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# Half a century of female wage disadvantage: an analysis of Denmark's public wage hierarchy in 1969 and today

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## ABSTRACT

In June 1969, the Danish parliament passed an extensive law complex, known as the Public Servant Reform of 1969. An important part of the reform was a new wage and classification system into which all public employees were placed. In newer Danish research on the gender wage gap, it is a hypothesis that the reform created a wage hierarchy in the public sector which in general was unfavourable to female-dominated professions, and that this hierarchy largely has persisted to the present due to mechanisms in the collective bargaining system. In our article, we test this hypothesis using graphical analysis and descriptive statistics. Our study supports the existing hypothesis about a gender biased wage hierarchy in 1969. We find that there is a close coherence between the wage hierarchy in 1969 and the wage hierarchy in 2019. However, our analysis also shows how education level explains even less of the traditional female dominated professions' position in the wage hierarchy in 2019 compared with 1969, and that this is still the case when we take absence patterns and family-friendly benefits into account. That points toward a wage system, which seems unable to adjust to changes in an established profession's profile.

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## 1. Introduction

Denmark and the other Nordic countries have a reputation as some of the most gender equal societies in the world. However, there is still a considerable wage gap between men and women in both the public and the private sector (Bettio & Verashchagina, 2009; Sorensen, 2018). This article explores the historical roots of the gendered wage gap in the Danish Public sector.

The existence of a gendered wage gap is well-documented in the literature – also outside Scandinavia – but the size of the gap and the factors that contribute to it seem to differ between countries (Gärtner, 2014; Kumlin, 2007). In the social science literature, there are in general two main approaches when studying the gendered wage gap: one using the raw wage gap and another using the standardised wage gap. The raw wage gap can in theory reflect widely different mechanisms from gender differences in education levels or job preferences to discrimination of women in relation to wage offers and employment opportunities. The standardised wage gap controls for observable differences in the characteristics of men and women, such as education, occupation etc. – thus expressing the size of the remaining wage gap after the influence of these other factors have been accounted for (Bishu & Alkadry, 2017; Blau & Kahn, 2017; Kunze, 2008).

Differences in human capital, typically in the form of education or training, are often highlighted as a possible cause for the wage gap between men and women, but even when human capital is accounted for, large wage gaps remain in most countries (Hansen & Wahlberg, 2008). Factors found to affect the wage gap through their effect on women's education or work experience are for example lack of access to affordable childcare, taxation that discourages female labour participation and cultural norms that place a disproportionate amount of childcare and housework on women. These factors all result in women developing a weaker connection to the labour market compared to men, which reduces their work experience and thereby their wage level (Gärtner, 2014; Kumlin, 2007). However, this cannot fully explain the wage gap. A study on Belgian data concludes that women's education increases their productivity more than their wages, thereby creating a profit for employers while leaving women underpaid relative to their productivity and educational level (Kampelmann, Rycx, Saks, & Tojerow, 2018).

Occupational gender segregation – that is, most women work in different occupations than most men – has also been found to play a substantial role on the wage gap (Arai, Nekby, & Thoursie, 2004; Kumlin, 2007; Reisel, Østbakken, & Attewell, 2019) as professions dominated by women tend to have a lower wage level than professions dominated by men (Reisel et al., 2019). The Nordic countries have a greater horizontal segregation by gender in the labour market than the average of the European Union and this is often seen as one of the main reasons behind the persisting wage gap (Bettio & Verashchagina, 2009; Sorensen, 2018). In the case of Denmark, a study finds that the greater the proportion of women in a profession, the lower the salary, which is particularly pronounced in the public sector (Larsen, Casier, & Albæk, 2019). The root causes of the lower wage level in the Danish female-dominated professions have been discussed in a number of studies (Bjørst, 2005; Borchorst & Jørgensen, 2010; Deding, Holt, Deding, & Holt, 2010; Larsen, Larsen, & Larsen, 2010). Possible explanations are high growth in female-dominated occupations leading to the occupation being considered low-status (Blackburn, Browne, Brooks, & Jarman, 2002), preferences of women to work in jobs where periods of absence do not result in lower pay (Hansen & Wahlberg, 2008) as well as downright wage discrimination of female employees (Hansen & Wahlberg, 2008; Perales, 2013).<sup>1</sup>

In newer research concerning Denmark, the Public Servant Reform of 1969 (Tjenestemandsreformen af 1969) has been pointed out as a possible cause to why female-dominated professions in the public sector have a lower wage level than male-dominated or mixed professions with the same level of education requirements and responsibility (Jørgensen, 2010; Sorensen, 2018; Wingender, 1999). The hypothesis is that the reform created a wage hierarchy in the public sector which in general was unfavourable to female-dominated professions, and that this hierarchy largely has persisted to the present due to mechanisms in the collective bargaining system that works against larger changes in the wage relations between professions. However, no one has tried to quantify this hierarchy from 1969 and investigate whether it is still in place and what this means for the wage level of traditional female-dominated professions in the public sector.

In this article, we therefore, compare 13 selected professional groups' relative placement in the public wage hierarchy in 1969 with their placement in 2019 to investigate whether the wage hierarchy from 1969 is still reflected in today's public sector wages. This comparison has required a historical examination of the Civil Servant Reform of 1969's wage system as well as of supplementary material as there are no wage and employment statistics dating back to 1969 that are directly comparable with Statistics Denmark's wage – and employment statistics for the selected groups in 2019. This gathering of historical data has resulted in a unique database and enables us to trace the relationship between profession, salary and gender by graphical analysis and descriptive statistics. Even though we only make a comparison of 13 professional groups, our study still represents more than 45% of the employees in the public sector today.

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<sup>1</sup>An elaboration on wage determination in the public sector is presented in section 3.

In our study we observe a close coherence between the hierarchy in 1969 and that in 2019 with an overall correlation coefficient 0.90 for the selected professions. Moreover, we have examined whether differences in education can explain the different positions in the wage hierarchy, acknowledging that education neither is nor should be the only wage determining factor. We conclude that the female-dominated professions in 1969 generally were placed lower in the hierarchy than what could be expected from their length of education compared with the male-dominated professions. This supports the existing hypothesis about a gender biased wage hierarchy in 1969. Our analysis also shows that education level explains even less of the traditional female-dominated professions' position in the wage hierarchy in 2019, and that this is still the case when we take absence patterns and family-friendly benefits into account. This indicates a wage system in the public sector that seems unable to sufficiently adjust to changes in an established profession's profile, such as more education.

This paper presents the possibility of an additional and more structural cause behind the occupational wage difference, as we examine how female and male-dominated professions in the Danish public sector were originally placed in a wage hierarchy in 1969, and to what degree that wage hierarchy is mirrored in one that exists today, despite 50 years of developments in job content and required education levels. Although a connection between the wage hierarchy in 1969 and today has been regularly proposed based on historical analysis, the 1969 wage hierarchy and current wage hierarchy have not previously been quantified and directly compared. This analysis thereby qualifies the discussion of the possibility that historical valuation of the worth of male and female professions play a role in the wage gap today in Denmark, offering a quite different focus than previous literature on wage gaps.

The paper is organised in the following way. Section 2 gives a historical introduction to the Public Servant Reform of 1969. Section 3 discuss wage determination in the public sector in theory and practise. Section 4 presents the data material and the method used. Section 5 presents our results and section 6 concludes.

## 2. The public servant reform of 1969 and its wage system

### 2.1. An introduction to the reform

In many ways, the 1960s can be described as a crossroad for the public sector in Denmark. A huge growth in public service and public spending was set in motion in this period, but at the same time the old state employment system – that was not made for such a large and diverse public sector – was still in place (Due & Madsen, 2020, chap. 17-18).

