



Ballooning bureaucracy? Stylized facts of growing administration in Swedish higher education

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Abstract

All organizations need to allocate labor to production and administration. In many cases—particularly within the public sector—the optimal allocation is far from obvious. Indeed, vocal concerns have been raised about the administrative burden in several public services, not least in education. We investigate this issue using detailed registry data on all employees at Swedish universities and colleges from 2005 to 2019 and document three stylized facts. First, the group of highly educated administrators has grown rapidly, almost by a factor of seven compared with teachers and researchers. Second, the number of less-educated administrators has stayed flat. Third, the time that teachers and researchers spend on administrative tasks has been roughly constant over time. This indicates that resources have been diverted from teaching and research and raises fears of excessive administrative growth in Swedish higher education.

Keywords Organizational theory · Bureaucracy · Sclerosis · Higher education · Productivity growth

JEL Classification P16 · L25

1 Introduction

Hacker: How many people do we have in this department?

Sir Humphrey: Ummm... well, we're very small...

Hacker: Two, maybe three thousand?

Sir Humphrey: About twenty-three thousand to be precise.

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Hacker: TWENTY-THREE THOUSAND! In the department of administrative affairs, twenty-three thousand administrators just to administer the other administrators! We need to do a time-and-motion study, see who we can get rid of.

Sir Humphrey: Ah, well, we did one of those last year.

Hacker: And what were the results?

Sir Humphrey: It turned out that we needed another five hundred people.

————— *Yes Minister, Season 1, Episode 3: "The Economy Drive" (1980)*

Administration is a necessary but often unappreciated activity in any organization. Tasks such as documentation, supervision, and budgeting are hard to avoid, but their distance from production, output, and sales makes them difficult to evaluate. Consequently, the internal division of labor is unlikely to be optimal and easy to criticize. In recent years, many have argued that the growth of administration has gone too far, such that too many professionals work in jobs that do not contribute to the efficiency of the organization or society (Graeber, 2018; Dur & Van Lent, 2019).

Following Power (1994, 1997), a stream of papers has problematized the increase of auditing and the accompanying decline of trust. In many cases, the public sector and variants of New Public Management have been in the line of fire. Theoretically, one might suspect that the lack of competition implies that a sub-optimal allocation of administrative resources is more likely in the public sector. While a private firm will ultimately go bankrupt if it becomes too inefficient, the so-called soft budget constraint cushions a public sector agency from comparable threats to its existence. Furthermore, public agencies typically have many – possibly conflicting—goals that must be balanced, making organizational efficacy difficult to evaluate.

We investigate administrative growth using fine-grained registry data from Swedish universities and colleges. Higher education in Sweden is almost entirely tax-financed, and countries with large public sectors need to be especially vigilant against the risk of administrative misallocation. In addition, higher education is an appropriate sector to study since it is complex, with goals that are difficult to evaluate, and seems to have experienced growth in administration in many countries (Marcus, 2016; Bozeman et al., 2020). This is not to say that there is one universal system of higher education. For instance, the state-coordinated university systems in the Nordic countries have been organized more rigidly compared with the market-coordinated systems in the UK and the US (Clark, 1986). Although external conditions, such as the rising knowledge economy, have pushed national higher education systems in similar directions, the larger historical differences remain (Stage & Aagaard, 2020). Baltaru and Soysal (2018) contrast functionalist and neo-institutionalist explanations of expanding administration in European universities. Their empirical findings lend support to neo-institutional mechanisms of external connectedness. For instance, third-party funding (a proxy for wider societal exposure) is associated with a higher employment share of administrators.

Using registry data on all individuals working at universities and colleges in Sweden from 2004 to 2019, we can identify the professions of all staff and track the development of academic and administrative occupations by headcount and total salaries. The data allow for a detailed decomposition into teaching and research as

well as highly educated and less educated administration. Compared with previous research, we get a deeper understanding of the growth of administration by not having to lump together all forms of administration in one category.

Our analysis reveals three stylized facts. First, there has been a rapid increase in the number and wage sum of highly educated administrators. Highly educated administrators (defined as having at least a bachelor's degree) and managers grew by almost a factor of seven compared to teachers and researchers. This growth is, in turn, driven by rapid increases in some professions, such as IT, communications, and HR, while other professions, such as librarians, have not grown at all. Second, the number of less skilled administrators (defined as having less than a bachelor's degree) has declined slightly. Third, the time that teachers and researchers spend on administrative tasks has been largely unchanged.

Notably, the increase in highly educated administrators has been financed, in part, by a substantial reduction in professions that have been replaced by digital technology. It might be seen as problematic that the new administrators seem to carry out other tasks than supporting teaching and research. While our investigation is exploratory and cannot be interpreted causally, the findings raise concerns about excessive administrative growth. To the extent that research output and teaching quality have been crowded out, the described development could potentially have adverse long-term effects on technological development and economic growth.

2 Management, production, and administration

In all organizations, someone must decide how labor is allocated and what goals the organization should pursue (Coase, 1937; Alchian & Demsetz, 1972; Holmstrom & Milgrom, 1994). Here, we focus on the choice between allocating labor to production or administration. This allocation problem is unavoidable both in the private and public sector and all but the smallest private firms need some internal administration. Unfortunately, the optimal allocation is far from obvious *ex ante*.

The management of firms and organizations has attracted a considerable amount of research. In all large organizations, a bureaucracy is responsible for internal affairs, creating information for management, and handling practical tasks such as paying wages. In the same way that the productivity of those working in production is of great importance to the output of an organization, an efficient bureaucracy is vital to organizational productivity, a fact that has been long recognized (Weber, 1921). An efficient internal organization, with, e.g., quality control and good management practices, can significantly improve the productivity of an organization, both for-profit firms and non-profits (Bloom et al., 2015a, b). Indeed, there is large variation in effectiveness among organizations due to different management practices (Bloom & Van Reenen, 2007, 2010; Bloom et al., 2019). External intervention in the form of private equity, venture capital or management consultants is often effective in increasing the efficiency of firms (Kaplan & Stromberg, 2001; Bloom et al., 2013, 2015c).

