF. The first is the match between the rate of return and the cost of performance. Unless the return generated outweighs the costs entailed in performance, HEIs tend to ignore the incentive. The second is the source of money. When the funds are new: additive, HEIs are likely to ignore it, especially if the level of funding is not substantial. If it is subtractive: taking money from existing grants, it is harder for HEIs to ignore the incentive.

2.3. Performance contracts or agreements (also compacts).

These are negotiated agreements between the government and individual HEIs. The contract is the regulatory documents which sets out the performance goals, indicators, weights, and success standards. Funding is awarded when HEIs meet the agreed upon performance set forth in the contract. This model has the advantage of cutting the performance accountability suit to fit the institutional cloth. In other words, it redresses the one-size-fit-all approach of the other

models by giving HEIs the opportunity to customize the contract to reflect their mission and other aspects of their performance. Therefore, it is less likely to corrode institutional diversity. By comparison, performance contracts offer ample room for continuous performance improvement than the other models as the rules of the game can be regularly finetuned.

2.4. Initiative funding.

Initiative funding is considered as a precursor of PBF (Serban, 1998). But it exhibits key elements of PBF. Namely, the funds made available by the initiative are distributed on the basis of criteria prescribed by the founders. Initiatives can be competitive: zero-sum contest (e.g., the Excellence Initiative of Germany), permitting HEIs to gain funds beyond their assigned levels from monies not earned by other institutions. This model brings new funds, usually paid upfront. This is a characteristic feature of this model. But the revenue raised from initiatives is also unstable. Initiatives are essentially temporary arrangements established to support special projects, such as high-quality programs in teaching and research. The high measure of uncertainty associated with them makes it unreliable to consider the income they generate for long-term planning of the activities, programs, or units they establish. Burke (2002) observes that the stability of initiative funding depends on fortuitous circumstances, such as the health of the economy, and the willingness of the founders to continue their support.

3. The nature of global rankings

One way to come closer to understanding global rankings is to determine what they are not. This said, global rankings are not barometers of overall institutional quality. Rankings use data assembled for specific and narrow purposes. This is partly due to pragmatic reasons. Universities today are the closest to Etzioni's (1961) characterization of complex organizations: social systems with elaborate division of labour, the performance of which depends on a

multitude of components that comprise the system and require technical expertise to judge. Good assessments of university quality requires relatively large texts punctuated with technical jargon. Extended texts of this kind can be a rich source of factual information, but they can also overload our information-processing capabilities (Miles et al., 2020). Therefore, the business models of global rankings publishers, mostly commercial organizations, are based on methodologies that transcribe complex institutional activities into multiple indicators and into aggregate scores. Rankings thereby simplify institutional quality, and this in turn makes them newsworthy, especially for stakeholders outside of HE (e.g., potential students, parents, employers). In other words, rankers capitalize on our tendencies to find simplifying patterns.

Despite ubiquity worldwide, global rankings use similar tactics. They select a number of indicators to determine quality. These indicators differ, but not in a meaningful way. Selecting slightly different metrics is important insofar as it allows publishers to differentiate their products. Writing on corporate strategy, Toma (2012) shows that firms are most successful when they differentiate themselves to attract a greater portion of a given market segment. The rankings considered in this study – Academic Ranking of World Universities (ARWU), the Times Higher Education (THE), and Quacquarelli Symonds (QS) – exemplify this strategy. Their metrics² vary in proxies and weights. However, difference is at the surface only, and they all arrive at common criteria, namely research output, calculated on publications and citations. Research data are obtained from external sources and thus are good for comparing universities across research performance. Therefore, rankings are essentially about the research productivity, not the quality of learning quality at universities. The irony is that governments, the principal financiers of HE, are often more interested in the quality of education, and thus global rankings provide little or no guidance to governments on how to incentivize HEIs.

² See Appendix for full list of metrics used in ARWU, THE, and QS.

4. Research design

In pursuing this inquiry, this study surveys the PBF programs of four HE systems. Analysis focuses on technical features, such as the designated performance indicators; their measurements and administration, as well as the volume of funding tied to them. The study takes the form of a policy analysis drawing mainly on the analysis of policy papers and financial data obtained from official documents published by government agencies and ministries which deal with statistics and questions of finances and quality in HE. Qualitative and quantitative data were also obtained from email communications with officials in the ministries responsible for HE, and with reference to three prominent global rankings are used: ARWU, THE, and QS. These data sources provided much-needed understanding of the overall structure of PBF programs detailed in this study. They also helped disentangle performance criteria prioritized in rankings and provide estimate of the volume of funding attached to them relative to government funding based on PBF.

Analysis focuses on recurrent government funding which public universities receive annually to cover their core activities. This does not include funding from research councils. These support HEIs by means of competitively-awarded funding which varies on a yearly basis according to the ability of research personnel to acquire research grants. In the systems under study, research councils, albeit state agencies, provide monetary support for research projects subject to quality assessment by experts. Revenue from this funding stream is not entitlement, and hence does not qualify as recurrent funding.

5. Case countries

This section turns to the examination of individual PBF programs. For each of the four cases, an overview the finance arrangements is also presented.

5.1. Austria

In Austria, the term HE exists in relation to credit load. Since 1997, institutions are classed as HEIs if they offer a minimum of 180 ECTS-credits³ (BMWF, 2016). Austria has two formal tiers of postsecondary education; 74 HEIs (*Hochschulen*) and 53 equal level institutions (*Gleichrangige Institutionen*)⁴, under the remit of the Federal Ministry of Education, Science, and Research (BMBWF). Institutions vary in size, qualifications, and structure. For a small country with a population just under nine million, the Austrian postsecondary education system can perhaps best be described as institutional diversity in a small venue.