Before the 1960s the backbone of the public sector was the state employed public servants, whose' employment conditions were decided by law and not by collective bargaining. As the welfare state grew the employees at municipality level started to outnumber the state employees, and in many public professions, there were shortage of qualified candidates. To attract employees, public employers started to offer employment under collective bargaining, which made a higher wage than the one fixed by law possible (Due & Madsen, 2020, pp. 472–475). The consequences of the introduction of employment under collective bargaining was that the employees hired as public servants started lagging behind in terms of salary. As an example, a nurse working under collective bargaining earned approximately 115% as one employed as a civil servant in 1965 (Rigsarkivet/Finansmin., Lønnings- og Pensionsdepartementet, Tjenestemandskomm. 22.11 1965, Diverse fra udvalg III (1965–1969), kasse 1, Udvalg III, bilag 1, 14. januar 1965). Furthermore, different public employers started to outbid each other in terms of salary, thus increasing the overall public spending (Betænkning afgivet af Tjenestemandskommissionen af 1965: Del 1–3, 1969, pp. X).

The Public Servant Reform of 1969 was an attempt to make an employment system that was in accordance with the growing welfare state. The reform was passed almost unanimously in the

Danish parliament on June 18 1969 and consisted of a comprehensive adjustment of the state's wage-, pension-, and employment system. The main purposes of the reform were to make a more flexible and modern hiring system, to ensure greater uniformity in employment conditions and to give the central administration a stronger control over public spending on wages (Sorensen, 2021).

An important part of the reform complex was a new wage and classification system in which all state-employed civil servants were placed in a wage hierarchy. In appendixes, the reform also classified all employees in the Danish state church, the primary school and the civil servant-like employees working in pedagogical institutions. The wage and classification system consisted of 40 salary brackets, where each salary bracket contained up to six salary steps built with a 2.75% increase in the lower salary brackets and 5.5% in the higher ones, as shown in Table 1.

In addition to this, job positions could be supplemented by various bonuses, but in general, the new system was a huge simplification compared to the previous salary system from 1958, which included a very long range of different salary supplements.

**Table 1.** Salary brackets from the public servant reform of 1969, DKK.

Salary bracket	Salary step 1	Salary step 2	Salary step 3	Salary step 4	Salary step 5	Salary step 6
1	15,700	16,132	16,575	17,031	17,500	17,981
2	17,981	18,475	18,983	19,505	20,042	20,593
3	18,475	18,983	19,505	20,042	20,593	21,159
4	18,983	19,505	20,042	20,593	21,159	21,741
5	19,505	20,042	20,593	21,159	21,741	22,339
6	20,593	21,159	21,741	22,339	22,953	
7	21,159	21,741	22,339	22,953	23,585	
8	21,741	22,339	22,953	23,585	24,233	
9	22,339	22,953	23,585	24,233	24,900	
10	22,953	23,585	24,233	24,900	25,584	
11	23,585	24,233	24,900	25,584	26,288	
12	24,233	24,900	25,584	26,288	27,011	
13	24,900	25,584	26,288	27,011	27,754	
14	25,584	26,288	27,011	27,754	28,517	
15	26,288	27,011	27,754	28,517	29,301	
16	27,011	27,754	28,517	29,301	30,107	
17	27,754	28,517	29,301	30,107	30,935	
18	28,517	29,301	30,107	30,935	31,785	
19	29,301	30,107	30,935	31,785	32,659	
20	30,107	31,785	33,558	35,429		
21	30,935	32,659	34,480	36,403		
22	31,785	33,558	35,429	37,404		
23	33,558	35,429	37,404	39,490		
24	34,480	36,403	38,433	40,576		
25	35,429	37,404	39,490	41,691		
26	36,403	38,433	40,576	42,838		
27	37,404	39,490	41,691	44,016		
28	40,576	42,838	45,226			
29	42,838	45,226	47,748			
30	44,016	46,470	49,061			
31	45,226	47,748	50,410			
32	49,061	51,797				
33	53,221					
34	56,188					
35	59,321					
36	64,351					
37	71,727					
38	79,948					
39	86,727					
40	96,668					

Source: Betænkning afgivet af Tjenestemandskommissionen af 1965: Del 1-3, 1969, pp. XI.

## 2.2. *The making of the classification system*

The content of the Civil Servant reform of 1969 was prepared in the Civil Servant Commission, which was established in 1965 and the reform was formed by what best can be described as an ‘ideology of objectivity’, where officials wanted to construct a wage- and employment system based on solely objective criteria. In order to make such an objective wage- and classification system the commission started to collect data on all job functions in both the public and private sector, which should be the foundation for a complete work assessment of all the state’s job positions (Rigsarkivet/ Finansmin., Lønnings- og Pensionsdept., Tjenestemandskomm. 22.11.1965: Arbejdsgruppe af 25.05.1966 (1966–1969) kasse 10, Skrivelse 17/10/66 om ‘lønfastsættelse og tjenestemandslønningernes regulering’). However, the commission and its’ subcommittees had to admit that it was easier said than done. Firstly, because the data collection turned out to be more troublesome than anticipated. Secondly, the commission could not decide which criteria they should use when classifying the different professional groups and exactly how these should be weighted in relation to each other. In a letter forwarded to all the ministries, the commission mentions workload, education and responsibility as criteria, which could be used for work assessment (Rigsarkivet: Finansmin., Lønnings- og Pensionsdept., Tjenestemandskomm. 22.11.1965: Opsplitning og klassificering (1965–1969), kasse 14, Brev 25.11.1966 fra økonomiministeriet til samtlige ministerier og styrelser), but the commission never succeeded in developing a system for work assessment of the various job titles (Rigsarkivet: Finansmin., Lønnings- og Pensionsdept., Tjenestemandskomm. 22.11.1965, Udvalgsmateriale (1965–1969) kasse 3; Referat af kommissionens 12. plenarmøde, torsdag den 15. august 1968; Plenum).

Furthermore, the commission was bound by the financial consideration that they had to keep the spending of public wages at a status quo, which put a limit on the number of professional groups the commission could proposed placed in a higher wage bracket: Especially since the commission also feared that a change in one group’s position would lead to demands from other groups. In the end, the commission chose mainly to continue the existing hierarchy between the professional groups, which the Commission itself dated back to the first Civil Servant Act of 1919 (Betænkning afgivet af Tjenestemandskommissionen af 1965: Del 1–3, 1969, part 3, pp. 154). When submitting the final draft of the new reform, the Civil Servant Commission openly acknowledged that it had not met its’ own expectations of creating an objective wage- and classification system. However, the commission found the need for a modernisation of the public sector’s employment system was urgent and that a number of unjustified classifications, therefore, had to be temporarily accepted (Rigsarkivet: Finansmin., Lønnings- og Pensionsdept., Tjenestemandskomm. 22.11.1965: Udvalgsmateriale (1965–1969) Notater 1968–1969, kasse 2, Notat 14.5.1969 til lønnings- og pensionsministeren om de fra ministerier m.v. modtagne ønsker om ændringsforslag til klassificeringsbestemmelserne). The need for, a modernisation was also the weighty argument, when the Danish Parliament adopted the Civil Servant Reform on June 18th 1969. However, several politicians openly stated that they did not have a full overview of the reform or the principles behind the wage classifications. Several politicians thus also highlighted professional groups whose classification they did not find reasonable, but without proposing concrete amendments (‘Folketingstidende 1968–69 III,’ e.g. pp. 6303, pp. 7817–7818, pp. 7839).

## 2.3. *The civil servant reform and the municipal level*

As mentioned in the previous section, one of the goals of the Public Servant Reform of 1969 was to secure a stronger central control with the public spending of wages. Even though the wage- and classification system at first glance only applied to civil servants with state employment, it was explicitly stated in the reform that the rest of the public sector should strongly strive to synchronise their wages with the new system to archive governmental control over public spending (Betænkning afgivet af Tjenestemandskommissionen af 1965: Del 1-3, 1969, part 3, pp. VII–VIII & p. X).

