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Revenues, ultimate sovereigns and resource allocation at Finnish, Swedish, UK and US universities

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Abstract

This article explores how the level of funding and the governance model at universities are related to their resource allocation, measured as the balance between faculty and other personnel. Data from 2019 are used to construct scatterplots of the relationship between other personnel per faculty and revenue per faculty in the UK, the US, Sweden, and Finland. The study indicates that the more financial resources a university has, the more the workforce will be dominated by nonfaculty. This is explained by Bowen's revenue theory of cost: universities raise all the money they can and spend all they raise. Institutions that limits their growth in order to maintain exclusivity are particularly prone to amass large economic resource and attain a high nonfaculty to faculty ratio. However, resource allocation can also be affected by the governance model. Where faculty elect the university board, faculty also comprise a larger share of the personnel. This might be explained by Tullock's theory of the politics of bureaucracy: middle management is loyal to the ultimate sovereign, which elects the university board, and if this sovereign is the faculty, middle management will allocate resources to what it believes is in the interest of faculty, such as teaching and research. For example, Oxford and Cambridge, where the ultimate sovereign is a large collegial body consisting of almost all teachers and researchers, achieve positions in international university rankings comparable to those of the top US universities at a fraction of the cost.

Keywords: revenue theory of cost, politics of bureaucracy, university governance

Introduction

Governments and private donors are investing large amounts of resources in the university sector. These external stakeholders also have an interest in influencing universities since they are considered to be vital for technological, economic, and social development. However, particularly among established universities, there is a strong belief in the ideals of academic freedom and university autonomy, although the definitions of these concepts vary considerably. While some universities rely heavily on private donations, public funding is important almost everywhere. The amount of funding available also differs greatly between institutions. The degree to which universities are controlled by internal or external stakeholders, such as faculty, political governments, or alumni, varies within both public and private universities.

By combining a quantitative and qualitative analysis of the university systems in the Nordic countries Finland and Sweden and the Anglo-Saxon nations United Kingdom and the United States, this article explores how levels of funding and forms of governance were related to resource allocation at universities in 2019. The revenue theory of cost (Bowen, 1980) predicts that the more resources an institution acquires, the larger the share of the resources will be allocated to things other than the core functions of education and research. These findings are consistent with those of earlier more limited studies (Holmén, 2023). However, Tullock's (1987) theories would also indicate that governance, particularly "ultimate sovereigns" —the actors who wield the power to appoint the university board— can also affect resource allocation.

The University Systems of Two Anglo-Saxon and Two Nordic Countries

The university systems of Britain, the United States, Sweden, and Finland have their roots in a common European university tradition. The links between the British and US universities, as well as between the

Swedish and Finnish, are further strengthened by the fact that they were initially formed within the same realms. The first universities in today's United States and Finland were founded in the 1600s, although politically, these areas were subject to the kings of England and Sweden until US independence in 1776 and Russia's conquest of Finland in 1809. This common historical origin means that the similarities within each pair of countries make it easier to discern the effects of the differing variables under investigation. However, the similarities between Sweden and Finland are stronger than those between Britain and the US. The forerunner of the University of Helsinki, the Academy of Turku, was, like other Swedish universities in the 1600s, founded by the state based on the model of the older Uppsala university and primarily catered to the demand for priests in the state church. In contrast, most early universities in the American colonies were private initiatives founded in opposition to Oxford and Cambridge, providing a spiritual alternative for religious refugees. As a consequence, their governance structures became different from those of old English universities, with less faculty influence (Alleman et al., 2017).

In the second half of the 19th century, German research universities became the model for institutions of higher education across the globe, and this also led to an increase in the influence of faculty at American universities (Alleman et al., 2017). Early British influence on the American system of colleges came from Scotland rather than from Oxford and Cambridge. However, the Oxbridge universities became ideological models for the 19th-century development of US colleges into universities, although their autonomous governance systems were not copied (Thelin, 2011). In the late 20th and early 21st centuries, influence was also exerted in the other direction, as Britain has attempted to move closer to the financial model of US universities, looking for other sources of revenue in addition to government funding (Anderson, 2006).

US higher education displays considerable diversity in terms of how the board is selected. A common denominator is, however, that faculty has less formal power than at most European universities. It has been claimed that faculty at US universities might be more influential in practice than formally (Smelser, 2010). However, the ultimate sovereign, which middle management is attempting to please according to the theory of politics of bureaucracy, is not faculty.

Both the US and British systems have universities with self-perpetuating boards, where a majority or a large part of new members are elected by the existing board. However, the British system also has substantial faculty representation. While all British universities are predominantly publicly funded, the US system consists of private and public institutions. Also among public universities, direct government funding provides only a minority of the revenues. In some states, the governor appoints the regents, but in, for example, the University of California system, this is balanced by safeguards for autonomy in the state constitution (University of California, 2016). However, this strong, formal autonomy is regularly challenged by de facto political interference (Smelser, 2010). In the US, only military academies are controlled by the federal government, and the political influence over state universities is dispersed among the governments of the 50 states.

In contrast, the Swedish system of higher education is subject to centralized government control. In his classic international comparison of higher education systems from 1983, Burton R. Clark described the Swedish higher education system as the second most authoritarian government in the world after the Soviet Union. Since then, government control of higher education has remained strong and has, in some respects, been strengthened further. For example, external representatives on university boards were first introduced in 1977, and their influence has gradually been increased in each bout of new university legislation since. Although these external representatives are supposed to represent stakeholders, such as industry and the labor market, they are directly appointed by the government (Holmén, 2022).

The so-called Autonomy Reform of 2011 allowed Swedish universities to organize their internal decision-making freely, removing the demand for collegial bodies. This enabled several universities to transform into top-down organizations inspired by business management, with a reduced influence for collegial bodies at faculty or department level (Ahlbäck Öberg & Boberg, 2023). Paradoxically, this "autonomy" reform therefore meant that the government allowed university boards, where the majority

were elected by the government, to abolish all governing bodies within the university not dominated by government appointees (Holmén, 2022). This means that the national government is more unchallenged as sovereign over Swedish universities than in most other countries in the world—more so now than earlier in Swedish history.

The Finnish system of higher education is also quite homogeneous, government funded, and regulated by a single law. However, Finnish universities are more autonomous than their Swedish counterparts. After the tumultuous years following Finland's independence from Russia in 1917, which included a civil war, the constitution of 1919 shielded Helsinki University from party politics. Helsinki was the country's only full university at that time, but the new constitution from the year 2000 safeguards the freedom of science, art, and higher education and guarantees autonomy for all universities. These constitutional guarantees have had a tangible influence on legislation in the field of higher education. For example, the constitution outlines that the majority of university boards be elected by faculty (Holmén, 2022). Thus, the ultimate sovereign at Finnish universities is the faculty.