To complicate matters, the balance between production and administration might also be skewed as a result of internal politics. Internal administrators could potentially use their positions to obtain advantages such as higher wages and more resources. Since they typically have access to more information and have closer connections to top management compared with employees in the direct line of production, the administrators might well be successful in securing more resources than what would maximize to the productive efficiency of the organization (Niskanen, 1968, 1975). In particular, the administration might have more time—and lower opportunity cost—for tasks such as petitioning management for more resources. They could also have a comparative advantage in internal persuasion since it is closer to the work of say a human resources officer than to that of a teacher. Empirical evidence of budget maximization has been found, for example, in community colleges in California (Kress, 1989). The accumulation of interest groups within an organization could have similar effects as the accumulation of interest groups within a nation, creating a sclerotic and inefficient organization in which groups of employees compete with each other over resources (Olson, 1982). It has even been suggested that organizations can become trapped in a dysfunctional state of "functional stupidity" in which cognitive and reflective capacities are only used narrowly (Alvesson & Spicer, 2012, 2016).

Competition is an important moderator of any imbalance between production and administration. Inefficient organizations that face insufficient competition could linger on without having to deal with the underlying problems. This logic raises fears that inefficiencies in the public sector could be worse and more persistent since public sector agencies run a lower risk of being out-competed by other organizations (Parkinson & Osborn, 1957; Williams, 2021). A myriad of reforms has therefore been suggested to improve public sector efficiency. Such reforms, often under the broad umbrella of so-called new public management, have increased productivity in some instances, e.g. health care in England (Propper et al., 2010), but have also been accused of mainly increasing the need for administration, when trying to measure performance that is inherently difficult to measure (Diefenbach, 2009). New public management reforms have also been accused of being ideological in supporting a neoliberal view of public administration (Lorenz, 2012; Nash, 2019).

Universities and colleges provide an ideal setting for testing theories of organizational sclerosis (Buchanan & Devletoglou, 1970; Stage & Aagaard, 2019, 2020). Universities and colleges are large organizations with many employees, hence a great need for internal organization. They are also non-profits with several vague objectives that are difficult to evaluate. Unlike a commercial firm, where activities are judged by their contribution to the profit and loss statement, it is less obvious how teaching and research contribute to the goals of higher education. Since it is difficult to measure the quantity and especially the quality of research and education, it is also difficult to determine whether an increase in administration harms the core mission of a university. An expanding administration may remain unchallenged as long as it cannot be linked to a decline in teaching and research (Paldam, 2015).

Furthermore, universities have been given additional responsibilities, which could call for a larger staff of administrators. In Sweden, new or expanded goals in the last two decades include life-long learning, outreach, internationalization, gender

equality, social inclusion, interdisciplinarity, external funding, and commercialization in the form of innovations and spin-offs. Such additional requirements have sometimes been the results of direct government action, such as increasing internalization which was passed as a regulation in 2017. Other times, these additional requirements have been part of broad government policy. Since all except three universities and colleges are government agencies, they are also affected by laws and regulations that affect all public agencies. Since 2013, all government agencies have requirements to work on gender equality, and this therefore affects universities and colleges as well. In addition to a potential direct effect on the number of administrators, additional goals make an overall evaluation of a university more difficult. Baltaru and Soysal (2018) link the increase in the number of administrators to an expansion of missions in European higher education.¹ To sum up, there are many reasons why universities could be particularly susceptible to administrative expansion.

In higher education, there is widespread discontent with a growing administration of employees who do not teach or do research. University faculty often complain about having to spend more time on administration, lacking control of their work, and a concentration of power in upper management (Raines & Leathers, 2003; Ginsberg, 2011; Brennan & Magness, 2019). However, the research on this topic has avoided deeper explanations, suggesting that the bureaucratic growth is due to universities copying management methods from the private sector (Muller, 2019). This perspective is understandable since reforms that make universities more similar to private firms might backfire because of the difficulties of measuring academic quality. Forcing faculty to spend considerable time documenting their teaching and research for evaluation has not been popular, according to evidence from Finland (Kallio et al., 2016). Although academics typically dislike such reforms, they might be unable to resist increasing administrative demands, instead choosing to adapt and work longer hours to avoid lowering their scholarly output (Flory et al., 2016).

3 The Swedish system of higher education

Swedish higher education is divided into two entities, universities (*universitet*) and colleges (*högskola*).² This definition includes specialized institutions, such as the Royal Institute of Technology and the Karolinska Institute, which are universities. Universities differ from colleges in that universities have the right to grant PhDs in a broad range of fields. However, a college often has the right to grant PhDs in a few fields in which the college specializes.³ By law, the main goals of higher education

¹ Bradley et al. (2018) find that the recruitment of diversity officers at U.S. universities did not affect the diversity of the university, despite being increasingly costly.

² All Swedish universities and colleges except for three are public agencies: Chalmers University of Technology, Jönköping University and Stockholm School of Economics are non-profit foundations. As they are regulated by the same laws and are mainly financed by taxes, the difference is small in practice.

³ Due to the small size of art colleges, we exclude them from the analysis.

are to educate students, conduct research, and disseminate knowledge to society at large.

Higher education has expanded rapidly, and for a period, there was an explicit political goal that 50% of a cohort should attend college. This goal was relaxed in 2006, but the general trend has been increasing since 1990, as shown in Fig. 8 in the appendix 1. The expansion can possibly have been self-reinforcing due to the need for individuals to signal their competence through a degree (Caplan, 2019). The increase in students has, in turn, increased funding. Higher education in Sweden is mainly funded by taxes, and tuition fees are only paid by a small minority of non-EU students.⁴ Research is conducted as part of an academic position but is also financed by public grants and by private foundations. Such grants are often used to reduce the teaching load for the researcher, allowing more time for research instead of teaching.

Higher education has expanded on all fronts to accommodate the increasing number of students. Old universities have expanded, some colleges have expanded and been upgraded to university status, and new colleges have been established. In recent years, the number of students has declined somewhat, possibly due to good economic conditions. This variation allows us to study changes in administration during periods both with increasing and decreasing numbers of students.