Only 22 HEIs have a university status. The University Act 2002 provides the legal basis for these institutions. It marks a milestone in the transition of Austrian public universities into fully autonomous institutions in that it transformed them into legal entities under public law. The Act introduced elements from commercial law which laid the legal basis for creating entrepreneurial universities with authority to solicit external funding other than the one received from the government (BMWF, 2016). It also triggered revisions of the funding of public universities, leading ultimately to the adoption of performance agreements (contracts) as the primary method of financing HE. Until 2010, public universities received a three-year global budget⁵ which comprised a basic budget allocated through performance agreements and a formula-based budget. In 2011, the latter was abandoned, making performance agreements the only mechanism for providing public subsidies (de Boer, et al., 2015).

³ The credit system complies with the European Credit Transfer and Accumulation System (ECTS), which is the chief tool used to facilitate credit transfer and mobility between the member countries of the EU.

⁴ Since 2014, the Federal Ministry of Science, Research and Economy (BMWF) has been in charge of research policy and funding for public universities, and other HEIs. For complete list of postsecondary institutes see: https://bmbwf.gv.at/fileadmin/user_upload/ENIC_NARIC_AUSTRIA/%C3%96sterr._Hochschulwesen/POSTSEK.BILD_201806_BF.pdf

⁵ 'Global budget' means the universities are free to allocate it internally as they see fit.

The performance agreements (*Leistungsvereinbarungen*) are bilateral agreements between BMBWF and universities. They represent a significant component of the steering framework within Austrian HE, which also includes the Austrian University Development Plan⁶ and the individual university plan. The former sets the systemic priorities. The latter defines the individual university strategic targets. This provides basis for negotiating the performance agreements. The current performance agreements are in the fifth cycle which covers the period of 2019-2021. The total amount of funding is set at €11.7 billion, which is up by €1.3 billion compared to its predecessor (BMBWF, 2018). The fifth cycle is important insofar as it introduces a new model of university financing described as ‘capacity-oriented and student-related’. The model is aimed at three goals: improving teaching quality; enhancing transparency by separating funding for teaching, research, and infrastructure/strategic development; and improve students’ outcomes (BMBWF et al., 2018). Universities continue to receive a three-year global budget for the performance agreement which provides separate funding for three pillars: teaching, research, and infrastructure and strategic development. Funding is directly tied to institutional results on two categories of indicators: basic and competitive. The funding volume of basic indicators is determined in advance for the three-year performance agreement period, whereas that of competitive indicators is assessed at regular intervals across a set of mutually agreed targets.

For teaching, the basic indicator (96% of budget) is the number of students in degree programs who are actively taking examinations (16+ ECTS-credits) weighted by field of study. The competitive indicators (4%) are: the graduation rate of bachelor, masters, and diploma programs; ‘fast’ graduates; and the number of studies ‘very actively’ pursued by students. The

⁶ The current Austrian University Development Plan (redrafted in 2017 for the period 2019-24) presents eight systemic objectives providing a strategic framework that takes into account the development of individual university development plans.

third indicator refers to students with at least 40 ECTS-credits. For research, the basic indicator (91% of funding) is the number of research staff and artistic staff (FTE). The competitive indicators (9%) are third-party revenue and the number of doctoral students with employment. The third pillar covers payments for areas that cannot be assigned to one of the first two pillars (e.g., funding for special initiatives). The only indicator relevant to the rankings under study is third-party revenue, which is considered by THE. This leaves open the question of the funding attached to this indicator. To answer this question requires understanding of the global budget (€11.7 billion), which represents the total government funding for 2019-2021.

The three pillars are not funded equally. Their proportions are estimated at 45% (teaching), 40% (research), and 15% (infrastructure and special initiatives). The research share is calculated at €4.68 billion. Of this, 9% (€4.212 million) is equally divided between third-party income and doctoral students with employment. This is estimated at €2.106 million, which is a minuscule (0.018%) of government funding for 2019-2021. It is thus safe to suggest that the funding tied to third-party income is so insignificant as to be negligible.

The Austrian HE authorities exhibit more interest in student achievement and capacity building than in rankings. This is manifested in the weight of basic indicators which reflect their relative importance. The bulk of government funding covers these metrics, which are essentially operational in nature: throughputs (credit accumulation) and inputs (number of teaching and research staff). This is probably a function of the drop in the graduation rate in public universities which was 2.5% in 2016/2017, according to Statistics Austria⁷.

5.2. Denmark

⁷ Statistics Austria. Retrieved from: http://www.statistik.at/web_en/statistics/PeopleSociety/education/universities/041702.html. (Accessed 10 June 2019).

As of January 2019, a new model for university funding has come into effect in Denmark. To disentangle the proportion of the current model orientation on rankings, it is necessary first to analyze the overall structure of university funding. This will facilitate understanding of the design of the Danish PBF program, the amount of the public budget for higher education tied to it, and the extent to which it is oriented on global rankings. More importantly, it will also help chart the change the new funding model brings.

Denmark's eight public universities are financed primarily from public sources (close to 90%). The bulk of public funding comes from the government which provides basic funding through two separate grants for teaching and research, with no restrictions on redistribution. Both grants are regulated by the Danish Appropriations Act (*Finansloven*) which determines the annual appropriations among Danish HEIs. In 2018, government basic funding totalled 18.024 billion DKK. This constituted 60% of the total revenue of Danish universities, which was 29.797 billion DKK (4.40 billion US dollars) (The Danish Appropriation Act, 2019). The remainder of funding comes from the EU, private donors, and revenue-generating activities, such as providing consultancy for the public sector and from competitively-awarded grants by research councils.