It might be argued that studying the effects of governance on resource allocation by comparing European and US universities is misleading since the latter define their mission more broadly, for example, by allocating resources to college sports, while European universities are more focused on teaching and research. However, it can also be claimed that this difference in mission has developed over centuries under the influence of different governance models, as the ultimate sovereign in the US has often been religious communities or private donors. In addition, most "sideshows" of US college culture were in their introduction justified by their beneficial effect on the core academic mission of the universities. For example, in the late 1800s, proponents of intercollegiate athletics claimed that a winning football team could bring many benefits to new universities (Thelin, 2011). The ambition of being an institution responsible for the total moral upbringing of students has led to the incorporation of student initiatives in the official structures of US universities. In Europe, similar activities have remained under student control or have withered away. However, this is not merely a cultural difference but rather one governed by the revenue theory of cost: European universities could simply not afford as broad a mission as US universities, while US universities need a broader mission to spend their revenues. Thus, the different missions of US and European universities are not distortions that complicate our comparison but rather are part of the main variable that we are exploring.

The Revenue Theory of Cost and the Politics of Bureaucracy

Universities are older than either government agencies or private companies. Sometimes they are treated as anomalies that should be forced into one of these models (Holmén & Ringarp, 2023). Although universities share some characteristics with both companies and public agencies, they differ from them in other respects. As government agencies, universities can exercise public authority, such as certifying the qualifications of professional groups, and are often dependent on public funding. Unlike most government agencies, but similar to commercial companies, they operate in a highly competitive environment. This has been the case since the Middle Ages, and today thousands of higher education institutions compete on an international market.

However, university competition differs from competition between for-profit companies in one important respect. Companies minimize cost to create profit for their owners, whereas even private universities are generally nonprofits without formal owners. Therefore, surpluses need to be consumed within the organization, which means that, over the long run, revenues and costs will mirror each other. In this close-knit relationship, revenues are the leader and costs the follower. According to Howard R. Bowen's (1980) revenue theory of cost, at a university, "cost is determined by hard dollars of revenue and only indirectly and remotely by considerations of need, technology, efficiency, and market wages and prices" (p. 17). Bowen saw the quest for academic excellence as the main driver behind the cost increases in higher education. Chasing elusive excellence, universities raise all the money they can and spend all they raise.

Of course, some universities use surpluses for expansion. However, elite institutions are often unwilling to do so since their status depends on their exclusivity, which could be threatened by growing

enrollment. High student fees and contributions from alumni make elite universities financially well off. Charles Clotfelter (1996) convincingly demonstrated that US elite universities were able to raise their tuition in the 1980s since the wealth of affluent families increased.

This quest for excellence might have benefited administration rather than faculty. In the US, the term "administrative bloat" describes how administrators grow in absolute numbers and relative to faculty. This is related to increased costs of university education, even though resources for instruction are reduced. Williamson et al. (2018) suggested that this is a result of the faculty's loss of power to administrators in university governance. Administrative growth has been greater at private colleges, which Ginsberg (2011) attributes to their better financial situation, as public colleges cannot afford to expand their administration beyond a certain limit. However, Comrie (2021) claims that the proportions of faculty and administrators have remained fairly stable at US universities during recent decades. The best interpretation of the available statistics is that the ratio stabilized in the first decade of the twenty-first century after several decades of fast administrative bloat. Comparisons between the US and other countries can contextualize whether the new stable level should be considered high or low.

Several other explanations have been given regarding why bureaucracy tends to expand. In 1968, Niskanen claimed that bureaucrats strive to maximize the total budget of their bureaus since they benefit from working in growing organizations. However, as studies showed only a weak correlation between a bureau's budget and individual salaries, in 1994, he suggested that bureaucrats maximize the "discretionary budget", the difference between the bureau's budget and the minimum cost sufficient to perform its function. This discretionary budget is similar to the profit of a company. However, in nonprofits, it must be absorbed internally, for example, by hiring additional staff involved in noncore activities.

Tullock (1987) described the strategies employed by middle management in public and private organizations as politics of bureaucracy. Mid-level bureaucrats attempt to please their superiors in exchange for favors such as career advancement. In particular, they ensure that their actions align with the interests of the ultimate sovereign. At universities, the ultimate sovereign is the actor that appoints the board, which might be the political government, alumni, the collegium of faculty, or, in self-perpetuating systems, the board itself. Holmén (2023) suggested that the nature of the ultimate sovereign affects the balance between faculty and other categories of personnel. However, his study was based on a small number of universities and was limited to Sweden and Finland. In this article, the validity of this hypothesis is tested on a broader set of countries and institutions.

Investigating the relationship between university board characteristics and institutional performance, Harris (2011) found that female and minority board representation is positively correlated with both the retention rate of females and minorities and university rank. She also found a correlation between the financial expertise of board members and the total revenues of the institution. Board members employed in higher education were associated with higher total contributions and higher student retention rates. Larger boards were also associated with better performance, which has also been observed in other nonprofits but not in for-profit companies. Harris also observed an inverse relationship between organizational efficiency and the number of employees on the board.

Some of Harris's results can be explained by the differences between universities and for-profit companies. While board members in companies are usually paid, it is common that university board members donate to the university. Taking that into account, it is not surprising that large boards can collect more money or that boards with representatives from the financial industry, often wealthy individuals, are more successful at fundraising through their own donations and those of their networks. Harris's last claim, about the relationship between employees on boards and efficiency, is central to the question of this study, and we will return to it in the conclusion.

Method

By analyzing the relationship between the share of faculty among personnel and revenues per faculty at universities in Finland, Sweden, the US, and the US, this study explores how levels of funding and forms of governance are related to resource allocation at universities.

University systems of culturally, economically, and politically similar countries are compared, matching Sweden with Finland and the United States with Britain, looking for the variable that explains the differences we can find within these pairs. We also compare universities that display similarities despite being from countries with different systems, such as Sweden and the US, while looking for the common variables that can explain these similarities. However, it should be kept in mind that the Nordic pair is more homogeneous than the Anglo-Saxon pair. Although the US and the UK systems share features such as the prevalence of top-ranked universities with large endowments and student fees, the UK is more similar to the Nordic countries in terms of total levels of funding and the importance of public funding. As measured by revenues per faculty, Sweden and the UK are the two most similar systems with respect to their funding levels. Therefore, we can investigate whether differences in governance can explain why these countries experience differences in outcomes despite similar levels of funding.

The university systems within each of the two pairs of countries studied, the Nordic and the Anglo-Saxon, have common origins and strong recent interactions. The differentiating variable studied within the Nordic pair is the ultimate sovereign—in Sweden, the government, and in Finland, the faculty. In the Anglo–Saxon pair, the variables are greater economic resources at US universities and greater autonomy and faculty governance, particularly for some leading British universities. The differences between the systems in the two Nordic countries and particularly in the United States are also great, which allows us to explore what factors unite Princeton University and the Stockholm School of Economics (SSE), which are the most well-funded and administration-rich institutions in the Swedish and US systems.

The quantitative analysis in this article is not aimed at providing statistical proof for either Tullock's or Bowen's theories. Instead, descriptive statistics and data visualization are used to identify general patterns and outliers that are suitable candidates for qualitative exploration.
To quantitatively explore and visualize the effects of Bowen's revenue theory of cost—the more resources an institution acquires, the greater the share of resources allocated to noncore activities—it is necessary to define metrics of the resource richness of an institution, as well as of its resource allocation. Furthermore, the comparison of resource allocation across countries requires metrics fundamental enough to be found in different databases. The US data are found in the IPEDS database, and the European data in the ETER.