Inspired by New public management, a number of reforms have been introduced to increase efficiency and accountability in Swedish higher education. The development started in the 1990 s and included a new system of performance-based funding. In steps, universities and colleges have also become more independent with regard to how they achieve the goals imposed by the government. Research has increasingly been funded based on merit and in open competition, both between individual researchers and between “centers” or “environments.” There have also been changes to quality assurance, with regular evaluations of universities and colleges to ensure they meet certain standards. Hall (2016) argues that still in the 1990s, Swedish universities were characterized by collegial guardianship and rule by professors, but since then have increasingly imitated corporate management.

4 Data and empirical results

To study the growth of administration in Swedish higher education, we use total population data of Swedish employees from Statistics Sweden (SCB) from 2004 to 2019. From this data set, we extract the 20 most common professions, as defined by employment codes (SSYK codes) for universities and colleges for each year.⁵

⁴ Tuition fees for non-EU students were introduced in 2011 and aim at recovering the cost of the student rather than generating a surplus. In addition to EU students, tuition fees are also waived for students from Iceland, Lichtenstein, Norway, and Switzerland.

⁵ SSYK (*Standard för svensk yrkesklassificering*) is the Swedish version of the international standard classification of occupations and contains codes created by the employer, who records the profession of a given job to SCB. Although SSYK codes are well-known and standardized, there is a risk of measurement error if the employer does not spend enough time recording detailed SSYK codes at the four-digit level or if the content of a job changes without any corresponding change of the SSYK code. However,

Colleges that were promoted to university status during the observed time period, such as Örebro and Karlstad, are coded as universities for the entire period.⁶ The data include the number of employees in a profession, their gender, and their wage sum at a university or college in a given year.

In 2014, there was a shift from coding professions according to the old standard SSYK96 to the new standard SSYK2012. It is not obvious how to convert SSYK96 codes to SSYK2012 codes to create a continuous panel. The codes of several professions have changed, codes for new professions have been introduced and a few fading professions have been removed. For example, according to SSYK2012, professors are recorded as a separate profession, whereas according to the earlier SSYK96, professors were included in the profession "university and college teacher". Likewise, the category for human resources personnel used to include student counselor, but this became a separate profession from 2014 onward. IT services were also split into several different categories. We, therefore, divide the sample and perform separate analyses for the 2004–2013 and 2014–2019 periods.

Another data issue relates to PhD students. During the 2004–2013 period, PhD students were increasingly employed instead of being financed by scholarships or loans. Under SSYK2012, PhD students are recorded as a separate profession, but there was no such category under the earlier SSSYK96. This implies that the category of researchers and teachers is too broad under SSYK96 since the employed PhD students were absorbed into this category. Fortunately, we can solve this problem by creating a new definition of PhD students. We distinguish PhD students from other researchers and teachers by checking whether the person received educational credits in a particular year. Since PhD students are properly registered with a code of their own after 2012, we can confirm that our new definition used until 2012 identifies PhD students correctly after 2012.

4.1 Changes in staffing in Swedish universities and colleges

For each year in our data we include the 20 most common professions for each year, which gives a total of 34 different professions recorded for universities and colleges for the 2004–2013 period and 29 recorded for the 2014–2019 period since new professions becomes more and less common. These top 20 professions cover 83% of all employees in universities and 88% of all employees in colleges. There are more than 100 different professions at universities, including a handful of printers, mailmen and warehouse workers. Excluding professions below the top 20-most common list therefore does not lead to a large exclusion of data but allow us to focus the analysis on professions that can be organized in a transparent way.

Footnote 5 (continued)

in our case, all observed individuals are employed by large public (or publicly funded) organizations that should keep records at a detailed level.

⁶ Since our panel covers the period 2004 to 2019, Malmö University, which became a university in 2019, is coded as a college.

Using the SSYK codes, we create four different groups of professions based on the requirements of the profession. The first number in the SSYK code identifies the requirement for the profession. Professions with an SSYK code starting with 1 are managerial positions, and professions with a code starting with 2 have higher academic requirements, such as at least a bachelor's degree. The larger the first number of the SSYK code, the lower the requirements of the profession. Our grouping is therefore based on the formal requirements rather than what the professions do on a day-to-day basis, (cf. Gornitzka and Larsen (2004); Baltaru and Soysal (2018)).

Our first group, *Assistant administration and supporting staff*, consists of professions with the lowest levels of education, such as cleaners and janitors, and administrators with low to moderate levels of education, such as accounting assistants. Our second group, *Professional administration and management*, consists of administrators with higher requirements on education, such as communications professionals, librarians, individuals working in human resources, as well as all individuals with a managerial position (the latter have a SSYK code starting with 1). Our third group, *Teachers and researchers*, consists of all individuals with research and teaching positions, including PhD students.

Our fourth and final group, *Others*, consists of everyone else that do not fall in the previous categories. This group mainly includes individuals who probably work in research and teaching but are not explicitly coded as researchers or teachers. This group includes engineers, biologists, and similar highly educated individuals. The Others group is much smaller than Teachers and researchers and we keep them separate since we cannot know for sure that they teach and do research, at least not to the same degree as Teachers and researchers. The professions that are included in each group are described in Tables 1 and 8 in the Appendix 2.

To begin with, we plot the number of students per teacher and per highly educated administrator in Fig. 1. The number of students per teacher varies considerably over time and increases sharply after the shift in SSYK-codes in 2014 (indicated by the dashed line). This variation is mainly driven by the variation in the number of students. Unlike the case for teachers, the number of students per highly educated administrator declines throughout the studied period, warranting further investigation.