The basic teaching grant is allocated through the taximeter system. This is essentially a performance formula that provides funding on student progression. Funding varies annually, depending on student activity. In 2018, the taximeter supplied 7.549 billion DKK, which is 92% of the teaching grant: 8.134 billion DKK. Universities receive taximeter-tariffs. These are prescribed amounts of money per active students. An active student is determined by the number of passed examinations⁸, converted into FTE, which equates to one year of the prescribed period of study (60 ECTS points). Tuition is covered by the government subsidy. Only international

⁸ Different exams have different rates. Some rates are politically determined by political parties through the annual Appropriation Act. The idea is that funds follow students. Thus, institutions will have incentive to become efficient by adjusting the capacity to fit the demand and to support political priorities (MCE, 2018).

students from outside the EU and EEA pay tuition. Other expenses are combined with the taximeter rates, including buildings maintenance and improvements. Universities also receive a completion bonus on the students completing their studies within a specified period. Moreover, universities receive funds for international students. The Danish Globalisation Strategy – introduced in 2006 – reward HEIs for international students and scholarship (MHES, 2017). This is relevant to THE and QS which consider the number of international students. The question is how much money is attached to this metric? According to the Appropriations Act (2019), the internationalization grant (*Internationaliseringstilskud*) for 2018 was 43 million DDK. This accounts for 0.52% of the basic teaching budget and 0.24% of the 18.024 billion DDK, the government basic funding including research.

The basic research grant is provided through a mixture of incremental budgeting and PBF. The portion based on PBF is allocated according to the 45-20-25-10 model⁹. Technically speaking, the 45-20-25-10 model is a performance formula used to competitively-allocate 14%¹⁰ of the 9.048 billion DKK research grant in 2018, in a zero-sum contest on four indicators: the number of active students as calculated in the teaching funding (45%), external research funding (20%), bibliometrics¹¹ (25%), and PhD degree completion (10%). Two of these metrics (research income and bibliometrics) are considered in rankings.

⁹ In 2009, a policy initiative introduced the 45-20-25-10-model, a modification of the former 50-40-10-model, which included a bibliometric indicator as a fourth parameter. The bibliometric indicator replaced external funding, going from 40 to 20.

¹⁰ This percentage is based on personal communications in September, 2019 with Mads Andersen Wickstrøm from the Board of Institutions and Educational Support at the Danish Ministry of Higher Education and Science about the percentage of government funding allocated competitively in a zero-sum contest.

¹¹ Panels in each scientific discipline evaluate the journals and book publishers in their field and place them on either level 1 or level 2. See Schneider and Aagaard (2012) for full account of the evaluation of journals.

The foregoing account shows that Denmark uses performance formulas to distribute portions of the teaching and research grants. Table 1 illustrates the composition and volume of government funding based on PBF in 2018.

Table 1

Composition and volume of government funding based on PBF, 2018.

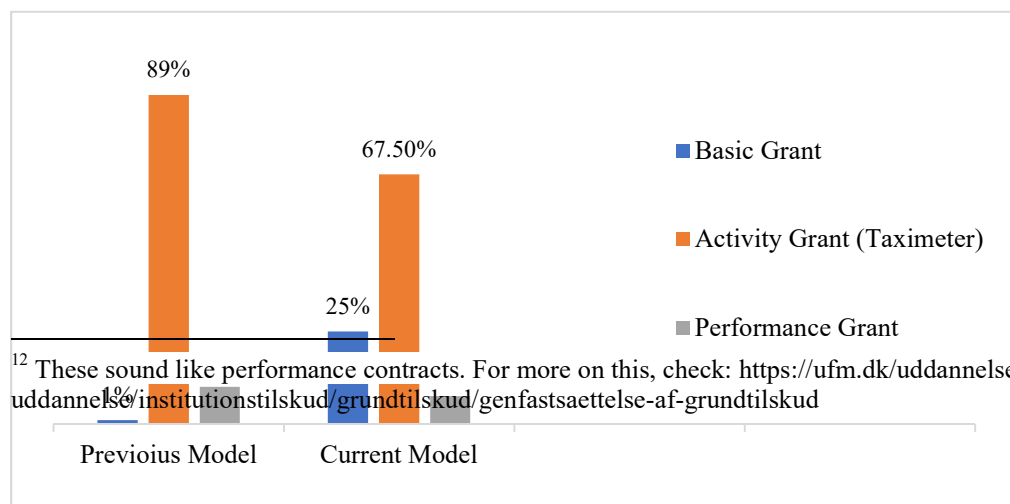
Source: By the author based on data from the Danish Appropriations Act (2019).

Budgeting item	Volume	% of government basic funding: 18.024B
Education		
Taximeter	7.549B	42%
Completion bonus	815M	4.5%
Internationalization grant	43M	0.24%
Research		
Student progression, external funding, bibliometrics, PhD students' graduation rate	1.267B	7%
Total	9.674B	Approx. 53.7%

Table 1 shows that the relative share of PBF of government funding was 53.7% in 2018. The indicators related to rankings, research income and bibliometrics, account for only 45% of the 1.267 billion DKK (which is 14%) tied to the 45-20-25-10 model. This is calculated at approximately 570 million DKK, which is 3.2% of the total government basic funding (18.024 billion DKK) and 1.9% of the total income (29.797 billion DKK) universities received from all sources in 2018. This leaves unexamined the question about the new funding model which took effect in 2019.

