Impacts of performance-based funding on higher education institutions: A literature review

Paper presented in Track 1 “Governance and Leadership”

EAIR 37th Annual Forum in Krems, Austria
30 August till 2 September 2015

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Key words
Funding-state higher education, Institutional performance measures, Higher education research design, Governance

Work in progress:
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Abstract

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Despite the growing popularity of applying performance-based funding throughout the European higher education systems, very little is known about its impacts on organizational performance and behaviour of higher education institutions. This paper provides a literature review on recent studies investigating the impact of performance-based funding schemes on higher education institutions in the U.S. and Europe. The main aim of this paper is to organize and synthesize results from the previous studies to identify the most crucial areas needing further research, especially in Europe.
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Introduction

For achieving higher level of efficiency in higher education, methods of allocating funding are considered essential instruments among the wider spectrum of other governance tools. Recent trends and practices in Europe increasingly point towards more frequent use of performance-based funding mechanisms (PBF) in higher education financing (Jongbloed, 2010). According to the recent EUA study, currently a majority of European higher education systems are at least partially funded based on HEI performance, and that in 13 European systems (out of 28 surveyed systems), funding formula for distributing basic funding is output-based (see Claeys-Kulik & Estermann, 2015).

Despite the popularity and widespread attention of PBF across European higher education systems, surprisingly little is known about the impacts of PBF on HEI performance and behaviour. In contrast with the volume of publications written about the PBF in general (e.g. conceptualisation of PBF, basic premises behind the uses of PBF, performance indicators, trends of using PBF, forms of PBF, and so on), empirical research on the actual performance impacts of PBF on HEIs has been almost non-existent in Europe. Moreover, even less is known on how and why PBF effects on the organizational behaviour of HEIs. Previous studies have either ignored how PBF affects organizational behaviour or have implicitly assumed that organizations are fully rational and that performance indicators somehow automatically mediate the institutional outcomes and goal setting (Barnetson & Cutright, 2000). The lack of empirical investigation is somewhat surprising, since PBF policies are grounded on an expectation that performance incentives influence HEIs to modify their organisational behaviour in ways that increase their productivity.

As an attempt to get more complete and coherent picture about the studies investigating the impacts of PBF, this paper aims to offer insights by reviewing most recent studies investigating the impacts of PBF on HEI performance and behaviour. The main aim of this review is twofold: 1) to organise and synthesise key findings from the previous studies 2) and to identify what are the most crucial areas in need for further research especially in Europe.

Data and methods: Studies reviewed

To locate research on PBF impacts on HEI performance, we searched for recent studies (book chapters, journal articles, policy reports etc.) written in English and published during the past 10 years (2006-2015) by using electronic databases such as Ebsco Academic Search Premier, Science Direct, SAGE Journals Online, and Springer Link. In addition, we used standard search engines (e.g. Google Scholar and Google) to find those articles, book chapters, studies, policy briefs and reports that were not covered in accessible electronic databases. In both of these searches, we used various combinations of the relevant search terms such as “higher education”, “performance-based funding”, “performance”, “impacts”, and “effects”.

Studies found in this way and a few additional research papers and articles cited in these studies totalled over 30 publications in number. A quick review of these studies helped to narrow the review to those empirically examining the impacts of PBF on either HEI behaviour of performance (or both) regardless of their methodology.
Publications chosen this way were 15 in number, of which 11 were American origin, all published in years 2010-2015. Two of these studies were comprehensive literature reviews (Dougherty & Reddy, 2011; Dougherty et al., 2014) which further broadened the views on previous research on the topic significantly. Most of these studies investigated the impacts and implementation of PFB in one or more state systems by utilising comprehensive statistical data sets derived from various sources and employed a range of statistical analysis techniques in their analysis (e.g. multivariate analyses, quasi-experimental research designs approximating causal relationships).