The number of employees is plotted in Fig. 2, again with the dashed line in 2014 indicating the shift in SSYK-codes. The number of teachers and researchers increased between 2004–2013 and declined marginally 2014–2019. The increase and later decrease coincide with a large increase and subsequent small decline in the number of students. From 2004 to 2019, the number of teachers and researchers, therefore, increased in total by 8.3 percent, which is reasonable since more students require more teachers and also provide the funding for them. However, administrators with higher education and management increased by almost 62 percent during the same period. Hence, the number of highly educated administrators increased almost seven times as fast as teachers and researchers. Finally, we note that the number of assistant administrators and support staff decreased by 30.3 percent.⁷ The

⁷ While our detailed data set is only available until 2019, there are more aggregated data from the Swedish Higher Education Authority (UKÄ) available for 2020 and 2021. The more recent aggregated data and the categories therein are, however, not fully comparable with our data set, but we note that the category Administration has grown at almost the same rate as that of teachers and researchers from 2019 to 2021.

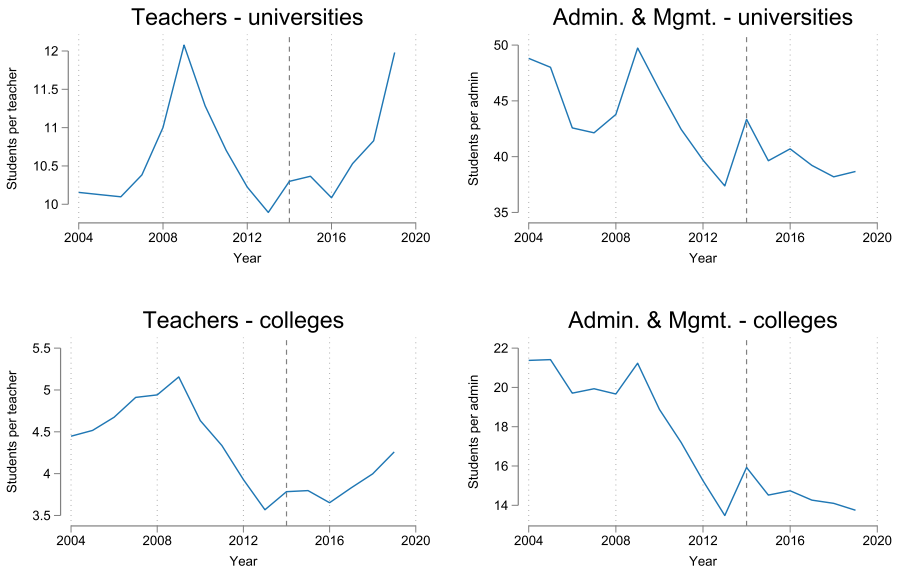


Fig. 1 Ratio of students to administrators and teachers, 2004–2019. *Notes* Number of students per group Teachers and researchers (Teacher) and Professional administration and management (Admin. and management). The dashed line in 2014 illustrates the shift from SSYK96 to SSYK2012. Note that the y-axes are shown on different scales to better display the variation

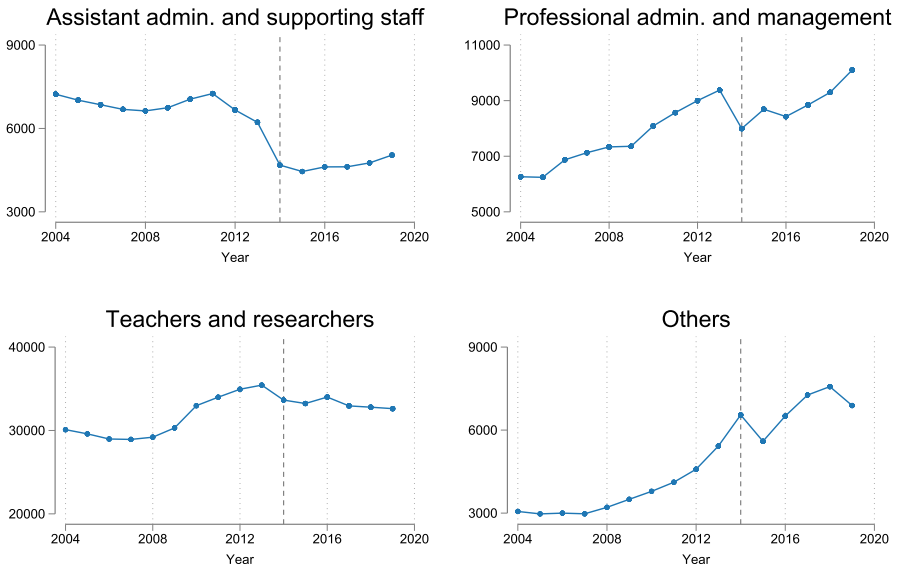


Fig. 2 Number of employees, 2004–2019. *Notes* For a definition of each group, see Tables 1 and 2. Note that the y-axes are shown on different scales to better display the variation

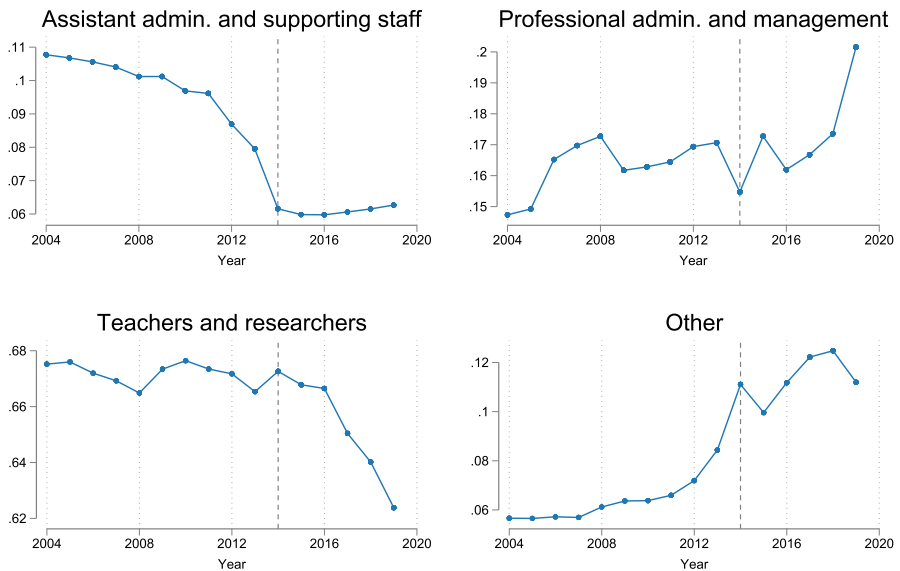


Fig. 3 Relative wage shares, 2004–2019. *Notes* Wages are relative to the entire wage sum for all 4 groups. For a definition of each group, see Tables 1 and 2. Note that the y-axes are shown on different scales to better display the variation

described changes also mean that the share of wages paid to each group changes, with a decreasing share going to teachers and researchers and an increasing share going to professional administration and management.