The new funding model has retained the major features of the old system. For example, universities continue to receive separate budgets for teaching and research, and the method used for research funding remains unaffected. It is the basic teaching grant where most of change has occurred. The new basic teaching grant consists of four grants: the basic grant, activity grant, performance grant, and quality grant. The first is the basic grant which provides 25% of a

university's teaching grant. Of this, 5% is based on the assessment of the fulfillment of what is called as strategic framework contracts¹² that will be negotiated with individual institutions. Another 5% is based on quality measurement, which is basically a survey distributed for students. The basic grant also includes three additional grants: decentralization, funds for programs outside the major university cities; compensation, funds for universities affected by the transition to the new system; and continuation, fixed grant unaffected by the new system. The second is activity grant which now provides 67.5% of the teaching grant, down from 82%. The taximeter is the primary appropriation model of distributing funds attached this portion. The performance grant provides 7.5% of the teaching grant on two metrics: employment rate and completion time (standardized time plus three months). Unearned funds are implemented to the so-called quality grants. The quality grant is actually a pool whereby unearned funds are used to support programs discussed in the strategic framework contracts. These two grants, therefore, are woven from a single fabric. Fig. 1 exhibits estimates of the three grants in the old and new models.



¹² These sound like performance contracts. For more on this, check: <https://ufm.dk/uddannelse/videregaende-uddannelse/institutionstilskud/grundtilskud/genfastsaettelse-af-grundtilskud>

Figure 1. Government teaching funding models for Danish universities before and now
Source: By the author with data from MHES (2019).

Denmark has not abandoned the taximeter. It has only reduced the amount of funding allocated through this modality. In other words, the new funding model increases the share of fixed grants (funds received regardless of performance) relative to variable grants (funds tied to performance). This is good news as predictable funding enhances the institutional capacity for planning. However, the broad financial outlook is far from certain. By 2022, Danish universities are projected to lose nearly one-tenth of their current government funding which will countervail improvements resulting from fixed support (See Fig. 2).

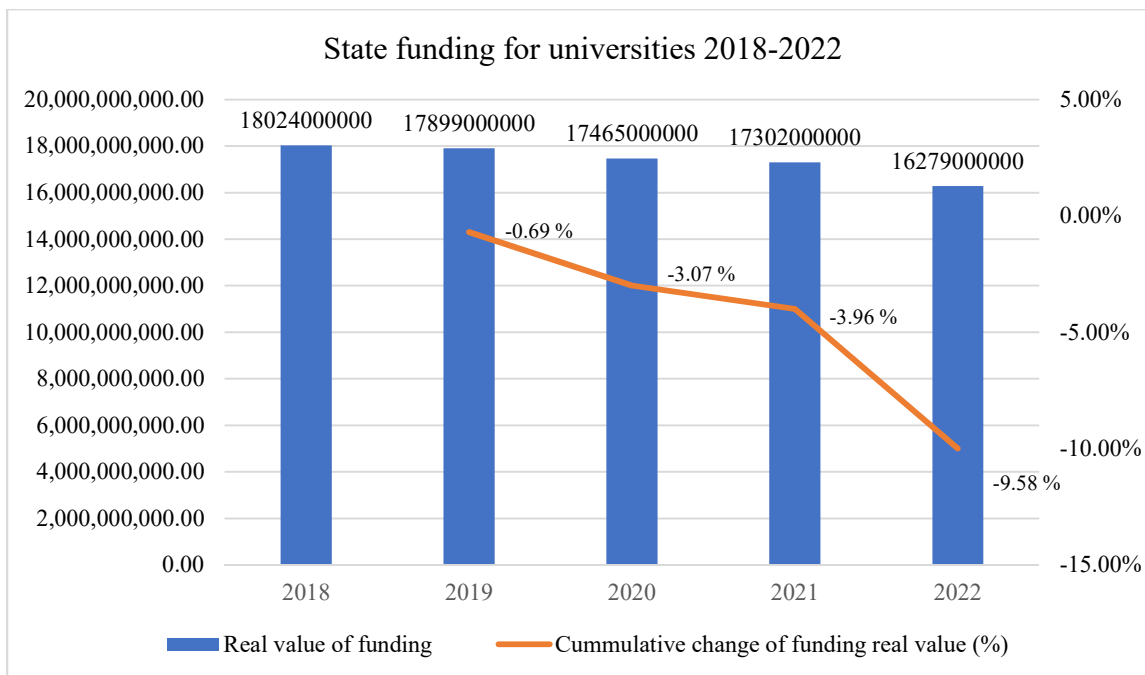


Figure 2. Government funding decreases since the introduction of the new funding model.
Source: By the author with data from the Danish Appropriations Act (2019).

Over the same forecast period, universities total revenue exhibits a downturn trend from 29.797 DKK in 2018 to 28.145 billion DKK in 2022. This is a 5.5%. However, revenue from other sources is projected to grow. This means that government appropriations for Danish universities are expected to be matched by increased revenue from other sources. Fig. 3 indicates the change in the government's share of the total revenue.