In contrast, the few European studies found (Frølich, Kalpazidou Schmidt & Rosa, 2010; Jongbloed et al., 2010; de Boer et al., 2015 and Claeys-Kulik & Estermann, 2015), examining PBF impacts on HEI performance was given secondary importance and it was discussed only as a one sub-topic of broader PBF focus. All of these studies employed qualitative methods in analysis. Unfortunately, even though these studies offer relevant viewpoints on the use of PBF and its implications in different contexts, none of them examined in detail the impacts of PBF on performance of HEIs.

The overall structure of the review will be organised according to three sections covering key aspects of the theme: 1) concepts, goals and contexts of PBF, 2) performance impacts of PBF, and 3) PBF impacts on organisational behaviour of HEIs. These are followed by conclusions, where we pull together the main insights from reviewed studies and identify areas in need for further research.

Performance-based funding: Concepts, goals and contexts

PBF can be defined as an allocation mechanism where the amount of funding is tied via a formula to the achievements of HEIs as reflected by performance indicators (e.g. Jongbloed & Vossensteyn, 2001). Most of the applied performance indicators in teaching and research are output-/outcome-based indicators measuring either progress to or completion of final outputs (e.g. study credits, number of degrees awarded, publications, competitive research funding awarded, citations, patents, amount of competitive/external research funding, student satisfaction). The substance of the indicators may also be ratios, percentages, or other quantitative values mixing input and output elements (e.g. staff-student ratio, employment ratio of graduates, retention rates, number or percentage of students completing fixed amount of credits per academic year/semester, graduation rates and graduation time) (e.g. Cave et al., 1997; Kivistö, 2008).

Policy objectives motivating states² to use PBF can be viewed both from internal and external perspectives. Internally, HEIs are expected to utilise PBF incentives as a mediating or supporting device for their own goal setting and productive behaviour. From external perspective, PBF is often considered as a tool to increase institutional awareness of policy objectives for higher education which again support HEIs’ accountability for resource providing stakeholders, the state and general public. Indeed, performance indicators “manage and control academic work by making visible and subjecting academic activities to external evaluation” and they can be “designed to advance the agenda and implement the policy” (Barnewton & Cutright, 2000, pp. 289-290; p. 280). Moreover, PBF often aims to increase the clarity, transparency and fairness in funding in contrast to less-transparent allocation methods such as negotiated, incremental, historical and ad hoc funding (see Ziegele, 2013).

PBF be also seen as a mechanism both for increasing accountability and to foster HEIs’ performance (Edgar & Geare, 2013, Ewell, 1999). However, in some cases, PBF policies may be adopted for symbolic purposes to initiate a compliance or oversight mechanism without any serious intention of actually improving institutional outcomes (Hillman, Tandberg & Gross, 2014). Thus, analytically speaking, the two policy rationales of improving

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² In the context of the European Union, the rationale for this approach is further strengthened by the Lisbon Agenda (2000) and the Bologna Process (1999), which aim at enhancing the quality and competitiveness of European higher education systems.
the level of HEI performance and holding HEIs accountable for the resources are not, by definition, mutually inclusive.

Without a doubt, the most important policy goal behind introducing PBF is to improve HEIs’ performance. Implicitly, this goal is grounded on a belief that institutions are “revenue maximisers” and will make a strong organisational efforts to improve (or maintain) their performance as exchange for a greater level of revenue (Dougherty & Reddy, 2011, see also Bowen, 1980). At the same time, HEIs as organisations are sometimes criticised for their inefficiency (Dougherty et al., 2014) and this criticism is then followed by policy demands for higher level of accountability (Edgar & Geare, 2013). PBF is expected to reduce potential or actual goal conflicts by aligning the strategic priorities of HEIs with the policy goals of the state/government and therefore offer more straightforward incentives for productive behaviour. By reformulating the incentives in a way that HEIs are rewarded or punished primarily based on actual performance, PBF seeks to stimulate shifts in institutional behaviour that is expected to result in greater level of efficiency (Rutherford & Rabovsky, 2014).