It is possible to describe the balance between resources allocated to core (teaching and research) and other functions as the full-time equivalents (FTE) of other staff per FTE of academic staff, teachers and researchers. Both of these groups are distinct categories in the IPEDS and ETER datasets. Of course, resources are allocated to things other than personnel. However, the balance of personnel is also indicative of other costs. For example, many administrators mean that a large part of the costs of office space will also be channeled toward that group. Overall, the balance between teachers/researchers and other personnel is likely the best metric we can construct using commonly available and internationally comparable statistical variables. In the following, we call this metric OTHERS/FACULTY. With faculty, we mean all personnel classified as teachers or researchers in the IPEDS and ETER, regardless of tenure status, etc., and with others, we men all other nonhospital personnel.

The resource richness of an institution can be measured by its revenues, which, in nonprofit organizations, converge with expenditures. Although the sources of revenue vary between different types of universities, total revenues is a category in the ETER and IPEDS datasets. These total revenues include all sources of income (from government, donors, students, etc.) except hospital revenues at university hospitals. These revenues must be adjusted according to the size of the institution. Dividing revenues by the number of students is unsuitable since it does not account for the fact that some institutions are more research intensive than others with fewer students per faculty. A better denominator

is therefore the number of faculty, teachers and researchers since it facilitates comparisons between institutions with different balances between research and instruction. Thus, the metric for wealth of the institution used in this article is revenue divided by the FTE of academic staff (REVENUE/FACULTY). In ETER, revenues are provided in euros, and in IPEDS, in USD. To make mental conversions easy for the reader, an exchange rate of 1 is used in the scatterplots. Since the currencies are of roughly equal value but there is considerable volatility in their exchange rates, this is preferable to converting them using them using the rate at the time of writing.

Scatterplots are used to analyze the relationship between two variables across a large number of data points. Together, the data points form a cloud, the shape of which reveals hints about correlations and other qualities of the dataset. In this investigation, we expect that the more REVENUE/FACULTY there is at an institution, the more OTHERS/FACULTY we will find. In a scatterplot with REVENUE/FACULTY on the X-axis and OTHERS/FACULTY on the Y-axis, we would therefore expect a rising trendline such as (a) in Figure 1.

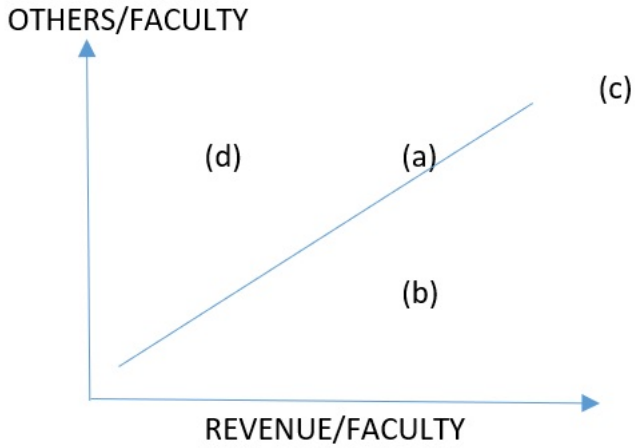

Figure 1. Schema for analysis of the scatterplots.

While we expect most institutions to arrange around axis *a*, as the revenue theory of cost stipulates that money not spent on faculty will instead be spent on nonfaculty, we also strive to identify and analyze the outliers. Universities that do not follow the pattern that more REVENUE/FACULTY leads to an increase in OTHERS/FACULTY are found below the trendline in position (b). Among them, we can expect to find confirmation of the second hypothesis of this article: the governance model of the institution affects its resource allocation. Since institutions in location (b) have effective resource allocation in the sense that they channel a large share of their resources to the core missions of teaching and research, determining which common traits in their governance facilitate this allocation is valuable.

Another category of universities relevant for a closer qualitative analysis is found at location (c), far up to the right on line (a). These institutions have much resources per faculty and an extremely small share of faculty among the personnel. It could be expected that most institutions would bunch together at roughly the same point along line (a). As an institution grows its revenues, which pushes it to the right in the diagram, it can also afford more teachers and researchers, which functions as a counteracting force to the left. However, institutions in location (c) have, for some reason, decided not to grow their faculty even though they have the means to do so but have instead hired more other personnel.

By transforming the numerical data into a diagrammatic form, we can visually compare the relationships and shapes of hundreds of datapoints, which is extremely difficult if not impossible with other methods. In the words of the graphic analyst Mary Eleanor Spear (1952), charts not only reveal hidden facts not obvious from the original data but also identify mistakes in statistical compilations that would otherwise have been overlooked. In this study, Spear's second observation applies to universities in location (d) in

the diagram. These institutions have low revenues per faculty and high numbers of other personnel per faculty. This means that their total headcount is extremely high in relation to their revenues. In fact, this group cannot possibly exist in real life since their revenues cannot sustain salaries for the personnel, let alone all the other costs associated with a university. The prevalence of institutions in this location seems to indicate inconsistencies in the data. According to the raw data from the US, a small number of universities could be found close to location (d), but this can be compensated for since it is mainly caused by variations in the accounting of healthcare personnel. Among European countries, most institutions in location (d) are found in Germany. Neither Germany nor any other country with a substantial number of institutions in location (d) has been included in the study, since it indicates that the data are not comparable.

Finally, the governance models of the outliers identified through diagrammatic analysis are subject to closer examination. This is done with the help of the bylaws of the universities, as well as through a study of the research literature on the historical development of these universities and the national systems in which they have developed. This analysis is also aided by theories on administrative growth and university governance, particularly Bowen's revenue theory of cost and Tullock's politics of bureaucracy. Expressed in a simplified manner, the revenue theory of cost contributes to the correlation in the scatterplot, while the effect of the ultimate sovereign contributes to the variance. The iron law that all revenue has to be translated into costs drives institutions with greater revenue per faculty to spend more on other personnel. However, it is possible that the nature of the ultimate sovereign affects the extent to which this tendency is carried through since the ultimate sovereign likely favors channeling resources toward its own interest group.

The empirical investigation in the following section first examines the countries one by one—Finland, Sweden, the United States, and then the UK—followed by a cross-country comparison. The comparative section also studies the relationship between economic resources and position in the Times Higher Education (THE) World University ranking. Although crude, the THE ranking allows us to discuss how the factors analyzed in this article are related to value for money.

Finland: A Homogeneous System

The Finnish system of higher education comprises universities and universities of applied sciences. Here, we analyze only the universities. As shown in Figure 2, there is a strong correlation (0.79) between the resources per faculty and the ratio of other personnel to faculty. All Finnish institutions have less than one other personnel per faculty, which means that faculty everywhere comprises the majority of the personnel. There are no real outliers in the system. The Finnish constitution and university law grant the same autonomy to all Finnish universities, which makes faculty the ultimate sovereign (Holmén, 2022). Two universities, Aalto and Tampere, are organized as foundations, while the rest are organized as associations under public law (Holmén & Ringarp, 2023). However, judging from Figure 2, this difference in organization does not seem to have any relevance to the quantity of resources they have access to or how they allocate them. The variation in size from Helsinki, with 7,255 total personnel, to Hanken School of Economics, with 265, does not seem to affect the variables we are investigating since smaller and larger institutions are mixed in the diagram.