Therefore, the Civil Servant Reform of 1969, including the wage and classification system, was largely transferred to municipal level in the early 1970s. It was done by setting it as a principle for negotiations on wage and working conditions in the public sector that the state negotiated before the municipal level and that the public servants' wage level was negotiated before that of the employees under a collective bargaining agreement. Thus, the state employed public servants' wage became the framework for all public employees, and the municipal civil servants as well as the employees under a collective bargaining agreement received close to identical salaries with equivalent or close to equivalent state-employed civil servants. This *modus operandi* ensured the state a relatively high degree of control over the general wage level in the public sector and secured a parallel wage development across the whole sector (Due & Madsen, 2015).

### 3. Wage determination in the public sector – in theory and practise

Today the Danish public sector has almost no employees employed as public servants left and therefore almost all public employees' wage and other working conditions are decided through collective bargaining, which formally is politically independent. However, where wages and working conditions can be described as market-driven in the private sector, they are ultimately still politically driven in the public sector, meaning that there are other mechanisms in play when it comes to wage determination (Due & Madsen, 2015).

In that way, there are several shortcomings of traditional economic wage theory in explaining public sector wage determination. Since the output of the public sector does not pass through a marketplace where its relative worth can be assessed by customers, there is an absence of a traditional supply-and-demand wage equilibrium, where workers are (at least theoretically) paid according to the value of their marginal product. In Denmark, where the public sector is quite extensive, there are a number of professions where there are either no private market or the rates in the private market that does exist are pegged to the public sector rather than the reverse, due to the dominant demand position of the public sector. In that way, the public sector has a monopsony position for these occupations, where employees do not have a real ability to compete.<sup>2</sup> Moreover, there is lack of a conventional demand curve for labour since public employers' demand curves are derived indirectly through voter expressed demands for government services and directly through political bargaining between governments and employee groups or unions (Fogel & Lewin, 1974). Governments need to work with a wage principle, where wages are comparable to those received by private employee to be able to attract workers of a certain quality, but public wages affect the respective government budget and, therefore, the citizens' tax burden, in that respect the government has a responsibility and an incentive not to pay to high wages. And the larger the group whose wages will be affected by a legislative decision, the larger the effect on the government budget. On the other hand, elected decision makers might be more responsive to demands from larger professional groups, who are also going to vote for them at the next election.

When the Public Servant Reform was passed in 1969, there were no fixed policy on what the relationship between the wage development in the public and private sector should be. That changed in 1973 when a long-lasting economic crisis began and since then it has been a general consensus in Danish politics, that the public sector must never have a higher overall wage development than the private sector (Jørgensen, 2010, pp. 64–67). Since 1975, different tripartite agreements (the latest from 1987) have also protected the overall wage development in the public sector from falling to far behind the private sectors. Thus the overall wage development in the Danish public sector is regulated to follow that of the private sector and the overall wage sum available for the collective bargaining in the public sector is hereby pretty much fixed before the bargaining begins (Jørgensen, 2010). As we described in section 2.3 a *modus operandi* that ensured the state a

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<sup>2</sup>This is the case for almost all our selected professional groups (See Table 2, where share of private employees within each selected profession is shown).

relatively high degree of control over the general wage level in the public sector and secured a parallel wage development across the whole sector was established in 1969 and is still in place today. These structures and regulations means that it is hard for one professional group in the public sector to get a better wage develop than the rest. As the professional groups watch each other to secure that one group does not take a bigger part of the total wage sum (Scheuer, 2000).

Since the early 1990s, salary allocation in the public sector has developed so that a part of the wage allocations shall be settled outside of the central collective bargaining that is in local or individual wage negotiations. In 2020, approximately 10% of the salary allocation is now decided outside of collective bargaining. This decentral part of the wage allocation is however not allocated completely independently from the central bargaining agreements but tend to roughly follow the same distribution pattern between occupations as agreed upon in the central collective bargaining (Mailand, 2020). To summarise the Danish collective bargaining system in the public sector has built-in mechanisms, which indirectly work to conserve the existing wage hierarchy.

#### 4. Data

In this section, we present the selection of professions together with the data and method used for the analysis.

**Table 2.** Overview of size, gender distribution for the professional groups in 1969 and 2019 ad share of private employees in 2019.

Profession (Danish name in brackets)	Number of employees		Female-dominated, male-dominated or mixed profession		Pct. Employed in private sector
	1969 (1)	2019 (2)	1969	2019	
	Librarians (Bibliotekarere)	1322	2482	F	F
School Teachers (Folkeskolelærere)	32,373	59,450	MIX	F	20%
Prison guards (Fængselsvæsnets opsynspersonale)	1820	2563	M	M	0%
High School Teachers (Gymnasielærere)	3300	14,206	M	MIX	4%
Midwives (Jordemødre)	578	1689	F	F	1%
Train Drivers (Lokomotivførere)	1778	2200	M	M	100%
Doctors (Læger)	8.053 (3)	18,053	M	MIX	2%
Nurses' Aides (Plejere/sygehjælpere 1969, Social- og sundhedsassistenter/hjælper 2019)	11.469 (4)	92,202	F	F	4%
Police (Politi)	7720	9359	M	M	0%
Postal workers (Postbude)	7821	6377	M	M	100%
Pedagogues (Pædagoger) (5)	6000	54,874	F	F	8%
Social Workers (Socialrådgivere)	635	13,892	MIX	F	5%
Nurses (Sygeplejersker)	21.538 (6)	52,167	F	F	3%

Source: Betænkning afgivet af Tjenestemandskommissionen af 1965: Del 1-3, 1969: part 3, LONS20 from Statistics Denmark and supplementing material.

Notes: (1) Unless otherwise stated all numbers about the professional groups in 1969 comes from Danmarks Statistik (1970): Statistisk årbog 1970 [Statistical Yearbook 1970], Danmarks Statistik. It should be noted, that the figures we find in the 1970 statistical yearbook do not fully coincide with the staffing norms in the Civil Servant Reform of the 1969 for the professional groups that are otherwise should be fully covered by the reform. Nonetheless, we assume that the distribution on the wage brackets is sufficiently accurate for our analysis. (2) All numbers concerning 2019 are from Statistics of earnings (LONS20) made by Statistics Denmark. The numbers exclude workers payed by the hour but include private employees and managers. One should also be aware that we only count in the ones from that are included in the Statistics of earning, and even though the public sector is considered full deck, the numbers are still associated with some uncertainty. (3) Ugeskrift for Læger, 1969, nr. 34, s. 1443 (memberships of the union). (4) According to the Civil Servant Commission's own archives, the number is from 1966 and covers civil servants, aspirants and salaried employees. (5) The Danish job titel 'pædagog' is hard to translate, as the profession do not exist in the same way in an Anglo-Saxon context. We have chosen to use pedagogue, as it is the translation used by the profession's trade union. A pedagogue is an educated professional working with care, targeted teaching or therapeutic and educational activities in a specialised field. Most pedagogues work with small children, but some are specialised in working with adults with disabilities or social problems. (6) Statistic from Dansk Sygeplejeråds arkiver, dated 1.7.1969.



#### 4.1. The selected professions

In our article, we want to examine how the wage hierarchy has evolved over the last 50 years. To do that we have selected 13 professional groups, which cover 46% of the public employees in Denmark in 2019 ('LONS20: Løn efter arbejdsfunktion, sektor, aflønningsform, lønmodtagergruppe, lønkomponenter og køn,').

Our first criteria for selecting a profession for analysis has been that it exists in both 1969 and 2019. This means that we have had to deselect seemingly obvious large professions, as their job titles and working functions in the available source material from 1969 have been too vague for us to make a proper comparison with the material from 2019 – This applies among others to the supporting office staff and the engineering group.

In our selection of professional groups, we have included both female-dominated, male-dominated and gender-mixed professions, as well as professions that change gender composition over the 50-year period. We define a profession as female-dominated when women account for 60% or more (in [Table 1](#) they are represented by an F) and a profession to be male-dominated subject when men account for 60% or more (in [Table 1](#) they are represented by an M). And everything between is considered as a mixed profession (in [Table 1](#) they are represented by a MIX).

Moreover, we have groups that in 1969 were public employees, but today are private employees and we have strived to select professional groups with different lengths of education and professions placed both in the low and high end of the salary hierarchy.