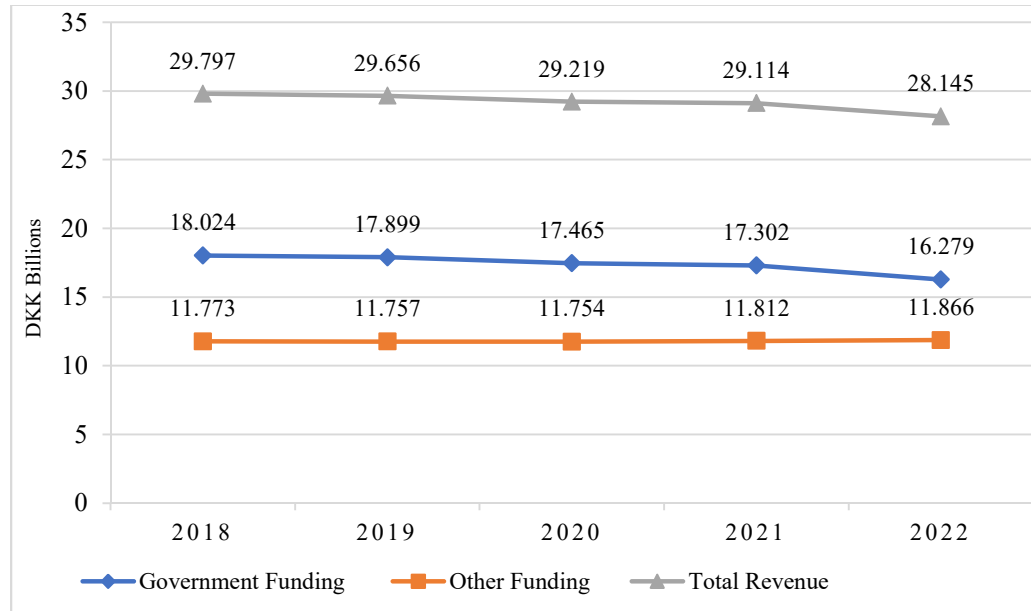


Figure 3. Danish universities revenue by source of funding, 2018-2022.
Source: By the author with data from the Danish Appropriations Act (2019).

Additionally, the current funding model introduces what seems like performance contracts with a minuscule (5%) of the teaching funding tied to them. Moreover, there is a shift of focus in the current model from outputs to outcomes/impact by incorporating measures of employment and learning by means of periodical student surveys.

5.3. Finland.

Finland has a binary system of HE, consisting of 13 universities and 23 universities of applied sciences (polytechnics). The two sectors operate under the remits of the Finnish Ministry of Education and Culture (MEC) which is responsible for the policies and disbursing the core

funding made available by the parliament. Government core funding is the key source of funding for universities. It accounts for approximately 60% of the income of universities. It is provided entirely through PBF which uses a mixture of performance formula and performance agreements. Finland has used PBF since 1994 when performance agreements were introduced as the only method to provide government core funding. In 2010, output-based formula was added.

The Finnish model of PBF combines summative (retrospective) assessment, formative (during the process), and diagnostic (prior to the process). The common criteria, targets, appropriations attached to the formula and the key measures for each university are formulated in the form of a four-year agreement. The current four-year period is 2017-2020. The appropriations for core funding are allocated to three categories: education (39%) research (33%), and institutional strategies and other policy considerations (28%). Funding for education and research is based on formula, while the strategic component is based on agreements.

Three indicators relating to rankings are found in the research funding. These include number of international staff, number of publications, and competed research funding. Publications are not rewarded equally. A three-level scale called *Jufo* is used to evaluate the amount of funding for each publication. Competed research funding is the competitive funding portion. The ministry conducts periodic reviews, including visits, and gives annual feedback on a university's performance and improvement needs. Universities are required by law to make information on performance available on a statistical database called KATO. The level of funding is determined by calculating the average of performance in the previous three years, not output targets (MEC, 2018). For example, funding for publications in 2017 is based on the 2013-2015 publications.

The annual reviews of Finnish universities show variation across the proportion of funding that comes from this source with larger institutions more capable of attracting funds from other sources¹³. The remainder of the universities' income (40%) comes from external funding and other public sources. The latter includes Academy of Finland, Tekes, ministries, municipalities, and foundations. This means 80% of universities' revenue is raised from public sources. Of this, 75% is PBF (core government funding).

The characteristic feature of the Finnish PBF is the detailed pricing information on performance. There is a unit price for performance for each indicator. For example, a three Jufo point publication (top level) is worth around €17,000, a foreign teaching or research is worth €9,300. For research income, every Euro earned from domestic research is matched by €0.20, whereas for international research funding the unit price is €0.40. The rationale is that prices allow universities to make strategic investments by focusing university resources on the most productive destinations (Seuri et al., 2018).

The universities core funding model for 2021-2024 is now available. The model maintains the same structure, but it increases the weight of education which will account for 42% (39% currently) at the expense of the strategic component covered by agreement which will represent 24% (28% currently). The share of research funding is slightly increased to 34%, from 33% currently. Table 2 compares the proportions of output metrics related to global ranking in the current core funding model and that of 2021.

Table 2

Metrics related to global rankings and their percentages: 2016-2020 vs 2021-2024

Source: By the author based on data from the universities core funding from 2017¹⁴ and 2021¹⁵

¹³ For larger universities (e.g., the University of Helsinki), the core funding covers 59% of the total income, whereas it represents 80% of Hanken School of Economics total income, which is relatively a smaller institution. Check: https://www.helsinki.fi/sites/default/files/atoms/files/annual_review_2018.pdf

¹⁴ https://minedu.fi/documents/1410845/4392480/Universities_funding_2017.pdf/abc0974d-b8d5-4486-a12a-aa141d54b66f/Universities_funding_2017.pdf.pdf

Metric	% of core funding 2018	% of core funding 2021
International research and teaching personnel	2%	NA
Scientific publications ¹⁶	13%	14%
Competed research funding	9%	12%
Total	24%	26%

As Table 2 illustrates, the 2021-2024 model raises the amount of funding oriented on rankings. It also accents publications and research income more than its predecessor. It also de-emphasizes internationalization by discarding the indicator that ties funding to the number of international staff.