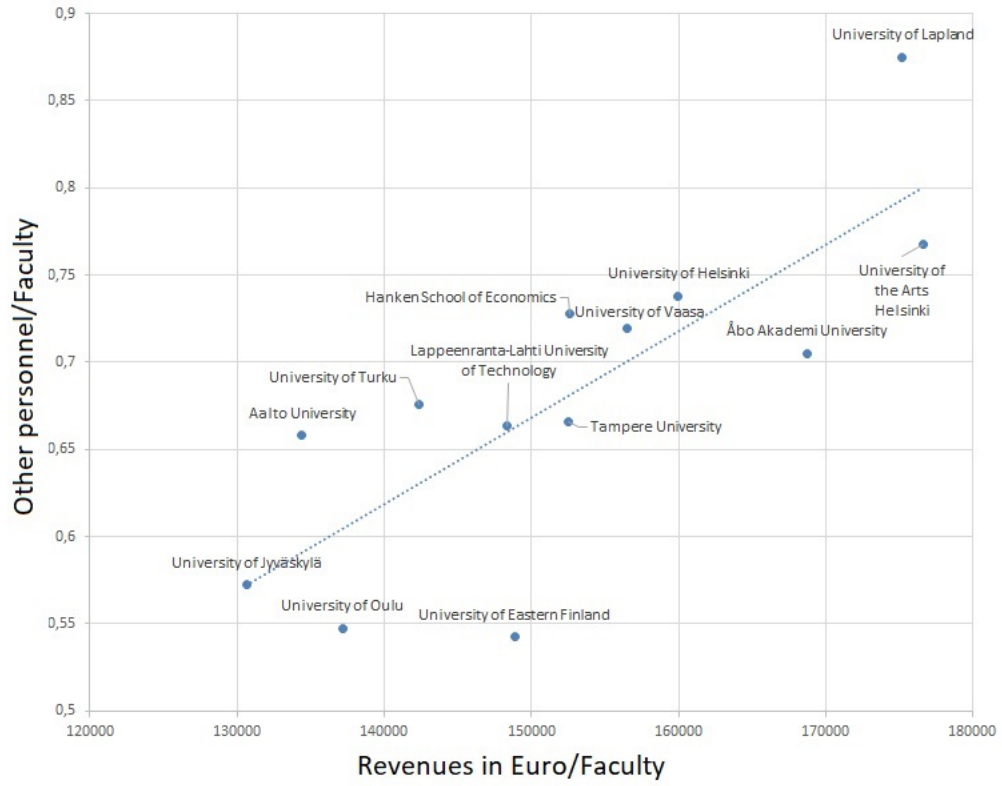

Figure 2. Scatterplot of all Finnish universities in 2019. Source: ETER.

To contextualize the share of researchers and teachers at Finnish universities, we need to compare our findings to those of other systems, such as neighboring Sweden.

Sweden: Extremely Homogeneous with One Outlier

The Swedish system of higher education comprises universities and university colleges. The difference between these two categories is not as clear as the difference in the Finnish system, and institutions with more than 200 total personnel are included in Figure 3, regardless of which category they belong to. This means that we include institutions of varying size and type. However, the large research universities in Stockholm, Uppsala, Lund, Gothenburg, Umeå, Linköping, and Örebro are all found in the middle of the distribution, while smaller and more specialized institutions are found on both edges of the scale. Thus, we do not observe any clear correlation between the size of the institution and the variables we are investigating.

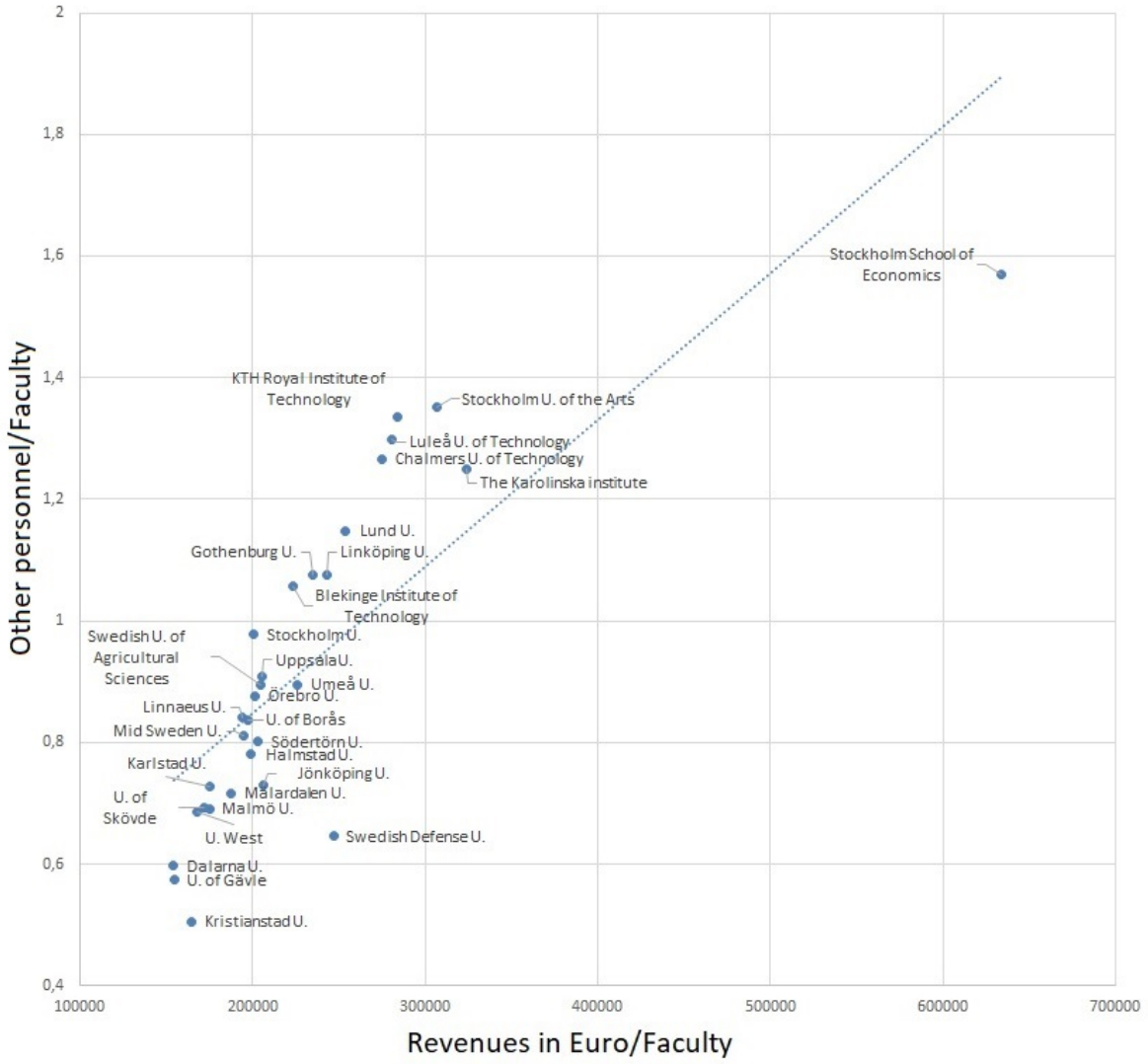

Figure 3. Swedish universities and university colleges with over 200 total employees in 2019. Source: ETER.