We have thus ended up selecting the professional groups shown in [Table 2](#) for analysis:

In 1969, the selected professions consisted of six male-dominated, two mixed and five female-dominated subjects. In 2019, the same professional groups consisted of seven female-dominated, two mixed and four male-dominated. No groups have gone from female to mixed or from mixed to male, which is not surprising as women are overrepresented in the public sector in Denmark.

Except from the train drivers and the postal workers the rest of the professions are to a large degree embedded in the public sector and there are in general a low demand for these professions in the private sector as can be seen from the last column of [Table 2](#). Moreover, the table shows how the public sector has been growing since 1969, where most of the professions have at least doubled in size, and some are even 10 or 20 times larger in 2019 compared with 1969.

Throughout our analysis, we generally focus on employees without management responsibilities, as some of the selected professional groups do not have positions with management responsibilities, and an inclusion therefore could lead to a distortion in our calculation of the salary hierarchy.

#### 4.2. The professions' education level

Many parameters come into play when it comes to determination of wage and there is a lot of disagreement on which parameters should be used and how they should count in relations to each other: supply and demand in general, demand from the private sector, job functions and employment conditions, including physical and mental strain in the job, possible management responsibilities, seniority, recruitment and absenteeism patterns, organisational conditions, collective bargaining structure etc. One relevant parameter that is widely studied within the literature for its significant influence on wages, is education (Psacharopoulos & Patrinos, 2018). Education is furthermore relatively easy to measure and compare between 1969 and 2019 (Cahuc & Zylberberg, 2004 chap. 2; Frank & Bernanke, 2009 chap. 13).

We, therefore, examine whether differences in educational length can explain the wage hierarchy in respectively 1969 and 2019. In both 1969 and 2019, we have only used the education levels that gives access to the professions (incl. mandatory general education such as primary school) and have in no professions included ongoing or extra education that gives access to special positions within

the professions, as we do not have enough data for 1969 to make a more detailed examination. See [Table 3](#) for the individual professions' specific length of education in respectively 1969 and 2019.

Our choice of not including continuing and further education in our calculations has the disadvantage that individual professional groups especially in 1969 may appear to have less education than they really had. This is especially true for the police profession, which in 1969 had no entry level education, but instead an entrance exam and then ongoing peer training and internal exams.

In addition, it is important to be aware that the nurses' aides in both 1969 and 2019 is a mixed group consisting of employees with different educations.

### 4.3. The empirical data from 1969

Our main data source concerning the selected professions in 1969 is the report 'Betænkning nr. 483 1969 – Betænkning afgivet af tjenestemandskommissionen af 1965, part 3', which contains both classifications, staffing norms and size of wage supplements for various job titles. [Table 4](#) shows which salary brackets the selected professional groups are placed in.

Within the individual professional groups, we have chosen not to include certain job titles from 1969, if the job title covers a job function that does not exist today. We have also deselected the job titles that cover people employed in Greenland and the Faroe Islands since sufficient information is not available for all selected groups and since there are often special conditions for these employees, which we cannot take sufficient account for in this study.

In the Civil Servant Reform of 1969s salary and classification system, pension is not included, and each salary step thus show an annual salary without pension. The pensions of the civil servants are dealt with independently in Part 2 of the reform ('Betænkning nr. 483 1969 – Betænkning afgivet af tjenestemandskommissionen af 1965, 2. del'). We have not included pension in our calculation of the 1969-wage, since we lack precise data on how many were employed under the different job titles and since part of the pension are linked to factors other than job function such as the employee's marital status. Moreover, the Civil Servant Reform of the 1969s pension system is designed so that the pension is mainly given in proportion to the salary. We, therefore assess that the wage hierarchies we are working with for 1969 would not have looked significantly different had we included pension in our calculations.

In the Civil Servant Reform of 1969, there is also a table about the allocation of accommodation allowances. Accommodation allowances was a salary supplement whose size depended on the geographical location of the place of employment. We have not included these in our calculations of the salaries for 1969, as we do not have the geographical distribution of our selected professional groups. However, an inclusion of accommodation allowances would hardly have been meaningful

**Table 3.** Years of education in 1969 and 2019.

Profession	Years of Education 1969	Years of Education 2019
Librarians	14	15
School Teachers	13	16
Prison Guards	7.25	15
High School Teachers	15	18
Midwives	10	15.5
Train drivers	10	12.8
Doctors	15	18
Nurses' aides	7.66	11.2
Police	7.46	14.3
Postal workers	7	9
Pedagogues	9	15.5
Social Workers	13	15.5
Nurses	10.4	15.5

Source: Supplementary material.

Note: For Nurses' aides we have included the education for a 'sygehjælper' in 1969 and for a 'social- og sundhedshjælper' in 2019.

**Table 4.** The professions' lowest and highest salary bracket for employees without management responsibility, and highest salary bracket for managers.

Profession	Lowest salary bracket for employees without management responsibility	Highest salary bracket for employees without management responsibility	Highest salary bracket for managers
Nurses' aides	2	8	21
Postal workers	3	5	
Pedagogues	4	8	
Prison guards	6	9	
Train drivers	7	17	20
Nurses	7	17	34
Police	11	13	39
Librarians	13	31	38
School Teachers	13	23	37
High School Teachers	13	34	37
Social Workers	14	17	36
Midwives	17	17	22
Doctors	18	37	37

Source: Betænkning afgivet af Tjenestemandskommissionen af 1965: Del 1-3. (1969), part 3.

in relation to the wage hierarchy, as accommodation allowances is not determined by job title and profession, but only by geographical location.

It is worth noting that, when a job title is classified in the Civil Servant Reform of 1969 reference is made only to the salary brackets and not the associated salary steps. Hitherto we have had to assume how the different job titles are placed within a salary bracket. For our average salary calculations, we, therefore, use the middle salary step in each salary bracket. To test the robustness of our results we look at the lowest paid employees within a profession, who will typically be the ones with the lowest seniority, and the highest paid within a profession, who will typically be the ones with the highest seniority. As a measure of the lowest wage in 1969, we use the lowest possible salary step for a profession; correspondingly, we use the highest possible salary step as the measure for the highest wage level. In Table 5, you can see how large a share of the profession that is placed in respectively the lowest and highest salary brackets based on the standardisation information we have from respectively the civil service reform report as well as from supplementary material for the following group's doctors, midwives, nurses aides and nurses.

Several of our selected professional groups had members with employment forms other than that of civil servant. For these groups it is therefore not possible to determine the distribution of wages based on the staffing norms from 'Betænkning nr. 483 1969 Part 3' alone. To solve this

**Table 5.** Percentage of professional group located in respectively lowest possible salary bracket and highest possible salary bracket (employees with management responsibility not included).

Profession	Lowest possible salary bracket	Highest possible salary bracket
Librarians	48%	2%
School Teachers	33%	33%
Prison Guards	36%	19%
High School Teachers	2%	19%
Midwives (1)	100%	100%
Train Drivers	9%	36%
Doctors	35%	1%
Nurses' Aides	47%	4%
Police	72%	28%
Postal workers	41%	59%
Pedagogues	22%	1%
Social Workers	59%	41%
Nurses (2)	79%	0%

Source: Betænkning afgivet af Tjenestemandskommissionen af 1965: Del 1-3. (1969), part 3 and supplementing material.

Notes: (1) Midwives without management responsibility are all classified in the same salary bracket, which means that they make up 100% on both the lowest and highest salary bracket. (2) Only one nurse is placed in the highest salary bracket and hitherto the percentage end up being 0%.

problem, we have included supplementary material, and adjusted the numbers of the following individual groups accordingly:<sup>3</sup> Librarians, High School Teachers, Midwives, Doctors, Social workers, Nurses' aides and Nurses. For these groups, we have sought to find data calculated and arranged in the same way as in the reform to ensure that the salaries of all professional groups are calculated equally.