The wage share for each group of professions is plotted in Fig. 3. From 2004 to 2019, the wage share of the group professional administration and management increased from 15 to 20 percent. Wages for assistant administration and support staff declined during the same period, suggesting a transfer of resources from less-skilled support staff to more educated administrators. Since 2016, the wage share of professional administration and management has increased considerably, whereas the wage share of teachers and researchers has dropped markedly. We note that the national system for quality assurance was reformed during the same period. The Swedish Higher Education Authority (UKÄ) received as a new central task to carry out a systematic review of the higher education institutions' quality assurance work. However, we are unable to determine whether the reform has had a significant impact on the described wage share changes. In any case, the gender ratios are fairly stable over time and are plotted in Fig. 7 in the Appendix 1. Women make up a majority of assistant administration and supporting staff, as well as professional administration and management, while there are smaller male majorities employed as researchers and teachers, as well as in the other category.

Taking a more detailed look at the number of employees in the group of Professional administration and management in universities in Fig. 4 it is apparent that

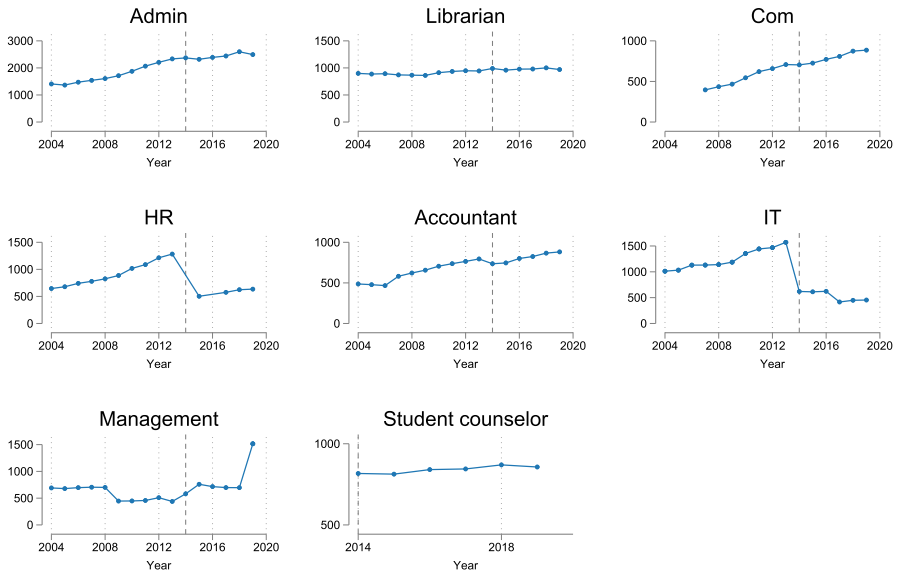


Fig. 4 Number of administrators in different categories, 2004–2019. *Notes* Number of university employees in the group administration, by profession 2004–2019. Admin = Administration. Com = Communications. HR = Human Resources. IT = Information Technology. Note that the y-axes are shown on different scales to better display the variation (Color figure online)

the increase is unequally distributed.⁸ The most rapidly expanding professions are related to communication, human resources, and information technology. These are professions that require at least a bachelor’s degree and that arguably possess skills that could be useful in persuading higher management to allocate more resources toward them.

Notably, the number of librarians and archivists did not increase from 2004 to 2019, which is somewhat surprising. At some point, an increase in the number of students will, *ceteris paribus*, require more librarians and archivists. The argument is stronger for archivists since they are needed to fulfill the extensive requirements established by Sweden’s right-to-information laws, which are regulated in the constitution. For similar reasons, one would expect the number of archivists to increase with the number of administrators. Since librarians and archivists are more organizationally distant from management than employees in communications and human resources, it is conceivable that they have been less successful in persuading management to channel more resources to them.

The groups that have grown most rapidly (administration, communication, and management) are all linked to higher management, and it can be argued that they possess more of the skills that are useful when seeking to attract more resources compared with the professions that carry out daily operations. Notably, the number

⁸ Due to the much lower number of employees in colleges, we restrict our sub-group analysis to universities.

of employees in management displays a big jump from 2018 to 2019. The size of the increase is surprising and coincides with the greatest increase in total employment in universities and colleges since 2011. There is no national reform or policy change in 2019 that could explain the increase. Here, we have to admit that the numbers are more uncertain for smaller, disaggregated groups since the classification becomes more subjective at finer levels.

4.2 Financing the increase in administration

The funding of Swedish universities and colleges is closely related to their number of students, with one part depending on students enrolled and one part depending on student performance (credits taken as a share of full time study). As can be seen in Fig. 1, the ratio of students to administrators has decreased, indicating that an increasing budget share has been used for administration. The ratio of students to teachers varies over time, reflecting that there have been larger yearly changes in the number of students than in the number of Teachers and researchers. Teachers and researchers have been able to cope with sudden increases in the number of students. In contrast, the number of administrators have expanded continuously.

Many professions have, over time, been exposed to technical changes and have been replaced by digital technologies (Acemoglu & Autor, 2011; Frey & Osborne, 2017; Acemoglu & Restrepo, 2019). For example, a professor today writes on a computer without needing a secretary with a typewriter. Such technical change has created opportunities for universities and colleges to reduce their number of employees, freeing up resources that can be used for other employees who cannot be replaced by machines. Since there are limits to expansion of resources to publicly funded organizations, their ability to free up resources through automatization could provide a resource increase that would otherwise be difficult to attain.