TABLE 1. Grouping of PBF goals

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<tr>
<th>Goals concerning PBF</th>
<th>Grouping of goals</th>
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<tr>
<td>• Increasing efficiency, productivity and effectiveness</td>
<td>Operation related goals: performance and accountability</td>
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<tr>
<td>• Focus from inputs to outputs and service orientation</td>
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<tr>
<td>• Increasing transparency</td>
<td>Policy and decision-making</td>
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<tr>
<td>• Enabling measurement and visibility</td>
<td></td>
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<tr>
<td>• Implementing policy</td>
<td>“Sticks” and “carrots” internally and externally</td>
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<tr>
<td>• Informing policy and decision-making</td>
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<td>• Providing incentives</td>
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<td>• Motivating</td>
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<td>• Rewarding</td>
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<td>• Punishing</td>
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<td>• Competing on funding</td>
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Naturally, the role of PBF varies greatly across higher education systems. It can be utilized either as “bonus funds” which are paid above the basic operational grant or it can be embedded as a portion in the basic funding. In the case of the former, the PBF proportion is usually quite modest (e.g. 1-5% above the basic funding) and in the case of the latter, it is much higher (e.g. over 10% of the basic state funding). For instance, recent study of de Boer et al. (2015) analysed the performance-based funding models that have been in use for some time in a number of higher education systems across the world. In most of the European countries they investigated, performance-based budget in total share of performance-based budget was ranging from 23% to 100% (see Table 1). However, it is important to notice that “the share of the performance-based budget” included also input-based indicators (such as student numbers), which cannot be considered as performance-based indicators as they lack output/outcome-orientation typical for PBF. In most countries the most important performance indicators were the number of degrees (BA, MA, PhD) and external/competitive/research funding awarded. Also bibliometric indicators are in use in several European countries (for details, see Clays-Kulik & Estermann, 2015, p. 30).
In the U.S., state performance funding for higher education has become widely used; currently 26 states were operating performance funding programs and four more have programs awaiting implementation as of June 2014 (Dougherty et al., 2014). According to Tandberg & Hillman (2013), state of Tennessee launched the first program in 1979, but most other states did not implement PBF until the 1990s. In the early 2000s, however, PBF popularity decreased and several states discontinued their reform efforts. Since 2007, number of large-scale initiatives backed by several foundations have advocated for the development of new state higher education performance funding programs. The first wave of PBF programmes (also known as “PBF 1.0”) typically involved a bonus for higher education institutions above base state funding. The performance funding bonus was relatively small, between 1-6% of base state funding for public higher education. However, in the second wave of performance funding programs (also known as “PBF 2.0”), performance funding typically did not take the form of a bonus on top of regular state funding but it was embedded in the base state funding for higher education. The proportion of state funding tied to performance outcomes PBF 2.0 programs usually is much higher than that for “PBF 1.0” programs: typically, 5-25% of total state funding for public higher education (Dougherty and Reddy, 2011; Rutherford & Rabovsky, 2014). Unlike in Europe, where PBF has been used also to support research performance (competitive research funding, research assessment scores, publications/citations), PBF in the U.S. has related to measuring student outcomes; especially graduation/completion rates, retention rates, credit accumulation rates and number of (undergraduate) degrees awarded (see Friedel, Thornton, D’Amico & Katsinas, 2013).
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PBF impacts on HEI performance

Based on the review of existing American studies applying various quantitative analysis methods, it can be concluded that empirical research findings do not provide firm evidence that performance funding increases the performance of HEIs (more specifically, rates of completion, retention, and graduation). This conclusion can be based on the evaluative research on PBF systems both on macro and micro levels. The macro level approaches have used states as the unit of analysis and examined whether states applying PBF outperform states that do not utilize PBF. The micro level approaches, on the other hand, examine how performance funding impacts HEIs within a specific PBF applying state. While studies of macro level approach have provided a national view of performance funding impacts and trends in the U.S., micro level studies have looked more precisely policy contexts that exist within each individual state applying PBF (Hillman, Tandberg & Fryar, 2015). In the following sections we will now provide a review of studies including both of these approaches.