#### 4.4. The empirical data from 2019

To calculate the wage hierarchy for 2019, we have used the standardised hourly earnings<sup>4</sup> from Statistics Denmark's annual statistic of earning ('LONS20: Løn efter arbejdsfunktion, sektor, aflønningsform, lønmodtagergruppe, lønkomponenter og køn,') where our professional groups are selected through the 4-digit DISCO code that makes up their occupation classification.

The standardised hourly earnings indicate approximately the wage that has been agreed upon, or the wage that the employee receives for each normal hour the person works and does not depend on the number of hours of absence and overtime hours. It enables comparisons of wages between occupational groups that have different wage and employment conditions, work in different sectors and have different workloads (Boye, Østberg, & Bielefeldt, 2011).

Standardised hourly earnings differ, in addition to being hourly earnings rather than annual salary, from the concept of salary from the Civil Servant Reform of 1969 by also including pension contributions, irregular payments, nuisance bonuses and fringe benefit. However, as the pension in the Civil Servant Reform of 1969 is largely proportional to the salary and nuisance bonuses did not exist in 1969, we believe that standardised hourly earnings are most comparable to the salary concept from the reform. We have used Basic Earnings to test the robustness of our results.

We have only included the fixed salary-earners in 2019, as only the fixed salary-earners are dealt with in the Civil Servant Reform of and we only look at the salary level for public employees in our selected groups, apart from the train drivers and the postal workers, which have both been privatised since 1969.

A challenge in using the data from Statistics Denmark is that we only have access to the 4-digit disco codes. Thus, the group of postal workers (Disco Code 4412 Postman and officer work as well as mail sorting work) are wider than could be desired, as it includes officer work, internal mail sorting and distribution. However, as this group is only a small part of the total group, we have assessed that this is of minor importance.<sup>5</sup>

To test the robustness of our result we again look into the employees with the lowest and highest wages with each profession. As a measure of the lowest wage in 2019, we use the lower quartile in standardised hourly earnings for a professional group, correspondingly we use the upper quartile as measurement for the highest wage. It is worth noting that the measure for the highest and lowest wages in the statements for 1969 and 2019 differ from each other, as we work with quantiles in 2019 and we in the calculations for 1969 operate with the highest and lowest possible salary step (incl. supplements). This could mean that the overview over the highest and lowest wage placement in 1969 will be more extreme than the overview for 2019, but as this is only used for robustness it is of minor importance. Moreover, one should be aware that the data from 1969 is based on

<sup>3</sup>For more details please contact the authors.

<sup>4</sup>Standardized hourly earnings are calculated as the standard earnings divided by the number of standard hours. The standard earnings are the total salary minus payments for overtime and absence, and including 'Basic earnings' (basic, qualification and functional earnings, etc. as well as holiday and public holiday allowances, special holiday allowance, gross allowances and optional scheme), pension contributions, irregular payments, nuisance bonuses and fringe benefit. Standard hours are the hours an employee has worked at the normal rate.

<sup>5</sup>According to data from Albæk et al. (2019) that states that 6% of the group (disco code 4412) is under the category officer work, internal mail sorting and distribution.

official documents whereas data from 2019 are based on observed earnings. If for example, the seniority differs significantly between professions in 2019, this could have an influence on the wage hierarchy. Unfortunately, we do not have access to this kind of data from 2019.

#### 4.5. Method

To conduct a wage analyse it is necessary to determine the principles on which wages are calculated to be able to compare wages between occupations and/or over time. Since we work with different units in 1969 and 2019 (annual salary and hourly salary, respectively), and we are interested in the hierarchy of our selected professional groups, we normalise the salary in the two periods, so that they are between 0 and 100 (also referred to as feature scaling).

$$z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$$

$z_i$  = Normalised earning-measure for group  $i$  in respectively 1969 and 2019 for a given earning measure (e.g. Average standardised hourly earnings);  $x_i$  = Observed earning-measure for group  $i$  in respectively 1969 and 2019 for a given earning measure;  $x$  = earning-measure for each group in respectively 1969 and 2019 for a given earning measure.

Thus, all professions are placed between the group at the top of the hierarchy (which scores 100) and the group at the bottom of the hierarchy (which scores 0) within the various measures of earnings used.

As the professional groups' placement is based on the distance to the lowest paid and highest paid professions, the placements will be sensitive to which profession is at the top and at the bottom. This should be of minor importance as we have occupations in both the very top and bottom end of the public wage hierarchy, but to test the sensitivity of our result, we have tried to exclude each profession one at a time from the hierarchy as a robustness check.

As mentioned earlier we do a series of additional robustness calculations to test the validity of our results. Besides analyzing the highest and lowest paid within each profession and including managers in the calculations, we perform additional sensitivity analysis. As for our calculations of the hierarchy from 1969, we are bound by the information and data that is available in *Betænkning afgivet af Tjenestemandskom-missionen af 1965*. As a robustness check, we have verified the calculations both with and without job titles, if there is doubt whether they should be included in our analysis. This applies for example to the small children teachers (*småbørnslærere*) – a job title under teachers, which does not exist in the Danish primary school today.

For 2019, there are significantly more wage data available, and we have therefore calculated wage hierarchies based on several different types of salary measures to see if our results are sensitive to the choices of calculation methods. Our calculations from 2019 are based, as mentioned, on the information from Statistics Denmark. In addition to the standardised hourly earnings, we have also calculated the hierarchy using basic earnings and earnings per hours worked<sup>6</sup> to see if our results remain the same. Furthermore, we have checked whether our results seem robust by: Including paid by hour employees in our calculations; Including employees from the private sector.

Using the data from Statistics Denmark' salary overview from 2018; Using Standardised hourly earnings from 2017 calculated by VIVE using 6-digit DISCO-code.

<sup>6</sup>This measure excludes hours of absence due to holiday, illness, children's illness, maternity leave, etc. and thereby measures the salary expense the employer has on average per. hour, by having an employee employed. The concept is thus not suitable for showing what earnings a person achieves as a result of his employment as an employee, as, for example, a high degree of paid absence will result in a higher profit per employee performed hour.

## 5. Results

In this section, we first examine how the wage hierarchy has developed from 1969 to 2019, by looking at scatterplots and correlations between the positions of the professions in the wage hierarchy in 1969 vs. 2019. Secondly, we look at possible explanations for this hierarchical structure. Specifically, we here look at how well education explains the hierarchy, and if differences in the hierarchy can be explained by absence patterns and family-friendly arrangements.

Because the hypothesis is that the gender composition of professions has had an effect on the determination of the public wage hierarchy in 1969, which is still reflected in the wage hierarchy in 2019, we focus primarily on the gender distribution among the professional groups in 1969. If the professional group in 1969 consisted of more than 60% women, it is represented by a red colour in the graphs. If there are more than 60% men, it is represented by a blue colour. The professional groups that had over 40% but less than 60% women, we perceive as mixed, which is represented by a grey colour.