5.4. Sweden

Sweden has a homogenous HE system. This sets it apart from the other jurisdictions surveyed in this study which all have binary systems. The majority of HEIs are public sector which offer the full range of programs, credentials, and functions. The only visible institutional differentiation among Swedish HEIs is in relation to the level of qualification. To illustrate, Sweden organizes its HE system into three cycles: first, second, and third. The Higher Education Act enacted by the Swedish parliament (*Riksdag*) specifies the formal requirements that distinguish these cycles. Broadly, cycles are classified according to the number HE credits awarded. An academic year is calculated at 40 weeks of full-time study which corresponds to 60 HE credits. This makes credits awarded in Sweden comparable to ECTS credits used by

¹⁵ https://minedu.fi/documents/1410845/4392480/UNI_core_funding_2021.pdf/a9a65de5-bd76-e4ff-ea94-9b318af2f1bc/UNI_core_funding_2021.pdf.pdf

¹⁶ For the bibliometric indicator, outlets are given a rating by the publication forum, a rating system created by the Federation of Finnish Learned Societies. The evaluation is conducted by expert panels that consider the typical publication practices of the specific research fields, the existing appreciation of the particular publication channel within the scientific community and the balance presence of various disciplines at higher quality levels. In this system, each scientific outlet is placed on a level between 1 and 3. Also, nonrefereed journals are included at level 0, and publication in these outlets provide very low rewards.

European countries in the Bologna Process where 60 ECTS credits are attained after one academic year of full-time study. The first-cycle qualifications encompass diplomas and bachelor's degree, 120 credits and 180 credits respectively. The second-cycle qualifications include 60-credits and 120-credit master's degrees. The third-cycle qualifications award licentiates (120 credits) and doctorates (420 credits) (UKÄ, 2018). Sweden has 30 public HEIs: 26 entitled to award first, second, and third-cycle qualifications and 4 HEIs entitled to award first and second-cycle qualifications. Sweden also has a small number of independent education providers with degree-awarding authority in both categories¹⁷. The Riksdag determines the level of funding for each HEI, which receive separate funding for first- and second-cycle education and the funding for research and third-cycle education. Funding covering education and research are both allocated as block grants which HEIs are free to distribute internally according to their needs.

In 2018, the total funding HEIs received from all sources was SEK 73.6 billion (7.6 billion US\$). Government funding comprises the bulk of funding, nearly 80% of total funding. The share of funding for first- and second-cycle education was SEK 30.3 billion. Of this, 84% (SEK 25.45 billion) was government funding, fully tied to performance through a performance formula which uses two metrics. The first is the number of registered students, converted to full-time equivalents (FTE). The second is the number of credits earned by students, converted to annual performance equivalent (APE). The funding per FTE and APE varies by disciplinary domains with engineering and medical sciences receiving the highest compensation. This is not new. Sweden has used PBF to determine funding for teaching since 1993 following reforms which gave greater autonomy for HEIs (Kivistö et al., 2019). No nationally planned limits are imposed on the number of students admitted at each HEI. However, the government sets a

¹⁷ See (UKÄ, 2019) for full list of Swedish HEIs.

funding cap as part of the appropriation directives. The funding cap defines the maximum amount of funding each HEI receives for first- and second-cycle education, which in turn sets a limit for the number of students.

Funding for research and third-cycle education from all sources totalled SEK 43.2 billion. Of this, 44% (SEK 18.9 billion) was government funding, which is a small proportion compared to funding for first- and second-cycle education. Only 20% (SEK 3.78 billion) of this amount is based on performance, on three indicators. This is a competitive PBF where HEIs compete with one another in a zero-sum contest (Berg, et al., 2019). The three indicators are bibliometrics, external funding, and collaboration with the surrounding society. These are equally weighted indicators incorporated into a performance formula. Bibliometrics measure publication numbers and citations using four-year averages extracted from (Thomson and Reuters). Citations are field-normalized. External funding measures as a running three-year average and is weighted by discipline. These two metrics relate directly to the three ranking systems considered in this study which measure universities across citations and external income. Sweden have used these measures since 2009 (OECD, 2016). The third metric, which measures the engagement of HEIs with local communities, has only come into effect in 2018 (UKÄ, 2019). The inclusion of a third component without attaching additional funds to the portion supplied through the performance formula diverts funding from the two indicators considered in rankings. This marks a shift of focus by the Swedish higher education authorities to new priorities, namely serving local communities. HEIs with research and third-cycle entitlement receive additional funding for research from public sources, such as research funding agencies. Fig. 4 illustrates the structure of income of Swedish HEIs from teaching and research.

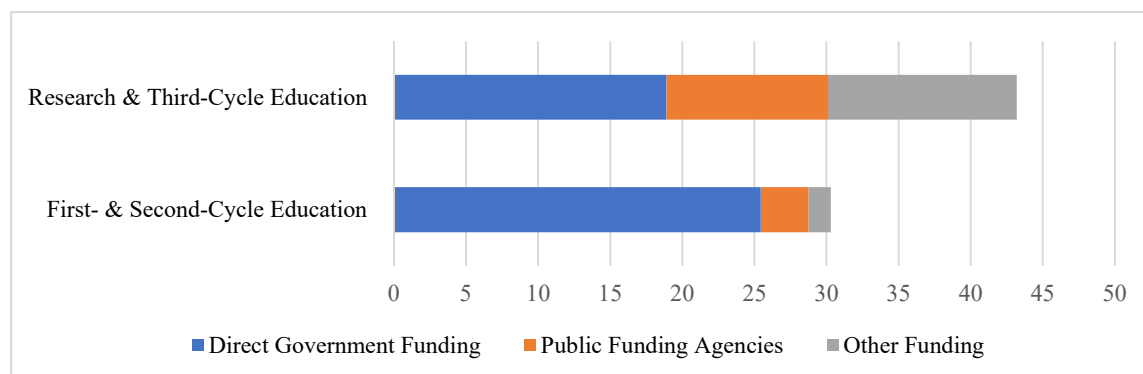


Figure 4. Funding for first- and second-cycle education and for research and third-cycle education in 2018, SEK billions

Source: By the author with data from UKÄ (2019).