In Sweden, the correlation (0.80) between revenues per faculty and other personnel per faculty is even stronger than that in Finland. In fact, if we exclude the outliers SSE and the Swedish Defense University, the correlation reaches 0.95. In comparison with Finland, such an exclusion is warranted since the Finnish National Defense University is not recognized as a full university and thus is not included in Figure 2. The SSE is also a rare institution with mainly private funding and no counterpart in Finland.

The fact that the correlation is greater in Sweden than in Finland might be due to the stronger element of central control in Sweden. This might lead universities to spend revenues and report financials uniformly, which makes them appear as a string of pearls in Figure 3. Finnish university autonomy gives each institution more leeway for individual priorities than is the case in Sweden. However, both systems have a high degree of internal homogeneity and are also very similar to each other. Swedish institutions are slightly more well off financially than their Finnish counterparts are, and as our hypothesis predicts, they thereby have more other personnel per faculty.

The greatest outlier among these two Nordic countries is the SSE, with twice the revenue per faculty of the second wealthiest institution, the Karolinska Institute, and more other personnel per faculty than anyone else. However, in this respect the gap is not as large, and the SSE is placed firmly below the trendline.

Holmén (2023) found that SSE's large cash pile was the result of successful private funding drives in combination with its ethos of exclusivity, which limited the expansion of institution size. However, that study left open whether SSE's high share of administrators was the result of the revenue theory of cost or the institution's ultimate sovereign. SSEs position under the trendline in Figure 3 indicates that the high share of non-faculty among the personnel is primarily a result of the large funds available, and that this situation is not aggravated by the governance model of the institution. However, it can be argued that the relationship between the variables is slightly logarithmic rather than linear since there are diminishing returns to the discretionary budget value of hiring administrators and other nonfaculty. A resource-starved institution recovering from cut-backs might use a large share of additional resources to hire more administrators. However, a rich institution, such as SSE, might, after becoming well endowed with other personnel, channel more of the discretionary budget into other noncore expenses, such as art.

The fact that Holmén (2023) gave an even bleaker picture of administrative bloat at the SSE than did the present study might partially be explained by methodology: that study focused on administrators, while this combines all other personnel into one category. Holmén revealed that SSEs cut down on other personnel, such as technicians and librarians, but hired administrators. While the high number of other personnel is primarily dictated by the SSE's large budget, the hiring of communicators rather than librarians might be influenced by the fact that the national economic elite is the ultimate sovereign.

US R1 Universities: High Levels of Funding

In the US, more than 6,000 institutions are available in the IPEDS database of higher education. This analysis is limited to the 150 most research-intensive universities, R1 in the Carnegie classification. In the US, OTHERS was calculated by subtracting the number of healthcare personnel (SFTEHLTH) from the total. The universities seem to follow different practices regarding what to include in this category. For example, Ohio State University's main campus has more than 7,000 people in this category, indicating that they might have included the university hospital. Other universities with medical schools of similar size are more restrictive regarding who to include.

Other variables might also be accounted for differently. Some universities have thousands of employees in the public service category, while most have few to none. Some tasks carried out by persons labeled as public service at one university might be performed by instructors at another, such as open lectures or online courses. Since it is unclear what public service personnel do, the problem cannot be avoided by excluding it, as with healthcare, because of the possible overlap with instructors. Since there are relatively few public service personnel at most universities, I have simply left them in the data, although this can affect the positions of some universities. For example, the high ratio of other personnel to faculty at the University of Miami would be drastically reduced if a substantial portion of its 1,057 public service personnel were added to its 1,545 instructors. Since the data for universities with high numbers of public service personnel are difficult to interpret, they are left out of the qualitative analysis.

In the IPEDS database, part-time employees are converted to FTEs by dividing their total by three. A university with many part-time workers who work significantly less than a third of full time would seem to have a larger number of FTEs than is the case. However, the differences between the share of nonfaculty in the US and European university systems are so large that they cannot be explained by this accounting principle.

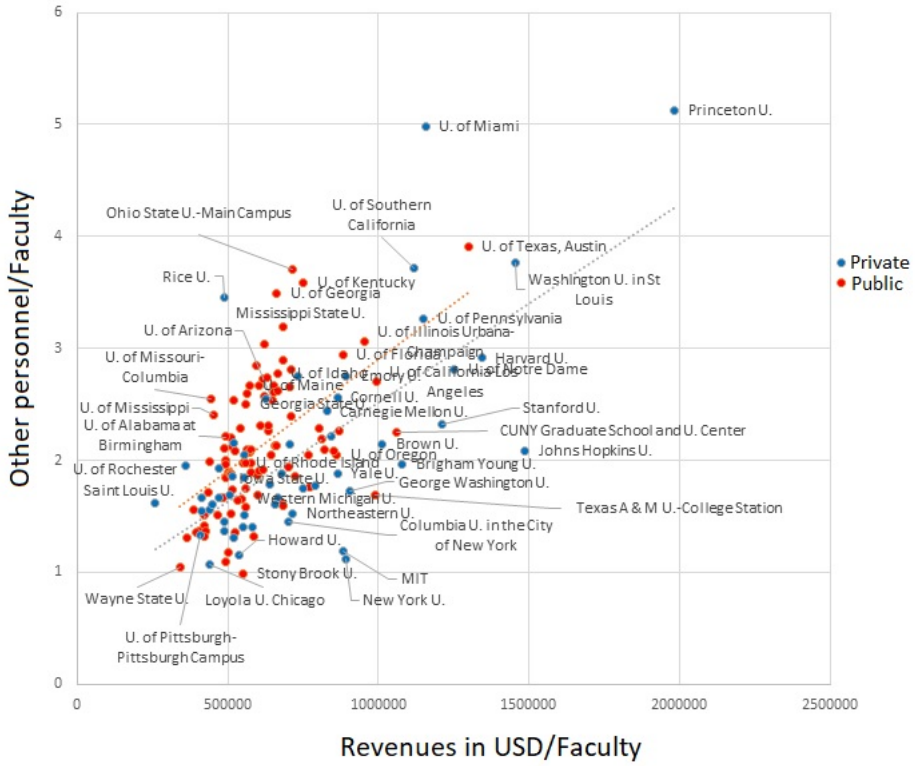

Figure 4. American 2019 R1 institutions: universities with the highest research activity. Source: IPEDS.

Figure 4 of 150 US institutions classified as R1 displays a relatively high correlation between others per faculty and revenue per faculty (0.59), although not quite as high as in Sweden and Finland. Public and private universities follow similar trendlines, although there are fewer public universities among the most financially well-off institutions. The extreme position of Princeton on the top right can be explained by its exclusivity. Princeton is one of fewer than ten of the 150 research-intensive universities of size 3 (5,000–9,999 students) or lower. The majority in the category are size 5, with over 20,000 students. According to the opening sentence in W. B. Leslie's book celebrating the university's 275-year anniversary in 2022, "Princeton prides itself on being small and intimate enough to be a community" (p. 4). This reflects that Princeton has been more reluctant than other old American colleges to become a large research university. In the late 19th and early 20th centuries, Princeton presidents James McCosh and Woodrow Wilson promoted a transformation on the basis of the model of German research universities, while Francis Patton, who was president between them, described Princeton as the East Coast's "best country club" (p. 97). Princeton was also last among leading US universities to admit new groups, such as blacks or women. While institutions such as Harvard used the influx of veterans to expand in the mid-20th century, Princeton's regents decided to put a cap on the university's growth.