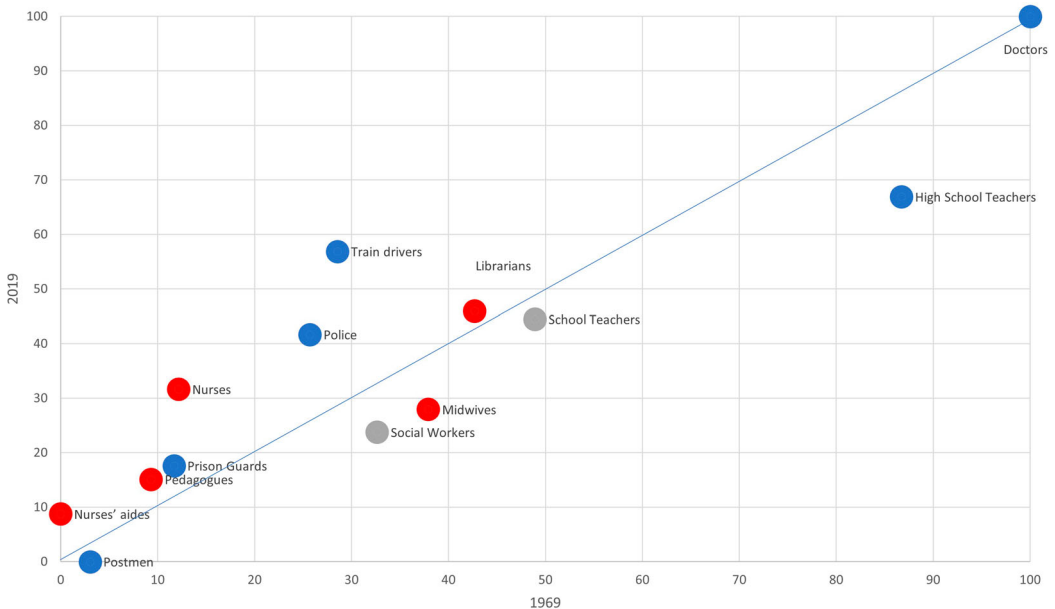
### 5.1. The structure of the wage hierarchy

Figure 1 presents the wage hierarchy in respectively 1969 (the  $x$ -axis) and 2019 (the  $y$ -axis).

If the hierarchy had been completely static all profession would have been placed on the diagonal line. We see that this is not the case. All profession below the diagonal line has had a relative fall in the wage hierarchy from 1969 to 2019, and all professions above the line has had a relative rise.

In Figure 1, we observe that the greatest movements have happened in the middle of the hierarchy. Here we observe that Nurses, Police and Train drivers all overtake midwives and social workers. The train drivers also overtake librarians and school teachers.<sup>7</sup> The correlation coefficient for the professions' placement in 1969 and 2019 is 0.90, corresponding to a close coherence.<sup>8</sup>

The results are robust with small deviations as shown in Table 7. All but two of the robustness measures are above 0.9. The correlation falls to 0.87 if we include managers in both years and falls



**Figure 1.** Relative wage hierarchy for the professional groups measured on average wages in 1969 and 2019.

Note: Own calculations of normalised wages. The colour represents the gender composition of the profession in 1969.

even further to 0.67 if we look at the lowest paid within each profession, indicating that these are the most dynamic employees in the wage hierarchy (Table 6).

We here observe that, when including managers, police converge more towards nurses in 2019. Nurses' aides converge towards postal workers. But the drop in the coefficient comes from the fact that when including the managers, there becomes a larger distance between doctors and the rest of the professions.<sup>9</sup>

The smaller correlation for the lowest paid works within each profession is due to large shifts for three occupations, namely train drivers, midwives and social workers.<sup>10</sup> The train drivers rise in the hierarchy, from a normalised wage of 30 to a normalised wage on 86 – and again overtake librarians, school teachers, midwives, social workers and this time also the police. The midwives (a drop from 93 in normalised wage to 37) and social workers (a drop from 72 in normalised wage to 37), who were both placed relatively high in the hierarchy in 1969 when it came to lowest paid positions, both experience a drop and are placed under the nurses in 2019.

We see no notable changes in the main part of the other robustness measures. The primary finding here is that if we use basic earnings instead of standardised hourly earnings social workers converge with the nurses, and thereby do not experience the same drop as for the rest of the measures. Furthermore, pedagogues converge with the midwives. If we look into the components of the standardised hourly earnings to find an explanation, we conclude that these two groups seem to be relatively disadvantaged when it comes to pension contributions and irregular payments, making the hierarchy looking better for these two groups, when we only look at basic earnings.<sup>11</sup>

Based on these scatterplots there are no clear trend showing that traditional female or male occupations have moved up or down the hierarchy. There is a small indication that professions that change gender composition towards more women experience a downward move, as three out of four (Social workers, School teachers and High school teachers) ends up below the diagonal line. If we look at the size of the professions, we neither find a clear trend on if it is larger or smaller occupations who have been most dynamic.<sup>12</sup>

## 5.2. Can education explain the position in the wage hierarchy

As shown in the former section, we find there is a high correlation between the position in the wage hierarchy in 1969 and 2019. As the placement of the professional groups were not transparent in 1969 (as discussed in section 2.2), assessing whether a professional group's wage level is reasonable in relation to the other professional groups' wage levels is challenging.

In the following section, we have looked at how our selected professional groups should position themselves, if education level alone should be decisive for the salary level. We recognise that education alone hardly can or should be the only factor that determines a profession's salary level, nevertheless, we find that time (and higher education) has not worked in favour of the female-dominated professions.

Figures 2 and 3 below show the positions of the various professional groups in the wage hierarchy plotted against the requirement for education for the profession in question. Since education is an investment in future earnings made by the individual and may in addition also require specific

<sup>7</sup>Both postal worker and train drivers are now private employees. Interestingly, the shift from public to private employment for Train drivers does not seem to have affected the wage level notably. Train drivers are the profession in our study, which changes their position in the hierarchy the most, but according to Statistics Denmark's wage tables, the shift happens before the privatisation. Postmen has experiences a minor drop, but we don't know if this is before or after privatization.

<sup>8</sup>We have checked the sensitivity of this result by looking at the correlation if excluding each of the groups. It remains between 0.89 and 0.94 for all exclusions except if when it comes to excluding doctors (the top of the hierarchy) then it drops to 0.82. See Table A1 in Appendix 1.

<sup>9</sup>Contact authors to get additional graphs.

<sup>10</sup>See figure A1 in the Appendix 1

<sup>11</sup>Contact authors to get additional graphs.

<sup>12</sup>See Table A2 in Appendix 1.

**Table 7.** Coefficient of determination for the different robustness measures.

Wage calculation metode	Year	Coefficient of determination
CSR 1969 (incl. managers)	1969	0.75
CSR 1969 highest salary step	1969	0.74
CSR 1969 baseline	1969	0.73
CSR 1969 (incl. småbørnslærinder)	1969	0.73
CSR 1969 (incl. plejemoderer)	1969	0.73
Earnings per hours worked 2019	2019	0.53
CSR 1969 lowest salary step	1969	0.52
Standardised basic earnings 2019	2019	0.47
SHE 2019 (incl. Hourly paid)	2019	0.46
SHE 2019 lower quantile	2019	0.45
SHE 2019 (incl. Private employees)	2019	0.45
SHE 2019 Baseline	2019	0.44
SHE 2017 calculated by VIVE	2017	0.43
SHE 2018	2018	0.42
SHE 2019 Higher quantile	2019	0.41
SHE 2019 (incl. managers)	2019	0.41

Note: Own calculations.

competencies that are not widely available, more education is associated with a compensation in the form of higher wages, which is shown by the positive trendline.

We note that the mixed- and female-dominated professions primarily fall below the line in 1969 when looking at the average earnings, which we find also applies to lowest paid and highest paid employees together with the rest of our robustness measures.<sup>13</sup>

The only traditional female-dominated profession that is above the line in 1969 is midwives. This trend is unchanged in 2019, where it is now the librarians who are slightly above the trend line, while the remaining traditional female-dominated professions are below the line. It also seems that the mixed professions place themselves below the trend line in both 1969 and 2019. It is worth noting that these mixed professions typically have gained a predominance of women in 2019. In contrast to the female-dominated and the mixed professions, only a single male-dominated profession, prison guards, falls below the line in 2019. The remaining traditional male-dominated professions thus receive a higher salary than explained by the trendline. This trend is unchanged across our different robustness measures.