To determine whether the change in professions is related to technical change, we use the probability that a profession will be automated as calculated by Gardberg et al. (2020). However, since the probabilities were only calculated for the SSK96 professions, we only use them for the 2004–2013 period. In Fig. 5, we plot the changes for professions with automation probabilities of over 50, 60, and 70 percent.

Both the number of employees and the wage shares for the groups with a high risk of automation have decreased substantially. The wage share for the professions with an automation probability above 50 percent decreased from approximately 35 percent in 2004 to 30 percent in 2013. For the group with the highest risk of automation, the wage share remains low for the entire period.

The decline of employees that can be replaced with digital technology could partly explain how resources have been available to increase skilled and highly educated administration. The economic surplus created when employees are replaced by digital technology seems to have contributed to financing the expanding wage share of the administration.

A possible caveat is that some low-skilled professions, such as cleaners, could have been outsourced to private firms during the time period under study, a process

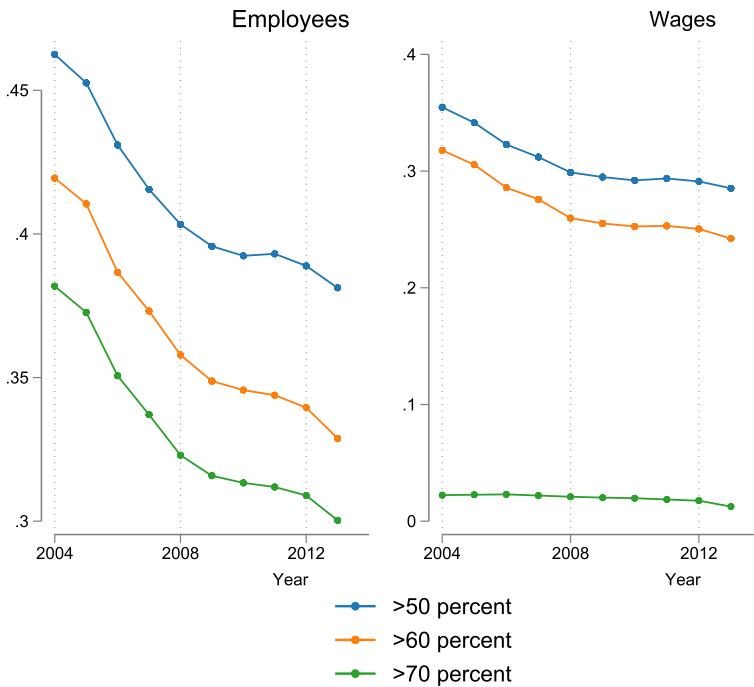


Fig. 5 Shares of total employees and wages for jobs susceptible to automation. *Notes* The figure shows the shares of total employees and total wages (relative to all employees included in the analysis) for professions with automation probabilities of more than 50, 60, and 70 percent for the years 2004–2013. The green lines represent professions with an automation probability of more than 70 percent, the orange of more than 60 percent, and the blue of more than 50 percent. The automation probabilities are from Gardberg et al. (2020) and matched with our professions using SSYK96. Note that the y-axes are shown on different scales to better display the variation

that could be mistaken for automation. Although it is unlikely that this would explain the entire decline in exactly the professions with a high risk of automation, the data do not allow us to address this potential problem directly.

4.3 Time use of researchers and teachers

A natural follow-up question concerns how a growing administration affects the time use of teachers and researchers. We investigate this issue using a biannual survey of time use of Swedish academics in the period 2007–2019 conducted by Statistics Sweden and the Swedish Higher Education Authority (*Universitetskanslersämbetet*). One of the survey questions concerns how much time, as a percentage of their total working hours, employees spend on "administration not related to R&D". We use this variable to investigate whether the increase in skilled administration has been accompanied by a significant decrease in time for administrative tasks among various types of teachers and researchers. We plot the time spent on administrative tasks for four groups of academics along with the 95% confidence intervals in Fig. 6.

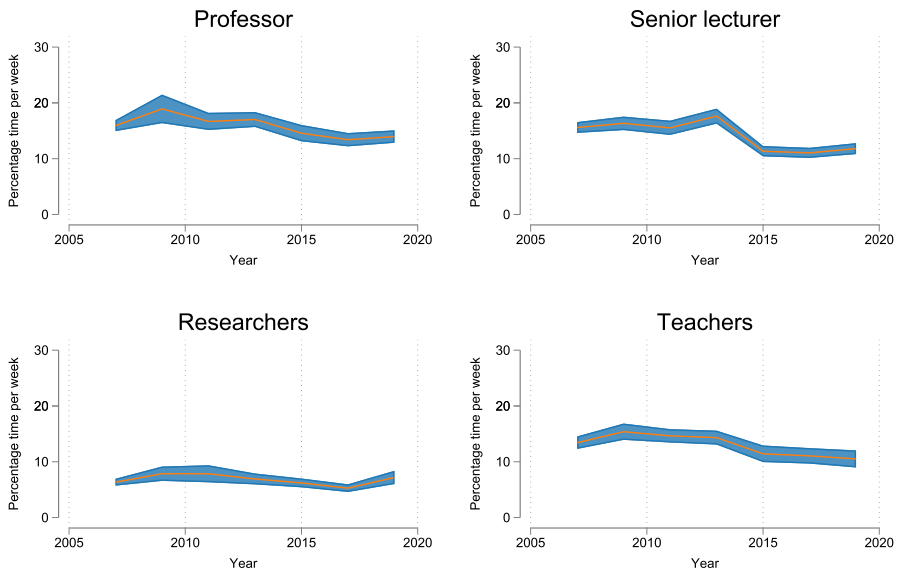


Fig. 6 Time spent on administration not related to R&D. *Notes* Percentage of total working hours in a week spent on "administration not directly related to research and development" during the period 2007–2009, averages and 95 percent confidence intervals. Data from UKÄ—the Swedish Higher Education Authority

Among professors, senior lecturers, and teachers, there is a modest decline in time spent on administrative tasks. Researchers are the exception, with an uptick at the end of the period. The share of time spent on administration has been approximately 15% for three of the four groups, with a lower time share among researchers. The large increase in administration has not led to a corresponding drop in the time that teachers spend on administrative tasks, suggesting that these groups perform other tasks than relieving teachers and researchers from administration.