A macro level study of Tandberg and Hillman (2013) utilised quasi-experimental difference-in-differences research design for examining changes in degree productivity between the years 1990 and 2010. By comparing the differences between pre/post outcomes, along with differences between performance and non-performance funding states, they ran separate analyses for bachelor’s and associate degree productivity, examining the overall effect across all of the PBF states, the effect of performance funding over time, and the effect of PBF within each state. As a result, Tandberg and Hillman found that introduction of PBF did not have a statistically significant impact on the total number of degrees earned within the states where the policy was in force. Moreover, in the states where there were effects, they did not occur for several years. In the case of associate degree completions, there were no effects until five to seven years after performance funding began. Similarly, Rutherford’s and Rabovsky’s (2014) multivariate study using extensive number of control variables examined the effect of PBF policies on student outcomes (six-year graduation rates, retention rates, and bachelor degree production) at public universities 50 states across an 18-year period (1993–2010). They found that PBF policies have been ineffective and in worst cases even negatively linked to student performance.

A micro level study of Sanford and Hunter (2011) utilised spline linear mixed models to examine the impact of changes in Tennessee’s performance-funding policies on retention and six-year graduation rates at public four-year institutions from 1995-2009. Their results show that PBF policies had no systematic effect on HEI performance in terms of retention and graduation rates. Moreover, another micro level study of Hillman, Tandberg and Gross (2014) utilised a difference-in-differences research design with multiple comparison groups to analyse the impact of Pennsylvania’s performance funding program on degree completions per full-time equivalent student. Although find modest impacts were found when compared against colleges in neighbouring states, these impacts disappeared when matched against similar colleges from other states implying that PBF policy has not systematically increased degree completions within the state. Also, by using difference-in-differences design Hillman, Tandberg and Fryar (2015) investigated the extent of performance funding impacts on degree productivity in community and technical colleges in the state of Washington. Like Tandberg and Gross, they found that the performance of community and technical colleges was not, on average, distinguishable from the performance of colleges in other states that had never been subject to similar accountability policies.

Discussion

Given the apparent failure of PBF policies to increase HEIs performance in reviewed studies may tempt us to draw a conclusion that PBF simply does not work in a way it should. However, even when we do have
information about the failure of PBF in bringing in improved performance, we do not have information why this has happened. What seems to be already proven based on the findings of the reviewed studies is that current funding levels tied to PBF programs have been insufficient in bringing forth positive changes in institutional performance. However, we cannot know whether higher levels of PBF would incentivize changes in institutional performance more strongly. Most of the reviewed studies primarily examined PBF programs which did not provide much funding (PBF 1.0 programmes), and not the programs that would provide considerably more funding (PBF 2.0 programmes). Therefore, before we can reach more definitive conclusions about PBF impacts, analyses on PBF programmes with higher level of funding attached are still very much needed in the future (cf. Dougherty et al., 2014; Rutherford & Rabovsky, 2014). Moreover, despite the recent increase of studies investigating the topic, the number of comprehensive multivariate studies is still relatively low which restricts the ability to reach definitive and generalisable conclusions. This is especially the case with higher education systems outside the U.S., where composition and relative importance of intervening variables having an influence on HEI performances is likely to be different across the systems. Contextual factors, such as student aid policies, level of tuition fees, levels of HEI autonomy and composition of other state policy instruments used differ greatly across higher education systems.

PBF impacts on organisational behaviour of HEIs

Empirical research on what kind of organisational behaviour can cause low (and high) level of HEI performance is still surprisingly scarce. Even though PBF has not been effective in bringing forth increases in HEI performances, in some cases it has been effective in incentivising *positive changes in organisational behaviour* aiming at greater performance. For example, study of Rabovsky (2012) found a small positive impact of PBF on HEI spending, with a modest increase in spending on instruction. This could suggest that institutions may adjust their policies and practices in response to the new policies, regardless of the amount of performance funds available from the state (Hillman, Tandberg & Fryar, 2015). Similarly, in their review of previous studies, Dougherty and Reddy (2011) found evidence that PBF can be associated with changes in campus planning efforts and administrative strategies aimed at improving academic and student support services. In detail, these changes can be broken down into following three broader categories:

1. *Increased use of data in institutional planning* including e.g. developing new internal data collection systems, providing training for administrative staff in data collection, and hiring information systems specialists to handle the increase in data collection.