Axtell (2006) claims that even Wilson did not want to transform Princeton into an ordinary US university; instead, he wanted create a unique and distinctive institution. Still today, Princeton is distinguished by its small size and high teacher-to-student ratio. According to Axtell's sources, this creates a need for large amounts of economic resources since the Princeton method is "damned expensive" (p. 597). Approximately 60% of Princeton alumni donate to the university, the highest in the country, as is the endowment per. In 2021, Princeton had 4.7 million USD in endowments per FTE student, compared with 2 million at Harvard (IPEDS).

The self-image of Princeton faculty conveyed through Axtell's work is partly confirmed by this study but also partly contradicted. Indeed, Princeton is relatively small, exclusive, and expensive. However, for the approximately 8,000 students at Princeton, there are more than 1,000 FTE faculty, but more than 5,500 FTE other staff. Thus, it is oversimplified to claim that the Princeton model of instruction requires large financial resources. Rather, the Princeton model of financing outpaces the demands of the

Princeton model of education. Therefore, it requires a large nonfaculty staff to balance its budget, as predicted by the revenue theory of cost. The Princeton example, similar to the SSE in Sweden, confirms that institutions with a policy of promoting exclusivity end up resource rich and with a high degree of nonfaculty among their employees.

The UK: Efficient Outliers

Figure 5 displays British universities with more than 2,500 total personnel. It confirms that the more resources a university has, the greater the share of nonfaculty will be among the staff, although the correlation is much lower (0.21) than that in Finland and Sweden. However, if we remove the outliers Oxford, Cambridge, and University College London (UCL), the correlation is strengthened to 0.51. These three top universities are well below the trend line, with a comparatively small share of nonfaculty.

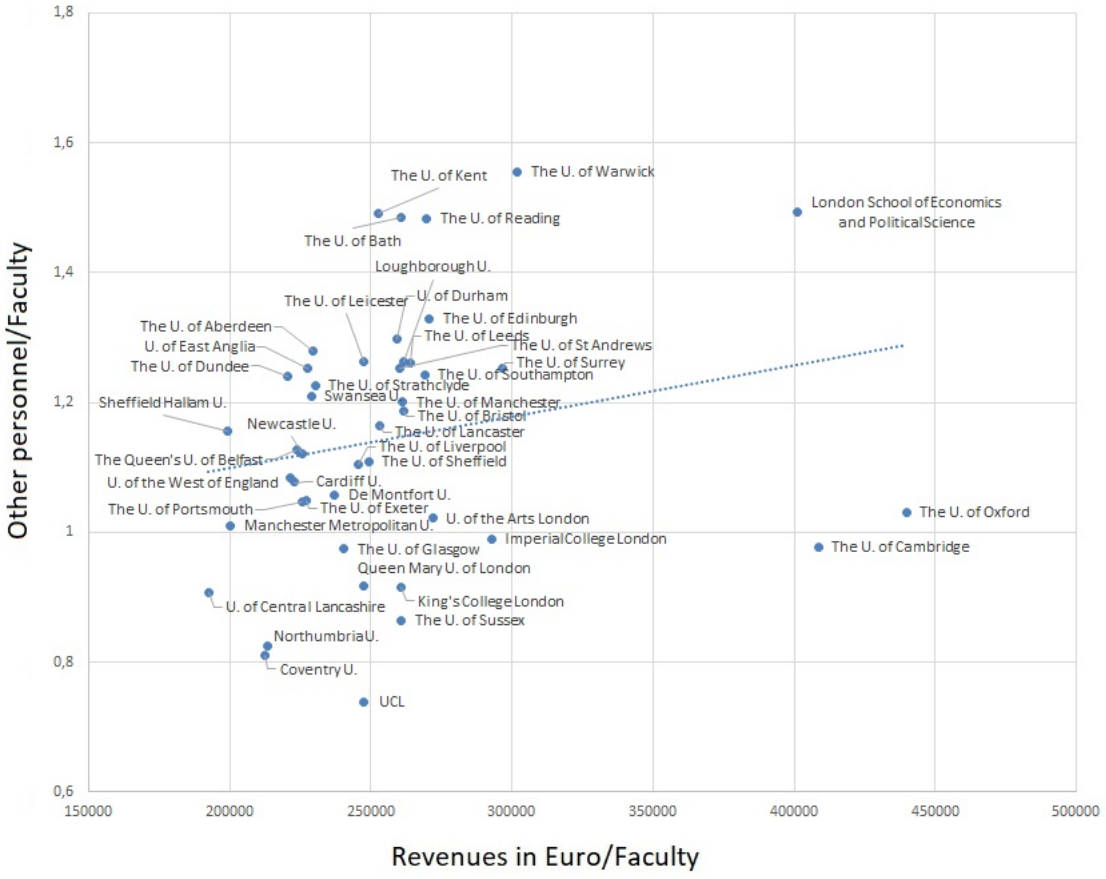

Figure 5. Universities in Britain with more than 2,500 total personnel in 2019. Source: ETER.

Oxford and Cambridge are by far the oldest universities in England, and, founded in 1826, the UCL ranks third, although the Scottish universities in Glasgow and Edinburgh are older than the English ones, with the exception of Oxford and Cambridge. However, there is one aspect of the Medieval governance system of Oxford and Cambridge which the UCL, but no other British universities, has adopted and retained. Moodie and Eustace (1974), who view medieval faculty autonomy as an invented or at least lost tradition, claim that it was in fact first (re)established with the foundation of an academic senate at the UCL in 1832, while it was not introduced until the midcentury in Oxbridge.

British universities have a council similar to the US board of regents. However, Oxford and Cambridge also have other bodies encompassing almost all teachers and researchers and some other personnel. At the University of Oxford (n.d.a), the highest governing body is the congregation with 5,500 members, and at the University of Cambridge (n.d.a), it is the regents house with 7,200 members. Cambridge also

has an even larger senate, comprising everyone within the university possessing a master's degree or higher. Until 1926, the senate was the highest governing body, but today, its main function is to elect the chancellor. This governance tradition is also found in the UCL (n.d.a). Its academic board comprises all professors at the university as well as many elected representatives of the nonprofessorial faculty and other staff. At other British universities, the senates are generally limited in size to hundreds, or even just dozens, of elected representatives.

At the University of Cambridge (n.d.b), different categories of faculty comprise most of the council. There are several external members, but they are selected by a committee with members from the regents' house and the senate. At the University of Oxford (n.d.b), the thousand-headed congregation dominates the council and approves its external members. At the UCL (n.d.b), there are three ex officio members, eleven appointed members, and six members elected among the professors on the academic board. Academic board members are not the majority but can influence appointed members through the board's elected members in the council. Therefore, it might be argued that the faculty is the ultimate sovereign in all these universities.

The University of Edinburgh has a general council that is represented on its board, which is called the university court. However, the Edinburgh General Council is not a faculty body but also comprises alumni. The University of Edinburgh's (n.d.a; n.d.b) senate has a much smaller representation in the council than the representations found in the UCL, Oxford, and Cambridge. At other British universities, the councils are generally self-perpetuating and strongly influenced by lay or external members, as at many US universities. Comparing Oxford, Cambridge, and the UCL to the rest of the British universities, large collegial bodies seem to encourage the allocation of resources toward education and research.