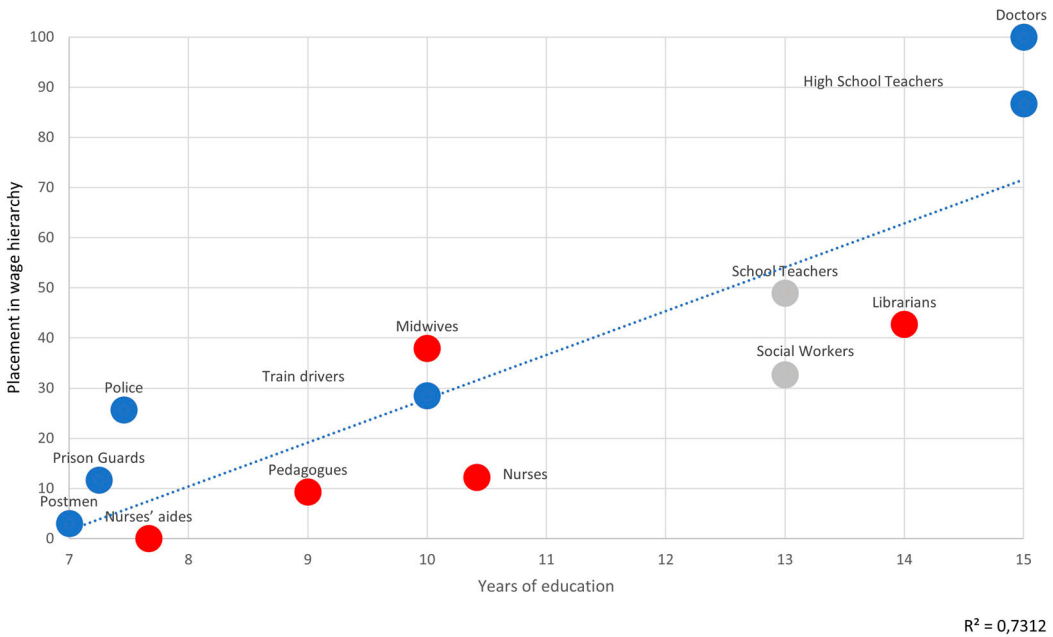
Both the male-dominated and the female-dominated professions have experienced increased educational requirements from 1969 to 2019, but the relative increases in education (especially for the female-dominated professions) has done little for the position in the wage hierarchy. The coefficient of determination ( $R^2$ ) is 0.73 in 1969 against 0.46 in 2019, meaning that there was a stronger correlation between wage position and education in 1969 than in 2019. Education can thus to a greater extent explain the salary in 1969 than in 2019. And we can conclude that relative

**Table 6.** Correlations for the different robustness measures.

Correlation	
CSR 1969 vs. Standardised basic earnings 2019	0.920
CSR 1969 vs. Earnings per hours worked 2019	0.916
CSR 1969 vs. SHE 2018	0.911
CSR 1969 vs. SHE 2017 calculated by VIVE	0.910
CSR 1969 vs. SHE 2019 (incl. Hourly paid)	0.905
CSR 1969 (incl. småbørnslærinder) vs. SHE 2019	0.905
CSR 1969 (incl. plejemoder) vs. SHE 2019	0.904
Baseline (Civil servant reform (CSR) 1969 vs. Standardised hourly earnings (SHE) 2019)	0.904
CSR 1969 vs. SHE 2019 (incl. Private employees)	0.904
CSR 1969 highest salary step vs. SHE 2019 Higher quantile	0.902
CSR 1969 (incl. managers) vs. SHE 2019 (incl. managers)	0.871
CSR 1969 lowest salary step vs. SHE 2019 lower quantile	0.665

Note: Own calculations.

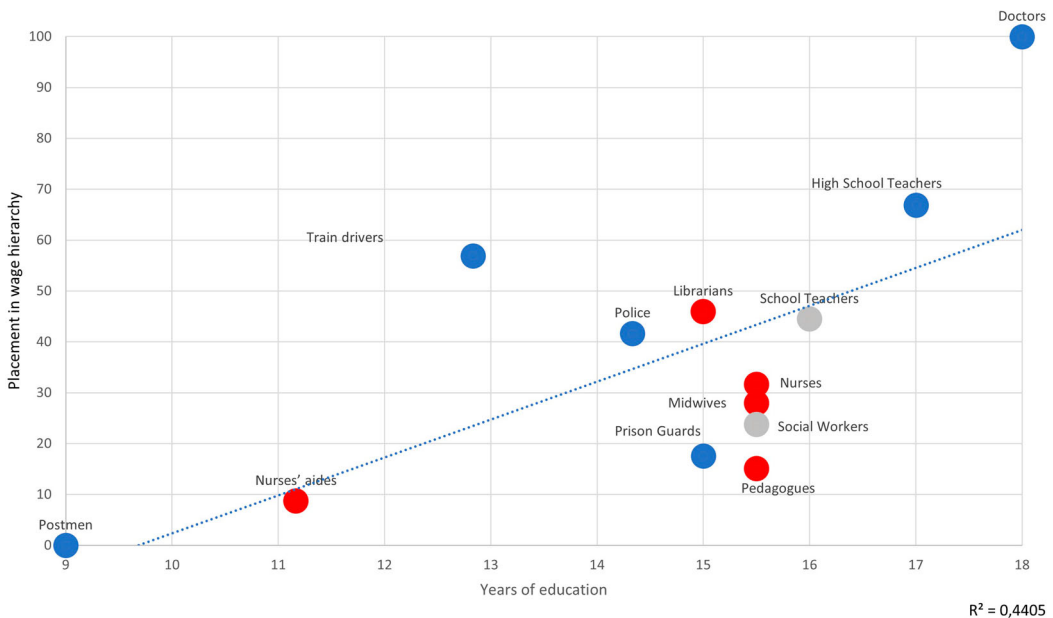




**Figure 2.** Observed relation between relative wage for the professional groups and education in 1969. Note: Own calculations of normalised wages. The colour represents the gender composition of the profession in 1969.

earnings have not been fully responsive to educational changes, especially for the traditional female-dominated professions. This is supported by our various robustness measures as shown in Table 7.

Our results regarding the link between education and earnings support VIVE’s conclusion that female-dominated professions in the public sector have a low wage level compared to other public



**Figure 3.** Observed relation between relative wage for the professional groups and education in 2019. Note: Own calculations of normalised wages. The colour represents the gender composition of the profession in 1969.

professions with a similar level of education (Albæk, Casier, & Larsen, 2019). It also supports Statistics Denmark's point that men typically gain more economically by taking an education than women (Lønforskellen mellem mænd og kvinder skabes blandt de højst lønnede, 2020). What our study adds to VIVE's and Statistics Denmark's results is that the problem of women's lower return of education dates back to at least 1969 and that the problem has actually gotten worse over time.

### 5.3. The cost of family-friendly benefits

As has been showed above, the professions that were originally female-dominated or become female-dominated tend to retain or worsen their position in the hierarchy compared to their educational requirements.

An explanation for the general decline and stagnation in the position of the female-dominated professions could be the price of ensuring family-friendly benefits. From the late 1980s and early 1990s, it was a major collective bargaining priority for the female-dominated trade unions to ensure their members family-friendly benefits such as the right to care days and pay and pension during maternity leave. The acquisition of these benefits, however, meant that the female-dominated professions had to accept a slower wage growth. During the 2000s, family-friendly benefits have become common in the rest of the Danish public sector as well as in large parts of the private sector but have not meant a slower wage development for the other professions (Sorensen, 2018 chap. 14).

We can control for this effect by looking at the Earnings per hours worked, where number of hours worked is the number of hours actually performed by an employee, including overtime hours worked, but excluded time off in connection with holidays and hours of absence due to sickness of children, maternity etc. Thereby the wage rate is adjusted for absence patterns and parts of the family-friendly benefits. As is shown in Figure 4 (and Table A1), the coefficient of determination does rise compared to our other wage measures from 2017-2019, but the pattern where traditional female-dominated professions are placed under the trendline and male-dominated above does not change notably.