Fig. 4 shows that SEK 58.85 billion (80%) of the total income (SEK 73.6) derives from public sources. This leaves open the question of how much the funding linked to performance indicators oriented to rankings comprised of the recurring public funding in 2018. In the case of Sweden, direct government funding for first- and second-cycle education and research and third-cycle education represent the annual public funding HEIs receive to cover their core mandates: teaching and research. This is calculated at SEK 44.35 billion in 2018. Of this, 65.9% (SEK 29.23 billion) was based performance. This comprises the SEK 25.45 billion for first- and second-cycle education) and the SEK 3.78 billion for funding for research and third-cycle education. Two-thirds of the latter are linked to two indicators which mimic those found in rankings: bibliometrics and external funding. This is calculated at SKE 2.52 billion. In 2018, this represented 8.6% of direct government funding entirely PBF (SEK 29.23 billion) and 5.7% of direct government funding including PBF (SEK 44.35 billion).

6. Conclusion and discussion

In looking at the PBF programs of Austria, Denmark, Finland, and Sweden, we note, first, that the orientation of PBF on global rankings is broadly weaker than it is commonly assumed. Analysis of the four PBF programs reveals varying degrees of orientation. In Austria, Denmark, Finland, and Sweden, there are points of confluence between rankings and the PBF. This is manifested in the performance indicators identified on both sides which consider the same institutional performances. However, except for Finland, the volume of funding attached to these indicators does not represent a substantial proportion of the revenue universities raise from direct government funding, much less of the revenue from all sources (see Table 3). This makes it less likely that these metrics can function as a major fillip to modify the performance of individual universities. This in turn makes it difficult to support the assertion that global rankings are a jurisdictional priority, at least in the systems under study. Even in the case of Finland, while the performance-based distributive mechanisms show a relatively high degree of orientation to rankings, it is insufficient reason to explain it terms of a single, simple cause. It also does not exclude the possibility that these choices work in concert with other policy priorities.

Table 3
PBF orientation on global rankings across four HE systems

Country	% PBF of public budget	% PBF oriented on rankings	Indicators oriented to global rankings	Type of PBF
Austria	100%	0.018%	Third-party income	Performance contracts
Denmark	53.7%	3.2%	Bibliometrics, Research income	Performance formula
Finland	75%	24%	International staff, Publications, Research funding	Performance formula, Performance contracts
Sweden	65.9%	8.6%	Bibliometrics, External funding	Performance formula

Second, significant similarities exist between the PBF programs considered in this study. We note that the four countries embed PBF indicators in the base, recurring government funding. This is the defining technical feature which distinguishes PBF in these jurisdictions from similar programs found in North America where PBF sometimes takes the form of a bonus on top. Given the historical high reliance of HEIs on government funding in Austria, Denmark, Finland, and Sweden, performance indicators are more likely to influence the behaviors of HEIs if their governments choose to steer performance toward rankings or other policy objectives. Another commonality between the four PBF programs is that they allocate the most funding based on teaching (e.g., 84% in Sweden, 65% in Austria). Even in Finland where teaching accounts for 39% of the funding based on performance, the PBF model considers indicators closely related to teaching such as teacher training but nevertheless not listed under teaching. This raises the proportion of funding tied to teaching. This support for teaching provides financial stability for HEIs in these countries where tuition and fee revenues are low or nonexistent. The high attention paid to teaching in these countries contrasts strongly with the assertions found in the rankings literature that governments are restructuring their national PBF programs to concentrate on global rankings which mostly consider research-related activities.

Significant differences also exist. For example, Austria and Finland deploy PBF over funding cycles, spanning three- to four-year periods. The advantage of this model is that it offers flexibility to balance between short-term outcomes, which tend to change continually, and long-term policy goals. Funds are allocated using HEIs' average outcomes over the funding cycle. This offers a degree of financial stability in year-to-year funding levels necessary for planning by spreading the impact of a change in performance results over the funding cycle. Conversely, the PBF programs of Denmark and Sweden do not have prespecified periods. Adaptations to

changing circumstances occur at a slower rate in such models. Another difference concerns the design of PBF programs. Austria uses bilateral performance contracts with individual HEIs. This model offers HEIs some room to shape the terms and measures of performance. Hence, it offers an opportunity to mitigate the homogenizing effect of a system-wide approach as the performance formula used in Denmark and Sweden. Finland uses contracts to allocate only 12% of PBF on universities' strategies that support national education and science policy aims, while the remainder of PBF is tied to a performance formula. This feature makes it possible for institutional leadership in Finnish HEIs to maneuver, which is often required to maintain the activities and mission of their institutions in the face of funding models that may consider rankings or other presumed international trends.