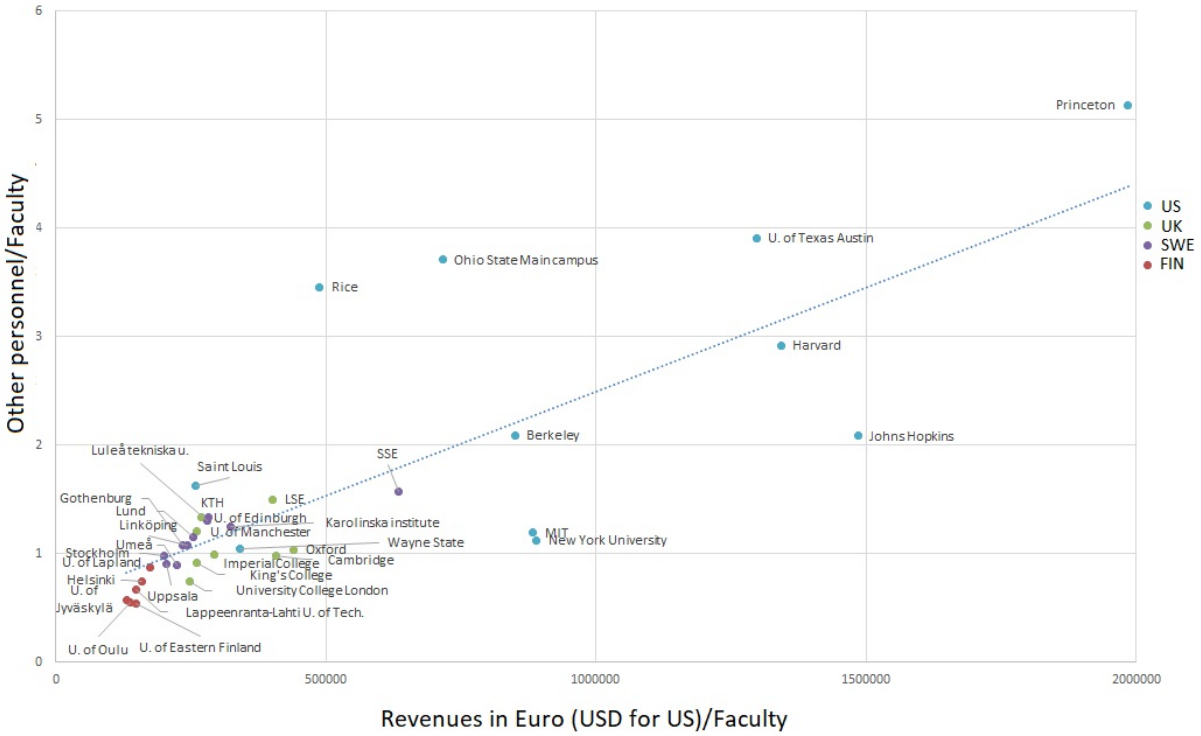

Figure 6. Comparison of the university systems in Sweden, Finland, the United States, and the UK. Sources. IPEDS, ETER 2019.

Cross-Country Comparisons

Figure 6 compares a selection of institutions from all four countries. From Sweden, Finland, and the UK, the largest institutions were selected (measured in the number of FTE personnel), in order to provide comparability with US R1 institutions. Because of its special characteristics, the SSE was included despite its small size. The US selection includes institutions on the edges of the cloud in Figure 4 and some from the middle.

Swedish and Finnish institutions are on the same trendline, with Swedish institutions being slightly better funded and having a larger share of nonfaculty. The top UK institutions are better funded than the Swedish institutions are, but this does not result in a higher share of nonfaculty, which indicates that they are able to access their resources for other uses.

While the Finnish, Swedish, and British institutions are closely spaced, there is enormous diversity in the US Saint Louis and Wayne State are mixed with British universities, with relatively limited resources and a moderate non-faculty-to-faculty ratio. MIT (Massachusetts Institute of Technology) and New York University manage to keep the share of nonfaculty down despite having larger resources than European universities. However, the bulk of US universities have far greater economic resources and a much greater non-faculty-to-faculty ratio than European universities. Princeton has the same top right position in the US system as does the SSE in Swedish, with rich economic resources and a high ratio of other personnel to faculty. The common factor is the conscious strategy of maintaining exclusivity by avoiding expansion.

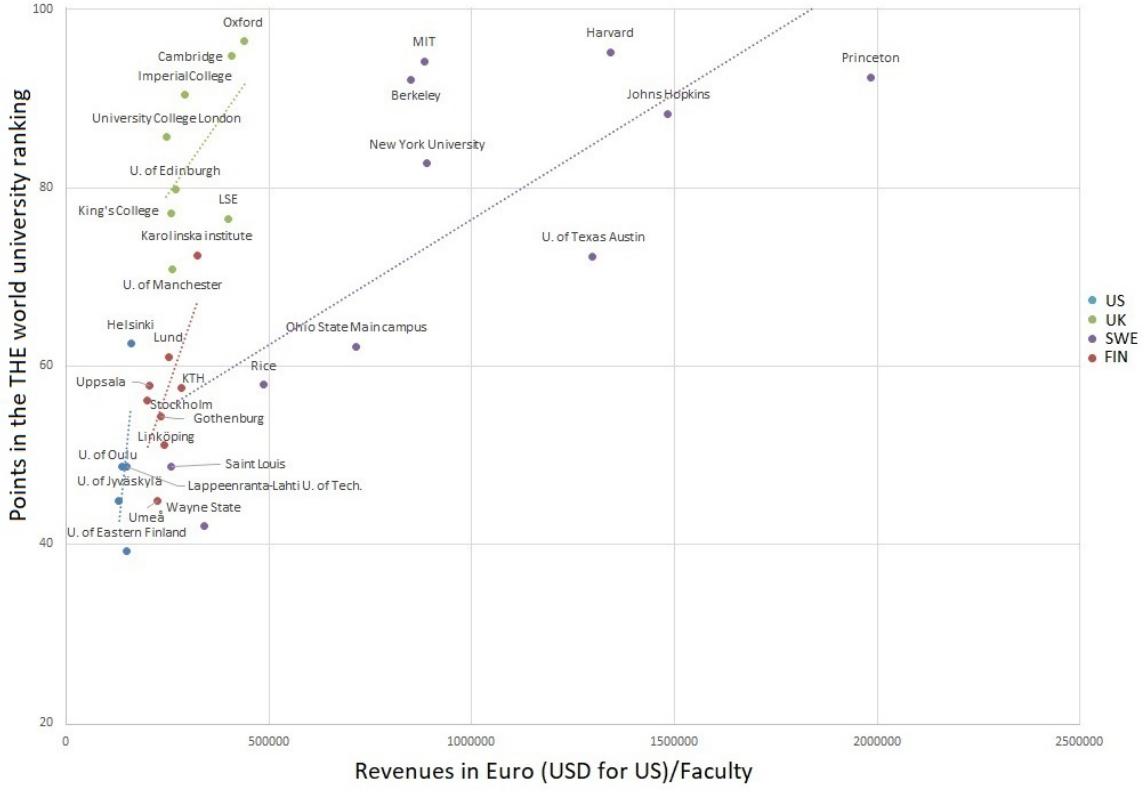

Figure 7. Relationships between rankings in THE 2023 and revenues per faculty 2019 (US: USD; others Euro). Source: THE, IPEDS, ETER.