5 Conclusions

Using detailed registry data, we have tracked the number of employees in the most common professions in Swedish universities and colleges from 2004 to 2019. Universities and colleges are tax-financed non-profit organizations that produce complex outputs. Finding the optimal balance of administration and production is far from easy, not least since the quality of teaching and research is inherently difficult to measure. Therefore, our investigation is suitable for exploring theories of bureaucratization.

By comparing inputs in terms of employment, we have shown that the number of highly educated administrators has been growing much faster than the number of teachers and researchers. Our results are obtained from fine-grained employment data, allowing us to analyze changes within narrow professions. The analysis reveals

that the most rapid growth within the administration is concentrated in a few highly educated professions: communications, human resources, as well as general administration and management. The increase is quite dramatic in terms of the number of employees. In contrast, the number of administrators with lower educational requirements has decreased. In particular, the employment share of professions that can be replaced by digital technology has fallen considerably. While we are unable to provide a causal explanation, our findings suggest that highly educated administration has benefited from resources made available by technical progress.

The detailed nature of registry data allows us to track the number of employees in universities and colleges, but we cannot determine exactly what type of tasks that each individual performed in their day to day work. Hence, we cannot rule out that teachers and researchers benefit from e.g. a more competent IT-service, administrative help with applying for external funding and similar services. With increased legislation regarding tasks such as gender equality and ensuring a sound learning environment for students with disabilities and non-academic background, additional administrative and legislative help for teachers and researchers could allow researchers to focus on their main objectives. The lack of reduction in the time that teachers and researchers spend performing their own administration does however suggest that this increase in professional administrative staff might not be the most efficient usage of limited resources.

Our results contribute to the ongoing discussion on the changing nature of staffing in higher education and are quite similar to previous findings. Evidence from Australia and Germany also finds an increase in administrative management and highly educated administrations with a decline in less educated and well paid administrative personnel (Hüther & Krücken, 2018; Croucher & Woelert, 2021). In New Zealand there has been a higher growth of organisational professionals in higher education compared to other public sectors and the private sector (Löfgren et al., 2022). In South Korea there has been large changes in the structure, as well as a growth of, administration partly related to legislation that force universities to implement units to promote and manage collaboration with industry partners (Kim et al., 2019). Legislative requirements in the UK, specifically regarding the role for inclusion regarding disabilities and gender, likewise led to an increase in the need for administrative staffing (Baltaru, 2019). In a cross-country study of Germany, Norway, and Denmark, the U.K. and the U.S., Stage (2020) finds support of a growing and even more professional administration while the teaching and research staff gets more insecure employment positions. In the United States, there has been an increase in managerial professionals while at the same time there has been an increase in the tuition costs for student without an increase in the teaching staff, suggesting that there could be crowding-out effects (Rhoades & Frye, 2015). Interestingly, evidence from Norway does not find a larger increase in the number of administrators relative to teachers and researchers (Gornitzka et al., 2009).

A possible interpretation is that of an internal rent-seeking contest in which the administration has been more successful than other groups, presumably since they possess useful skills and are positioned closer to top management. The professions that have grown the most are the ones that can arguably be expected to be the most skilled when it comes to persuading higher management, in line with the Niskanen

theory of bureaucracy, in which the administration is capable of acquiring more resources and competence over time. Other interpretations are, however, also possible. As we have argued, new public management and competition could either increase or decrease the size of the administration. During our period of study, the growth in administration has coincided with New public management reforms. Similar to the findings in Croucher and Woelert (2021), our results, therefore, cast doubt on new public management as an automatic way to increase organizational efficiency.

The main opportunity cost of an increasing administration consists of the teachers and researchers who were not hired. Therefore, the size of a university administration must be carefully weighed against the quantity and quality of teaching and research. There is a risk that scarce resources are not allocated in the most efficient manner if an increasing share of the budget is allocated to highly educated and therefore well-paid administrators compared to if the funding is directed to teachers and researchers. The exact balance between teaching and researches contra administration is, of course, debatable and must be subjected to careful balancing over time.

The risks of inefficient usage of scarce resources is especially relevant in view of recent research that shows a decrease in productivity growth and spending on R &D by private firms (Erixon & Weigel, 2016; Färnstrand Damsgaard et al., 2017; Arora et al., 2018; Bloom et al., 2020). Furthermore, if the administration changes its nature from a supportive to more of a controlling role, there could be additional detrimental effects on the time use and productivity of researchers and teachers. Since the organization of higher education can have powerful, wide-reaching consequences, including in terms of economic growth, it is important to strengthen the scientific basis on which significant organizational decisions are made.

Appendix 1: Supplementary data

See Figs. 7 and 8.

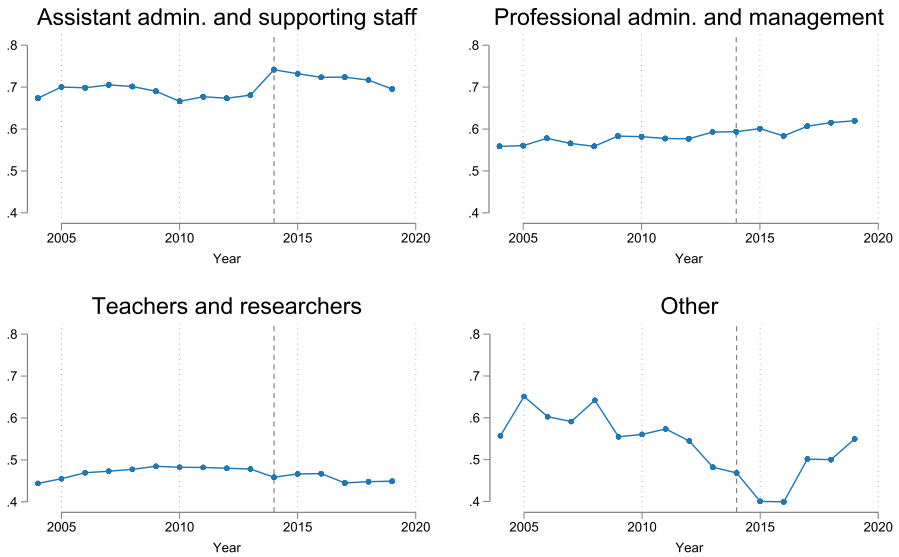


Fig. 7 Share women per profession group, 2004–2019. *Notes* For a definition of each group, see Tables 1 and 2. Note that the y-axes are shown on different scales to better display the variation