Third, financing of HE is inseparably linked to the philosophy, challenges, and inner dynamics of a country (Teichler, 2018). Looking from this angle, we note that the PBF programs of Austria, Denmark, Finland, and Sweden seek to strike a balance between addressing global trends and upholding the egalitarian principles underlying the educational systems in these countries. We cannot understand the design of PBF in these four countries without taking into consideration the links between these factors. A combination of overlapping issues is important in this regard. Some of these issues reflect the dynamics of globalization. Since about the mid-1990s, global trends such as the increased importance of competitive markets and internationalization and their associated rhetoric of 'knowledge society' have risen in prominence in these four countries. The emphasis these global trends place upon research performance aroused concerns about the capacity of research systems in these countries to position them competitively on the international stage. This in turn spurred demands for the strengthening of research systems, which induced the public into complacency of steering

resources to a wide spectrum of research activities. This adaptation process affected the amount of money proportioned to instruction. In 2008, another issue took a central stage: austerity. The fiscal austerity following the 2008 global financial crisis, with its restricted revenues, brought a new accent on efficiency for all public sectors including HE. For HEIs dependent largely on government funding, the stringency imposed by austerity budgets presented considerable challenges to the financial sustainability of systems that are quintessentially intended to function as a mechanism of social mobility by being accessible and affordable. The four PBF programs seek to adapt to these global trends and sustain this egalitarian model of education by providing incentives for HEIs to enhance student progression to avoid incurring additional costs associated with the undue prolongation of degree completion, which is a challenge often faced by systems not supported by tuition revenue. The attempt to create such balance manifests itself in the performance indicators used in PBF. Indicators encompass a variety of types that, by and large, tie funding to teaching-related activities such as capacity building and credit progression but by no means display obsession with the metrics found in global rankings. It also manifests itself in the aforementioned amount of public funding tied to the performance indicators which measure teaching-related activities such as student outcomes (credit accumulation and degree completion). These measures account for nearly 60% of the total money allocated on the basis of performance in Austria, close to 55% in Denmark, 50% in Finland, and 84% in Sweden. The relatively high share of PBF derived from these activities is an indication of the extent to which funding authorities pay attention to the quality and output of teaching. These teaching-related performances are not considered in global rankings¹⁸. Hence, this study finds that, in the countries under review, the design of PBF programs is more a function of domestic politics and dynamics than it is a reflection of global rankings. Based on this analysis, the evidence from this

¹⁸ See Appendix for full list of metrics used in ARWU, THE, and QS.

study does not support the assertion that governments in these four national contexts particularly attach PBF to performances measured by rankings to boost the international visibility of their national universities. Considering the tenuous links between PBF and rankings found here, this study counsels caution. Careful reflection and policy dialogues are warranted before drawing conclusive policy lessons from the rankings literature about how performance-based accountability mechanisms like PBF can be formulated or improved.

Global rankings exert influence that cannot be written off. But to the extent that they impact PBF, this study shows there are significant variations by country. Thus, it may be more useful to focus on individual cases when it comes to the links between funding and rankings. Historically, this line of enquiry has received scant attention compared to other domains. This is partly because significant differences exist with respect to how countries finance their HE systems, which in turn makes the comparison of funding methods a complex process to permit easy generalizations. Hence, and for reasons of practical legitimacy, many explanations of the relationship between the finance of HE and rankings allude to existing theories which have close affinities to the rationalist strand of organizational theory (e.g., resource dependence, contingency theory) which view HE as embedded in an environment that drives resources (Gumport, 2012). This spawned generalized statements which frame nearly every change in the finance of HE as an aberrational realignment of HE policy with rankings in the face of growing resources challenge. As much these efforts sensitize the HE communities to the ramifications of rankings-driven policymaking, they also smuggle into their arguments precisely the sorts of anxieties about rankings their work attempts to curb.

Generalizations drawn from academic literature, albeit insufficient condition for placing an issue on the policy agenda, can be inferentially powerful, even when they do not reflect every

situational condition. Conceptually, the institutions and work of HE increasingly define the legitimacy of knowledge in modern society (Clark, 1983). This puts HE in a position of authority over defining what is known. Psychologically, studies into the impact of generalizations found that people give considerably higher estimates to the prevalence of a particular situation when presented with generic statements (Cimpian et al., 2010). This means the attitudes and rhetoric of policymakers and HE leaders are susceptible to influence from literature asserting that governments are basing PBF on rankings. These dimensions give glimpse of some of the dynamics at play in the diffusion of policies and practices of a particular organizational field, and the role of HE thereof.

It is not clear that the links between PBF and rankings are tight. But it is clear there is some connection in the HE systems considered here. Therefore, jurisdictions considering this path or revising their PBF programs should tread warily. PBF is a means to an end, and the end should be refracted through the expectations of society and students not through the prism of rankings. These considerations should be the standard for the design and details of any PBF.

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Appendix

Metrics used in ARWU, THE, and QS

ARWU	THE	QS
Alumni of an institution winning Nobel Prizes and Fields Medals 10%	Reputation survey (learning environment) 15%	Academic reputation 40%
Staff of an institution winning Nobel Prizes and Fields Medals 20%	Staff-to-student ratio 4.5%	Employer reputation (surveys employers' opinions of institutions that source most competent graduate) 10%
Highly cited researchers in 21 broad subject categories 20%	Doctorate-to-bachelor's ratio 2.25%	Faculty-to-student ratio 20%
Papers published in Nature and Science 20%	Doctorate-to-warded-to-academic-staff ratio 6%	Citations per faculty 20%
Papers indexed in Science Citation Index-expanded and Social Science Citation Index 20%	Institutional income 2.25%	International student ratio 5%
Per capita academic performance of an institution 10%	Reputation survey (volume, income, and reputation) 18%	International staff ratio 5%
	Research income 6%	
	Research productivity 6%	
	Citations 30%	
	International-to-domestic-student ratio 2.5%	
	International-to-domestic-staff ratio 2.5%	
	International collaboration 2.5%	
	knowledge transfer (industry income) 2.5%	
TOTAL 100.00	100.00	100.00

Source: The author based on data from the official website of the three rankings