Figure 7 investigates the relationship between revenue per faculty and ranking points for institutions from Figure 6 included in the THE 2023 World University ranking. The trendlines of the four countries

indicate that richer institutions tend to score higher on the ranking. These trendlines are based on the universities in the diagram and not on the entire system. However, they are good approximations since the selected universities reflect the general shapes of the clouds of all universities.

The trendline is steepest in Finland, the country with the poorest universities. The richer the university system is, the less steep the trendline becomes. This indicates that there are diminishing returns for investments in higher education. In part, this is explained by a maximum score in the rankings—100. However, because no university achieves maximum points, regardless of resources, and that Oxford is closest with 96.4 points, indicates that the additional funding of top US universities does little to improve their academic quality. These diminishing returns are not difficult to explain. For example, a money-starved Finnish university can easily find use for additional funds that increase the quality of instruction and research, while this is less true for extremely rich institutions such as Princeton.

Comparing Swedish and British universities, we notice that most UK universities have similar revenues per faculty as Swedish universities but still rank substantially higher in the THE. One explanation might be that UK universities are freer at managing their resources than are their Swedish counterparts. Although public funding is important in both countries, government control is stricter in Sweden, where universities are government agencies. Unlike autonomous British universities, they are not independent legal subjects. For example, Swedish universities do not own their buildings but rent most of them from another government agency, Akademiska hus, which, out of its 6.95 billion SEK revenue in 2022, channelled an operating income of 5.14 billion SEK back into the government budget. This limits the resources available for teaching and research.

The recent history of UK university financing might also explain the system's frugality. Due to financial difficulties and the ideology of the Thatcher years, British universities suffered a period of austerity from the 1970s to 1997, during which expenditures per student decreased 40% (Anderson, 2006). The British universities might thus still be recovering after a period of starvation.

The differences in rankings between similarly funded Swedish and British universities could also be explained by bias favoring Anglophone institutions. However, these findings cannot explain the differences between British and US universities. Why British top universities use their money more efficiently than their US counterparts is instead explained by the revenue theory of cost. British universities have limited revenues, imposed, for example, by the 9,250 GBP cap on student fees (UCAS, n.d.). US universities can and will earn more revenue and therefore have to spend more money to balance their budgets.

Conclusions

This study confirms that, in general, the more resources a university has available, the smaller the share of researchers and teachers will be among the institution's total personnel. Teachers and researchers are involved in the core mission of the university, and even poor universities must maintain them. When a university gets richer, these "must haves" can be supplemented with "good to haves." According to the revenue theory of cost, this shifted focus is not only an option but also a necessity: when all the essentials are paid for, nonprofit organizations can only balance their budgets by increasing other expenses.

This study also indicates that the tendency to channel resources into nonfaculty staff can be affected by a university's model of governance. For example, Oxford and Cambridge, two of the richest universities in Britain, have far fewer nonfaculty in their staff than could be expected based upon their wealth, and UCL is also well below the national trendline. These three institutions have faculty-dominated governing bodies comprising thousands of people, which elect the university board in Britain called the council. Contrary to Harris' (2011) claim that employees on university boards lowers efficiency, these thousand-headed bodies seem to be efficient at allocating resources to the core mission of the university, teaching and research. According to Tullock's theory of the politics of bureaucracy, middle management is loyal to the ultimate sovereign, and if this sovereign is the faculty, middle management will allocate resources to what it believes is in the interest of faculty.

In contrast, US university boards are often dominated by the corporate world, particularly the financial industry. Harris (2011) indicated that a representation of financial expertise on university boards leads to increased funding. However, the financial industry has also been criticized for being bloated with "bullshit jobs" (Graeber 2018). When the ultimate sovereign industry is the financial industry, the political game of bureaucracy played by middle management might create an administrative apparatus reminiscent of that sector.

In addition to creating financial leeway for administrative bloats, a funding model based on private fees and donations might also directly require a larger nonfaculty workforce. For example, large donations are often earmarked for particular purposes. By the second half of the 19th century, the role of donors had changed in the US Instead of replying to requests for purposes specified by the university president, donors began to specify how the funds should be utilized (Hofstadter & Metzger 1955). Catering to the wishes of donors inflates employment outside of research and teaching. In addition, fundraising drives and competition for student tuition create administration.

Privately funded systems also tend to create inequities, such as easier admissions for students who are able to pay full price or who are related to alumni or large donors. A large bureaucracy is needed to counteract these tendencies, for example, through affirmative action and complex application processes. In this respect, Sweden is the other extreme where an automated process distributes students among universities based on their choices, grades, and results on the Swedish Scholastic Aptitude Test (Studera.nu n.d.), which requires minimal administration.

Although the purpose of this article is not to provide policy recommendations, a few words can be said about each system. In Finland, the university system is underfunded, and additional resources would probably result in higher quality education and research. The Swedish system has more resources than the Finnish system but is hindered by a lack of autonomy. A transformation in the Finnish direction, where the universities are autonomous associations under public law that own their own buildings, would probably lead to more efficient use of available resources. The British system seems to function quite efficiently, at least according to the parameters used in this study. However, the situation has not been investigated for individual teachers or researchers. It is also possible that the British situation described here is a snapshot in time and is being undermined by, for example, the effects of Brexit and changes in internal organization and research funding. However, there are still lessons to be learned from the governance models of Oxford, Cambridge, and the UCL.

Finally, the US system has experienced increasing costs, although they seem to have reached a ceiling in recent decades. By combining high costs of tuition with different forms of scholarships for most students, universities ensure that most families are paying close to the limits of their abilities. In combination with the US universities' character as total institutions, these practices create loyalties and feelings of indebtedness toward one's college that, in Nordic welfare societies, are instead directed toward society at large. This might explain why the willingness to donate to universities exceeds the willingness to pay taxes, while the reverse is true in Nordic countries. However, it seems that tax-financed higher education makes more efficient use of total resources. Primarily, this is because the public resources are smaller, which results in less waste according to the revenue theory of cost. That differences are so small between US public and private universities is likely because the differences between their funding models are actually quite small (Comrie 2021).

Top British universities produce results similar to those of the top US universities, with lower total costs. In the frugal Finnish university system, Helsinki University is more highly ranked than many US R1 institutions are, with a fraction of their budget. Universities and their funding systems are extremely complex and difficult to reform. However, given the problem of rising college costs, there might be room for institutions in the US that, as in other countries, provide low-cost, high-quality education. Furthermore, it is possible that the mechanisms discussed here could also help explain the extremely high costs in other sectors of US society in an international comparison, such as healthcare, which includes a similar public–private mix of providers and revenue streams.

Based on this study, a general recommendation can be given to funders of non-profit institutions who want to safeguard that their resources are used efficiently. Firstly, identify the core functions of the institution that you are funding. Secondly, identify actors within the organization that benefit from resources being allocated to the core functions. Thirdly, adopt a governance model where these actors are made ultimate sovereigns of the institution.

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