2. *Improvements in academic policies and practices* such as in (a) alterations to academic department organization and staffing (e.g. reducing the number of part-time faculty, require full-time faculty to teach larger courses, consolidation of units and programmes); (b) alterations to academic programs and curricula (e.g. shutting down programs on efficiency grounds, elimination of unnecessary requirements that impede graduation, including too hard-to-pass courses); and (c) alterations to course instruction (e.g. developing course contents, instructional technique, and testing).

3. *Student service improvements* such as developing registration and graduation procedures, increasing the level of financial aid and simplifying financial aid procedures, making changes in counselling and advising practices, improving in tutoring and other supplemental instruction, and making improvements in job placement services.

In contrast, there are also a few studies which have touched the *main obstacles* preventing HEIs to improve their
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For instance, Pheatt et al. (2014) explored the factors that hinder HEIs from responding effectively to PBF by interviewing administrators and academics (N=222) at 18 public HEIs (community colleges, universities) in three states. Based on their data, they formed five categories of obstacles: composition of student body (e.g. inadequate student preparation for college, non-degree seeking students, lower socio-economic status of students and financial burden of attending), inappropriate PBF measures (e.g. selected PBF indicators do not align with HEI mission and characteristics), insufficient institutional capacity (e.g. inadequate capabilities of required institutional research, limited staff and support services), institutional resistance (e.g. PBF threats professional autonomy or academic standards), inadequate level of state funding (e.g. lack of financial resources to make necessary improvements to academic and student support services) and insufficient knowledge about PBF (e.g. overly complex funding formula).

Similarly, Dougherty and Reddy (2011), based on the review of research literature, highlight the following factors as causes for ineffectiveness: appropriateness of the performance measures employed; instability in funding, indicators, and measures; the brief duration of performance funding programs; funding levels that are too low and not well enough insulated against the ups and downs of the state revenue cycle; shortfalls in regular state funding for higher education; lack of a clear connection for academic staff between performance and funding; inequalities in institutional capacity; unequal distribution of knowledge and expertise about performance funding within institutions; and “game-playing” by institutions.

Also Hillman, Tandberg and Gross (2014) offered (or, as they call it, “speculated”) possible explanations for PBF ineffectiveness in the context of Pennsylvania’s performance funding program by proposing three possible categories explaining the failure: 1) Poor program design (PBF design not reflecting differences in the various missions and goals of the HEIs, performance ceilings, improvements in performance not matching funding received, using too many performance indicators 2) viewing PBF as a signal of mistrust (feelings of mistrust limiting willingness to pursue further improvements); and 3) misalignment of underlying theory of action (not taking into account that HEIs either lack the capacity to respond positively, or are already responding at their maximum capacity).

Discussion

Analytically speaking, PBF models are based on a rather simple expectation of causal chain where an event (restructuring PBF incentives) causes the next (managerial and administrative responses in HEIs which translate into changes in production processes) and that these responses (supposedly positive) cause in turn improvements in HEI outputs and performance (Figure 1).

FIGURE 1. Simplified illustration of expected PBF causal logic (adapted from Rabovsky 2012, p. 679)