## 6. Conclusion

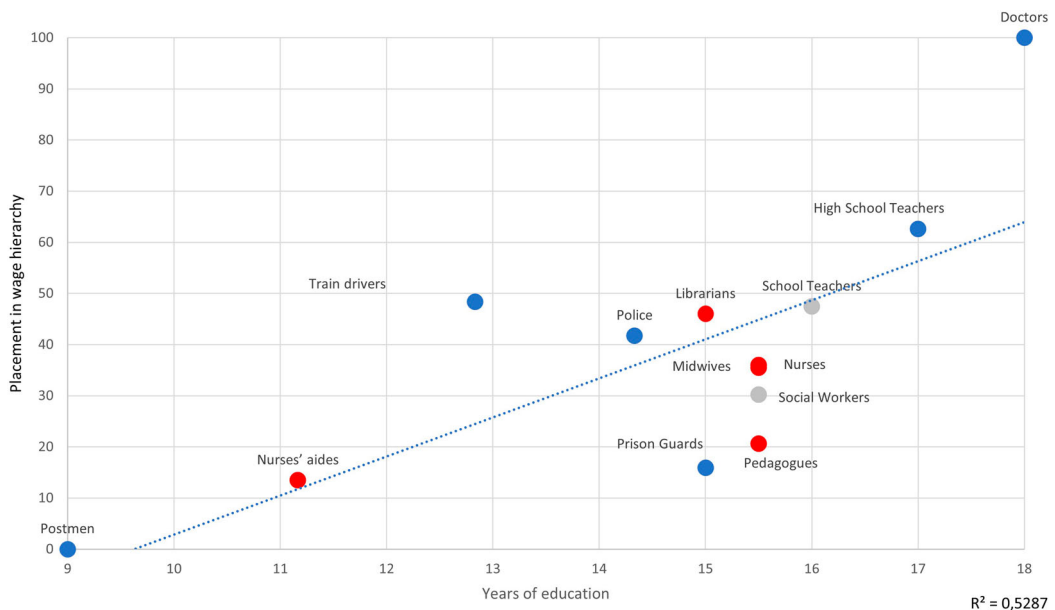
In newer Danish research on the gender wage gap, it has been suggested that the wage hierarchy from the Public Servant Reform of 1969 is mirrored in today's wage hierarchy – and that this has disadvantaged the traditional female-dominated professions. Our goal has been, through graphical analysis and descriptive statistics, to see if we could quantify this hypothesis.

We have conducted a comparison of 13 selected professional groups' relative position in the wage hierarchy in 1969 and 2019, representing almost 50% of the public-sector employees in Denmark today, and found a close coherence between the hierarchy in 1969 and the hierarchy in 2019 with an overall correlation coefficient 0.90.

To investigate whether the wage hierarchy in respectively 1969 and 2019 is unfavourable for the traditional female-dominated professions, we have looked at how well education explains their position, acknowledging that education neither is nor should be the only wage determining factor. From this investigation, we can conclude that the female-dominated professions in 1969 in general were placed lower than what could be expected from their length of education while the male-dominated professions were placed higher. The same trend can be observed in 2019, but here educational actually ends up explaining even less of the positions in the wage hierarchy than was the case in 1969. Thus time (and more education) has not worked in favour of the female-dominated professions.

A possible explanation for the general decline and stagnation in the position of the female-dominated professions could be the price of ensuring family-friendly benefits. We have controlled for this effect by constructing the wage hierarchy using the wage measurement 'earnings per hours

<sup>13</sup>Additional figures and datasets can be obtained by contacting the authors.



**Figure 4.** Observed relation between relative wage for the professional groups and education in 2019 – Earnings per hours worked.

Note: Own calculations of normalised wages. The colour represents the gender composition of the profession in 1969.

worked', where the salary is adjusted by time off in connection with holidays and hours of absence due to sickness of children, maternity etc. When using this wage measure the coefficient of determination does rise, but the pattern where traditional female-dominated professions get a lower return to education does not change notably.

Our article highlights and opens a discussion on how historical (and partly forgotten) reforms can still influence the present. Furthermore, our finding is challenging the Danish self-understanding of a labour market solely controlled through collective bargaining as the wage relations in the public sectors seems rooted in a politically decided reform. However, we would like to emphasise that our study is not comprehensive for the entire public sector. We, therefore, call for more research in the area. Moreover, the archives of the Civil Servant Commission describe how the Danish Civil Servant Reform of 1969 was inspired by the Swedish system for public employees, and how a similar wage system could also be found in Norway (Rigsarkivet/Finansmin., Lønnings- og Pensionsdept., Tjenestemandskomm. 22.11.1965: Arbejdsgruppe af 25.05.1966 (1966–1969), kasse 10, notat vedrørende arbejdsgruppens 1. møde onsdag den 1. juni 1966). It is therefore possible that the trends that we describe for the Danish wage hierarchy can also be found in the rest of Scandinavia, as we know they also has a persistent pay gap between traditional female- and male-dominated professions (Grönlund, Halldén, & Magnusson, 2017).

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## Archives

Complete archives by Finansmin., Lønnings- og Pensionsdept.  
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## Appendix

**Table A1.** Correlation table when removing professions one at a time.

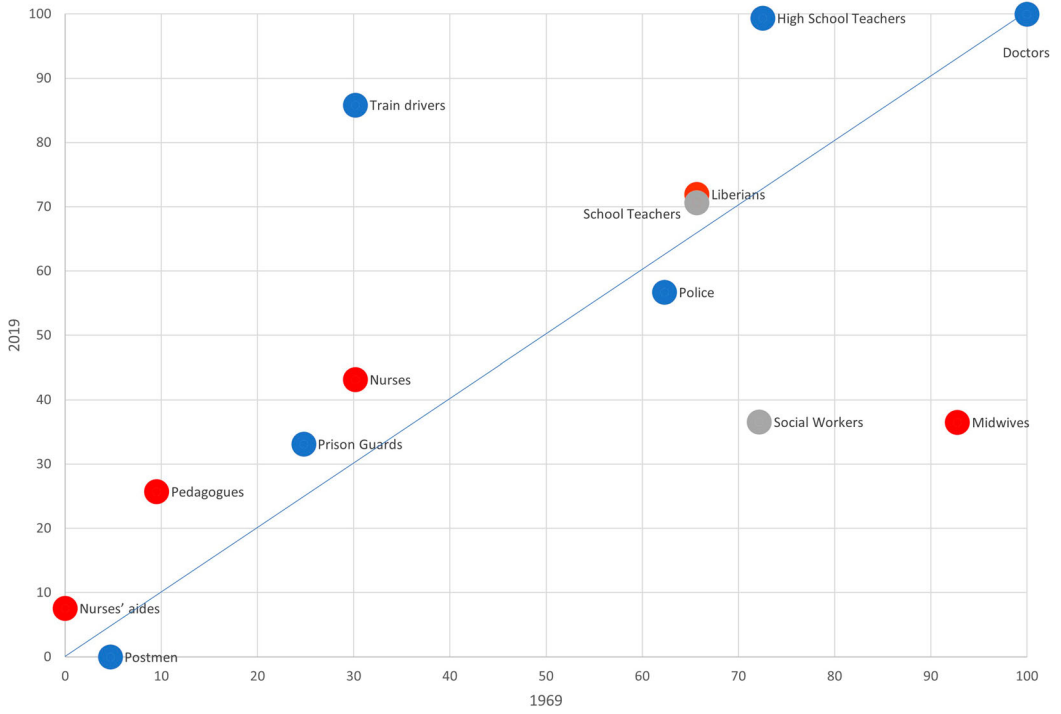
Correlations excluding	
Librarians	0.903
School Teachers	0.905
Prison Guards	0.899
High School Teachers	0.907
Midwives	0.913
Train drivers	0.940
Doctors	0.827
Police	0.912
Postmen	0.897
Pedagogues	0.898
Social Workers	0.912
Nurses' aides	0.893
Nurses	0.914

Note: Own calculations.

**Table A2.** Correlation table – hierarchy and size of profession.

Correlation between position in hierarchy and size of profession	
Position in 1969 and size 1969	–0.04
Position in 2019 and size 2019	–0.27
Change in position and change in size between 1969 and 2019	0.14

Note: Own calculations.



**Figure A1.** Relative wage hierarchy for the professional groups measured on lowest wage within the professions in 1969 and 2019.

Note: Own calculations of normalised wages. The colour represents the gender composition of the profession in 1969.