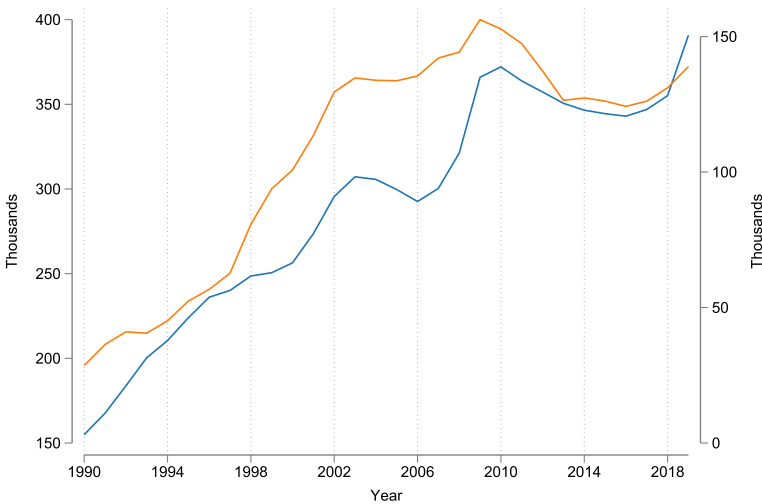


Fig. 8 Number of students at colleges and universities. *Notes* Students at universities (blue, left axis) and colleges (yellow, right axis), 1990–2019. Only students from colleges and universities used in the analysis are included

Appendix 2: Definition of groups

Tables 1 and 2 show each of the professions with their SSYK codes and which group they belong to.

Table 1 Definition of groups for SSYK96, 2004–2013

Profession name	SSYK96	Group name
Administrative secretaries and related associate professionals	3431	Assistant administration and support staff
Library and filing clerks	4140	Assistant administration and support staff
Numerical clerks	4120	Assistant administration and support staff
Data entry operators	4111	Assistant administration and support staff
Computer assistants	3121	Assistant administration and support staff
Other office clerks	4190	Assistant administration and support staff
Personal care and related workers not elsewhere classified	5139	Assistant administration and support staff
Doorkeepers and related workers	9142	Assistant administration and support staff
Receptionists	4222	Assistant administration and support staff
Bookkeepers	3433	Assistant administration and support staff
Agricultural, fishery and related laborers	9210	Assistant administration and support staff
Office secretaries	4112	Assistant administration and support staff
Helpers and cleaners in offices	9122	Assistant administration and support staff
Computing professionals not elsewhere classified	2139	Professional administration and management
Business professionals not elsewhere classified	2419	Professional administration and management
Production and operations managers in public administration	1226	Professional administration and management
Production and operations managers in education	1227	Professional administration and management
Accountants	2411	Professional administration and management
Computer systems designers, analysts and programmers	2131	Professional administration and management
Personnel and careers professionals	2412	Professional administration and management
Authors, journalists and related professionals	2451	Professional administration and management
Finance and administration managers	1231	Professional administration and management
Librarians and related information professionals	2432	Professional administration and management
Public service administrative professionals	2470	Professional administration and management

Table 1 (continued)

Profession name	SSYK96	Group name
College, university and higher education teaching professionals	2310	Teachers and researchers
PhD students	0007	Teachers and researchers
Military	0110	Other
Chemical and physical science technicians	3111	Other
Medical doctors	2221	Other
Physicists and astronomers	2111	Other
Biologists and related professionals	2211	Other
Life science technicians	3240	Other
Agronomists and horticulturists	2213	Other
Teaching professionals not elsewhere classified	2359	Other

Table 2 Definition of groups for SSYK2012, 2014–2019

Profession name	SSYK2012	Group name
Library and filing clerks	4410	Assistant administration and support staff
Cleaners and helpers in offices	9111	Assistant administration and support staff
ICT support technicians	3512	Assistant administration and support staff
Janitors and related workers	9622	Assistant administration and support staff
Administrative secretaries and related associate professionals	3359	Assistant administration and support staff
Office clerks not elsewhere classified	4119	Assistant administration and support staff
Other service workers not elsewhere classified	9629	Assistant administration and support staff
Accountants	2411	Professional administration and management
Student counselor	2352	Professional administration and management
Public relations professionals	2432	Professional administration and management
Software and system developers	2512	Professional administration and management
System administrators	2515	Professional administration and management
Personnel and human resources specialist	2423	Professional administration and management
Policy administration professionals	2422	Professional administration and management
Managers in public services not elsewhere classified, level 1	1591	Professional administration and management
ICT specialist professionals not elsewhere classified	2519	Professional administration and management
Librarians and archivists	2622	Professional administration and management
Operations managers in public services not elsewhere classified, level 2	1592	Professional administration and management
Professors	2311	Teachers and researchers
University and higher education lecturers	2312	Teachers and researchers
University and higher education teachers not elsewhere classified	2319	Teachers and researchers
PhD students	2314	Teachers and researchers
Medical and pathology laboratory technicians	3212	Other
Cell and molecular biologists and related professionals	2131	Other

Table 2 (continued)

Profession name	SSYK2012	Group name
Research assistants	2313	Other
Physicists and astronomers	2111	Other
Chemical and physical science technicians	3215	Other
Other physicians	2219	Other
Engineering professionals not elsewhere classified	2149	Other

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Declarations

Conflict of interest The authors declare no competing interests.

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