All of this presumes that without PBF, HEIs are not placing enough emphasis on performance or that they even are wilfully bypassing their chances to improve performance unless they are clearly incentivised to do so. This
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implies that HEI mismanagement or even opportunistic behaviour (see Kivistö, 2007; 2008) is intentional, and that it can be fixed with appropriate incentives. However, this may lack accuracy at least on following grounds (cf. Rutherford & Rabovsky, 2014): First, institutional leaders are believed to have the ability to make changes by possessing knowhow, required level of expertise, technical capacity, and personnel and financial resources. Based on the reviewed studies, this is often not the case; many institutions may lack sufficient technical resources to effectively implement necessary changes in their institutions, and some of them even may lack knowhow how to do this. Secondly, PBF is also grounded on an assumption that HEIs are willing to pursue PBF incentives with administrative decisions and grass-root level efforts. In other words, PBF policies presume that if only HEI leaders want it, they can decide to change institutional policies and practices and that these changes are implemented at sub-unit levels (faculties, schools, departments, administrative support units) automatically and without significant delays. Again, based on the reviewed studies, it seems even when HEIs have required capacity, their willingness to comply with PBF may be compromised either because of the flawed incentive structure (e.g. too many and conflicting performance indicators, too small amount of funding related to performance), or some other reason, such as ethical principles (e.g. fear that quality is sacrificed for greater quantity). Of course, it is also possible that HEIs do not want to comply with PBF incentives, because they are in principle opposed to policy goals which PBF indicators are representing, no matter the level of funding attached to PBF indictors.

Conclusions

The studies reviewed suggest unanimously that PBF policies have not impacted positively on HEI performance. However, what seems to be already proven based on the findings of the reviewed studies is that current funding levels tied to PBF programs have been insufficient in bringing forth positive changes in institutional performance. Because of the lack of studies investigating higher education systems where the share of PBF has been higher for a longer period of time, at the moment we cannot reach definitive conclusions. Moreover, generalisability of findings of these studies is also very much in doubt as the context of the studies (U.S. state systems, “PBF 1.0” type policies) is rather homogenous in terms of social, political, cultural and economic aspects. As the impacts of PBF are likely to be contingent on the overall funding context of specific HE systems, drawing general conclusions on the performance impact of PBF is challenging (cf. Claeys-Kulik & Estermann, 2015).

Studies investigating PBF impacts on HEI behaviour have remained scarce and therefore, drawing any sort of generalisable conclusions is impossible. Nevertheless, existing research literature provide some evidence that HEIs respond to PBF incentives in multiple ways, especially when they have sufficient capacity and motivation to do so. On the other hand, reviewed studies also suggest that institutions that would like to adjust their policies and practices as a response to PBF incentives can be hindered by several other factors on which they have little control.

There are several areas which are in urgent need for further research, especially in Europe. To this date, it seems that European researchers and policy analysts have paid very little attention to actual impacts of PBF, and when they have, they have employed different forms of qualitative methodology. Although current qualitative analyses and case study designs can be helpful for generating insights and understanding about the nuances of PBF and its impacts, they have hardly provided any evidence shedding light on possible shifts in HEI performance their relations to PBF policies in use. Therefore, European researchers would be encouraged to employ a range of quantitative methods in their analyses (e.g. multivariate studies with extensive controls), as several U.S. scholars have already done over the past 4-5 years. American studies should not be replicated, but they can
serve as useful examples in constructing appropriate research settings. Given the high importance of PBF in several European countries, this should be one of the top priorities for further PBF-related research, both for academic and practical reasons.

Moreover, we also need to move beyond the issue if PBF policies are effective to when and why they are effective / ineffective. Future research should also investigate more the organizational behaviour related to PBF, both in Europe and in the U.S. As suggested by many of the American studies reviewed in this paper, future research should seek to test the presumed causal chain depicted in Figure 1. by investigating the connections between PBF incentives, organisational behaviour and performance in detail and in several contexts. Understanding the logic behind PBF is essential both for academic research on PBF as well as for practioners designing performance-based funding policies. Articulating how PBF impacts on HEI behaviour and how this behaviour translates or does not translate into actual shifts in HEI performance is necessary if we want move away from anecdotal perceptions of PBF effectiveness.

NOTES:

1 In addition to intended PBF impacts, research findings also indicate that PBF systems can produce a range of unintended side-effects. However, this important discussion falls beyond the scope of this paper.
2 In this paper “state” refers to any public body (ministry, department, agency, funding council, etc.) responsible for allocating public funding for higher education institutions irrespective of its level of operation (local, regional, national or federal).

References


